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AUTOSTRADA (A14): BOLOGNA - BARI -TARANTO

TRATTO: BOLOGNA BORGO PANIGALE - BOLOGNA SAN LAZZARO

POTENZIAMENTO IN SEDE DEL SISTEMA

AUTOSTRADALE E TANGENZIALE DI BOLOGNA

"PASSANTE DI BOLOGNA"

PROGETTO ESECUTIVO

AUTOSTRADA A14 / TANGENZIALE

OPERE COMPLEMENTARI
PAVIMENTAZIONI

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1 PREMESSA

Nel presente documento vengono illustrati i risultati del dimensionamento delle **nuove pavimentazioni** e degli **interventi di risanamento**, di **riqualifica** e di **ripristino** delle pavimentazioni esistenti previste nell'ambito del progetto. Vengono altresì presentate le lavorazioni inerenti le pavimentazioni.

Per quanto attiene agli **interventi di risanamento** dell'autostrada A14, del Raccordo di Casalecchio e della tangenziale, questi sono stati previsti laddove i risultati delle verifiche prestazionali delle pavimentazioni (definite a seguito di una campagna di carotaggi e di indagini mediante prove ad alto rendimento GPR e FWD) sono risultati inadeguati secondo quanto esposto nella relazione ATR0020 "Analisi delle caratteristiche strutturali delle pavimentazioni esistenti" allegata al presente progetto.

L'impostazione della presente relazione prevede le seguenti due parti:

1. Dimensionamento delle pavimentazioni: presentazione della metodologia adottata, del criterio di verifica e dei pacchetti risultanti.
2. Lavorazioni: presentazione delle lavorazioni inerenti le pavimentazioni presentate graficamente negli elaborati ATR0022 – ATR0040.

PARTE 1: DIMENSIONAMENTO PAVIMENTAZIONI

2 METODOLOGIA E CRITERI DI VERIFICA

2.1 METODOLOGIA

La metodologia utilizzata nel dimensionamento delle pavimentazioni è quella proposta dall'Asphalt Institute [1]. Questa tratta separatamente la fessurazione a fatica dei conglomerati, messa in relazione con la massima deformazione di trazione degli strati legati a bitume, e la formazione di ormaie, messa in relazione con la massima deformazione di compressione che si realizza sulla sommità del sottofondo. Il raggiungimento delle condizioni ultime (raggiungimento del Danno unitario) corrisponde, secondo quanto indicato negli studi dell'Asphalt Institute, ad una fessurazione sul 20% della superficie della pavimentazione ed alla formazione di ormaie aventi una profondità di 1.27 cm.

Per tener conto di diverse proprietà volumetriche della miscela rispetto a quelle inizialmente considerate dal modello (7% di vuoti e 11% di bitume effettivo), la curva di fatica utilizzata è quella dell'Asphalt Institute corretta come di seguito riportato [2].

$$N_f = A * 0{,}00432 * C * {\varepsilon_t}^{-3{,}291} * |E^*|^{-0{,}854}$$

Dove:

- A, Field Shift Factor (FSF) è pari a 18,4 è stato calibrato sul 20% di fessure per fatica nell'area di impronta;
- $C = 10^M$
- $M = 4{,}84 * \left(\frac{V_{b\,effettivo}}{V_a + V_{b\,effettivo}} - 0{,}69\right)$
- E^* è il modulo dinamico in psi
- $V_{b\,effettivo}$ è il volume % effettivo di bitume;
- V_a è il volume dei vuoti %.

Le caratteristiche volumetriche utilizzate per la correzione della curva di fatica, in accordo con le Norme Tecniche, sono le stesse utilizzate in fase di definizione dei moduli dei materiali componenti la pavimentazione (vedi capitolo 3.2).

La verifica razionale delle pavimentazioni è effettuata utilizzando una schematizzazione di multi-strato elastico ed impiegando il codice di calcolo KENLAYER [3]. Il software è stato utilizzato per la determinazione dello stato tenso-deformativo.

Si è ipotizzato il raggiungimento di condizioni di perfetta aderenza tra gli strati legati a bitume e aderenza nulla tra questi e la fondazione. Condizioni di perfetta aderenza sono ipotizzate anche tra fondazione e terreno di sottofondo.

Il traffico commerciale di progetto transitante è determinato attraverso la conversione in passaggi di assi equivalenti singoli da 80 kN, tramite il coefficiente di carico equivalente (Load Equivalency Factor, LEF), facendo riferimento alla legge della quarta potenza per la quale:

$$LEF_x = \left(\frac{P_x}{P_{ref}}\right)^4$$

dove Px è il carico per asse generico e Pref è il carico per asse di riferimento (80kN).

La configurazione geometrica utilizzata prevede due impronte circolari di raggio 89,2 mm (a cui corrisponde una pressione di gonfiaggio di 800 kPa) distanziate trasversalmente di 0,315 metri.

Si rimanda all'**Allegato B** per ulteriori approfondimenti sulla determinazione del coefficiente di equivalenza.

In funzione di quanto riportato nel Catalogo Italiano delle Pavimentazioni [6], considerato che in alcuni casi lo studio trasportistico evidenzia un mix di traffico commerciale con una componente prevalente di veicoli con più di 2 assi (classi di pedaggio 3-4-5), e quindi difforme da quella di riferimento per la tipologia di infrastruttura in oggetto, si è proceduto alla ridefinizione dello spettro di traffico: il coefficiente di equivalenza tra un generico veicolo commerciale ed un asse da 80 kN è stato quindi ricalcolato pari a 3 o 3.5 (anziché lo standard pari a 2.5) sulla base del nuovo spettro. In alcuni casi invece è stato assunto il coefficiente standard pari a 2.5 perché il mix di traffico commerciale presenta uno spettro in linea con quanto riportato nel Catalogo Italiano delle Pavimentazioni.

Ai fini del calcolo strutturale, il numero di ripetizioni di carico di progetto è espresso in termini di assi equivalenti/mese.

I flussi di traffico sono distribuiti omogeneamente nei 12 periodi mensili e così associati alle corrispondenti caratteristiche tenso-deformative degli strati legati a bitume.

Sulla base di quanto sopra esposto viene calcolato il danno cumulato corrispondente sia alla fessurazione a fatica sia alla formazione di ormaie utilizzando la legge espressa da Miner secondo la seguente relazione:

$$D = \sum_{i=1}^{I} \frac{n_i}{N_i}$$

dove:

- n_i è il numero effettivo di ripetizioni di assi transitati;
- N_i è il numero di ripetizioni di assi che portano a rottura il materiale, per le diverse condizioni di temperatura considerate.

2.2 CRITERIO DI VERIFICA

Il dimensionamento adottato è stato considerato verificato quando la sovrastruttura di progetto è risultata possedere una vita utile superiore a 20 anni. Tale riferimento è stato concordato con la Committente.

3 DATI DI INPUT

Per la valutazione della vita utile della sovrastruttura di progetto, secondo la metodologia presentata al capitolo precedente, si sono resi necessari i seguenti dati di input:

1. Caratteristiche di portanza dei terreni di sottofondo esistenti e di nuova realizzazione;
2. Caratteristiche tenso-deformative e di resistenza dei materiali impiegati per la realizzazione delle nuove sovrastrutture;
3. Temperature caratteristiche dell'aria nella zona in cui è ubicato l'intervento;
4. Flussi di traffico commerciale previsti nell'arco del periodo di progetto nel tratto di intervento.

3.1 PORTANZA TERRENO DI SOTTOFONDO

Le caratteristiche di portanza del terreno di sottofondo delle nuove pavimentazioni sono state desunte dalle prescrizioni contenute nel Capitolato Tecnico d'Appalto [4]. A tale proposito si riporta quanto segue:

"*Salvo diverse e più restrittive prescrizioni motivate in sede di progettazione dalla necessità di garantire la stabilità del rilevato, il modulo di deformazione Md al primo ciclo di carico su piastra (diametro 30 cm) dovrà risultare non inferiore a 60 MPa nell'intervallo compreso tra 1,5÷2,5 daN/cm² sul piano di posa della fondazione della pavimentazione autostradale in rilevato, in trincea e nel riempimento dell'arco rovescio in galleria; …*".

Per determinare il valore di progetto del modulo elastico si è fatto quindi riferimento alla seguente correlazione, proposta da Ferrari/Giannini [5] e riportata anche negli allegati al Catalogo delle Pavimentazioni Stradali [6]:

$$E_{din}(MPa) = 1.9 \div 2.1\, M_d$$

Nei calcoli si è quindi assunto come valore di progetto un valore del modulo dinamico pari a 120 MPa.

Le caratteristiche di portanza del terreno di sottofondo, nei tratti in cui è previsto un risanamento di tipo profondo, sono state desunte dai risultati della campagna di prove ad alto rendimento (carotaggi, prove GPR e prove FWD); in particolare si è assunto come valore di progetto il modulo minimo rilevato nelle tratte che necessitano di tale intervento.

Il corrispondente rapporto di Poisson è stato assunto pari a 0.40.

3.2 CARATTERISTICHE MATERIALI SOVRASTRUTTURA

3.2.1 Misto granulare non legato

Le caratteristiche meccaniche del misto granulare sono state stimate facendo riferimento alla espressione di Heukelom e Klomp che, in virtù del comportamento non lineare dei materiali non legati, fa discendere il valore del ***modulo elastico*** del misto granulare dal suo spessore e dalle caratteristiche del terreno di sottofondo su cui è appoggiato:

$$E_2 = 0.206 \cdot h^{0.45} \cdot E_1$$

dove:

E_2 = modulo elastico del misto granulare

E_1 = modulo elastico del sottofondo

h = spessore in mm dello strato di misto granulare

Per strati di spessore pari a 20 cm, poggianti su un sottofondo di modulo pari a 120 MPa, si è considerato un valore di calcolo pari a 268 MPa.

Il rapporto di Poisson è stato assunto pari a 0.40.

3.2.2 Misto cementato

Nelle soluzioni progettuali individuate è prevista la realizzazione di una sovrastruttura comprendente, al di sotto degli strati legati a bitume, uno strato in misto cementato.

Le caratteristiche meccaniche del misto cementato da assumere nel progetto sono state desunte dalle Norme Tecniche. Per tali materiali è previsto un nomogramma di controllo che oltre i 90 giorni di maturazione stabilisce un intervallo di accettazione del modulo dinamico rilevato mediante FWD compreso tra 4000 e 12000 MPa. A questo proposito le stesse Norme Tecniche stabiliscono quanto segue:

"*Il riferimento prestazionale sarà costituito dal modulo elastico reale derivato mediante retro calcolo con i valori rilevati in opera (anche a strato ricoperto) con il F.W.D. in un periodo compreso tra 7 e 90 giorni dalla stesa. La media dei valori di modulo sui tronchi omogenei dovrà essere quella compresa nell'area A del diagramma che segue*".

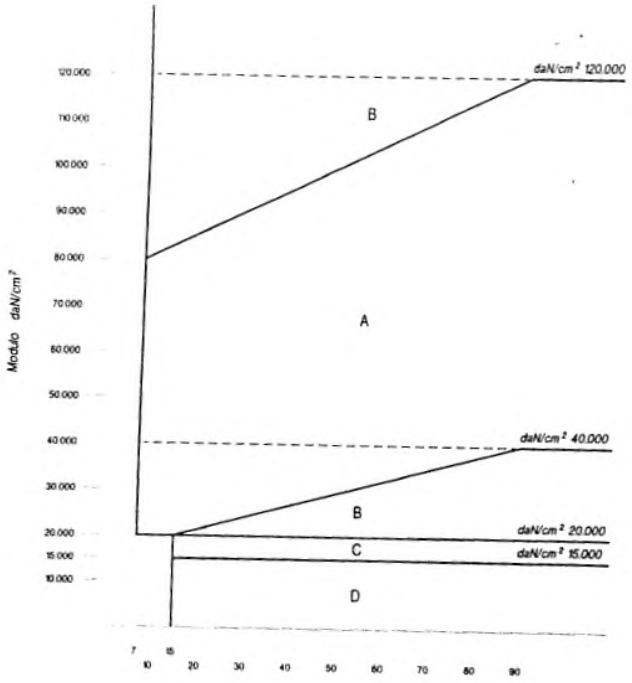

Figura 1 - Diagramma di controllo della media dei moduli dinamici relativi al misto cementato

Nei calcoli si è pertanto assunto un valore prudenziale del modulo pari a 3000 MPa, sia per garantire buoni margini di sicurezza per la variabilità di prestazione che il materiale può manifestare durante la produzione ed all'atto della messa in opera, sia per non trascurare i fenomeni di fessurazione che inevitabilmente lo interessano nel corso della sua vita utile.

Il rapporto di Poisson è stato assunto pari a 0.25.

3.2.3 Conglomerati bituminosi

Le caratteristiche meccaniche dei conglomerati bituminosi, espresse in termini di modulo elastico e di coefficiente di Poisson, sono state valutate, facendo riferimento agli studi di Francken [7], sulla base delle grandezze volumetriche che caratterizzano il conglomerato (percentuale dei vuoti e volume percentuale degli aggregati) e delle proprietà reologiche dei leganti (modulo complesso ridotto).

Si rimanda all'**Allegato C** per il dettaglio delle formule utilizzate.

Le caratteristiche volumetriche delle miscele costituenti i singoli strati sono state estratte dalle Norme Tecniche. Queste prevedono:

- per miscele di usura una percentuale di bitume compresa tra il 5 ed il 6.5% ed una percentuale dei vuoti corrispondente a 150 rotazioni della pressa giratoria compresa tra il 3 ed il 5%;
- per miscele di collegamento una percentuale di bitume (Hard) compresa tra il 4.5 ed il 6% ed una percentuale dei vuoti corrispondete a 120 rotazioni della pressa giratoria compresa tra il 3 ed il 5%;
- per miscele di base una percentuale di bitume (Hard) compresa tra il 4 ed il 5.5% ed una percentuale dei vuoti corrispondente a 120 rotazioni della pressa giratoria compresa tra il 3 ed il 5%.

Nei calcoli si sono pertanto utilizzati i valori mediani degli intervalli di accettazione della percentuale di bitume, mentre per le percentuali dei vuoti si sono prudenzialmente assunti valori coincidenti con gli estremi superiori degli intervalli su citati.

In particolare, il modulo complesso ridotto del bitume è stato determinato tramite correlazione con il modulo di rigidezza S_b. Si definisce "modulo complesso ridotto o normalizzato funzione della temperatura e della frequenza" il coefficiente adimensionale R*(T, f).

In mancanza di sperimentazione diretta sui leganti da utilizzare effettivamente nella realizzazione della sovrastruttura, per la stima delle proprietà reologiche del legante, si è fatto riferimento ai risultati di uno studio *Round Robin* condotto nell'ambito del RILEM e coordinato dal Belgian Road Research Centre [8]. I valori del modulo di rigidezza S_b erano disponibili ad una frequenza di sollecitazione di 10 Hz ed a temperature T pari a 10, 22 e 40°C. Per estrapolare tali risultati al di fuori dell'intervallo di indagine si è pertanto operata una modellazione della relazione S_b -T mediante funzione di tipo esponenziale:

$$S_b = 627.45 \cdot e^{-0.1387 \cdot T(^\circ C)}$$

La funzione così ottenuta è stata utilizzata per la valutazione del modulo normale ridotto B* (mediante quindi il calcolo del modulo di rigidezza Sb del legante per ciascuna temperatura media mensile caratterizzante il singolo strato di pavimentazione) da inserire nelle relazioni di Francken per il calcolo del modulo normale complesso E*. I risultati di queste elaborazioni riguardanti le miscele bituminose sono contenute nell'**Allegato C**.

Per i leganti bituminosi di tipo tradizionale il modulo di rigidezza S_b viene stimato utilizzando la formula proposta da Collop [9] che deriva dal normogramma di Van der Poel:

$$S_b = 1{,}157 \cdot 10^{-7} t^{-0{,}326} 2{,}718^{-PI^R} \left(T_{RB}{}^R - T_{asp}\right)^5$$

I parametri di input utilizzati per tale formulazione derivano dalle caratteristiche dei bitumi previste dalle Norme Tecniche invecchiate con le seguenti correlazioni sperimentali [[9] per tener conto delle operazioni di miscelazione e stesa:

Per tutte le miscele bituminose si è assunto un valore del rapporto di Poisson pari a 0.35.

3.2.4 Trattamento di irruvidimento ad alta aderenza (TAA)

In corrispondenza di alcuni tratti di A14 e tangenziale è previsto un trattamento di irruvidimento ad alta aderenza (TAA), da realizzarsi su usura chiusa.

Tale trattamento è eseguito con inerti di elevatissime caratteristiche di rugosità e resistenza all'abrasione, prodotti dalla frantumazione di bauxite calcinata o simili, incollati al manto stradale (previa spazzolatura della superficie di applicazione) per mezzo di collante epossidico bi-componente. Tale trattamento consente infatti di conferire alla superficie pavimentata caratteristiche di aderenza superiori a quelle che si otterrebbero con uno strato di usura tradizionale privo di trattamento.

3.3 TEMPERATURA DELLA PAVIMENTAZIONE

In mancanza di specifiche informazioni, si è fatto riferimento ai dati climatici rilevati negli ultimi 30 anni dalla stazione meteoclimatica di Bologna. Tali dati climatici sono stati utilizzati (**Allegato A**) per la valutazione delle temperature caratteristiche degli strati in conglomerato bituminoso utilizzando la formulazione di Marchionna:

$$T_{PAV_i} = (1.467 + 0.043 \cdot z) + (1.362 - 0.005 \cdot z) \cdot T_a$$

dove:

- i = i-esimo strato;
- z = quota media dello spessore dell' i-esimo strato rispetto alla sommità della pavimentazione;

- T_a = temperatura media mensile dell'aria, espressa in °C.

3.4 FLUSSI DI TRAFFICO E NUMERO DI RIPETIZIONI DI CARICO DI PROGETTO

La determinazione del numero di carichi che dovrà sopportare la struttura della pavimentazione è stata effettuata tenendo conto dei soli veicoli commerciali (commerciali leggeri + commerciali pesanti) in quanto questi sono gli unici che influenzano il comportamento strutturale.

I dati di traffico sono stati elaborati a partire dai seguenti scenari contenuti nell'elaborato Studio di Traffico allegato al progetto:

- Scenario Progettuale 2030;
- Scenario Progettuale 2040.

I flussi di traffico commerciale utilizzati per la verifica delle pavimentazioni sono riportati nell'**Allegato B**.

Per quanto riguarda la verifica della sovrastruttura per nuove pavimentazioni in autostrada A14 e tangenziale questa è stata condotta facendo riferimento al tratto elementare maggiormente critico, tra autostrada e tangenziale, dal punto di vista dei carichi di traffico commerciale a cui sarà soggetta la pavimentazione, ipotizzando una suddivisione omogenea (50/50) tra le due direzioni di traffico a partire dal dato di TGMA bidirezionale. È stata inoltre considerata una percentuale del traffico commerciale transitante pari al 70%, in quanto rappresenta la situazione più gravosa tra quelle presenti (viabilità a tre corsie per senso di marcia).

Per gli interventi di risanamento sulle attuali corsie di marcia dinamica e marcia normale dell'autostrada A14, trattandosi di interventi in notturna con caratteristiche degli strati sottostanti differenti tratto per tratto si è fatto riferimento al tratto elementare autostradale su cui ricadono. E' stata inoltre considerata una percentuale del traffico commerciale transitante sulle future corsie di marcia lenta e veloce rispettivamente pari al 70% e 30%.

In funzione di quanto riportato nel Catalogo Italiano delle Pavimentazioni [6], considerato che in alcuni casi lo studio trasportistico evidenzia un mix di traffico commerciale con una componente prevalente di veicoli con più di 2 assi (classi di pedaggio 3-4-5), e quindi difforme da quella di riferimento per la tipologia di infrastruttura in oggetto, si è proceduto alla ridefinizione dello spettro di traffico: il coefficiente di equivalenza tra un generico veicolo commerciale ed un asse da 80 kN è stato quindi ricalcolato pari a 3 o 3.5 (anziché lo standard pari a 2.5) sulla base del nuovo spettro. In alcuni casi invece è stato assunto il coefficiente standard pari a 2.5 perché il mix di traffico commerciale presenta uno spettro in linea con quanto riportato nel Catalogo Italiano delle Pavimentazioni.

3.5 ELEMENTO DI RINFORZO

L'elemento di rinforzo consiste in un geocomposito costituito da una griglia di rinforzo in fibra di vetro ad alto modulo accoppiata ad un geotessile non tessuto.

Tale elemento posto all'interfaccia tra lo strato in conglomerato bituminoso esistente residuo e i nuovi strati in conglomerato bituminoso svolge le seguenti funzioni:

- contrasta/ritarda la propagazione per riflessione delle fessure tra pavimentazione esistente ed il nuovo strato in conglomerato bituminoso;
- incrementa la resistenza a trazione dello strato in conglomerato bituminoso in quanto assorbe parte delle tensioni di trazione orizzontali, che si sviluppano alla base del nuovo strato in conglomerato bituminoso per effetto dei cicli di carico, migliorando di conseguenza il comportamento a fatica della sovrastruttura nel suo complesso;
- consente una distribuzione delle tensioni su un'area più ampia contrastando di conseguenza il degrado della pavimentazione per innesco di un'unica grande fessura per effetto di picchi di tensione di trazione concentrati.

Le fibre di vetro sono inoltre fresabili, con i metodi tradizionali, insieme alla pavimentazione e quindi riciclabili.

Per i materiali rinforzati con geocompositi, il meccanismo di rottura può essere rappresentato con un criterio di verifica in grado di combinare le leggi di propagazione della fatica con un modello di propagazione delle fessure.

Infatti, le pavimentazioni rinforzate con geocompositi esplicano la loro principale funzione non tanto nell'inibire l'innesco della fessurazione alla base degli strati legati, quanto nel ritardarne la risalita in sommità. Facendo riferimento allo studio sperimentale ASPI [13], la pavimentazione con il geocomposito viene studiata distinguendo due contributi che insieme concorrono a determinare la vita utile complessiva della sovrastruttura:

- un contributo legato all'innesco della fessurazione
- un contributo rappresentativo della fase di propagazione, determinabili ciascuno secondo una precisa legge.

Per ciò che concerne l'innesco della fessurazione, la legge di Verstraeten riportata di seguito considera che le curva di fatica di materiali differenti sono da considerarsi parallele in un piano $logNt{-}log\varepsilon t$ a prescindere dalla composizione della miscela e, conseguentemente, dalla sua rigidezza [10]:

$$\log_{10} N_0 = 6 + 4.7619 \cdot \left[\log_{10}\left(\lambda \cdot \frac{V_b}{V_b + V_v} \right) - \log_{10} \varepsilon_t \right]$$

Dove:

N0 è il numero di cicli di carico riferito all'asse standard considerato che causa l'ini-zio della fessurazione;

ε$_t$ è la massima deformazione orizzontale di trazione alla base degli strati legati della pavimentazione;

Vb è la percentuale in volume di bitume nella miscela di conglomerato;

Vv è la percentuale in volume dei vuoti nella miscela di conglomerato;

λ è un coefficiente che dipende dalla tipologia di bitume impiegato e può essere espresso in funzione del tenore di asfalteni oppure della temperatura di palla-anello TR&B (di norma per bitumi stradali risulta pari a 1.25×10-4)

L'espressione sopra riportata risulta valida se vengono rispettate le seguenti condizioni:

la percentuale in volume degli aggregati nella miscela di conglomerato deve essere compresa nell'intervallo 78÷85%;

il tenore di bitume deve assicurare il rivestimento ed il legame di tutti i granuli (senza eccedere);

la miscela in conglomerato possa essere considerata una miscela "grossa", vale a dire che almeno il 50% del volume totale degli aggregati deve essere costituito da elementi grossi.

Relativamente al calcolo del numero di cicli associati alla propagazione delle fessure è possibile far riferimento alla relazione proposta da Marchionna et al. [11] nel caso in cui il grado di fessurazione superficiale sia pari o inferiore al 10%:

$$\Delta N_0 = \left(E^{\alpha'} \cdot \sigma^{\beta'} \cdot 10^{\gamma'} \right) \cdot \left(1.373 \cdot e^{-1.089 \cdot n} \cdot h^{(-0.152 + 0.476 \cdot n)} \right)$$

in cui

ΔN0 numero di cicli di carico riferiti all'asse standard di riferimento che a partire dall'innesco della fessurazione alla base degli strati legati determina la risalita in superficie di fessure interessando il 10% della pavimentazione;

h spessore complessivo degli strati legati. Nel caso specifico non è stato incluso lo spessore dello strato di usura drenante ritenendo che, a causa della sua elevata percentuale di vuoti, la fase di propagazione possa essere ritenuta conclusa quando la fessura ha attraversato tutto lo spessore del conglomerato bituminoso chiuso.

E modulo di rigidezza pesato rispetto allo spessore degli strati in conglomerato bituminoso in kg/cm2;

σ massima tensione di trazione alla base degli strati legati espressa in kg/cm2;

n parametro dipendente dalla composizione del materiale (i.e. funzione della tipo-logia di legante) ricavabile sperimentalmente da prove di creep statico o sulla base di modelli teorici che considerano le caratteristiche del bitume impiegato per produrre la miscela. In assenza delle prove di creep e con riferimento ad uno studio dell'Università di Delft [12] secondo le condizioni previste dal modello può assumere valori pari a 5 e 4.5 a seconda che si tratti di conglomerati non modificati o modificati;

α' (2.43683*n)/5

β' (-3.28354*n)/5

γ' [(-2.24181*n)/5]+0.847(1-n/5)

Una volta determinati i singoli contributi relativi all'innesco della fessurazione e alla fase di propagazione della stessa (considerando lo sviluppo superficiale di una fessurazione estesa al 10% della superficie stradale), il numero complessivo di passaggi Nt è pari a:

$$N_t = N_0 + k\Delta N_0$$

dove $N0$ e $\Delta N0$ sono calcolati attraverso la risoluzione del multistrato elastico senza tener conto della presenza del rinforzo.

In particolare, i valori del coefficiente di prestazione k, ricavati interpretando i risultati sperimentali con approcci tipici della meccanica della frattura, variano al variare della tipologia di conglomerato coinvolta nell'interazione con il geocomposito.

Secondo lo studio sperimentale eseguito da ASPI k può assumere i valori di 5, 6 e 7.

Nel presente progetto, per l'intervento 2A è possibile utilizzare un geocomposito di classe inferiore (k=5), mentre per l'intervento 2D è necessario utilizzare un geocomposito di classe superiore (k=7). La condizione tenso-deformativa è stata invece ricavata dal modello al multistrato elastico calcolato con KENLAYER.

4 RISULTATI DIMENSIONAMENTO: SOVRASTRUTTURE DI PROGETTO

4.1 NUOVE PAVIMENTAZIONI

Per quanto riguarda le nuove pavimentazioni, codificate con P1, sono previsti 8 ambiti di intervento che hanno portato a definire 8 pacchetti di pavimentazione qui di seguito descritti:

- TIPO P1A: per l'autostrada e la tangenziale
- TIPO P1B: per le rampe di svincolo
- TIPO P1C: per l'autostrada e la tangenziale su impalcato
- TIPO P1D: per il cavalcavia Benazza
- TIPO P1E: per il cavalcavia Donato – Terrapieno
- TIPO P1F: per il cavalcavia Colombo – Europa
- TIPO P1G: per le riprofilature dei sottovia
- TIPO P1H: per le viabilità locali

4.1.1 Autostrada e tangenziale – TIPO P1A

Il progetto delle pavimentazioni per l'ampliamento di autostrada e tangenziale e per i tratti in variante ha previsto l'impiego di un pacchetto di spessore complessivo pari a 84 cm con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 25 cm;
- Fondazione legata in misto cementato di 30 cm;
- Fondazione non legata in misto granulare di 20 cm.

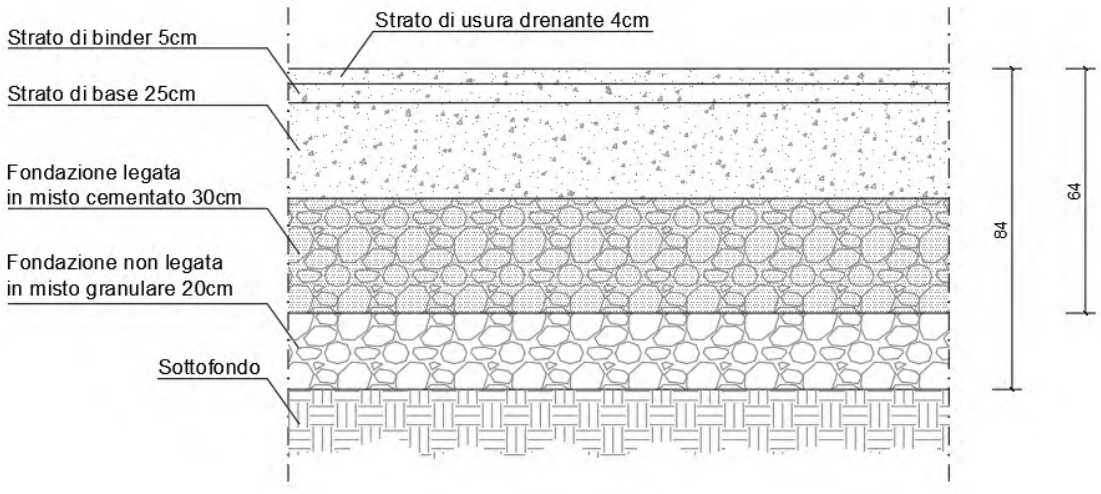

Figura 4-1. Composizione sovrastruttura autostrada e tangenziale – TIPO P1A

Si fa osservare che, quando il pacchetto dovrà essere steso strettamente al di sopra di un'opera in calcestruzzo la fondazione non legata in misto granulare non dovrà essere stesa e lo spessore del pacchetto dovrà essere:

- limitato agli strati stendibili nella profondità a disposizione quando tale profondità è <= 64 cm oppure
- dovrà essere ampliato con misto cementato quando tale profondità è > 64 cm.

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.1.2 Rampe di svincolo – TIPO P1B

Il progetto delle pavimentazioni per le rampe di svincolo ha previsto l'impiego di un pacchetto di spessore complessivo pari a 84 cm con una sovrastruttura così composta:

- Usura chiusa in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 25 cm;
- Fondazione legata in misto cementato di 30 cm;
- Fondazione non legata in misto granulare di 20 cm.

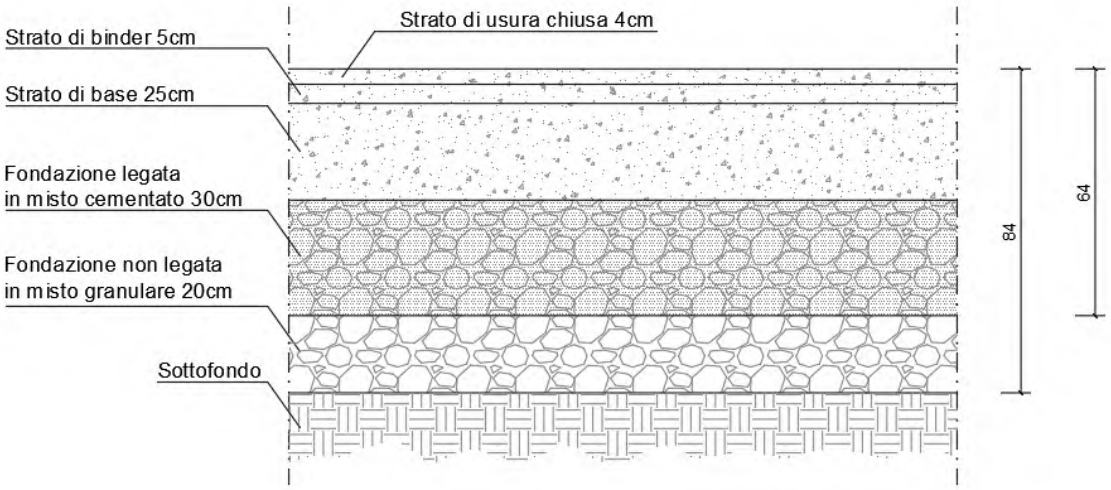

Figura 4-2. Composizione sovrastruttura rampe di svincolo – TIPO P1B

Tale pacchetto è stato assunto pari a quello di autostrada e tangenziale con la sola differenza del tipo di usura che qui è chiusa invece di drenante.

Si fa osservare che, quando il pacchetto dovrà essere steso strettamente al di sopra di tubi e opere minori, la fondazione non legata in misto granulare non dovrà essere stesa e lo spessore del pacchetto dovrà essere:

- limitato agli strati stendibili nella profondità a disposizione quando tale profondità è <= 64 cm oppure
- dovrà essere ampliato con misto cementato quando tale profondità è > 64 cm.

4.1.3 Autostrada e tangenziale su impalcato – TIPO P1C

Per i tratti su impalcato è prevista la stesa di una sovrastruttura così composta con l'interposizione tra la soletta e la pavimentazione di uno strato di impermeabilizzazione di spessore pari a 1 cm.

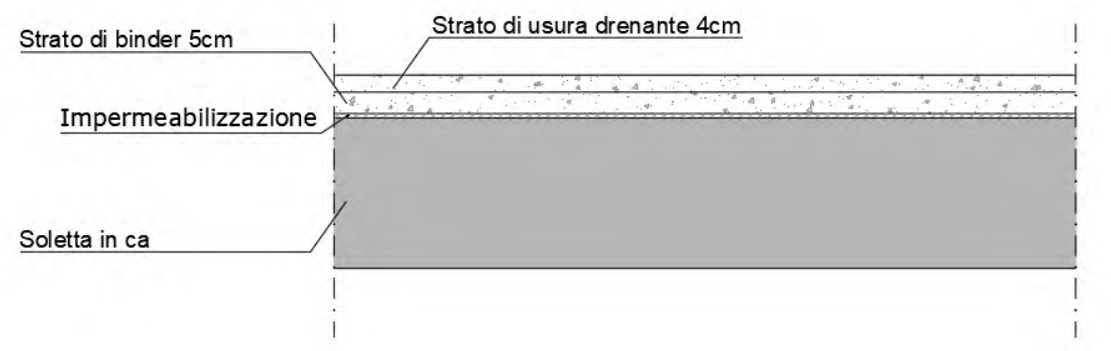

Figura 4-3. Composizione sovrastruttura autostrada e tangenziale su impalcato – TIPO P1C

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza “TAA” va prevista l’usura chiusa al posto dell’usura drenante.

4.1.4 Cavalcavia Benazza – TIPO P1D

Il progetto delle pavimentazioni per il cavalcavia Benazza ha previsto l’impiego di un pacchetto di spessore complessivo pari a 49 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 10 cm;
- Fondazione non legata in misto granulare di 30 cm.

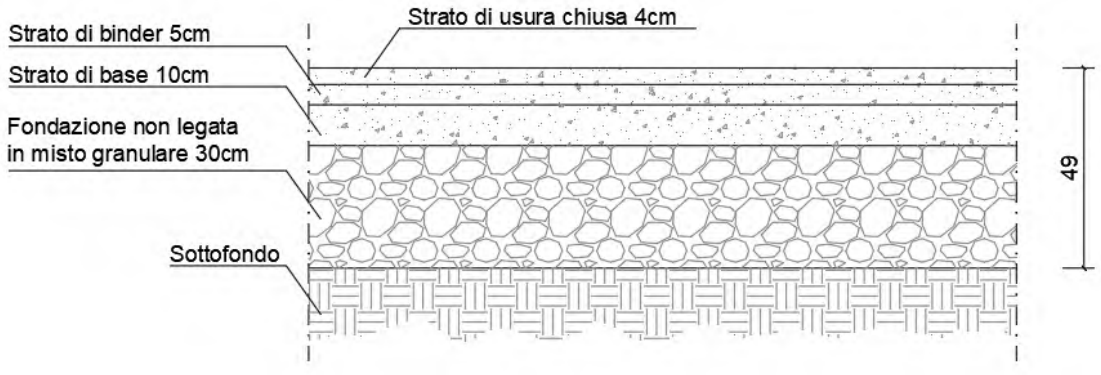

Figura 4-4. Composizione sovrastruttura cavalcavia Benazza – TIPO P1D

In corrispondenza di opere minori in cls che dovessero essere realizzate sotto la piattaforma stradale per il passaggio di sottoservizi al posto della fondazione non legata in misto granulare andrà prevista una fondazione legata in misto cementato di spessore almeno pari a 30cm.

4.1.5 Cavalcavia Donato - Terrapieno – TIPO P1E

Il progetto delle pavimentazioni per il cavalcavia Donato - Terrapieno ha previsto l’impiego di un pacchetto di spessore complessivo pari a 49 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 20 cm;
- Fondazione non legata in misto granulare di 20 cm.

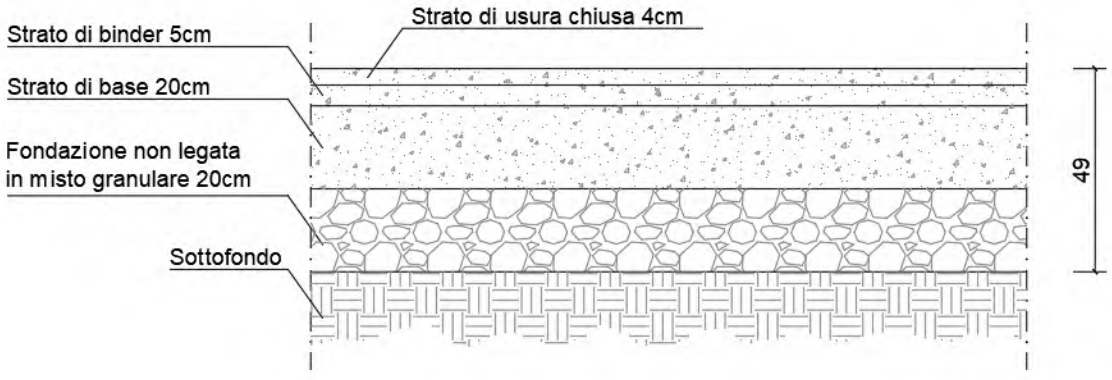

Figura 4-5. Composizione sovrastruttura cavalcavia Donato - Terrapieno – TIPO P1E

In corrispondenza di opere minori in cls che dovessero essere realizzate sotto la piattaforma stradale per il passaggio di sottoservizi al posto della fondazione non legata in misto granulare andrà prevista una fondazione legata in misto cementato di spessore almeno pari a 20cm.

4.1.6 Cavalcavia Colombo - Europa – TIPO P1F

Il progetto delle pavimentazioni per il cavalcavia Colombo - Europa ha previsto l'impiego di un pacchetto di spessore complessivo pari a 54 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 25 cm;
- Fondazione non legata in misto granulare di 20 cm.

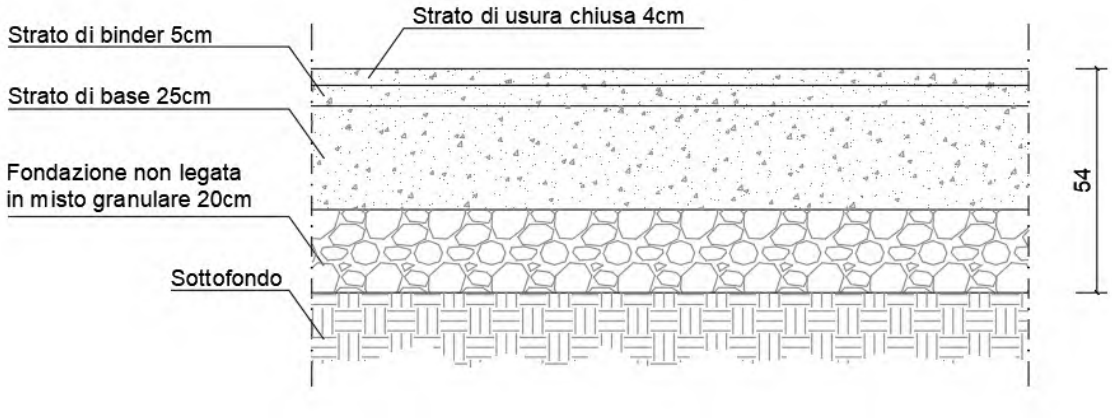

Figura 4-6. Composizione sovrastruttura cavalcavia Colombo - Europa – TIPO P1F

In corrispondenza di opere minori in cls che dovessero essere realizzate sotto la piattaforma stradale per il passaggio di sottoservizi al posto della fondazione non legata in misto granulare andrà prevista una fondazione legata in misto cementato di spessore almeno pari a 20cm.

4.1.7 Riprofilatura sottovia – TIPO P1G

Il progetto delle pavimentazioni per la riprofilatura dei sottovia ha previsto l'impiego di un pacchetto di spessore complessivo pari a 41 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 22 cm;
- Fondazione non legata in misto granulare di 10 cm.

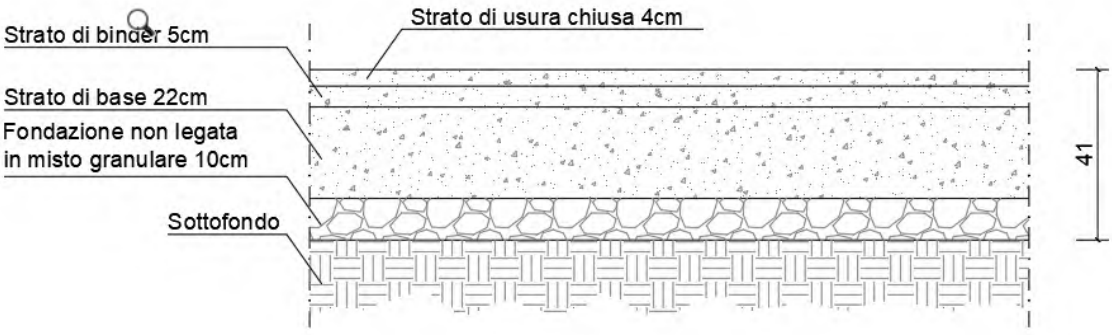

Figura 4-7. Composizione sovrastruttura riprofilatura sottovia – TIPO P1G

In corrispondenza di opere minori in cls che dovessero essere realizzate sotto la piattaforma stradale per il passaggio di sottoservizi al posto della fondazione non legata in misto granulare andrà prevista una fondazione in cls di spessore pari a 10cm.

4.1.8 Viabilità locali – TIPO P1H

Il progetto delle pavimentazioni per le viabilità locali ha previsto l'impiego di un pacchetto di spessore complessivo pari a 59 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 20 cm;
- Fondazione non legata in misto granulare di 30 cm.

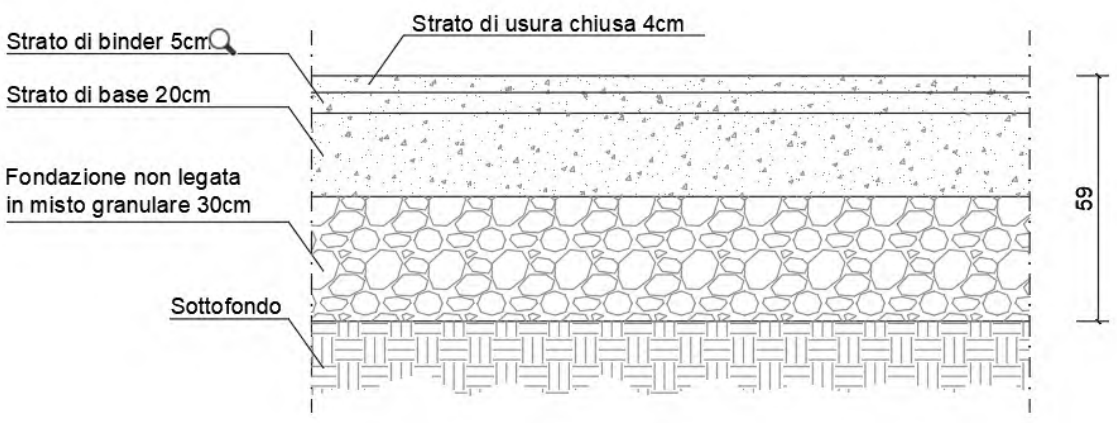

Figura 4-8. Composizione sovrastruttura viabilità locali – TIPO P1H

Tale pacchetto non è stato oggetto di dimensionamento e fa riferimento ai pacchetti standard concordati con la committente per tale tipologia di viabilità.

In corrispondenza di opere minori in cls che dovessero essere realizzate sotto la piattaforma stradale per il passaggio di sottoservizi al posto della fondazione non legata in misto granulare andrà prevista una fondazione legata in misto cementato di spessore almeno pari a 30cm.

4.2 RISANAMENTI PROFONDI

Per quanto riguarda i risanamenti profondi, codificati con P2, sono previsti 6 ambiti di intervento che hanno portato a definire 6 pacchetti di pavimentazione qui di seguito descritti:

- TIPO P2A: per gli interventi di risanamento profondo da prevedere in notturna in autostrada A14 e Raccordo di Casalecchio e in tangenziale con altezza dello strato di binder pari a 15 cm ed elemento di rinforzo al di sotto dello stesso;
- TIPO P2B: per gli interventi di risanamento profondo da prevedere in notturna in autostrada A14 con altezza dello strato di binder pari a 20 cm ed elemento di rinforzo al di sotto dello stesso;
- TIPO P2C: per gli interventi di risanamento profondo da prevedere in notturna in autostrada A14 con altezza dello strato di binder pari a 25 cm ed elemento di rinforzo al di sotto dello stesso;
- TIPO P2D: per l'intervento di risanamento profondo da prevedere in notturna in tangenziale con altezza dello strato di base pari a 10 cm ed elemento di rinforzo al di sotto dello stesso;
- TIPO P2E: per gli interventi di risanamento profondo in diurna in tangenziale;
- TIPO P2F: per gli interventi di risanamento profondo nelle aree di ingresso e uscita in tangenziale.

4.2.1 Risanamento profondo in autostrada A14 e Raccordo di Casalecchio e in tangenziale in notturna con altezza binder pari a 15cm ed elemento di rinforzo al di sotto dello stesso – TIPO P2A

Il progetto delle pavimentazioni per il risanamento profondo in autostrada A14 e Raccordo di Casalecchio e in tangenziale in notturna con altezza binder pari a 15cm ed elemento di rinforzo al di sotto dello stesso ha previsto l'impiego del seguente pacchetto con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 15 cm;
- Elemento di rinforzo costituito da una griglia in fibra di vetro (con resistenza a trazione pari a 100 kN/m) accoppiata ad un geotessile non tessuto in polipropilene.

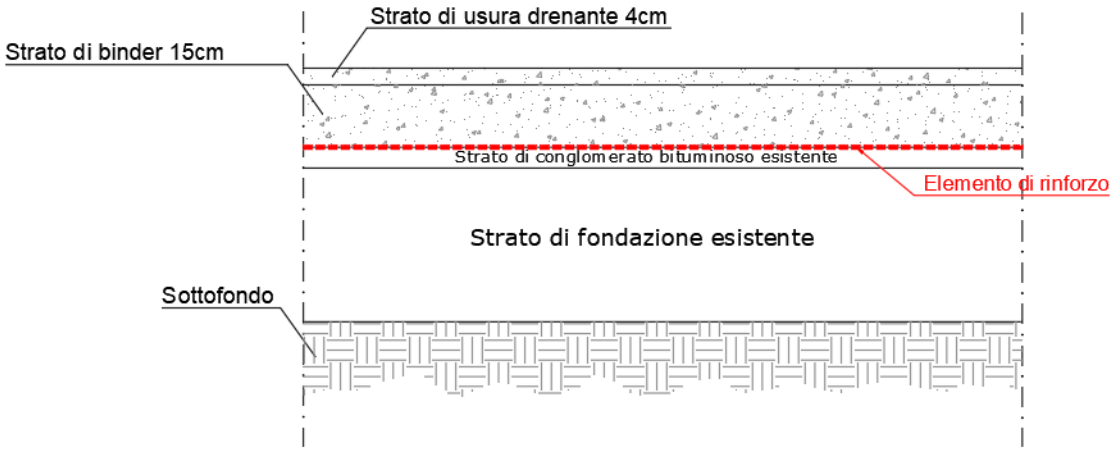

Figura 4-9. Composizione sovrastruttura risanamento profondo in notturna con h binder=15cm e elemento di rinforzo – TIPO P2A

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.2.2 Risanamento profondo in autostrada A14 in notturna con altezza binder pari a 20cm ed elemento di rinforzo al di sotto dello stesso – TIPO P2B

Il progetto delle pavimentazioni per il risanamento profondo in autostrada A14 in notturna con altezza binder pari a 20cm ed elemento di rinforzo al di sotto dello stesso ha previsto l'impiego del seguente pacchetto con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 20 cm;
- Elemento di rinforzo costituito da una griglia in fibra di vetro (con resistenza a trazione pari a 100 kN/m) accoppiata ad un geotessile non tessuto in polipropilene.

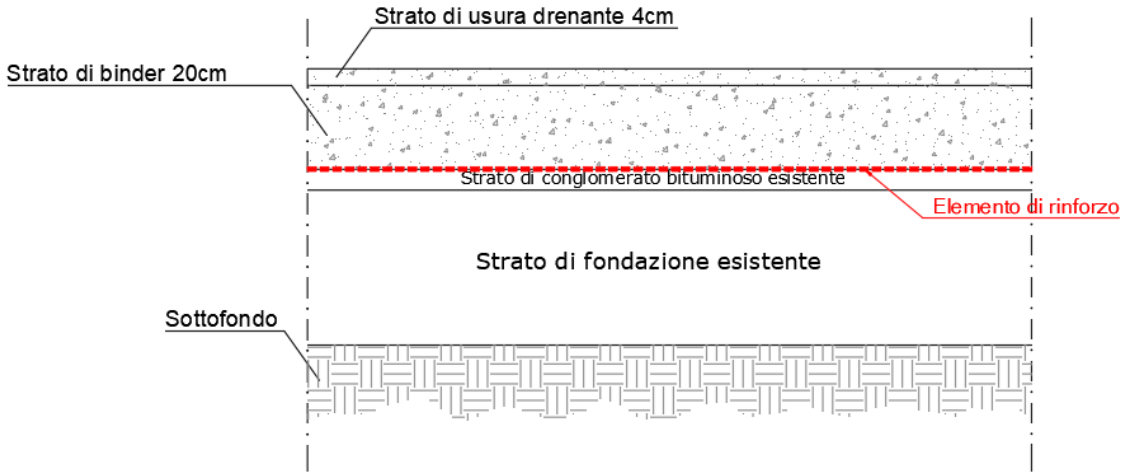

Figura 4-10. Composizione sovrastruttura risanamento profondo in notturna con h binder=20cm e elemento di rinforzo – TIPO P2B

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.2.3 Risanamento profondo in autostrada A14 in notturna con altezza binder pari a 25cm ed elemento di rinforzo al di sotto dello stesso – TIPO P2C

Il progetto delle pavimentazioni per il risanamento profondo in autostrada A14 in notturna con altezza binder pari a 25cm ed elemento di rinforzo al di sotto dello stesso ha previsto l'impiego del seguente pacchetto con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 25 cm;
- Elemento di rinforzo costituito da una griglia in fibra di vetro (con resistenza a trazione pari a 100 kN/m) accoppiata ad un geotessile non tessuto in polipropilene.

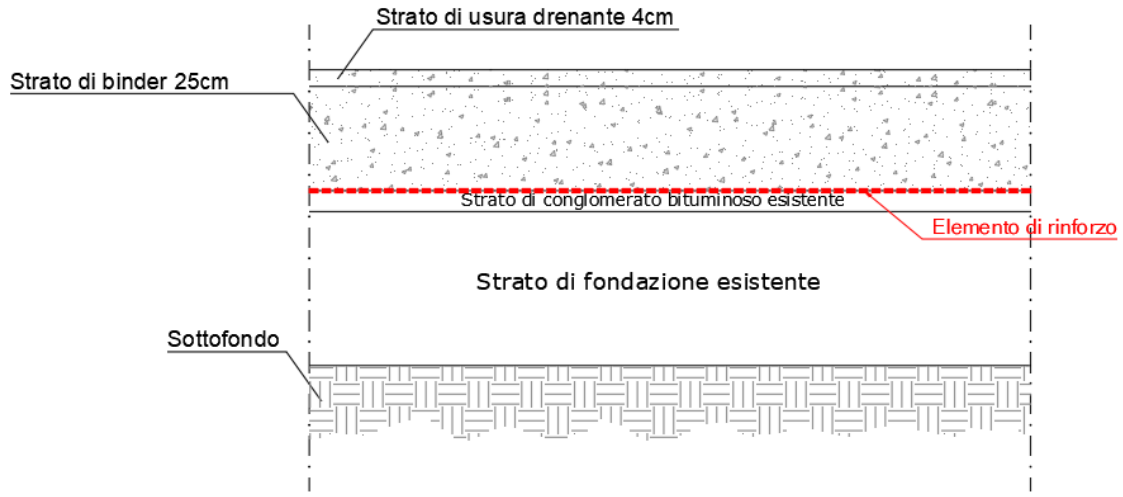

Figura 4-11. Composizione sovrastruttura risanamento profondo in notturna con h binder=25cm e elemento di rinforzo – TIPO P2C

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.2.4 Risanamento profondo in notturna in tangenziale con altezza base pari a 10cm ed elemento di rinforzo al di sotto dello stesso – TIPO P2D

Il progetto delle pavimentazioni per il risanamento profondo in tangenziale in notturna con altezza base pari a 10cm ed elemento di rinforzo al di sotto dello stesso ha previsto l'impiego del seguente pacchetto con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Base in CB con bitumi modificati tipo Hard di 10 cm;
- Elemento di rinforzo costituito da una griglia in fibra di vetro (con resistenza a trazione pari a 100 kN/m) accoppiata ad un geotessile non tessuto in polipropilene.

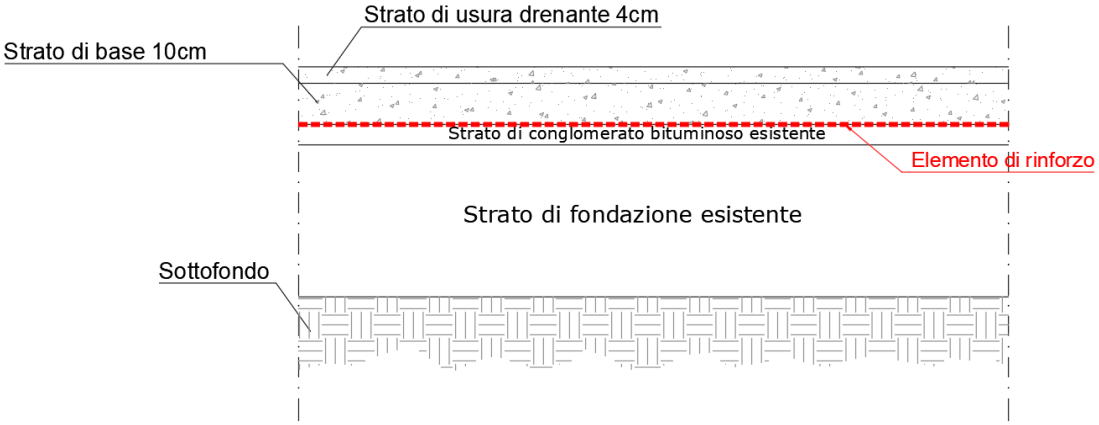

Figura 4-12. Composizione sovrastruttura risanamento profondo in notturna in tangenziale con h base=10cm e elemento di rinforzo – TIPO P2D

4.2.5 Risanamento profondo in diurna in tangenziale – TIPO P2E

Il progetto delle pavimentazioni per il risanamento profondo in diurna in tangenziale ha previsto l'impiego di un pacchetto di spessore complessivo pari a 54 cm con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 25 cm;
- Fondazione legata in misto cementato di 20 cm.

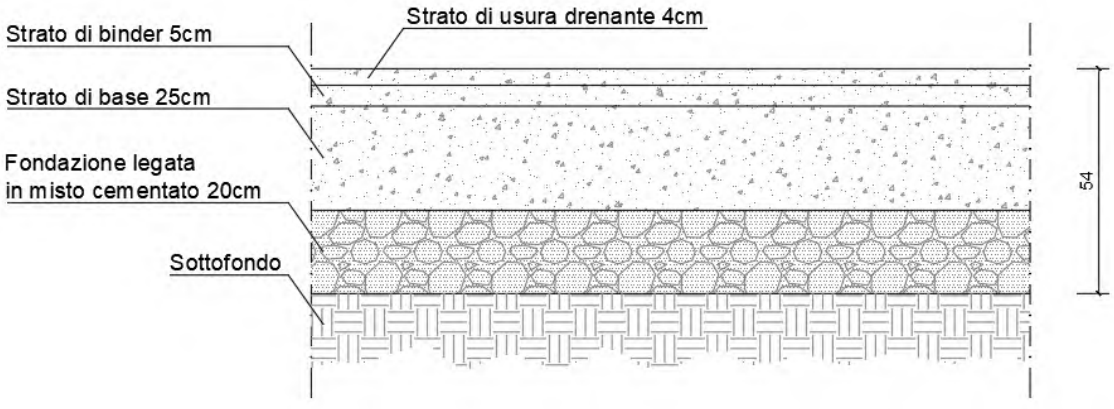

Figura 4-13. Composizione sovrastruttura risanamento profondo in diurna in tangenziale – TIPO P2E

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.2.6 Risanamento profondo nelle aree di ingresso e uscita in tangenziale – TIPO P2F

Il progetto delle pavimentazioni per il risanamento profondo nelle aree di ingresso e uscita in tangenziale ha previsto l'impiego di un pacchetto di spessore complessivo pari a 59 cm con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 30 cm;
- Fondazione legata in misto cementato di 20 cm.

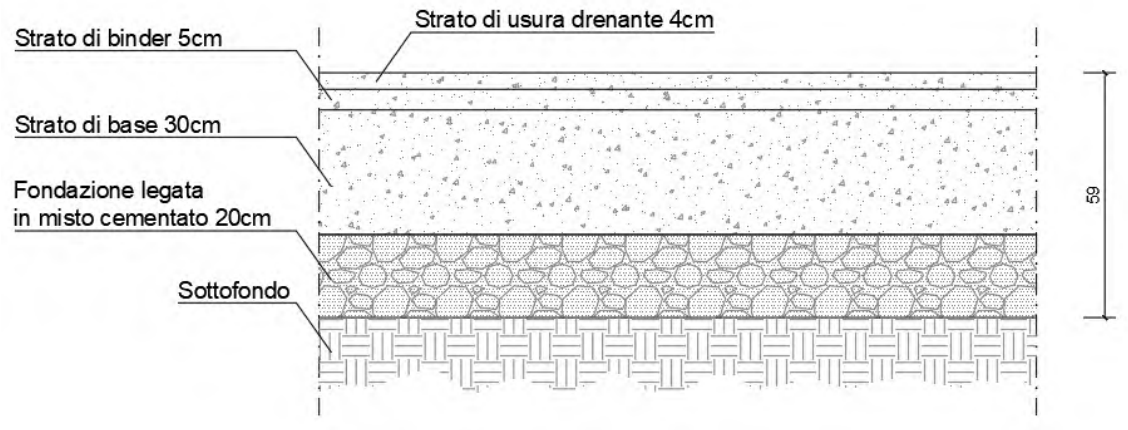

Figura 4-14. Composizione sovrastruttura risanamento profondo aree ingresso e uscita in tangenziale – TIPO P2F

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza "TAA" va prevista l'usura chiusa al posto dell'usura drenante.

4.2.7 Sintesi estensione risanamenti profondi

Nelle tabelle seguenti è riportato l'elenco delle tratte a cui corrispondono le suddette tipologie di risanamento profondo.

Autostrada A14_corsia di marcia dinamica_carreggiata sud			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
11597	14300	2703	P2B
15300	16200	900	P2C
18703	21122	2419	P2A
21587	21699	112	P2A

Tabella 4-1. Ubicazione risanamenti profondi Autostrada A14_Carreggiata sud_corsia di marcia dinamica

Autostrada A14_corsia di marcia dinamica_carreggiata nord			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
10250	17700	7450	P2B

Tabella 4-2. Ubicazione risanamenti profondi Autostrada A14_Carreggiata nord_corsia di marcia dinamica

Autostrada A14_corsia di marcia normale_carreggiata sud			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
8500	9088	588	P2A
9088	9175	87	P2C
10250	11807	1557	P2C
11807	14606	2799	P2B
14606	21122	6516	P2C
21587	21700	113	P2C

Tabella 4-3. Ubicazione risanamenti profondi Autostrada A14_Carreggiata sud_corsia di marcia normale

Autostrada A14_corsia di marcia normale_carreggiata nord			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
10250	11197	947	P2B
11197	13296	2099	P2C
13296	15900	2604	P2B
15900	21122	2799	P2C
21587	21700	113	P2C

Tabella 4-4. Ubicazione risanamenti profondi Autostrada A14_Carreggiata nord_corsia di marcia normale

Raccordo di Casalecchio_corsia di marcia_carreggiata sud			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
4500	5315	815	P2A

Tabella 4-5. Ubicazione risanamenti profondi Raccordo di Casalecchio_Carreggiata sud_corsia di marcia

Raccordo di Casalecchio_corsia di marcia_carreggiata nord			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
4500	5000	500	P2A

Tabella 4-6. Ubicazione risanamenti profondi Raccordo di Casalecchio_Carreggiata nord_corsia di marcia

Tangenziale_corsia di marcia_carreggiata sud			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
8100	8998	898	P2D
14499	17380	2881	P2E
17617	17900	283	P2E

Tabella 4-7. Ubicazione risanamenti profondi Tangenziale_Carreggiata sud_corsia di marcia

Tangenziale_corsia di marcia_carreggiata nord			
Pk i	**Pk f**	**Sviluppo [m]**	**Pacchetto**
8010	9175	1165	P2A
10250	10303	53	P2E
12597	16300	3703	P2E

Tabella 4-8. Ubicazione risanamenti profondi Tangenziale_Carreggiata nord_corsia di marcia

4.3 RIQUALIFICA SPARTITRAFFICO

4.3.1 Riqualifica spartitraffico tra autostrada e tangenziale – TIPO P3

Il progetto delle pavimentazioni per la riqualifica dello spartitraffico tra autostrada e tangenziale ha previsto l'impiego del seguente pacchetto con una sovrastruttura così composta:

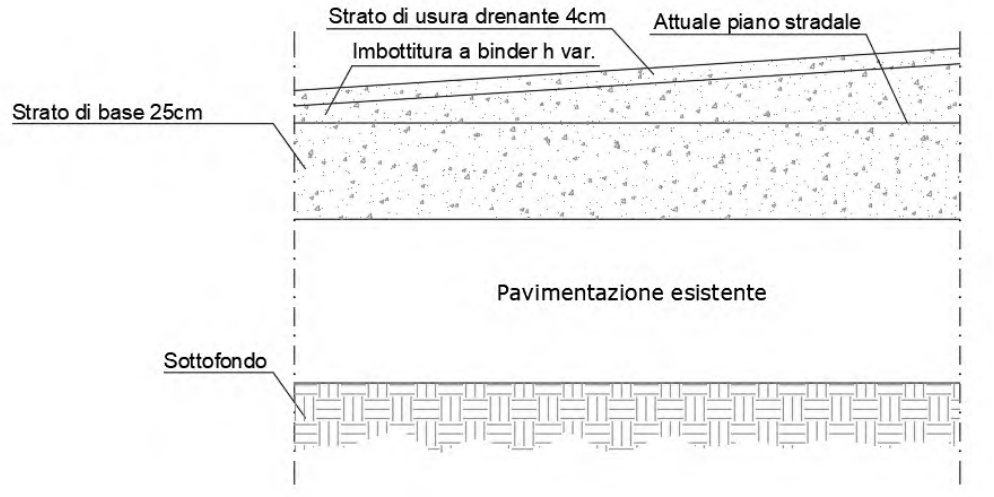

Figura 4-15. Composizione sovrastruttura riqualifica spartitraffico autostrada - tangenziale – TIPO P3

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza “TAA” va prevista l’usura chiusa al posto dell’usura drenante.

4.4 RIPRISTINO PAVIMENTAZIONE

Per quanto riguarda i ripristini della pavimentazione, codificati con P4, sono previsti 4 ambiti di intervento che hanno portato a definire 4 pacchetti di pavimentazione qui di seguito descritti:

- TIPO P4A: per gli interventi di ripristino della pavimentazione in autostrada e tangenziale;
- TIPO P4B: per gli interventi di ripristino della pavimentazione sulle rampe di svincolo;
- TIPO P4C: per gli interventi di ripristino della pavimentazione nei sottovia;
- TIPO P4D: per gli interventi di ripristino della pavimentazione nelle viabilità locali.

4.4.1 Ripristino pavimentazione in autostrada e tangenziale – TIPO P4A

Il progetto per il ripristino delle pavimentazioni, in corrispondenza di opere in calcestruzzo in autostrada e tangenziale, ha previsto l’impiego di un pacchetto di spessore complessivo pari a 69 cm con una sovrastruttura così composta:

- Usura drenante in conglomerato bituminoso (CB) con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 25 cm;
- Fondazione legata in misto cementato di 35 cm.

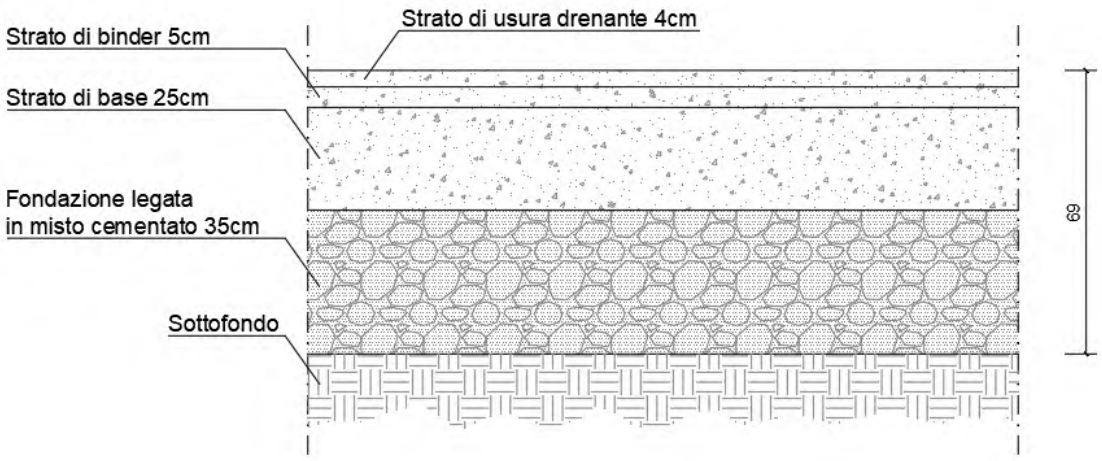

Figura 4-16. Pacchetto di ripristino pavimentazione autostrada e tangenziale TIPO P4A

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza “TAA” va prevista l’usura chiusa al posto dell’usura drenante.

4.4.2 Ripristino pavimentazione rampe di svincolo – TIPO P4B

Il progetto per il ripristino delle pavimentazioni, in corrispondenza di opere in calcestruzzo sulle rampe di svincolo, ha previsto l’impiego di un pacchetto di spessore complessivo pari a 69 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi modificati tipo Hard di 4 cm;
- Binder in CB con bitumi modificati tipo Hard di 5 cm;
- Base in CB con bitumi modificati tipo Hard di 25 cm;
- Fondazione legata in misto cementato di 35 cm.

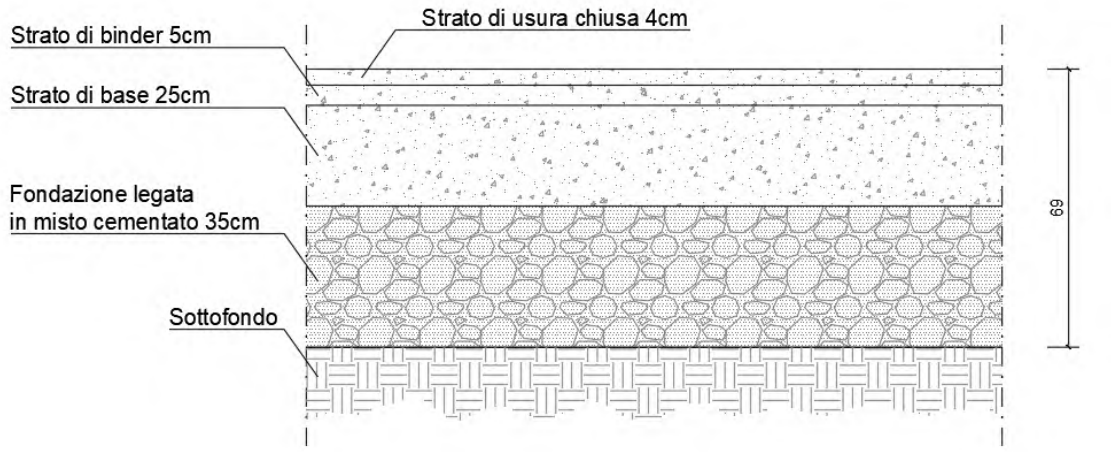

Figura 4-17. Pacchetto di ripristino pavimentazione rampe di svincolo TIPO P4B

4.4.3 Ripristino pavimentazione nei sottovia – TIPO P4C

Il progetto di ripristino delle pavimentazioni in corrispondenza di opere in calcestruzzo nei sottovia ha previsto l'impiego di un pacchetto di spessore complessivo pari a 41 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;
- Base in CB con bitumi normali di 22 cm;
- Fondazione in cls di 10 cm.

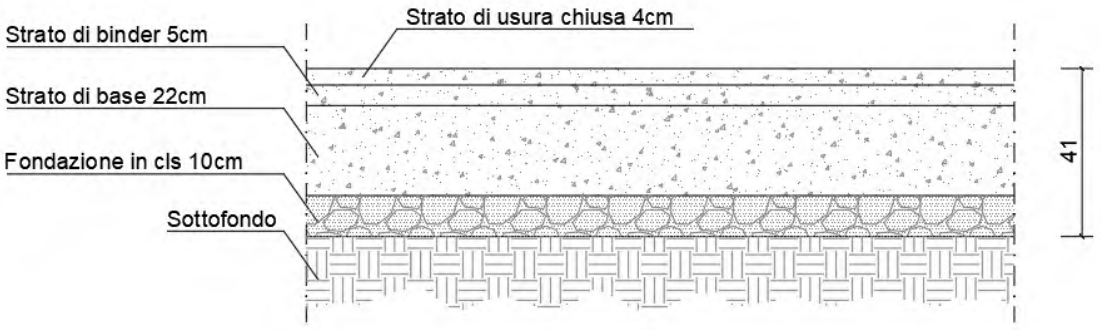

Figura 4-18. Pacchetto di ripristino pavimentazione nei sottovia TIPO P4C

4.4.4 Ripristino pavimentazione nelle viabilità locali – TIPO P4D

Il progetto di ripristino delle pavimentazioni in corrispondenza di opere in calcestruzzo nelle viabilità locali ha previsto l'impiego di un pacchetto di spessore complessivo pari a 59 cm con una sovrastruttura così composta:

- Usura in conglomerato bituminoso (CB) di tipo chiuso con bitumi normali di 4 cm;
- Binder in CB con bitumi normali di 5 cm;

- Base in CB con bitumi normali di 20 cm;
- Fondazione legata in misto cementato di 30 cm.

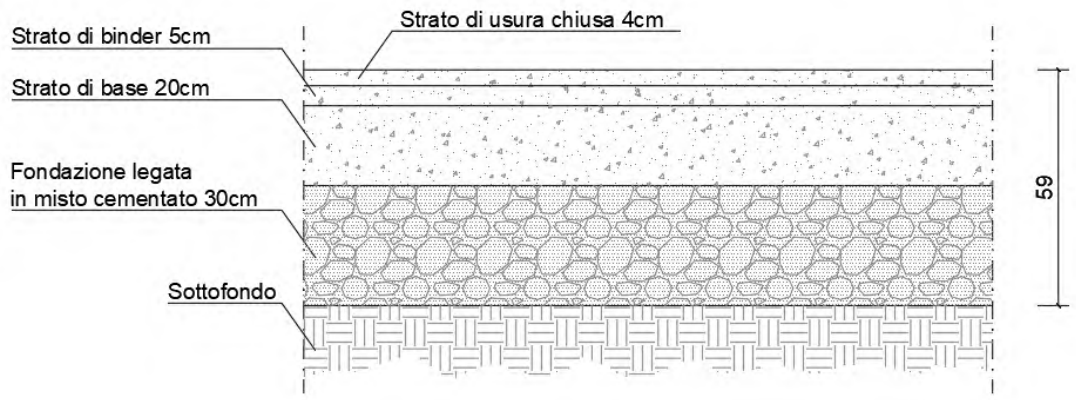

Figura 4-19. Pacchetto di ripristino pavimentazione nelle viabilità locali - TIPO P4D

4.5 RIEPILOGO DATI DI INPUT

Nella tabella seguente si riportano in sintesi i dati di input utilizzati per il dimensionamento.

Tipologia sovrastruttura		***P1A***	***P1D***	***P1E***	***P1F***	***P1G***	***P2A***	***P2B***	***P2C***	***P2D***	***P2E***	***P2F***	***P4A***
Traffico													
numero assi medio mensile	80 kN/ mese	738'532	17'492	93'324	132'203	149'996	variabile	variabile	variabile	398'597	283'702	661'973	738'532
Spessori sovrastruttura													
$H_{1\ USURA}$	cm	4	4	4	4	4	4	4	4	4	4	4	4
$H_{2\ BINDER}$	cm	5	5	5	5	5	15	20	25	-	5	5	5
$H_{3\ BASE}$	cm	25	10	20	25	22	-	-	-	10	25	30	25
$H_{CONGLOMERATI\ BITUMINOSI\ ESISTENTI}$	cm	-	-	-	-	-	variabile	variabile	variabile	7	-	-	-
$H_{5\ FONDAZIONE\ LEGATA}$	cm	30	-	-	-	-	-	-	-	-	20	20	35
$H_{FONDAZIONE\ NON\ LEGATA}$	cm	20	30	20	20	10	-	-	-	-	-	-	-
$H_{FONDAZIONE\ ESISTENTE}$	cm	-	-	-	-	-	variabile	variabile	variabile	36	-	-	-
H_{TOTALE}	cm	**84**	**49**	**49**	**54**	**41**	**variabile**	**variabile**	**variabile**	**57**	**54**	**59**	**69**
Moduli elastici													
Conglomerati bituminosi E_1, E_2, E_3	MPa	variabile	variabile	variabile	variabile	variabile	variabile	variabile	variabile	variabile	variabile	variabile	variabile
Conglomerato bituminoso esistente	MPa	-	-	-	-	-	variabile	variabile	variabile	3805	-	-	-
Misto cementato E_4	MPa	3000	-	-	-	-	-	-	-	-	3000	3000	3000
Misto granulare non legato E_5	MPa	268	322	268	268	196	-	-	-	-	-	-	-
Fondazione esistente	MPa	-	-	-	-	-	variabile	variabile	variabile	756	-	-	-
Sottofondo E_6	MPa	120	120	120	120	120	variabile	variabile	variabile	91	91	91	120

Tabella 4-9. Riepilogo dati di input

4.6 SINTESI RISULTATI DELLE VERIFICHE

I risultati delle verifiche strutturali sono riportati integralmente nell'**Allegato E**, ad eccezione dei pacchetti P2A, P2B e P2C per i quali, trattandosi di pacchetti che si appoggiano su pavimentazioni esistenti con differenti caratteristiche di portanza, si riporta solo uno dei casi presenti per ogni tipologia di pacchetto.

Nella tabella seguente è riportata una sintesi dei risultati espressi sotto forma di vita utile di calcolo, corrispondente al numero di anni necessari al raggiungimento di un valore unitario del danno.

Sulla base dei calcoli effettuati tutte le sovrastrutture di progetto risultano verificate. La vita utile di calcolo risulta infatti superiore alla vita di progetto (vita utile richiesta) di 20 anni. Fanno eccezione gli interventi TIPO 2A, 2B, 2C e 2D che, essendo interventi in notturna e prevedendo soltanto un intervento di rifacimento degli strati di usura e binder con interposizione di un rinforzo, sono stati dimensionati in modo da garantire una vita utile di almeno 10 anni (in linea con quanto previsto per tali risanamenti).

TIPO PACCHETTO	***P1A***	***P1D***	***P1E***	***P1F***	***P1G***	***P2A***	***P2B***	***P2C***	***P2D***	***P2E***	***P2F***	***P4A***
VITA UTILE DI CALCOLO (anni)	>20	>20	>20	>20	>20	>10	>10	>10	>10	>20	>20	>20
VITA UTILE DI PROGETTO (anni)	20	20	20	20	20	10	10	10	10	20	20	20
VERIFICA SODDISFATTA	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**	**SI**

Tabella 4-10. Risultati della verifica strutturale

PARTE 2: LAVORAZIONI

5 PREMESSA

Si premette che la posa dello strato di usura in tutte le lavorazioni menzionate nei successivi capitoli dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

6 LAVORAZIONE DI FASE ZERO – TIPO L0

La lavorazione che viene effettuata prima della fase di cantiere, tipo L0, è la predisposizione a binder di tutta la piattaforma esistente dell'autostrada e della tangenziale.

La lavorazione, per soddisfare la richiesta progettuale di mantenere la quota esistente, è costituita dalle seguenti fasi:

- Fresatura conglomerati bituminosi per uno spessore di 4cm;
- Stesa strato di binder in CB con bitumi modificati tipo Hard di 4 cm.

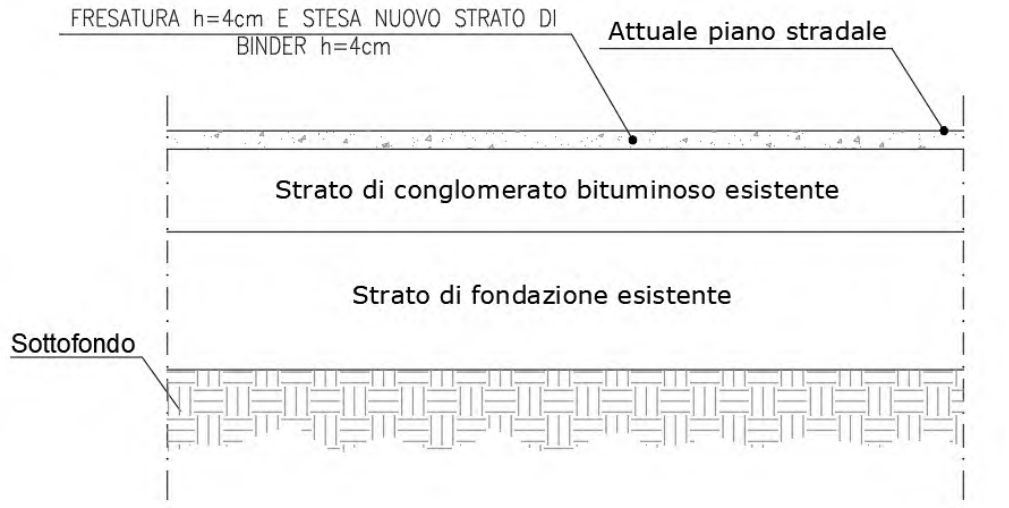

Figura 6-1. Intervento prima fase TIPO L0

L'intervento sopra descritto è stato definito allo scopo di rimuovere lo strato di usura drenante esistente al fine di non mantenere in opera strati intermedi ad alto contenuto di vuoti all'interno dei quali, durante l'esercizio dell'infrastruttura, potrebbe penetrare acqua, con conseguente accelerazione dei fenomeni di degrado e, nel caso di gelo, formazione di rigonfiamenti all'interno dello strato e successiva propagazione dei dissesti in superficie. Il nuovo strato di binder fungerà da supporto per la realizzazione della segnaletica di cantiere nonché per gli interventi successivi previsti in progetto (in particolare imbottitura e/o stesa del nuovo strato di usura).

7 NUOVE PAVIMENTAZIONI

7.1 LAVORAZIONE L1A

La lavorazione L1A prevede la stesa del pacchetto P1A per la realizzazione della nuova piattaforma dell'autostrada e della tangenziale.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1A.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.2 LAVORAZIONE L1Abis

La lavorazione L1Abis prevede la stesa del pacchetto P1A per la realizzazione della nuova piattaforma dell'autostrada e della tangenziale nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente e nei tratti in cui la quota di progetto e inferiore a quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1A.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.3 LAVORAZIONE L1Ater

La lavorazione L1Ater prevede la stesa del pacchetto P1A per la realizzazione della nuova piattaforma dell'autostrada e della tangenziale nei tratti in cui la quota di progetto è superiore a quella esistente per più di 69 cm.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso;
- Realizzazione della sovrastruttura P1A.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.4 LAVORAZIONE L1B

La lavorazione L1B prevede la stesa del pacchetto P1B per la realizzazione della nuova piattaforma per le rampe di svincolo.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1B.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.5 LAVORAZIONE L1Bbis

La lavorazione L1Bbis prevede la stesa del pacchetto P1B per la realizzazione della nuova piattaforma delle rampe di svincolo nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1B.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.6 LAVORAZIONE L1Bter

La lavorazione L1Ater prevede la stesa del pacchetto P1B per la realizzazione della nuova piattaforma delle rampe nei tratti in cui la quota di progetto è superiore a quella esistente per più di 69 cm.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso;
- Realizzazione della sovrastruttura P1B.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.7 LAVORAZIONE L1C

La lavorazione L1C prevede la stesa del pacchetto P1C per la realizzazione della nuova piattaforma dell'autostrada e della tangenziale su impalcato.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1C.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.8 LAVORAZIONE L1D

La lavorazione L1D prevede la stesa del pacchetto P1D per la realizzazione della nuova piattaforma per il cavalcavia Benazza.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1D.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.9 LAVORAZIONE L1Dbis

La lavorazione L1Dbis prevede la stesa del pacchetto P1D per la realizzazione della nuova piattaforma per il cavalcavia Benazza nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1D.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.10 LAVORAZIONE L1E

La lavorazione L1E prevede la stesa del pacchetto P1E per la realizzazione della nuova piattaforma del cavalcavia Donato - Terrapieno

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1E.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.11 LAVORAZIONE L1Ebis

La lavorazione L1Ebis prevede la stesa del pacchetto P1E per la realizzazione della nuova piattaforma per il cavalcavia Donato - Terrapieno nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1E.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.12 LAVORAZIONE L1F

La lavorazione L1F prevede la stesa del pacchetto P1F per la realizzazione della nuova piattaforma del cavalcavia Colombo – Europa.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1F.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.13 LAVORAZIONE L1Fbis

La lavorazione L1Fbis prevede la stesa del pacchetto P1F per la realizzazione della nuova piattaforma per il cavalcavia Colombo - Europa nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1F.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.14 LAVORAZIONE L1G

La lavorazione L1G prevede la stesa del pacchetto P1G per la realizzazione della nuova piattaforma per le riprofilature dei sottovia.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1G.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.15 LAVORAZIONE L1Gbis

La lavorazione L1Gbis prevede la stesa del pacchetto P1G per la realizzazione della nuova piattaforma per le riprofilature dei sottovia nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1G.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.16 LAVORAZIONE L1H

La lavorazione L1H prevede la stesa del pacchetto P1H per la realizzazione della nuova piattaforma per le viabilità locali.

La lavorazione risulta costituita dalla seguente fase:

- Realizzazione della sovrastruttura P1H.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

7.17 LAVORAZIONE L1Hbis

La lavorazione L1Hbis prevede la stesa del pacchetto P1H per la realizzazione della nuova piattaforma per le viabilità locali nei tratti in cui la nuova pavimentazione si ammorsa su quella esistente.

La lavorazione risulta costituita dalle seguenti fasi:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1H.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

8 RISANAMENTI PROFONDI

8.1 LAVORAZIONI L2A, L2B, L2C e L2D

Le lavorazioni L2A, L2B, L2C e L2D prevedono, rispettivamente, la stesa del pacchetto P2A, P2B, P2C e P2D.

La lavorazione risulta costituita dalle seguenti fasi:

- Fresatura di una parte degli strati in conglomerato bituminoso,
- Realizzazione della nuova sovrastruttura (P2A, P2B, P2C e P2D).

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

8.2 LAVORAZIONI L2E e L2F

Le lavorazioni L2E e L2F prevedono, rispettivamente, la stesa del pacchetto P2E e P2F.

La lavorazione risulta costituita dalle seguenti fasi:

- Fresatura degli strati in conglomerato bituminoso,
- Demolizione della porzione restante di cassonetto necessaria a raggiungere la quota di posa della nuova sovrastruttura,
- Realizzazione della nuova sovrastruttura (P2E e P2F).

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

9 RIQUALIFICA SPARTITRAFFICO

9.1 LAVORAZIONE L3A

La lavorazione L3A prevede la riqualifica dello spartitraffico tra autostrada e tangenziale, nei casi in cui questo ricade in progetto fuori dalla carreggiata o in corsie non interessate dal traffico commerciale, attraverso il seguente intervento:

- Demolizione della porzione di pavimentazione necessaria a raggiungere la quota di posa della nuova sovrastruttura,
- Realizzazione della nuova sovrastruttura (P3).

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

9.2 LAVORAZIONE L3B

La lavorazione L3B prevede la riqualifica dello spartitraffico tra autostrada e tangenziale, nei casi in cui questo ricade in progetto in una corsia interessata dal transito dei veicoli commerciali, attraverso il seguente intervento:

- Demolizione degli strati in conglomerato bituminoso e della porzione restante di cassonetto nonché rimozione del materiale da rilevato necessaria a raggiungere la quota di posa della nuova sovrastruttura;
- Realizzazione della sovrastruttura P1A.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

10 RISANAMENTI SUPERFICIALI

La lavorazione tipo L4 prevede il rifacimento degli attuali strati di usura e binder secondo i seguenti due sotto casi.

10.1 LAVORAZIONE L4A

La lavorazione L4A prevede il rifacimento degli attuali strati di usura e binder su autostrada e tangenziale attraverso il seguente intervento:

- Fresatura dello strato superficiale della pavimentazione (9 cm);
- Eventuale imbottitura in conglomerato bituminoso;
- Realizzazione dello strato di collegamento (binder) in conglomerato bituminoso (h=5cm);
- Realizzazione dello strato di usura drenante in conglomerato bituminoso (h=4cm).

Nei tratti in cui è previsto il Trattamento di irruvidimento ad alta aderenza “TAA” va prevista l’usura chiusa al posto dell’usura drenante.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

10.2 LAVORAZIONE L4B

La lavorazione L4B prevede il rifacimento dell’attuale strato di usura sulle rampe di svincolo attraverso il seguente intervento:

- Fresatura dello strato superficiale della pavimentazione (4 cm);
- Eventuale imbottitura in conglomerato bituminoso;
- Realizzazione dello strato di usura chiusa in conglomerato bituminoso (h=4cm).

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

11 RIPRISTINO PAVIMENTAZIONI

11.1 LAVORAZIONI L5A, L5B, L5C e L5D

Le lavorazioni L5A, L5B, L5C e L5D prevedono, rispettivamente, la stesa del pacchetto P4A, P4B, P4C e P4D.

La lavorazione risulta costituita dalle seguenti fasi:

- Realizzazione della nuova sovrastruttura (P4A, P4B, P4C e P4D) a ripristino della pavimentazione demolita per opere in calcestruzzo.

Si ricorda, come esplicitato nella premessa della parte 2 della presente relazione, che la posa dello strato di usura dovrà essere fatta contemporaneamente per tutte le lavorazioni che comprendono il medesimo tipo di usura.

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ALLEGATI

ALLEGATO A: ELABORAZIONE DEI DATI DI TEMPERATURA

Mese	Tmin	Tmax	ΔT
Gen	-2.0	5.0	1.5
Feb	1.0	8.0	4.5
Mar	4.0	13.0	8.5
Apr	8.0	18.0	13.0
Mag	12.0	23.0	17.5
Giu	16.0	27.0	21.5
Lug	18.0	30.0	24.0
Ago	18.0	29.0	23.5
Set	15.0	25.0	20.0
Ott	10.0	19.0	14.5
Nov	4.0	11.0	7.5
Dic	0.0	6.0	3.0

I valori della temperatura della pavimentazione T_{PAV}, utilizzati nel calcolo e determinati utilizzando la relazione proposta da Marchionna sono i seguenti:

- Sovrastruttura **TIPO P1A**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.3
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.7
MAGGIO	17.5	25.2	25.0	24.3
GIUGNO	21.5	30.6	30.3	29.4
LUGLIO	24.0	34.0	33.7	32.5
AGOSTO	23.5	33.3	33.0	31.9
SETTEMBRE	20.0	28.6	28.3	27.5
OTTOBRE	14.5	21.2	21.0	20.6
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.2

- Sovrastruttura **TIPO P1D**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.0
FEBBRAIO	4.5	7.6	7.7	7.9
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.9
MAGGIO	17.5	25.2	25.0	24.7

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GIUGNO	21.5	30.6	30.3	29.8
LUGLIO	24.0	34.0	33.7	33.1
AGOSTO	23.5	33.3	33.0	32.4
SETTEMBRE	20.0	28.6	28.3	27.9
OTTOBRE	14.5	21.2	21.0	20.8
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	5.9

- Sovrastruttura **TIPO P1E**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.2
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.8
MAGGIO	17.5	25.2	25.0	24.5
GIUGNO	21.5	30.6	30.3	29.5
LUGLIO	24.0	34.0	33.7	32.7
AGOSTO	23.5	33.3	33.0	32.1
SETTEMBRE	20.0	28.6	28.3	27.6
OTTOBRE	14.5	21.2	21.0	20.7
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.1

- Sovrastruttura **TIPO P1F**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.3
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.7
MAGGIO	17.5	25.2	25.0	24.3
GIUGNO	21.5	30.6	30.3	29.4
LUGLIO	24.0	34.0	33.7	32.5
AGOSTO	23.5	33.3	33.0	31.9
SETTEMBRE	20.0	28.6	28.3	27.5
OTTOBRE	14.5	21.2	21.0	20.6
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.2

- Sovrastruttura **TIPO P1G**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.2

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.7
MAGGIO	17.5	25.2	25.0	24.4
GIUGNO	21.5	30.6	30.3	29.5
LUGLIO	24.0	34.0	33.7	32.6
AGOSTO	23.5	33.3	33.0	32.0
SETTEMBRE	20.0	28.6	28.3	27.6
OTTOBRE	14.5	21.2	21.0	20.6
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.1

- Sovrastruttura **TIPO P2A**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)
GENNAIO	1.5	3.6	3.9
FEBBRAIO	4.5	7.6	7.8
MARZO	8.5	13.0	13.0
APRILE	13.0	19.1	18.9
MAGGIO	17.5	25.2	24.8
GIUGNO	21.5	30.6	30.0
LUGLIO	24.0	34.0	33.3
AGOSTO	23.5	33.3	32.6
SETTEMBRE	20.0	28.6	28.1
OTTOBRE	14.5	21.2	20.9
NOVEMBRE	7.5	11.7	11.7
DICEMBRE	3.0	5.6	5.9

- Sovrastruttura **TIPO P2B**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)
GENNAIO	1.5	3.6	4.0
FEBBRAIO	4.5	7.6	7.9
MARZO	8.5	13.0	13.1
APRILE	13.0	19.1	18.9
MAGGIO	17.5	25.2	24.7
GIUGNO	21.5	30.6	29.8
LUGLIO	24.0	34.0	33.1
AGOSTO	23.5	33.3	32.4
SETTEMBRE	20.0	28.6	27.9
OTTOBRE	14.5	21.2	20.8
NOVEMBRE	7.5	11.7	11.8
DICEMBRE	3.0	5.6	5.9

- Sovrastruttura **TIPO P2C**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)
GENNAIO	1.5	3.6	4.1
FEBBRAIO	4.5	7.6	7.9
MARZO	8.5	13.0	13.1
APRILE	13.0	19.1	18.8
MAGGIO	17.5	25.2	24.6
GIUGNO	21.5	30.6	29.7
LUGLIO	24.0	34.0	32.9
AGOSTO	23.5	33.3	32.2
SETTEMBRE	20.0	28.6	27.8
OTTOBRE	14.5	21.2	20.7
NOVEMBRE	7.5	11.7	11.8
DICEMBRE	3.0	5.6	6.0

- Sovrastruttura **TIPO P2D**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.2
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.8
MAGGIO	17.5	25.2	25.0	24.5
GIUGNO	21.5	30.6	30.3	29.5
LUGLIO	24.0	34.0	33.7	32.7
AGOSTO	23.5	33.3	33.0	32.1
SETTEMBRE	20.0	28.6	28.3	27.6
OTTOBRE	14.5	21.2	21.0	20.7
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.1

- Sovrastruttura **TIPO P2E**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.3
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.7
MAGGIO	17.5	25.2	25.0	24.3
GIUGNO	21.5	30.6	30.3	29.4
LUGLIO	24.0	34.0	33.7	32.5
AGOSTO	23.5	33.3	33.0	31.9
SETTEMBRE	20.0	28.6	28.3	27.5
OTTOBRE	14.5	21.2	21.0	20.6

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.2

- Sovrastruttura **TIPO P2F**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.4
FEBBRAIO	4.5	7.6	7.7	8.1
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.6
MAGGIO	17.5	25.2	25.0	24.2
GIUGNO	21.5	30.6	30.3	29.2
LUGLIO	24.0	34.0	33.7	32.3
AGOSTO	23.5	33.3	33.0	31.7
SETTEMBRE	20.0	28.6	28.3	27.3
OTTOBRE	14.5	21.2	21.0	20.5
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.2

- Sovrastruttura **TIPO P5A**

MESE	T_{ARIA} (°C)	T_{PAV} Usura (°C)	T_{PAV} Binder (°C)	T_{PAV} Base (°C)
GENNAIO	1.5	3.6	3.7	4.3
FEBBRAIO	4.5	7.6	7.7	8.0
MARZO	8.5	13.0	13.0	13.1
APRILE	13.0	19.1	19.0	18.7
MAGGIO	17.5	25.2	25.0	24.3
GIUGNO	21.5	30.6	30.3	29.4
LUGLIO	24.0	34.0	33.7	32.5
AGOSTO	23.5	33.3	33.0	31.9
SETTEMBRE	20.0	28.6	28.3	27.5
OTTOBRE	14.5	21.2	21.0	20.6
NOVEMBRE	7.5	11.7	11.7	11.8
DICEMBRE	3.0	5.6	5.7	6.2

ALLEGATO B: ELABORAZIONE DEI DATI DI TRAFFICO

- Sovrastruttura **P1A**

	TGM
TGM 2030 bidirezionale	22965
TGM 2040 bidirezionale	23284

var med 2030/2040	0.14%

	TGM
2030	22965
2031	22997
2032	23029
2033	23060
2034	23092
2035	23124
2036	23156
2037	23188
2038	23220
2039	23252
2040	23284

MED 2030-2040 BID	**23124**

TGM VP BID	23124
% corsia più caricata	70%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	**24281**

Mese	***n° assi 80 kN mese***
GEN	752,696
FEB	679,854
MAR	752,696
APR	728,415
MAG	752,696
GIU	728,415
LUG	752,696
AGO	752,696
SET	728,415
OTT	752,696
NOV	728,415
DIC	752,696
Traffico medio	**738,532**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	6.54%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	13.09%	2	40	80				0.0625	1.0000				1.0625	0.1390
4	7.83%	2	50	110				0.1526	3.5745				3.7271	0.2918
5	4.33%	3	40	80	80			0.0625	1.3800				1.4425	0.0624
6	22.00%	3	60	100	100			0.3164	2.7100				3.0264	0.6658
7	4.33%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1586
8	8.84%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6751
9	4.33%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1222
10	8.84%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4424
11	4.33%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1802
12	8.84%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5550
13	0.18%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0227
16	6.54%	2	50	80				0.1526	1.0000				1.1526	0.0754
													ESALF TOT	**3**

- Sovrastruttura **P1D**

	TGM
TGM 2030	191
TGM 2040	140

var med 2030/2040	-3.06%

	TGM
2030	191
2031	185
2032	179
2033	174
2034	169
2035	164
2036	159
2037	154
2038	149
2039	144
2040	140
TOT	1807
MED 2030-2040	**164**

TGM VP	164
% corsia più caricata	100%
coeff. eq assi 80 kN	3.5
n° assi 80 kN giorno	**575**

Mese	***n° assi 80 kN mese***
GEN	17,828
FEB	16,102
MAR	17,828
APR	17,252
MAG	17,828
GIU	17,252
LUG	17,828
AGO	17,828
SET	17,252
OTT	17,828
NOV	17,252
DIC	17,828
Traffico medio	**17,492**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	7.70%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	15.39%	2	40	80				0.0625	1.0000				1.0625	0.1636
4	9.21%	2	50	110				0.1526	3.5745				3.7271	0.3433
5	3.93%	3	40	80	80			0.0625	1.3800				1.4425	0.0568
6	20.00%	3	60	100	100			0.3164	2.7100				3.0264	0.6053
7	3.93%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1442
8	8.03%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6138
9	3.93%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1110
10	8.03%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4022
11	3.93%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1638
12	8.03%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5545
13	0.16%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0207
16	7.70%	2	50	80				0.1526	1.0000				1.1526	0.0887
												ESALF TOT	**3.5**	

- Sovrastruttura **P1E**

	TGM
TGM 2030	993
TGM 2040	1053

var med 2030/2040	0.59%

	TGM
2030	993
2031	999
2032	1005
2033	1011
2034	1017
2035	1023
2036	1029
2037	1035
2038	1041
2039	1047
2040	1053
TOT	11250
MED 2030-2040	**1023**

TGM VP	1023
% corsia più caricata	100%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	**3068**

Mese	***n° assi 80 kN mese***
GEN	95,114
FEB	85,909
MAR	95,114
APR	92,046
MAG	95,114
GIU	92,046
LUG	95,114
AGO	95,114
SET	92,046
OTT	95,114
NOV	92,046
DIC	95,114
Traffico medio	**93,324**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	11.16%	2	10	20				0.0002	0.0039				0.0042	0.0005
3	22.32%	2	40	80				0.0625	1.0000				1.0625	0.2372
4	13.36%	2	50	110				0.1526	3.5745				3.7271	0.4978
5	2.75%	3	40	80	80			0.0625	1.3800				1.4425	0.0397
6	14.00%	3	60	100	100			0.3164	2.7100				3.0264	0.4237
7	2.75%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1009
8	5.62%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.4296
9	2.75%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0777
10	5.62%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2815
11	2.75%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1147
12	5.62%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.3532
13	0.11%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0145
16	11.16%	2	50	80				0.1526	1.0000				1.1526	0.1286
													ESALF TOT	**3**

- Sovrastruttura **P1F**

	TGM
TGM 2030	1689
TGM 2040	1789

var med 2030/2040	0.58%

	TGM
2030	1689
2031	1699
2032	1709
2033	1718
2034	1728
2035	1738
2036	1748
2037	1758
2038	1769
2039	1779
2040	1789
TOT	19124
MED 2030-2040	**1739**

TGM VP	1739
% corsia più caricata	100%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	**4346**

Mese	***n° assi 80 kN mese***
GEN	134,739
FEB	121,699
MAR	134,739
APR	130,392
MAG	134,739
GIU	130,392
LUG	134,739
AGO	134,739
SET	130,392
OTT	134,739
NOV	130,392
DIC	134,739
Traffico medio	**132,203**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	13.28%	2	10	20				0.0002	0.0039				0.0042	0.0006
3	26.56%	2	40	80				0.0625	1.0000				1.0625	0.2821
4	15.89%	2	50	110				0.1526	3.5745				3.7271	0.5922
5	2.03%	3	40	80	80			0.0625	1.3800				1.4425	0.0293
6	10.33%	3	60	100	100			0.3164	2.7100				3.0264	0.3127
7	2.03%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.0745
8	4.15%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.3171
9	2.03%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0574
10	4.15%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2078
11	2.03%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.0846
12	4.15%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.2607
13	0.08%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0107
16	13.28%	2	50	80				0.1526	1.0000				1.1526	0.1530
												ESALF TOT	**2.5**	

- Sovrastruttura **P1G**

	TGM
TGM 2030	1397
TGM 2040	1421

var med 2030/2040	0.17%

	TGM
2030	1397
2031	1399
2032	1402
2033	1404
2034	1407
2035	1409
2036	1411
2037	1414
2038	1416
2039	1419
2040	1421
TOT	15499
MED 2030-2040	**1409**

TGM VP	1409
% corsia più caricata	100%
coeff. eq assi 80 kN	3.5
n° assi 80 kN giorno	**4931**

Mese	***n° assi 80 kN mese***
GEN	152,873
FEB	138,078
MAR	152,873
APR	147,941
MAG	152,873
GIU	147,941
LUG	152,873
AGO	152,873
SET	147,941
OTT	152,873
NOV	147,941
DIC	152,873
Traffico medio	**149,996**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	7.12%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	14.24%	2	40	80				0.0625	1.0000				1.0625	0.1513
4	8.52%	2	50	110				0.1526	3.5745				3.7271	0.3176
5	4.13%	3	40	80	80			0.0625	1.3800				1.4425	0.0596
6	21.00%	3	60	100	100			0.3164	2.7100				3.0264	0.6355
7	4.13%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1514
8	8.43%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6444
9	4.13%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1166
10	8.43%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4223
11	4.13%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1720
12	8.43%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5298
13	0.17%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0217
16	7.12%	2	50	80				0.1526	1.0000				1.1526	0.0821
													ESALF TOT	**3.5**

- Sovrastruttura **P2A**

	TGM
TGM 2030	8,719
TGM 2040	9,071

var med 2030/2040	0.40%

	TGM
2030	8719
2031	8754
2032	8789
2033	8824
2034	8859
2035	8894
2036	8929
2037	8964
2038	9000
2039	9035
2040	9071

MED 2030-2040	**8894**

TGM VP	8894
% VP	70%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	**15565**

Mese	***n° assi 80 kN mese***
GEN	482,517
FEB	435,821
MAR	482,517
APR	466,952
MAG	482,517
GIU	466,952
LUG	482,517
AGO	482,517
SET	466,952
OTT	482,517
NOV	466,952
DIC	482,517
Traffico medio	**473,437**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	11.35%	2	10	20				0.0002	0.0039				0.0042	0.0005
3	22.71%	2	40	80				0.0625	1.0000				1.0625	0.2413
4	13.59%	2	50	110				0.1526	3.5745				3.7271	0.5064
5	2.69%	3	40	80	80			0.0625	1.3800				1.4425	0.0388
6	13.67%	3	60	100	100			0.3164	2.7100				3.0264	0.4136
7	2.69%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.0985
8	5.49%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.4194
9	2.69%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0759
10	5.49%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2748
11	2.69%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1119
12	5.49%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.3448
13	0.11%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0141
16	11.35%	2	50	80				0.1526	1.0000				1.1526	0.1309
												ESALF TOT	**2.5**	

- Sovrastruttura **P2B**

	TGM
TGM 2030	11,569
TGM 2040	12,074

var med 2030/2040	0.43%

	TGM
2030	11569
2031	11618
2032	11668
2033	11718
2034	11768
2035	11819
2036	11869
2037	11920
2038	11971
2039	12022
2040	12074

MED 2030-2040	**11820**

TGM VP	11820
% VP	70%
coeff. eq assi 80 kN	3.5
n° assi 80 kN giorno	**28958**

Mese	***n° assi 80 kN mese***
GEN	897,698
FEB	810,824
MAR	897,698
APR	868,740
MAG	897,698
GIU	868,740
LUG	897,698
AGO	897,698
SET	868,740
OTT	897,698
NOV	868,740
DIC	897,698
Traffico medio	**880,806**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	6.35%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	12.70%	2	40	80				0.0625	1.0000				1.0625	0.1349
4	7.60%	2	50	110				0.1526	3.5745				3.7271	0.2832
5	4.39%	3	40	80	80			0.0625	1.3800				1.4425	0.0634
6	22.33%	3	60	100	100			0.3164	2.7100				3.0264	0.6759
7	4.39%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1610
8	8.97%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6854
9	4.39%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1240
10	8.97%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4491
11	4.39%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1829
12	8.97%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5634
13	0.18%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0231
16	6.35%	2	50	80				0.1526	1.0000				1.1526	0.0732
												ESALF TOT	**3.5**	

- Sovrastruttura **P2C**

	TGM
TGM 2030	9,284
TGM 2040	9,780

var med 2030/2040	0.52%

	TGM
2030	9284
2031	9332
2032	9381
2033	9430
2034	9479
2035	9529
2036	9579
2037	9629
2038	9679
2039	9730
2040	9780

MED 2030-2040	**9530**

TGM VP	9530
% VP	70%
coeff. eq assi 80 kN	3.5
n° assi 80 kN giorno	**23349**

Mese	***n° assi 80 kN mese***
GEN	723,814
FEB	653,767
MAR	723,814
APR	700,465
MAG	723,814
GIU	700,465
LUG	723,814
AGO	723,814
SET	700,465
OTT	723,814
NOV	700,465
DIC	723,814
Traffico medio	**710,194**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	6.74%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	13.47%	2	40	80				0.0625	1.0000				1.0625	0.1431
4	8.06%	2	50	110				0.1526	3.5745				3.7271	0.3004
5	4.26%	3	40	80	80			0.0625	1.3800				1.4425	0.0615
6	21.67%	3	60	100	100			0.3164	2.7100				3.0264	0.6557
7	4.26%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1562
8	8.70%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6649
9	4.26%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1203
10	8.70%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4357
11	4.26%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1775
12	8.70%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5466
13	0.18%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0224
16	6.74%	2	50	80				0.1526	1.0000				1.1526	0.0776
													ESALF TOT	**3.5**

- Sovrastruttura **P2D**

	TGM
TGM 2030	7,322
TGM 2040	7,657

var med 2030/2040	0.45%

	TGM
2030	7322
2031	7355
2032	7388
2033	7421
2034	7454
2035	7488
2036	7521
2037	7555
2038	7589
2039	7622
2040	7657

MED 2030-2040	**7488**

TGM VP	7488
% VP	70%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	**13105**

Mese	***n° assi 80 kN mese***
GEN	406,241
FEB	366,927
MAR	406,241
APR	393,136
MAG	406,241
GIU	393,136
LUG	406,241
AGO	406,241
SET	393,136
OTT	406,241
NOV	393,136
DIC	406,241
Traffico medio	**398,597**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	12.32%	2	10	20				0.0002	0.0039				0.0042	0.0005
3	24.63%	2	40	80				0.0625	1.0000				1.0625	0.2617
4	14.74%	2	50	110				0.1526	3.5745				3.7271	0.5493
5	2.36%	3	40	80	80			0.0625	1.3800				1.4425	0.0341
6	12.00%	3	60	100	100			0.3164	2.7100				3.0264	0.3632
7	2.36%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.0865
8	4.82%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.3683
9	2.36%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0666
10	4.82%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2413
11	2.36%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.0983
12	4.82%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.3027
13	0.10%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0124
16	12.32%	2	50	80				0.1526	1.0000				1.1526	0.1419
													ESALF TOT	**2.5**

- Sovrastruttura **P2E**

	TGM
TGM 2030	12,147
TGM 2040	12,730

var med 2030/2040	0.47%

	TGM
2030	12147
2031	12204
2032	12261
2033	12319
2034	12377
2035	12435
2036	12493
2037	12552
2038	12611
2039	12671
2040	12730

MED 2030-2040	**12436**

TGM VP	12436
% VP	30%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	**9327**

Mese	***n° assi 80 kN mese***
GEN	289,143
FEB	261,162
MAR	289,143
APR	279,816
MAG	289,143
GIU	279,816
LUG	289,143
AGO	289,143
SET	279,816
OTT	289,143
NOV	279,816
DIC	289,143
Traffico medio	**283,702**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	12.12%	2	10	20				0.0002	0.0039				0.0042	0.0005
3	24.25%	2	40	80				0.0625	1.0000				1.0625	0.2576
4	14.51%	2	50	110				0.1526	3.5745				3.7271	0.5407
5	2.43%	3	40	80	80			0.0625	1.3800				1.4425	0.0350
6	12.33%	3	60	100	100			0.3164	2.7100				3.0264	0.3733
7	2.43%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.0889
8	4.95%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.3785
9	2.43%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0685
10	4.95%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2480
11	2.43%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1010
12	4.95%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.3111
13	0.10%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0128
16	12.12%	2	50	80				0.1526	1.0000				1.1526	0.1397
													ESALF TOT	**2.5**

- Sovrastruttura **P2F**

	TGM
TGM 2030	12,147
TGM 2040	12,730

var med 2030/2040	0.47%

	TGM
2030	12147
2031	12204
2032	12261
2033	12319
2034	12377
2035	12435
2036	12493
2037	12552
2038	12611
2039	12671
2040	12730

MED 2030-2040	**12436**

TGM VP	12436
% VP	70%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	**21764**

Mese	***n° assi 80 kN mese***
GEN	674,669
FEB	609,378
MAR	674,669
APR	652,905
MAG	674,669
GIU	652,905
LUG	674,669
AGO	674,669
SET	652,905
OTT	674,669
NOV	652,905
DIC	674,669
Traffico medio	**661,973**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	12.12%	2	10	20				0.0002	0.0039				0.0042	0.0005
3	24.25%	2	40	80				0.0625	1.0000				1.0625	0.2576
4	14.51%	2	50	110				0.1526	3.5745				3.7271	0.5407
5	2.43%	3	40	80	80			0.0625	1.3800				1.4425	0.0350
6	12.33%	3	60	100	100			0.3164	2.7100				3.0264	0.3733
7	2.43%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.0889
8	4.95%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.3785
9	2.43%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.0685
10	4.95%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.2480
11	2.43%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1010
12	4.95%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.3111
13	0.10%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0128
16	12.12%	2	50	80				0.1526	1.0000				1.1526	0.1397
													ESALF TOT	**2.5**

- Sovrastruttura **P5A**

	TGM
TGM 2030 bidirezionale	22965
TGM 2040 bidirezionale	23284

var med 2030/2040	0.14%

	TGM
2030	22965
2031	22997
2032	23029
2033	23060
2034	23092
2035	23124
2036	23156
2037	23188
2038	23220
2039	23252
2040	23284

MED 2030-2040 BID	**23124**

TGM VP BID	23124
% corsia più caricata	70%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	**24281**

Mese	***n° assi 80 kN mese***
GEN	752,696
FEB	679,854
MAR	752,696
APR	728,415
MAG	752,696
GIU	728,415
LUG	752,696
AGO	752,696
SET	728,415
OTT	752,696
NOV	728,415
DIC	752,696
Traffico medio	**738,532**

Calcolo coefficiente di equivalenza dello spettro di traffico

TIPOLOGIA VEICOLI	FREQUENZA %	NUMERO DI ASSI	DISTRIBUZIONE CARICHI PER ASSE [KN]					LEFi					∑LEF veicolo$_i$	LEF x f%
1	6.54%	2	10	20				0.0002	0.0039				0.0042	0.0003
3	13.09%	2	40	80				0.0625	1.0000				1.0625	0.1390
4	7.83%	2	50	110				0.1526	3.5745				3.7271	0.2918
5	4.33%	3	40	80	80			0.0625	1.3800				1.4425	0.0624
6	22.00%	3	60	100	100			0.3164	2.7100				3.0264	0.6658
7	4.33%	4	40	90	80	80		0.0625	1.6018	1.0000	1.0000		3.6643	0.1586
8	8.84%	4	60	100	100	100		0.3164	2.4414	2.4414	2.4414		7.6406	0.6751
9	4.33%	5	40	80	80	80	80	0.0625	1.3800		1.3800		2.8225	0.1222
10	8.84%	5	60	90	90	100	100	0.3164	1.9800		2.7100		5.0064	0.4424
11	4.33%	5	40	100	80	80	80	0.0625	2.4414	1.6600			4.1639	0.1802
12	8.84%	5	60	110	90	90	90	0.3164	3.5745	2.3900			6.2809	0.5550
13	0.18%	5	50	120	130	130	130	0.1526	5.0625	7.4000			12.6151	0.0227
16	6.54%	2	50	80				0.1526	1.0000				1.1526	0.0754
													ESALF TOT	**3**

ALLEGATO C: ELABORAZIONE DEI DATI RELATIVI ALLE MISCELE BITUMINOSE

FORMULARIO

1. Calcolo del modulo del legante bituminoso per bitumi modificati

$$S_b = 627.45 \cdot e^{-0.1387 \cdot T(°C)}$$

Dove:

S_b è il modulo del bitume in Mpa
T è la temperatura della pavimentazione in °C

2. Calcolo del modulo di rigidezza del conglomerato bituminoso

$$E^* = E_\infty \cdot R^*$$

$$R^* = 10^{\log R}$$

$$\log R^* = \log \frac{B^*}{B_\infty} \cdot (1 - (1{,}35 \cdot \left(1 - e^{-0{,}13 \frac{V_{min}}{V_{bit}}}\right)) \cdot (1 + (0{,}11 \cdot \log \frac{B^*}{B_\infty})))$$

$$E_\infty = 14500 \cdot (\frac{V_{min}}{V_{bit}})^{0{,}55} \cdot e^{-0{,}0584 \cdot V_{HR}}$$

$$\frac{B^*}{B_\infty} = \frac{S_b}{3000}$$

Dove:

E^* è il modulo di rigidezza del conglomerato bituminoso in Mpa
E_∞ è il valore massimo del modulo di rigidezza del conglomerato (modulo vetroso) in Mpa
R^* è il modulo ridotto, variabile tra 0 e 1, che descrive la forma della curva maestra
B_∞ è il valore massimo del modulo di rigidezza del bitume (modulo vetroso) in Mpa
V_{min} è il contenuto % volumetrico della componente minerale nella miscela bituminosa
V_{bit} è il contenuto % volumetrico di bitume
V_{HR} è il contenuto % dei vuoti d'aria

3. Calcolo del modulo del legante bituminoso per i bitumi tradizionali

$$S_b = 1{,}157 \cdot 10^{-7} t^{-0{,}326} 2{,}718^{-PI^R} \left(T_{RB}{}^R - T_{asp}\right)^5$$

Dove:

$$P^R = 0{,}65 P^I$$

$$T_{RB}{}^R = 98{,}4 - 26{,}35 \log_{10}(P^R)$$

$$PI^R = \frac{27 \log_{10} P^I - 21{,}65}{76{,}35 \log_{10} P^I - 232{,}82}$$

Dove:

P^I è la penetrazione iniziale del bitume;
T_{asp} è la temperatura dello strato in conglomerato bituminoso
t è il tempo di carico (0,02 sec) – 8Hz
PI^R è l'indice di penetrazione "Recovery" dopo la miscelazione e stesa
$T_{RB}{}^R$ è la temperatura di palla e anello "Recovery"

ELABORAZIONE DEI DATI RELATIVI ALLE MISCELE BITUMINOSE

- Sovrastruttura **P1A**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.7	373.5	0.124	0.559	31052	17349
FEB	7.7	214.8	0.072	0.453	31052	14058
MAR	13.0	102.7	0.034	0.330	31052	10241
APR	19.0	44.8	0.015	0.220	31052	6822
MAG	25.0	19.5	0.007	0.139	31052	4312
GIU	30.3	9.3	0.003	0.088	31052	2744
LUG	33.7	5.9	0.002	0.065	31052	2025
AGO	33.0	6.5	0.002	0.069	31052	2155
SET	28.3	12.3	0.004	0.105	31052	3267
OTT	21.0	34.0	0.011	0.190	31052	5889
NOV	11.7	123.5	0.041	0.358	31052	11128
DIC	5.7	283.2	0.094	0.504	31052	15663

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.3	346.9	0.116	0.600	32851	19714
FEB	8.0	205.8	0.069	0.501	32851	16460
MAR	13.1	102.6	0.034	0.381	32851	12502
APR	18.7	46.9	0.016	0.266	32851	8753
MAG	24.3	21.4	0.007	0.177	32851	5831
GIU	29.4	10.7	0.004	0.119	32851	3897
LUG	32.5	6.9	0.002	0.090	32851	2969
AGO	31.9	7.5	0.003	0.096	32851	3139
SET	27.5	13.9	0.005	0.139	32851	4553
OTT	20.6	36.1	0.012	0.234	32851	7687
NOV	11.8	122.1	0.041	0.409	32851	13442
DIC	6.2	267.2	0.089	0.550	32851	18064

- Sovrastruttura **P1D**

USURA (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.467
P_b	5.75%
P_{bm}	5.437

Indici V_g, V_b, V_a.

V_g [%]	81.6
V_b [%]	13.4
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.6	265.58	0.089	0.430	28936	12446
FEB	7.6	178.22	0.059	0.360	28936	10412
MAR	13.0	99.11	0.033	0.271	28936	7846
APR	19.1	46.60	0.016	0.182	28936	5262
MAG	25.2	19.15	0.006	0.108	28936	3122
GIU	30.6	7.41	0.002	0.058	28936	1680
LUG	34.0	3.68	0.001	0.035	28936	1022
AGO	33.3	4.27	0.001	0.039	28936	1138
SET	28.6	10.81	0.004	0.075	28936	2166
OTT	21.2	35.25	0.012	0.155	28936	4493
NOV	11.7	115.53	0.039	0.293	28936	8468
DIC	5.6	218.42	0.073	0.395	28936	11420

BINDER (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.7	261.59	0.087	0.489	31052	15193
FEB	7.7	176.54	0.059	0.418	31052	12975
MAR	13.0	99.08	0.033	0.324	31052	10072
APR	19.0	47.22	0.016	0.226	31052	7011
MAG	25.0	19.78	0.007	0.140	31052	4342
GIU	30.3	7.84	0.003	0.079	31052	2448
LUG	33.7	3.97	0.001	0.050	31052	1541
AGO	33.0	4.58	0.002	0.055	31052	1704
SET	28.3	11.32	0.004	0.100	31052	3098
OTT	21.0	35.92	0.012	0.195	31052	6069
NOV	11.7	115.21	0.038	0.347	31052	10787
DIC	5.7	215.73	0.072	0.454	31052	14083

BASE (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

Indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	4.0	255.05	0.085	0.541	32851	17774
FEB	7.9	173.77	0.058	0.470	32851	15451
MAR	13.1	99.04	0.033	0.375	32851	12315
APR	18.9	48.27	0.016	0.270	32851	8877
MAG	24.7	20.85	0.007	0.175	32851	5742
GIU	29.8	8.59	0.003	0.104	32851	3405
LUG	33.1	4.50	0.001	0.068	32851	2235
AGO	32.4	5.15	0.002	0.075	32851	2449
SET	27.9	12.20	0.004	0.128	32851	4220
OTT	20.8	37.05	0.012	0.237	32851	7786
NOV	11.8	114.68	0.038	0.399	32851	13098
DIC	5.9	211.30	0.070	0.506	32851	16619

- Sovrastruttura **P1E**

USURA (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.467
P_b	5.75%
P_{bm}	5.437

Indici V_g, V_b, V_a.

V_g [%]	81.6
V_b [%]	13.4
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.6	265.58	0.089	0.430	28936	12446
FEB	7.6	178.22	0.059	0.360	28936	10412
MAR	13.0	99.11	0.033	0.271	28936	7846
APR	19.1	46.60	0.016	0.182	28936	5262
MAG	25.2	19.15	0.006	0.108	28936	3122
GIU	30.6	7.41	0.002	0.058	28936	1680
LUG	34.0	3.68	0.001	0.035	28936	1022
AGO	33.3	4.27	0.001	0.039	28936	1138
SET	28.6	10.81	0.004	0.075	28936	2166
OTT	21.2	35.25	0.012	0.155	28936	4493
NOV	11.7	115.53	0.039	0.293	28936	8468
DIC	5.6	218.42	0.073	0.395	28936	11420

BINDER (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.7	261.59	0.087	0.489	31052	15193
FEB	7.7	176.54	0.059	0.418	31052	12975
MAR	13.0	99.08	0.033	0.324	31052	10072
APR	19.0	47.22	0.016	0.226	31052	7011
MAG	25.0	19.78	0.007	0.140	31052	4342
GIU	30.3	7.84	0.003	0.079	31052	2448
LUG	33.7	3.97	0.001	0.050	31052	1541
AGO	33.0	4.58	0.002	0.055	31052	1704
SET	28.3	11.32	0.004	0.100	31052	3098
OTT	21.0	35.92	0.012	0.195	31052	6069
NOV	11.7	115.21	0.038	0.347	31052	10787
DIC	5.7	215.73	0.072	0.454	31052	14083

BASE (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

Indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	4.2	250.77	0.084	0.538	32851	17669
FEB	8.0	171.95	0.057	0.468	32851	15389
MAR	13.1	99.01	0.033	0.375	32851	12314
APR	18.8	48.98	0.016	0.272	32851	8940
MAG	24.5	21.59	0.007	0.178	32851	5853
GIU	29.5	9.12	0.003	0.108	32851	3535
LUG	32.7	4.88	0.002	0.072	32851	2361
AGO	32.1	5.57	0.002	0.078	32851	2577
SET	27.6	12.82	0.004	0.132	32851	4347
OTT	20.7	37.82	0.013	0.240	32851	7868
NOV	11.8	114.32	0.038	0.398	32851	13081
DIC	6.1	208.39	0.069	0.503	32851	16535

- Sovrastruttura **P1F**

USURA (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.467
P_b	5.75%
P_{bm}	5.437

Indici V_g, V_b, V_a.

V_g [%]	81.6
V_b [%]	13.4
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.6	265.58	0.089	0.430	28936	12446
FEB	7.6	178.22	0.059	0.360	28936	10412
MAR	13.0	99.11	0.033	0.271	28936	7846
APR	19.1	46.60	0.016	0.182	28936	5262
MAG	25.2	19.15	0.006	0.108	28936	3122
GIU	30.6	7.41	0.002	0.058	28936	1680
LUG	34.0	3.68	0.001	0.035	28936	1022
AGO	33.3	4.27	0.001	0.039	28936	1138
SET	28.6	10.81	0.004	0.075	28936	2166
OTT	21.2	35.25	0.012	0.155	28936	4493
NOV	11.7	115.53	0.039	0.293	28936	8468
DIC	5.6	218.42	0.073	0.395	28936	11420

BINDER (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.7	261.59	0.087	0.489	31052	15193
FEB	7.7	176.54	0.059	0.418	31052	12975
MAR	13.0	99.08	0.033	0.324	31052	10072
APR	19.0	47.22	0.016	0.226	31052	7011
MAG	25.0	19.78	0.007	0.140	31052	4342
GIU	30.3	7.84	0.003	0.079	31052	2448
LUG	33.7	3.97	0.001	0.050	31052	1541
AGO	33.0	4.58	0.002	0.055	31052	1704
SET	28.3	11.32	0.004	0.100	31052	3098
OTT	21.0	35.92	0.012	0.195	31052	6069
NOV	11.7	115.21	0.038	0.347	31052	10787
DIC	5.7	215.73	0.072	0.454	31052	14083

BASE (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

Indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	4.3	248.65	0.083	0.536	32851	17616
FEB	8.0	171.04	0.057	0.468	32851	15358
MAR	13.1	99.00	0.033	0.375	32851	12313
APR	18.7	49.34	0.016	0.273	32851	8971
MAG	24.3	21.96	0.007	0.180	32851	5909
GIU	29.4	9.40	0.003	0.110	32851	3601
LUG	32.5	5.08	0.002	0.074	32851	2426
AGO	31.9	5.78	0.002	0.080	32851	2642
SET	27.5	13.14	0.004	0.134	32851	4411
OTT	20.6	38.21	0.013	0.241	32851	7909
NOV	11.8	114.15	0.038	0.398	32851	13073
DIC	6.2	206.95	0.069	0.502	32851	16493

- Sovrastruttura **P1G**

USURA (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.467
P_b	5.75%
P_{bm}	5.437

Indici V_g, V_b, V_a.

V_g [%]	81.6
V_b [%]	13.4
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.6	265.58	0.089	0.430	28936	12446
FEB	7.6	178.22	0.059	0.360	28936	10412
MAR	13.0	99.11	0.033	0.271	28936	7846
APR	19.1	46.60	0.016	0.182	28936	5262
MAG	25.2	19.15	0.006	0.108	28936	3122
GIU	30.6	7.41	0.002	0.058	28936	1680
LUG	34.0	3.68	0.001	0.035	28936	1022
AGO	33.3	4.27	0.001	0.039	28936	1138
SET	28.6	10.81	0.004	0.075	28936	2166
OTT	21.2	35.25	0.012	0.155	28936	4493
NOV	11.7	115.53	0.039	0.293	28936	8468
DIC	5.6	218.42	0.073	0.395	28936	11420

BINDER (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	3.7	261.59	0.087	0.489	31052	15193
FEB	7.7	176.54	0.059	0.418	31052	12975
MAR	13.0	99.08	0.033	0.324	31052	10072
APR	19.0	47.22	0.016	0.226	31052	7011
MAG	25.0	19.78	0.007	0.140	31052	4342
GIU	30.3	7.84	0.003	0.079	31052	2448
LUG	33.7	3.97	0.001	0.050	31052	1541
AGO	33.0	4.58	0.002	0.055	31052	1704
SET	28.3	11.32	0.004	0.100	31052	3098
OTT	21.0	35.92	0.012	0.195	31052	6069
NOV	11.7	115.21	0.038	0.347	31052	10787
DIC	5.7	215.73	0.072	0.454	31052	14083

BASE (CON BITUMI NORMALI) - METODO SHELL NOTTINGHAM+FRANCKEN

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

Indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo modulo di rigidezza Sb del bitume

Pen 25 °C [dmm]	60
Pr [dmm]	39
SPr [°C]	56.5
PIr	-0.27
Trif [°C]	20.0
tc [sec]	0.02
Sb [MPa]	41.41

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	E∞ (MPa)	E (MPa)
GEN	4.2	249.92	0.083	0.537	32851	17648
FEB	8.0	171.59	0.057	0.468	32851	15377
MAR	13.1	99.01	0.033	0.375	32851	12314
APR	18.7	49.12	0.016	0.273	32851	8953
MAG	24.4	21.74	0.007	0.179	32851	5876
GIU	29.5	9.23	0.003	0.108	32851	3562
LUG	32.6	4.96	0.002	0.073	32851	2387
AGO	32.0	5.65	0.002	0.079	32851	2603
SET	27.6	12.95	0.004	0.133	32851	4372
OTT	20.6	37.98	0.013	0.240	32851	7884
NOV	11.8	114.25	0.038	0.398	32851	13078
DIC	6.1	207.81	0.069	0.503	32851	16518

- Sovrastruttura **P2A**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.9	364.4	0.121	0.554	31052	17196
FEB	7.8	211.7	0.071	0.450	31052	13978
MAR	13.0	102.7	0.034	0.330	31052	10239
APR	18.9	45.5	0.015	0.221	31052	6877
MAG	24.8	20.2	0.007	0.141	31052	4390
GIU	30.0	9.8	0.003	0.091	31052	2823
LUG	33.3	6.2	0.002	0.068	31052	2100
AGO	32.6	6.8	0.002	0.072	31052	2230
SET	28.1	12.8	0.004	0.108	31052	3347
OTT	20.9	34.7	0.012	0.192	31052	5955
NOV	11.7	123.1	0.041	0.358	31052	11109
DIC	5.9	277.8	0.093	0.501	31052	15547

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.2	351.2	0.117	0.603	32851	19793
FEB	8.0	207.3	0.069	0.502	32851	16503
MAR	13.1	102.6	0.034	0.381	32851	12503
APR	18.8	46.5	0.016	0.265	32851	8721
MAG	24.5	21.1	0.007	0.176	32851	5781
GIU	29.5	10.5	0.003	0.117	32851	3844
LUG	32.7	6.7	0.002	0.089	32851	2918
AGO	32.1	7.4	0.002	0.094	32851	3087
SET	27.6	13.6	0.005	0.137	32851	4501
OTT	20.7	35.8	0.012	0.233	32851	7647
NOV	11.8	122.3	0.041	0.409	32851	13452
DIC	6.1	269.8	0.090	0.552	32851	18124

- Sovrastruttura **P2B**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.0	359.9	0.120	0.551	31052	17119
FEB	7.9	210.2	0.070	0.449	31052	13938
MAR	13.1	102.7	0.034	0.330	31052	10238
APR	18.9	45.8	0.015	0.222	31052	6904
MAG	24.7	20.5	0.007	0.143	31052	4430
GIU	29.8	10.0	0.003	0.092	31052	2864
LUG	33.1	6.4	0.002	0.069	31052	2137
AGO	32.4	7.0	0.002	0.073	31052	2269
SET	27.9	13.1	0.004	0.109	31052	3388
OTT	20.8	35.0	0.012	0.193	31052	5988
NOV	11.8	122.8	0.041	0.357	31052	11100
DIC	5.9	275.1	0.092	0.499	31052	15490

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.4	342.6	0.114	0.598	32851	19635
FEB	8.1	204.4	0.068	0.500	32851	16417
MAR	13.1	102.6	0.034	0.381	32851	12501
APR	18.6	47.3	0.016	0.267	32851	8786
MAG	24.2	21.8	0.007	0.179	32851	5880
GIU	29.2	10.9	0.004	0.120	32851	3950
LUG	32.3	7.1	0.002	0.092	32851	3020
AGO	31.7	7.7	0.003	0.097	32851	3191
SET	27.3	14.2	0.005	0.140	32851	4606
OTT	20.5	36.5	0.012	0.235	32851	7727
NOV	11.8	121.9	0.041	0.409	32851	13431
DIC	6.2	264.6	0.088	0.548	32851	18003

- Sovrastruttura **P2C**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.1	355.5	0.119	0.549	31052	17043
FEB	7.9	208.8	0.070	0.448	31052	13898
MAR	13.1	102.6	0.034	0.330	31052	10237
APR	18.8	46.2	0.015	0.223	31052	6931
MAG	24.6	20.8	0.007	0.144	31052	4470
GIU	29.7	10.2	0.003	0.094	31052	2905
LUG	32.9	6.6	0.002	0.070	31052	2176
AGO	32.2	7.2	0.002	0.074	31052	2308
SET	27.8	13.3	0.004	0.110	31052	3430
OTT	20.7	35.4	0.012	0.194	31052	6021
NOV	11.8	122.6	0.041	0.357	31052	11090
DIC	6.0	272.4	0.091	0.497	31052	15432

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.5	334.3	0.111	0.593	32851	19478
FEB	8.2	201.5	0.067	0.497	32851	16331
MAR	13.1	102.6	0.034	0.380	32851	12500
APR	18.5	48.0	0.016	0.269	32851	8851
MAG	24.0	22.4	0.007	0.182	32851	5981
GIU	28.9	11.4	0.004	0.124	32851	4058
LUG	31.9	7.5	0.002	0.095	32851	3125
AGO	31.3	8.2	0.003	0.100	32851	3296
SET	27.1	14.7	0.005	0.143	32851	4714
OTT	20.4	37.3	0.012	0.238	32851	7808
NOV	11.8	121.4	0.040	0.408	32851	13410
DIC	6.4	259.5	0.087	0.544	32851	17882

- Sovrastruttura **P2D**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.7	373.5	0.124	0.559	31052	17349
FEB	7.7	214.8	0.072	0.453	31052	14058
MAR	13.0	102.7	0.034	0.330	31052	10241
APR	19.0	44.8	0.015	0.220	31052	6822
MAG	25.0	19.5	0.007	0.139	31052	4312
GIU	30.3	9.3	0.003	0.088	31052	2744
LUG	33.7	5.9	0.002	0.065	31052	2025
AGO	33.0	6.5	0.002	0.069	31052	2155
SET	28.3	12.3	0.004	0.105	31052	3267
OTT	21.0	34.0	0.011	0.190	31052	5889
NOV	11.7	123.5	0.041	0.358	31052	11128
DIC	5.7	283.2	0.094	0.504	31052	15663

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.2	351.2	0.117	0.603	32851	19793
FEB	8.0	207.3	0.069	0.502	32851	16503
MAR	13.1	102.6	0.034	0.381	32851	12503
APR	18.8	46.5	0.016	0.265	32851	8721
MAG	24.5	21.1	0.007	0.176	32851	5781
GIU	29.5	10.5	0.003	0.117	32851	3844
LUG	32.7	6.7	0.002	0.089	32851	2918
AGO	32.1	7.4	0.002	0.094	32851	3087
SET	27.6	13.6	0.005	0.137	32851	4501
OTT	20.7	35.8	0.012	0.233	32851	7647
NOV	11.8	122.3	0.041	0.409	32851	13452
DIC	6.1	269.8	0.090	0.552	32851	18124

- Sovrastruttura **P2E**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.7	373.5	0.124	0.559	31052	17349
FEB	7.7	214.8	0.072	0.453	31052	14058
MAR	13.0	102.7	0.034	0.330	31052	10241
APR	19.0	44.8	0.015	0.220	31052	6822
MAG	25.0	19.5	0.007	0.139	31052	4312
GIU	30.3	9.3	0.003	0.088	31052	2744
LUG	33.7	5.9	0.002	0.065	31052	2025
AGO	33.0	6.5	0.002	0.069	31052	2155
SET	28.3	12.3	0.004	0.105	31052	3267
OTT	21.0	34.0	0.011	0.190	31052	5889
NOV	11.7	123.5	0.041	0.358	31052	11128
DIC	5.7	283.2	0.094	0.504	31052	15663

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.3	346.9	0.116	0.600	32851	19714
FEB	8.0	205.8	0.069	0.501	32851	16460
MAR	13.1	102.6	0.034	0.381	32851	12502
APR	18.7	46.9	0.016	0.266	32851	8753
MAG	24.3	21.4	0.007	0.177	32851	5831
GIU	29.4	10.7	0.004	0.119	32851	3897
LUG	32.5	6.9	0.002	0.090	32851	2969
AGO	31.9	7.5	0.003	0.096	32851	3139
SET	27.5	13.9	0.005	0.139	32851	4553
OTT	20.6	36.1	0.012	0.234	32851	7687
NOV	11.8	122.1	0.041	0.409	32851	13442
DIC	6.2	267.2	0.089	0.550	32851	18064

- Sovrastruttura **P2F**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.7	373.5	0.124	0.559	31052	17349
FEB	7.7	214.8	0.072	0.453	31052	14058
MAR	13.0	102.7	0.034	0.330	31052	10241
APR	19.0	44.8	0.015	0.220	31052	6822
MAG	25.0	19.5	0.007	0.139	31052	4312
GIU	30.3	9.3	0.003	0.088	31052	2744
LUG	33.7	5.9	0.002	0.065	31052	2025
AGO	33.0	6.5	0.002	0.069	31052	2155
SET	28.3	12.3	0.004	0.105	31052	3267
OTT	21.0	34.0	0.011	0.190	31052	5889
NOV	11.7	123.5	0.041	0.358	31052	11128
DIC	5.7	283.2	0.094	0.504	31052	15663

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.4	342.6	0.114	0.598	32851	19635
FEB	8.1	204.4	0.068	0.500	32851	16417
MAR	13.1	102.6	0.034	0.381	32851	12501
APR	18.6	47.3	0.016	0.267	32851	8786
MAG	24.2	21.8	0.007	0.179	32851	5880
GIU	29.2	10.9	0.004	0.120	32851	3950
LUG	32.3	7.1	0.002	0.092	32851	3020
AGO	31.7	7.7	0.003	0.097	32851	3191
SET	27.3	14.2	0.005	0.140	32851	4606
OTT	20.5	36.5	0.012	0.235	32851	7727
NOV	11.8	121.9	0.041	0.409	32851	13431
DIC	6.2	264.6	0.088	0.548	32851	18003

- Sovrastruttura **P5A**

USURA DRENANTE

G_b (g/cm3)	1.02
G_g (g/cm3)	2.85
G_m(g/cm3)	2.085
P_b	5.5%
P_{bm}	5.213

Calcolo degli indici V_g, V_b, V_a.

V_g [%]	69.1
V_b [%]	10.9
V_a [%]	20.0

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.522	12356	6452
FEB	7.6	217.5	0.073	0.415	12356	5122
MAR	13.0	102.8	0.034	0.294	12356	3633
APR	19.1	44.2	0.015	0.190	12356	2351
MAG	25.2	19.0	0.006	0.117	12356	1444
GIU	30.6	9.0	0.003	0.073	12356	897
LUG	34.0	5.6	0.002	0.053	12356	652
AGO	33.3	6.2	0.002	0.056	12356	696
SET	28.6	11.9	0.004	0.087	12356	1078
OTT	21.2	33.4	0.011	0.163	12356	2010
NOV	11.7	123.9	0.041	0.322	12356	3974
DIC	5.6	288.2	0.096	0.467	12356	5765

BINDER (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.409
P_b	5.25%
P_{bm}	4.988

Indici V_g, V_b, V_a.

V_g [%]	83.0
V_b [%]	12.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	12.0
V_a [%]	5.0
M	0.078
C	1.196
f1	**0.495**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	3.7	373.5	0.124	0.559	31052	17349
FEB	7.7	214.8	0.072	0.453	31052	14058
MAR	13.0	102.7	0.034	0.330	31052	10241
APR	19.0	44.8	0.015	0.220	31052	6822
MAG	25.0	19.5	0.007	0.139	31052	4312
GIU	30.3	9.3	0.003	0.088	31052	2744
LUG	33.7	5.9	0.002	0.065	31052	2025
AGO	33.0	6.5	0.002	0.069	31052	2155
SET	28.3	12.3	0.004	0.105	31052	3267
OTT	21.0	34.0	0.011	0.190	31052	5889
NOV	11.7	123.5	0.041	0.358	31052	11128
DIC	5.7	283.2	0.094	0.504	31052	15663

BASE (CON BITUMI MODIFICATI)

G_b (g/cm3)	1.02
G_g (g/cm3)	2.75
G_m(g/cm3)	2.426
P_b	4.75%
P_{bm}	4.535

indici V_g, V_b, V_a.

V_g [%]	84.0
V_b [%]	11.0
V_a [%]	5.0

Calcolo del parametro f1 della legge di fatica dell'Asphalt Institute

V_b [%]	11.0
V_a [%]	5.0
M	-0.014
C	0.967
f1	**0.400**

Calcolo del modulo elastico

	Tpav (°C)	Sb (MPa)	B*	R*	Einf (MPa)	E (MPa)
GEN	4.3	346.9	0.116	0.600	32851	19714
FEB	8.0	205.8	0.069	0.501	32851	16460
MAR	13.1	102.6	0.034	0.381	32851	12502
APR	18.7	46.9	0.016	0.266	32851	8753
MAG	24.3	21.4	0.007	0.177	32851	5831
GIU	29.4	10.7	0.004	0.119	32851	3897
LUG	32.5	6.9	0.002	0.090	32851	2969
AGO	31.9	7.5	0.003	0.096	32851	3139
SET	27.5	13.9	0.005	0.139	32851	4553
OTT	20.6	36.1	0.012	0.234	32851	7687
NOV	11.8	122.1	0.041	0.409	32851	13442
DIC	6.2	267.2	0.089	0.550	32851	18064

ALLEGATO D: QUANTITA' RIPORTATE NEL COMPUTO NON DEDUCIBILI DALLE SEZIONI TRASVERSALI O DAGLI ELABORATI STRUTTURALI

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A2	C01	SZ01N	2,032.59	922.91						1,729.94						693.89		1,379.55		3,347	450	1,458.84
A1	C01	SZ01X																				
A1	C01	SZ01C																				
A1	C01	SZ01Y																				
A2	C01	SZ01S	2,120.84	1,083.58									2,180.92					2,191.16			521	1,046.45
A2	C02	SZ02N	5,490.10	2,219.24						1,401.43						769.18		1,795.37		5,847	564	1,572.68
A1	C02	SZ02X	188.05	106.03													939.53				208	502.33
A1	C02	SZ02C																				
A1	C02	SZ02Y		21.25						1,187.61		299.70					1,401.04	4,445.38			12	1,483.27
A2	C02	SZ02S	4,269.00	2,026.42									592.25		370.74			1,695.11			575	616.46
A2	C03	SZ03N	6,344.68	559.32																		
A1	C03	SZ03X	331.36	1,162.31	954.55												1,449.00	2,339.15			350	655.11
A1	C03	SZ03C																				
A1	C03	SZ03Y		363.84													1,633.66	3,982.58			385	771.59
A2	C03	SZ03S	4,083.91	1,460.36																		
A2	C04	SZ04N	3,032.61																			
A1	C04	SZ04X	495.09	66.45	1,711.47												86.52	383.51			58	88.34
A1	C04	SZ04C																			13	
A1	C04	SZ04Y	496.03		2,962.90											261.38		484.68			65	180.31
A2	C04	SZ04S	4,342.28	259.37	373.96													362.13			100	
A2	C05	SZ05N	3,879.31	863.63														750.39			249	
A1	C05	SZ05X		75.89							766.09						1,206.33	2,702.30			89	943.76
A1	C05	SZ05C																				

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A1	C05	SZ05Y										1,209.38				1,042.04		2,590.79				1,398.91
A2	C05	SZ05S	3,623.91	1,035.58														1,585.53			350	
A2	C06	SZ06N	15,977.92	6,068.01										614.55	571.29			9,147.82			2,185	760.90
A1	C06	SZ06X									8,843.75	6,174.21				6,453.89		8,555.86				12,152.94
A1	C06	SZ06C																				
A1	C06	SZ06Y									8,775.39	3,408.52				6,355.53		11,210.03				9,363.24
A2	C06	SZ06S	15,204.39	6,332.06											535.44			9,839.48			2,139	258.03
A2	C07	SZ07N	925.63	411.49										350.31				293.73			140	285.32
A1	C07	SZ07X									498.02	500.98				424.52		576.17				874.15
A1	C07	SZ07C																				
A1	C07	SZ07Y									1,028.64					444.46		582.45				610.48
A2	C07	SZ07S	1,095.12	442.25														683.03			150	
A2	C08	SZ08N	2,004.74	826.79										656.20				526.89			262	529.76
A1	C08	SZ08X									1,474.32	365.63				787.82		1,052.44				1,287.01
A1	C08	SZ08C																				
A1	C08	SZ08Y									1,845.91					791.90		1,053.74				1,075.40
A2	C08	SZ08S	1,772.66	793.31														1,188.57			264	
A2	C09	SZ09N	2,438.47	866.25										464.40	588.89			1,049.91			367	637.67
A1	C09	SZ09X									2,217.91					954.16		1,262.05				1,290.13
A1	C09	SZ09C																				
A1	C09	SZ09Y									2,187.98					934.08		1,306.02				1,268.00
A2	C09	SZ09S	2,485.37	970.14														1,366.91			310	
A2	C10	SZ10N	2,457.71	832.78														380.50			198	
A1	C10	SZ10X									1,387.41	479.32				170.47		1,242.11				819.46
A1	C10	SZ10C																				

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A1	C10	SZ10Y									694.35	463.62				175.88		2,036.34				813.47
A2	C10	SZ10S	1,953.18	459.53											263.39			619.99			545	184.80
A2	C11	SZ11N	5,608.51	1,839.20										668.62	640.59			3,056.01		10,075	702	888.71
A1	C11	SZ11X	1,422.04	991.77							4,048.74	322.14				90.65		3,654.96			490	1,548.30
A1	C11	SZ11C																				
A1	C11	SZ11Y	1,319.15	927.93							1,937.84	589.86				106.98		5,398.84			480	1,602.00
A2	C11	SZ11S	6,690.01	2,132.99											844.99			3,975.27		12,616	697	353.32
A2	C12	SZ12N	2,991.79	645.11											393.13			1,547.65			335	276.35
A1	C12	SZ12X									1,904.71					814.77		1,090.73				1,107.60
A1	C12	SZ12C																				
A1	C12	SZ12Y										1,171.70				611.57		2,237.61				1,116.07
A2	C12	SZ12S	3,466.70	697.80											462.08			1,293.30			353	291.56
A2	C13	SZ13N	2,455.62	614.26											346.65			1,362.75			249	248.53
A1	C13	SZ13X									1,635.43					702.43		932.36				954.84
A1	C13	SZ13C																				
A1	C13	SZ13Y										849.61				656.86		1,747.02				945.98
A2	C13	SZ13S	2,474.31	605.19											321.98			1,273.19			308	232.28
A2	C14	SZ14N	6,967.61	4,009.43										2,453.93	13.64			2,964.71			1,567	1,453.95
A1	C14	SZ14X	1,712.32	1,012.37							4,610.88	686.36				386.89		4,886.62			595	2,324.53
A1	C14	SZ14C																				
A1	C14	SZ14Y	1,649.27	1,262.55								5,295.93						4,963.76			652	1,689.44
A2	C14	SZ14S	7,932.66	3,354.27										1,713.60	9.43			2,282.27		10,598	1,344	816.85
A2	C15	SZ15N	3,699.51	3,948.40										129.80	600.45			4,457.68			826	328.03
A1	C15	SZ15X	1,074.90	556.14							2,978.93	3,262.44				1,876.56		3,812.70		693	380	5,003.90
A1	C15	SZ15C																				

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A1	C15	SZ15Y	103.95	46.83								4,062.60				2,221.64		7,241.00		2,563	50	3,548.16
A2	C15	SZ15S	6,937.83	3,053.94										1,340.74	1,177.54			2,973.31			973	1,609.46
A2	C16	SZ16N	2,149.73	2,970.35														3,721.18			605	
A1	C16	SZ16X									2,344.51	2,107.12				1,106.17		2,404.23		5,617		3,408.55
A1	C16	SZ16C																				
A1	C16	SZ16Y										1,441.64 Usura drenante 653,00 Usura chiusa				699.13 Usura drenante 1,091,00 Usura chiusa		3,087.24 Usura drenante 1,402,00 Usura chiusa		4,826		2,404.95
A2	C16	SZ16S	389.84 Usura drenante 750,00 Usura chiusa	1,607.29 Usura drenante 2,106,00 Usura chiusa										359.73 Usura drenante 595,00 Usura chiusa				511.50 Usura drenante 845,00 Usura chiusa			406	768.29
A2	C17	SZ17N	5,092.01	1,269.02											342.30			3,606.22			729	133.24
A1	C17	SZ17X									228.32	2,411.06				2,061.06		4,939.21		3,136		2,902.26
A1	C17	SZ17C																				
A1	C17	SZ17Y										2,424.96				2,084.40		5,195.91		1,394		2,788.38
A2	C17	SZ17S	5,604.67	2,358.38										665.44				2,781.17			685	537.33
A2	C18	SZ18N	2,715.52	1,073.44														1,510.59			334	
A1	C18	SZ18X										1,150.94				994.69		2,465.17				1,334.31
A1	C18	SZ18C																				
A1	C18	SZ18Y										1,131.14				961.37		2,424.98				1,300.79
A2	C18	SZ18S	2,406.25	962.88														1,480.75			318	
A2	C19	SZ19N	2,028.54	905.73											458.63			177.02			294	196.78
A1	C19	SZ19X										1,024.32				869.71		2,196.42				1,178.72
A1	C19	SZ19C																				

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A1	C19	SZ19Y								1,049.89		1,044.71				904.02		1,187.83				1,820.38
A2	C19	SZ19S	2,281.08	738.51											559.86			1,575.35			317	248.59
A2	C20	SZ20N	1,858.71	531.49											547.77			1,334.88			272	254.85
A1	C20	SZ20X										856.78				747.31		1,834.23		2,123		1,002.46
A1	C20	SZ20C																				
A1	C20	SZ20Y								818.00		825.72				695.01		953.16				1,425.05
A2	C20	SZ20S	643.78	596.66	35.19										286.90			1,136.74			247	134.01
A2	C21	SZ21N	3,101.17	1,357.55														2,050.07			438	
A1	C21	SZ21X										1,590.89				1,339.02		3,412.37		5,083		1,816.38
A1	C21	SZ21C																				
A1	C21	SZ21Y								1,665.01		1,650.22				1,438.92		1,867.84				2,876.06
A2	C21	SZ21S	3,824.17	1,555.11											140.26			2,162.89			496	78.63
A2	C22	SZ22N	5,027.88	1,505.97											328.56			3,515.29			706	113.14
A1	C22	SZ22X										2,490.58				2,139.37		5,336.89				2,859.72
A1	C22	SZ22C																				
A1	C22	SZ22Y								2,489.05		2,489.05				2,133.23		2,845.35				4,286.96
A2	C22	SZ22S	5,095.04	2,514.45											400.65			3,486.67			699	132.86
A2	C23	SZ23N	1,312.44	557.17														929.76			197	
A1	C23	SZ23X										689.88				591.36		1,478.37				801.46
A1	C23	SZ23C																				
A1	C23	SZ23Y								689.65		690.05				591.33		788.36				1,202.46
A2	C23	SZ23S	1,327.66	582.20														888.27			197	
A2	C24	SZ24N	4,249.70	1,339.19	927.32										370.87			2,105.44			393	131.33
A1	C24	SZ24X			1,849.26							1,233.02				1,207.02		3,192.13			15	1,522.26
A1	C24	SZ24C																			3	

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A1	C24	SZ24Y			1,850.00					1,145.11		1,232.64				1,206.39		2,046.32			15	2,182.99
A2	C24	SZ24S	3,884.18	1,729.80	990.32										337.61			1,958.44			389	113.50
A2	C25	SZ25N	3,567.54	571.62	900.76										579.92			202.15			283	230.61
A1	C25	SZ25X		89.39	1,746.27							460.05				794.86		2,746.60			44	805.79
A1	C25	SZ25C																			3	
A1	C25	SZ25Y			1,744.57					415.91		460.28				872.64		2,318.15			15	1,102.45
A2	C25	SZ25S	3,188.00	728.33	912.61										465.95			1,642.79			315	173.24
A2	C26	SZ26N	1,783.65	1,536.59														2,260.63			293	
A1	C26	SZ26X														1,318.79		5,062.65				884.55
A1	C26	SZ26C																				
A1	C26	SZ26Y														927.26		608.77				624.18
A2	C26	SZ26S	2,049.35	1,467.62														3,381.82			287	
A2	O01	ST60N							1,372.61											817		
A2	O02	ST061							1,839.65													
A2	O03	ST066							2,016.66													
AU	V63	VI63N							17,826.04													
AU	V63	VI63S							18,839.23													
A2	O04	ST069							1,034.73													
A2	V82	VA82N							4,884.56													
A2	O05	ST083							769.16													
A2	O06	ST084							1,236.17													
A2	O07	ST086							1,644.13													
A2	O08	ST89N							469.90											470		
A1	O08	ST090							942.59													
A2	O8A	ST90S							170.26									398.19				

WBS			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A2	O09	ST91N							856.67											857		
A1	O10	ST092							644.58													
A2	O10	ST93N							482.18											482		
A2	O11	ST095							1,800.90													
A2	O12	ST097							2,428.15													
A2	O13	ST098							1,986.23											594		
A2	O14	ST109							184.49									595.34				
A2	O15	ST111							2,298.39													
A2	O16	ST113							6,398.44													
A2	O17	ST115							1,040.72											231		
A2	O18	ST118							964.00													
A2	O19	ST122							1,338.45													
A2	O20	ST124							1,345.64													
A2	O21	PO128							4,696.22													
A2	O22	ST132							666.19													
S0	LVS	RS101		21.25						4,961.12							1,206.62	1,513.04			12	2,118.04
S0	LVS	RS102	37.54	56.73						6,716.76							339.54	1,892.89			45	2,079.63
A2	U04	RS04A				646.61	242.53												806.98		308	
A2	U04	RS04B																			39	
A2	U54	RS54A				699.14	48.67												127.08		31	
A2	U54	RS54B				1,516.20	138.00												305.41		136	
A2	U54	RS54C				1,387.20	181.81												178.34		69	
A2	U54	RS54D				622.00	81.00												144.40		37	
A2	U05	RS05A				221.28	267.80												626.68		236	

WBS			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A2	U05	RS05B				919.25	177.00												657.82		264	
A2	U05	RS05C				69.53	124.48												119.71		105	
A2	U05	RS05D				37.00	132.61												54.77		107	
A2	U05	RS05E																			53	
S1	LVS	RS201				25.95	286.39												85.33	460	211	
S1	LVS	RS202				125.96	339.21												229.78	672	268	
S1	LVS	RS203	165.51	20.93														85.34		436	268	
S1	LVS	RS204																		410		
S1	LVS	RS205	72.21	251.32														91.63			206	
S1	LVS	RS206	78.79	190.74														85.21			175	
S1	LVS	RS207	5.99	88.58														106.83			115	
S1	LVS	RS208	226.62	131.92														853.94			164	
A2	U06	RS06A				229.34	391.69												740.90		308	
A2	U06	RS06B				1,188.11	58.36												208.36		125	
A2	U06	RS06C				944.02	45.29												75.82		150	
A2	U06	RS06D				472.60	70.33												353.07		114	
A2	U06	RS06E				28.88	36.53												60.06		42	
A2	U06	RS06F				81.11																
A2	U07	RS07A				166.72	73.11												152.26		73	
A2	U07	RS07B				132.38	58.35												184.60		76	
A2	U07	RS07C				243.28	59.04												217.38		93	
A2	U07	RS07D				322.44	44.45												127.40		60	
A2	U57	RS57A				728.34	41.91														47	
A2	U57	RS57B				26.78	106.27												130.18		90	

WBS			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A2	U57	RS57C				127.11	36.44												161.40		57	
A2	U57	RS57D				110.49	77.75												182.06		75	
S2	LVS	RS301				9.12	70.15												1,124.34		85	
S2	LVS	RS302				78.83	52.22												1,319.15		131	
S2	LVS	RS303				128.73	95.82												1,180.51		228	
S2	LVS	RS304				2,312.11	13.09												440.25		109	
S2	LVS	RS305				2,653.67	364.79												751.17		95	
A2	U08	RS08A				158.57	41.03												315.92		156	
A2	U08	RS08B				206.31	31.17												216.99		101	
A2	U08	RS08C				504.51	29.86												82.93		244	
A2	U08	RS08D				426.04	337.86												675.02		366	
A2	U08	RS08E				351.62																
A2	U08	RS08H				404.26															116	
A2	U58	RS58C				251.62	318.18												755.93		285	
A2	U58	RS58D				435.59	164.75												575.74		226	
A2	U10	RS10A				600.42	52.54												100.67		85	
A2	U10	RS10B				47.96	59.13												180.43		86	
A2	U10	RS10C				1,396.98																
A2	U10	RS10D				1,396.98																
A2	U11	RS11A				39.22	51.66												182.63		59	
A2	U11	RS11B				18.15	65.04												154.00		73	
A2	U11	RS11C				72.97	44.15												205.90		69	
A2	U11	RS11D				90.49	97.87												302.67		107	
A2	U51	RS51A				78.31	122.59												167.44		107	

			L1A	L1Abis	L1Ater	L1B	L1Bbis	L1Bter	L1C	L2A	L2B	L2C	L2D	L2E	L2F	L3A	L3B	L4A	L4B	TAA (*)	Linea di Taglio	Membrana
WBS			[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[mq]	[m]	[m]
A2	U51	RS51B				61.91	70.27												220.92		85	
A2	U51	RS51C				435.02		953.06													12	
A2	U51	RS51D				1,219.01	24.07												7.74		49	
A2	U12	RS12A				51.57	592.95												32.98		70	
A2	U12	RS12B				30.44	291.14												94.06		247	
A2	U12	RS12C				68.37	435.50												199.72		138	
A2	U12	RS12D				135.10	541.14												86.55		116	
A2	U13	RS13A				19.23	55.34												129.90		64	
A2	U13	RS13B				82.75	47.28												197.59		78	
A2	U13	RS13C				306.91	56.12												247.54		81	
A2	U13	RS13D				112.09	149.33												432.64		286	
A2	U14	RS14D																			444	
A2	U16	RS16A																			262	

NOTE:

(*) In corrispondenza dei tratti in cui è prevista il TAA (vedi negli elaborati delle planimetrie di progetto delle pavimentazioni da ATR0022 a ATR0038 l'esatto posizionamento planimetrico) al posto dell'usura drenante va prevista usura chiusa.

ALLEGATO E: VERIFICA STRUTTURALE DELLE PAVIMENTAZIONI

- Sovrastruttura **P1A**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 6
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 30 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.25 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.735E+07
3 1.971E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
3 1.646E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 1.250E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
3 8.753E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
3 5.831E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
3 3.897E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
3 2.969E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
3 3.139E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
3 4.553E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
3 7.687E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
3 1.344E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
3 1.806E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 5 6

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 738532

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 6 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01068	546.114	547.937	265.229	270.712
	(STRAIN)	-1.086E-06	2.063E-05	2.077E-05	-1.228E-06	-8.010E-07
1	34.00000	0.01037	26.695	26.695	-453.371	-400.385
	(STRAIN)	-1.636E-05	1.651E-05	1.651E-05	-1.636E-05	-1.273E-05
1	64.00010	0.01024	8.368	8.529	0.919	1.122
	(STRAIN)	-1.098E-05	2.794E-05	2.878E-05	-1.098E-05	-9.915E-06
1	84.00010	0.00968	6.203	6.253	1.266	1.342
	(STRAIN)	-1.477E-05	4.283E-05	4.341E-05	-1.477E-05	-1.387E-05
2	9.00000	0.01069	275.817	417.714	163.828	226.656
	(STRAIN)	1.332E-06	5.158E-06	1.620E-05	-3.557E-06	1.332E-06
2	34.00000	0.01047	27.708	27.708	-471.411	-415.068
	(STRAIN)	-1.704E-05	1.714E-05	1.714E-05	-1.704E-05	-1.318E-05
2	64.00010	0.01033	8.689	8.720	0.905	1.160
	(STRAIN)	-1.137E-05	2.929E-05	2.946E-05	-1.137E-05	-1.004E-05
2	84.00010	0.00974	6.343	6.353	1.273	1.351
	(STRAIN)	-1.507E-05	4.408E-05	4.420E-05	-1.507E-05	-1.416E-05
3	9.00000	0.01074	88.821	320.749	88.814	200.702
	(STRAIN)	3.306E-06	-5.400E-06	1.265E-05	-5.401E-06	3.306E-06
3	34.00000	0.01057	27.598	27.598	-473.444	-413.702
	(STRAIN)	-1.716E-05	1.715E-05	1.715E-05	-1.716E-05	-1.307E-05
3	64.00010	0.01043	8.823	8.823	0.945	1.214
	(STRAIN)	-1.145E-05	2.970E-05	2.970E-05	-1.145E-05	-1.005E-05
3	84.00010	0.00984	6.440	6.440	1.315	1.393
	(STRAIN)	-1.515E-05	4.464E-05	4.464E-05	-1.515E-05	-1.424E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.086E-06
ALLOWABLE LOAD REPETITIONS = 1.383E+13 DAMAGE RATIO = 5.338E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.716E-05
ALLOWABLE LOAD REPETITIONS = 1.136E+09 DAMAGE RATIO = 6.500E-04

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.970E-05
ALLOWABLE LOAD REPETITIONS = 2.533E+11 DAMAGE RATIO = 2.915E-06

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 4.464E-05
ALLOWABLE LOAD REPETITIONS = 4.085E+10 DAMAGE RATIO = 1.808E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01130	549.163	550.781	260.147	265.233
	(STRAIN)	-1.656E-06	2.594E-05	2.610E-05	-1.811E-06	-1.322E-06

1	34.00000	0.01093	30.738	30.738	-432.483	-380.123
	(STRAIN)	-1.885E-05	1.915E-05	1.915E-05	-1.885E-05	-1.455E-05
1	64.00010	0.01078	9.319	9.510	0.881	1.117
	(STRAIN)	-1.257E-05	3.151E-05	3.250E-05	-1.257E-05	-1.134E-05
1	84.00010	0.01015	6.818	6.877	1.306	1.395
	(STRAIN)	-1.669E-05	4.762E-05	4.831E-05	-1.669E-05	-1.565E-05
2	9.00000	0.01130	277.036	413.215	158.178	217.408
	(STRAIN)	1.239E-06	6.965E-06	2.004E-05	-4.449E-06	1.239E-06
2	34.00000	0.01104	31.918	31.918	-450.058	-394.146
	(STRAIN)	-1.964E-05	1.989E-05	1.989E-05	-1.964E-05	-1.505E-05
2	64.00010	0.01087	9.692	9.730	0.864	1.162
	(STRAIN)	-1.303E-05	3.309E-05	3.328E-05	-1.303E-05	-1.148E-05
2	84.00010	0.01022	6.980	6.992	1.313	1.404
	(STRAIN)	-1.704E-05	4.908E-05	4.921E-05	-1.704E-05	-1.598E-05
3	9.00000	0.01134	88.669	305.346	88.661	188.605
	(STRAIN)	3.607E-06	-5.990E-06	1.482E-05	-5.991E-06	3.607E-06
3	34.00000	0.01114	31.762	31.762	-451.612	-392.254
	(STRAIN)	-1.977E-05	1.987E-05	1.987E-05	-1.977E-05	-1.490E-05
3	64.00010	0.01098	9.824	9.824	0.900	1.214
	(STRAIN)	-1.312E-05	3.350E-05	3.350E-05	-1.312E-05	-1.147E-05
3	84.00010	0.01032	7.068	7.068	1.352	1.443
	(STRAIN)	-1.711E-05	4.959E-05	4.959E-05	-1.711E-05	-1.604E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.656E-06
ALLOWABLE LOAD REPETITIONS = 4.128E+12 DAMAGE RATIO = 1.789E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.977E-05
ALLOWABLE LOAD REPETITIONS = 8.317E+08 DAMAGE RATIO = 8.880E-04

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.350E-05
ALLOWABLE LOAD REPETITIONS = 1.477E+11 DAMAGE RATIO = 4.999E-06

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 4.959E-05
ALLOWABLE LOAD REPETITIONS = 2.553E+10 DAMAGE RATIO = 2.893E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01227	553.376	554.704	251.309	255.632
	(STRAIN)	-2.980E-06	3.667E-05	3.684E-05	-3.155E-06	-2.585E-06
1	34.00000	0.01179	37.753	37.753	-398.633	-347.514
	(STRAIN)	-2.321E-05	2.391E-05	2.391E-05	-2.321E-05	-1.769E-05
1	64.00010	0.01160	10.881	11.125	0.789	1.080
	(STRAIN)	-1.527E-05	3.745E-05	3.872E-05	-1.527E-05	-1.375E-05
1	84.00010	0.01086	7.803	7.877	1.352	1.462
	(STRAIN)	-1.986E-05	5.539E-05	5.626E-05	-1.986E-05	-1.858E-05
2	9.00000	0.01227	278.812	406.701	148.922	202.574
	(STRAIN)	7.915E-07	1.084E-05	2.770E-05	-6.281E-06	7.915E-07
2	34.00000	0.01192	39.224	39.224	-415.350	-360.352
	(STRAIN)	-2.423E-05	2.485E-05	2.485E-05	-2.423E-05	-1.829E-05
2	64.00010	0.01172	11.346	11.394	0.765	1.139
	(STRAIN)	-1.585E-05	3.942E-05	3.967E-05	-1.585E-05	-1.390E-05
2	84.00010	0.01095	8.003	8.017	1.360	1.473
	(STRAIN)	-2.030E-05	5.720E-05	5.737E-05	-2.030E-05	-1.898E-05
3	9.00000	0.01227	88.609	282.443	88.600	170.036
	(STRAIN)	3.923E-06	-6.812E-06	1.874E-05	-6.813E-06	3.923E-06
3	34.00000	0.01202	38.987	38.987	-416.529	-358.006
	(STRAIN)	-2.439E-05	2.480E-05	2.480E-05	-2.439E-05	-1.807E-05
3	64.00010	0.01182	11.477	11.477	0.791	1.188
	(STRAIN)	-1.595E-05	3.987E-05	3.987E-05	-1.595E-05	-1.388E-05
3	84.00010	0.01104	8.077	8.077	1.392	1.506
	(STRAIN)	-2.035E-05	5.765E-05	5.765E-05	-2.035E-05	-1.902E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.980E-06
ALLOWABLE LOAD REPETITIONS = 7.818E+11 DAMAGE RATIO = 9.446E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.439E-05
ALLOWABLE LOAD REPETITIONS = 5.275E+08 DAMAGE RATIO = 1.400E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.987E-05
ALLOWABLE LOAD REPETITIONS = 6.776E+10 DAMAGE RATIO = 1.090E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 5.765E-05
ALLOWABLE LOAD REPETITIONS = 1.300E+10 DAMAGE RATIO = 5.681E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01359	558.331	559.328	238.966	242.066
	(STRAIN)	-5.890E-06	5.711E-05	5.731E-05	-6.086E-06	-5.473E-06
1	34.00000	0.01290	48.364	48.364	-352.246	-303.201
	(STRAIN)	-3.005E-05	3.173E-05	3.173E-05	-3.005E-05	-2.249E-05
1	64.00010	0.01266	13.071	13.399	0.601	0.978
	(STRAIN)	-1.922E-05	4.593E-05	4.764E-05	-1.922E-05	-1.725E-05
1	84.00010	0.01176	9.132	9.230	1.382	1.523
	(STRAIN)	-2.433E-05	6.609E-05	6.724E-05	-2.433E-05	-2.268E-05
2	9.00000	0.01356	281.045	399.249	136.041	182.844
	(STRAIN)	-6.607E-07	1.877E-05	4.216E-05	-9.922E-06	-6.607E-07
2	34.00000	0.01306	50.272	50.272	-367.598	-314.209
	(STRAIN)	-3.144E-05	3.300E-05	3.300E-05	-3.144E-05	-2.321E-05
2	64.00010	0.01281	13.678	13.742	0.567	1.059
	(STRAIN)	-1.998E-05	4.852E-05	4.885E-05	-1.998E-05	-1.740E-05
2	84.00010	0.01187	9.389	9.408	1.389	1.537
	(STRAIN)	-2.491E-05	6.843E-05	6.865E-05	-2.491E-05	-2.319E-05
3	9.00000	0.01350	88.771	253.859	88.760	146.157
	(STRAIN)	3.846E-06	-7.509E-06	2.516E-05	-7.511E-06	3.846E-06
3	34.00000	0.01314	49.917	49.917	-368.648	-311.632
	(STRAIN)	-3.165E-05	3.290E-05	3.290E-05	-3.165E-05	-2.286E-05
3	64.00010	0.01289	13.820	13.820	0.580	1.103
	(STRAIN)	-2.011E-05	4.905E-05	4.905E-05	-2.011E-05	-1.738E-05
3	84.00010	0.01194	9.455	9.455	1.412	1.561
	(STRAIN)	-2.495E-05	6.888E-05	6.888E-05	-2.495E-05	-2.322E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.890E-06
ALLOWABLE LOAD REPETITIONS = 1.175E+11 DAMAGE RATIO = 6.285E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.165E-05
ALLOWABLE LOAD REPETITIONS = 3.032E+08 DAMAGE RATIO = 2.436E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.905E-05
ALLOWABLE LOAD REPETITIONS = 2.679E+10 DAMAGE RATIO = 2.757E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 6.888E-05
ALLOWABLE LOAD REPETITIONS = 5.861E+09 DAMAGE RATIO = 1.260E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01516	563.509	564.195	225.042	226.541
	(STRAIN)	-1.178E-05	9.398E-05	9.419E-05	-1.199E-05	-1.152E-05
1	34.00000	0.01411	62.277	62.277	-298.004	-251.879
	(STRAIN)	-3.973E-05	4.369E-05	4.369E-05	-3.973E-05	-2.905E-05
1	64.00010	0.01380	15.704	16.144	0.297	0.788
	(STRAIN)	-2.416E-05	5.632E-05	5.862E-05	-2.416E-05	-2.160E-05
1	84.00010	0.01272	10.659	10.788	1.371	1.554
	(STRAIN)	-2.971E-05	7.864E-05	8.015E-05	-2.971E-05	-2.758E-05
2	9.00000	0.01507	283.533	392.444	120.805	160.871
	(STRAIN)	-4.352E-06	3.405E-05	6.815E-05	-1.690E-05	-4.352E-06
2	34.00000	0.01432	64.746	64.746	-311.515	-260.470
	(STRAIN)	-4.168E-05	4.544E-05	4.544E-05	-4.168E-05	-2.986E-05
2	64.00010	0.01399	16.497	16.583	0.248	0.900
	(STRAIN)	-2.517E-05	5.971E-05	6.016E-05	-2.517E-05	-2.176E-05

2	84.00010	0.01285	10.989	11.014	1.378	1.571
	(STRAIN)	-3.046E-05	8.166E-05	8.195E-05	-3.046E-05	-2.822E-05
3	9.00000	0.01493	89.190	223.241	89.177	119.999
	(STRAIN)	2.471E-06	-7.175E-06	3.479E-05	-7.180E-06	2.471E-06
3	34.00000	0.01439	64.231	64.231	-312.551	-257.771
	(STRAIN)	-4.199E-05	4.525E-05	4.525E-05	-4.199E-05	-2.930E-05
3	64.00010	0.01406	16.668	16.668	0.248	0.943
	(STRAIN)	-2.536E-05	6.042E-05	6.042E-05	-2.536E-05	-2.173E-05
3	84.00010	0.01291	11.056	11.056	1.392	1.587
	(STRAIN)	-3.054E-05	8.221E-05	8.221E-05	-3.054E-05	-2.827E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.178E-05
ALLOWABLE LOAD REPETITIONS = 1.777E+10 DAMAGE RATIO = 4.156E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.199E-05
ALLOWABLE LOAD REPETITIONS = 1.692E+08 DAMAGE RATIO = 4.364E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.042E-05
ALLOWABLE LOAD REPETITIONS = 1.054E+10 DAMAGE RATIO = 7.007E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 8.221E-05
ALLOWABLE LOAD REPETITIONS = 2.655E+09 DAMAGE RATIO = 2.781E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01680	568.242	568.692	212.441	212.642
	(STRAIN)	-2.224E-05	1.528E-04	1.530E-04	-2.224E-05	-2.214E-05
1	34.00000	0.01521	77.293	77.293	-245.465	-202.635
	(STRAIN)	-5.174E-05	6.009E-05	6.009E-05	-5.174E-05	-3.690E-05
1	64.00010	0.01482	18.312	18.876	-0.074	0.540
	(STRAIN)	-2.926E-05	6.679E-05	6.974E-05	-2.926E-05	-2.605E-05
1	84.00010	0.01355	12.103	12.266	1.321	1.548
	(STRAIN)	-3.503E-05	9.075E-05	9.265E-05	-3.503E-05	-3.239E-05
2	9.00000	0.01660	285.906	387.526	106.049	140.866
	(STRAIN)	-1.162E-05	5.974E-05	1.097E-04	-2.875E-05	-1.162E-05
2	34.00000	0.01546	80.341	80.341	-256.972	-208.645
	(STRAIN)	-5.442E-05	6.244E-05	6.244E-05	-5.442E-05	-3.768E-05
2	64.00010	0.01505	19.305	19.416	-0.141	0.687
	(STRAIN)	-3.053E-05	7.105E-05	7.163E-05	-3.053E-05	-2.620E-05
2	84.00010	0.01371	12.509	12.541	1.327	1.568
	(STRAIN)	-3.597E-05	9.449E-05	9.486E-05	-3.597E-05	-3.316E-05
3	9.00000	0.01635	89.733	195.679	89.716	96.188
	(STRAIN)	-1.349E-06	-4.524E-06	4.760E-05	-4.533E-06	-1.349E-06
3	34.00000	0.01553	79.633	79.633	-257.951	-205.794
	(STRAIN)	-5.487E-05	6.209E-05	6.209E-05	-5.487E-05	-3.680E-05
3	64.00010	0.01512	19.519	19.519	-0.153	0.732
	(STRAIN)	-3.080E-05	7.197E-05	7.197E-05	-3.080E-05	-2.617E-05
3	84.00010	0.01377	12.588	12.588	1.334	1.579
	(STRAIN)	-3.611E-05	9.519E-05	9.519E-05	-3.611E-05	-3.325E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.224E-05
ALLOWABLE LOAD REPETITIONS = 3.227E+09 DAMAGE RATIO = 2.289E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.487E-05
ALLOWABLE LOAD REPETITIONS = 9.897E+07 DAMAGE RATIO = 7.462E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.197E-05
ALLOWABLE LOAD REPETITIONS = 4.817E+09 DAMAGE RATIO = 1.533E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 9.519E-05
ALLOWABLE LOAD REPETITIONS = 1.377E+09 DAMAGE RATIO = 5.364E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)

1	9.00000	0.01797	571.214	571.544	204.222	205.559
	(STRAIN)	-3.346E-05	2.112E-04	2.114E-04	-3.346E-05	-3.257E-05
1	34.00000	0.01586	87.583	87.583	-212.149	-171.633
	(STRAIN)	-6.155E-05	7.474E-05	7.474E-05	-6.155E-05	-4.313E-05
1	64.00010	0.01543	19.986	20.636	-0.346	0.354
	(STRAIN)	-3.262E-05	7.359E-05	7.699E-05	-3.262E-05	-2.896E-05
1	84.00010	0.01404	12.997	13.183	1.272	1.528
	(STRAIN)	-3.844E-05	9.835E-05	1.005E-04	-3.844E-05	-3.545E-05
2	9.00000	0.01766	287.417	385.151	96.786	128.916
	(STRAIN)	-1.963E-05	8.602E-05	1.512E-04	-4.105E-05	-1.963E-05
2	34.00000	0.01614	91.005	91.005	-222.287	-175.902
	(STRAIN)	-6.486E-05	7.759E-05	7.759E-05	-6.486E-05	-4.377E-05
2	64.00010	0.01569	21.116	21.243	-0.426	0.526
	(STRAIN)	-3.408E-05	7.845E-05	7.912E-05	-3.408E-05	-2.911E-05
2	84.00010	0.01422	13.454	13.491	1.276	1.550
	(STRAIN)	-3.950E-05	1.026E-04	1.030E-04	-3.950E-05	-3.630E-05
3	9.00000	0.01731	90.106	179.042	81.818	90.085
	(STRAIN)	-6.111E-06	-5.865E-07	5.870E-05	-6.111E-06	-6.006E-07
3	34.00000	0.01621	90.148	90.148	-223.192	-172.921
	(STRAIN)	-6.542E-05	7.706E-05	7.706E-05	-6.542E-05	-4.256E-05
3	64.00010	0.01575	21.362	21.362	-0.444	0.575
	(STRAIN)	-3.440E-05	7.951E-05	7.951E-05	-3.440E-05	-2.907E-05
3	84.00010	0.01427	13.545	13.545	1.280	1.559
	(STRAIN)	-3.968E-05	1.034E-04	1.034E-04	-3.968E-05	-3.642E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.346E-05
ALLOWABLE LOAD REPETITIONS = 1.091E+09 DAMAGE RATIO = 6.769E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.542E-05
ALLOWABLE LOAD REPETITIONS = 6.998E+07 DAMAGE RATIO = 1.055E-02

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.951E-05
ALLOWABLE LOAD REPETITIONS = 3.083E+09 DAMAGE RATIO = 2.396E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.034E-04
ALLOWABLE LOAD REPETITIONS = 9.505E+08 DAMAGE RATIO = 7.770E-04

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01773	570.621	570.973	205.805	206.906
	(STRAIN)	-3.084E-05	1.977E-04	1.979E-04	-3.084E-05	-3.015E-05
1	34.00000	0.01574	85.490	85.490	-218.775	-177.785
	(STRAIN)	-5.941E-05	7.146E-05	7.146E-05	-5.941E-05	-4.178E-05
1	64.00010	0.01531	19.652	20.285	-0.290	0.393
	(STRAIN)	-3.194E-05	7.223E-05	7.554E-05	-3.194E-05	-2.838E-05
1	84.00010	0.01395	12.820	13.002	1.283	1.533
	(STRAIN)	-3.776E-05	9.684E-05	9.896E-05	-3.776E-05	-3.484E-05
2	9.00000	0.01744	287.116	385.580	98.619	131.243
	(STRAIN)	-1.774E-05	7.991E-05	1.416E-04	-3.818E-05	-1.774E-05
2	34.00000	0.01601	88.838	88.838	-229.190	-182.405
	(STRAIN)	-6.259E-05	7.420E-05	7.420E-05	-6.259E-05	-4.246E-05
2	64.00010	0.01556	20.754	20.878	-0.367	0.560
	(STRAIN)	-3.337E-05	7.697E-05	7.762E-05	-3.337E-05	-2.853E-05
2	84.00010	0.01412	13.268	13.303	1.287	1.554
	(STRAIN)	-3.880E-05	1.010E-04	1.014E-04	-3.880E-05	-3.568E-05
3	9.00000	0.01711	90.032	182.305	84.631	90.011
	(STRAIN)	-4.956E-06	-1.573E-06	5.624E-05	-4.956E-06	-1.586E-06
3	34.00000	0.01608	88.012	88.012	-230.112	-179.452
	(STRAIN)	-6.312E-05	7.371E-05	7.371E-05	-6.312E-05	-4.133E-05
3	64.00010	0.01563	20.993	20.993	-0.384	0.608
	(STRAIN)	-3.367E-05	7.800E-05	7.800E-05	-3.367E-05	-2.849E-05
3	84.00010	0.01418	13.356	13.356	1.292	1.564
	(STRAIN)	-3.897E-05	1.018E-04	1.018E-04	-3.897E-05	-3.579E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.084E-05

ALLOWABLE LOAD REPETITIONS = 1.353E+09 DAMAGE RATIO = 5.458E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.312E-05
ALLOWABLE LOAD REPETITIONS = 7.508E+07 DAMAGE RATIO = 9.836E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.800E-05
ALLOWABLE LOAD REPETITIONS = 3.359E+09 DAMAGE RATIO = 2.198E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.018E-04
ALLOWABLE LOAD REPETITIONS = 1.021E+09 DAMAGE RATIO = 7.236E-04

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01615	566.459	566.992	217.198	217.660
	(STRAIN)	-1.739E-05	1.268E-04	1.270E-04	-1.758E-05	-1.739E-05
1	34.00000	0.01480	71.409	71.409	-265.436	-221.302
	(STRAIN)	-4.677E-05	5.310E-05	5.310E-05	-4.677E-05	-3.369E-05
1	64.00010	0.01445	17.315	17.831	0.075	0.641
	(STRAIN)	-2.729E-05	6.277E-05	6.546E-05	-2.729E-05	-2.433E-05
1	84.00010	0.01325	11.558	11.708	1.345	1.554
	(STRAIN)	-3.300E-05	8.616E-05	8.791E-05	-3.300E-05	-3.056E-05
2	9.00000	0.01600	285.004	389.219	111.645	148.312
	(STRAIN)	-8.263E-06	4.823E-05	9.130E-05	-2.342E-05	-8.263E-06
2	34.00000	0.01503	74.234	74.234	-277.728	-228.318
	(STRAIN)	-4.915E-05	5.520E-05	5.520E-05	-4.915E-05	-3.450E-05
2	64.00010	0.01466	18.230	18.331	0.016	0.775
	(STRAIN)	-2.846E-05	6.669E-05	6.722E-05	-2.846E-05	-2.449E-05
2	84.00010	0.01340	11.935	11.964	1.351	1.572
	(STRAIN)	-3.387E-05	8.962E-05	8.996E-05	-3.387E-05	-3.128E-05
3	9.00000	0.01580	89.517	205.948	89.501	105.071
	(STRAIN)	5.094E-07	-5.919E-06	4.220E-05	-5.925E-06	5.094E-07
3	34.00000	0.01510	73.605	73.605	-278.738	-225.532
	(STRAIN)	-4.954E-05	5.493E-05	5.493E-05	-4.954E-05	-3.376E-05
3	64.00010	0.01472	18.426	18.426	0.008	0.818
	(STRAIN)	-2.869E-05	6.752E-05	6.752E-05	-2.869E-05	-2.446E-05
3	84.00010	0.01345	12.009	12.009	1.360	1.585
	(STRAIN)	-3.398E-05	9.026E-05	9.026E-05	-3.398E-05	-3.135E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.739E-05
ALLOWABLE LOAD REPETITIONS = 6.246E+09 DAMAGE RATIO = 1.182E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.954E-05
ALLOWABLE LOAD REPETITIONS = 1.213E+08 DAMAGE RATIO = 6.090E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.752E-05
ALLOWABLE LOAD REPETITIONS = 6.408E+09 DAMAGE RATIO = 1.153E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 9.026E-05
ALLOWABLE LOAD REPETITIONS = 1.748E+09 DAMAGE RATIO = 4.226E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01409	560.034	560.924	234.432	237.043
	(STRAIN)	-7.413E-06	6.702E-05	6.723E-05	-7.617E-06	-7.018E-06
1	34.00000	0.01329	52.625	52.625	-334.944	-286.774
	(STRAIN)	-3.291E-05	3.515E-05	3.515E-05	-3.291E-05	-2.445E-05
1	64.00010	0.01303	13.903	14.265	0.513	0.925
	(STRAIN)	-2.076E-05	4.919E-05	5.108E-05	-2.076E-05	-1.861E-05
1	84.00010	0.01208	9.623	9.730	1.383	1.537
	(STRAIN)	-2.603E-05	7.010E-05	7.135E-05	-2.603E-05	-2.424E-05
2	9.00000	0.01404	281.848	396.870	131.193	175.699
	(STRAIN)	-1.549E-06	2.278E-05	4.915E-05	-1.175E-05	-1.549E-06
2	34.00000	0.01347	54.707	54.707	-349.735	-297.041

	(STRAIN)	-3.446E-05	3.657E-05	3.657E-05	-3.446E-05	-2.521E-05
2	64.00010	0.01319	14.567	14.638	0.475	1.016
	(STRAIN)	-2.159E-05	5.202E-05	5.239E-05	-2.159E-05	-1.877E-05
2	84.00010	0.01219	9.902	9.923	1.391	1.552
	(STRAIN)	-2.666E-05	7.264E-05	7.288E-05	-2.666E-05	-2.478E-05
3	9.00000	0.01396	88.883	243.811	88.872	137.625
	(STRAIN)	3.598E-06	-7.576E-06	2.794E-05	-7.579E-06	3.598E-06
3	34.00000	0.01355	54.304	54.304	-350.778	-294.422
	(STRAIN)	-3.470E-05	3.644E-05	3.644E-05	-3.470E-05	-2.480E-05
3	64.00010	0.01327	14.716	14.716	0.483	1.059
	(STRAIN)	-2.174E-05	5.261E-05	5.261E-05	-2.174E-05	-1.874E-05
3	84.00010	0.01226	9.967	9.967	1.410	1.573
	(STRAIN)	-2.671E-05	7.311E-05	7.311E-05	-2.671E-05	-2.481E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.413E-06
ALLOWABLE LOAD REPETITIONS = 6.250E+10 DAMAGE RATIO = 1.182E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.470E-05
ALLOWABLE LOAD REPETITIONS = 2.503E+08 DAMAGE RATIO = 2.951E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.261E-05
ALLOWABLE LOAD REPETITIONS = 1.958E+10 DAMAGE RATIO = 3.771E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 7.311E-05
ALLOWABLE LOAD REPETITIONS = 4.488E+09 DAMAGE RATIO = 1.646E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01201	552.306	553.707	253.724	258.273
	(STRAIN)	-2.568E-06	3.348E-05	3.365E-05	-2.738E-06	-2.186E-06
1	34.00000	0.01156	35.805	35.805	-407.753	-356.275
	(STRAIN)	-2.199E-05	2.256E-05	2.256E-05	-2.199E-05	-1.682E-05
1	64.00010	0.01138	10.457	10.686	0.817	1.093
	(STRAIN)	-1.453E-05	3.582E-05	3.702E-05	-1.453E-05	-1.309E-05
1	84.00010	0.01067	7.539	7.609	1.342	1.446
	(STRAIN)	-1.900E-05	5.330E-05	5.411E-05	-1.900E-05	-1.779E-05
2	9.00000	0.01201	278.351	408.363	151.429	206.540
	(STRAIN)	9.537E-07	9.665E-06	2.544E-05	-5.732E-06	9.537E-07
2	34.00000	0.01168	37.194	37.194	-424.713	-369.446
	(STRAIN)	-2.295E-05	2.345E-05	2.345E-05	-2.295E-05	-1.739E-05
2	64.00010	0.01150	10.897	10.942	0.796	1.149
	(STRAIN)	-1.508E-05	3.769E-05	3.793E-05	-1.508E-05	-1.323E-05
2	84.00010	0.01076	7.728	7.742	1.349	1.456
	(STRAIN)	-1.942E-05	5.500E-05	5.516E-05	-1.942E-05	-1.817E-05
3	9.00000	0.01202	88.607	288.410	88.598	174.930
	(STRAIN)	3.862E-06	-6.610E-06	1.763E-05	-6.611E-06	3.862E-06
3	34.00000	0.01178	36.980	36.980	-425.957	-367.186
	(STRAIN)	-2.309E-05	2.340E-05	2.340E-05	-2.309E-05	-1.719E-05
3	64.00010	0.01160	11.027	11.027	0.824	1.198
	(STRAIN)	-1.517E-05	3.813E-05	3.813E-05	-1.517E-05	-1.322E-05
3	84.00010	0.01085	7.806	7.806	1.383	1.491
	(STRAIN)	-1.946E-05	5.547E-05	5.547E-05	-1.946E-05	-1.821E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.568E-06
ALLOWABLE LOAD REPETITIONS = 1.189E+12 DAMAGE RATIO = 6.212E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.309E-05
ALLOWABLE LOAD REPETITIONS = 5.933E+08 DAMAGE RATIO = 1.245E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.813E-05
ALLOWABLE LOAD REPETITIONS = 8.278E+10 DAMAGE RATIO = 8.922E-06

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 5.547E-05
ALLOWABLE LOAD REPETITIONS = 1.545E+10 DAMAGE RATIO = 4.780E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT	VERTICAL	VERTICAL	VERTICAL	MAJOR	MINOR	INTERMEDIATE

NO.	DISPL. COORDINATE (HORIZONTAL P. STRAIN)	PRINCIPAL STRESS (STRAIN)	PRINCIPAL STRESS (STRAIN)	PRINCIPAL STRESS (STRAIN)	STRESS (STRAIN)
1	9.00000	0.01098	547.627	549.349	262.857	268.166
	(STRAIN)	-1.337E-06	2.306E-05	2.321E-05	-1.486E-06	-1.028E-06
1	34.00000	0.01064	28.600	28.600	-443.395	-390.691
	(STRAIN)	-1.753E-05	1.774E-05	1.774E-05	-1.753E-05	-1.359E-05
1	64.00010	0.01050	8.821	8.997	0.903	1.121
	(STRAIN)	-1.173E-05	2.963E-05	3.055E-05	-1.173E-05	-1.059E-05
1	84.00010	0.00990	6.498	6.552	1.286	1.368
	(STRAIN)	-1.568E-05	4.512E-05	4.575E-05	-1.568E-05	-1.472E-05
2	9.00000	0.01098	276.415	415.520	161.135	222.238
	(STRAIN)	1.303E-06	5.973E-06	1.796E-05	-3.964E-06	1.303E-06
2	34.00000	0.01074	29.692	29.692	-461.221	-405.067
	(STRAIN)	-1.826E-05	1.843E-05	1.843E-05	-1.826E-05	-1.406E-05
2	64.00010	0.01059	9.167	9.201	0.888	1.163
	(STRAIN)	-1.216E-05	3.109E-05	3.127E-05	-1.216E-05	-1.072E-05
2	84.00010	0.00997	6.648	6.659	1.293	1.377
	(STRAIN)	-1.601E-05	4.647E-05	4.659E-05	-1.601E-05	-1.503E-05
3	9.00000	0.01103	88.735	313.245	88.727	194.854
	(STRAIN)	3.458E-06	-5.689E-06	1.366E-05	-5.689E-06	3.458E-06
3	34.00000	0.01085	29.560	29.560	-462.993	-403.420
	(STRAIN)	-1.839E-05	1.842E-05	1.842E-05	-1.839E-05	-1.394E-05
3	64.00010	0.01070	9.300	9.300	0.926	1.216
	(STRAIN)	-1.224E-05	3.150E-05	3.150E-05	-1.224E-05	-1.072E-05
3	84.00010	0.01007	6.741	6.741	1.334	1.418
	(STRAIN)	-1.608E-05	4.700E-05	4.700E-05	-1.608E-05	-1.510E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.337E-06
ALLOWABLE LOAD REPETITIONS = 7.603E+12 DAMAGE RATIO = 9.714E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.839E-05
ALLOWABLE LOAD REPETITIONS = 9.755E+08 DAMAGE RATIO = 7.571E-04

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.150E-05
ALLOWABLE LOAD REPETITIONS = 1.945E+11 DAMAGE RATIO = 3.797E-06

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 4.700E-05
ALLOWABLE LOAD REPETITIONS = 3.244E+10 DAMAGE RATIO = 2.277E-05

****
* SUMMARY OF DAMAGE ANALYSIS *
****
AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 1.631E-03
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.863E-02
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 8.949E-04
AT TOP OF LAYER 6 SUM OF DAMAGE RATIO = 3.203E-03

MAXIMUM DAMAGE RATO = 4.863E-02 DESIGN LIFE IN YEARS = 20.56

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N	
1	1.72E-05	19714	2859282.9	11	5	1.14E+09	738,532	6.47E-04	
2	1.98E-05	16460	2387286.4	11	5	8.36E+08	738,532	8.83E-04	
3	2.44E-05	12502	1813287.8	11	5	5.30E+08	738,532	1.39E-03	
4	3.17E-05	8753	1269557.5	11	5	3.05E+08	738,532	2.42E-03	
5	4.20E-05	5831	845645.56	11	5	1.70E+08	738,532	4.34E-03	
6	5.49E-05	3897	565140.58	11	5	9.95E+07	738,532	7.42E-03	
7	6.54E-05	2969	430600.96	11	5	7.03E+07	738,532	1.05E-02	
8	6.31E-05	3139	455224.73	11	5	7.55E+07	738,532	9.79E-03	
9	4.95E-05	4553	660386.28	11	5	1.22E+08	738,532	6.06E-03	
10	3.47E-05	7687	1114901.6	11	5	2.52E+08	738,532	2.94E-03	
11	2.31E-05	13442	1949529.7	11	5	5.96E+08	738,532	1.24E-03	
12	1.84E-05	18064	2619893.2	11	5	9.80E+08	738,532	7.54E-04	
							8.86E+06	4.84E-02	***20.67***

VITA UTILE

- Sovrastruttura **P1D**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 10 30
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 1.245E+07 2 1.519E+07
3 1.777E+07 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 1.041E+07 2 1.298E+07
3 1.545E+07 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 7.846E+06 2 1.007E+07
3 1.232E+07 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 5.262E+06 2 7.011E+06
3 8.877E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 3.122E+06 2 4.342E+06
3 5.742E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 1.680E+06 2 2.448E+06
3 3.405E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 1.022E+06 2 1.541E+06
3 2.235E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 1.138E+06 2 1.704E+06
3 2.449E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 2.166E+06 2 3.098E+06
3 4.220E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 4.493E+06 2 6.069E+06
3 7.786E+06 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 8.468E+06 2 1.079E+07
3 1.310E+07 4 3.220E+05 5 1.200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 1.142E+07 2 1.408E+07
3 1.662E+07 4 3.220E+05 5 1.200E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 17492

LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 17492
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 17492

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01904	442.173	455.121	137.483	155.021
	(STRAIN)	-3.856E-06	2.207E-05	2.322E-05	-5.007E-06	-3.448E-06
1	19.00000	0.01876	32.456	32.456	-1195.457	-1028.974
	(STRAIN)	-4.764E-05	4.563E-05	4.563E-05	-4.764E-05	-3.499E-05
1	19.00010	0.01876	32.456	41.131	32.455	39.572
	(STRAIN)	3.148E-05	5.416E-07	3.826E-05	5.412E-07	3.148E-05
1	49.00010	0.01742	18.613	18.874	5.455	5.860
	(STRAIN)	-3.699E-05	1.165E-04	1.196E-04	-3.699E-05	-3.226E-05
2	9.00000	0.01932	206.155	309.161	73.041	114.393
	(STRAIN)	-1.275E-06	6.878E-06	1.603E-05	-4.950E-06	-1.275E-06
2	19.00000	0.01909	32.206	32.206	-1185.583	-943.109
	(STRAIN)	-4.877E-05	4.373E-05	4.373E-05	-4.877E-05	-3.035E-05
2	19.00010	0.01909	32.207	41.536	32.207	39.945
	(STRAIN)	3.245E-05	-1.198E-06	3.937E-05	-1.198E-06	3.245E-05
2	49.00010	0.01771	19.427	19.477	5.595	6.086
	(STRAIN)	-3.858E-05	1.228E-04	1.234E-04	-3.858E-05	-3.285E-05
3	9.00000	0.01933	44.134	186.061	44.125	90.612
	(STRAIN)	6.613E-07	-3.469E-06	9.143E-06	-3.469E-06	6.613E-07
3	19.00000	0.01915	31.314	31.314	-1151.044	-861.805
	(STRAIN)	-4.841E-05	4.140E-05	4.140E-05	-4.841E-05	-2.644E-05
3	19.00010	0.01915	31.314	40.927	31.314	39.223
	(STRAIN)	3.207E-05	-2.319E-06	3.948E-05	-2.319E-06	3.207E-05
3	49.00010	0.01778	19.594	19.594	5.617	6.132
	(STRAIN)	-3.895E-05	1.241E-04	1.241E-04	-3.895E-05	-3.294E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.856E-06
ALLOWABLE LOAD REPETITIONS = 2.390E+11 DAMAGE RATIO = 7.318E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.877E-05
ALLOWABLE LOAD REPETITIONS = 3.992E+07 DAMAGE RATIO = 4.382E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.416E-07
ALLOWABLE LOAD REPETITIONS = 1.546E+19 DAMAGE RATIO = 1.131E-15

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.241E-04
ALLOWABLE LOAD REPETITIONS = 4.197E+08 DAMAGE RATIO = 4.168E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01991	446.222	458.594	143.460	161.186
	(STRAIN)	-4.375E-06	2.584E-05	2.713E-05	-5.662E-06	-3.818E-06
1	19.00000	0.01959	35.862	35.862	-1162.766	-997.008
	(STRAIN)	-5.348E-05	5.124E-05	5.124E-05	-5.348E-05	-3.900E-05

1	19.00010	0.01959	35.862	45.333	35.862	43.553
	(STRAIN)	3.440E-05	9.558E-07	4.213E-05	9.562E-07	3.439E-05
1	49.00010	0.01810	20.081	20.379	5.664	6.126
	(STRAIN)	-4.115E-05	1.270E-04	1.305E-04	-4.115E-05	-3.576E-05
2	9.00000	0.02022	208.542	312.797	73.984	118.558
	(STRAIN)	-1.296E-06	8.066E-06	1.891E-05	-5.934E-06	-1.296E-06
2	19.00000	0.01996	35.534	35.534	-1151.611	-908.667
	(STRAIN)	-5.475E-05	4.897E-05	4.897E-05	-5.475E-05	-3.353E-05
2	19.00010	0.01996	35.535	45.755	35.535	43.929
	(STRAIN)	3.544E-05	-1.052E-06	4.338E-05	-1.052E-06	3.544E-05
2	49.00010	0.01843	20.999	21.056	5.818	6.381
	(STRAIN)	-4.297E-05	1.341E-04	1.348E-04	-4.297E-05	-3.641E-05
3	9.00000	0.02023	45.283	186.052	45.273	93.253
	(STRAIN)	9.471E-07	-4.044E-06	1.060E-05	-4.045E-06	9.471E-07
3	19.00000	0.02002	34.499	34.499	-1116.736	-826.525
	(STRAIN)	-5.433E-05	4.625E-05	4.625E-05	-5.433E-05	-2.898E-05
3	19.00010	0.02002	34.497	45.049	34.497	43.090
	(STRAIN)	3.501E-05	-2.354E-06	4.352E-05	-2.354E-06	3.501E-05
3	49.00010	0.01850	21.194	21.194	5.844	6.435
	(STRAIN)	-4.340E-05	1.357E-04	1.357E-04	-4.340E-05	-3.650E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.375E-06
ALLOWABLE LOAD REPETITIONS = 1.806E+11 DAMAGE RATIO = 9.687E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.475E-05
ALLOWABLE LOAD REPETITIONS = 3.073E+07 DAMAGE RATIO = 5.692E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 9.558E-07
ALLOWABLE LOAD REPETITIONS = 1.216E+18 DAMAGE RATIO = 1.438E-14

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.357E-04
ALLOWABLE LOAD REPETITIONS = 2.817E+08 DAMAGE RATIO = 6.211E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02136	452.541	463.833	150.834	168.380
	(STRAIN)	-5.480E-06	3.344E-05	3.496E-05	-6.993E-06	-4.642E-06
1	19.00000	0.02097	42.004	42.004	-1107.580	-943.717
	(STRAIN)	-6.431E-05	6.171E-05	6.171E-05	-6.431E-05	-4.635E-05
1	19.00010	0.02097	42.003	52.841	42.003	50.654
	(STRAIN)	3.949E-05	1.880E-06	4.900E-05	1.880E-06	3.949E-05
1	49.00010	0.01922	22.596	22.964	5.976	6.544
	(STRAIN)	-4.856E-05	1.453E-04	1.496E-04	-4.856E-05	-4.194E-05
2	9.00000	0.02171	212.448	317.762	74.412	122.729
	(STRAIN)	-1.443E-06	1.058E-05	2.470E-05	-7.919E-06	-1.443E-06
2	19.00000	0.02140	41.499	41.499	-1094.163	-851.172
	(STRAIN)	-6.583E-05	5.866E-05	5.866E-05	-6.583E-05	-3.920E-05
2	19.00010	0.02140	41.499	53.270	41.499	50.998
	(STRAIN)	4.066E-05	-6.465E-07	5.053E-05	-6.455E-07	4.065E-05
2	49.00010	0.01960	23.703	23.773	6.154	6.850
	(STRAIN)	-5.080E-05	1.539E-04	1.548E-04	-5.080E-05	-4.267E-05
3	9.00000	0.02172	47.375	184.279	47.365	95.152
	(STRAIN)	1.398E-06	-5.006E-06	1.334E-05	-5.007E-06	1.398E-06
3	19.00000	0.02147	40.175	40.175	-1058.572	-767.493
	(STRAIN)	-6.528E-05	5.516E-05	5.516E-05	-6.529E-05	-3.338E-05
3	19.00010	0.02147	40.174	52.363	40.174	49.921
	(STRAIN)	4.008E-05	-2.296E-06	5.070E-05	-2.297E-06	4.008E-05
3	49.00010	0.01969	23.948	23.948	6.187	6.920
	(STRAIN)	-5.134E-05	1.559E-04	1.559E-04	-5.134E-05	-4.278E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.480E-06
ALLOWABLE LOAD REPETITIONS = 1.068E+11 DAMAGE RATIO = 1.638E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.583E-05
ALLOWABLE LOAD REPETITIONS = 2.034E+07 DAMAGE RATIO = 8.601E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.880E-06

ALLOWABLE LOAD REPETITIONS = 5.880E+16 DAMAGE RATIO = 2.975E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.559E-04
ALLOWABLE LOAD REPETITIONS = 1.514E+08 DAMAGE RATIO = 1.156E-04

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02354	461.519	471.046	157.984	174.451
	(STRAIN)	-7.856E-06	4.875E-05	5.059E-05	-9.690E-06	-6.519E-06
1	19.00000	0.02302	52.387	52.387	-1024.276	-864.462
	(STRAIN)	-8.337E-05	8.037E-05	8.037E-05	-8.337E-05	-5.906E-05
1	19.00010	0.02302	52.387	65.353	52.386	62.448
	(STRAIN)	4.767E-05	3.932E-06	6.031E-05	3.931E-06	4.768E-05
1	49.00010	0.02083	26.517	27.007	6.355	7.110
	(STRAIN)	-6.077E-05	1.745E-04	1.802E-04	-6.077E-05	-5.195E-05
2	9.00000	0.02396	218.332	323.702	73.305	124.694
	(STRAIN)	-2.034E-06	1.600E-05	3.628E-05	-1.193E-05	-2.034E-06
2	19.00000	0.02356	51.472	51.472	-1007.276	-765.681
	(STRAIN)	-8.531E-05	7.570E-05	7.570E-05	-8.531E-05	-4.857E-05
2	19.00010	0.02356	51.473	65.706	51.472	62.633
	(STRAIN)	4.895E-05	4.258E-07	6.231E-05	4.250E-07	4.895E-05
2	49.00010	0.02131	27.945	28.037	6.567	7.505
	(STRAIN)	-6.375E-05	1.857E-04	1.867E-04	-6.375E-05	-5.281E-05
3	9.00000	0.02396	50.899	178.957	50.888	94.106
	(STRAIN)	1.948E-06	-6.371E-06	1.829E-05	-6.373E-06	1.948E-06
3	19.00000	0.02364	49.579	49.579	-970.639	-679.934
	(STRAIN)	-8.449E-05	7.066E-05	7.066E-05	-8.449E-05	-4.028E-05
3	19.00010	0.02364	49.578	64.393	49.578	61.064
	(STRAIN)	4.806E-05	-1.876E-06	6.253E-05	-1.877E-06	4.806E-05
3	49.00010	0.02142	28.270	28.270	6.612	7.601
	(STRAIN)	-6.447E-05	1.882E-04	1.882E-04	-6.447E-05	-5.293E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.856E-06
ALLOWABLE LOAD REPETITIONS = 4.449E+10 DAMAGE RATIO = 3.932E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.531E-05
ALLOWABLE LOAD REPETITIONS = 1.146E+07 DAMAGE RATIO = 1.526E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 3.932E-06
ALLOWABLE LOAD REPETITIONS = 2.162E+15 DAMAGE RATIO = 8.091E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.882E-04
ALLOWABLE LOAD REPETITIONS = 6.510E+07 DAMAGE RATIO = 2.687E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02661	473.772	480.825	163.377	177.324
	(STRAIN)	-1.323E-05	8.108E-05	8.327E-05	-1.542E-05	-1.109E-05
1	19.00000	0.02584	69.359	69.359	-909.352	-757.454
	(STRAIN)	-1.164E-04	1.137E-04	1.137E-04	-1.164E-04	-8.072E-05
1	19.00010	0.02584	69.357	85.354	69.357	81.215
	(STRAIN)	6.003E-05	8.476E-06	7.803E-05	8.476E-06	6.003E-05
1	49.00010	0.02294	32.194	32.886	6.691	7.773
	(STRAIN)	-7.977E-05	2.178E-04	2.258E-04	-7.977E-05	-6.715E-05
2	9.00000	0.02710	226.829	330.620	69.688	122.253
	(STRAIN)	-4.112E-06	2.840E-05	6.067E-05	-2.045E-05	-4.112E-06
2	19.00000	0.02653	67.437	67.437	-886.986	-649.814
	(STRAIN)	-1.190E-04	1.054E-04	1.054E-04	-1.190E-04	-6.322E-05
2	19.00010	0.02653	67.439	85.313	67.439	80.799
	(STRAIN)	6.117E-05	3.086E-06	8.080E-05	3.086E-06	6.117E-05
2	49.00010	0.02356	34.137	34.268	6.949	8.311
	(STRAIN)	-8.402E-05	2.332E-04	2.347E-04	-8.402E-05	-6.813E-05

3	9.00000	0.02706	56.481	168.539	56.467	87.912
	(STRAIN)	2.109E-06	-7.662E-06	2.718E-05	-7.667E-06	2.109E-06
3	19.00000	0.02663	64.391	64.391	-849.048	-561.589
	(STRAIN)	-1.176E-04	9.720E-05	9.720E-05	-1.176E-04	-4.998E-05
3	19.00010	0.02663	64.389	83.143	64.390	78.206
	(STRAIN)	5.961E-05	-4.657E-07	8.107E-05	-4.654E-07	5.961E-05
3	49.00010	0.02370	34.582	34.582	7.007	8.447
	(STRAIN)	-8.504E-05	2.367E-04	2.367E-04	-8.504E-05	-6.824E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.323E-05
ALLOWABLE LOAD REPETITIONS = 1.205E+10 DAMAGE RATIO = 1.452E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.190E-04
ALLOWABLE LOAD REPETITIONS = 5.565E+06 DAMAGE RATIO = 3.143E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 8.476E-06
ALLOWABLE LOAD REPETITIONS = 6.943E+13 DAMAGE RATIO = 2.519E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.367E-04
ALLOWABLE LOAD REPETITIONS = 2.334E+07 DAMAGE RATIO = 7.495E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.03051	489.472	493.801	166.168	176.039
	(STRAIN)	-2.550E-05	1.504E-04	1.528E-04	-2.789E-05	-2.245E-05
1	19.00000	0.02928	94.982	94.982	-769.606	-630.656
	(STRAIN)	-1.709E-04	1.718E-04	1.718E-04	-1.709E-04	-1.159E-04
1	19.00010	0.02928	94.979	114.628	94.980	108.561
	(STRAIN)	7.677E-05	1.771E-05	1.031E-04	1.771E-05	7.677E-05
1	49.00010	0.02533	39.429	40.419	6.783	8.388
	(STRAIN)	-1.062E-04	2.747E-04	2.863E-04	-1.062E-04	-8.744E-05
2	9.00000	0.03104	238.120	338.745	63.445	114.489
	(STRAIN)	-1.073E-05	5.745E-05	1.129E-04	-3.888E-05	-1.073E-05
2	19.00000	0.03014	90.647	90.647	-740.466	-512.507
	(STRAIN)	-1.741E-04	1.554E-04	1.554E-04	-1.741E-04	-8.371E-05
2	19.00010	0.03014	90.649	113.242	90.649	106.321
	(STRAIN)	7.690E-05	8.771E-06	1.070E-04	8.768E-06	7.691E-05
2	49.00010	0.02614	42.108	42.293	7.088	9.139
	(STRAIN)	-1.124E-04	2.962E-04	2.984E-04	-1.124E-04	-8.845E-05
3	9.00000	0.03090	64.325	153.241	64.307	75.784
	(STRAIN)	-1.461E-07	-6.466E-06	4.257E-05	-6.476E-06	-1.461E-07
3	19.00000	0.03024	85.314	85.314	-701.441	-422.050
	(STRAIN)	-1.714E-04	1.405E-04	1.405E-04	-1.714E-04	-6.061E-05
3	19.00010	0.03024	85.313	109.321	85.312	101.641
	(STRAIN)	7.387E-05	2.882E-06	1.073E-04	2.881E-06	7.387E-05
3	49.00010	0.02633	42.715	42.715	7.159	9.334
	(STRAIN)	-1.138E-04	3.010E-04	3.010E-04	-1.138E-04	-8.846E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.550E-05
ALLOWABLE LOAD REPETITIONS = 2.267E+09 DAMAGE RATIO = 7.717E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.741E-04
ALLOWABLE LOAD REPETITIONS = 2.485E+06 DAMAGE RATIO = 7.040E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.771E-05
ALLOWABLE LOAD REPETITIONS = 2.562E+12 DAMAGE RATIO = 6.827E-09

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.010E-04
ALLOWABLE LOAD REPETITIONS = 7.957E+06 DAMAGE RATIO = 2.198E-03

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.03384	503.052	505.644	166.884	173.038

	(STRAIN)	-4.357E-05	2.486E-04	2.509E-04	-4.584E-05	-4.045E-05
1	19.00000	0.03200	119.956	119.956	-659.026	-532.849
	(STRAIN)	-2.302E-04	2.403E-04	2.403E-04	-2.302E-04	-1.540E-04
1	19.00010	0.03200	119.952	142.250	119.951	134.312
	(STRAIN)	9.139E-05	2.897E-05	1.259E-04	2.896E-05	9.140E-05
1	49.00010	0.02707	45.293	46.553	6.595	8.726
	(STRAIN)	-1.293E-04	3.222E-04	3.369E-04	-1.293E-04	-1.044E-04
2	9.00000	0.03429	247.909	345.558	57.878	106.048
	(STRAIN)	-2.281E-05	1.014E-04	1.870E-04	-6.500E-05	-2.281E-05
2	19.00000	0.03298	112.104	112.104	-624.906	-407.439
	(STRAIN)	-2.334E-04	2.118E-04	2.118E-04	-2.334E-04	-1.020E-04
2	19.00010	0.03298	112.106	138.570	112.107	129.077
	(STRAIN)	8.947E-05	1.567E-05	1.307E-04	1.568E-05	8.946E-05
2	49.00010	0.02803	48.615	48.848	6.922	9.678
	(STRAIN)	-1.374E-04	3.490E-04	3.517E-04	-1.374E-04	-1.053E-04
3	9.00000	0.03398	71.130	140.149	63.810	71.102
	(STRAIN)	-6.571E-06	-1.593E-07	6.029E-05	-6.571E-06	-1.840E-07
3	19.00000	0.03306	103.880	103.880	-585.723	-316.324
	(STRAIN)	-2.288E-04	1.878E-04	1.878E-04	-2.288E-04	-6.608E-05
3	19.00010	0.03306	103.876	132.380	103.876	121.708
	(STRAIN)	8.449E-05	6.959E-06	1.309E-04	6.959E-06	8.449E-05
3	49.00010	0.02826	49.359	49.359	6.999	9.929
	(STRAIN)	-1.393E-04	3.549E-04	3.549E-04	-1.393E-04	-1.051E-04

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.357E-05
ALLOWABLE LOAD REPETITIONS = 5.775E+08 DAMAGE RATIO = 3.029E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.334E-04
ALLOWABLE LOAD REPETITIONS = 1.357E+06 DAMAGE RATIO = 1.289E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.897E-05
ALLOWABLE LOAD REPETITIONS = 2.833E+11 DAMAGE RATIO = 6.175E-08

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.549E-04
ALLOWABLE LOAD REPETITIONS = 3.805E+06 DAMAGE RATIO = 4.597E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.03310	500.036	502.962	166.793	173.771
	(STRAIN)	-3.879E-05	2.228E-04	2.252E-04	-4.111E-05	-3.558E-05
1	19.00000	0.03142	114.210	114.210	-682.727	-553.629
	(STRAIN)	-2.160E-04	2.233E-04	2.233E-04	-2.160E-04	-1.448E-04
1	19.00010	0.03142	114.207	135.968	114.207	128.454
	(STRAIN)	8.815E-05	2.620E-05	1.208E-04	2.620E-05	8.815E-05
1	49.00010	0.02671	44.033	45.233	6.655	8.664
	(STRAIN)	-1.242E-04	3.119E-04	3.259E-04	-1.242E-04	-1.008E-04
2	9.00000	0.03358	245.747	344.059	59.083	107.982
	(STRAIN)	-1.943E-05	8.968E-05	1.676E-04	-5.816E-05	-1.943E-05
2	19.00000	0.03238	107.275	107.275	-649.603	-429.629
	(STRAIN)	-2.192E-04	1.980E-04	1.980E-04	-2.192E-04	-9.792E-05
2	19.00010	0.03238	107.278	132.907	107.278	124.021
	(STRAIN)	8.680E-05	1.400E-05	1.254E-04	1.400E-05	8.679E-05
2	49.00010	0.02764	47.214	47.436	6.979	9.570
	(STRAIN)	-1.319E-04	3.375E-04	3.401E-04	-1.319E-04	-1.016E-04
3	9.00000	0.03332	69.627	142.997	66.515	69.601
	(STRAIN)	-4.632E-06	-2.166E-06	5.594E-05	-4.632E-06	-2.187E-06
3	19.00000	0.03246	99.775	99.775	-610.384	-338.540
	(STRAIN)	-2.151E-04	1.764E-04	1.764E-04	-2.151E-04	-6.526E-05
3	19.00010	0.03246	99.773	127.290	99.773	117.329
	(STRAIN)	8.231E-05	5.980E-06	1.256E-04	5.980E-06	8.231E-05
3	49.00010	0.02786	47.928	47.928	7.055	9.809
	(STRAIN)	-1.337E-04	3.432E-04	3.432E-04	-1.337E-04	-1.015E-04

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.879E-05
ALLOWABLE LOAD REPETITIONS = 7.770E+08 DAMAGE RATIO = 2.251E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.192E-04

ALLOWABLE LOAD REPETITIONS = 1.543E+06 DAMAGE RATIO = 1.134E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.620E-05
ALLOWABLE LOAD REPETITIONS = 4.437E+11 DAMAGE RATIO = 3.943E-08

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.432E-04
ALLOWABLE LOAD REPETITIONS = 4.421E+06 DAMAGE RATIO = 3.956E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02888	482.870	488.258	165.367	177.014
	(STRAIN)	-1.944E-05	1.166E-04	1.189E-04	-2.178E-05	-1.671E-05
1	19.00000	0.02787	83.738	83.738	-826.938	-682.246
	(STRAIN)	-1.463E-04	1.450E-04	1.450E-04	-1.463E-04	-1.000E-04
1	19.00010	0.02787	83.735	101.908	83.735	96.691
	(STRAIN)	6.967E-05	1.334E-05	9.235E-05	1.334E-05	6.967E-05
1	49.00010	0.02438	36.427	37.287	6.789	8.161
	(STRAIN)	-9.492E-05	2.509E-04	2.609E-04	-9.492E-05	-7.891E-05
2	9.00000	0.02941	233.345	335.374	66.172	118.154
	(STRAIN)	-7.227E-06	4.297E-05	8.744E-05	-2.988E-05	-7.227E-06
2	19.00000	0.02866	80.603	80.603	-800.567	-568.304
	(STRAIN)	-1.492E-04	1.326E-04	1.326E-04	-1.492E-04	-7.495E-05
2	19.00010	0.02866	80.605	101.232	80.605	95.396
	(STRAIN)	7.038E-05	6.066E-06	9.575E-05	6.066E-06	7.038E-05
2	49.00010	0.02510	38.791	38.952	7.076	8.819
	(STRAIN)	-1.003E-04	2.697E-04	2.716E-04	-1.003E-04	-7.993E-05
3	9.00000	0.02932	60.973	159.757	60.958	81.236
	(STRAIN)	1.287E-06	-7.544E-06	3.551E-05	-7.551E-06	1.287E-06
3	19.00000	0.02876	76.355	76.355	-761.896	-478.617
	(STRAIN)	-1.472E-04	1.210E-04	1.210E-04	-1.472E-04	-5.655E-05
3	19.00010	0.02876	76.354	98.148	76.354	91.714
	(STRAIN)	6.805E-05	1.271E-06	9.603E-05	1.272E-06	6.805E-05
3	49.00010	0.02527	39.329	39.329	7.143	8.990
	(STRAIN)	-1.015E-04	2.740E-04	2.740E-04	-1.015E-04	-7.999E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.944E-05
ALLOWABLE LOAD REPETITIONS = 4.534E+09 DAMAGE RATIO = 3.858E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.492E-04
ALLOWABLE LOAD REPETITIONS = 3.433E+06 DAMAGE RATIO = 5.095E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.334E-05
ALLOWABLE LOAD REPETITIONS = 9.116E+12 DAMAGE RATIO = 1.919E-09

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.740E-04
ALLOWABLE LOAD REPETITIONS = 1.212E+07 DAMAGE RATIO = 1.443E-03

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02445	465.146	473.931	160.010	175.830
	(STRAIN)	-9.153E-06	5.677E-05	5.873E-05	-1.111E-05	-7.588E-06
1	19.00000	0.02386	57.095	57.095	-990.065	-832.333
	(STRAIN)	-9.231E-05	8.925E-05	8.925E-05	-9.231E-05	-6.496E-05
1	19.00010	0.02386	57.095	70.957	57.095	67.713
	(STRAIN)	5.122E-05	5.052E-06	6.532E-05	5.052E-06	5.122E-05
1	49.00010	0.02147	28.176	28.721	6.478	7.322
	(STRAIN)	-6.616E-05	1.870E-04	1.933E-04	-6.616E-05	-5.631E-05
2	9.00000	0.02489	220.801	325.850	72.431	124.469
	(STRAIN)	-2.460E-06	1.897E-05	4.234E-05	-1.404E-05	-2.460E-06
2	19.00000	0.02444	55.945	55.945	-971.519	-730.960
	(STRAIN)	-9.443E-05	8.371E-05	8.371E-05	-9.443E-05	-5.272E-05
2	19.00010	0.02444	55.946	71.237	55.946	67.774

	(STRAIN)	5.250E-05	1.059E-06	6.754E-05	1.060E-06	5.249E-05
2	49.00010	0.02199	29.748	29.851	6.704	7.757
	(STRAIN)	-6.949E-05	1.993E-04	2.006E-04	-6.949E-05	-5.721E-05
3	9.00000	0.02488	52.474	176.148	52.462	92.730
	(STRAIN)	2.095E-06	-6.860E-06	2.065E-05	-6.862E-06	2.095E-06
3	19.00000	0.02453	53.760	53.760	-934.470	-644.430
	(STRAIN)	-9.346E-05	7.788E-05	7.788E-05	-9.346E-05	-4.318E-05
3	19.00010	0.02453	53.759	69.706	53.759	65.953
	(STRAIN)	5.144E-05	-1.567E-06	6.777E-05	-1.568E-06	5.145E-05
3	49.00010	0.02211	30.107	30.107	6.753	7.864
	(STRAIN)	-7.029E-05	2.022E-04	2.022E-04	-7.029E-05	-5.734E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -9.153E-06
ALLOWABLE LOAD REPETITIONS = 3.043E+10 DAMAGE RATIO = 5.748E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.443E-05
ALLOWABLE LOAD REPETITIONS = 9.179E+06 DAMAGE RATIO = 1.906E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.052E-06
ALLOWABLE LOAD REPETITIONS = 7.042E+14 DAMAGE RATIO = 2.484E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.022E-04
ALLOWABLE LOAD REPETITIONS = 4.725E+07 DAMAGE RATIO = 3.702E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02096	450.842	462.442	149.066	166.714
	(STRAIN)	-5.143E-06	3.117E-05	3.262E-05	-6.595E-06	-4.386E-06
1	19.00000	0.02059	40.255	40.255	-1122.814	-958.361
	(STRAIN)	-6.119E-05	5.869E-05	5.869E-05	-6.119E-05	-4.424E-05
1	19.00010	0.02059	40.254	50.712	40.255	48.640
	(STRAIN)	3.806E-05	1.594E-06	4.706E-05	1.595E-06	3.806E-05
1	49.00010	0.01892	21.896	22.244	5.895	6.432
	(STRAIN)	-4.646E-05	1.402E-04	1.443E-04	-4.646E-05	-4.020E-05
2	9.00000	0.02130	211.377	316.503	74.410	121.864
	(STRAIN)	-1.386E-06	9.816E-06	2.297E-05	-7.325E-06	-1.386E-06
2	19.00000	0.02101	39.805	39.805	-1110.029	-866.965
	(STRAIN)	-6.264E-05	5.587E-05	5.587E-05	-6.264E-05	-3.759E-05
2	19.00010	0.02101	39.806	51.141	39.806	49.000
	(STRAIN)	3.920E-05	-7.801E-07	4.851E-05	-7.801E-07	3.920E-05
2	49.00010	0.01929	22.949	23.015	6.066	6.724
	(STRAIN)	-4.858E-05	1.484E-04	1.492E-04	-4.858E-05	-4.090E-05
3	9.00000	0.02131	46.778	184.944	46.769	94.885
	(STRAIN)	1.278E-06	-4.742E-06	1.255E-05	-4.744E-06	1.278E-06
3	19.00000	0.02107	38.567	38.567	-1074.634	-783.706
	(STRAIN)	-6.213E-05	5.260E-05	5.260E-05	-6.213E-05	-3.215E-05
3	19.00010	0.02107	38.566	50.297	38.566	47.993
	(STRAIN)	3.866E-05	-2.328E-06	4.867E-05	-2.327E-06	3.866E-05
3	49.00010	0.01937	23.180	23.180	6.097	6.789
	(STRAIN)	-4.909E-05	1.502E-04	1.502E-04	-4.909E-05	-4.102E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.143E-06
ALLOWABLE LOAD REPETITIONS = 1.241E+11 DAMAGE RATIO = 1.409E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.264E-05
ALLOWABLE LOAD REPETITIONS = 2.272E+07 DAMAGE RATIO = 7.699E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.594E-06
ALLOWABLE LOAD REPETITIONS = 1.231E+17 DAMAGE RATIO = 1.421E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.502E-04
ALLOWABLE LOAD REPETITIONS = 1.786E+08 DAMAGE RATIO = 9.791E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL	VERTICAL DISPL. STRESS	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIPAL STRESS	INTERMEDIATE STRESS

```
                P. STRAIN)  (STRAIN)    (STRAIN)    (STRAIN)    (STRAIN)

 1      9.00000    0.01946     444.136     456.817     140.511     158.172
        (STRAIN)  -4.091E-06   2.380E-05   2.501E-05  -5.307E-06  -3.614E-06
 1     19.00000    0.01916      34.055      34.055   -1179.924   -1013.744
        (STRAIN)  -5.037E-05   4.825E-05   4.825E-05  -5.037E-05  -3.687E-05
 1     19.00010    0.01916      34.055      43.106      34.055      41.446
        (STRAIN)   3.286E-05   7.270E-07   4.008E-05   7.265E-07   3.286E-05
 1     49.00010    0.01775      19.309      19.587       5.557       5.988
        (STRAIN)  -3.895E-05   1.215E-04   1.247E-04  -3.895E-05  -3.391E-05

 2      9.00000    0.01975     207.300     310.972      73.569     116.569
        (STRAIN)  -1.280E-06   7.418E-06   1.736E-05  -5.402E-06  -1.280E-06
 2     19.00000    0.01951      33.771      33.771   -1169.453    -926.711
        (STRAIN)  -5.156E-05   4.618E-05   4.618E-05  -5.156E-05  -3.184E-05
 2     19.00010    0.01951      33.771      43.522      33.771      41.821
        (STRAIN)   3.386E-05  -1.137E-06   4.126E-05  -1.136E-06   3.386E-05
 2     49.00010    0.01806      20.172      20.225       5.704       6.228
        (STRAIN)  -4.065E-05   1.281E-04   1.288E-04  -4.065E-05  -3.453E-05

 3      9.00000    0.01976      44.671     186.178      44.662      92.042
        (STRAIN)   7.987E-07  -3.742E-06   9.823E-06  -3.743E-06   7.987E-07
 3     19.00000    0.01956      32.813      32.813   -1134.769    -845.009
        (STRAIN)  -5.118E-05   4.367E-05   4.367E-05  -5.118E-05  -2.764E-05
 3     19.00010    0.01956      32.812      42.867      32.811      41.047
        (STRAIN)   3.346E-05  -2.342E-06   4.138E-05  -2.342E-06   3.346E-05
 3     49.00010    0.01812      20.352      20.352       5.727       6.277
        (STRAIN)  -4.104E-05   1.296E-04   1.296E-04  -4.104E-05  -3.462E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -4.091E-06
ALLOWABLE LOAD REPETITIONS =   2.099E+11  DAMAGE RATIO =   8.333E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -5.156E-05
ALLOWABLE LOAD REPETITIONS =   3.519E+07  DAMAGE RATIO =   4.971E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   7.270E-07
ALLOWABLE LOAD REPETITIONS =   4.140E+18  DAMAGE RATIO =   4.225E-15

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   1.296E-04
ALLOWABLE LOAD REPETITIONS =   3.461E+08  DAMAGE RATIO =   5.054E-05

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 6.735E-05
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 4.607E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 1.102E-07
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 1.395E-02
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MAXIMUM DAMAGE RATO = 4.607E-02 DESIGN LIFE IN YEARS = 21.7

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	4.88E-05	17774	2577905.039	11	5	4.01E+07	17,492	4.36E-04
2	5.48E-05	15451	2240992.265	11	5	3.09E+07	17,492	5.66E-04
3	6.58E-05	12315	1786185.862	11	5	2.04E+07	17,492	8.56E-04
4	8.53E-05	8877	1287480.187	11	5	1.15E+07	17,492	1.52E-03
5	1.19E-04	5742	832774.077	11	5	5.59E+06	17,492	3.13E-03
6	1.74E-04	3405	493894.1495	11	5	2.50E+06	17,492	7.01E-03
7	2.33E-04	2235	324128.9193	11	5	1.36E+06	17,492	1.28E-02
8	2.19E-04	2449	355197.0501	11	5	1.55E+06	17,492	1.13E-02
9	1.49E-04	4220	612098.7015	11	5	3.45E+06	17,492	5.06E-03
10	9.44E-05	7786	1129321.108	11	5	9.23E+06	17,492	1.90E-03
11	6.26E-05	13098	1899716.021	11	5	2.28E+07	17,492	7.66E-04
12	5.16E-05	16619	2410386.55	11	5	3.54E+07	17,492	4.94E-04
							2.10E+05	4.58E-02

21.81
VITA UTILE

- Sovrastruttura **P1E**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.25 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.735E+07
3 1.971E+07 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
3 1.646E+07 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 1.250E+07 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
3 8.753E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
3 5.831E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
3 3.897E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
3 2.969E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
3 3.139E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
3 4.553E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
3 7.687E+06 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
3 1.344E+07 4 3.000E+06 5 1.160E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
3 1.806E+07 4 3.000E+06 5 1.160E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 283702

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 283702

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL STRESS (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	9.00000	0.01155	545.071	547.374	283.945	291.217
	(STRAIN)		1.977E-05	1.995E-05	-5.511E-07	-3.717E-07
1	34.00000	0.01124	17.517	17.517	-495.897	-440.621
	(STRAIN)		1.752E-05	1.752E-05	-1.764E-05	-1.764E-05
1	34.00010	0.01124	17.517	52.261	17.517	46.662
	(STRAIN)		-2.405E-06	1.207E-05	-2.405E-06	9.739E-06
1	54.00010	0.01118	7.763	7.822	3.348	3.480
	(STRAIN)		4.317E-05	4.388E-05	-1.011E-05	-1.011E-05
2	9.00000	0.01157	274.653	428.124	172.531	247.860
	(STRAIN)		4.254E-06	1.620E-05	-3.693E-06	2.169E-06
2	34.00000	0.01134	17.480	17.480	-515.825	-457.827
	(STRAIN)		1.817E-05	1.817E-05	-1.835E-05	-1.835E-05
2	34.00010	0.01134	17.480	54.174	17.480	48.864
	(STRAIN)		-2.760E-06	1.253E-05	-2.760E-06	1.032E-05
2	54.00010	0.01128	8.012	8.023	3.411	3.571
	(STRAIN)		4.496E-05	4.509E-05	-1.057E-05	-1.057E-05
3	9.00000	0.01163	87.628	341.055	87.622	221.843
	(STRAIN)		-6.305E-06	1.342E-05	-6.306E-06	4.139E-06
3	34.00000	0.01147	17.133	17.133	-517.876	-456.638
	(STRAIN)		1.817E-05	1.817E-05	-1.847E-05	-1.847E-05
3	34.00010	0.01147	17.133	54.397	17.133	49.000
	(STRAIN)		-2.906E-06	1.262E-05	-2.906E-06	1.037E-05
3	54.00010	0.01141	8.126	8.126	3.468	3.636
	(STRAIN)		4.556E-05	4.556E-05	-1.066E-05	-1.066E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.717E-07
ALLOWABLE LOAD REPETITIONS = 4.709E+14 DAMAGE RATIO = 6.025E-10
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.847E-05
ALLOWABLE LOAD REPETITIONS = 8.926E+08 DAMAGE RATIO = 3.178E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.556E-05
ALLOWABLE LOAD REPETITIONS = 3.731E+10 DAMAGE RATIO = 7.604E-06

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL STRESS (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	9.00000	0.01231	547.997	550.104	280.250	287.320
	(STRAIN)		2.480E-05	2.500E-05	-9.140E-07	-7.114E-07
1	34.00000	0.01194	20.257	20.257	-479.193	-424.197
	(STRAIN)		2.044E-05	2.044E-05	-2.052E-05	-2.052E-05
1	34.00010	0.01194	20.257	60.320	20.257	53.684
	(STRAIN)		-2.748E-06	1.394E-05	-2.748E-06	1.118E-05
1	54.00010	0.01187	8.716	8.787	3.675	3.830
	(STRAIN)		4.901E-05	4.987E-05	-1.182E-05	-1.182E-05

2	9.00000	0.01233	275.732	423.813	168.101	240.289
	(STRAIN)		5.760E-06	1.998E-05	-4.576E-06	2.356E-06
2	34.00000	0.01206	20.224	20.224	-498.946	-441.130
	(STRAIN)		2.122E-05	2.122E-05	-2.136E-05	-2.136E-05
2	34.00010	0.01206	20.224	62.593	20.224	56.306
	(STRAIN)		-3.167E-06	1.449E-05	-3.167E-06	1.187E-05
2	54.00010	0.01199	9.010	9.023	3.748	3.937
	(STRAIN)		5.113E-05	5.129E-05	-1.238E-05	-1.238E-05
3	9.00000	0.01237	87.332	327.215	87.325	211.426
	(STRAIN)		-7.198E-06	1.584E-05	-7.199E-06	4.719E-06
3	34.00000	0.01218	19.787	19.787	-500.542	-439.452
	(STRAIN)		2.119E-05	2.119E-05	-2.149E-05	-2.149E-05
3	34.00010	0.01218	19.787	62.794	19.787	56.406
	(STRAIN)		-3.338E-06	1.458E-05	-3.338E-06	1.192E-05
3	54.00010	0.01211	9.114	9.114	3.796	3.995
	(STRAIN)		5.170E-05	5.170E-05	-1.248E-05	-1.248E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.114E-07
ALLOWABLE LOAD REPETITIONS = 6.653E+13 DAMAGE RATIO = 4.264E-09
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.149E-05
ALLOWABLE LOAD REPETITIONS = 6.326E+08 DAMAGE RATIO = 4.485E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.170E-05
ALLOWABLE LOAD REPETITIONS = 2.117E+10 DAMAGE RATIO = 1.340E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL STRESS (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	9.00000	0.01354	552.015	553.837	273.378	279.984
	(STRAIN)		3.493E-05	3.517E-05	-1.803E-06	-1.562E-06
1	34.00000	0.01306	25.134	25.134	-451.667	-397.336
	(STRAIN)		2.578E-05	2.578E-05	-2.571E-05	-2.571E-05
1	34.00010	0.01306	25.133	74.545	25.133	66.008
	(STRAIN)		-3.335E-06	1.725E-05	-3.335E-06	1.370E-05
1	54.00010	0.01297	10.332	10.426	4.204	4.401
	(STRAIN)		5.907E-05	6.020E-05	-1.488E-05	-1.488E-05
2	9.00000	0.01356	277.285	417.341	160.792	227.879
	(STRAIN)		9.006E-06	2.747E-05	-6.351E-06	2.493E-06
2	34.00000	0.01321	25.115	25.115	-471.043	-413.715
	(STRAIN)		2.678E-05	2.678E-05	-2.680E-05	-2.680E-05
2	34.00010	0.01321	25.115	77.484	25.115	69.410
	(STRAIN)		-3.869E-06	1.795E-05	-3.869E-06	1.459E-05
2	54.00010	0.01312	10.708	10.726	4.296	4.538
	(STRAIN)		6.179E-05	6.200E-05	-1.560E-05	-1.560E-05
3	9.00000	0.01356	87.041	306.612	87.033	195.350
	(STRAIN)		-8.656E-06	2.029E-05	-8.657E-06	5.622E-06
3	34.00000	0.01331	24.527	24.527	-472.430	-411.787
	(STRAIN)		2.672E-05	2.672E-05	-2.695E-05	-2.695E-05
3	34.00010	0.01331	24.527	77.691	24.527	69.493
	(STRAIN)		-4.090E-06	1.806E-05	-4.090E-06	1.465E-05
3	54.00010	0.01322	10.802	10.802	4.332	4.588
	(STRAIN)		6.236E-05	6.236E-05	-1.572E-05	-1.572E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.562E-06
ALLOWABLE LOAD REPETITIONS = 6.550E+12 DAMAGE RATIO = 4.331E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.695E-05
ALLOWABLE LOAD REPETITIONS = 3.797E+08 DAMAGE RATIO = 7.471E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.236E-05
ALLOWABLE LOAD REPETITIONS = 9.145E+09 DAMAGE RATIO = 3.102E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIAL STRESS	MINOR P. STRESS	INTERMEDIATE STRESS (HORIZONTAL STRAIN)
1	9.00000	0.01529	556.715	558.194	263.144	268.899
	(STRAIN)		5.423E-05	5.452E-05	-3.861E-06	-3.569E-06
1	34.00000	0.01459	32.846	32.846	-412.889	-359.826
	(STRAIN)		3.465E-05	3.465E-05	-3.410E-05	-3.410E-05
1	34.00010	0.01459	32.846	96.799	32.846	85.140
	(STRAIN)		-4.213E-06	2.243E-05	-4.213E-06	1.758E-05
1	54.00010	0.01448	12.726	12.858	4.936	5.202
	(STRAIN)		7.429E-05	7.589E-05	-1.972E-05	-1.972E-05
2	9.00000	0.01528	279.228	409.500	150.417	210.840
	(STRAIN)		1.571E-05	4.149E-05	-9.777E-06	2.179E-06
2	34.00000	0.01479	32.880	32.880	-431.573	-375.262
	(STRAIN)		3.602E-05	3.602E-05	-3.561E-05	-3.561E-05
2	34.00010	0.01479	32.880	100.846	32.880	89.847
	(STRAIN)		-4.931E-06	2.339E-05	-4.931E-06	1.881E-05
2	54.00010	0.01468	13.237	13.261	5.058	5.388
	(STRAIN)		7.800E-05	7.830E-05	-2.070E-05	-2.070E-05
3	9.00000	0.01522	86.903	280.612	86.894	174.313
	(STRAIN)		-1.060E-05	2.773E-05	-1.060E-05	6.697E-06
3	34.00000	0.01487	32.077	32.077	-433.181	-373.506
	(STRAIN)		3.592E-05	3.592E-05	-3.584E-05	-3.584E-05
3	34.00010	0.01487	32.077	101.159	32.077	90.004
	(STRAIN)		-5.238E-06	2.355E-05	-5.238E-06	1.890E-05
3	54.00010	0.01476	13.334	13.334	5.084	5.432
	(STRAIN)		7.869E-05	7.869E-05	-2.089E-05	-2.089E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.569E-06
ALLOWABLE LOAD REPETITIONS = 6.112E+11 DAMAGE RATIO = 4.642E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.584E-05
ALLOWABLE LOAD REPETITIONS = 2.015E+08 DAMAGE RATIO = 1.408E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.869E-05
ALLOWABLE LOAD REPETITIONS = 3.230E+09 DAMAGE RATIO = 8.784E-05

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIAL STRESS	MINOR P. STRESS	INTERMEDIATE STRESS (HORIZONTAL STRAIN)
1	9.00000	0.01746	561.643	562.770	250.670	255.176
	(STRAIN)		8.910E-05	8.946E-05	-8.259E-06	-7.906E-06
1	34.00000	0.01642	43.696	43.696	-365.435	-314.421
	(STRAIN)		4.831E-05	4.831E-05	-4.642E-05	-4.642E-05
1	34.00010	0.01642	43.696	127.699	43.696	111.463
	(STRAIN)		-5.365E-06	2.964E-05	-5.365E-06	2.287E-05
1	54.00010	0.01627	15.852	16.042	5.811	6.176
	(STRAIN)		9.466E-05	9.695E-05	-2.651E-05	-2.651E-05
2	9.00000	0.01742	281.428	401.702	137.607	190.880
	(STRAIN)		2.884E-05	6.650E-05	-1.619E-05	4.921E-07
2	34.00000	0.01668	43.858	43.858	-383.005	-328.393
	(STRAIN)		5.023E-05	5.023E-05	-4.861E-05	-4.861E-05
2	34.00010	0.01668	43.858	133.400	43.858	118.141
	(STRAIN)		-6.342E-06	3.097E-05	-6.342E-06	2.461E-05
2	54.00010	0.01653	16.557	16.592	5.976	6.433
	(STRAIN)		9.982E-05	1.002E-04	-2.788E-05	-2.788E-05
3	9.00000	0.01727	87.027	251.903	87.016	150.331
	(STRAIN)		-1.247E-05	3.915E-05	-1.247E-05	7.354E-06
3	34.00000	0.01675	42.793	42.793	-384.993	-326.962
	(STRAIN)		5.008E-05	5.008E-05	-4.897E-05	-4.897E-05
3	34.00010	0.01675	42.793	133.976	42.793	118.524
	(STRAIN)		-6.777E-06	3.122E-05	-6.777E-06	2.478E-05

3	54.00010	0.01659	16.688	16.688	6.002	6.486
	(STRAIN)		1.008E-04	1.008E-04	-2.817E-05	-2.817E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.906E-06
ALLOWABLE LOAD REPETITIONS = 6.598E+10 DAMAGE RATIO = 4.300E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.897E-05
ALLOWABLE LOAD REPETITIONS = 1.020E+08 DAMAGE RATIO = 2.782E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.008E-04
ALLOWABLE LOAD REPETITIONS = 1.066E+09 DAMAGE RATIO = 2.662E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)
1	9.00000	0.01982	566.228	567.051	238.330	241.343
	(STRAIN)		1.451E-04	1.455E-04	-1.626E-05	-1.585E-05
1	34.00000	0.01826	56.534	56.534	-316.233	-267.864
	(STRAIN)		6.697E-05	6.697E-05	-6.218E-05	-6.218E-05
1	34.00010	0.01826	56.534	163.819	56.534	141.957
	(STRAIN)		-6.637E-06	3.807E-05	-6.637E-06	2.896E-05
1	54.00010	0.01806	19.300	19.563	6.689	7.173
	(STRAIN)		1.177E-04	1.208E-04	-3.453E-05	-3.453E-05
2	9.00000	0.01970	283.628	395.386	124.276	171.275
	(STRAIN)		5.141E-05	1.064E-04	-2.699E-05	-3.866E-06
2	34.00000	0.01860	56.935	56.935	-332.348	-279.963
	(STRAIN)		6.961E-05	6.961E-05	-6.526E-05	-6.526E-05
2	34.00010	0.01860	56.935	171.601	56.935	151.145
	(STRAIN)		-7.917E-06	3.986E-05	-7.917E-06	3.134E-05
2	54.00010	0.01839	20.243	20.292	6.904	7.516
	(STRAIN)		1.246E-04	1.252E-04	-3.638E-05	-3.638E-05
3	9.00000	0.01945	87.390	224.646	87.377	127.010
	(STRAIN)		-1.301E-05	5.453E-05	-1.301E-05	6.488E-06
3	34.00000	0.01867	55.602	55.602	-334.528	-278.666
	(STRAIN)		6.935E-05	6.935E-05	-6.582E-05	-6.582E-05
3	34.00010	0.01867	55.602	172.556	55.602	151.881
	(STRAIN)		-8.502E-06	4.023E-05	-8.502E-06	3.161E-05
3	54.00010	0.01847	20.432	20.432	6.940	7.589
	(STRAIN)		1.260E-04	1.260E-04	-3.680E-05	-3.680E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.585E-05
ALLOWABLE LOAD REPETITIONS = 9.835E+09 DAMAGE RATIO = 2.884E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.582E-05
ALLOWABLE LOAD REPETITIONS = 5.439E+07 DAMAGE RATIO = 5.216E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.260E-04
ALLOWABLE LOAD REPETITIONS = 3.919E+08 DAMAGE RATIO = 7.238E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)
1	9.00000	0.02154	569.180	569.826	230.411	232.319
	(STRAIN)		2.010E-04	2.014E-04	-2.486E-05	-2.442E-05
1	34.00000	0.01947	66.137	66.137	-282.697	-236.406
	(STRAIN)		8.347E-05	8.347E-05	-7.515E-05	-7.515E-05
1	34.00010	0.01947	66.137	190.600	66.137	164.411
	(STRAIN)		-7.539E-06	4.432E-05	-7.539E-06	3.341E-05
1	54.00010	0.01924	21.753	22.073	7.266	7.842
	(STRAIN)		1.343E-04	1.382E-04	-4.052E-05	-4.052E-05
2	9.00000	0.02134	285.111	391.949	115.210	158.544

	(STRAIN)	7.500E-05	1.462E-04	-3.825E-05	-9.362E-06	
2	34.00000	0.01987	66.777	66.777	-297.645	-247.018
	(STRAIN)	8.670E-05	8.670E-05	-7.901E-05	-7.901E-05	
2	34.00010	0.01987	66.777	200.015	66.777	175.592
	(STRAIN)	-9.041E-06	4.647E-05	-9.041E-06	3.630E-05	
2	54.00010	0.01963	22.878	22.938	7.518	8.250
	(STRAIN)	1.426E-04	1.434E-04	-4.273E-05	-4.273E-05	
3	9.00000	0.02100	87.733	207.192	87.718	111.877
	(STRAIN)	-1.182E-05	6.781E-05	-1.183E-05	4.275E-06	
3	34.00000	0.01996	65.267	65.267	-299.819	-245.674
	(STRAIN)	8.629E-05	8.629E-05	-7.972E-05	-7.972E-05	
3	34.00010	0.01996	65.267	201.270	65.267	176.620
	(STRAIN)	-9.735E-06	4.693E-05	-9.735E-06	3.666E-05	
3	54.00010	0.01972	23.114	23.114	7.565	8.341
	(STRAIN)	1.444E-04	1.444E-04	-4.325E-05	-4.325E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.442E-05
ALLOWABLE LOAD REPETITIONS = 3.074E+09 DAMAGE RATIO = 9.229E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.972E-05
ALLOWABLE LOAD REPETITIONS = 3.651E+07 DAMAGE RATIO = 7.770E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.444E-04
ALLOWABLE LOAD REPETITIONS = 2.131E+08 DAMAGE RATIO = 1.331E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIAL STRESS	MINOR P. STRESS	INTERMEDIATE STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)	
1	9.00000	0.02118	568.585	569.266	231.997	234.122
	(STRAIN)	1.880E-04	1.885E-04	-2.283E-05	-2.240E-05	
1	34.00000	0.01923	64.125	64.125	-289.540	-242.808
	(STRAIN)	7.979E-05	7.979E-05	-7.232E-05	-7.232E-05	
1	34.00010	0.01923	64.125	185.003	64.125	159.729
	(STRAIN)	-7.353E-06	4.301E-05	-7.353E-06	3.248E-05	
1	54.00010	0.01900	21.247	21.554	7.149	7.706
	(STRAIN)	1.309E-04	1.346E-04	-3.926E-05	-3.926E-05	
2	9.00000	0.02100	284.808	392.599	117.057	161.100
	(STRAIN)	6.948E-05	1.370E-04	-3.561E-05	-8.019E-06	
2	34.00000	0.01962	64.711	64.711	-304.738	-253.738
	(STRAIN)	8.289E-05	8.289E-05	-7.601E-05	-7.601E-05	
2	34.00010	0.01962	64.711	194.071	64.711	170.484
	(STRAIN)	-8.809E-06	4.509E-05	-8.809E-06	3.526E-05	
2	54.00010	0.01938	22.333	22.391	7.394	8.100
	(STRAIN)	1.389E-04	1.396E-04	-4.140E-05	-4.140E-05	
3	9.00000	0.02068	87.658	210.689	87.643	114.918
	(STRAIN)	-1.220E-05	6.487E-05	-1.221E-05	4.873E-06	
3	34.00000	0.01970	63.237	63.237	-306.921	-252.411
	(STRAIN)	8.252E-05	8.252E-05	-7.669E-05	-7.669E-05	
3	34.00010	0.01970	63.237	195.263	63.237	171.449
	(STRAIN)	-9.480E-06	4.553E-05	-9.480E-06	3.561E-05	
3	54.00010	0.01946	22.560	22.560	7.439	8.188
	(STRAIN)	1.406E-04	1.406E-04	-4.190E-05	-4.190E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.240E-05
ALLOWABLE LOAD REPETITIONS = 3.873E+09 DAMAGE RATIO = 7.325E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.669E-05
ALLOWABLE LOAD REPETITIONS = 3.955E+07 DAMAGE RATIO = 7.173E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.406E-04
ALLOWABLE LOAD REPETITIONS = 2.403E+08 DAMAGE RATIO = 1.181E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIAL STRESS (STRAIN)	MINOR P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	9.00000	0.01888	564.487	565.421	243.048	246.656
	(STRAIN)		1.202E-04	1.206E-04	-1.261E-05	-1.222E-05
1	34.00000	0.01755	51.349	51.349	-335.399	-285.941
	(STRAIN)		5.904E-05	5.904E-05	-5.563E-05	-5.563E-05
1	34.00010	0.01755	51.349	149.279	51.349	129.713
	(STRAIN)		-6.133E-06	3.467E-05	-6.133E-06	2.652E-05
1	54.00010	0.01737	17.934	18.167	6.351	6.787
	(STRAIN)		1.085E-04	1.113E-04	-3.130E-05	-3.130E-05
2	9.00000	0.01880	282.776	397.654	129.468	178.781
	(STRAIN)		4.123E-05	8.871E-05	-2.213E-05	-1.749E-06
2	34.00000	0.01786	51.642	51.642	-352.117	-298.812
	(STRAIN)		6.138E-05	6.138E-05	-5.833E-05	-5.833E-05
2	34.00010	0.01786	51.642	156.206	51.642	137.865
	(STRAIN)		-7.292E-06	3.628E-05	-7.292E-06	2.863E-05
2	54.00010	0.01767	18.780	18.824	6.546	7.095
	(STRAIN)		1.147E-04	1.152E-04	-3.295E-05	-3.295E-05
3	9.00000	0.01860	87.226	235.008	87.213	135.928
	(STRAIN)		-1.304E-05	4.804E-05	-1.305E-05	7.087E-06
3	34.00000	0.01793	50.412	50.412	-354.253	-297.493
	(STRAIN)		6.117E-05	6.117E-05	-5.881E-05	-5.881E-05
3	34.00010	0.01793	50.412	157.003	50.412	138.452
	(STRAIN)		-7.817E-06	3.660E-05	-7.817E-06	2.887E-05
3	54.00010	0.01774	18.944	18.944	6.577	7.159
	(STRAIN)		1.159E-04	1.159E-04	-3.331E-05	-3.331E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.222E-05
ALLOWABLE LOAD REPETITIONS = 1.995E+10 DAMAGE RATIO = 1.422E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.881E-05
ALLOWABLE LOAD REPETITIONS = 6.896E+07 DAMAGE RATIO = 4.114E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.159E-04
ALLOWABLE LOAD REPETITIONS = 5.694E+08 DAMAGE RATIO = 4.982E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIAL STRESS (STRAIN)	MINOR P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	9.00000	0.01596	558.331	559.692	259.199	264.597
	(STRAIN)		6.360E-05	6.391E-05	-4.976E-06	-4.663E-06
1	34.00000	0.01517	36.074	36.074	-398.041	-345.564
	(STRAIN)		3.855E-05	3.855E-05	-3.769E-05	-3.769E-05
1	34.00010	0.01517	36.074	106.035	36.074	93.035
	(STRAIN)		-4.564E-06	2.459E-05	-4.564E-06	1.917E-05
1	54.00010	0.01504	13.681	13.830	5.213	5.508
	(STRAIN)		8.046E-05	8.226E-05	-2.174E-05	-2.174E-05
2	9.00000	0.01595	279.930	406.860	146.420	204.485
	(STRAIN)		1.913E-05	4.823E-05	-1.147E-05	1.840E-06
2	34.00000	0.01539	36.139	36.139	-416.407	-360.578
	(STRAIN)		4.008E-05	4.008E-05	-3.940E-05	-3.940E-05
2	34.00010	0.01539	36.139	110.564	36.139	98.313
	(STRAIN)		-5.360E-06	2.565E-05	-5.360E-06	2.055E-05
2	54.00010	0.01526	14.249	14.277	5.347	5.715
	(STRAIN)		8.460E-05	8.493E-05	-2.284E-05	-2.284E-05
3	9.00000	0.01586	86.912	271.321	86.903	166.629
	(STRAIN)		-1.127E-05	3.100E-05	-1.127E-05	7.005E-06
3	34.00000	0.01546	35.253	35.253	-418.143	-358.931
	(STRAIN)		3.997E-05	3.997E-05	-3.966E-05	-3.966E-05
3	34.00010	0.01546	35.253	110.945	35.253	98.525
	(STRAIN)		-5.705E-06	2.583E-05	-5.705E-06	2.066E-05
3	54.00010	0.01533	14.354	14.354	5.372	5.760
	(STRAIN)		8.536E-05	8.536E-05	-2.305E-05	-2.305E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.663E-06
ALLOWABLE LOAD REPETITIONS = 2.874E+11 DAMAGE RATIO = 9.872E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.966E-05
ALLOWABLE LOAD REPETITIONS = 1.612E+08 DAMAGE RATIO = 1.759E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.536E-05
ALLOWABLE LOAD REPETITIONS = 2.244E+09 DAMAGE RATIO = 1.264E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)
1	9.00000	0.01321	550.997	552.893	275.303	282.043
	(STRAIN)		3.193E-05	3.216E-05	-1.521E-06	-1.291E-06
1	34.00000	0.01276	23.762	23.762	-459.137	-404.599
	(STRAIN)		2.426E-05	2.426E-05	-2.424E-05	-2.424E-05
1	34.00010	0.01276	23.762	70.559	23.762	62.563
	(STRAIN)		-3.173E-06	1.633E-05	-3.173E-06	1.299E-05
1	54.00010	0.01268	9.887	9.974	4.061	4.247
	(STRAIN)		5.628E-05	5.733E-05	-1.402E-05	-1.402E-05
2	9.00000	0.01322	276.883	419.021	162.780	231.229
	(STRAIN)		8.019E-06	2.526E-05	-5.824E-06	2.480E-06
2	34.00000	0.01290	23.738	23.738	-478.628	-421.146
	(STRAIN)		2.519E-05	2.519E-05	-2.526E-05	-2.526E-05
2	34.00010	0.01290	23.738	73.308	23.738	65.741
	(STRAIN)		-3.675E-06	1.698E-05	-3.675E-06	1.383E-05
2	54.00010	0.01282	10.240	10.256	4.148	4.375
	(STRAIN)		5.883E-05	5.902E-05	-1.469E-05	-1.469E-05
3	9.00000	0.01324	87.101	311.989	87.093	199.602
	(STRAIN)		-8.263E-06	1.902E-05	-8.264E-06	5.385E-06
3	34.00000	0.01301	23.191	23.191	-480.024	-419.239
	(STRAIN)		2.514E-05	2.514E-05	-2.540E-05	-2.540E-05
3	34.00010	0.01301	23.191	73.507	23.191	65.823
	(STRAIN)		-3.880E-06	1.708E-05	-3.880E-06	1.388E-05
3	54.00010	0.01293	10.335	10.335	4.187	4.426
	(STRAIN)		5.940E-05	5.940E-05	-1.481E-05	-1.481E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.291E-06
ALLOWABLE LOAD REPETITIONS = 1.143E+13 DAMAGE RATIO = 2.483E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.540E-05
ALLOWABLE LOAD REPETITIONS = 4.336E+08 DAMAGE RATIO = 6.543E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.940E-05
ALLOWABLE LOAD REPETITIONS = 1.138E+10 DAMAGE RATIO = 2.494E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)
1	9.00000	0.01191	546.526	548.733	282.257	289.438
	(STRAIN)		2.207E-05	2.226E-05	-7.088E-07	-5.185E-07
1	34.00000	0.01157	18.802	18.802	-487.948	-432.792
	(STRAIN)		1.888E-05	1.888E-05	-1.899E-05	-1.899E-05
1	34.00010	0.01157	18.802	56.048	18.802	49.965
	(STRAIN)		-2.567E-06	1.295E-05	-2.567E-06	1.042E-05
1	54.00010	0.01151	8.214	8.279	3.505	3.647
	(STRAIN)		4.593E-05	4.671E-05	-1.091E-05	-1.091E-05
2	9.00000	0.01193	275.184	426.036	170.422	244.260
	(STRAIN)		4.932E-06	1.793E-05	-4.098E-06	2.267E-06
2	34.00000	0.01169	18.766	18.766	-507.798	-449.874

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      (STRAIN)          1.959E-05   1.959E-05  -1.976E-05  -1.976E-05
 2    34.00010   0.01169    18.766      58.128      18.766      52.362
      (STRAIN)         -2.952E-06   1.345E-05  -2.952E-06   1.105E-05
 2    54.00010   0.01162     8.485       8.496       3.572       3.745
      (STRAIN)          4.787E-05   4.801E-05  -1.142E-05  -1.142E-05

 3     9.00000   0.01199    87.473     334.310      87.466     216.811
      (STRAIN)         -6.730E-06   1.454E-05  -6.731E-06   4.417E-06
 3    34.00000   0.01181    18.377      18.377    -509.591    -448.410
      (STRAIN)          1.958E-05   1.958E-05  -1.988E-05  -1.988E-05
 3    34.00010   0.01181    18.377      58.338      18.377      52.479
      (STRAIN)         -3.109E-06   1.354E-05  -3.109E-06   1.110E-05
 3    54.00010   0.01175     8.594       8.594       3.625       3.807
      (STRAIN)          4.845E-05   4.845E-05  -1.151E-05  -1.151E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -5.185E-07
ALLOWABLE LOAD REPETITIONS =   1.717E+14  DAMAGE RATIO =   1.652E-09
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -1.988E-05
ALLOWABLE LOAD REPETITIONS =   7.547E+08  DAMAGE RATIO =   3.759E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4.845E-05
ALLOWABLE LOAD REPETITIONS =   2.831E+10  DAMAGE RATIO =   1.002E-05

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* SUMMARY OF DAMAGE ANALYSIS *
*******************************
AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 2.144E-04
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 3.277E-02
AT TOP OF LAYER  4       SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER  5       SUM OF DAMAGE RATIO = 4.302E-03
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MAXIMUM DAMAGE RATO = 3.277E-02 DESIGN LIFE IN YEARS = 30.52

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	1.85E-05	19714	2859282.882	11	5	8.97E+08	283,702	3.16E-04
2	2.15E-05	16460	2387286.382	11	5	6.35E+08	283,702	4.46E-04
3	2.70E-05	12502	1813287.803	11	5	3.82E+08	283,702	7.44E-04
4	3.58E-05	8753	1269557.481	11	5	2.02E+08	283,702	1.40E-03
5	4.90E-05	5831	845645.5593	11	5	1.03E+08	283,702	2.77E-03
6	6.58E-05	3897	565140.5798	11	5	5.47E+07	283,702	5.19E-03
7	7.97E-05	2969	430600.9563	11	5	3.67E+07	283,702	7.73E-03
8	7.67E-05	3139	455224.7323	11	5	3.98E+07	283,702	7.14E-03
9	5.88E-05	4553	660386.2812	11	5	6.93E+07	283,702	4.09E-03
10	3.97E-05	7687	1114901.631	11	5	1.62E+08	283,702	1.75E-03
11	2.54E-05	13442	1949529.725	11	5	4.36E+08	283,702	6.51E-04
12	1.99E-05	18064	2619893.15	11	5	7.58E+08	283,702	3.74E-04
							3.40E+06	3.26E-02

30.67
VITA UTILE

- Sovrastruttura **P1F**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 1.245E+07 2 1.519E+07
3 1.762E+07 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 1.041E+07 2 1.298E+07
3 1.536E+07 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 7.846E+06 2 1.007E+07
3 1.231E+07 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 5.262E+06 2 7.011E+06
3 8.971E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 3.122E+06 2 4.342E+06
3 5.909E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 1.680E+06 2 2.448E+06
3 3.601E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 1.022E+06 2 1.541E+06
3 2.426E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 1.138E+06 2 1.704E+06
3 2.642E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 2.166E+06 2 3.098E+06
3 4.411E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 4.493E+06 2 6.069E+06
3 7.909E+06 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 8.468E+06 2 1.079E+07
3 1.307E+07 4 2.680E+05 5 1.200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 1.142E+07 2 1.408E+07
3 1.649E+07 4 2.680E+05 5 1.200E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 132203

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 132203
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 132203

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01156	520.550	523.242	241.499	246.200
	(STRAIN)	-1.591E-06	2.297E-05	2.320E-05	-1.830E-06	-1.412E-06
1	34.00000	0.01122	9.177	9.177	-477.731	-423.940
	(STRAIN)	-1.888E-05	1.844E-05	1.844E-05	-1.888E-05	-1.476E-05
1	34.00010	0.01122	9.177	11.019	9.177	10.704
	(STRAIN)	9.796E-06	1.821E-06	1.144E-05	1.822E-06	9.795E-06
1	54.00010	0.01096	7.720	7.772	3.841	3.949
	(STRAIN)	-7.064E-06	3.819E-05	3.880E-05	-7.064E-06	-5.800E-06
2	9.00000	0.01158	264.914	391.143	156.343	205.495
	(STRAIN)	9.132E-07	6.193E-06	1.741E-05	-3.454E-06	9.132E-07
2	34.00000	0.01133	9.413	9.413	-497.002	-440.472
	(STRAIN)	-1.965E-05	1.916E-05	1.916E-05	-1.965E-05	-1.532E-05
2	34.00010	0.01133	9.413	11.341	9.413	11.056
	(STRAIN)	1.028E-05	1.696E-06	1.177E-05	1.696E-06	1.028E-05
2	54.00010	0.01106	7.959	7.969	3.911	4.044
	(STRAIN)	-7.448E-06	3.977E-05	3.989E-05	-7.447E-06	-5.901E-06
3	9.00000	0.01164	89.695	298.178	89.689	180.735
	(STRAIN)	2.961E-06	-5.129E-06	1.340E-05	-5.129E-06	2.961E-06
3	34.00000	0.01145	9.478	9.478	-498.758	-439.083
	(STRAIN)	-1.978E-05	1.917E-05	1.917E-05	-1.978E-05	-1.520E-05
3	34.00010	0.01145	9.478	11.434	9.478	11.149
	(STRAIN)	1.039E-05	1.661E-06	1.188E-05	1.660E-06	1.039E-05
3	54.00010	0.01118	8.070	8.070	3.978	4.117
	(STRAIN)	-7.478E-06	4.027E-05	4.027E-05	-7.478E-06	-5.847E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.591E-06
ALLOWABLE LOAD REPETITIONS = 4.403E+12 DAMAGE RATIO = 3.003E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.978E-05
ALLOWABLE LOAD REPETITIONS = 7.841E+08 DAMAGE RATIO = 1.686E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.821E-06
ALLOWABLE LOAD REPETITIONS = 6.780E+16 DAMAGE RATIO = 1.950E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.027E-05
ALLOWABLE LOAD REPETITIONS = 6.483E+10 DAMAGE RATIO = 2.039E-06

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01217	523.302	525.880	241.799	246.664
	(STRAIN)	-1.935E-06	2.709E-05	2.735E-05	-2.204E-06	-1.697E-06
1	34.00000	0.01179	10.139	10.139	-468.746	-414.852
	(STRAIN)	-2.130E-05	2.080E-05	2.080E-05	-2.130E-05	-1.656E-05
1	34.00010	0.01179	10.139	12.195	10.139	11.834
	(STRAIN)	1.082E-05	1.969E-06	1.271E-05	1.968E-06	1.082E-05

1	54.00010	0.01149	8.469	8.530	4.140	4.264
	(STRAIN)	-8.150E-06	4.236E-05	4.308E-05	-8.150E-06	-6.704E-06
2	9.00000	0.01219	265.868	390.494	154.230	203.453
	(STRAIN)	9.864E-07	7.480E-06	2.045E-05	-4.135E-06	9.865E-07
2	34.00000	0.01191	10.409	10.409	-487.986	-431.267
	(STRAIN)	-2.218E-05	2.163E-05	2.163E-05	-2.218E-05	-1.720E-05
2	34.00010	0.01191	10.409	12.564	10.409	12.236
	(STRAIN)	1.137E-05	1.823E-06	1.308E-05	1.823E-06	1.137E-05
2	54.00010	0.01160	8.743	8.754	4.219	4.372
	(STRAIN)	-8.592E-06	4.418E-05	4.431E-05	-8.591E-06	-6.813E-06
3	9.00000	0.01224	89.347	291.754	89.341	176.754
	(STRAIN)	3.343E-06	-5.752E-06	1.531E-05	-5.752E-06	3.343E-06
3	34.00000	0.01203	10.458	10.458	-489.377	-429.473
	(STRAIN)	-2.232E-05	2.162E-05	2.162E-05	-2.232E-05	-1.705E-05
3	34.00010	0.01203	10.458	12.644	10.458	12.315
	(STRAIN)	1.147E-05	1.768E-06	1.319E-05	1.769E-06	1.147E-05
3	54.00010	0.01172	8.845	8.845	4.278	4.439
	(STRAIN)	-8.630E-06	4.465E-05	4.465E-05	-8.630E-06	-6.753E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.935E-06
ALLOWABLE LOAD REPETITIONS = 2.644E+12 DAMAGE RATIO = 5.000E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.232E-05
ALLOWABLE LOAD REPETITIONS = 5.925E+08 DAMAGE RATIO = 2.231E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.969E-06
ALLOWABLE LOAD REPETITIONS = 4.788E+16 DAMAGE RATIO = 2.761E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.465E-05
ALLOWABLE LOAD REPETITIONS = 4.081E+10 DAMAGE RATIO = 3.239E-06

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIPAL STRESS	INTERMEDIATE STRESS
1	9.00000	0.01323	527.448	529.845	241.454	246.500
	(STRAIN)	-2.684E-06	3.533E-05	3.565E-05	-3.005E-06	-2.329E-06
1	34.00000	0.01275	11.877	11.877	-453.354	-399.373
	(STRAIN)	-2.580E-05	2.520E-05	2.520E-05	-2.580E-05	-1.989E-05
1	34.00010	0.01275	11.877	14.327	11.877	13.875
	(STRAIN)	1.266E-05	2.224E-06	1.502E-05	2.225E-06	1.266E-05
1	54.00010	0.01240	9.802	9.880	4.652	4.806
	(STRAIN)	-1.019E-05	4.990E-05	5.081E-05	-1.019E-05	-8.394E-06
2	9.00000	0.01325	267.327	389.133	150.486	199.419
	(STRAIN)	1.048E-06	1.015E-05	2.647E-05	-5.511E-06	1.048E-06
2	34.00000	0.01290	12.210	12.210	-472.500	-415.548
	(STRAIN)	-2.691E-05	2.623E-05	2.623E-05	-2.691E-05	-2.066E-05
2	34.00010	0.01290	12.210	14.784	12.210	14.373
	(STRAIN)	1.335E-05	2.040E-06	1.549E-05	2.040E-06	1.334E-05
2	54.00010	0.01253	10.141	10.155	4.749	4.940
	(STRAIN)	-1.074E-05	5.216E-05	5.233E-05	-1.074E-05	-8.517E-06
3	9.00000	0.01326	88.856	281.168	88.849	169.882
	(STRAIN)	4.009E-06	-6.851E-06	1.892E-05	-6.852E-06	4.009E-06
3	34.00000	0.01300	12.234	12.234	-473.635	-413.432
	(STRAIN)	-2.706E-05	2.621E-05	2.621E-05	-2.706E-05	-2.046E-05
3	34.00010	0.01300	12.234	14.845	12.234	14.434
	(STRAIN)	1.344E-05	1.950E-06	1.559E-05	1.950E-06	1.344E-05
3	54.00010	0.01264	10.232	10.232	4.795	4.996
	(STRAIN)	-1.080E-05	5.263E-05	5.263E-05	-1.080E-05	-8.453E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.684E-06
ALLOWABLE LOAD REPETITIONS = 1.120E+12 DAMAGE RATIO = 1.181E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.706E-05
ALLOWABLE LOAD REPETITIONS = 3.793E+08 DAMAGE RATIO = 3.485E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.224E-06
ALLOWABLE LOAD REPETITIONS = 2.771E+16 DAMAGE RATIO = 4.770E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.263E-05
ALLOWABLE LOAD REPETITIONS = 1.955E+10 DAMAGE RATIO = 6.761E-06

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01490	533.033	535.171	239.884	245.033
	(STRAIN)	-4.322E-06	5.171E-05	5.212E-05	-4.733E-06	-3.742E-06
1	34.00000	0.01424	14.828	14.828	-429.769	-375.822
	(STRAIN)	-3.382E-05	3.308E-05	3.308E-05	-3.382E-05	-2.570E-05
1	34.00010	0.01424	14.828	17.960	14.828	17.345
	(STRAIN)	1.578E-05	2.635E-06	1.899E-05	2.635E-06	1.578E-05
1	54.00010	0.01379	12.012	12.121	5.451	5.660
	(STRAIN)	-1.384E-05	6.270E-05	6.398E-05	-1.384E-05	-1.141E-05
2	9.00000	0.01491	269.335	386.879	144.513	192.585
	(STRAIN)	9.411E-07	1.572E-05	3.835E-05	-8.315E-06	9.410E-07
2	34.00000	0.01444	15.275	15.275	-448.674	-391.520
	(STRAIN)	-3.533E-05	3.448E-05	3.448E-05	-3.533E-05	-2.673E-05
2	34.00010	0.01444	15.275	18.578	15.275	18.016
	(STRAIN)	1.670E-05	2.378E-06	1.963E-05	2.378E-06	1.670E-05
2	54.00010	0.01397	12.469	12.489	5.580	5.841
	(STRAIN)	-1.460E-05	6.577E-05	6.601E-05	-1.460E-05	-1.155E-05
3	9.00000	0.01486	88.266	265.582	88.259	159.337
	(STRAIN)	5.062E-06	-8.622E-06	2.552E-05	-8.624E-06	5.062E-06
3	34.00000	0.01452	15.272	15.272	-449.906	-389.408
	(STRAIN)	-3.555E-05	3.445E-05	3.445E-05	-3.555E-05	-2.645E-05
3	34.00010	0.01452	15.272	18.625	15.272	18.063
	(STRAIN)	1.681E-05	2.228E-06	1.974E-05	2.228E-06	1.680E-05
3	54.00010	0.01405	12.558	12.558	5.612	5.889
	(STRAIN)	-1.472E-05	6.631E-05	6.631E-05	-1.472E-05	-1.149E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.322E-06
ALLOWABLE LOAD REPETITIONS = 3.179E+11 DAMAGE RATIO = 4.159E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.555E-05
ALLOWABLE LOAD REPETITIONS = 2.025E+08 DAMAGE RATIO = 6.529E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.635E-06
ALLOWABLE LOAD REPETITIONS = 1.297E+16 DAMAGE RATIO = 1.019E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.631E-05
ALLOWABLE LOAD REPETITIONS = 6.949E+09 DAMAGE RATIO = 1.903E-05

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01739	540.125	541.927	236.998	242.062
	(STRAIN)	-8.053E-06	8.563E-05	8.619E-05	-8.612E-06	-7.038E-06
1	34.00000	0.01641	19.716	19.716	-396.658	-343.046
	(STRAIN)	-4.797E-05	4.715E-05	4.715E-05	-4.797E-05	-3.573E-05
1	34.00010	0.01641	19.715	24.005	19.715	23.087
	(STRAIN)	2.089E-05	3.278E-06	2.569E-05	3.278E-06	2.089E-05
1	54.00010	0.01579	15.539	15.708	6.614	6.923
	(STRAIN)	-2.032E-05	8.380E-05	8.577E-05	-2.032E-05	-1.671E-05
2	9.00000	0.01738	271.963	383.950	135.794	182.573
	(STRAIN)	1.526E-07	2.794E-05	6.276E-05	-1.439E-05	1.526E-07
2	34.00000	0.01668	20.365	20.365	-415.074	-357.888
	(STRAIN)	-5.025E-05	4.923E-05	4.923E-05	-5.025E-05	-3.719E-05
2	34.00010	0.01668	20.365	24.912	20.365	24.071
	(STRAIN)	2.224E-05	2.881E-06	2.663E-05	2.881E-06	2.224E-05
2	54.00010	0.01603	16.209	16.240	6.797	7.191
	(STRAIN)	-2.146E-05	8.834E-05	8.871E-05	-2.146E-05	-1.687E-05
3	9.00000	0.01725	87.643	244.456	87.634	144.609

	(STRAIN)	6.535E-06	-1.118E-05	3.758E-05	-1.118E-05	6.535E-06
3	34.00000	0.01675	20.348	20.348	-416.697	-356.037
	(STRAIN)	-5.063E-05	4.921E-05	4.921E-05	-5.063E-05	-3.677E-05
3	34.00010	0.01675	20.348	24.975	20.348	24.130
	(STRAIN)	2.239E-05	2.634E-06	2.681E-05	2.634E-06	2.239E-05
3	54.00010	0.01610	16.331	16.331	6.827	7.245
	(STRAIN)	-2.169E-05	8.918E-05	8.918E-05	-2.169E-05	-1.682E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.053E-06
ALLOWABLE LOAD REPETITIONS = 6.173E+10 DAMAGE RATIO = 2.142E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.063E-05
ALLOWABLE LOAD REPETITIONS = 9.034E+07 DAMAGE RATIO = 1.463E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 3.278E-06
ALLOWABLE LOAD REPETITIONS = 4.885E+15 DAMAGE RATIO = 2.706E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.918E-05
ALLOWABLE LOAD REPETITIONS = 1.844E+09 DAMAGE RATIO = 7.170E-05

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02086	548.515	549.933	233.659	238.328
	(STRAIN)	-1.647E-05	1.564E-04	1.572E-04	-1.725E-05	-1.468E-05
1	34.00000	0.01926	27.330	27.330	-355.294	-302.559
	(STRAIN)	-7.191E-05	7.152E-05	7.152E-05	-7.191E-05	-5.214E-05
1	34.00010	0.01926	27.330	33.464	27.330	32.010
	(STRAIN)	2.870E-05	4.255E-06	3.630E-05	4.255E-06	2.870E-05
1	54.00010	0.01837	20.768	21.043	8.127	8.615
	(STRAIN)	-3.113E-05	1.163E-04	1.196E-04	-3.113E-05	-2.544E-05
2	9.00000	0.02079	275.157	381.203	124.559	170.256
	(STRAIN)	-2.762E-06	5.509E-05	1.136E-04	-2.796E-05	-2.762E-06
2	34.00000	0.01966	28.319	28.319	-372.823	-315.985
	(STRAIN)	-7.557E-05	7.481E-05	7.481E-05	-7.557E-05	-5.426E-05
2	34.00010	0.01966	28.319	34.865	28.319	33.520
	(STRAIN)	3.077E-05	3.602E-06	3.780E-05	3.602E-06	3.077E-05
2	54.00010	0.01873	21.801	21.852	8.398	9.029
	(STRAIN)	-3.296E-05	1.234E-04	1.240E-04	-3.296E-05	-2.559E-05
3	9.00000	0.02054	87.087	218.890	87.077	126.494
	(STRAIN)	7.927E-06	-1.380E-05	5.888E-05	-1.381E-05	7.927E-06
3	34.00000	0.01974	28.302	28.303	-374.674	-314.193
	(STRAIN)	-7.625E-05	7.481E-05	7.481E-05	-7.625E-05	-5.358E-05
3	34.00010	0.01974	28.303	34.985	28.303	33.630
	(STRAIN)	3.103E-05	3.197E-06	3.810E-05	3.197E-06	3.103E-05
3	54.00010	0.01881	22.013	22.013	8.448	9.119
	(STRAIN)	-3.338E-05	1.249E-04	1.249E-04	-3.338E-05	-2.554E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.647E-05
ALLOWABLE LOAD REPETITIONS = 9.556E+09 DAMAGE RATIO = 1.383E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.625E-05
ALLOWABLE LOAD REPETITIONS = 3.584E+07 DAMAGE RATIO = 3.689E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 4.255E-06
ALLOWABLE LOAD REPETITIONS = 1.518E+15 DAMAGE RATIO = 8.707E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.249E-04
ALLOWABLE LOAD REPETITIONS = 4.083E+08 DAMAGE RATIO = 3.238E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02413	555.347	556.475	231.697	235.827
	(STRAIN)	-2.860E-05	2.539E-04	2.549E-04	-2.959E-05	-2.597E-05
1	34.00000	0.02175	35.102	35.102	-320.998	-269.401

	(STRAIN)	-9.852E-05	9.965E-05	9.965E-05	-9.852E-05	-6.981E-05
1	34.00010	0.02175	35.102	43.136	35.102	41.074
	(STRAIN)	3.648E-05	5.293E-06	4.726E-05	5.292E-06	3.649E-05
1	54.00010	0.02058	25.838	26.236	9.401	10.094
	(STRAIN)	-4.276E-05	1.490E-04	1.537E-04	-4.276E-05	-3.468E-05
2	9.00000	0.02395	277.863	379.747	115.289	160.634
	(STRAIN)	-8.194E-06	9.449E-05	1.837E-04	-4.791E-05	-8.194E-06
2	34.00000	0.02228	36.453	36.453	-337.544	-281.348
	(STRAIN)	-1.038E-04	1.043E-04	1.043E-04	-1.038E-04	-7.254E-05
2	34.00010	0.02228	36.453	45.077	36.453	43.153
	(STRAIN)	3.933E-05	4.334E-06	4.938E-05	4.333E-06	3.933E-05
2	54.00010	0.02106	27.271	27.344	9.762	10.668
	(STRAIN)	-4.536E-05	1.589E-04	1.598E-04	-4.536E-05	-3.479E-05
3	9.00000	0.02357	86.762	198.443	86.749	111.956
	(STRAIN)	7.876E-06	-1.419E-05	8.363E-05	-1.420E-05	7.876E-06
3	34.00000	0.02239	36.428	36.428	-339.305	-279.320
	(STRAIN)	-1.048E-04	1.043E-04	1.043E-04	-1.048E-04	-7.145E-05
3	34.00010	0.02239	36.428	45.253	36.429	43.306
	(STRAIN)	3.968E-05	3.748E-06	4.985E-05	3.749E-06	3.968E-05
3	54.00010	0.02116	27.585	27.585	9.838	10.805
	(STRAIN)	-4.598E-05	1.611E-04	1.611E-04	-4.598E-05	-3.470E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.860E-05
ALLOWABLE LOAD REPETITIONS = 2.307E+09 DAMAGE RATIO = 5.731E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.048E-04
ALLOWABLE LOAD REPETITIONS = 1.762E+07 DAMAGE RATIO = 7.503E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.293E-06
ALLOWABLE LOAD REPETITIONS = 5.714E+14 DAMAGE RATIO = 2.314E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.611E-04
ALLOWABLE LOAD REPETITIONS = 1.307E+08 DAMAGE RATIO = 1.011E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.02338	553.854	555.042	232.046	236.313
	(STRAIN)	-2.542E-05	2.285E-04	2.295E-04	-2.636E-05	-2.298E-05
1	34.00000	0.02119	33.280	33.280	-328.511	-276.632
	(STRAIN)	-9.209E-05	9.275E-05	9.275E-05	-9.209E-05	-6.558E-05
1	34.00010	0.02119	33.280	40.869	33.280	38.953
	(STRAIN)	3.468E-05	5.044E-06	4.469E-05	5.044E-06	3.468E-05
1	54.00010	0.02009	24.671	25.039	9.123	9.766
	(STRAIN)	-3.999E-05	1.414E-04	1.457E-04	-3.999E-05	-3.249E-05
2	9.00000	0.02323	277.266	379.999	117.309	162.683
	(STRAIN)	-6.673E-06	8.408E-05	1.654E-04	-4.261E-05	-6.673E-06
2	34.00000	0.02170	34.546	34.546	-345.292	-288.926
	(STRAIN)	-9.698E-05	9.708E-05	9.708E-05	-9.698E-05	-6.818E-05
2	34.00010	0.02170	34.546	42.680	34.546	40.897
	(STRAIN)	3.734E-05	4.159E-06	4.665E-05	4.159E-06	3.734E-05
2	54.00010	0.02054	26.008	26.076	9.462	10.302
	(STRAIN)	-4.241E-05	1.506E-04	1.514E-04	-4.241E-05	-3.262E-05
3	9.00000	0.02288	86.825	202.856	86.813	115.091
	(STRAIN)	8.042E-06	-1.435E-05	7.755E-05	-1.436E-05	8.042E-06
3	34.00000	0.02180	34.525	34.525	-347.088	-286.966
	(STRAIN)	-9.791E-05	9.705E-05	9.705E-05	-9.791E-05	-6.720E-05
3	34.00010	0.02180	34.525	42.843	34.524	41.044
	(STRAIN)	3.767E-05	3.618E-06	4.707E-05	3.618E-06	3.767E-05
3	54.00010	0.02064	26.298	26.298	9.533	10.427
	(STRAIN)	-4.298E-05	1.526E-04	1.526E-04	-4.298E-05	-3.254E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.542E-05
ALLOWABLE LOAD REPETITIONS = 3.123E+09 DAMAGE RATIO = 4.234E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.791E-05
ALLOWABLE LOAD REPETITIONS = 2.050E+07 DAMAGE RATIO = 6.448E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.044E-06
ALLOWABLE LOAD REPETITIONS = 7.095E+14 DAMAGE RATIO = 1.863E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.526E-04
ALLOWABLE LOAD REPETITIONS = 1.664E+08 DAMAGE RATIO = 7.945E-04

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01936	545.067	546.639	234.944	239.818
	(STRAIN)	-1.233E-05	1.221E-04	1.228E-04	-1.302E-05	-1.089E-05
1	34.00000	0.01805	23.948	23.948	-372.461	-319.297
	(STRAIN)	-6.101E-05	6.032E-05	6.032E-05	-6.101E-05	-4.474E-05
1	34.00010	0.01805	23.947	29.258	23.947	28.050
	(STRAIN)	2.525E-05	3.820E-06	3.156E-05	3.820E-06	2.525E-05
1	54.00010	0.01729	18.481	18.707	7.493	7.899
	(STRAIN)	-2.624E-05	1.019E-04	1.046E-04	-2.624E-05	-2.151E-05
2	9.00000	0.01932	273.846	382.183	129.274	175.304
	(STRAIN)	-1.196E-06	4.175E-05	8.897E-05	-2.126E-05	-1.196E-06
2	34.00000	0.01840	24.783	24.783	-390.396	-333.360
	(STRAIN)	-6.403E-05	6.305E-05	6.305E-05	-6.403E-05	-4.657E-05
2	34.00010	0.01840	24.783	30.435	24.783	29.322
	(STRAIN)	2.699E-05	3.286E-06	3.281E-05	3.286E-06	2.699E-05
2	54.00010	0.01760	19.349	19.391	7.725	8.246
	(STRAIN)	-2.775E-05	1.079E-04	1.084E-04	-2.775E-05	-2.167E-05
3	9.00000	0.01913	87.293	229.391	87.284	133.954
	(STRAIN)	7.463E-06	-1.287E-05	4.906E-05	-1.288E-05	7.463E-06
3	34.00000	0.01847	24.766	24.766	-392.204	-331.596
	(STRAIN)	-6.458E-05	6.305E-05	6.305E-05	-6.458E-05	-4.602E-05
3	34.00010	0.01847	24.766	30.529	24.766	29.408
	(STRAIN)	2.720E-05	2.953E-06	3.305E-05	2.953E-06	2.720E-05
3	54.00010	0.01766	19.518	19.518	7.764	8.318
	(STRAIN)	-2.809E-05	1.090E-04	1.090E-04	-2.809E-05	-2.162E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.233E-05
ALLOWABLE LOAD REPETITIONS = 2.027E+10 DAMAGE RATIO = 6.521E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.458E-05
ALLOWABLE LOAD REPETITIONS = 5.209E+07 DAMAGE RATIO = 2.538E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 3.820E-06
ALLOWABLE LOAD REPETITIONS = 2.463E+15 DAMAGE RATIO = 5.368E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.090E-04
ALLOWABLE LOAD REPETITIONS = 7.495E+08 DAMAGE RATIO = 1.764E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01561	535.193	537.228	239.063	244.209
	(STRAIN)	-5.223E-06	6.020E-05	6.065E-05	-5.675E-06	-4.530E-06
1	34.00000	0.01487	16.175	16.175	-419.977	-366.096
	(STRAIN)	-3.762E-05	3.683E-05	3.683E-05	-3.762E-05	-2.842E-05
1	34.00010	0.01487	16.175	19.622	16.174	18.928
	(STRAIN)	1.720E-05	2.816E-06	2.083E-05	2.816E-06	1.720E-05
1	54.00010	0.01438	12.999	13.124	5.790	6.025
	(STRAIN)	-1.558E-05	6.852E-05	6.998E-05	-1.558E-05	-1.284E-05
2	9.00000	0.01562	270.126	385.965	141.969	189.644
	(STRAIN)	8.020E-07	1.871E-05	4.447E-05	-9.804E-06	8.020E-07
2	34.00000	0.01509	16.676	16.676	-438.758	-381.566
	(STRAIN)	-3.933E-05	3.841E-05	3.841E-05	-3.933E-05	-2.957E-05
2	34.00010	0.01509	16.676	20.317	16.676	19.682
	(STRAIN)	1.823E-05	2.522E-06	2.154E-05	2.522E-06	1.823E-05
2	54.00010	0.01457	13.512	13.536	5.933	6.229

```
      (STRAIN)  -1.644E-05   7.198E-05   7.226E-05  -1.644E-05  -1.299E-05

 3     9.00000    0.01555     88.061     259.263     88.053     154.970
      (STRAIN)   5.505E-06  -9.379E-06   2.871E-05  -9.381E-06   5.505E-06
 3    34.00000    0.01516     16.666      16.666    -440.103    -379.528
      (STRAIN)  -3.959E-05   3.838E-05   3.838E-05  -3.959E-05  -2.925E-05
 3    34.00010    0.01516     16.666      20.365      16.666     19.729
      (STRAIN)   1.834E-05   2.346E-06   2.167E-05   2.346E-06   1.834E-05
 3    54.00010    0.01464     13.607      13.607       5.963      6.277
      (STRAIN)  -1.659E-05   7.259E-05   7.259E-05  -1.659E-05  -1.293E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -5.223E-06
ALLOWABLE LOAD REPETITIONS =   1.929E+11  DAMAGE RATIO =   6.855E-07
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -3.959E-05
ALLOWABLE LOAD REPETITIONS =   1.583E+08  DAMAGE RATIO =   8.351E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   2.816E-06
ALLOWABLE LOAD REPETITIONS =   9.642E+15  DAMAGE RATIO =   1.371E-11

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   7.259E-05
ALLOWABLE LOAD REPETITIONS =   4.633E+09  DAMAGE RATIO =   2.853E-05

DAMAGE ANALYSIS OF PERIOD NO.  11  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1     9.00000    0.01294     526.351     528.797     241.625     246.636
      (STRAIN)  -2.454E-06   3.287E-05   3.318E-05  -2.760E-06  -2.133E-06
 1    34.00000    0.01248      11.382      11.382    -457.625    -403.659
      (STRAIN)  -2.450E-05   2.393E-05   2.393E-05  -2.450E-05  -1.893E-05
 1    34.00010    0.01248      11.382      13.718      11.382      13.294
      (STRAIN)   1.214E-05   2.153E-06   1.436E-05   2.152E-06   1.214E-05
 1    54.00010    0.01215       9.425       9.498       4.509       4.654
      (STRAIN)  -9.597E-06   4.775E-05   4.861E-05  -9.598E-06  -7.905E-06

 2     9.00000    0.01295     266.938     389.529     151.539     200.588
      (STRAIN)   1.039E-06   9.343E-06   2.469E-05  -5.099E-06   1.040E-06
 2    34.00000    0.01263      11.696      11.696    -476.803    -419.906
      (STRAIN)  -2.554E-05   2.490E-05   2.490E-05  -2.554E-05  -1.967E-05
 2    34.00010    0.01263      11.696      14.150      11.696      13.764
      (STRAIN)   1.278E-05   1.979E-06   1.480E-05   1.979E-06   1.278E-05
 2    54.00010    0.01228       9.745       9.758       4.602       4.781
      (STRAIN)  -1.012E-05   4.988E-05   5.004E-05  -1.012E-05  -8.024E-06

 3     9.00000    0.01298      88.982     284.064      88.975     171.792
      (STRAIN)   3.822E-06  -6.542E-06   1.787E-05  -6.542E-06   3.822E-06
 3    34.00000    0.01273      11.727      11.727    -477.973    -417.843
      (STRAIN)  -2.569E-05   2.488E-05   2.488E-05  -2.569E-05  -1.948E-05
 3    34.00010    0.01273      11.727      14.216      11.727      13.828
      (STRAIN)   1.288E-05   1.900E-06   1.490E-05   1.900E-06   1.288E-05
 3    54.00010    0.01238       9.838       9.838       4.651       4.840
      (STRAIN)  -1.017E-05   5.035E-05   5.035E-05  -1.017E-05  -7.961E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -2.454E-06
ALLOWABLE LOAD REPETITIONS =   1.417E+12  DAMAGE RATIO =   9.327E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.569E-05
ALLOWABLE LOAD REPETITIONS =   4.278E+08  DAMAGE RATIO =   3.091E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   2.153E-06
ALLOWABLE LOAD REPETITIONS =   3.210E+16  DAMAGE RATIO =   4.119E-12

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   5.035E-05
ALLOWABLE LOAD REPETITIONS =   2.384E+10  DAMAGE RATIO =   5.545E-06

DAMAGE ANALYSIS OF PERIOD NO.  12  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)
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 1     9.00000    0.01185     521.893     524.530     241.703     246.490
       (STRAIN)  -1.746E-06   2.486E-05   2.511E-05  -1.999E-06  -1.540E-06
 1    34.00000    0.01149       9.629       9.629    -473.478    -419.632
       (STRAIN)  -2.001E-05   1.954E-05   1.954E-05  -2.001E-05  -1.560E-05
 1    34.00010    0.01149       9.629      11.570       9.629      11.235
       (STRAIN)   1.028E-05   1.891E-06   1.203E-05   1.891E-06   1.028E-05
 1    54.00010    0.01121       8.072       8.129       3.983       4.098
       (STRAIN)  -7.570E-06   4.015E-05   4.081E-05  -7.570E-06  -6.222E-06

 2     9.00000    0.01187     265.378     390.856     155.350     204.567
       (STRAIN)   9.511E-07   6.781E-06   1.881E-05  -3.767E-06   9.511E-07
 2    34.00000    0.01160       9.880       9.880    -492.737    -436.112
       (STRAIN)  -2.083E-05   2.031E-05   2.031E-05  -2.083E-05  -1.620E-05
 2    34.00010    0.01160       9.880      11.915       9.881      11.610
       (STRAIN)   1.079E-05   1.756E-06   1.238E-05   1.756E-06   1.079E-05
 2    54.00010    0.01132       8.328       8.338       4.057       4.199
       (STRAIN)  -7.980E-06   4.184E-05   4.196E-05  -7.981E-06  -6.325E-06

 3     9.00000    0.01192      89.523     295.109      89.517     178.856
       (STRAIN)   3.141E-06  -5.422E-06   1.429E-05  -5.423E-06   3.141E-06
 3    34.00000    0.01173       9.938       9.938    -494.294    -434.505
       (STRAIN)  -2.096E-05   2.031E-05   2.031E-05  -2.096E-05  -1.607E-05
 3    34.00010    0.01173       9.938      12.002       9.938      11.696
       (STRAIN)   1.090E-05   1.712E-06   1.249E-05   1.712E-06   1.090E-05
 3    54.00010    0.01144       8.434       8.434       4.120       4.270
       (STRAIN)  -8.014E-06   4.232E-05   4.232E-05  -8.014E-06  -6.268E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.746E-06
ALLOWABLE LOAD REPETITIONS =   3.458E+12  DAMAGE RATIO =   3.823E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.096E-05
ALLOWABLE LOAD REPETITIONS =   6.851E+08  DAMAGE RATIO =   1.930E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   1.891E-06
ALLOWABLE LOAD REPETITIONS =   5.731E+16  DAMAGE RATIO =   2.307E-12

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4.232E-05
ALLOWABLE LOAD REPETITIONS =   5.188E+10  DAMAGE RATIO =   2.548E-06

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 1.236E-04
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 2.437E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 6.253E-10
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 2.445E-03
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MAXIMUM DAMAGE RATO = 2.437E-02 DESIGN LIFE IN YEARS = 41.03

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	1.98E-05	17616	2555027.624	11	5	7.88E+08	132,203	1.68E-04
2	2.23E-05	15358	2227495.201	11	5	5.95E+08	132,203	2.22E-04
3	2.71E-05	12313	1785857.069	11	5	3.81E+08	132,203	3.47E-04
4	3.56E-05	8971	1301187.791	11	5	2.04E+08	132,203	6.49E-04
5	5.06E-05	5909	857074.1225	11	5	9.08E+07	132,203	1.46E-03
6	7.63E-05	3601	522312.2464	11	5	3.60E+07	132,203	3.67E-03
7	1.05E-04	2426	351832.4218	11	5	1.77E+07	132,203	7.46E-03
8	9.79E-05	2642	383257.6328	11	5	2.06E+07	132,203	6.41E-03
9	6.46E-05	4411	639686.2261	11	5	5.23E+07	132,203	2.53E-03
10	3.96E-05	7909	1147091.052	11	5	1.59E+08	132,203	8.31E-04
11	2.57E-05	13073	1896085.122	11	5	4.30E+08	132,203	3.08E-04
12	2.10E-05	16493	2392108.873	11	5	6.89E+08	132,203	1.92E-04
							1.59E+06	2.42E-02

41.25

VITA UTILE

- Sovrastruttura **P1G**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 22 10
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 1.245E+07 2 1.519E+07
3 1.765E+07 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 1.041E+07 2 1.298E+07
3 1.538E+07 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 7.846E+06 2 1.007E+07
3 1.231E+07 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 5.262E+06 2 7.011E+06
3 8.953E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 3.122E+06 2 4.342E+06
3 5.876E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 1.680E+06 2 2.448E+06
3 3.562E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 1.022E+06 2 1.541E+06
3 2.387E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 1.138E+06 2 1.704E+06
3 2.603E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 2.166E+06 2 3.098E+06
3 4.372E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 4.493E+06 2 6.069E+06
3 7.884E+06 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 8.468E+06 2 1.079E+07
3 1.308E+07 4 1.960E+05 5 1.200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 1.142E+07 2 1.408E+07
3 1.652E+07 4 1.960E+05 5 1.200E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 149996

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 149996
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 149996

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01273	515.299	519.292	248.344	256.999
	(STRAIN)	-1.182E-06	2.218E-05	2.254E-05	-1.537E-06	-7.683E-07
1	31.00000	0.01239	10.010	10.010	-563.637	-497.549
	(STRAIN)	-2.227E-05	2.161E-05	2.161E-05	-2.227E-05	-1.721E-05
1	31.00010	0.01239	10.010	10.551	10.010	10.302
	(STRAIN)	1.060E-05	8.516E-06	1.238E-05	8.515E-06	1.060E-05
1	41.00010	0.01222	9.467	9.510	6.001	6.098
	(STRAIN)	-2.020E-06	3.842E-05	3.892E-05	-2.020E-06	-8.849E-07
2	9.00000	0.01277	259.413	391.460	159.196	217.035
	(STRAIN)	1.600E-06	5.365E-06	1.710E-05	-3.540E-06	1.600E-06
2	31.00000	0.01253	10.233	10.233	-583.996	-510.626
	(STRAIN)	-2.317E-05	2.229E-05	2.229E-05	-2.317E-05	-1.755E-05
2	31.00010	0.01253	10.233	10.805	10.232	10.553
	(STRAIN)	1.090E-05	8.621E-06	1.271E-05	8.617E-06	1.091E-05
2	41.00010	0.01235	9.754	9.760	6.148	6.304
	(STRAIN)	-2.320E-06	3.976E-05	3.983E-05	-2.319E-06	-4.911E-07
3	9.00000	0.01282	84.215	306.431	84.210	192.039
	(STRAIN)	3.641E-06	-5.940E-06	1.381E-05	-5.941E-06	3.641E-06
3	31.00000	0.01264	10.259	10.259	-583.663	-504.480
	(STRAIN)	-2.327E-05	2.216E-05	2.216E-05	-2.327E-05	-1.721E-05
3	31.00010	0.01264	10.259	10.848	10.260	10.578
	(STRAIN)	1.091E-05	8.612E-06	1.282E-05	8.621E-06	1.089E-05
3	41.00010	0.01247	9.831	9.831	6.209	6.385
	(STRAIN)	-2.315E-06	3.994E-05	3.994E-05	-2.315E-06	-2.530E-07

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.182E-06
ALLOWABLE LOAD REPETITIONS = 1.170E+13 DAMAGE RATIO = 1.282E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.327E-05
ALLOWABLE LOAD REPETITIONS = 4.583E+08 DAMAGE RATIO = 3.273E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 8.621E-06
ALLOWABLE LOAD REPETITIONS = 6.438E+13 DAMAGE RATIO = 2.330E-09

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.994E-05
ALLOWABLE LOAD REPETITIONS = 6.723E+10 DAMAGE RATIO = 2.231E-06

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01341	518.085	521.913	248.544	257.336
	(STRAIN)	-1.466E-06	2.618E-05	2.658E-05	-1.865E-06	-9.499E-07
1	31.00000	0.01303	11.024	11.024	-552.914	-486.677
	(STRAIN)	-2.513E-05	2.438E-05	2.438E-05	-2.513E-05	-1.932E-05
1	31.00010	0.01303	11.024	11.634	11.025	11.342
	(STRAIN)	1.165E-05	9.350E-06	1.371E-05	9.361E-06	1.163E-05

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 1     41.00010    0.01284      10.401      10.451       6.522       6.634
       (STRAIN)  -2.596E-06   4.265E-05   4.323E-05  -2.597E-06  -1.291E-06

 2      9.00000    0.01346     260.445     390.698     157.252     214.955
       (STRAIN)   1.786E-06   6.519E-06   2.007E-05  -4.218E-06   1.786E-06
 2     31.00000    0.01318      11.278      11.278    -573.219    -499.569
       (STRAIN)  -2.616E-05   2.515E-05   2.515E-05  -2.616E-05  -1.970E-05
 2     31.00010    0.01318      11.278      11.922      11.277      11.634
       (STRAIN)   1.200E-05   9.468E-06   1.407E-05   9.462E-06   1.201E-05
 2     41.00010    0.01298      10.729      10.736       6.689       6.870
       (STRAIN)  -2.942E-06   4.418E-05   4.427E-05  -2.942E-06  -8.310E-07

 3      9.00000    0.01349      83.970     300.190      83.965     188.200
       (STRAIN)   4.142E-06  -6.702E-06   1.579E-05  -6.703E-06   4.142E-06
 3     31.00000    0.01328      11.287      11.287    -572.772    -493.242
       (STRAIN)  -2.628E-05   2.500E-05   2.500E-05  -2.628E-05  -1.930E-05
 3     31.00010    0.01328      11.287      11.949      11.287      11.641
       (STRAIN)   1.198E-05   9.439E-06   1.417E-05   9.446E-06   1.197E-05
 3     41.00010    0.01309      10.796      10.796       6.742       6.946
       (STRAIN)  -2.956E-06   4.434E-05   4.434E-05  -2.956E-06  -5.751E-07

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.466E-06
ALLOWABLE LOAD REPETITIONS =   6.593E+12  DAMAGE RATIO =   2.275E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.628E-05
ALLOWABLE LOAD REPETITIONS =   3.456E+08  DAMAGE RATIO =   4.341E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   9.468E-06
ALLOWABLE LOAD REPETITIONS =   4.230E+13  DAMAGE RATIO =   3.546E-09

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4.434E-05
ALLOWABLE LOAD REPETITIONS =   4.212E+10  DAMAGE RATIO =   3.561E-06

DAMAGE ANALYSIS OF PERIOD NO.  3  LOAD GROUP NO.  1

 POINT    VERTICAL   VERTICAL    VERTICAL    MAJOR       MINOR    INTERMEDIATE
                      DISPL.                PRINCIPAL   PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL   STRESS      STRESS      STRESS      STRESS
                    P. STRAIN)  (STRAIN)    (STRAIN)    (STRAIN)    (STRAIN)

 1      9.00000    0.01458     522.270     525.830     247.913     256.826
       (STRAIN)  -2.106E-06   3.419E-05   3.467E-05  -2.583E-06  -1.388E-06
 1     31.00000    0.01411      12.845      12.845    -534.639    -468.266
       (STRAIN)  -3.047E-05   2.955E-05   2.955E-05  -3.047E-05  -2.320E-05
 1     31.00010    0.01411      12.845      13.577      12.843      13.226
       (STRAIN)   1.353E-05   1.084E-05   1.607E-05   1.082E-05   1.356E-05
 1     41.00010    0.01388      12.067      12.131       7.433       7.573
       (STRAIN)  -3.736E-06   5.033E-05   5.107E-05  -3.736E-06  -2.105E-06

 2      9.00000    0.01463     262.022     389.093     153.738     210.733
       (STRAIN)   2.059E-06   8.934E-06   2.596E-05  -5.580E-06   2.059E-06
 2     31.00000    0.01429      13.156      13.156    -554.808    -480.797
       (STRAIN)  -3.176E-05   3.050E-05   3.050E-05  -3.176E-05  -2.365E-05
 2     31.00010    0.01429      13.156      13.939      13.157      13.572
       (STRAIN)   1.396E-05   1.098E-05   1.657E-05   1.098E-05   1.395E-05
 2     41.00010    0.01406      12.473      12.482       7.639       7.866
       (STRAIN)  -4.171E-06   5.223E-05   5.233E-05  -4.171E-06  -1.518E-06

 3      9.00000    0.01462      83.650     289.776      83.644     181.401
       (STRAIN)   5.034E-06  -8.068E-06   1.956E-05  -8.068E-06   5.034E-06
 3     31.00000    0.01437      13.142      13.142    -554.440    -474.447
       (STRAIN)  -3.191E-05   3.031E-05   3.031E-05  -3.191E-05  -2.314E-05
 3     31.00010    0.01437      13.142      13.945      13.143      13.559
       (STRAIN)   1.391E-05   1.092E-05   1.665E-05   1.092E-05   1.390E-05
 3     41.00010    0.01414      12.532      12.532       7.682       7.939
       (STRAIN)  -4.218E-06   5.236E-05   5.236E-05  -4.219E-06  -1.223E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -2.106E-06
ALLOWABLE LOAD REPETITIONS =   2.487E+12  DAMAGE RATIO =   6.032E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -3.191E-05
ALLOWABLE LOAD REPETITIONS =   2.204E+08  DAMAGE RATIO =   6.805E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   1.098E-05
ALLOWABLE LOAD REPETITIONS =   2.181E+13  DAMAGE RATIO =   6.878E-09
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AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.236E-05
ALLOWABLE LOAD REPETITIONS = 2.000E+10 DAMAGE RATIO = 7.499E-06

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01641	527.881	531.058	245.762	254.674
	(STRAIN)	-3.559E-06	5.015E-05	5.076E-05	-4.171E-06	-2.455E-06
1	31.00000	0.01577	15.914	15.914	-506.884	-440.517
	(STRAIN)	-4.002E-05	3.882E-05	3.882E-05	-4.002E-05	-3.001E-05
1	31.00010	0.01577	15.914	16.876	15.914	16.384
	(STRAIN)	1.669E-05	1.331E-05	2.019E-05	1.332E-05	1.667E-05
1	41.00010	0.01548	14.852	14.942	8.903	9.094
	(STRAIN)	-5.934E-06	6.347E-05	6.452E-05	-5.932E-06	-3.693E-06
2	9.00000	0.01647	264.195	386.432	148.026	203.463
	(STRAIN)	2.339E-06	1.403E-05	3.757E-05	-8.335E-06	2.339E-06
2	31.00000	0.01601	16.329	16.329	-526.745	-452.389
	(STRAIN)	-4.179E-05	4.010E-05	4.010E-05	-4.179E-05	-3.058E-05
2	31.00010	0.01601	16.329	17.355	16.328	16.858
	(STRAIN)	1.725E-05	1.349E-05	2.082E-05	1.348E-05	1.727E-05
2	41.00010	0.01571	15.399	15.412	9.178	9.493
	(STRAIN)	-6.536E-06	6.605E-05	6.620E-05	-6.535E-06	-2.860E-06
3	9.00000	0.01641	83.315	274.251	83.309	170.716
	(STRAIN)	6.500E-06	-1.033E-05	2.643E-05	-1.033E-05	6.500E-06
3	31.00000	0.01608	16.293	16.293	-526.748	-446.267
	(STRAIN)	-4.203E-05	3.986E-05	3.986E-05	-4.203E-05	-2.989E-05
3	31.00010	0.01608	16.293	17.350	16.295	16.818
	(STRAIN)	1.717E-05	1.339E-05	2.094E-05	1.341E-05	1.714E-05
3	41.00010	0.01578	15.464	15.464	9.219	9.575
	(STRAIN)	-6.636E-06	6.622E-05	6.622E-05	-6.637E-06	-2.484E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.559E-06
ALLOWABLE LOAD REPETITIONS = 6.023E+11 DAMAGE RATIO = 2.490E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.203E-05
ALLOWABLE LOAD REPETITIONS = 1.170E+08 DAMAGE RATIO = 1.282E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.349E-05
ALLOWABLE LOAD REPETITIONS = 8.662E+12 DAMAGE RATIO = 1.732E-08

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.622E-05
ALLOWABLE LOAD REPETITIONS = 6.992E+09 DAMAGE RATIO = 2.145E-05

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01914	534.983	537.662	241.927	250.575
	(STRAIN)	-6.987E-06	8.329E-05	8.412E-05	-7.820E-06	-5.131E-06
1	31.00000	0.01819	20.958	20.958	-468.395	-402.395
	(STRAIN)	-5.700E-05	5.544E-05	5.544E-05	-5.700E-05	-4.183E-05
1	31.00010	0.01819	20.958	22.326	20.959	21.587
	(STRAIN)	2.182E-05	1.730E-05	2.708E-05	1.732E-05	2.180E-05
1	41.00010	0.01780	19.365	19.505	11.163	11.455
	(STRAIN)	-1.017E-05	8.552E-05	8.715E-05	-1.017E-05	-6.774E-06
2	9.00000	0.01920	267.047	382.965	139.545	192.694
	(STRAIN)	2.260E-06	2.538E-05	6.141E-05	-1.426E-05	2.260E-06
2	31.00000	0.01852	21.556	21.556	-487.641	-413.138
	(STRAIN)	-5.967E-05	5.733E-05	5.733E-05	-5.967E-05	-4.255E-05
2	31.00010	0.01852	21.556	23.027	21.557	22.262
	(STRAIN)	2.261E-05	1.755E-05	2.806E-05	1.756E-05	2.259E-05
2	41.00010	0.01812	20.168	20.187	11.562	12.044
	(STRAIN)	-1.109E-05	8.931E-05	8.954E-05	-1.109E-05	-5.466E-06
3	9.00000	0.01907	83.059	252.997	83.052	155.512

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       (STRAIN)   8.727E-06  -1.380E-05   3.903E-05  -1.380E-05   8.727E-06
 3     31.00000    0.01859     21.507      21.507     -488.060    -407.219
       (STRAIN)  -6.009E-05   5.699E-05   5.699E-05  -6.009E-05  -4.151E-05
 3     31.00010    0.01859     21.507      23.019      21.507      22.218
       (STRAIN)   2.249E-05   1.741E-05   2.821E-05   1.741E-05   2.249E-05
 3     41.00010    0.01818     20.275      20.275      11.626      12.171
       (STRAIN)  -1.127E-05   8.964E-05   8.964E-05  -1.127E-05  -4.915E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -6.987E-06
ALLOWABLE LOAD REPETITIONS =   9.850E+10  DAMAGE RATIO =   1.523E-06
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -6.009E-05
ALLOWABLE LOAD REPETITIONS =   5.168E+07  DAMAGE RATIO =   2.903E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   1.755E-05
ALLOWABLE LOAD REPETITIONS =   2.671E+12  DAMAGE RATIO =   5.616E-08

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   8.964E-05
ALLOWABLE LOAD REPETITIONS =   1.802E+09  DAMAGE RATIO =   8.322E-05

DAMAGE ANALYSIS OF PERIOD NO.  6  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR    INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1      9.00000    0.02296     543.378     545.487     237.238     245.228
       (STRAIN)  -1.498E-05   1.527E-04   1.539E-04  -1.614E-05  -1.173E-05
 1     31.00000    0.02141     28.769      28.769     -420.812    -355.832
       (STRAIN)  -8.601E-05   8.440E-05   8.440E-05  -8.601E-05  -6.138E-05
 1     31.00010    0.02141     28.769      30.831      28.772      29.649
       (STRAIN)   2.967E-05   2.335E-05   3.807E-05   2.337E-05   2.963E-05
 1     41.00010    0.02084     26.226      26.456      14.368      14.842
       (STRAIN)  -1.793E-05   1.204E-04   1.231E-04  -1.793E-05  -1.240E-05

 2      9.00000    0.02299     270.565     379.605     128.460     179.256
       (STRAIN)   5.855E-07   5.094E-05   1.111E-04  -2.743E-05   5.856E-07
 2     31.00000    0.02190     29.663      29.663     -438.972    -364.727
       (STRAIN)  -9.032E-05   8.731E-05   8.731E-05  -9.032E-05  -6.218E-05
 2     31.00010    0.02190     29.663      31.896      29.663      30.664
       (STRAIN)   3.082E-05   2.367E-05   3.962E-05   2.367E-05   3.082E-05
 2     41.00010    0.02132     27.462      27.494      14.972      15.763
       (STRAIN)  -1.943E-05   1.263E-04   1.267E-04  -1.943E-05  -1.019E-05

 3      9.00000    0.02276      82.995     227.107      82.985     136.560
       (STRAIN)   1.145E-05  -1.809E-05   6.138E-05  -1.810E-05   1.145E-05
 3     31.00000    0.02199     29.595      29.595     -439.432    -358.614
       (STRAIN)  -9.105E-05   8.673E-05   8.673E-05  -9.105E-05  -6.041E-05
 3     31.00010    0.02199     29.595      31.899      29.596      30.597
       (STRAIN)   3.061E-05   2.345E-05   3.991E-05   2.346E-05   3.061E-05
 3     41.00010    0.02142     27.654      27.654      15.089      15.983
       (STRAIN)  -1.972E-05   1.269E-04   1.269E-04  -1.972E-05  -9.281E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.498E-05
ALLOWABLE LOAD REPETITIONS =   1.306E+10  DAMAGE RATIO =   1.148E-05
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -9.105E-05
ALLOWABLE LOAD REPETITIONS =   2.018E+07  DAMAGE RATIO =   7.431E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   2.367E-05
ALLOWABLE LOAD REPETITIONS =   6.995E+11  DAMAGE RATIO =   2.144E-07

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   1.269E-04
ALLOWABLE LOAD REPETITIONS =   3.804E+08  DAMAGE RATIO =   3.943E-04

DAMAGE ANALYSIS OF PERIOD NO.  7  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR    INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1      9.00000    0.02657     550.231     551.911     234.036     241.242
       (STRAIN)  -2.680E-05   2.487E-04   2.502E-04  -2.827E-05  -2.196E-05
 1     31.00000    0.02426     36.723      36.723     -381.622    -317.983
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	(STRAIN)	-1.186E-04	1.180E-04	1.180E-04	-1.186E-04	-8.264E-05
1	31.00010	0.02426	36.723	39.551	36.721	37.871
	(STRAIN)	3.754E-05	2.936E-05	4.956E-05	2.935E-05	3.756E-05
1	41.00010	0.02352	33.070	33.405	17.339	18.034
	(STRAIN)	-2.697E-05	1.566E-04	1.605E-04	-2.697E-05	-1.887E-05
2	9.00000	0.02652	273.519	377.825	119.028	168.533
	(STRAIN)	-3.481E-06	8.847E-05	1.798E-04	-4.684E-05	-3.481E-06
2	31.00000	0.02491	37.920	37.920	-398.612	-325.018
	(STRAIN)	-1.249E-04	1.220E-04	1.220E-04	-1.249E-04	-8.328E-05
2	31.00010	0.02491	37.920	41.009	37.920	39.221
	(STRAIN)	3.902E-05	2.974E-05	5.180E-05	2.973E-05	3.903E-05
2	41.00010	0.02415	34.781	34.826	18.164	19.329
	(STRAIN)	-2.915E-05	1.647E-04	1.652E-04	-2.915E-05	-1.556E-05
3	9.00000	0.02616	83.170	206.300	83.157	121.212
	(STRAIN)	1.291E-05	-2.041E-05	8.744E-05	-2.042E-05	1.291E-05
3	31.00000	0.02505	37.805	37.805	-398.839	-318.456
	(STRAIN)	-1.259E-04	1.210E-04	1.210E-04	-1.259E-04	-8.048E-05
3	31.00010	0.02505	37.805	41.003	37.809	39.098
	(STRAIN)	3.868E-05	2.941E-05	5.225E-05	2.943E-05	3.864E-05
3	41.00010	0.02429	35.054	35.054	18.334	19.651
	(STRAIN)	-2.956E-05	1.655E-04	1.655E-04	-2.956E-05	-1.420E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.680E-05
ALLOWABLE LOAD REPETITIONS = 2.860E+09 DAMAGE RATIO = 5.245E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.259E-04
ALLOWABLE LOAD REPETITIONS = 9.767E+06 DAMAGE RATIO = 1.536E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.974E-05
ALLOWABLE LOAD REPETITIONS = 2.518E+11 DAMAGE RATIO = 5.956E-07

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.655E-04
ALLOWABLE LOAD REPETITIONS = 1.158E+08 DAMAGE RATIO = 1.296E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.02574	548.731	550.501	234.666	242.060
	(STRAIN)	-2.367E-05	2.237E-04	2.251E-04	-2.507E-05	-1.921E-05
1	31.00000	0.02362	34.859	34.859	-390.191	-326.219
	(STRAIN)	-1.107E-04	1.097E-04	1.097E-04	-1.107E-04	-7.754E-05
1	31.00010	0.02362	34.859	37.503	34.860	35.940
	(STRAIN)	3.570E-05	2.796E-05	4.685E-05	2.797E-05	3.569E-05
1	41.00010	0.02292	31.477	31.787	16.666	17.305
	(STRAIN)	-2.476E-05	1.480E-04	1.517E-04	-2.476E-05	-1.730E-05
2	9.00000	0.02571	272.859	378.149	121.084	170.833
	(STRAIN)	-2.287E-06	7.852E-05	1.619E-04	-4.169E-05	-2.287E-06
2	31.00000	0.02424	35.985	35.985	-407.459	-333.687
	(STRAIN)	-1.165E-04	1.135E-04	1.135E-04	-1.165E-04	-7.824E-05
2	31.00010	0.02424	35.985	38.870	35.988	37.209
	(STRAIN)	3.711E-05	2.833E-05	4.893E-05	2.835E-05	3.707E-05
2	41.00010	0.02352	33.075	33.117	17.438	18.511
	(STRAIN)	-2.677E-05	1.557E-04	1.561E-04	-2.677E-05	-1.426E-05
3	9.00000	0.02539	83.133	210.795	83.120	124.534
	(STRAIN)	1.271E-05	-2.008E-05	8.103E-05	-2.009E-05	1.271E-05
3	31.00000	0.02436	35.884	35.884	-407.747	-327.235
	(STRAIN)	-1.175E-04	1.126E-04	1.126E-04	-1.175E-04	-7.571E-05
3	31.00010	0.02436	35.884	38.862	35.882	37.118
	(STRAIN)	3.681E-05	2.803E-05	4.929E-05	2.801E-05	3.684E-05
3	41.00010	0.02365	33.330	33.330	17.596	18.808
	(STRAIN)	-2.716E-05	1.564E-04	1.564E-04	-2.716E-05	-1.302E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.367E-05
ALLOWABLE LOAD REPETITIONS = 3.948E+09 DAMAGE RATIO = 3.799E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.175E-04
ALLOWABLE LOAD REPETITIONS = 1.141E+07 DAMAGE RATIO = 1.315E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.833E-05
ALLOWABLE LOAD REPETITIONS = 3.130E+11 DAMAGE RATIO = 4.793E-07

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.564E-04
ALLOWABLE LOAD REPETITIONS = 1.491E+08 DAMAGE RATIO = 1.006E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02132	539.926	542.264	239.105	247.412
	(STRAIN)	-1.102E-05	1.191E-04	1.201E-04	-1.204E-05	-8.415E-06
1	31.00000	0.02004	25.304	25.304	-440.509	-375.029
	(STRAIN)	-7.276E-05	7.107E-05	7.107E-05	-7.276E-05	-5.254E-05
1	31.00010	0.02004	25.304	27.050	25.307	26.070
	(STRAIN)	2.620E-05	2.069E-05	3.316E-05	2.071E-05	2.616E-05
1	41.00010	0.01956	23.201	23.389	12.985	13.374
	(STRAIN)	-1.433E-05	1.048E-04	1.070E-04	-1.433E-05	-9.798E-06
2	9.00000	0.02136	269.100	380.850	133.107	184.788
	(STRAIN)	1.583E-06	3.833E-05	8.703E-05	-2.094E-05	1.583E-06
2	31.00000	0.02046	26.066	26.066	-459.162	-384.739
	(STRAIN)	-7.631E-05	7.352E-05	7.352E-05	-7.631E-05	-5.333E-05
2	31.00010	0.02046	26.066	27.946	26.063	26.942
	(STRAIN)	2.720E-05	2.098E-05	3.441E-05	2.096E-05	2.724E-05
2	41.00010	0.01996	24.239	24.265	13.496	14.144
	(STRAIN)	-1.556E-05	1.098E-04	1.101E-04	-1.556E-05	-8.009E-06
3	9.00000	0.02118	82.991	237.758	82.983	144.392
	(STRAIN)	1.037E-05	-1.639E-05	5.106E-05	-1.639E-05	1.037E-05
3	31.00000	0.02054	26.009	26.009	-459.664	-378.772
	(STRAIN)	-7.689E-05	7.307E-05	7.307E-05	-7.689E-05	-5.192E-05
3	31.00010	0.02054	26.009	27.947	26.006	26.888
	(STRAIN)	2.703E-05	2.080E-05	3.464E-05	2.077E-05	2.707E-05
3	41.00010	0.02004	24.394	24.394	13.589	14.321
	(STRAIN)	-1.580E-05	1.102E-04	1.102E-04	-1.580E-05	-7.271E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.102E-05
ALLOWABLE LOAD REPETITIONS = 2.937E+10 DAMAGE RATIO = 5.107E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.689E-05
ALLOWABLE LOAD REPETITIONS = 2.954E+07 DAMAGE RATIO = 5.078E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.098E-05
ALLOWABLE LOAD REPETITIONS = 1.202E+12 DAMAGE RATIO = 1.248E-07

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.102E-04
ALLOWABLE LOAD REPETITIONS = 7.136E+08 DAMAGE RATIO = 2.102E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01719	530.046	533.071	244.674	253.534
	(STRAIN)	-4.376E-06	5.843E-05	5.911E-05	-5.048E-06	-3.078E-06
1	31.00000	0.01647	17.307	17.307	-495.453	-429.154
	(STRAIN)	-4.456E-05	4.324E-05	4.324E-05	-4.456E-05	-3.321E-05
1	31.00010	0.01647	17.307	18.377	17.308	17.822
	(STRAIN)	1.811E-05	1.442E-05	2.207E-05	1.443E-05	1.810E-05
1	41.00010	0.01616	16.106	16.209	9.545	9.763
	(STRAIN)	-7.033E-06	6.951E-05	7.072E-05	-7.033E-06	-4.490E-06
2	9.00000	0.01725	265.052	385.353	145.567	200.312
	(STRAIN)	2.388E-06	1.679E-05	4.355E-05	-9.791E-06	2.388E-06
2	31.00000	0.01674	17.772	17.772	-515.154	-440.713
	(STRAIN)	-4.656E-05	4.469E-05	4.469E-05	-4.656E-05	-3.382E-05
2	31.00010	0.01674	17.772	18.917	17.772	18.348
	(STRAIN)	1.873E-05	1.462E-05	2.280E-05	1.462E-05	1.873E-05
2	41.00010	0.01641	16.721	16.736	9.853	10.211

(STRAIN) -7.717E-06 7.241E-05 7.258E-05 -7.718E-06 -3.534E-06

3 9.00000 0.01717 83.217 267.914 83.210 166.235
(STRAIN) 7.142E-06 -1.133E-05 2.976E-05 -1.133E-05 7.142E-06
3 31.00000 0.01680 17.730 17.730 -515.312 -434.688
(STRAIN) -4.685E-05 4.442E-05 4.442E-05 -4.685E-05 -3.304E-05
3 31.00010 0.01680 17.730 18.907 17.730 18.309
(STRAIN) 1.864E-05 1.451E-05 2.292E-05 1.451E-05 1.864E-05
3 41.00010 0.01647 16.795 16.795 9.899 10.303
(STRAIN) -7.841E-06 7.262E-05 7.262E-05 -7.840E-06 -3.118E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.376E-06
ALLOWABLE LOAD REPETITIONS = 3.453E+11 DAMAGE RATIO = 4.344E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.685E-05
ALLOWABLE LOAD REPETITIONS = 9.119E+07 DAMAGE RATIO = 1.645E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.462E-05
ALLOWABLE LOAD REPETITIONS = 6.044E+12 DAMAGE RATIO = 2.482E-08

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.262E-05
ALLOWABLE LOAD REPETITIONS = 4.626E+09 DAMAGE RATIO = 3.243E-05

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

1 9.00000 0.01425 521.164 524.797 248.177 257.066
(STRAIN) -1.907E-06 3.180E-05 3.226E-05 -2.362E-06 -1.249E-06
1 31.00000 0.01381 12.327 12.327 -539.697 -473.348
(STRAIN) -2.893E-05 2.805E-05 2.805E-05 -2.893E-05 -2.208E-05
1 31.00010 0.01381 12.327 13.025 12.327 12.688
(STRAIN) 1.300E-05 1.042E-05 1.540E-05 1.042E-05 1.300E-05
1 41.00010 0.01359 11.595 11.654 7.178 7.309
(STRAIN) -3.399E-06 4.813E-05 4.883E-05 -3.399E-06 -1.863E-06

2 9.00000 0.01430 261.602 389.560 154.733 211.964
(STRAIN) 1.989E-06 8.202E-06 2.422E-05 -5.173E-06 1.989E-06
2 31.00000 0.01398 12.622 12.622 -559.910 -485.984
(STRAIN) -3.014E-05 2.896E-05 2.896E-05 -3.014E-05 -2.251E-05
2 31.00010 0.01398 12.622 13.363 12.621 13.023
(STRAIN) 1.340E-05 1.055E-05 1.584E-05 1.054E-05 1.341E-05
2 41.00010 0.01376 11.978 11.986 7.372 7.586
(STRAIN) -3.808E-06 4.993E-05 5.003E-05 -3.807E-06 -1.313E-06

3 9.00000 0.01431 83.729 292.637 83.723 183.307
(STRAIN) 4.782E-06 -7.680E-06 1.846E-05 -7.681E-06 4.782E-06
3 31.00000 0.01407 12.613 12.613 -559.497 -479.619
(STRAIN) -3.028E-05 2.877E-05 2.877E-05 -3.028E-05 -2.204E-05
3 31.00010 0.01407 12.613 13.376 12.615 13.011
(STRAIN) 1.336E-05 1.050E-05 1.595E-05 1.051E-05 1.334E-05
3 41.00010 0.01385 12.038 12.038 7.417 7.658
(STRAIN) -3.845E-06 5.006E-05 5.006E-05 -3.846E-06 -1.030E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.907E-06
ALLOWABLE LOAD REPETITIONS = 3.250E+12 DAMAGE RATIO = 4.615E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.028E-05
ALLOWABLE LOAD REPETITIONS = 2.488E+08 DAMAGE RATIO = 6.028E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.055E-05
ALLOWABLE LOAD REPETITIONS = 2.606E+13 DAMAGE RATIO = 5.757E-09

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.006E-05
ALLOWABLE LOAD REPETITIONS = 2.445E+10 DAMAGE RATIO = 6.134E-06

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

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 1     9.00000    0.01305     516.659     520.574     248.512     257.236
       (STRAIN)  -1.309E-06   2.402E-05   2.440E-05  -1.684E-06  -8.481E-07
 1    31.00000    0.01270      10.487      10.487    -558.555    -492.389
       (STRAIN)  -2.360E-05   2.290E-05   2.290E-05  -2.360E-05  -1.820E-05
 1    31.00010    0.01270      10.487      11.060      10.487      10.791
       (STRAIN)   1.109E-05   8.909E-06   1.300E-05   8.913E-06   1.108E-05
 1    41.00010    0.01252       9.907       9.953       6.248       6.351
       (STRAIN)  -2.285E-06   4.040E-05   4.094E-05  -2.284E-06  -1.073E-06

 2     9.00000    0.01310     259.915     391.123     158.287     216.099
       (STRAIN)   1.690E-06   5.891E-06   1.847E-05  -3.851E-06   1.690E-06
 2    31.00000    0.01284      10.724      10.724    -578.892    -505.380
       (STRAIN)  -2.456E-05   2.362E-05   2.362E-05  -2.456E-05  -1.856E-05
 2    31.00010    0.01284      10.724      11.330      10.723      11.060
       (STRAIN)   1.142E-05   9.020E-06   1.335E-05   9.017E-06   1.142E-05
 2    41.00010    0.01265      10.212      10.219       6.403       6.571
       (STRAIN)  -2.606E-06   4.183E-05   4.191E-05  -2.606E-06  -6.476E-07

 3     9.00000    0.01314      84.093     303.458      84.087     190.238
       (STRAIN)   3.877E-06  -6.298E-06   1.473E-05  -6.299E-06   3.877E-06
 3    31.00000    0.01295      10.741      10.741    -578.484    -499.128
       (STRAIN)  -2.467E-05   2.348E-05   2.348E-05  -2.467E-05  -1.819E-05
 3    31.00010    0.01295      10.741      11.362      10.740      11.081
       (STRAIN)   1.142E-05   9.001E-06   1.344E-05   8.995E-06   1.143E-05
 3    41.00010    0.01276      10.284      10.284       6.460       6.650
       (STRAIN)  -2.610E-06   4.200E-05   4.200E-05  -2.610E-06  -4.005E-07

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.309E-06
ALLOWABLE LOAD REPETITIONS =   8.923E+12  DAMAGE RATIO =   1.681E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.467E-05
ALLOWABLE LOAD REPETITIONS =   4.001E+08  DAMAGE RATIO =   3.749E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   9.020E-06
ALLOWABLE LOAD REPETITIONS =   5.257E+13  DAMAGE RATIO =   2.853E-09

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4.200E-05
ALLOWABLE LOAD REPETITIONS =   5.368E+10  DAMAGE RATIO =   2.794E-06

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 1.094E-04
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 4.927E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 1.534E-06
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 3.066E-03
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MAXIMUM DAMAGE RATO = 4.927E-02 DESIGN LIFE IN YEARS = 20.3

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	2.33E-05	17648	2559606.892	11	5	4.61E+08	149,996	3.26E-04
2	2.63E-05	15377	2230195.159	11	5	3.47E+08	149,996	4.32E-04
3	3.19E-05	12314	1785922.827	11	5	2.22E+08	149,996	6.77E-04
4	4.20E-05	8953	1298443.497	11	5	1.18E+08	149,996	1.28E-03
5	6.01E-05	5876	852193.5337	11	5	5.19E+07	149,996	2.89E-03
6	9.11E-05	3562	516569.2847	11	5	2.03E+07	149,996	7.39E-03
7	1.26E-04	2387	346196.8043	11	5	9.83E+06	149,996	1.53E-02
8	1.18E-04	2603	377558.2309	11	5	1.15E+07	149,996	1.31E-02
9	7.69E-05	4372	634126.7722	11	5	2.97E+07	149,996	5.05E-03
10	4.69E-05	7884	1143530.751	11	5	9.17E+07	149,996	1.64E-03
11	3.03E-05	13078	1896811.277	11	5	2.50E+08	149,996	6.00E-04
12	2.47E-05	16518	2395766.133	11	5	4.02E+08	149,996	3.73E-04
							1.80E+06	4.90E-02

20.40

VITA UTILE

- Sovrastruttura **P2A** in carreggiata nord della tangenziale

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 15 9 34
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.720E+07
3 6.395E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.398E+07
3 5.595E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 4.533E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.877E+06
3 3.422E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.390E+06
3 2.466E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.823E+06
3 1.771E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.100E+06
3 1.414E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.230E+06
3 1.481E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.347E+06
3 2.014E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.955E+06
3 3.084E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.111E+07
3 4.795E+06 4 2.734E+06 5 1.800E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.555E+07
3 5.997E+06 4 2.734E+06 5 1.800E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 473437

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 473437
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 473437

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01069	126.701	127.943	-432.207	-362.883
	(STRAIN)	-2.035E-05	2.353E-05	2.362E-05	-2.035E-05	-1.491E-05
1	28.00000	0.01040	62.896	62.896	-278.304	-234.289
	(STRAIN)	-3.414E-05	3.789E-05	3.789E-05	-3.414E-05	-2.485E-05
1	28.00010	0.01040	62.896	132.674	62.896	125.818
	(STRAIN)	1.741E-05	-1.481E-05	2.092E-05	-1.481E-05	1.741E-05
1	62.00010	0.01008	14.765	14.971	3.516	3.839
	(STRAIN)	-2.226E-05	6.522E-05	6.683E-05	-2.226E-05	-1.976E-05
2	19.00000	0.01084	102.892	103.145	-423.392	-303.391
	(STRAIN)	-2.055E-05	2.077E-05	2.079E-05	-2.055E-05	-1.113E-05
2	28.00000	0.01056	64.149	64.149	-288.305	-236.082
	(STRAIN)	-3.567E-05	3.873E-05	3.873E-05	-3.567E-05	-2.465E-05
2	28.00010	0.01056	64.149	137.107	64.149	131.045
	(STRAIN)	1.849E-05	-1.577E-05	2.159E-05	-1.577E-05	1.849E-05
2	62.00010	0.01023	15.374	15.414	3.586	3.952
	(STRAIN)	-2.312E-05	6.857E-05	6.888E-05	-2.312E-05	-2.027E-05
3	19.00000	0.01087	85.377	85.377	-407.467	-258.230
	(STRAIN)	-2.018E-05	1.851E-05	1.851E-05	-2.018E-05	-8.461E-06
3	28.00000	0.01060	62.968	62.968	-287.715	-229.967
	(STRAIN)	-3.585E-05	3.818E-05	3.818E-05	-3.585E-05	-2.366E-05
3	28.00010	0.01060	62.968	136.765	62.968	130.688
	(STRAIN)	1.858E-05	-1.610E-05	2.169E-05	-1.610E-05	1.858E-05
3	62.00010	0.01027	15.493	15.493	3.596	3.975
	(STRAIN)	-2.328E-05	6.925E-05	6.925E-05	-2.328E-05	-2.034E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.055E-05
ALLOWABLE LOAD REPETITIONS = 8.737E+08 DAMAGE RATIO = 5.419E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.585E-05
ALLOWABLE LOAD REPETITIONS = 2.631E+08 DAMAGE RATIO = 1.800E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.925E-05
ALLOWABLE LOAD REPETITIONS = 5.723E+09 DAMAGE RATIO = 8.273E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01110	135.241	136.486	-386.389	-321.479
	(STRAIN)	-2.301E-05	2.737E-05	2.749E-05	-2.301E-05	-1.674E-05
1	28.00000	0.01077	70.198	70.198	-267.022	-222.552
	(STRAIN)	-3.819E-05	4.317E-05	4.317E-05	-3.819E-05	-2.746E-05
1	28.00010	0.01077	70.198	145.445	70.198	137.714
	(STRAIN)	1.882E-05	-1.575E-05	2.278E-05	-1.575E-05	1.882E-05

1	62.00010	0.01041	15.755	15.988	3.598	3.962
	(STRAIN)	-2.434E-05	7.021E-05	7.202E-05	-2.434E-05	-2.151E-05
2	19.00000	0.01127	110.259	110.607	-377.569	-263.101
	(STRAIN)	-2.319E-05	2.392E-05	2.396E-05	-2.319E-05	-1.214E-05
2	28.00000	0.01095	71.486	71.486	-276.565	-223.055
	(STRAIN)	-3.995E-05	4.403E-05	4.403E-05	-3.995E-05	-2.704E-05
2	28.00010	0.01095	71.485	150.312	71.485	143.420
	(STRAIN)	2.001E-05	-1.683E-05	2.354E-05	-1.683E-05	2.001E-05
2	62.00010	0.01058	16.433	16.478	3.672	4.088
	(STRAIN)	-2.530E-05	7.395E-05	7.430E-05	-2.530E-05	-2.207E-05
3	19.00000	0.01130	91.788	91.788	-362.687	-219.642
	(STRAIN)	-2.275E-05	2.115E-05	2.115E-05	-2.275E-05	-8.930E-06
3	28.00000	0.01099	70.075	70.075	-275.905	-216.500
	(STRAIN)	-4.015E-05	4.333E-05	4.333E-05	-4.015E-05	-2.582E-05
3	28.00010	0.01099	70.075	149.896	70.075	142.968
	(STRAIN)	2.011E-05	-1.722E-05	2.366E-05	-1.722E-05	2.011E-05
3	62.00010	0.01062	16.569	16.569	3.682	4.112
	(STRAIN)	-2.550E-05	7.473E-05	7.473E-05	-2.550E-05	-2.216E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.319E-05
ALLOWABLE LOAD REPETITIONS = 6.998E+08 DAMAGE RATIO = 6.765E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.015E-05
ALLOWABLE LOAD REPETITIONS = 2.031E+08 DAMAGE RATIO = 2.331E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.473E-05
ALLOWABLE LOAD REPETITIONS = 4.069E+09 DAMAGE RATIO = 1.163E-04

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	19.00000	0.01171	148.169	149.357	-325.641	-266.624
	(STRAIN)	-2.780E-05	3.468E-05	3.483E-05	-2.780E-05	-2.001E-05
1	28.00000	0.01130	82.004	82.004	-246.603	-202.016
	(STRAIN)	-4.514E-05	5.273E-05	5.273E-05	-4.514E-05	-3.186E-05
1	28.00010	0.01130	82.003	165.469	82.003	156.324
	(STRAIN)	2.097E-05	-1.709E-05	2.565E-05	-1.709E-05	2.097E-05
1	62.00010	0.01089	17.237	17.512	3.696	4.126
	(STRAIN)	-2.755E-05	7.777E-05	7.991E-05	-2.755E-05	-2.420E-05
2	19.00000	0.01190	121.536	122.072	-316.896	-209.979
	(STRAIN)	-2.795E-05	2.986E-05	2.993E-05	-2.795E-05	-1.385E-05
2	28.00000	0.01150	83.281	83.281	-255.283	-200.416
	(STRAIN)	-4.727E-05	5.356E-05	5.356E-05	-4.727E-05	-3.093E-05
2	28.00010	0.01150	83.280	170.976	83.280	162.715
	(STRAIN)	2.232E-05	-1.836E-05	2.655E-05	-1.836E-05	2.232E-05
2	62.00010	0.01107	18.024	18.078	3.776	4.272
	(STRAIN)	-2.869E-05	8.213E-05	8.255E-05	-2.869E-05	-2.483E-05
3	19.00000	0.01193	101.687	101.687	-303.458	-168.813
	(STRAIN)	-2.734E-05	2.608E-05	2.608E-05	-2.734E-05	-9.590E-06
3	28.00000	0.01155	81.459	81.459	-254.501	-193.210
	(STRAIN)	-4.752E-05	5.254E-05	5.254E-05	-4.752E-05	-2.926E-05
3	28.00010	0.01155	81.459	170.404	81.459	162.062
	(STRAIN)	2.243E-05	-1.885E-05	2.670E-05	-1.885E-05	2.243E-05
3	62.00010	0.01111	18.187	18.187	3.786	4.300
	(STRAIN)	-2.894E-05	8.307E-05	8.307E-05	-2.893E-05	-2.494E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.795E-05
ALLOWABLE LOAD REPETITIONS = 4.944E+08 DAMAGE RATIO = 9.576E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.752E-05
ALLOWABLE LOAD REPETITIONS = 1.397E+08 DAMAGE RATIO = 3.390E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.307E-05
ALLOWABLE LOAD REPETITIONS = 2.534E+09 DAMAGE RATIO = 1.869E-04

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.01248	164.728	165.757	-260.105	-207.523
	(STRAIN)	-3.570E-05	4.770E-05	4.791E-05	-3.570E-05	-2.538E-05
1	28.00000	0.01193	98.133	98.133	-216.977	-173.023
	(STRAIN)	-5.574E-05	6.856E-05	6.856E-05	-5.574E-05	-3.840E-05
1	28.00010	0.01193	98.133	191.721	98.133	180.647
	(STRAIN)	2.367E-05	-1.859E-05	2.934E-05	-1.859E-05	2.367E-05
1	62.00010	0.01144	19.059	19.391	3.776	4.298
	(STRAIN)	-3.167E-05	8.721E-05	8.979E-05	-3.167E-05	-2.760E-05
2	19.00000	0.01269	136.069	136.936	-251.658	-153.313
	(STRAIN)	-3.576E-05	4.035E-05	4.052E-05	-3.576E-05	-1.646E-05
2	28.00000	0.01216	99.238	99.239	-224.364	-168.589
	(STRAIN)	-5.846E-05	6.918E-05	6.918E-05	-5.846E-05	-3.646E-05
2	28.00010	0.01216	99.238	197.953	99.238	187.773
	(STRAIN)	2.520E-05	-2.014E-05	3.041E-05	-2.014E-05	2.520E-05
2	62.00010	0.01165	19.991	20.056	3.862	4.469
	(STRAIN)	-3.304E-05	9.240E-05	9.291E-05	-3.304E-05	-2.832E-05
3	19.00000	0.01271	114.508	114.508	-239.946	-114.745
	(STRAIN)	-3.488E-05	3.470E-05	3.470E-05	-3.488E-05	-1.030E-05
3	28.00000	0.01221	96.764	96.764	-223.426	-160.599
	(STRAIN)	-5.875E-05	6.755E-05	6.755E-05	-5.875E-05	-3.397E-05
3	28.00010	0.01221	96.764	197.082	96.764	186.738
	(STRAIN)	2.531E-05	-2.076E-05	3.061E-05	-2.076E-05	2.531E-05
3	62.00010	0.01170	20.191	20.191	3.874	4.503
	(STRAIN)	-3.335E-05	9.356E-05	9.356E-05	-3.335E-05	-2.846E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.576E-05
ALLOWABLE LOAD REPETITIONS = 3.084E+08 DAMAGE RATIO = 1.535E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.875E-05
ALLOWABLE LOAD REPETITIONS = 8.827E+07 DAMAGE RATIO = 5.363E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.356E-05
ALLOWABLE LOAD REPETITIONS = 1.488E+09 DAMAGE RATIO = 3.181E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.01332	182.890	183.679	-200.274	-153.606
	(STRAIN)	-4.802E-05	6.981E-05	7.005E-05	-4.802E-05	-3.367E-05
1	28.00000	0.01255	116.791	116.791	-182.320	-139.818
	(STRAIN)	-7.067E-05	9.309E-05	9.309E-05	-7.067E-05	-4.740E-05
1	28.00010	0.01255	116.791	220.691	116.791	207.399
	(STRAIN)	2.648E-05	-1.991E-05	3.329E-05	-1.991E-05	2.648E-05
1	62.00010	0.01197	20.924	21.320	3.812	4.441
	(STRAIN)	-3.607E-05	9.702E-05	1.001E-04	-3.607E-05	-3.118E-05
2	19.00000	0.01355	151.978	153.334	-192.538	-102.618
	(STRAIN)	-4.790E-05	5.804E-05	5.846E-05	-4.790E-05	-2.025E-05
2	28.00000	0.01282	117.417	117.417	-188.192	-132.247
	(STRAIN)	-7.422E-05	9.310E-05	9.310E-05	-7.422E-05	-4.359E-05
2	28.00010	0.01282	117.416	227.496	117.416	215.031
	(STRAIN)	2.819E-05	-2.180E-05	3.457E-05	-2.180E-05	2.819E-05
2	62.00010	0.01221	22.015	22.091	3.904	4.640
	(STRAIN)	-3.772E-05	1.031E-04	1.037E-04	-3.772E-05	-3.199E-05
3	19.00000	0.01355	128.517	128.517	-182.700	-66.697

	(STRAIN)	-4.654E-05	4.916E-05	4.916E-05	-4.654E-05	-1.087E-05
3	28.00000	0.01287	114.031	114.031	-187.122	-123.490
	(STRAIN)	-7.454E-05	9.033E-05	9.033E-05	-7.454E-05	-3.971E-05
3	28.00010	0.01287	114.032	226.134	114.032	213.376
	(STRAIN)	2.828E-05	-2.259E-05	3.481E-05	-2.259E-05	2.828E-05
3	62.00010	0.01226	22.255	22.255	3.916	4.682
	(STRAIN)	-3.810E-05	1.045E-04	1.045E-04	-3.810E-05	-3.214E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.802E-05
ALLOWABLE LOAD REPETITIONS = 1.716E+08 DAMAGE RATIO = 2.759E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.454E-05
ALLOWABLE LOAD REPETITIONS = 5.336E+07 DAMAGE RATIO = 8.873E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.045E-04
ALLOWABLE LOAD REPETITIONS = 9.057E+08 DAMAGE RATIO = 5.227E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	19.00000	0.01414	199.536	200.089	-153.754	-111.725
	(STRAIN)	-6.541E-05	1.035E-04	1.038E-04	-6.541E-05	-4.532E-05
1	28.00000	0.01305	134.491	134.491	-150.060	-109.393
	(STRAIN)	-8.967E-05	1.272E-04	1.272E-04	-8.967E-05	-5.868E-05
1	28.00010	0.01305	134.492	246.931	134.492	231.573
	(STRAIN)	2.890E-05	-2.082E-05	3.676E-05	-2.082E-05	2.890E-05
1	62.00010	0.01239	22.487	22.940	3.808	4.537
	(STRAIN)	-3.991E-05	1.054E-04	1.089E-04	-3.991E-05	-3.423E-05
2	19.00000	0.01436	166.347	168.278	-147.137	-64.384
	(STRAIN)	-6.499E-05	8.490E-05	8.582E-05	-6.499E-05	-2.542E-05
2	28.00000	0.01335	134.308	134.308	-154.583	-99.056
	(STRAIN)	-9.423E-05	1.259E-04	1.259E-04	-9.423E-05	-5.191E-05
2	28.00010	0.01335	134.307	253.950	134.307	239.258
	(STRAIN)	3.071E-05	-2.303E-05	3.823E-05	-2.303E-05	3.071E-05
2	62.00010	0.01265	23.719	23.807	3.901	4.762
	(STRAIN)	-4.181E-05	1.123E-04	1.130E-04	-4.181E-05	-3.512E-05
3	19.00000	0.01434	141.025	141.025	-139.133	-30.865
	(STRAIN)	-6.293E-05	7.102E-05	7.102E-05	-6.293E-05	-1.117E-05
3	28.00000	0.01340	129.872	129.872	-153.471	-89.718
	(STRAIN)	-9.457E-05	1.214E-04	1.214E-04	-9.457E-05	-4.598E-05
3	28.00010	0.01340	129.873	251.948	129.873	236.808
	(STRAIN)	3.075E-05	-2.400E-05	3.851E-05	-2.400E-05	3.075E-05
3	62.00010	0.01271	23.995	23.995	3.915	4.812
	(STRAIN)	-4.226E-05	1.139E-04	1.139E-04	-4.226E-05	-3.529E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.541E-05
ALLOWABLE LOAD REPETITIONS = 9.044E+07 DAMAGE RATIO = 5.235E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.457E-05
ALLOWABLE LOAD REPETITIONS = 3.234E+07 DAMAGE RATIO = 1.464E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.139E-04
ALLOWABLE LOAD REPETITIONS = 6.164E+08 DAMAGE RATIO = 7.680E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	19.00000	0.01471	209.734	210.153	-128.298	-88.860
	(STRAIN)	-8.133E-05	1.360E-04	1.363E-04	-8.133E-05	-5.597E-05
1	28.00000	0.01333	145.486	145.486	-130.577	-91.200

	(STRAIN)	-1.058E-04	1.578E-04	1.578E-04	-1.058E-04	-6.819E-05
1	28.00010	0.01333	145.486	262.656	145.486	246.040
	(STRAIN)	3.028E-05	-2.121E-05	3.879E-05	-2.121E-05	3.028E-05
1	62.00010	0.01261	23.365	23.853	3.790	4.582
	(STRAIN)	-4.213E-05	1.101E-04	1.139E-04	-4.213E-05	-3.597E-05
2	19.00000	0.01492	174.961	177.300	-122.658	-44.180
	(STRAIN)	-8.061E-05	1.108E-04	1.123E-04	-8.061E-05	-3.015E-05
2	28.00000	0.01364	144.578	144.578	-134.348	-79.276
	(STRAIN)	-1.112E-04	1.551E-04	1.551E-04	-1.112E-04	-5.860E-05
2	28.00010	0.01364	144.577	269.603	144.577	253.501
	(STRAIN)	3.213E-05	-2.365E-05	4.037E-05	-2.365E-05	3.212E-05
2	62.00010	0.01289	24.680	24.775	3.884	4.822
	(STRAIN)	-4.419E-05	1.176E-04	1.183E-04	-4.419E-05	-3.690E-05
3	19.00000	0.01487	148.399	148.399	-115.887	-12.216
	(STRAIN)	-7.790E-05	9.204E-05	9.204E-05	-7.790E-05	-1.124E-05
3	28.00000	0.01370	139.376	139.376	-133.264	-69.649
	(STRAIN)	-1.115E-04	1.488E-04	1.488E-04	-1.115E-04	-5.077E-05
3	28.00010	0.01370	139.377	267.103	139.377	250.431
	(STRAIN)	3.213E-05	-2.474E-05	4.067E-05	-2.474E-05	3.213E-05
3	62.00010	0.01295	24.976	24.976	3.898	4.876
	(STRAIN)	-4.468E-05	1.193E-04	1.193E-04	-4.468E-05	-3.708E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.133E-05
ALLOWABLE LOAD REPETITIONS = 5.687E+07 DAMAGE RATIO = 8.325E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.115E-04
ALLOWABLE LOAD REPETITIONS = 2.280E+07 DAMAGE RATIO = 2.077E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.193E-04
ALLOWABLE LOAD REPETITIONS = 5.020E+08 DAMAGE RATIO = 9.432E-04

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.01459	207.724	208.168	-133.161	-93.225
	(STRAIN)	-7.774E-05	1.286E-04	1.289E-04	-7.774E-05	-5.357E-05
1	28.00000	0.01328	143.314	143.314	-134.385	-94.746
	(STRAIN)	-1.022E-04	1.509E-04	1.509E-04	-1.022E-04	-6.609E-05
1	28.00010	0.01328	143.314	259.584	143.314	243.214
	(STRAIN)	3.001E-05	-2.114E-05	3.840E-05	-2.114E-05	3.001E-05
1	62.00010	0.01257	23.197	23.678	3.794	4.574
	(STRAIN)	-4.170E-05	1.092E-04	1.129E-04	-4.170E-05	-3.564E-05
2	19.00000	0.01480	173.275	175.531	-127.308	-47.986
	(STRAIN)	-7.709E-05	1.048E-04	1.062E-04	-7.709E-05	-2.908E-05
2	28.00000	0.01359	142.565	142.565	-138.298	-83.127
	(STRAIN)	-1.074E-04	1.486E-04	1.486E-04	-1.074E-04	-5.714E-05
2	28.00010	0.01359	142.564	266.558	142.564	250.739
	(STRAIN)	3.185E-05	-2.354E-05	3.995E-05	-2.354E-05	3.185E-05
2	62.00010	0.01285	24.496	24.589	3.888	4.811
	(STRAIN)	-4.373E-05	1.165E-04	1.173E-04	-4.373E-05	-3.655E-05
3	19.00000	0.01476	146.968	146.969	-120.286	-15.711
	(STRAIN)	-7.453E-05	8.723E-05	8.723E-05	-7.453E-05	-1.123E-05
3	28.00000	0.01364	137.522	137.522	-137.204	-73.552
	(STRAIN)	-1.078E-04	1.427E-04	1.427E-04	-1.078E-04	-4.974E-05
3	28.00010	0.01364	137.523	264.165	137.523	247.799
	(STRAIN)	3.187E-05	-2.460E-05	4.025E-05	-2.460E-05	3.187E-05
3	62.00010	0.01291	24.788	24.788	3.902	4.864
	(STRAIN)	-4.421E-05	1.182E-04	1.182E-04	-4.421E-05	-3.673E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.774E-05
ALLOWABLE LOAD REPETITIONS = 6.266E+07 DAMAGE RATIO = 7.556E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.078E-04
ALLOWABLE LOAD REPETITIONS = 2.452E+07 DAMAGE RATIO = 1.931E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.182E-04
ALLOWABLE LOAD REPETITIONS = 5.218E+08 DAMAGE RATIO = 9.073E-04

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.01382	193.297	193.938	-170.383	-126.681
	(STRAIN)	-5.793E-05	8.874E-05	8.900E-05	-5.793E-05	-4.031E-05
1	28.00000	0.01287	127.814	127.814	-162.120	-120.720
	(STRAIN)	-8.173E-05	1.126E-04	1.126E-04	-8.173E-05	-5.398E-05
1	28.00010	0.01287	127.814	237.168	127.814	222.584
	(STRAIN)	2.801E-05	-2.051E-05	3.548E-05	-2.051E-05	2.801E-05
1	62.00010	0.01224	21.919	22.351	3.813	4.505
	(STRAIN)	-3.850E-05	1.023E-04	1.057E-04	-3.850E-05	-3.312E-05
2	19.00000	0.01405	161.003	162.704	-163.287	-77.893
	(STRAIN)	-5.765E-05	7.314E-05	7.382E-05	-5.765E-05	-2.321E-05
2	28.00000	0.01316	127.982	127.982	-167.135	-111.396
	(STRAIN)	-8.587E-05	1.119E-04	1.119E-04	-8.587E-05	-4.851E-05
2	28.00010	0.01316	127.982	244.148	127.982	230.306
	(STRAIN)	2.979E-05	-2.260E-05	3.688E-05	-2.260E-05	2.979E-05
2	62.00010	0.01249	23.099	23.183	3.906	4.720
	(STRAIN)	-4.031E-05	1.090E-04	1.096E-04	-4.031E-05	-3.398E-05
3	19.00000	0.01404	136.396	136.396	-154.575	-43.460
	(STRAIN)	-5.590E-05	6.145E-05	6.145E-05	-5.590E-05	-1.108E-05
3	28.00000	0.01321	123.968	123.968	-166.028	-102.263
	(STRAIN)	-8.621E-05	1.082E-04	1.082E-04	-8.621E-05	-4.346E-05
3	28.00010	0.01321	123.968	242.411	123.968	228.180
	(STRAIN)	2.986E-05	-2.351E-05	3.714E-05	-2.351E-05	2.986E-05
3	62.00010	0.01255	23.362	23.362	3.919	4.767
	(STRAIN)	-4.073E-05	1.105E-04	1.105E-04	-4.073E-05	-3.414E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.793E-05
ALLOWABLE LOAD REPETITIONS = 1.166E+08 DAMAGE RATIO = 4.060E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.621E-05
ALLOWABLE LOAD REPETITIONS = 3.931E+07 DAMAGE RATIO = 1.204E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.105E-04
ALLOWABLE LOAD REPETITIONS = 7.068E+08 DAMAGE RATIO = 6.699E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.01275	170.643	171.599	-239.396	-188.852
	(STRAIN)	-3.919E-05	5.377E-05	5.399E-05	-3.919E-05	-2.773E-05
1	28.00000	0.01214	104.117	104.117	-205.839	-162.282
	(STRAIN)	-6.014E-05	7.554E-05	7.554E-05	-6.014E-05	-4.107E-05
1	28.00010	0.01214	104.117	201.168	104.117	189.379
	(STRAIN)	2.460E-05	-1.906E-05	3.064E-05	-1.906E-05	2.460E-05
1	62.00010	0.01162	19.684	20.036	3.793	4.350
	(STRAIN)	-3.312E-05	9.048E-05	9.322E-05	-3.312E-05	-2.879E-05
2	19.00000	0.01297	141.272	142.281	-231.136	-135.632
	(STRAIN)	-3.921E-05	4.522E-05	4.545E-05	-3.921E-05	-1.755E-05
2	28.00000	0.01239	105.105	105.105	-212.736	-156.821
	(STRAIN)	-6.311E-05	7.602E-05	7.602E-05	-6.311E-05	-3.863E-05
2	28.00010	0.01239	105.104	207.617	105.104	196.712
	(STRAIN)	2.620E-05	-2.071E-05	3.178E-05	-2.071E-05	2.620E-05
2	62.00010	0.01184	20.667	20.736	3.881	4.530

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      (STRAIN)  -3.458E-05   9.597E-05   9.651E-05  -3.458E-05  -2.954E-05

 3    19.00000    0.01298     119.090     119.090    -220.024    -97.925
      (STRAIN)  -3.819E-05   3.869E-05   3.869E-05  -3.819E-05  -1.051E-05
 3    28.00000    0.01243     102.358     102.358    -211.749    -148.571
      (STRAIN)  -6.341E-05   7.408E-05   7.408E-05  -6.341E-05  -3.576E-05
 3    28.00010    0.01243     102.358     206.606     102.358     195.501
      (STRAIN)   2.630E-05  -2.139E-05   3.199E-05  -2.139E-05   2.630E-05
 3    62.00010    0.01189      20.880      20.880       3.893       4.566
      (STRAIN)  -3.492E-05   9.720E-05   9.720E-05  -3.492E-05  -2.968E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -3.921E-05
ALLOWABLE LOAD REPETITIONS =   2.577E+08  DAMAGE RATIO =   1.837E-03
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -6.341E-05
ALLOWABLE LOAD REPETITIONS =   7.505E+07  DAMAGE RATIO =   6.308E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   9.720E-05
ALLOWABLE LOAD REPETITIONS =   1.254E+09  DAMAGE RATIO =   3.775E-04

DAMAGE ANALYSIS OF PERIOD NO.  11  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1    19.00000    0.01155     144.773     145.982    -340.697    -280.216
      (STRAIN)  -2.644E-05   3.256E-05   3.270E-05  -2.644E-05  -1.909E-05
 1    28.00000    0.01116      78.825      78.825    -252.268    -207.654
      (STRAIN)  -4.321E-05   5.001E-05   5.001E-05  -4.321E-05  -3.065E-05
 1    28.00010    0.01116      78.825     160.148      78.825     151.385
      (STRAIN)   2.041E-05  -1.675E-05   2.490E-05  -1.675E-05   2.041E-05
 1    62.00010    0.01077      16.852      17.115       3.673       4.086
      (STRAIN)  -2.670E-05   7.579E-05   7.784E-05  -2.670E-05  -2.350E-05

 2    19.00000    0.01174     118.563     119.044    -331.921    -223.104
      (STRAIN)  -2.660E-05   2.814E-05   2.820E-05  -2.660E-05  -1.338E-05
 2    28.00000    0.01136      80.113      80.113    -261.190    -206.618
      (STRAIN)  -4.524E-05   5.086E-05   5.086E-05  -4.524E-05  -2.988E-05
 2    28.00010    0.01136      80.113     165.491      80.113     157.604
      (STRAIN)   2.171E-05  -1.797E-05   2.575E-05  -1.797E-05   2.171E-05
 2    62.00010    0.01094      17.610      17.661       3.752       4.226
      (STRAIN)  -2.779E-05   7.999E-05   8.039E-05  -2.779E-05  -2.411E-05

 3    19.00000    0.01176      99.070      99.070    -318.115    -181.362
      (STRAIN)  -2.604E-05   2.465E-05   2.465E-05  -2.604E-05  -9.424E-06
 3    28.00000    0.01140      78.407      78.407    -260.442    -199.581
      (STRAIN)  -4.547E-05   4.993E-05   4.993E-05  -4.547E-05  -2.834E-05
 3    28.00010    0.01140      78.408     164.967      78.408     157.010
      (STRAIN)   2.182E-05  -1.843E-05   2.590E-05  -1.843E-05   2.182E-05
 3    62.00010    0.01099      17.765      17.765       3.762       4.253
      (STRAIN)  -2.803E-05   8.088E-05   8.088E-05  -2.803E-05  -2.421E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -2.660E-05
ALLOWABLE LOAD REPETITIONS =   5.424E+08  DAMAGE RATIO =   8.728E-04
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -4.547E-05
ALLOWABLE LOAD REPETITIONS =   1.538E+08  DAMAGE RATIO =   3.078E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   8.088E-05
ALLOWABLE LOAD REPETITIONS =   2.855E+09  DAMAGE RATIO =   1.658E-04

DAMAGE ANALYSIS OF PERIOD NO.  12  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)
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1	19.00000	0.01089	130.849	132.096	-409.333	-342.211
	(STRAIN)	-2.160E-05	2.531E-05	2.542E-05	-2.160E-05	-1.577E-05
1	28.00000	0.01058	66.386	66.386	-273.100	-228.821
	(STRAIN)	-3.606E-05	4.036E-05	4.036E-05	-3.606E-05	-2.609E-05
1	28.00010	0.01058	66.386	138.817	66.386	131.543
	(STRAIN)	1.809E-05	-1.527E-05	2.182E-05	-1.527E-05	1.809E-05
1	62.00010	0.01024	15.246	15.465	3.558	3.900
	(STRAIN)	-2.327E-05	6.764E-05	6.934E-05	-2.327E-05	-2.061E-05
2	19.00000	0.01105	106.459	106.755	-400.512	-283.260
	(STRAIN)	-2.179E-05	2.223E-05	2.226E-05	-2.179E-05	-1.161E-05
2	28.00000	0.01075	67.660	67.660	-282.893	-230.002
	(STRAIN)	-3.769E-05	4.121E-05	4.121E-05	-3.769E-05	-2.579E-05
2	28.00010	0.01075	67.659	143.461	67.659	137.005
	(STRAIN)	1.922E-05	-1.629E-05	2.253E-05	-1.629E-05	1.922E-05
2	62.00010	0.01040	15.888	15.931	3.629	4.019
	(STRAIN)	-2.417E-05	7.117E-05	7.151E-05	-2.417E-05	-2.114E-05
3	19.00000	0.01108	88.474	88.474	-385.105	-238.947
	(STRAIN)	-2.138E-05	1.974E-05	1.974E-05	-2.138E-05	-8.691E-06
3	28.00000	0.01079	66.371	66.371	-282.270	-223.672
	(STRAIN)	-3.789E-05	4.059E-05	4.059E-05	-3.789E-05	-2.469E-05
3	28.00010	0.01079	66.371	143.086	66.371	136.604
	(STRAIN)	1.932E-05	-1.664E-05	2.264E-05	-1.664E-05	1.932E-05
3	62.00010	0.01044	16.015	16.015	3.640	4.042
	(STRAIN)	-2.435E-05	7.190E-05	7.190E-05	-2.435E-05	-2.122E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.179E-05
ALLOWABLE LOAD REPETITIONS = 7.850E+08 DAMAGE RATIO = 6.031E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.789E-05
ALLOWABLE LOAD REPETITIONS = 2.317E+08 DAMAGE RATIO = 2.043E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.190E-05
ALLOWABLE LOAD REPETITIONS = 4.837E+09 DAMAGE RATIO = 9.789E-05

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* SUMMARY OF DAMAGE ANALYSIS *
****
AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 3.496E-02
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 9.995E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 5.156E-03

MAXIMUM DAMAGE RATO = 9.995E-02 DESIGN LIFE IN YEARS = 10.01

E' presente un caso nella sezione con traffico ESAL/mese 360'995 assi 80 kN mese per cui si ha una vita utile calcolata con Kenlayer di 3.44 anni.
Si riporta nelle pagine seguenti l'output di Kenlayer e le elaborazioni in excel relative allo studio del contributo del geocomposito.

- Sovrastruttura **P2A** in carreggiata sud dell'A14

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 15 5 35
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.720E+07
3 7.889E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.398E+07
3 6.897E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 5.579E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.877E+06
3 4.202E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.390E+06
3 3.018E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.823E+06
3 2.161E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.100E+06
3 1.720E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.230E+06
3 1.803E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.347E+06
3 2.460E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.955E+06
3 3.783E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.111E+07
3 5.904E+06 4 8.380E+05 5 1.180E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.555E+07
3 7.396E+06 4 8.380E+05 5 1.180E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 360995

LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 360995
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 360995

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01661	83.937	84.933	-658.691	-565.600
	(STRAIN)	-2.852E-05	2.978E-05	2.986E-05	-2.852E-05	-2.121E-05
1	24.00000	0.01642	41.507	41.507	-486.242	-416.462
	(STRAIN)	-4.500E-05	4.531E-05	4.531E-05	-4.500E-05	-3.306E-05
1	24.00010	0.01642	41.507	71.647	41.507	68.472
	(STRAIN)	2.770E-05	-1.735E-05	3.300E-05	-1.735E-05	2.770E-05
1	59.00010	0.01570	15.098	15.301	3.709	4.016
	(STRAIN)	-3.405E-05	1.011E-04	1.035E-04	-3.405E-05	-3.041E-05
2	19.00000	0.01687	64.629	64.960	-664.037	-528.315
	(STRAIN)	-2.919E-05	2.802E-05	2.805E-05	-2.919E-05	-1.853E-05
2	24.00000	0.01668	41.800	41.800	-495.766	-406.221
	(STRAIN)	-4.667E-05	4.531E-05	4.531E-05	-4.667E-05	-3.135E-05
2	24.00010	0.01668	41.800	73.359	41.800	70.433
	(STRAIN)	2.908E-05	-1.876E-05	3.397E-05	-1.876E-05	2.908E-05
2	59.00010	0.01593	15.700	15.739	3.784	4.133
	(STRAIN)	-3.530E-05	1.061E-04	1.065E-04	-3.530E-05	-3.115E-05
3	19.00000	0.01692	50.965	50.965	-651.462	-489.478
	(STRAIN)	-2.896E-05	2.619E-05	2.619E-05	-2.896E-05	-1.624E-05
3	24.00000	0.01674	40.854	40.854	-489.994	-387.812
	(STRAIN)	-4.672E-05	4.412E-05	4.412E-05	-4.672E-05	-2.923E-05
3	24.00010	0.01674	40.854	72.846	40.854	69.848
	(STRAIN)	2.908E-05	-1.936E-05	3.409E-05	-1.936E-05	2.908E-05
3	59.00010	0.01599	15.817	15.817	3.793	4.155
	(STRAIN)	-3.555E-05	1.071E-04	1.071E-04	-3.555E-05	-3.127E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.919E-05
ALLOWABLE LOAD REPETITIONS = 2.752E+08 DAMAGE RATIO = 1.312E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.672E-05
ALLOWABLE LOAD REPETITIONS = 9.199E+07 DAMAGE RATIO = 3.924E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.071E-04
ALLOWABLE LOAD REPETITIONS = 8.125E+08 DAMAGE RATIO = 4.443E-04

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01741	91.013	92.084	-599.462	-511.487
	(STRAIN)	-3.238E-05	3.430E-05	3.441E-05	-3.238E-05	-2.389E-05
1	24.00000	0.01719	47.173	47.173	-479.960	-408.474
	(STRAIN)	-5.125E-05	5.192E-05	5.192E-05	-5.125E-05	-3.726E-05

1	24.00010	0.01719	47.173	80.300	47.173	76.613
	(STRAIN)	3.058E-05	-1.861E-05	3.674E-05	-1.861E-05	3.058E-05
1	59.00010	0.01637	16.399	16.636	3.827	4.182
	(STRAIN)	-3.814E-05	1.110E-04	1.138E-04	-3.814E-05	-3.392E-05
2	19.00000	0.01769	70.737	71.154	-604.466	-474.848
	(STRAIN)	-3.314E-05	3.208E-05	3.212E-05	-3.314E-05	-2.062E-05
2	24.00000	0.01748	47.409	47.409	-488.925	-396.154
	(STRAIN)	-5.319E-05	5.179E-05	5.179E-05	-5.319E-05	-3.503E-05
2	24.00010	0.01748	47.409	82.189	47.409	78.755
	(STRAIN)	3.212E-05	-2.025E-05	3.786E-05	-2.025E-05	3.212E-05
2	59.00010	0.01662	17.088	17.134	3.908	4.316
	(STRAIN)	-3.960E-05	1.168E-04	1.173E-04	-3.960E-05	-3.475E-05
3	19.00000	0.01774	56.286	56.287	-592.932	-437.755
	(STRAIN)	-3.287E-05	2.983E-05	2.983E-05	-3.287E-05	-1.788E-05
3	24.00000	0.01754	46.250	46.250	-482.842	-376.669
	(STRAIN)	-5.324E-05	5.032E-05	5.032E-05	-5.324E-05	-3.246E-05
3	24.00010	0.01754	46.250	81.565	46.250	78.032
	(STRAIN)	3.211E-05	-2.099E-05	3.801E-05	-2.099E-05	3.211E-05
3	59.00010	0.01668	17.227	17.227	3.918	4.340
	(STRAIN)	-3.991E-05	1.180E-04	1.180E-04	-3.991E-05	-3.489E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.314E-05
ALLOWABLE LOAD REPETITIONS = 2.163E+08 DAMAGE RATIO = 1.669E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.324E-05
ALLOWABLE LOAD REPETITIONS = 6.711E+07 DAMAGE RATIO = 5.379E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.180E-04
ALLOWABLE LOAD REPETITIONS = 5.265E+08 DAMAGE RATIO = 6.857E-04

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01861	102.367	103.513	-517.608	-436.926
	(STRAIN)	-3.916E-05	4.259E-05	4.274E-05	-3.916E-05	-2.852E-05
1	24.00000	0.01835	56.878	56.878	-463.338	-390.249
	(STRAIN)	-6.213E-05	6.374E-05	6.374E-05	-6.213E-05	-4.445E-05
1	24.00010	0.01835	56.878	94.713	56.878	90.131
	(STRAIN)	3.520E-05	-2.036E-05	4.285E-05	-2.036E-05	3.520E-05
1	59.00010	0.01736	18.443	18.737	3.968	4.409
	(STRAIN)	-4.484E-05	1.269E-04	1.304E-04	-4.484E-05	-3.960E-05
2	19.00000	0.01895	80.691	81.270	-521.997	-401.016
	(STRAIN)	-4.005E-05	3.941E-05	3.949E-05	-4.005E-05	-2.410E-05
2	24.00000	0.01869	56.942	56.942	-471.155	-374.506
	(STRAIN)	-6.453E-05	6.326E-05	6.326E-05	-6.453E-05	-4.114E-05
2	24.00010	0.01869	56.942	96.842	56.942	92.502
	(STRAIN)	3.698E-05	-2.243E-05	4.423E-05	-2.243E-05	3.698E-05
2	59.00010	0.01766	19.280	19.337	4.059	4.570
	(STRAIN)	-4.665E-05	1.339E-04	1.346E-04	-4.665E-05	-4.058E-05
3	19.00000	0.01900	65.061	65.061	-511.808	-366.160
	(STRAIN)	-3.969E-05	3.637E-05	3.637E-05	-3.969E-05	-2.049E-05
3	24.00000	0.01875	55.369	55.369	-464.555	-353.390
	(STRAIN)	-6.457E-05	6.124E-05	6.124E-05	-6.457E-05	-3.767E-05
3	24.00010	0.01875	55.368	95.984	55.368	91.492
	(STRAIN)	3.693E-05	-2.342E-05	4.444E-05	-2.342E-05	3.693E-05
3	59.00010	0.01772	19.457	19.457	4.071	4.601
	(STRAIN)	-4.706E-05	1.355E-04	1.355E-04	-4.706E-05	-4.076E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.005E-05
ALLOWABLE LOAD REPETITIONS = 1.512E+08 DAMAGE RATIO = 2.387E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.457E-05
ALLOWABLE LOAD REPETITIONS = 4.263E+07 DAMAGE RATIO = 8.469E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00

ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.355E-04
ALLOWABLE LOAD REPETITIONS = 2.835E+08 DAMAGE RATIO = 1.274E-03

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02016	118.290	119.455	-424.003	-352.050
	(STRAIN)	-4.982E-05	5.664E-05	5.687E-05	-4.982E-05	-3.569E-05
1	24.00000	0.01981	71.433	71.433	-432.471	-358.862
	(STRAIN)	-7.898E-05	8.291E-05	8.291E-05	-7.898E-05	-5.533E-05
1	24.00010	0.01981	71.433	115.492	71.433	109.553
	(STRAIN)	4.151E-05	-2.218E-05	5.143E-05	-2.218E-05	4.151E-05
1	59.00010	0.01857	21.155	21.536	4.078	4.650
	(STRAIN)	-5.421E-05	1.484E-04	1.529E-04	-5.421E-05	-4.742E-05
2	19.00000	0.02056	94.808	95.669	-427.532	-316.868
	(STRAIN)	-5.091E-05	5.163E-05	5.180E-05	-5.091E-05	-2.919E-05
2	24.00000	0.02022	71.048	71.048	-438.373	-338.298
	(STRAIN)	-8.207E-05	8.160E-05	8.160E-05	-8.207E-05	-4.991E-05
2	24.00010	0.02022	71.048	117.814	71.048	112.049
	(STRAIN)	4.356E-05	-2.494E-05	5.319E-05	-2.494E-05	4.356E-05
2	59.00010	0.01893	22.207	22.281	4.180	4.851
	(STRAIN)	-5.655E-05	1.573E-04	1.582E-04	-5.655E-05	-4.858E-05
3	19.00000	0.02062	77.607	77.607	-418.823	-284.382
	(STRAIN)	-5.038E-05	4.708E-05	4.708E-05	-5.038E-05	-2.399E-05
3	24.00000	0.02030	68.733	68.733	-431.070	-315.127
	(STRAIN)	-8.206E-05	7.851E-05	7.851E-05	-8.206E-05	-4.481E-05
3	24.00010	0.02030	68.732	116.496	68.732	110.477
	(STRAIN)	4.342E-05	-2.632E-05	5.347E-05	-2.632E-05	4.342E-05
3	59.00010	0.01901	22.441	22.441	4.195	4.893
	(STRAIN)	-5.711E-05	1.594E-04	1.594E-04	-5.711E-05	-4.882E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.091E-05
ALLOWABLE LOAD REPETITIONS = 9.645E+07 DAMAGE RATIO = 3.743E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.207E-05
ALLOWABLE LOAD REPETITIONS = 2.467E+07 DAMAGE RATIO = 1.463E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.594E-04
ALLOWABLE LOAD REPETITIONS = 1.371E+08 DAMAGE RATIO = 2.633E-03

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02188	138.093	139.165	-332.276	-269.330
	(STRAIN)	-6.531E-05	7.933E-05	7.966E-05	-6.531E-05	-4.595E-05
1	24.00000	0.02140	90.627	90.627	-388.683	-316.348
	(STRAIN)	-1.026E-04	1.118E-04	1.118E-04	-1.026E-04	-7.026E-05
1	24.00010	0.02140	90.627	141.616	90.627	133.879
	(STRAIN)	4.891E-05	-2.336E-05	6.183E-05	-2.335E-05	4.890E-05
1	59.00010	0.01984	24.227	24.717	4.101	4.850
	(STRAIN)	-6.547E-05	1.733E-04	1.791E-04	-6.547E-05	-5.659E-05
2	19.00000	0.02235	112.375	113.673	-334.926	-235.012
	(STRAIN)	-6.662E-05	7.093E-05	7.133E-05	-6.662E-05	-3.589E-05
2	24.00000	0.02189	89.250	89.250	-392.041	-290.049
	(STRAIN)	-1.066E-04	1.087E-04	1.087E-04	-1.066E-04	-6.100E-05
2	24.00010	0.02189	89.250	143.843	89.250	136.091
	(STRAIN)	5.114E-05	-2.712E-05	6.409E-05	-2.712E-05	5.114E-05
2	59.00010	0.02027	25.547	25.642	4.213	5.101
	(STRAIN)	-6.851E-05	1.846E-04	1.857E-04	-6.851E-05	-5.798E-05

3	19.00000	0.02241	93.220	93.220	-327.752	-204.748
	(STRAIN)	-6.576E-05	6.369E-05	6.369E-05	-6.576E-05	-2.794E-05
3	24.00000	0.02198	85.722	85.722	-384.026	-264.764
	(STRAIN)	-1.065E-04	1.037E-04	1.037E-04	-1.065E-04	-5.314E-05
3	24.00010	0.02198	85.721	141.703	85.721	133.521
	(STRAIN)	5.078E-05	-2.908E-05	6.445E-05	-2.908E-05	5.078E-05
3	59.00010	0.02037	25.849	25.849	4.232	5.157
	(STRAIN)	-6.925E-05	1.872E-04	1.872E-04	-6.925E-05	-5.826E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.662E-05
ALLOWABLE LOAD REPETITIONS = 5.842E+07 DAMAGE RATIO = 6.180E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.066E-04
ALLOWABLE LOAD REPETITIONS = 1.383E+07 DAMAGE RATIO = 2.611E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.872E-04
ALLOWABLE LOAD REPETITIONS = 6.663E+07 DAMAGE RATIO = 5.418E-03

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02350	159.078	159.964	-255.703	-200.634
	(STRAIN)	-8.552E-05	1.128E-04	1.132E-04	-8.552E-05	-5.919E-05
1	24.00000	0.02284	111.908	111.908	-340.416	-270.960
	(STRAIN)	-1.318E-04	1.508E-04	1.508E-04	-1.318E-04	-8.840E-05
1	24.00010	0.02284	111.908	169.192	111.908	159.482
	(STRAIN)	5.614E-05	-2.334E-05	7.236E-05	-2.334E-05	5.614E-05
1	59.00010	0.02093	27.112	27.718	4.029	4.973
	(STRAIN)	-7.668E-05	1.972E-04	2.044E-04	-7.668E-05	-6.547E-05
2	19.00000	0.02403	130.758	132.610	-257.809	-167.493
	(STRAIN)	-8.699E-05	9.880E-05	9.969E-05	-8.699E-05	-4.380E-05
2	24.00000	0.02341	108.828	108.828	-341.220	-239.214
	(STRAIN)	-1.368E-04	1.444E-04	1.444E-04	-1.368E-04	-7.307E-05
2	24.00010	0.02341	108.828	170.775	108.828	160.706
	(STRAIN)	5.831E-05	-2.836E-05	7.513E-05	-2.836E-05	5.831E-05
2	59.00010	0.02144	28.709	28.826	4.144	5.276
	(STRAIN)	-8.048E-05	2.110E-04	2.124E-04	-8.048E-05	-6.705E-05
3	19.00000	0.02407	109.408	109.408	-252.149	-139.124
	(STRAIN)	-8.562E-05	8.725E-05	8.725E-05	-8.562E-05	-3.158E-05
3	24.00000	0.02350	103.616	103.616	-332.730	-212.237
	(STRAIN)	-1.364E-04	1.362E-04	1.362E-04	-1.364E-04	-6.112E-05
3	24.00010	0.02350	103.616	167.431	103.616	156.674
	(STRAIN)	5.758E-05	-3.106E-05	7.555E-05	-3.106E-05	5.758E-05
3	59.00010	0.02156	29.078	29.078	4.165	5.348
	(STRAIN)	-8.140E-05	2.142E-04	2.142E-04	-8.140E-05	-6.737E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.699E-05
ALLOWABLE LOAD REPETITIONS = 3.539E+07 DAMAGE RATIO = 1.020E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.368E-04
ALLOWABLE LOAD REPETITIONS = 8.098E+06 DAMAGE RATIO = 4.458E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.142E-04
ALLOWABLE LOAD REPETITIONS = 3.650E+07 DAMAGE RATIO = 9.892E-03

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02454	173.628	174.359	-211.634	-161.256

	(STRAIN)	-1.030E-04	1.447E-04	1.452E-04	-1.030E-04	-7.059E-05
1	24.00000	0.02372	127.066	127.066	-307.109	-240.268
	(STRAIN)	-1.555E-04	1.852E-04	1.852E-04	-1.555E-04	-1.030E-04
1	24.00010	0.02372	127.080	188.107	127.080	177.014
	(STRAIN)	6.079E-05	-2.264E-05	7.932E-05	-2.264E-05	6.079E-05
1	59.00010	0.02157	28.901	29.584	3.937	5.020
	(STRAIN)	-8.393E-05	2.122E-04	2.203E-04	-8.393E-05	-7.109E-05
2	19.00000	0.02509	143.249	145.518	-213.658	-129.169
	(STRAIN)	-1.045E-04	1.250E-04	1.265E-04	-1.045E-04	-5.016E-05
2	24.00000	0.02433	122.353	122.353	-306.417	-205.319
	(STRAIN)	-1.613E-04	1.753E-04	1.753E-04	-1.613E-04	-8.191E-05
2	24.00010	0.02433	122.353	188.845	122.353	177.058
	(STRAIN)	6.274E-05	-2.865E-05	8.243E-05	-2.865E-05	6.274E-05
2	59.00010	0.02212	30.679	30.811	4.052	5.359
	(STRAIN)	-8.827E-05	2.276E-04	2.292E-04	-8.827E-05	-7.276E-05
3	19.00000	0.02512	120.239	120.239	-209.061	-101.982
	(STRAIN)	-1.026E-04	1.091E-04	1.091E-04	-1.026E-04	-3.377E-05
3	24.00000	0.02442	115.711	115.711	-297.816	-177.546
	(STRAIN)	-1.606E-04	1.640E-04	1.640E-04	-1.606E-04	-6.616E-05
3	24.00010	0.02442	115.708	184.439	115.708	171.743
	(STRAIN)	6.168E-05	-3.194E-05	8.289E-05	-3.194E-05	6.168E-05
3	59.00010	0.02225	31.092	31.092	4.073	5.441
	(STRAIN)	-8.932E-05	2.312E-04	2.312E-04	-8.932E-05	-7.309E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.045E-04
ALLOWABLE LOAD REPETITIONS = 2.493E+07 DAMAGE RATIO = 1.448E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.613E-04
ALLOWABLE LOAD REPETITIONS = 5.728E+06 DAMAGE RATIO = 6.303E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.312E-04
ALLOWABLE LOAD REPETITIONS = 2.590E+07 DAMAGE RATIO = 1.394E-02

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	19.00000	0.02433	170.648	171.411	-220.171	-168.878
	(STRAIN)	-9.911E-05	1.374E-04	1.379E-04	-9.911E-05	-6.806E-05
1	24.00000	0.02355	123.945	123.945	-313.928	-246.519
	(STRAIN)	-1.504E-04	1.776E-04	1.776E-04	-1.504E-04	-9.987E-05
1	24.00010	0.02355	123.945	184.244	123.945	173.436
	(STRAIN)	5.986E-05	-2.282E-05	7.791E-05	-2.282E-05	5.986E-05
1	59.00010	0.02144	28.548	29.215	3.958	5.013
	(STRAIN)	-8.248E-05	2.093E-04	2.172E-04	-8.248E-05	-6.997E-05
2	19.00000	0.02488	140.718	142.901	-222.189	-136.565
	(STRAIN)	-1.006E-04	1.190E-04	1.204E-04	-1.006E-04	-4.879E-05
2	24.00000	0.02415	119.587	119.587	-313.485	-212.142
	(STRAIN)	-1.559E-04	1.684E-04	1.684E-04	-1.559E-04	-8.004E-05
2	24.00010	0.02415	119.589	185.184	119.589	173.758
	(STRAIN)	6.187E-05	-2.862E-05	8.096E-05	-2.862E-05	6.187E-05
2	59.00010	0.02199	30.289	30.418	4.073	5.344
	(STRAIN)	-8.671E-05	2.243E-04	2.259E-04	-8.671E-05	-7.163E-05
3	19.00000	0.02491	118.049	118.050	-217.371	-109.127
	(STRAIN)	-9.886E-05	1.042E-04	1.042E-04	-9.886E-05	-3.334E-05
3	24.00000	0.02424	113.260	113.260	-304.898	-184.520
	(STRAIN)	-1.553E-04	1.579E-04	1.579E-04	-1.553E-04	-6.516E-05
3	24.00010	0.02424	113.258	181.013	113.258	168.724
	(STRAIN)	6.088E-05	-3.179E-05	8.141E-05	-3.179E-05	6.088E-05
3	59.00010	0.02212	30.693	30.693	4.095	5.424
	(STRAIN)	-8.773E-05	2.278E-04	2.278E-04	-8.773E-05	-7.196E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.006E-04
ALLOWABLE LOAD REPETITIONS = 2.681E+07 DAMAGE RATIO = 1.346E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.559E-04

ALLOWABLE LOAD REPETITIONS = 6.144E+06 DAMAGE RATIO = 5.875E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.278E-04
ALLOWABLE LOAD REPETITIONS = 2.767E+07 DAMAGE RATIO = 1.305E-02

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02289	150.852	151.818	-283.660	-225.678
	(STRAIN)	-7.702E-05	9.822E-05	9.861E-05	-7.702E-05	-5.363E-05
1	24.00000	0.02230	103.469	103.469	-359.378	-288.647
	(STRAIN)	-1.198E-04	1.343E-04	1.343E-04	-1.198E-04	-8.093E-05
1	24.00010	0.02230	103.469	158.413	103.469	149.483
	(STRAIN)	5.338E-05	-2.350E-05	6.830E-05	-2.350E-05	5.338E-05
1	59.00010	0.02053	26.025	26.586	4.067	4.934
	(STRAIN)	-7.238E-05	1.881E-04	1.948E-04	-7.238E-05	-6.210E-05
2	19.00000	0.02339	123.594	125.220	-285.924	-192.030
	(STRAIN)	-7.843E-05	8.673E-05	8.738E-05	-7.843E-05	-4.056E-05
2	24.00000	0.02284	101.145	101.145	-361.147	-258.939
	(STRAIN)	-1.244E-04	1.294E-04	1.294E-04	-1.244E-04	-6.827E-05
2	24.00010	0.02284	101.145	160.322	101.145	151.189
	(STRAIN)	5.561E-05	-2.799E-05	7.087E-05	-2.799E-05	5.561E-05
2	59.00010	0.02101	27.515	27.624	4.181	5.216
	(STRAIN)	-7.589E-05	2.010E-04	2.022E-04	-7.589E-05	-6.361E-05
3	19.00000	0.02344	103.127	103.127	-279.672	-162.954
	(STRAIN)	-7.729E-05	7.709E-05	7.709E-05	-7.729E-05	-3.022E-05
3	24.00000	0.02293	96.648	96.648	-352.808	-232.568
	(STRAIN)	-1.241E-04	1.226E-04	1.226E-04	-1.241E-04	-5.810E-05
3	24.00010	0.02293	96.645	157.497	96.645	147.780
	(STRAIN)	5.504E-05	-3.039E-05	7.127E-05	-3.039E-05	5.504E-05
3	59.00010	0.02112	27.859	27.859	4.202	5.282
	(STRAIN)	-7.674E-05	2.039E-04	2.039E-04	-7.674E-05	-6.392E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.843E-05
ALLOWABLE LOAD REPETITIONS = 4.303E+07 DAMAGE RATIO = 8.390E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.244E-04
ALLOWABLE LOAD REPETITIONS = 9.921E+06 DAMAGE RATIO = 3.639E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.039E-04
ALLOWABLE LOAD REPETITIONS = 4.544E+07 DAMAGE RATIO = 7.944E-03

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.02072	124.440	125.588	-393.021	-324.058
	(STRAIN)	-5.434E-05	6.298E-05	6.324E-05	-5.434E-05	-3.870E-05
1	24.00000	0.02033	77.283	77.283	-419.266	-345.864
	(STRAIN)	-8.598E-05	9.122E-05	9.122E-05	-8.598E-05	-5.979E-05
1	24.00010	0.02033	77.283	123.594	77.283	117.109
	(STRAIN)	4.386E-05	-2.267E-05	5.470E-05	-2.267E-05	4.386E-05
1	59.00010	0.01899	22.146	22.560	4.097	4.723
	(STRAIN)	-5.777E-05	1.564E-04	1.613E-04	-5.777E-05	-5.034E-05
2	19.00000	0.02114	100.273	101.260	-396.247	-289.134
	(STRAIN)	-5.550E-05	5.707E-05	5.729E-05	-5.550E-05	-3.122E-05
2	24.00000	0.02077	76.644	76.644	-424.376	-323.460
	(STRAIN)	-8.935E-05	8.945E-05	8.945E-05	-8.935E-05	-5.333E-05
2	24.00010	0.02077	76.646	125.932	76.646	119.576

	(STRAIN)	4.600E-05	-2.573E-05	5.661E-05	-2.573E-05	4.600E-05
2	59.00010	0.01938	23.281	23.362	4.203	4.939
	(STRAIN)	-6.032E-05	1.660E-04	1.670E-04	-6.032E-05	-5.158E-05
3	19.00000	0.02120	82.471	82.471	-388.037	-257.403
	(STRAIN)	-5.488E-05	5.179E-05	5.179E-05	-5.488E-05	-2.527E-05
3	24.00000	0.02085	73.990	73.990	-416.837	-299.597
	(STRAIN)	-8.932E-05	8.584E-05	8.584E-05	-8.932E-05	-4.748E-05
3	24.00010	0.02085	73.989	124.391	73.989	117.729
	(STRAIN)	4.580E-05	-2.728E-05	5.693E-05	-2.728E-05	4.580E-05
3	59.00010	0.01946	23.537	23.537	4.219	4.986
	(STRAIN)	-6.093E-05	1.683E-04	1.683E-04	-6.093E-05	-5.183E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.550E-05
ALLOWABLE LOAD REPETITIONS = 8.211E+07 DAMAGE RATIO = 4.397E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.935E-05
ALLOWABLE LOAD REPETITIONS = 2.040E+07 DAMAGE RATIO = 1.770E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.683E-04
ALLOWABLE LOAD REPETITIONS = 1.075E+08 DAMAGE RATIO = 3.358E-03

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	19.00000	0.01830	99.301	100.432	-538.288	-455.736
	(STRAIN)	-3.726E-05	4.022E-05	4.036E-05	-3.726E-05	-2.723E-05
1	24.00000	0.01804	54.193	54.193	-468.423	-395.648
	(STRAIN)	-5.910E-05	6.041E-05	6.041E-05	-5.910E-05	-4.246E-05
1	24.00010	0.01804	54.193	90.774	54.193	86.442
	(STRAIN)	3.395E-05	-1.992E-05	4.119E-05	-1.992E-05	3.396E-05
1	59.00010	0.01710	17.898	18.177	3.935	4.353
	(STRAIN)	-4.302E-05	1.226E-04	1.260E-04	-4.302E-05	-3.807E-05
2	19.00000	0.01862	77.989	78.521	-542.847	-419.655
	(STRAIN)	-3.812E-05	3.733E-05	3.739E-05	-3.812E-05	-2.315E-05
2	24.00000	0.01837	54.314	54.314	-476.569	-380.826
	(STRAIN)	-6.137E-05	6.003E-05	6.003E-05	-6.137E-05	-3.947E-05
2	24.00010	0.01837	54.314	92.844	54.314	88.760
	(STRAIN)	3.568E-05	-2.187E-05	4.250E-05	-2.187E-05	3.568E-05
2	59.00010	0.01739	18.695	18.749	4.024	4.507
	(STRAIN)	-4.473E-05	1.293E-04	1.300E-04	-4.473E-05	-3.900E-05
3	19.00000	0.01867	62.671	62.671	-532.326	-384.252
	(STRAIN)	-3.779E-05	3.452E-05	3.452E-05	-3.779E-05	-1.979E-05
3	24.00000	0.01843	52.862	52.862	-470.110	-360.138
	(STRAIN)	-6.141E-05	5.818E-05	5.818E-05	-6.141E-05	-3.627E-05
3	24.00010	0.01843	52.862	92.058	52.862	87.836
	(STRAIN)	3.564E-05	-2.279E-05	4.270E-05	-2.279E-05	3.564E-05
3	59.00010	0.01745	18.862	18.862	4.035	4.535
	(STRAIN)	-4.512E-05	1.308E-04	1.308E-04	-4.512E-05	-3.918E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.812E-05
ALLOWABLE LOAD REPETITIONS = 1.660E+08 DAMAGE RATIO = 2.175E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.141E-05
ALLOWABLE LOAD REPETITIONS = 4.790E+07 DAMAGE RATIO = 7.536E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.308E-04
ALLOWABLE LOAD REPETITIONS = 3.320E+08 DAMAGE RATIO = 1.087E-03

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL	VERTICAL PRINCIPAL STRESS	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIPAL STRESS	INTERMEDIATE STRESS

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              P. STRAIN)  (STRAIN)    (STRAIN)    (STRAIN)    (STRAIN)

  1     19.00000    0.01700     87.335     88.370    -629.368    -538.795
        (STRAIN)  -3.034E-05   3.189E-05   3.198E-05  -3.034E-05  -2.248E-05
  1     24.00000    0.01679     44.186     44.186    -483.729    -413.051
        (STRAIN)  -4.795E-05   4.841E-05   4.841E-05  -4.795E-05  -3.505E-05
  1     24.00010    0.01679     44.186     75.762     44.186      72.345
        (STRAIN)   2.908E-05  -1.797E-05   3.478E-05  -1.797E-05   2.908E-05
  1     59.00010    0.01603     15.723     15.943      3.769       4.098
        (STRAIN)  -3.600E-05   1.058E-04   1.084E-04  -3.600E-05  -3.209E-05

  2     19.00000    0.01727     67.551     67.921    -634.557    -501.845
        (STRAIN)  -3.105E-05   2.992E-05   2.995E-05  -3.105E-05  -1.952E-05
  2     24.00000    0.01707     44.456     44.456    -493.002    -401.818
        (STRAIN)  -4.975E-05   4.836E-05   4.836E-05  -4.975E-05  -3.310E-05
  2     24.00010    0.01707     44.456     77.560     44.456      74.397
        (STRAIN)   3.054E-05  -1.948E-05   3.582E-05  -1.948E-05   3.054E-05
  2     59.00010    0.01627     16.367     16.410      3.846       4.223
        (STRAIN)  -3.735E-05   1.112E-04   1.117E-04  -3.735E-05  -3.287E-05

  3     19.00000    0.01732     53.502     53.502    -622.506    -463.887
        (STRAIN)  -3.080E-05   2.790E-05   2.790E-05  -3.080E-05  -1.703E-05
  3     24.00000    0.01713     43.412     43.412    -487.082    -382.885
        (STRAIN)  -4.979E-05   4.704E-05   4.704E-05  -4.979E-05  -3.077E-05
  3     24.00010    0.01713     43.411     76.997     43.411      73.749
        (STRAIN)   3.053E-05  -2.015E-05   3.596E-05  -2.015E-05   3.053E-05
  3     59.00010    0.01633     16.494     16.494      3.856       4.246
        (STRAIN)  -3.763E-05   1.123E-04   1.123E-04  -3.763E-05  -3.300E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -3.105E-05
ALLOWABLE LOAD REPETITIONS =   2.448E+08  DAMAGE RATIO =   1.475E-03
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -4.979E-05
ALLOWABLE LOAD REPETITIONS =   7.881E+07  DAMAGE RATIO =   4.581E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   1.123E-04
ALLOWABLE LOAD REPETITIONS =   6.565E+08  DAMAGE RATIO =   5.498E-04

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 6.987E-02
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 2.911E-01
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 6.027E-02
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MAXIMUM DAMAGE RATO = 2.911E-01 DESIGN LIFE IN YEARS = 3.44

mese	ε	V_b	V_a	N_0
1	4.67E-05	11	5	18212901
2	5.32E-05	11	5	9777137
3	6.46E-05	11	5	3901208
4	8.21E-05	11	5	1245173
5	1.07E-04	11	5	358433
6	1.37E-04	11	5	109665
7	1.61E-04	11	5	49871
8	1.56E-04	11	5	58650
9	1.24E-04	11	5	171814
10	8.94E-05	11	5	830745
11	6.14E-05	11	5	4954147
12	4.98E-05	11	5	13451279

mese	**Em**	**n**	σ	α	β	γ	h	ΔN_0
1	137318	4.5	4.899	2.193147	-2.95519	-1.93293	24	1.13E+08
2	112442	4.5	4.828	2.193147	-2.95519	-1.93293	24	75835591
3	83282	4.5	4.645	2.193147	-2.95519	-1.93293	24	44007170
4	56748	4.5	4.31	2.193147	-2.95519	-1.93293	24	23671275
5	36846	4.5	3.84	2.193147	-2.95519	-1.93293	24	12913804
6	24109	4.5	3.412	2.193147	-2.95519	-1.93293	24	7222870
7	18144	4.5	3.064	2.193147	-2.95519	-1.93293	24	5321646
8	19228	4.5	3.134	2.193147	-2.95519	-1.93293	24	5653517
9	28391	4.5	3.611	2.193147	-2.95519	-1.93293	24	8743330
10	49403	4.5	4.243	2.193147	-2.95519	-1.93293	24	18293855
11	90097	4.5	4.7	2.193147	-2.95519	-1.93293	24	50505169
12	124597	4.5	4.87	2.193147	-2.95519	-1.93293	24	92581531

mese	n_mese	$N+k\Delta N_0$	danno	
1	360,995	581161130	0.000621	
2	360,995	388955090	0.000928	
3	360,995	223937056	0.001612	
4	360,995	119601548	0.003018	
5	360,995	64927455	0.00556	
6	360,995	36224016	0.009966	
7	360,995	26658100	0.013542	
8	360,995	28326234	0.012744	
9	360,995	43888466	0.008225	
10	360,995	92300021	0.003911	
11	360,995	257479991	0.001402	
12	360,995	476358932	0.000758	**VITA UTILE con coefficiente K pari a 5**
			0.062287	***16***

- Sovrastruttura **P2B**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 20 7 32
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.712E+07
3 6.381E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.394E+07
3 5.592E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 4.544E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.904E+06
3 3.447E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.430E+06
3 2.500E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.864E+06
3 1.808E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.137E+06
3 1.450E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.269E+06
3 1.517E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.388E+06
3 2.050E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.988E+06
3 3.113E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.110E+07
3 4.802E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.549E+07
3 5.988E+06 4 6.314E+06 5 2.030E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 880806

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 880806
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 880806

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.00832	94.233	94.723	-355.302	-297.847
	(STRAIN)	-1.660E-05	1.885E-05	1.889E-05	-1.660E-05	-1.207E-05
1	31.00000	0.00813	70.164	70.164	-183.309	-152.622
	(STRAIN)	-2.420E-05	2.942E-05	2.942E-05	-2.420E-05	-1.771E-05
1	31.00010	0.00813	70.164	184.623	70.164	174.669
	(STRAIN)	1.152E-05	-1.165E-05	1.373E-05	-1.165E-05	1.152E-05
1	63.00010	0.00799	11.971	12.114	3.259	3.496
	(STRAIN)	-1.471E-05	4.538E-05	4.637E-05	-1.471E-05	-1.307E-05
2	24.00000	0.00843	88.277	88.297	-361.223	-280.412
	(STRAIN)	-1.717E-05	1.827E-05	1.828E-05	-1.717E-05	-1.080E-05
2	31.00000	0.00824	72.482	72.482	-190.647	-155.241
	(STRAIN)	-2.534E-05	3.033E-05	3.033E-05	-2.534E-05	-1.785E-05
2	31.00010	0.00824	72.482	191.768	72.482	183.333
	(STRAIN)	1.230E-05	-1.228E-05	1.417E-05	-1.228E-05	1.230E-05
2	63.00010	0.00809	12.421	12.449	3.317	3.584
	(STRAIN)	-1.525E-05	4.753E-05	4.773E-05	-1.525E-05	-1.341E-05
3	24.00000	0.00847	82.047	82.047	-356.313	-261.992
	(STRAIN)	-1.713E-05	1.743E-05	1.743E-05	-1.713E-05	-9.697E-06
3	31.00000	0.00829	71.583	71.583	-190.838	-152.209
	(STRAIN)	-2.548E-05	3.003E-05	3.003E-05	-2.548E-05	-1.731E-05
3	31.00010	0.00829	71.583	191.867	71.583	183.592
	(STRAIN)	1.239E-05	-1.245E-05	1.422E-05	-1.245E-05	1.239E-05
3	63.00010	0.00814	12.514	12.514	3.335	3.610
	(STRAIN)	-1.534E-05	4.796E-05	4.796E-05	-1.534E-05	-1.345E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.717E-05
ALLOWABLE LOAD REPETITIONS = 1.583E+09 DAMAGE RATIO = 5.566E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.548E-05
ALLOWABLE LOAD REPETITIONS = 8.103E+08 DAMAGE RATIO = 1.087E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.796E-05
ALLOWABLE LOAD REPETITIONS = 2.964E+10 DAMAGE RATIO = 2.972E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.00862	102.192	102.682	-318.054	-263.572
	(STRAIN)	-1.878E-05	2.192E-05	2.197E-05	-1.878E-05	-1.350E-05
1	31.00000	0.00840	77.789	77.789	-174.522	-143.394
	(STRAIN)	-2.710E-05	3.381E-05	3.381E-05	-2.710E-05	-1.959E-05
1	31.00010	0.00840	77.789	201.093	77.789	189.988
	(STRAIN)	1.242E-05	-1.246E-05	1.488E-05	-1.246E-05	1.242E-05

1	63.00010	0.00825	12.738	12.898	3.362	3.627
	(STRAIN)	-1.600E-05	4.866E-05	4.977E-05	-1.600E-05	-1.418E-05
2	24.00000	0.00874	96.073	96.104	-323.121	-245.453
	(STRAIN)	-1.943E-05	2.117E-05	2.117E-05	-1.943E-05	-1.191E-05
2	31.00000	0.00852	80.323	80.323	-181.560	-145.203
	(STRAIN)	-2.841E-05	3.482E-05	3.482E-05	-2.841E-05	-1.963E-05
2	31.00010	0.00852	80.323	208.996	80.323	199.541
	(STRAIN)	1.327E-05	-1.316E-05	1.537E-05	-1.316E-05	1.327E-05
2	63.00010	0.00836	13.235	13.266	3.425	3.723
	(STRAIN)	-1.661E-05	5.105E-05	5.127E-05	-1.661E-05	-1.455E-05
3	24.00000	0.00877	89.477	89.477	-318.522	-227.574
	(STRAIN)	-1.939E-05	2.013E-05	2.013E-05	-1.939E-05	-1.058E-05
3	31.00000	0.00856	79.278	79.278	-181.752	-141.950
	(STRAIN)	-2.858E-05	3.444E-05	3.444E-05	-2.858E-05	-1.897E-05
3	31.00010	0.00856	79.279	209.120	79.279	199.829
	(STRAIN)	1.338E-05	-1.335E-05	1.544E-05	-1.335E-05	1.338E-05
3	63.00010	0.00840	13.335	13.335	3.440	3.748
	(STRAIN)	-1.671E-05	5.152E-05	5.152E-05	-1.671E-05	-1.459E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.943E-05
ALLOWABLE LOAD REPETITIONS = 1.256E+09 DAMAGE RATIO = 7.014E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.858E-05
ALLOWABLE LOAD REPETITIONS = 6.219E+08 DAMAGE RATIO = 1.416E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.152E-05
ALLOWABLE LOAD REPETITIONS = 2.150E+10 DAMAGE RATIO = 4.096E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	24.00000	0.00905	114.168	114.636	-267.847	-217.443
	(STRAIN)	-2.265E-05	2.773E-05	2.779E-05	-2.265E-05	-1.600E-05
1	31.00000	0.00878	89.553	89.553	-158.898	-127.488
	(STRAIN)	-3.205E-05	4.177E-05	4.177E-05	-3.205E-05	-2.271E-05
1	31.00010	0.00878	89.553	225.763	89.553	212.883
	(STRAIN)	1.374E-05	-1.361E-05	1.660E-05	-1.361E-05	1.374E-05
1	63.00010	0.00860	13.844	14.031	3.496	3.802
	(STRAIN)	-1.792E-05	5.345E-05	5.474E-05	-1.792E-05	-1.581E-05
2	24.00000	0.00918	107.834	107.891	-271.723	-198.389
	(STRAIN)	-2.345E-05	2.660E-05	2.661E-05	-2.345E-05	-1.378E-05
2	31.00000	0.00892	92.387	92.387	-165.348	-127.942
	(STRAIN)	-3.365E-05	4.292E-05	4.292E-05	-3.365E-05	-2.254E-05
2	31.00010	0.00892	92.387	234.798	92.387	223.749
	(STRAIN)	1.471E-05	-1.442E-05	1.716E-05	-1.442E-05	1.471E-05
2	63.00010	0.00872	14.414	14.450	3.564	3.912
	(STRAIN)	-1.863E-05	5.620E-05	5.645E-05	-1.863E-05	-1.622E-05
3	24.00000	0.00921	100.705	100.705	-267.545	-181.233
	(STRAIN)	-2.338E-05	2.518E-05	2.518E-05	-2.338E-05	-1.200E-05
3	31.00000	0.00895	91.097	91.097	-165.527	-124.355
	(STRAIN)	-3.387E-05	4.238E-05	4.238E-05	-3.387E-05	-2.163E-05
3	31.00010	0.00895	91.097	234.955	91.097	224.071
	(STRAIN)	1.483E-05	-1.465E-05	1.725E-05	-1.465E-05	1.483E-05
3	63.00010	0.00876	14.526	14.526	3.577	3.937
	(STRAIN)	-1.876E-05	5.675E-05	5.675E-05	-1.876E-05	-1.628E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.345E-05
ALLOWABLE LOAD REPETITIONS = 8.809E+08 DAMAGE RATIO = 9.998E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.387E-05
ALLOWABLE LOAD REPETITIONS = 4.248E+08 DAMAGE RATIO = 2.074E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.675E-05
ALLOWABLE LOAD REPETITIONS = 1.395E+10 DAMAGE RATIO = 6.314E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	24.00000	0.00956	129.080	129.488	-213.133	-167.303
	(STRAIN)	-2.895E-05	3.796E-05	3.804E-05	-2.895E-05	-1.999E-05
1	31.00000	0.00921	104.542	104.542	-136.975	-105.688
	(STRAIN)	-3.962E-05	5.496E-05	5.496E-05	-3.962E-05	-2.736E-05
1	31.00010	0.00921	104.542	255.998	104.542	240.863
	(STRAIN)	1.531E-05	-1.492E-05	1.866E-05	-1.492E-05	1.531E-05
1	63.00010	0.00900	15.138	15.358	3.628	3.989
	(STRAIN)	-2.025E-05	5.913E-05	6.065E-05	-2.025E-05	-1.776E-05
2	24.00000	0.00971	122.462	122.568	-215.715	-147.331
	(STRAIN)	-2.999E-05	3.614E-05	3.616E-05	-2.999E-05	-1.662E-05
2	31.00000	0.00936	107.672	107.672	-142.539	-104.292
	(STRAIN)	-4.169E-05	5.629E-05	5.629E-05	-4.169E-05	-2.671E-05
2	31.00010	0.00936	107.672	266.388	107.672	253.280
	(STRAIN)	1.642E-05	-1.587E-05	1.932E-05	-1.587E-05	1.642E-05
2	63.00010	0.00913	15.797	15.840	3.703	4.116
	(STRAIN)	-2.108E-05	6.232E-05	6.262E-05	-2.108E-05	-1.823E-05
3	24.00000	0.00974	114.653	114.653	-212.024	-130.996
	(STRAIN)	-2.988E-05	3.400E-05	3.400E-05	-2.988E-05	-1.404E-05
3	31.00000	0.00940	106.021	106.021	-142.679	-100.281
	(STRAIN)	-4.197E-05	5.542E-05	5.542E-05	-4.197E-05	-2.537E-05
3	31.00010	0.00940	106.021	266.555	106.021	253.596
	(STRAIN)	1.656E-05	-1.616E-05	1.943E-05	-1.616E-05	1.656E-05
3	63.00010	0.00917	15.928	15.928	3.715	4.142
	(STRAIN)	-2.124E-05	6.298E-05	6.298E-05	-2.124E-05	-1.830E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.999E-05
ALLOWABLE LOAD REPETITIONS = 5.487E+08 DAMAGE RATIO = 1.605E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.197E-05
ALLOWABLE LOAD REPETITIONS = 2.654E+08 DAMAGE RATIO = 3.318E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.298E-05
ALLOWABLE LOAD REPETITIONS = 8.751E+09 DAMAGE RATIO = 1.006E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	24.00000	0.01010	144.606	144.930	-163.275	-121.788
	(STRAIN)	-3.869E-05	5.514E-05	5.524E-05	-3.869E-05	-2.604E-05
1	31.00000	0.00960	120.395	120.395	-112.639	-81.872
	(STRAIN)	-5.046E-05	7.540E-05	7.540E-05	-5.046E-05	-3.384E-05
1	31.00010	0.00960	120.394	286.626	120.394	269.119
	(STRAIN)	1.684E-05	-1.614E-05	2.072E-05	-1.614E-05	1.684E-05
1	63.00010	0.00936	16.381	16.636	3.733	4.150
	(STRAIN)	-2.257E-05	6.466E-05	6.642E-05	-2.257E-05	-1.969E-05
2	24.00000	0.01026	137.578	137.763	-164.790	-101.282
	(STRAIN)	-4.008E-05	5.206E-05	5.212E-05	-4.008E-05	-2.073E-05
2	31.00000	0.00977	123.688	123.688	-117.186	-78.437
	(STRAIN)	-5.322E-05	7.687E-05	7.687E-05	-5.322E-05	-3.229E-05
2	31.00010	0.00977	123.687	298.295	123.687	282.972
	(STRAIN)	1.808E-05	-1.723E-05	2.148E-05	-1.723E-05	1.808E-05
2	63.00010	0.00951	17.131	17.181	3.814	4.295
	(STRAIN)	-2.353E-05	6.831E-05	6.866E-05	-2.353E-05	-2.021E-05
3	24.00000	0.01029	128.997	128.997	-161.637	-85.824

	(STRAIN)	-3.990E-05	4.867E-05	4.867E-05	-3.990E-05	-1.680E-05
3	31.00000	0.00981	121.572	121.572	-117.276	-73.978
	(STRAIN)	-5.358E-05	7.541E-05	7.541E-05	-5.358E-05	-3.020E-05
3	31.00010	0.00981	121.572	298.398	121.572	283.192
	(STRAIN)	1.825E-05	-1.759E-05	2.162E-05	-1.759E-05	1.825E-05
3	63.00010	0.00955	17.284	17.284	3.826	4.324
	(STRAIN)	-2.373E-05	6.908E-05	6.908E-05	-2.373E-05	-2.030E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.008E-05
ALLOWABLE LOAD REPETITIONS = 3.085E+08 DAMAGE RATIO = 2.855E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.358E-05
ALLOWABLE LOAD REPETITIONS = 1.564E+08 DAMAGE RATIO = 5.633E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.908E-05
ALLOWABLE LOAD REPETITIONS = 5.784E+09 DAMAGE RATIO = 1.523E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.01060	157.902	158.147	-124.970	-87.005
	(STRAIN)	-5.233E-05	8.101E-05	8.113E-05	-5.233E-05	-3.443E-05
1	31.00000	0.00990	134.062	134.062	-91.449	-61.325
	(STRAIN)	-6.465E-05	1.037E-04	1.037E-04	-6.465E-05	-4.216E-05
1	31.00010	0.00990	134.062	311.936	134.061	292.416
	(STRAIN)	1.806E-05	-1.705E-05	2.239E-05	-1.705E-05	1.806E-05
1	63.00010	0.00963	17.358	17.642	3.800	4.266
	(STRAIN)	-2.445E-05	6.905E-05	7.101E-05	-2.445E-05	-2.124E-05
2	24.00000	0.01077	150.349	150.630	-125.889	-66.554
	(STRAIN)	-5.423E-05	7.598E-05	7.612E-05	-5.423E-05	-2.626E-05
2	31.00000	0.01008	137.307	137.307	-95.121	-56.108
	(STRAIN)	-6.832E-05	1.052E-04	1.052E-04	-6.832E-05	-3.919E-05
2	31.00010	0.01008	137.306	324.522	137.306	307.264
	(STRAIN)	1.941E-05	-1.828E-05	2.323E-05	-1.828E-05	1.941E-05
2	63.00010	0.00979	18.183	18.238	3.885	4.425
	(STRAIN)	-2.552E-05	7.309E-05	7.347E-05	-2.552E-05	-2.180E-05
3	24.00000	0.01079	141.000	141.000	-123.294	-51.970
	(STRAIN)	-5.393E-05	7.065E-05	7.065E-05	-5.393E-05	-2.031E-05
3	31.00000	0.01012	134.692	134.692	-95.176	-51.266
	(STRAIN)	-6.878E-05	1.028E-04	1.028E-04	-6.878E-05	-3.600E-05
3	31.00010	0.01012	134.693	324.483	134.693	307.287
	(STRAIN)	1.958E-05	-1.869E-05	2.339E-05	-1.869E-05	1.958E-05
3	63.00010	0.00983	18.354	18.354	3.896	4.456
	(STRAIN)	-2.575E-05	7.396E-05	7.396E-05	-2.575E-05	-2.189E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.423E-05
ALLOWABLE LOAD REPETITIONS = 1.655E+08 DAMAGE RATIO = 5.321E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.878E-05
ALLOWABLE LOAD REPETITIONS = 9.063E+07 DAMAGE RATIO = 9.719E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.396E-05
ALLOWABLE LOAD REPETITIONS = 4.263E+09 DAMAGE RATIO = 2.066E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.01093	165.589	165.791	-104.327	-68.371
	(STRAIN)	-6.476E-05	1.057E-04	1.058E-04	-6.476E-05	-4.205E-05
1	31.00000	0.01006	141.925	141.925	-79.430	-49.710

	(STRAIN)	-7.702E-05	1.290E-04	1.290E-04	-7.702E-05	-4.935E-05
1	31.00010	0.01006	141.925	326.016	141.925	305.357
	(STRAIN)	1.872E-05	-1.752E-05	2.330E-05	-1.752E-05	1.872E-05
1	63.00010	0.00977	17.880	18.180	3.830	4.323
	(STRAIN)	-2.548E-05	7.142E-05	7.349E-05	-2.548E-05	-2.207E-05
2	24.00000	0.01111	157.585	157.936	-105.060	-48.228
	(STRAIN)	-6.712E-05	9.877E-05	9.899E-05	-6.712E-05	-3.122E-05
2	31.00000	0.01024	145.026	145.026	-82.627	-43.474
	(STRAIN)	-8.147E-05	1.304E-04	1.304E-04	-8.148E-05	-4.503E-05
2	31.00010	0.01024	145.026	339.016	145.026	320.633
	(STRAIN)	2.012E-05	-1.882E-05	2.419E-05	-1.882E-05	2.012E-05
2	63.00010	0.00994	18.747	18.805	3.916	4.490
	(STRAIN)	-2.661E-05	7.567E-05	7.607E-05	-2.661E-05	-2.265E-05
3	24.00000	0.01112	147.722	147.722	-102.862	-34.259
	(STRAIN)	-6.670E-05	9.156E-05	9.156E-05	-6.670E-05	-2.337E-05
3	31.00000	0.01028	142.066	142.066	-82.676	-38.416
	(STRAIN)	-8.202E-05	1.272E-04	1.272E-04	-8.202E-05	-4.082E-05
3	31.00010	0.01028	142.067	338.839	142.067	320.476
	(STRAIN)	2.029E-05	-1.927E-05	2.436E-05	-1.927E-05	2.029E-05
3	63.00010	0.00998	18.928	18.928	3.928	4.524
	(STRAIN)	-2.686E-05	7.659E-05	7.659E-05	-2.686E-05	-2.275E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.712E-05
ALLOWABLE LOAD REPETITIONS = 1.054E+08 DAMAGE RATIO = 8.358E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.202E-05
ALLOWABLE LOAD REPETITIONS = 6.131E+07 DAMAGE RATIO = 1.437E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.659E-05
ALLOWABLE LOAD REPETITIONS = 3.646E+09 DAMAGE RATIO = 2.416E-04

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	24.00000	0.01086	164.102	164.312	-108.251	-71.905
	(STRAIN)	-6.196E-05	1.001E-04	1.002E-04	-6.196E-05	-4.034E-05
1	31.00000	0.01003	140.408	140.408	-81.729	-51.931
	(STRAIN)	-7.426E-05	1.234E-04	1.234E-04	-7.426E-05	-4.776E-05
1	31.00010	0.01003	140.408	323.327	140.408	302.890
	(STRAIN)	1.859E-05	-1.743E-05	2.312E-05	-1.743E-05	1.859E-05
1	63.00010	0.00974	17.781	18.078	3.824	4.313
	(STRAIN)	-2.528E-05	7.098E-05	7.302E-05	-2.528E-05	-2.191E-05
2	24.00000	0.01104	156.195	156.532	-109.008	-51.681
	(STRAIN)	-6.421E-05	9.357E-05	9.377E-05	-6.421E-05	-3.011E-05
2	31.00000	0.01021	143.545	143.545	-85.014	-45.890
	(STRAIN)	-7.855E-05	1.248E-04	1.248E-04	-7.855E-05	-4.374E-05
2	31.00010	0.01021	143.545	336.257	143.545	318.091
	(STRAIN)	1.998E-05	-1.872E-05	2.401E-05	-1.872E-05	1.998E-05
2	63.00010	0.00991	18.640	18.698	3.911	4.478
	(STRAIN)	-2.640E-05	7.518E-05	7.558E-05	-2.640E-05	-2.249E-05
3	24.00000	0.01105	146.437	146.437	-106.727	-37.585
	(STRAIN)	-6.383E-05	8.680E-05	8.680E-05	-6.383E-05	-2.269E-05
3	31.00000	0.01025	140.656	140.656	-85.064	-40.874
	(STRAIN)	-7.907E-05	1.217E-04	1.217E-04	-7.907E-05	-3.976E-05
3	31.00010	0.01025	140.656	336.111	140.657	317.973
	(STRAIN)	2.016E-05	-1.916E-05	2.418E-05	-1.916E-05	2.016E-05
3	63.00010	0.00996	18.820	18.820	3.922	4.511
	(STRAIN)	-2.665E-05	7.609E-05	7.609E-05	-2.665E-05	-2.259E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.421E-05
ALLOWABLE LOAD REPETITIONS = 1.158E+08 DAMAGE RATIO = 7.605E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.907E-05
ALLOWABLE LOAD REPETITIONS = 6.653E+07 DAMAGE RATIO = 1.324E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.609E-05
ALLOWABLE LOAD REPETITIONS = 3.753E+09 DAMAGE RATIO = 2.347E-04

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.01041	153.026	153.299	-138.586	-99.343
	(STRAIN)	-4.647E-05	6.971E-05	6.982E-05	-4.647E-05	-3.084E-05
1	31.00000	0.00979	129.056	129.056	-99.192	-68.819
	(STRAIN)	-5.866E-05	9.163E-05	9.163E-05	-5.866E-05	-3.866E-05
1	31.00010	0.00979	129.056	302.785	129.056	284.000
	(STRAIN)	1.762E-05	-1.673E-05	2.179E-05	-1.673E-05	1.762E-05
1	63.00010	0.00953	17.010	17.283	3.778	4.226
	(STRAIN)	-2.377E-05	6.748E-05	6.937E-05	-2.377E-05	-2.068E-05
2	24.00000	0.01058	145.702	145.944	-139.693	-78.817
	(STRAIN)	-4.816E-05	6.555E-05	6.564E-05	-4.816E-05	-2.391E-05
2	31.00000	0.00997	132.344	132.344	-103.180	-64.255
	(STRAIN)	-6.195E-05	9.313E-05	9.313E-05	-6.195E-05	-3.632E-05
2	31.00010	0.00997	132.344	315.060	132.344	298.515
	(STRAIN)	1.893E-05	-1.791E-05	2.260E-05	-1.791E-05	1.893E-05
2	63.00010	0.00969	17.808	17.862	3.861	4.379
	(STRAIN)	-2.480E-05	7.138E-05	7.175E-05	-2.480E-05	-2.123E-05
3	24.00000	0.01060	136.647	136.647	-136.876	-63.888
	(STRAIN)	-4.791E-05	6.107E-05	6.107E-05	-4.791E-05	-1.883E-05
3	31.00000	0.01001	129.925	129.925	-103.245	-59.553
	(STRAIN)	-6.237E-05	9.116E-05	9.116E-05	-6.237E-05	-3.360E-05
3	31.00010	0.01001	129.926	315.085	129.926	298.624
	(STRAIN)	1.910E-05	-1.830E-05	2.275E-05	-1.830E-05	1.910E-05
3	63.00010	0.00973	17.973	17.973	3.873	4.410
	(STRAIN)	-2.503E-05	7.221E-05	7.221E-05	-2.503E-05	-2.132E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.816E-05
ALLOWABLE LOAD REPETITIONS = 2.120E+08 DAMAGE RATIO = 4.156E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.237E-05
ALLOWABLE LOAD REPETITIONS = 1.123E+08 DAMAGE RATIO = 7.841E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.221E-05
ALLOWABLE LOAD REPETITIONS = 4.743E+09 DAMAGE RATIO = 1.857E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	24.00000	0.00974	134.245	134.627	-195.834	-151.487
	(STRAIN)	-3.172E-05	4.270E-05	4.279E-05	-3.172E-05	-2.172E-05
1	31.00000	0.00934	109.795	109.795	-128.990	-97.840
	(STRAIN)	-4.278E-05	6.078E-05	6.078E-05	-4.278E-05	-2.927E-05
1	31.00010	0.00934	109.795	266.299	109.795	250.373
	(STRAIN)	1.583E-05	-1.534E-05	1.936E-05	-1.534E-05	1.583E-05
1	63.00010	0.00912	15.563	15.795	3.667	4.046
	(STRAIN)	-2.103E-05	6.101E-05	6.261E-05	-2.103E-05	-1.842E-05
2	24.00000	0.00989	127.509	127.638	-198.025	-131.282
	(STRAIN)	-3.286E-05	4.054E-05	4.057E-05	-3.286E-05	-1.781E-05
2	31.00000	0.00950	113.000	113.000	-134.222	-95.774
	(STRAIN)	-4.506E-05	6.216E-05	6.216E-05	-4.506E-05	-2.838E-05
2	31.00010	0.00950	113.000	277.131	113.000	263.296
	(STRAIN)	1.698E-05	-1.634E-05	2.005E-05	-1.634E-05	1.699E-05
2	63.00010	0.00926	16.253	16.298	3.744	4.179

(STRAIN) -2.191E-05 6.436E-05 6.467E-05 -2.191E-05 -1.891E-05

3 24.00000 0.00992 119.454 119.454 -194.506 -115.232
(STRAIN) -3.273E-05 3.805E-05 3.805E-05 -3.273E-05 -1.486E-05
3 31.00000 0.00954 111.205 111.205 -134.346 -91.615
(STRAIN) -4.536E-05 6.113E-05 6.113E-05 -4.536E-05 -2.683E-05
3 31.00010 0.00954 111.206 277.288 111.206 263.592
(STRAIN) 1.714E-05 -1.665E-05 2.017E-05 -1.665E-05 1.714E-05
3 63.00010 0.00930 16.391 16.391 3.756 4.206
(STRAIN) -2.208E-05 6.506E-05 6.506E-05 -2.208E-05 -1.898E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.286E-05
ALLOWABLE LOAD REPETITIONS = 4.587E+08 DAMAGE RATIO = 1.920E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.536E-05
ALLOWABLE LOAD REPETITIONS = 2.243E+08 DAMAGE RATIO = 3.928E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.506E-05
ALLOWABLE LOAD REPETITIONS = 7.568E+09 DAMAGE RATIO = 1.164E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

1 24.00000 0.00894 111.040 111.516 -280.357 -228.928
(STRAIN) -2.156E-05 2.605E-05 2.611E-05 -2.156E-05 -1.530E-05
1 31.00000 0.00869 86.453 86.453 -163.194 -131.820
(STRAIN) -3.068E-05 3.951E-05 3.951E-05 -3.068E-05 -2.186E-05
1 31.00010 0.00869 86.453 219.346 86.453 206.932
(STRAIN) 1.340E-05 -1.331E-05 1.615E-05 -1.331E-05 1.340E-05
1 63.00010 0.00851 13.561 13.741 3.463 3.758
(STRAIN) -1.742E-05 5.222E-05 5.346E-05 -1.742E-05 -1.539E-05

2 24.00000 0.00907 104.762 104.811 -284.532 -210.104
(STRAIN) -2.231E-05 2.503E-05 2.504E-05 -2.231E-05 -1.326E-05
2 31.00000 0.00882 89.213 89.213 -169.811 -132.642
(STRAIN) -3.220E-05 4.062E-05 4.062E-05 -3.220E-05 -2.175E-05
2 31.00010 0.00882 89.213 228.086 89.213 217.461
(STRAIN) 1.434E-05 -1.410E-05 1.670E-05 -1.410E-05 1.434E-05
2 63.00010 0.00863 14.112 14.147 3.530 3.865
(STRAIN) -1.810E-05 5.487E-05 5.512E-05 -1.810E-05 -1.579E-05

3 24.00000 0.00910 97.771 97.771 -280.248 -192.767
(STRAIN) -2.225E-05 2.372E-05 2.372E-05 -2.225E-05 -1.161E-05
3 31.00000 0.00886 87.990 87.990 -169.994 -129.142
(STRAIN) -3.240E-05 4.013E-05 4.013E-05 -3.240E-05 -2.092E-05
3 31.00010 0.00886 87.990 228.237 87.990 217.775
(STRAIN) 1.446E-05 -1.432E-05 1.678E-05 -1.432E-05 1.446E-05
3 63.00010 0.00867 14.220 14.220 3.544 3.890
(STRAIN) -1.823E-05 5.540E-05 5.540E-05 -1.823E-05 -1.584E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.231E-05
ALLOWABLE LOAD REPETITIONS = 9.677E+08 DAMAGE RATIO = 9.102E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.240E-05
ALLOWABLE LOAD REPETITIONS = 4.687E+08 DAMAGE RATIO = 1.879E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.540E-05
ALLOWABLE LOAD REPETITIONS = 1.553E+10 DAMAGE RATIO = 5.670E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

1	24.00000	0.00846	98.096	98.589	-336.787	-280.806
	(STRAIN)	-1.763E-05	2.028E-05	2.032E-05	-1.763E-05	-1.275E-05
1	31.00000	0.00827	73.843	73.843	-179.243	-148.313
	(STRAIN)	-2.558E-05	3.148E-05	3.148E-05	-2.558E-05	-1.861E-05
1	31.00010	0.00827	73.843	192.618	73.843	182.109
	(STRAIN)	1.196E-05	-1.204E-05	1.429E-05	-1.204E-05	1.196E-05
1	63.00010	0.00812	12.346	12.498	3.311	3.561
	(STRAIN)	-1.533E-05	4.698E-05	4.803E-05	-1.533E-05	-1.361E-05
2	24.00000	0.00858	92.058	92.083	-342.288	-263.034
	(STRAIN)	-1.824E-05	1.962E-05	1.962E-05	-1.824E-05	-1.133E-05
2	31.00000	0.00838	76.267	76.267	-186.446	-150.549
	(STRAIN)	-2.679E-05	3.243E-05	3.243E-05	-2.679E-05	-1.870E-05
2	31.00010	0.00838	76.267	200.130	76.267	191.206
	(STRAIN)	1.277E-05	-1.271E-05	1.475E-05	-1.271E-05	1.277E-05
2	63.00010	0.00822	12.819	12.848	3.371	3.653
	(STRAIN)	-1.591E-05	4.925E-05	4.945E-05	-1.591E-05	-1.397E-05
3	24.00000	0.00862	85.649	85.649	-337.533	-244.885
	(STRAIN)	-1.819E-05	1.869E-05	1.869E-05	-1.819E-05	-1.012E-05
3	31.00000	0.00842	75.298	75.298	-186.638	-147.410
	(STRAIN)	-2.695E-05	3.210E-05	3.210E-05	-2.695E-05	-1.811E-05
3	31.00010	0.00842	75.299	200.240	75.299	191.480
	(STRAIN)	1.287E-05	-1.289E-05	1.481E-05	-1.289E-05	1.287E-05
3	63.00010	0.00827	12.915	12.915	3.388	3.678
	(STRAIN)	-1.601E-05	4.970E-05	4.970E-05	-1.601E-05	-1.400E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.824E-05
ALLOWABLE LOAD REPETITIONS = 1.415E+09 DAMAGE RATIO = 6.226E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.695E-05
ALLOWABLE LOAD REPETITIONS = 7.115E+08 DAMAGE RATIO = 1.238E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.970E-05
ALLOWABLE LOAD REPETITIONS = 2.527E+10 DAMAGE RATIO = 3.485E-05

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 3.561E-02
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 6.574E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 1.463E-03

MAXIMUM DAMAGE RATO = 6.574E-02 DESIGN LIFE IN YEARS = 15.21

- Sovrastruttura **P2C**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 25 11 33
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.704E+07
3 5.866E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.390E+07
3 5.154E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 4.211E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.931E+06
3 3.222E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.470E+06
3 2.362E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.905E+06
3 1.729E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.176E+06
3 1.399E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.308E+06
3 1.461E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.430E+06
3 1.952E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 6.021E+06
3 2.919E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.109E+07
3 4.443E+06 4 3.910E+05 5 1.630E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.543E+07
3 5.511E+06 4 3.910E+05 5 1.630E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 710194

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 710194
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 710194

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	29.00000	0.00934	41.894	43.135	-322.609	-281.398
	(STRAIN)	-1.404E-05	1.484E-05	1.493E-05	-1.404E-05	-1.077E-05
1	40.00000	0.00913	12.329	12.329	-185.718	-165.634
	(STRAIN)	-2.251E-05	2.307E-05	2.307E-05	-2.251E-05	-1.789E-05
1	40.00010	0.00913	12.329	15.281	12.329	14.895
	(STRAIN)	9.848E-06	6.610E-07	1.123E-05	6.610E-07	9.848E-06
1	73.00010	0.00867	8.711	8.781	3.237	3.344
	(STRAIN)	-9.897E-06	3.712E-05	3.772E-05	-9.897E-06	-8.977E-06
2	29.00000	0.00945	39.190	39.275	-333.783	-282.737
	(STRAIN)	-1.458E-05	1.496E-05	1.497E-05	-1.458E-05	-1.054E-05
2	40.00000	0.00923	12.821	12.821	-194.397	-175.581
	(STRAIN)	-2.343E-05	2.426E-05	2.426E-05	-2.343E-05	-1.910E-05
2	40.00010	0.00923	12.821	15.837	12.821	15.519
	(STRAIN)	1.037E-05	7.129E-07	1.151E-05	7.129E-07	1.037E-05
2	73.00010	0.00875	8.959	8.973	3.286	3.403
	(STRAIN)	-1.021E-05	3.852E-05	3.863E-05	-1.021E-05	-9.207E-06
3	29.00000	0.00952	36.639	36.639	-333.202	-276.373
	(STRAIN)	-1.463E-05	1.467E-05	1.467E-05	-1.463E-05	-1.013E-05
3	40.00000	0.00930	12.917	12.917	-195.531	-176.530
	(STRAIN)	-2.357E-05	2.440E-05	2.440E-05	-2.357E-05	-1.920E-05
3	40.00010	0.00930	12.917	15.938	12.917	15.631
	(STRAIN)	1.046E-05	7.412E-07	1.156E-05	7.413E-07	1.046E-05
3	73.00010	0.00882	9.037	9.037	3.324	3.444
	(STRAIN)	-1.023E-05	3.883E-05	3.883E-05	-1.023E-05	-9.207E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.463E-05
ALLOWABLE LOAD REPETITIONS = 2.693E+09 DAMAGE RATIO = 2.637E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.357E-05
ALLOWABLE LOAD REPETITIONS = 1.125E+09 DAMAGE RATIO = 6.310E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 7.412E-07
ALLOWABLE LOAD REPETITIONS = 3.798E+18 DAMAGE RATIO = 1.870E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.883E-05
ALLOWABLE LOAD REPETITIONS = 7.626E+10 DAMAGE RATIO = 9.312E-06

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	29.00000	0.00990	44.703	46.105	-298.411	-259.108
	(STRAIN)	-1.611E-05	1.722E-05	1.736E-05	-1.611E-05	-1.229E-05
1	40.00000	0.00966	13.927	13.927	-186.641	-165.671
	(STRAIN)	-2.591E-05	2.663E-05	2.663E-05	-2.591E-05	-2.042E-05
1	40.00010	0.00966	13.927	17.262	13.927	16.803
	(STRAIN)	1.107E-05	7.704E-07	1.271E-05	7.703E-07	1.107E-05

1	73.00010	0.00914	9.657	9.741	3.467	3.593
	(STRAIN)	-1.145E-05	4.171E-05	4.243E-05	-1.145E-05	-1.037E-05
2	29.00000	0.01003	41.899	41.992	-309.051	-259.872
	(STRAIN)	-1.675E-05	1.734E-05	1.735E-05	-1.675E-05	-1.197E-05
2	40.00000	0.00978	14.511	14.511	-195.627	-175.910
	(STRAIN)	-2.700E-05	2.805E-05	2.805E-05	-2.700E-05	-2.183E-05
2	40.00010	0.00978	14.511	17.920	14.511	17.542
	(STRAIN)	1.169E-05	8.338E-07	1.304E-05	8.336E-07	1.169E-05
2	73.00010	0.00923	9.949	9.965	3.523	3.662
	(STRAIN)	-1.183E-05	4.336E-05	4.350E-05	-1.183E-05	-1.063E-05
3	29.00000	0.01010	39.205	39.206	-308.548	-253.702
	(STRAIN)	-1.680E-05	1.698E-05	1.698E-05	-1.680E-05	-1.147E-05
3	40.00000	0.00985	14.606	14.606	-196.812	-176.878
	(STRAIN)	-2.717E-05	2.821E-05	2.821E-05	-2.717E-05	-2.195E-05
3	40.00010	0.00985	14.606	18.023	14.606	17.656
	(STRAIN)	1.178E-05	8.557E-07	1.309E-05	8.557E-07	1.178E-05
3	73.00010	0.00929	10.020	10.020	3.554	3.696
	(STRAIN)	-1.186E-05	4.368E-05	4.368E-05	-1.186E-05	-1.063E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.680E-05
ALLOWABLE LOAD REPETITIONS = 2.033E+09 DAMAGE RATIO = 3.494E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.717E-05
ALLOWABLE LOAD REPETITIONS = 7.878E+08 DAMAGE RATIO = 9.015E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 8.557E-07
ALLOWABLE LOAD REPETITIONS = 1.996E+18 DAMAGE RATIO = 3.558E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.368E-05
ALLOWABLE LOAD REPETITIONS = 4.502E+10 DAMAGE RATIO = 1.577E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIPAL STRESS	INTERMEDIATE STRESS
1	29.00000	0.01082	49.075	50.719	-264.737	-228.158
	(STRAIN)	-1.979E-05	2.159E-05	2.181E-05	-1.979E-05	-1.497E-05
1	40.00000	0.01052	16.692	16.692	-185.970	-163.799
	(STRAIN)	-3.194E-05	3.304E-05	3.304E-05	-3.194E-05	-2.483E-05
1	40.00010	0.01052	16.692	20.678	16.692	20.086
	(STRAIN)	1.314E-05	9.875E-07	1.526E-05	9.875E-07	1.314E-05
1	73.00010	0.00988	11.234	11.344	3.820	3.982
	(STRAIN)	-1.417E-05	4.950E-05	5.045E-05	-1.417E-05	-1.278E-05
2	29.00000	0.01098	46.156	46.261	-274.604	-228.070
	(STRAIN)	-2.061E-05	2.169E-05	2.170E-05	-2.061E-05	-1.447E-05
2	40.00000	0.01066	17.443	17.443	-195.330	-174.364
	(STRAIN)	-3.334E-05	3.487E-05	3.487E-05	-3.334E-05	-2.662E-05
2	40.00010	0.01066	17.443	21.525	17.443	21.034
	(STRAIN)	1.393E-05	1.073E-06	1.569E-05	1.073E-06	1.393E-05
2	73.00010	0.00999	11.605	11.626	3.889	4.069
	(STRAIN)	-1.466E-05	5.162E-05	5.180E-05	-1.466E-05	-1.311E-05
3	29.00000	0.01103	43.270	43.270	-274.318	-222.284
	(STRAIN)	-2.068E-05	2.120E-05	2.120E-05	-2.068E-05	-1.381E-05
3	40.00000	0.01072	17.549	17.549	-196.672	-175.437
	(STRAIN)	-3.358E-05	3.510E-05	3.510E-05	-3.358E-05	-2.677E-05
3	40.00010	0.01072	17.549	21.644	17.549	21.169
	(STRAIN)	1.405E-05	1.084E-06	1.575E-05	1.083E-06	1.405E-05
3	73.00010	0.01005	11.677	11.677	3.909	4.094
	(STRAIN)	-1.472E-05	5.200E-05	5.200E-05	-1.472E-05	-1.313E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.068E-05
ALLOWABLE LOAD REPETITIONS = 1.333E+09 DAMAGE RATIO = 5.329E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.358E-05
ALLOWABLE LOAD REPETITIONS = 4.660E+08 DAMAGE RATIO = 1.524E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.084E-06
ALLOWABLE LOAD REPETITIONS = 6.937E+17 DAMAGE RATIO = 1.024E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.200E-05
ALLOWABLE LOAD REPETITIONS = 2.064E+10 DAMAGE RATIO = 3.441E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	29.00000	0.01209	55.051	56.999	-225.675	-192.374
	(STRAIN)	-2.572E-05	2.895E-05	2.933E-05	-2.572E-05	-1.924E-05
1	40.00000	0.01169	20.949	20.949	-182.152	-158.649
	(STRAIN)	-4.158E-05	4.352E-05	4.352E-05	-4.158E-05	-3.173E-05
1	40.00010	0.01169	20.949	25.913	20.949	25.099
	(STRAIN)	1.625E-05	1.391E-06	1.916E-05	1.391E-06	1.625E-05
1	73.00010	0.01088	13.537	13.691	4.272	4.492
	(STRAIN)	-1.841E-05	6.117E-05	6.249E-05	-1.841E-05	-1.652E-05
2	29.00000	0.01230	52.052	52.169	-234.583	-191.217
	(STRAIN)	-2.682E-05	2.900E-05	2.903E-05	-2.682E-05	-1.838E-05
2	40.00000	0.01188	21.978	21.978	-191.840	-169.455
	(STRAIN)	-4.352E-05	4.607E-05	4.607E-05	-4.352E-05	-3.414E-05
2	40.00010	0.01188	21.978	27.071	21.978	26.392
	(STRAIN)	1.732E-05	1.516E-06	1.975E-05	1.516E-06	1.732E-05
2	73.00010	0.01103	14.036	14.066	4.359	4.608
	(STRAIN)	-1.908E-05	6.403E-05	6.429E-05	-1.908E-05	-1.695E-05
3	29.00000	0.01234	48.954	48.954	-234.590	-185.926
	(STRAIN)	-2.693E-05	2.830E-05	2.830E-05	-2.693E-05	-1.745E-05
3	40.00000	0.01193	22.120	22.120	-193.422	-170.677
	(STRAIN)	-4.389E-05	4.642E-05	4.642E-05	-4.389E-05	-3.436E-05
3	40.00010	0.01193	22.120	27.242	22.120	26.582
	(STRAIN)	1.749E-05	1.510E-06	1.985E-05	1.510E-06	1.749E-05
3	73.00010	0.01107	14.128	14.128	4.374	4.630
	(STRAIN)	-1.920E-05	6.458E-05	6.458E-05	-1.920E-05	-1.700E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.693E-05
ALLOWABLE LOAD REPETITIONS = 7.794E+08 DAMAGE RATIO = 9.113E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.389E-05
ALLOWABLE LOAD REPETITIONS = 2.426E+08 DAMAGE RATIO = 2.927E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.516E-06
ALLOWABLE LOAD REPETITIONS = 1.542E+17 DAMAGE RATIO = 4.606E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.458E-05
ALLOWABLE LOAD REPETITIONS = 7.822E+09 DAMAGE RATIO = 9.079E-05

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	29.00000	0.01366	62.454	64.706	-186.359	-156.485
	(STRAIN)	-3.451E-05	4.064E-05	4.132E-05	-3.451E-05	-2.548E-05
1	40.00000	0.01311	26.862	26.862	-174.527	-149.794
	(STRAIN)	-5.567E-05	5.943E-05	5.943E-05	-5.567E-05	-4.153E-05
1	40.00010	0.01311	26.862	33.132	26.862	31.984
	(STRAIN)	2.042E-05	2.087E-06	2.454E-05	2.087E-06	2.043E-05
1	73.00010	0.01206	16.532	16.753	4.760	5.069
	(STRAIN)	-2.434E-05	7.676E-05	7.865E-05	-2.435E-05	-2.169E-05
2	29.00000	0.01394	59.466	59.588	-194.211	-154.167
	(STRAIN)	-3.604E-05	4.057E-05	4.061E-05	-3.604E-05	-2.395E-05
2	40.00000	0.01336	28.310	28.310	-184.394	-160.583
	(STRAIN)	-5.846E-05	6.310E-05	6.310E-05	-5.846E-05	-4.485E-05
2	40.00010	0.01336	28.310	34.759	28.310	33.791
	(STRAIN)	2.190E-05	2.276E-06	2.537E-05	2.276E-06	2.190E-05
2	73.00010	0.01225	17.220	17.263	4.874	5.226
	(STRAIN)	-2.529E-05	8.075E-05	8.112E-05	-2.529E-05	-2.226E-05
3	29.00000	0.01399	56.167	56.167	-194.447	-149.329

	(STRAIN)	-3.621E-05	3.949E-05	3.949E-05	-3.621E-05	-2.258E-05
3	40.00000	0.01342	28.523	28.523	-186.161	-161.913
	(STRAIN)	-5.905E-05	6.365E-05	6.365E-05	-5.905E-05	-4.519E-05
3	40.00010	0.01342	28.523	35.024	28.523	34.084
	(STRAIN)	2.216E-05	2.251E-06	2.553E-05	2.251E-06	2.216E-05
3	73.00010	0.01229	17.359	17.359	4.890	5.254
	(STRAIN)	-2.549E-05	8.160E-05	8.160E-05	-2.549E-05	-2.236E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.621E-05
ALLOWABLE LOAD REPETITIONS = 4.278E+08 DAMAGE RATIO = 1.660E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.905E-05
ALLOWABLE LOAD REPETITIONS = 1.192E+08 DAMAGE RATIO = 5.958E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.276E-06
ALLOWABLE LOAD REPETITIONS = 2.499E+16 DAMAGE RATIO = 2.842E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.160E-05
ALLOWABLE LOAD REPETITIONS = 2.745E+09 DAMAGE RATIO = 2.588E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	29.00000	0.01535	70.525	72.999	-152.089	-125.273
	(STRAIN)	-4.606E-05	5.740E-05	5.855E-05	-4.606E-05	-3.360E-05
1	40.00000	0.01459	33.960	33.960	-164.111	-138.469
	(STRAIN)	-7.375E-05	8.088E-05	8.088E-05	-7.375E-05	-5.373E-05
1	40.00010	0.01459	33.960	41.719	33.960	40.134
	(STRAIN)	2.523E-05	3.117E-06	3.090E-05	3.117E-06	2.522E-05
1	73.00010	0.01325	19.881	20.188	5.195	5.618
	(STRAIN)	-3.146E-05	9.468E-05	9.732E-05	-3.146E-05	-2.782E-05
2	29.00000	0.01572	67.668	67.785	-158.927	-121.900
	(STRAIN)	-4.819E-05	5.712E-05	5.717E-05	-4.819E-05	-3.098E-05
2	40.00000	0.01492	35.949	35.949	-173.917	-148.958
	(STRAIN)	-7.770E-05	8.613E-05	8.613E-05	-7.770E-05	-5.821E-05
2	40.00010	0.01492	35.949	43.950	35.949	42.600
	(STRAIN)	2.722E-05	3.397E-06	3.205E-05	3.398E-06	2.721E-05
2	73.00010	0.01349	20.806	20.866	5.338	5.827
	(STRAIN)	-3.276E-05	1.001E-04	1.006E-04	-3.276E-05	-2.856E-05
3	29.00000	0.01578	64.207	64.207	-159.275	-117.393
	(STRAIN)	-4.842E-05	5.544E-05	5.544E-05	-4.842E-05	-2.896E-05
3	40.00000	0.01499	36.256	36.256	-175.745	-150.246
	(STRAIN)	-7.855E-05	8.694E-05	8.694E-05	-7.855E-05	-5.865E-05
3	40.00010	0.01499	36.256	44.338	36.256	43.023
	(STRAIN)	2.759E-05	3.354E-06	3.229E-05	3.355E-06	2.758E-05
3	73.00010	0.01354	21.010	21.010	5.362	5.868
	(STRAIN)	-3.307E-05	1.013E-04	1.013E-04	-3.307E-05	-2.872E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.842E-05
ALLOWABLE LOAD REPETITIONS = 2.375E+08 DAMAGE RATIO = 2.991E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.855E-05
ALLOWABLE LOAD REPETITIONS = 6.080E+07 DAMAGE RATIO = 1.168E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 3.397E-06
ALLOWABLE LOAD REPETITIONS = 4.161E+15 DAMAGE RATIO = 1.707E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.013E-04
ALLOWABLE LOAD REPETITIONS = 1.041E+09 DAMAGE RATIO = 6.825E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	29.00000	0.01657	76.389	78.948	-131.379	-106.411
	(STRAIN)	-5.596E-05	7.294E-05	7.453E-05	-5.596E-05	-4.047E-05
1	40.00000	0.01562	39.457	39.457	-155.734	-129.664

	(STRAIN)	-8.875E-05	9.961E-05	9.961E-05	-8.875E-05	-6.360E-05
1	40.00010	0.01562	39.458	48.313	39.458	46.371
	(STRAIN)	2.881E-05	4.051E-06	3.576E-05	4.051E-06	2.880E-05
1	73.00010	0.01406	22.326	22.703	5.448	5.965
	(STRAIN)	-3.693E-05	1.080E-04	1.113E-04	-3.693E-05	-3.249E-05
2	29.00000	0.01700	73.691	73.798	-137.554	-102.404
	(STRAIN)	-5.861E-05	7.244E-05	7.251E-05	-5.861E-05	-3.681E-05
2	40.00000	0.01602	41.888	41.888	-165.361	-139.781
	(STRAIN)	-9.371E-05	1.063E-04	1.063E-04	-9.371E-05	-6.903E-05
2	40.00010	0.01602	41.888	51.034	41.888	49.374
	(STRAIN)	3.121E-05	4.411E-06	3.716E-05	4.410E-06	3.122E-05
2	73.00010	0.01434	23.439	23.514	5.612	6.214
	(STRAIN)	-3.852E-05	1.146E-04	1.152E-04	-3.852E-05	-3.335E-05
3	29.00000	0.01709	70.138	70.138	-137.939	-98.082
	(STRAIN)	-5.890E-05	7.020E-05	7.020E-05	-5.890E-05	-3.417E-05
3	40.00000	0.01610	42.268	42.268	-167.167	-140.969
	(STRAIN)	-9.480E-05	1.073E-04	1.073E-04	-9.480E-05	-6.952E-05
3	40.00010	0.01610	42.268	51.516	42.268	49.897
	(STRAIN)	3.166E-05	4.355E-06	3.747E-05	4.354E-06	3.167E-05
3	73.00010	0.01440	23.696	23.696	5.642	6.267
	(STRAIN)	-3.891E-05	1.161E-04	1.161E-04	-3.891E-05	-3.355E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.890E-05
ALLOWABLE LOAD REPETITIONS = 1.595E+08 DAMAGE RATIO = 4.451E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.480E-05
ALLOWABLE LOAD REPETITIONS = 3.925E+07 DAMAGE RATIO = 1.809E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 4.411E-06
ALLOWABLE LOAD REPETITIONS = 1.293E+15 DAMAGE RATIO = 5.491E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.161E-04
ALLOWABLE LOAD REPETITIONS = 5.651E+08 DAMAGE RATIO = 1.257E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	29.00000	0.01631	75.164	77.709	-135.464	-110.133
	(STRAIN)	-5.377E-05	6.942E-05	7.091E-05	-5.377E-05	-3.896E-05
1	40.00000	0.01541	38.288	38.288	-157.526	-131.531
	(STRAIN)	-8.548E-05	9.545E-05	9.545E-05	-8.548E-05	-6.146E-05
1	40.00010	0.01541	38.288	46.915	38.288	45.049
	(STRAIN)	2.805E-05	3.843E-06	3.473E-05	3.843E-06	2.805E-05
1	73.00010	0.01389	21.815	22.178	5.399	5.896
	(STRAIN)	-3.577E-05	1.052E-04	1.083E-04	-3.577E-05	-3.150E-05
2	29.00000	0.01673	72.428	72.537	-141.773	-106.250
	(STRAIN)	-5.631E-05	6.897E-05	6.903E-05	-5.631E-05	-3.553E-05
2	40.00000	0.01579	40.623	40.623	-167.199	-141.736
	(STRAIN)	-9.021E-05	1.018E-04	1.018E-04	-9.021E-05	-6.669E-05
2	40.00010	0.01579	40.622	49.530	40.623	47.936
	(STRAIN)	3.037E-05	4.185E-06	3.608E-05	4.185E-06	3.037E-05
2	73.00010	0.01416	22.888	22.960	5.559	6.136
	(STRAIN)	-3.730E-05	1.115E-04	1.122E-04	-3.730E-05	-3.234E-05
3	29.00000	0.01681	68.893	68.893	-142.152	-101.891
	(STRAIN)	-5.658E-05	6.685E-05	6.685E-05	-5.658E-05	-3.303E-05
3	40.00000	0.01587	40.987	40.987	-169.013	-142.948
	(STRAIN)	-9.125E-05	1.028E-04	1.028E-04	-9.125E-05	-6.717E-05
3	40.00010	0.01587	40.987	49.990	40.987	48.439
	(STRAIN)	3.081E-05	4.132E-06	3.637E-05	4.131E-06	3.081E-05
3	73.00010	0.01422	23.134	23.134	5.588	6.187
	(STRAIN)	-3.767E-05	1.130E-04	1.130E-04	-3.767E-05	-3.253E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.658E-05
ALLOWABLE LOAD REPETITIONS = 1.731E+08 DAMAGE RATIO = 4.103E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.125E-05
ALLOWABLE LOAD REPETITIONS = 4.288E+07 DAMAGE RATIO = 1.656E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 4.185E-06
ALLOWABLE LOAD REPETITIONS = 1.636E+15 DAMAGE RATIO = 4.340E-10

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.130E-04
ALLOWABLE LOAD REPETITIONS = 6.383E+08 DAMAGE RATIO = 1.113E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	29.00000	0.01468	67.317	69.717	-164.810	-136.855
	(STRAIN)	-4.120E-05	5.017E-05	5.111E-05	-4.120E-05	-3.020E-05
1	40.00000	0.01401	31.067	31.067	-168.441	-143.112
	(STRAIN)	-6.622E-05	7.179E-05	7.179E-05	-6.622E-05	-4.869E-05
1	40.00010	0.01401	31.067	38.229	31.067	36.827
	(STRAIN)	2.330E-05	2.672E-06	2.832E-05	2.672E-06	2.329E-05
1	73.00010	0.01279	18.545	18.816	5.035	5.410
	(STRAIN)	-2.856E-05	8.748E-05	8.980E-05	-2.856E-05	-2.534E-05
2	29.00000	0.01501	64.394	64.514	-172.037	-133.876
	(STRAIN)	-4.308E-05	4.998E-05	5.003E-05	-4.308E-05	-2.806E-05
2	40.00000	0.01431	32.831	32.831	-178.299	-153.753
	(STRAIN)	-6.967E-05	7.637E-05	7.637E-05	-6.967E-05	-5.270E-05
2	40.00010	0.01431	32.831	40.209	32.831	39.021
	(STRAIN)	2.508E-05	2.914E-06	2.933E-05	2.914E-06	2.508E-05
2	73.00010	0.01301	19.372	19.425	5.165	5.598
	(STRAIN)	-2.971E-05	9.230E-05	9.276E-05	-2.971E-05	-2.600E-05
3	29.00000	0.01507	60.993	60.993	-172.352	-129.252
	(STRAIN)	-4.329E-05	4.856E-05	4.856E-05	-4.329E-05	-2.632E-05
3	40.00000	0.01437	33.100	33.100	-180.118	-155.073
	(STRAIN)	-7.042E-05	7.707E-05	7.707E-05	-7.042E-05	-5.309E-05
3	40.00010	0.01437	33.100	40.547	33.100	39.389
	(STRAIN)	2.540E-05	2.878E-06	2.954E-05	2.878E-06	2.540E-05
3	73.00010	0.01305	19.549	19.549	5.186	5.633
	(STRAIN)	-2.998E-05	9.338E-05	9.338E-05	-2.998E-05	-2.614E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.329E-05
ALLOWABLE LOAD REPETITIONS = 2.980E+08 DAMAGE RATIO = 2.383E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.042E-05
ALLOWABLE LOAD REPETITIONS = 7.858E+07 DAMAGE RATIO = 9.037E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.914E-06
ALLOWABLE LOAD REPETITIONS = 8.270E+15 DAMAGE RATIO = 8.587E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.338E-05
ALLOWABLE LOAD REPETITIONS = 1.501E+09 DAMAGE RATIO = 4.733E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	29.00000	0.01258	57.343	59.394	-212.545	-180.374
	(STRAIN)	-2.827E-05	3.225E-05	3.271E-05	-2.827E-05	-2.106E-05
1	40.00000	0.01213	22.710	22.710	-180.062	-156.132
	(STRAIN)	-4.569E-05	4.809E-05	4.809E-05	-4.569E-05	-3.462E-05
1	40.00010	0.01213	22.710	28.068	22.710	27.159
	(STRAIN)	1.751E-05	1.582E-06	2.077E-05	1.582E-06	1.751E-05
1	73.00010	0.01126	14.452	14.624	4.432	4.678
	(STRAIN)	-2.018E-05	6.588E-05	6.736E-05	-2.018E-05	-1.806E-05
2	29.00000	0.01280	54.335	54.454	-221.111	-178.839
	(STRAIN)	-2.949E-05	3.227E-05	3.229E-05	-2.949E-05	-2.002E-05
2	40.00000	0.01234	23.860	23.860	-189.835	-166.956
	(STRAIN)	-4.787E-05	5.095E-05	5.095E-05	-4.787E-05	-3.729E-05
2	40.00010	0.01234	23.860	29.363	23.860	28.600
	(STRAIN)	1.870E-05	1.725E-06	2.143E-05	1.725E-06	1.870E-05
2	73.00010	0.01141	15.006	15.040	4.527	4.806

	(STRAIN)	-2.093E-05	6.907E-05	6.936E-05	-2.093E-05	-1.853E-05
3	29.00000	0.01285	51.168	51.168	-221.206	-173.708
	(STRAIN)	-2.962E-05	3.146E-05	3.146E-05	-2.962E-05	-1.897E-05
3	40.00000	0.01239	24.022	24.022	-191.486	-168.235
	(STRAIN)	-4.831E-05	5.136E-05	5.136E-05	-4.831E-05	-3.755E-05
3	40.00010	0.01239	24.022	29.560	24.022	28.820
	(STRAIN)	1.889E-05	1.713E-06	2.154E-05	1.713E-06	1.890E-05
3	73.00010	0.01145	15.110	15.110	4.542	4.829
	(STRAIN)	-2.107E-05	6.971E-05	6.971E-05	-2.107E-05	-1.860E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.962E-05
ALLOWABLE LOAD REPETITIONS = 6.426E+08 DAMAGE RATIO = 1.105E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.831E-05
ALLOWABLE LOAD REPETITIONS = 1.926E+08 DAMAGE RATIO = 3.687E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.725E-06
ALLOWABLE LOAD REPETITIONS = 8.646E+16 DAMAGE RATIO = 8.215E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.971E-05
ALLOWABLE LOAD REPETITIONS = 5.557E+09 DAMAGE RATIO = 1.278E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	29.00000	0.01057	47.908	49.488	-273.277	-235.999
	(STRAIN)	-1.875E-05	2.034E-05	2.053E-05	-1.875E-05	-1.422E-05
1	40.00000	0.01029	15.922	15.922	-186.361	-164.491
	(STRAIN)	-3.024E-05	3.122E-05	3.122E-05	-3.024E-05	-2.360E-05
1	40.00010	0.01029	15.922	19.728	15.922	19.175
	(STRAIN)	1.257E-05	9.235E-07	1.455E-05	9.231E-07	1.257E-05
1	73.00010	0.00969	10.802	10.905	3.727	3.879
	(STRAIN)	-1.341E-05	4.735E-05	4.823E-05	-1.341E-05	-1.211E-05
2	29.00000	0.01072	45.014	45.116	-283.344	-236.133
	(STRAIN)	-1.952E-05	2.045E-05	2.046E-05	-1.952E-05	-1.377E-05
2	40.00000	0.01043	16.626	16.626	-195.631	-174.980
	(STRAIN)	-3.156E-05	3.294E-05	3.294E-05	-3.156E-05	-2.528E-05
2	40.00010	0.01043	16.626	20.522	16.626	20.062
	(STRAIN)	1.331E-05	1.003E-06	1.495E-05	1.003E-06	1.331E-05
2	73.00010	0.00979	11.151	11.171	3.792	3.961
	(STRAIN)	-1.387E-05	4.933E-05	4.951E-05	-1.387E-05	-1.242E-05
3	29.00000	0.01078	42.176	42.176	-282.996	-230.242
	(STRAIN)	-1.958E-05	2.000E-05	2.000E-05	-1.958E-05	-1.316E-05
3	40.00000	0.01048	16.727	16.727	-196.927	-176.023
	(STRAIN)	-3.177E-05	3.314E-05	3.314E-05	-3.177E-05	-2.542E-05
3	40.00010	0.01048	16.727	20.635	16.727	20.190
	(STRAIN)	1.342E-05	1.016E-06	1.501E-05	1.016E-06	1.342E-05
3	73.00010	0.00984	11.221	11.221	3.815	3.988
	(STRAIN)	-1.392E-05	4.969E-05	4.969E-05	-1.392E-05	-1.243E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.958E-05
ALLOWABLE LOAD REPETITIONS = 1.488E+09 DAMAGE RATIO = 4.772E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.177E-05
ALLOWABLE LOAD REPETITIONS = 5.341E+08 DAMAGE RATIO = 1.330E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.016E-06
ALLOWABLE LOAD REPETITIONS = 9.243E+17 DAMAGE RATIO = 7.684E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.969E-05
ALLOWABLE LOAD REPETITIONS = 2.528E+10 DAMAGE RATIO = 2.809E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS

1	29.00000	0.00961	43.253	44.572	-310.642	-270.370
	(STRAIN)	-1.501E-05	1.595E-05	1.607E-05	-1.501E-05	-1.149E-05
1	40.00000	0.00938	13.084	13.084	-186.320	-165.795
	(STRAIN)	-2.411E-05	2.474E-05	2.474E-05	-2.411E-05	-1.908E-05
1	40.00010	0.00938	13.084	16.217	13.084	15.797
	(STRAIN)	1.043E-05	7.112E-07	1.193E-05	7.110E-07	1.043E-05
1	73.00010	0.00890	9.161	9.237	3.348	3.464
	(STRAIN)	-1.063E-05	3.930E-05	3.995E-05	-1.063E-05	-9.632E-06
2	29.00000	0.00973	40.498	40.587	-321.554	-271.429
	(STRAIN)	-1.560E-05	1.607E-05	1.608E-05	-1.560E-05	-1.122E-05
2	40.00000	0.00949	13.618	13.618	-195.154	-175.891
	(STRAIN)	-2.510E-05	2.603E-05	2.603E-05	-2.510E-05	-2.039E-05
2	40.00010	0.00949	13.618	16.820	13.618	16.475
	(STRAIN)	1.099E-05	7.684E-07	1.223E-05	7.683E-07	1.100E-05
2	73.00010	0.00898	9.430	9.444	3.400	3.528
	(STRAIN)	-1.097E-05	4.081E-05	4.094E-05	-1.097E-05	-9.878E-06
3	29.00000	0.00980	37.876	37.876	-321.001	-265.150
	(STRAIN)	-1.565E-05	1.575E-05	1.575E-05	-1.565E-05	-1.076E-05
3	40.00000	0.00956	13.714	13.714	-196.306	-176.843
	(STRAIN)	-2.526E-05	2.619E-05	2.619E-05	-2.526E-05	-2.049E-05
3	40.00010	0.00956	13.714	16.922	13.714	16.587
	(STRAIN)	1.108E-05	7.937E-07	1.228E-05	7.938E-07	1.108E-05
3	73.00010	0.00905	9.504	9.504	3.435	3.565
	(STRAIN)	-1.100E-05	4.113E-05	4.113E-05	-1.100E-05	-9.879E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.565E-05
ALLOWABLE LOAD REPETITIONS = 2.349E+09 DAMAGE RATIO = 3.023E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.526E-05
ALLOWABLE LOAD REPETITIONS = 9.455E+08 DAMAGE RATIO = 7.511E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 7.937E-07
ALLOWABLE LOAD REPETITIONS = 2.795E+18 DAMAGE RATIO = 2.541E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.113E-05
ALLOWABLE LOAD REPETITIONS = 5.898E+10 DAMAGE RATIO = 1.204E-05

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 1.953E-02
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 7.308E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 1.283E-09
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 4.102E-03

MAXIMUM DAMAGE RATO = 7.308E-02 DESIGN LIFE IN YEARS = 13.68

- Sovrastruttura **P2D**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 10 7 36
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.4 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 2.011E+07
3 7.713E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.668E+07
3 6.733E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.251E+07
3 5.430E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 8.592E+06
3 4.070E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 5.587E+06
3 2.904E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 3.639E+06
3 2.065E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.723E+06
3 1.636E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.889E+06
3 1.716E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 4.295E+06
3 2.357E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 7.489E+06
3 3.657E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.349E+07
3 5.751E+06 4 7.560E+05 5 9.100E+04

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.837E+07
3 7.226E+06 4 7.560E+05 5 9.100E+04

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 398597

LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 398597
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 398597

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02236	168.043	169.997	-784.345	-672.927
	(STRAIN)		3.369E-05	3.382E-05	-3.025E-05	-3.025E-05
1	21.00000	0.02203	52.683	52.683	-643.330	-549.370
	(STRAIN)		6.095E-05	6.095E-05	-6.087E-05	-6.087E-05
1	21.00010	0.02203	52.692	92.063	52.692	87.849
	(STRAIN)		-2.549E-05	4.742E-05	-2.549E-05	3.961E-05
1	57.00010	0.02100	16.113	16.347	3.612	3.958
	(STRAIN)		1.428E-04	1.464E-04	-4.956E-05	-4.956E-05
2	14.00000	0.02271	109.282	111.309	-748.380	-536.791
	(STRAIN)		2.777E-05	2.790E-05	-2.981E-05	-2.981E-05
2	21.00000	0.02239	52.464	52.464	-650.680	-525.424
	(STRAIN)		6.017E-05	6.017E-05	-6.290E-05	-6.290E-05
2	21.00010	0.02239	52.463	93.812	52.463	89.855
	(STRAIN)		-2.778E-05	4.879E-05	-2.778E-05	4.146E-05
2	57.00010	0.02132	16.783	16.828	3.687	4.082
	(STRAIN)		1.501E-04	1.508E-04	-5.140E-05	-5.140E-05
3	14.00000	0.02276	69.175	69.175	-705.682	-433.354
	(STRAIN)		2.327E-05	2.327E-05	-2.875E-05	-2.875E-05
3	21.00000	0.02246	50.827	50.827	-639.536	-494.520
	(STRAIN)		5.805E-05	5.805E-05	-6.278E-05	-6.278E-05
3	21.00010	0.02246	50.825	92.830	50.825	88.731
	(STRAIN)		-2.883E-05	4.895E-05	-2.883E-05	4.136E-05
3	57.00010	0.02140	16.917	16.917	3.696	4.104
	(STRAIN)		1.516E-04	1.516E-04	-5.179E-05	-5.179E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.025E-05
ALLOWABLE LOAD REPETITIONS = 2.140E+08 DAMAGE RATIO = 1.863E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.290E-05
ALLOWABLE LOAD REPETITIONS = 3.524E+07 DAMAGE RATIO = 1.131E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.516E-04
ALLOWABLE LOAD REPETITIONS = 1.714E+08 DAMAGE RATIO = 2.326E-03

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02326	176.567	178.535	-717.728	-612.698
	(STRAIN)		3.847E-05	3.863E-05	-3.393E-05	-3.393E-05
1	21.00000	0.02288	59.021	59.021	-623.920	-529.616
	(STRAIN)		6.873E-05	6.873E-05	-6.820E-05	-6.820E-05
1	21.00010	0.02288	59.021	101.540	59.021	96.750
	(STRAIN)		-2.685E-05	5.189E-05	-2.685E-05	4.302E-05
1	57.00010	0.02172	17.254	17.519	3.683	4.076

	(STRAIN)		1.543E-04	1.584E-04	-5.445E-05	-5.445E-05
2	14.00000	0.02363	115.569	118.035	-682.536	-479.574
	(STRAIN)		3.127E-05	3.147E-05	-3.334E-05	-3.334E-05
2	21.00000	0.02328	58.591	58.591	-629.878	-502.378
	(STRAIN)		6.756E-05	6.756E-05	-7.048E-05	-7.048E-05
2	21.00010	0.02328	58.591	103.370	58.591	98.819
	(STRAIN)		-2.948E-05	5.345E-05	-2.948E-05	4.502E-05
2	57.00010	0.02208	18.004	18.056	3.762	4.214
	(STRAIN)		1.626E-04	1.634E-04	-5.654E-05	-5.654E-05
3	14.00000	0.02368	73.847	73.847	-641.789	-378.938
	(STRAIN)		2.585E-05	2.585E-05	-3.208E-05	-3.208E-05
3	21.00000	0.02335	56.618	56.618	-618.166	-469.985
	(STRAIN)		6.497E-05	6.497E-05	-7.032E-05	-7.032E-05
3	21.00010	0.02335	56.618	102.182	56.618	97.446
	(STRAIN)		-3.073E-05	5.365E-05	-3.073E-05	4.488E-05
3	57.00010	0.02216	18.159	18.159	3.772	4.239
	(STRAIN)		1.643E-04	1.643E-04	-5.700E-05	-5.700E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.393E-05
ALLOWABLE LOAD REPETITIONS = 1.721E+08 DAMAGE RATIO = 2.316E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.048E-05
ALLOWABLE LOAD REPETITIONS = 2.721E+07 DAMAGE RATIO = 1.465E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.643E-04
ALLOWABLE LOAD REPETITIONS = 1.195E+08 DAMAGE RATIO = 3.336E-03

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02462	189.784	191.700	-624.985	-529.104
	(STRAIN)		4.742E-05	4.762E-05	-4.053E-05	-4.053E-05
1	21.00000	0.02416	69.852	69.852	-588.281	-494.518
	(STRAIN)		8.266E-05	8.266E-05	-8.097E-05	-8.097E-05
1	21.00010	0.02416	69.851	117.260	69.851	111.479
	(STRAIN)		-2.863E-05	5.916E-05	-2.863E-05	4.846E-05
1	57.00010	0.02280	19.032	19.351	3.758	4.233
	(STRAIN)		1.726E-04	1.775E-04	-6.236E-05	-6.236E-05
2	14.00000	0.02504	125.532	128.807	-590.946	-400.614
	(STRAIN)		3.769E-05	3.805E-05	-3.964E-05	-3.964E-05
2	21.00000	0.02462	68.938	68.938	-591.823	-461.987
	(STRAIN)		8.062E-05	8.062E-05	-8.366E-05	-8.366E-05
2	21.00010	0.02462	68.943	119.108	68.943	113.508
	(STRAIN)		-3.188E-05	6.102E-05	-3.188E-05	5.065E-05
2	57.00010	0.02321	19.917	19.979	3.844	4.394
	(STRAIN)		1.824E-04	1.833E-04	-6.489E-05	-6.489E-05
3	14.00000	0.02508	81.429	81.429	-552.992	-303.823
	(STRAIN)		3.049E-05	3.049E-05	-3.799E-05	-3.799E-05
3	21.00000	0.02469	66.327	66.327	-579.293	-427.500
	(STRAIN)		7.711E-05	7.711E-05	-8.341E-05	-8.341E-05
3	21.00010	0.02469	66.324	117.499	66.324	111.632
	(STRAIN)		-3.350E-05	6.126E-05	-3.350E-05	5.040E-05
3	57.00010	0.02330	20.108	20.108	3.856	4.425
	(STRAIN)		1.846E-04	1.846E-04	-6.547E-05	-6.547E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.053E-05
ALLOWABLE LOAD REPETITIONS = 1.226E+08 DAMAGE RATIO = 3.251E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.366E-05
ALLOWABLE LOAD REPETITIONS = 1.860E+07 DAMAGE RATIO = 2.143E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.846E-04
ALLOWABLE LOAD REPETITIONS = 7.105E+07 DAMAGE RATIO = 5.610E-03

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02637	207.589	209.315	-518.802	-433.819
	(STRAIN)		6.290E-05	6.317E-05	-5.124E-05	-5.124E-05
1	21.00000	0.02577	86.008	86.008	-534.867	-443.423
	(STRAIN)		1.053E-04	1.053E-04	-1.007E-04	-1.007E-04
1	21.00010	0.02577	86.008	139.717	86.008	132.460
	(STRAIN)		-3.024E-05	6.922E-05	-3.024E-05	5.578E-05
1	57.00010	0.02411	21.356	21.753	3.795	4.392
	(STRAIN)		1.970E-04	2.031E-04	-7.322E-05	-7.322E-05
2	14.00000	0.02685	139.184	143.800	-486.352	-311.665
	(STRAIN)		4.852E-05	4.925E-05	-4.977E-05	-4.977E-05
2	21.00000	0.02631	84.081	84.081	-535.014	-403.917
	(STRAIN)		1.014E-04	1.014E-04	-1.040E-04	-1.040E-04
2	21.00010	0.02631	84.081	141.320	84.081	134.087
	(STRAIN)		-3.450E-05	7.150E-05	-3.450E-05	5.810E-05
2	57.00010	0.02459	22.433	22.510	3.888	4.586
	(STRAIN)		2.089E-04	2.101E-04	-7.638E-05	-7.638E-05
3	14.00000	0.02688	92.010	92.011	-451.844	-219.246
	(STRAIN)		3.805E-05	3.805E-05	-4.741E-05	-4.741E-05
3	21.00000	0.02639	80.320	80.320	-521.388	-366.701
	(STRAIN)		9.612E-05	9.612E-05	-1.035E-04	-1.035E-04
3	21.00010	0.02639	80.319	138.921	80.319	131.265
	(STRAIN)		-3.671E-05	7.181E-05	-3.671E-05	5.763E-05
3	57.00010	0.02469	22.673	22.673	3.901	4.627
	(STRAIN)		2.117E-04	2.117E-04	-7.713E-05	-7.713E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.124E-05
ALLOWABLE LOAD REPETITIONS = 7.809E+07 DAMAGE RATIO = 5.104E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.040E-04
ALLOWABLE LOAD REPETITIONS = 1.164E+07 DAMAGE RATIO = 3.424E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.117E-04
ALLOWABLE LOAD REPETITIONS = 3.847E+07 DAMAGE RATIO = 1.036E-02

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02832	228.911	230.290	-415.319	-341.441
	(STRAIN)		8.830E-05	8.863E-05	-6.738E-05	-6.738E-05
1	21.00000	0.02750	107.209	107.209	-468.647	-381.700
	(STRAIN)		1.394E-04	1.394E-04	-1.283E-04	-1.283E-04
1	21.00010	0.02750	107.209	167.688	107.210	158.519
	(STRAIN)		-3.079E-05	8.121E-05	-3.078E-05	6.423E-05
1	57.00010	0.02545	23.933	24.427	3.754	4.512
	(STRAIN)		2.245E-04	2.321E-04	-8.595E-05	-8.595E-05
2	14.00000	0.02884	155.595	162.161	-385.020	-227.220
	(STRAIN)		6.580E-05	6.738E-05	-6.484E-05	-6.484E-05
2	21.00000	0.02812	103.336	103.336	-464.784	-334.294
	(STRAIN)		1.319E-04	1.319E-04	-1.322E-04	-1.322E-04
2	21.00010	0.02812	103.334	168.422	103.334	158.939
	(STRAIN)		-3.652E-05	8.401E-05	-3.652E-05	6.645E-05
2	57.00010	0.02601	25.243	25.339	3.851	4.747
	(STRAIN)		2.392E-04	2.407E-04	-8.993E-05	-8.993E-05
3	14.00000	0.02885	104.793	104.794	-354.372	-139.118
	(STRAIN)		4.967E-05	4.967E-05	-6.128E-05	-6.128E-05
3	21.00000	0.02821	97.723	97.723	-450.159	-294.422
	(STRAIN)		1.234E-04	1.234E-04	-1.313E-04	-1.313E-04
3	21.00010	0.02821	97.723	164.675	97.722	154.510

	(STRAIN)	-3.962E-05	8.437E-05	-3.962E-05	6.554E-05	
3	57.00010	0.02614	25.542	25.542	3.866	4.800
	(STRAIN)	2.426E-04	2.426E-04	-9.089E-05	-9.089E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.738E-05
ALLOWABLE LOAD REPETITIONS = 4.580E+07 DAMAGE RATIO = 8.703E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.322E-04
ALLOWABLE LOAD REPETITIONS = 7.039E+06 DAMAGE RATIO = 5.662E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.426E-04
ALLOWABLE LOAD REPETITIONS = 2.090E+07 DAMAGE RATIO = 1.907E-02

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)	
1	14.00000	0.03018	250.911	251.887	-329.622	-265.300
	(STRAIN)	1.261E-04	1.264E-04	-8.929E-05	-8.929E-05	
1	21.00000	0.02907	130.735	130.735	-401.683	-320.678
	(STRAIN)	1.858E-04	1.858E-04	-1.624E-04	-1.624E-04	
1	21.00010	0.02907	130.735	197.110	130.736	185.887
	(STRAIN)	-2.971E-05	9.320E-05	-2.971E-05	7.242E-05	
1	57.00010	0.02659	26.304	26.896	3.640	4.573
	(STRAIN)	2.504E-04	2.595E-04	-9.832E-05	-9.832E-05	
2	14.00000	0.03071	172.296	181.161	-302.028	-159.799
	(STRAIN)	9.092E-05	9.421E-05	-8.506E-05	-8.506E-05	
2	21.00000	0.02975	123.794	123.794	-394.171	-266.165
	(STRAIN)	1.719E-04	1.719E-04	-1.668E-04	-1.668E-04	
2	21.00010	0.02975	123.794	196.071	123.794	183.979
	(STRAIN)	-3.734E-05	9.651E-05	-3.734E-05	7.411E-05	
2	57.00010	0.02723	27.846	27.960	3.735	4.850
	(STRAIN)	2.678E-04	2.695E-04	-1.032E-04	-1.032E-04	
3	14.00000	0.03067	117.638	117.639	-275.262	-75.491
	(STRAIN)	6.607E-05	6.607E-05	-7.970E-05	-7.970E-05	
3	21.00000	0.02984	115.640	115.640	-378.996	-224.341
	(STRAIN)	1.583E-04	1.583E-04	-1.651E-04	-1.651E-04	
3	21.00010	0.02984	115.634	190.397	115.634	177.249
	(STRAIN)	-4.157E-05	9.688E-05	-4.157E-05	7.253E-05	
3	57.00010	0.02738	28.201	28.201	3.751	4.916
	(STRAIN)	2.718E-04	2.718E-04	-1.043E-04	-1.043E-04	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.929E-05
ALLOWABLE LOAD REPETITIONS = 2.614E+07 DAMAGE RATIO = 1.525E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.668E-04
ALLOWABLE LOAD REPETITIONS = 4.386E+06 DAMAGE RATIO = 9.088E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.718E-04
ALLOWABLE LOAD REPETITIONS = 1.256E+07 DAMAGE RATIO = 3.174E-02

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIAL STRESS	INTERMEDIATE P. STRESS (HORIZONTAL
		(STRAIN)	(STRAIN)	(STRAIN)	P. STRAIN)	
1	14.00000	0.03141	265.979	266.694	-280.547	-221.830
	(STRAIN)	1.622E-04	1.625E-04	-1.088E-04	-1.088E-04	
1	21.00000	0.03001	147.627	147.627	-357.674	-281.229
	(STRAIN)	2.270E-04	2.270E-04	-1.901E-04	-1.901E-04	
1	21.00010	0.03001	147.624	217.367	147.623	204.729
	(STRAIN)	-2.806E-05	1.011E-04	-2.806E-05	7.769E-05	
1	57.00010	0.02725	27.752	28.408	3.533	4.588
	(STRAIN)	2.664E-04	2.765E-04	-1.062E-04	-1.062E-04	

2	14.00000	0.03190	183.449	193.962	-255.179	-122.609
	(STRAIN)		1.146E-04	1.198E-04	-1.029E-04	-1.029E-04
2	21.00000	0.03073	137.848	137.848	-348.159	-222.719
	(STRAIN)		2.064E-04	2.064E-04	-1.947E-04	-1.947E-04
2	21.00010	0.03073	137.848	214.493	137.848	200.463
	(STRAIN)		-3.722E-05	1.047E-04	-3.722E-05	7.874E-05
2	57.00010	0.02793	29.443	29.570	3.625	4.895
	(STRAIN)		2.855E-04	2.875E-04	-1.117E-04	-1.117E-04
3	14.00000	0.03182	126.009	126.011	-231.095	-40.732
	(STRAIN)		8.122E-05	8.122E-05	-9.584E-05	-9.584E-05
3	21.00000	0.03081	127.516	127.516	-332.908	-179.994
	(STRAIN)		1.877E-04	1.877E-04	-1.923E-04	-1.923E-04
3	21.00010	0.03081	127.515	207.137	127.515	191.731
	(STRAIN)		-4.237E-05	1.051E-04	-4.237E-05	7.655E-05
3	57.00010	0.02809	29.833	29.833	3.640	4.969
	(STRAIN)		2.900E-04	2.900E-04	-1.130E-04	-1.130E-04

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.088E-04
ALLOWABLE LOAD REPETITIONS = 1.748E+07 DAMAGE RATIO = 2.280E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.947E-04
ALLOWABLE LOAD REPETITIONS = 3.216E+06 DAMAGE RATIO = 1.240E-01

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.900E-04
ALLOWABLE LOAD REPETITIONS = 9.397E+06 DAMAGE RATIO = 4.242E-02

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL STRESS (STRAIN)	INTERMEDIATE P. STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.03116	262.894	263.660	-290.044	-230.234
	(STRAIN)		1.539E-04	1.543E-04	-1.044E-04	-1.044E-04
1	21.00000	0.02983	144.124	144.124	-366.538	-289.139
	(STRAIN)		2.178E-04	2.178E-04	-1.841E-04	-1.841E-04
1	21.00010	0.02983	144.122	213.220	144.122	200.870
	(STRAIN)		-2.846E-05	9.950E-05	-2.846E-05	7.663E-05
1	57.00010	0.02712	27.467	28.111	3.556	4.587
	(STRAIN)		2.632E-04	2.731E-04	-1.046E-04	-1.046E-04
2	14.00000	0.03166	181.190	191.365	-264.193	-129.709
	(STRAIN)		1.092E-04	1.139E-04	-9.891E-05	-9.891E-05
2	21.00000	0.03053	134.980	134.980	-357.394	-231.385
	(STRAIN)		1.988E-04	1.988E-04	-1.886E-04	-1.886E-04
2	21.00010	0.03053	134.976	210.765	134.976	197.138
	(STRAIN)		-3.728E-05	1.031E-04	-3.728E-05	7.783E-05
2	57.00010	0.02780	29.129	29.253	3.649	4.887
	(STRAIN)		2.820E-04	2.839E-04	-1.100E-04	-1.100E-04
3	14.00000	0.03159	124.331	124.333	-239.556	-47.338
	(STRAIN)		7.778E-05	7.779E-05	-9.224E-05	-9.224E-05
3	21.00000	0.03062	125.123	125.123	-342.133	-188.807
	(STRAIN)		1.812E-04	1.812E-04	-1.864E-04	-1.864E-04
3	21.00010	0.03062	125.121	203.781	125.121	188.849
	(STRAIN)		-4.224E-05	1.034E-04	-4.224E-05	7.578E-05
3	57.00010	0.02796	29.512	29.512	3.664	4.959
	(STRAIN)		2.864E-04	2.864E-04	-1.113E-04	-1.113E-04

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.044E-04
ALLOWABLE LOAD REPETITIONS = 1.901E+07 DAMAGE RATIO = 2.096E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.886E-04
ALLOWABLE LOAD REPETITIONS = 3.425E+06 DAMAGE RATIO = 1.164E-01

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.864E-04
ALLOWABLE LOAD REPETITIONS = 9.938E+06 DAMAGE RATIO = 4.011E-02

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02947	242.336	243.469	-360.836	-292.997
	(STRAIN)		1.096E-04	1.100E-04	-7.997E-05	-7.997E-05
1	21.00000	0.02848	121.392	121.392	-427.461	-344.020
	(STRAIN)		1.661E-04	1.661E-04	-1.483E-04	-1.483E-04
1	21.00010	0.02848	121.392	185.605	121.392	175.191
	(STRAIN)		-3.033E-05	8.859E-05	-3.033E-05	6.930E-05
1	57.00010	0.02618	25.416	25.970	3.692	4.555
	(STRAIN)		2.406E-04	2.491E-04	-9.361E-05	-9.361E-05
2	14.00000	0.03000	165.834	173.779	-332.118	-184.032
	(STRAIN)		8.002E-05	8.252E-05	-7.649E-05	-7.649E-05
2	21.00000	0.02914	115.788	115.788	-421.283	-292.114
	(STRAIN)		1.551E-04	1.551E-04	-1.526E-04	-1.526E-04
2	21.00010	0.02914	115.788	185.378	115.788	174.335
	(STRAIN)		-3.717E-05	9.171E-05	-3.717E-05	7.125E-05
2	57.00010	0.02678	26.869	26.977	3.788	4.816
	(STRAIN)		2.570E-04	2.586E-04	-9.813E-05	-9.813E-05
3	14.00000	0.02998	112.702	112.704	-303.841	-98.299
	(STRAIN)		5.901E-05	5.901E-05	-7.191E-05	-7.191E-05
3	21.00000	0.02923	108.706	108.706	-406.255	-250.941
	(STRAIN)		1.437E-04	1.437E-04	-1.512E-04	-1.512E-04
3	21.00010	0.02923	108.705	180.526	108.705	168.586
	(STRAIN)		-4.093E-05	9.208E-05	-4.093E-05	6.996E-05
3	57.00010	0.02692	27.203	27.203	3.803	4.877
	(STRAIN)		2.608E-04	2.608E-04	-9.921E-05	-9.921E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.997E-05
ALLOWABLE LOAD REPETITIONS = 3.262E+07 DAMAGE RATIO = 1.222E-02
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.526E-04
ALLOWABLE LOAD REPETITIONS = 5.253E+06 DAMAGE RATIO = 7.587E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.608E-04
ALLOWABLE LOAD REPETITIONS = 1.512E+07 DAMAGE RATIO = 2.637E-02

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIAL P. STRESS (STRAIN)	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
1	14.00000	0.02700	214.290	215.917	-483.760	-402.481
	(STRAIN)		6.996E-05	7.025E-05	-5.588E-05	-5.588E-05
1	21.00000	0.02634	92.478	92.478	-514.101	-423.910
	(STRAIN)		1.151E-04	1.151E-04	-1.089E-04	-1.089E-04
1	21.00010	0.02634	92.477	148.417	92.477	140.572
	(STRAIN)		-3.058E-05	7.301E-05	-3.058E-05	5.849E-05
1	57.00010	0.02456	22.194	22.621	3.791	4.437
	(STRAIN)		2.058E-04	2.124E-04	-7.728E-05	-7.728E-05
2	14.00000	0.02749	144.349	149.540	-451.947	-282.773
	(STRAIN)		5.337E-05	5.431E-05	-5.412E-05	-5.412E-05
2	21.00000	0.02690	90.034	90.034	-512.960	-381.833
	(STRAIN)		1.103E-04	1.103E-04	-1.124E-04	-1.124E-04
2	21.00010	0.02690	90.032	149.822	90.032	141.917
	(STRAIN)		-3.527E-05	7.545E-05	-3.527E-05	6.081E-05
2	57.00010	0.02506	23.344	23.427	3.885	4.644
	(STRAIN)		2.187E-04	2.199E-04	-8.069E-05	-8.069E-05
3	14.00000	0.02752	96.037	96.038	-418.674	-191.802
	(STRAIN)		4.135E-05	4.135E-05	-5.143E-05	-5.143E-05
3	21.00000	0.02699	85.749	85.749	-498.976	-343.699
	(STRAIN)		1.041E-04	1.041E-04	-1.118E-04	-1.118E-04
3	21.00010	0.02699	85.749	147.052	85.749	138.648
	(STRAIN)		-3.774E-05	7.579E-05	-3.774E-05	6.022E-05
3	57.00010	0.02517	23.603	23.603	3.899	4.689

(STRAIN) 2.216E-04 2.216E-04 -8.151E-05 -8.151E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.588E-05
ALLOWABLE LOAD REPETITIONS = 6.602E+07 DAMAGE RATIO = 6.037E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.124E-04
ALLOWABLE LOAD REPETITIONS = 9.878E+06 DAMAGE RATIO = 4.035E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 2.216E-04
ALLOWABLE LOAD REPETITIONS = 3.132E+07 DAMAGE RATIO = 1.273E-02

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIAL STRESS	MINOR P. STRESS	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
			(STRAIN)	(STRAIN)	(STRAIN)	
1	14.00000	0.02426	186.265	188.203	-648.453	-550.226
	(STRAIN)		4.484E-05	4.504E-05	-3.866E-05	-3.866E-05
1	21.00000	0.02382	66.860	66.860	-598.247	-504.228
	(STRAIN)		7.873E-05	7.873E-05	-7.741E-05	-7.741E-05
1	21.00010	0.02382	66.860	112.977	66.860	107.468
	(STRAIN)		-2.820E-05	5.720E-05	-2.820E-05	4.700E-05
1	57.00010	0.02252	18.561	18.865	3.742	4.194
	(STRAIN)		1.677E-04	1.724E-04	-6.023E-05	-6.023E-05
2	14.00000	0.02467	122.859	125.904	-614.108	-420.500
	(STRAIN)		3.586E-05	3.617E-05	-3.787E-05	-3.787E-05
2	21.00000	0.02426	66.099	66.099	-602.468	-473.148
	(STRAIN)		7.696E-05	7.696E-05	-7.999E-05	-7.999E-05
2	21.00010	0.02426	66.099	114.833	66.099	109.525
	(STRAIN)		-3.128E-05	5.897E-05	-3.128E-05	4.914E-05
2	57.00010	0.02291	19.409	19.468	3.827	4.349
	(STRAIN)		1.771E-04	1.780E-04	-6.264E-05	-6.264E-05
3	14.00000	0.02471	79.378	79.379	-575.436	-322.743
	(STRAIN)		2.918E-05	2.918E-05	-3.633E-05	-3.633E-05
3	21.00000	0.02434	63.669	63.669	-590.131	-439.157
	(STRAIN)		7.372E-05	7.372E-05	-7.977E-05	-7.977E-05
3	21.00010	0.02434	63.669	113.348	63.669	107.800
	(STRAIN)		-3.279E-05	5.921E-05	-3.279E-05	4.893E-05
3	57.00010	0.02300	19.590	19.590	3.838	4.379
	(STRAIN)		1.792E-04	1.792E-04	-6.319E-05	-6.319E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.866E-05
ALLOWABLE LOAD REPETITIONS = 1.342E+08 DAMAGE RATIO = 2.971E-03
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.999E-05
ALLOWABLE LOAD REPETITIONS = 2.053E+07 DAMAGE RATIO = 1.942E-02

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.792E-04
ALLOWABLE LOAD REPETITIONS = 8.117E+07 DAMAGE RATIO = 4.911E-03

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISP.	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIAL STRESS	MINOR P. STRESS	INTERMEDIATE STRESS (HORIZONTAL P. STRAIN)
			(STRAIN)	(STRAIN)	(STRAIN)	
1	14.00000	0.02279	172.167	174.133	-751.441	-643.161
	(STRAIN)		3.591E-05	3.606E-05	-3.197E-05	-3.197E-05
1	21.00000	0.02244	55.680	55.680	-634.395	-540.189
	(STRAIN)		6.460E-05	6.460E-05	-6.432E-05	-6.432E-05
1	21.00010	0.02244	55.690	96.577	55.690	92.091
	(STRAIN)		-2.616E-05	4.956E-05	-2.616E-05	4.125E-05
1	57.00010	0.02135	16.663	16.911	3.649	4.017
	(STRAIN)		1.483E-04	1.521E-04	-5.189E-05	-5.189E-05
2	14.00000	0.02315	112.307	114.539	-715.855	-508.487
	(STRAIN)		2.940E-05	2.957E-05	-3.147E-05	-3.147E-05

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 2    21.00000   0.02282     55.367     55.367    -641.085    -514.656
      (STRAIN)             6.364E-05  6.364E-05  -6.647E-05  -6.647E-05
 2    21.00010   0.02282     55.367     98.365     55.367      94.129
      (STRAIN)            -2.861E-05  5.101E-05  -2.861E-05   4.317E-05
 2    57.00010   0.02169     17.370     17.419      3.725       4.147
      (STRAIN)             1.561E-04  1.568E-04  -5.385E-05  -5.385E-05

 3    14.00000   0.02320     71.409     71.410    -674.119    -406.440
      (STRAIN)             2.448E-05  2.448E-05  -3.032E-05  -3.032E-05
 3    21.00000   0.02289     53.576     53.576    -629.679    -483.050
      (STRAIN)             6.131E-05  6.131E-05  -6.634E-05  -6.634E-05
 3    21.00010   0.02289     53.574     97.289     53.574      92.891
      (STRAIN)            -2.976E-05  5.119E-05  -2.976E-05   4.305E-05
 3    57.00010   0.02177     17.515     17.515      3.735       4.171
      (STRAIN)             1.577E-04  1.577E-04  -5.428E-05  -5.428E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -3.197E-05
ALLOWABLE LOAD REPETITIONS =   1.927E+08  DAMAGE RATIO =   2.069E-03
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -6.647E-05
ALLOWABLE LOAD REPETITIONS =   3.106E+07  DAMAGE RATIO =   1.283E-02

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   1.577E-04
ALLOWABLE LOAD REPETITIONS =   1.436E+08  DAMAGE RATIO =   2.775E-03

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 1.035E-01
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 6.179E-01
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 2.017E-01
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MAXIMUM DAMAGE RATO = 6.179E-01 DESIGN LIFE IN YEARS = 1.62

mese	ε	V_b	V_a	N_0
1	6.29E-05	11	5	4419673
2	7.05E-05	11	5	2570867
3	8.37E-05	11	5	1136441
4	1.04E-04	11	5	403156
5	1.32E-04	11	5	128615
6	1.67E-04	11	5	42512
7	1.95E-04	11	5	20354
8	1.89E-04	11	5	23686
9	1.53E-04	11	5	64941
10	1.12E-04	11	5	278510
11	8.00E-05	11	5	1407081
12	6.65E-05	11	5	3398001

mese	Em	n	σ	α	β	γ	h	ΔN_0
1	136394	4.5	6.506	2.193147	-2.95519	-1.93293	21	36775907
2	113806	4.5	6.298	2.193147	-2.95519	-1.93293	21	27215450
3	86243	4.5	5.918	2.193147	-2.95519	-1.93293	21	17805193
4	60118	4.5	5.35	2.193147	-2.95519	-1.93293	21	10872673
5	39804	4.5	4.647	2.193147	-2.95519	-1.93293	21	6674084
6	26429	4.5	3.941	2.193147	-2.95519	-1.93293	21	4424459
7	20048	4.5	3.481	2.193147	-2.95519	-1.93293	21	3482957
8	21214	4.5	3.573	2.193147	-2.95519	-1.93293	21	3650074
9	30962	4.5	4.212	2.193147	-2.95519	-1.93293	21	5143558
10	52697	4.5	5.129	2.193147	-2.95519	-1.93293	21	9225655
11	92790	4.5	6.024	2.193147	-2.95519	-1.93293	21	19836071
12	124950	4.5	6.41	2.193147	-2.95519	-1.93293	21	31708127

mese	n_mese	$N+k\Delta N_0$	danno	
1	398,597	261851024	0.001522	
2	398,597	193079016	0.002064	
3	398,597	125772795	0.003169	
4	398,597	76511868	0.00521	
5	398,597	46847202	0.008508	
6	398,597	31013725	0.012852	
7	398,597	24401053	0.016335	
8	398,597	25574201	0.015586	
9	398,597	36069844	0.011051	
10	398,597	64858097	0.006146	
11	398,597	140259579	0.002842	
12	398,597	225354893	0.001769	**VITA UTILE con coefficiente K pari a 7**
			0.087054	***11.4***

- Sovrastruttura **P2E**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.25 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.735E+07
3 1.971E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
3 1.646E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 1.250E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
3 8.753E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
3 5.831E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
3 3.897E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
3 2.969E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
3 3.139E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
3 4.553E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
3 7.687E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
3 1.344E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
3 1.806E+07 4 3.000E+06 5 9.100E+04

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 283702

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 283702
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 283702

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01354	544.940	547.389	294.292	301.861
	(STRAIN)	2.086E-08	1.933E-05	1.953E-05	-1.698E-07	4.192E-07
1	34.00000	0.01322	16.378	16.378	-516.084	-460.530
	(STRAIN)	-1.829E-05	1.817E-05	1.817E-05	-1.829E-05	-1.449E-05
1	34.00010	0.01322	16.378	53.509	16.378	47.863
	(STRAIN)	1.013E-05	-2.988E-06	1.248E-05	-2.988E-06	1.013E-05
1	54.00010	0.01317	6.660	6.707	2.924	3.030
	(STRAIN)	-1.067E-05	4.682E-05	4.753E-05	-1.067E-05	-9.035E-06
2	9.00000	0.01356	274.514	434.453	176.694	258.591
	(STRAIN)	2.576E-06	3.815E-06	1.626E-05	-3.797E-06	2.576E-06
2	34.00000	0.01334	16.285	16.285	-536.199	-478.025
	(STRAIN)	-1.900E-05	1.883E-05	1.883E-05	-1.900E-05	-1.502E-05
2	34.00010	0.01334	16.285	55.422	16.285	50.076
	(STRAIN)	1.072E-05	-3.363E-06	1.294E-05	-3.363E-06	1.072E-05
2	54.00010	0.01328	6.861	6.869	2.975	3.102
	(STRAIN)	-1.114E-05	4.864E-05	4.878E-05	-1.114E-05	-9.181E-06
3	9.00000	0.01366	87.490	352.296	87.484	233.170
	(STRAIN)	4.568E-06	-6.768E-06	1.384E-05	-6.769E-06	4.568E-06
3	34.00000	0.01349	15.947	15.947	-539.348	-477.958
	(STRAIN)	-1.916E-05	1.887E-05	1.887E-05	-1.916E-05	-1.495E-05
3	34.00010	0.01349	15.947	55.746	15.947	50.316
	(STRAIN)	1.080E-05	-3.523E-06	1.306E-05	-3.523E-06	1.080E-05
3	54.00010	0.01344	6.986	6.986	3.040	3.174
	(STRAIN)	-1.126E-05	4.946E-05	4.946E-05	-1.126E-05	-9.193E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.916E-05
ALLOWABLE LOAD REPETITIONS = 7.911E+08 DAMAGE RATIO = 3.586E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.946E-05
ALLOWABLE LOAD REPETITIONS = 2.582E+10 DAMAGE RATIO = 1.099E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01442	547.854	550.098	290.578	297.953
	(STRAIN)	-2.282E-07	2.426E-05	2.448E-05	-4.439E-07	2.644E-07
1	34.00000	0.01405	19.000	19.000	-499.718	-444.420
	(STRAIN)	-2.131E-05	2.123E-05	2.123E-05	-2.131E-05	-1.678E-05
1	34.00010	0.01405	18.999	61.918	18.999	55.220
	(STRAIN)	1.166E-05	-3.428E-06	1.445E-05	-3.428E-06	1.166E-05

1	54.00010	0.01398	7.491	7.546	3.218	3.343
	(STRAIN)	-1.250E-05	5.323E-05	5.409E-05	-1.250E-05	-1.058E-05
2	9.00000	0.01444	275.582	429.892	172.492	251.018
	(STRAIN)	2.858E-06	5.217E-06	2.004E-05	-4.682E-06	2.858E-06
2	34.00000	0.01417	18.900	18.900	-519.679	-461.664
	(STRAIN)	-2.216E-05	2.202E-05	2.202E-05	-2.216E-05	-1.740E-05
2	34.00010	0.01417	18.900	64.195	18.900	57.860
	(STRAIN)	1.236E-05	-3.871E-06	1.500E-05	-3.871E-06	1.236E-05
2	54.00010	0.01411	7.727	7.737	3.277	3.428
	(STRAIN)	-1.307E-05	5.539E-05	5.555E-05	-1.307E-05	-1.074E-05
3	9.00000	0.01453	87.182	338.215	87.176	222.520
	(STRAIN)	5.238E-06	-7.759E-06	1.635E-05	-7.759E-06	5.238E-06
3	34.00000	0.01433	18.473	18.473	-521.958	-460.699
	(STRAIN)	-2.231E-05	2.202E-05	2.202E-05	-2.231E-05	-1.728E-05
3	34.00010	0.01433	18.473	64.477	18.473	58.045
	(STRAIN)	1.244E-05	-4.053E-06	1.512E-05	-4.053E-06	1.244E-05
3	54.00010	0.01427	7.844	7.844	3.336	3.495
	(STRAIN)	-1.318E-05	5.617E-05	5.617E-05	-1.318E-05	-1.074E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.282E-07
ALLOWABLE LOAD REPETITIONS = 2.805E+15 DAMAGE RATIO = 1.011E-10
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.231E-05
ALLOWABLE LOAD REPETITIONS = 5.591E+08 DAMAGE RATIO = 5.074E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.617E-05
ALLOWABLE LOAD REPETITIONS = 1.461E+10 DAMAGE RATIO = 1.942E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01586	551.855	553.799	283.569	290.499
	(STRAIN)	-9.085E-07	3.420E-05	3.446E-05	-1.165E-06	-2.520E-07
1	34.00000	0.01537	23.687	23.687	-472.481	-417.783
	(STRAIN)	-2.676E-05	2.682E-05	2.682E-05	-2.676E-05	-2.085E-05
1	34.00010	0.01537	23.687	76.823	23.687	68.193
	(STRAIN)	1.436E-05	-4.189E-06	1.795E-05	-4.189E-06	1.436E-05
1	54.00010	0.01529	8.906	8.979	3.699	3.859
	(STRAIN)	-1.578E-05	6.432E-05	6.545E-05	-1.578E-05	-1.333E-05
2	9.00000	0.01588	277.116	422.970	165.491	238.501
	(STRAIN)	3.178E-06	8.268E-06	2.750E-05	-6.447E-06	3.178E-06
2	34.00000	0.01553	23.588	23.588	-492.115	-434.556
	(STRAIN)	-2.786E-05	2.783E-05	2.783E-05	-2.786E-05	-2.164E-05
2	34.00010	0.01553	23.588	79.774	23.588	71.630
	(STRAIN)	1.526E-05	-4.754E-06	1.866E-05	-4.754E-06	1.526E-05
2	54.00010	0.01545	9.209	9.222	3.774	3.968
	(STRAIN)	-1.651E-05	6.711E-05	6.732E-05	-1.651E-05	-1.352E-05
3	9.00000	0.01593	86.873	317.225	86.865	206.071
	(STRAIN)	6.312E-06	-9.402E-06	2.097E-05	-9.403E-06	6.312E-06
3	34.00000	0.01568	23.004	23.004	-493.694	-432.851
	(STRAIN)	-2.801E-05	2.778E-05	2.778E-05	-2.801E-05	-2.144E-05
3	34.00010	0.01568	23.004	80.021	23.004	71.758
	(STRAIN)	1.533E-05	-4.980E-06	1.878E-05	-4.980E-06	1.533E-05
3	54.00010	0.01560	9.311	9.311	3.820	4.024
	(STRAIN)	-1.664E-05	6.783E-05	6.783E-05	-1.664E-05	-1.349E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -9.085E-07
ALLOWABLE LOAD REPETITIONS = 3.898E+13 DAMAGE RATIO = 7.278E-09
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.801E-05
ALLOWABLE LOAD REPETITIONS = 3.341E+08 DAMAGE RATIO = 8.491E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.783E-05
ALLOWABLE LOAD REPETITIONS = 6.277E+09 DAMAGE RATIO = 4.520E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01790	556.534	558.118	272.945	279.043
	(STRAIN)	-2.627E-06	5.318E-05	5.349E-05	-2.941E-06	-1.734E-06
1	34.00000	0.01720	31.156	31.156	-433.646	-380.153
	(STRAIN)	-3.559E-05	3.610E-05	3.610E-05	-3.559E-05	-2.734E-05
1	34.00010	0.01720	31.156	100.272	31.156	88.457
	(STRAIN)	1.853E-05	-5.342E-06	2.346E-05	-5.342E-06	1.853E-05
1	54.00010	0.01710	11.015	11.119	4.374	4.589
	(STRAIN)	-2.098E-05	8.119E-05	8.279E-05	-2.098E-05	-1.767E-05
2	9.00000	0.01791	279.036	414.440	155.408	221.111
	(STRAIN)	3.175E-06	1.464E-05	4.143E-05	-9.826E-06	3.175E-06
2	34.00000	0.01741	31.084	31.084	-452.646	-396.058
	(STRAIN)	-3.712E-05	3.749E-05	3.749E-05	-3.712E-05	-2.839E-05
2	34.00010	0.01741	31.084	104.352	31.084	93.238
	(STRAIN)	1.979E-05	-6.104E-06	2.442E-05	-6.104E-06	1.979E-05
2	54.00010	0.01730	11.428	11.447	4.474	4.738
	(STRAIN)	-2.198E-05	8.500E-05	8.530E-05	-2.198E-05	-1.791E-05
3	9.00000	0.01789	86.710	290.681	86.702	184.510
	(STRAIN)	7.685E-06	-1.167E-05	2.869E-05	-1.167E-05	7.685E-06
3	34.00000	0.01753	30.271	30.271	-454.115	-394.198
	(STRAIN)	-3.733E-05	3.738E-05	3.738E-05	-3.733E-05	-2.809E-05
3	34.00010	0.01753	30.271	104.646	30.271	93.385
	(STRAIN)	1.989E-05	-6.412E-06	2.458E-05	-6.412E-06	1.989E-05
3	54.00010	0.01742	11.520	11.520	4.505	4.784
	(STRAIN)	-2.216E-05	8.576E-05	8.576E-05	-2.216E-05	-1.787E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.627E-06
ALLOWABLE LOAD REPETITIONS = 1.676E+12 DAMAGE RATIO = 1.693E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.733E-05
ALLOWABLE LOAD REPETITIONS = 1.762E+08 DAMAGE RATIO = 1.611E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.576E-05
ALLOWABLE LOAD REPETITIONS = 2.197E+09 DAMAGE RATIO = 1.291E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02044	561.442	562.653	259.761	264.611
	(STRAIN)	-6.528E-06	8.755E-05	8.792E-05	-6.907E-06	-5.388E-06
1	34.00000	0.01940	41.745	41.745	-385.502	-333.980
	(STRAIN)	-4.857E-05	5.035E-05	5.035E-05	-4.857E-05	-3.665E-05
1	34.00010	0.01940	41.745	133.054	41.745	116.545
	(STRAIN)	2.428E-05	-6.885E-06	3.116E-05	-6.885E-06	2.428E-05
1	54.00010	0.01925	13.786	13.937	5.192	5.488
	(STRAIN)	-2.833E-05	1.039E-04	1.062E-04	-2.833E-05	-2.377E-05
2	9.00000	0.02042	281.213	405.784	142.730	200.470
	(STRAIN)	1.969E-06	2.725E-05	6.625E-05	-1.611E-05	1.969E-06
2	34.00000	0.01968	41.773	41.773	-403.454	-348.512
	(STRAIN)	-5.078E-05	5.230E-05	5.230E-05	-5.078E-05	-3.806E-05
2	34.00010	0.01968	41.773	138.831	41.773	123.373
	(STRAIN)	2.607E-05	-7.926E-06	3.251E-05	-7.926E-06	2.607E-05
2	54.00010	0.01953	14.359	14.387	5.327	5.695
	(STRAIN)	-2.973E-05	1.092E-04	1.096E-04	-2.973E-05	-2.408E-05
3	9.00000	0.02030	86.809	261.245	86.798	159.822

	(STRAIN)	8.814E-06	-1.405E-05	4.057E-05	-1.405E-05	8.814E-06
3	34.00000	0.01977	40.679	40.679	-405.256	-346.937
	(STRAIN)	-5.112E-05	5.213E-05	5.213E-05	-5.112E-05	-3.762E-05
3	34.00010	0.01977	40.679	139.350	40.679	123.717
	(STRAIN)	2.624E-05	-8.363E-06	3.275E-05	-8.363E-06	2.624E-05
3	54.00010	0.01962	14.464	14.464	5.351	5.739
	(STRAIN)	-3.000E-05	1.102E-04	1.102E-04	-3.001E-05	-2.403E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.528E-06
ALLOWABLE LOAD REPETITIONS = 1.239E+11 DAMAGE RATIO = 2.289E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.112E-05
ALLOWABLE LOAD REPETITIONS = 8.854E+07 DAMAGE RATIO = 3.204E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.102E-04
ALLOWABLE LOAD REPETITIONS = 7.150E+08 DAMAGE RATIO = 3.968E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.02319	566.014	566.902	246.481	249.857
	(STRAIN)	-1.391E-05	1.429E-04	1.433E-04	-1.435E-05	-1.269E-05
1	34.00000	0.02162	54.385	54.385	-335.022	-286.083
	(STRAIN)	-6.517E-05	6.975E-05	6.975E-05	-6.517E-05	-4.821E-05
1	34.00010	0.02162	54.384	171.684	54.385	149.365
	(STRAIN)	3.095E-05	-8.626E-06	4.025E-05	-8.626E-06	3.095E-05
1	54.00010	0.02143	16.862	17.072	6.024	6.418
	(STRAIN)	-3.706E-05	1.297E-04	1.329E-04	-3.706E-05	-3.099E-05
2	9.00000	0.02309	283.397	398.627	129.293	179.951
	(STRAIN)	-1.757E-06	4.914E-05	1.058E-04	-2.668E-05	-1.757E-06
2	34.00000	0.02198	54.623	54.623	-351.573	-298.814
	(STRAIN)	-6.829E-05	7.244E-05	7.244E-05	-6.829E-05	-5.001E-05
2	34.00010	0.02198	54.623	179.613	54.623	158.828
	(STRAIN)	3.342E-05	-9.996E-06	4.208E-05	-9.996E-06	3.342E-05
2	54.00010	0.02179	17.633	17.672	6.201	6.695
	(STRAIN)	-3.896E-05	1.369E-04	1.375E-04	-3.896E-05	-3.137E-05
3	9.00000	0.02285	87.155	233.108	87.143	135.636
	(STRAIN)	8.582E-06	-1.527E-05	5.654E-05	-1.528E-05	8.582E-06
3	34.00000	0.02206	53.248	53.248	-353.671	-297.483
	(STRAIN)	-6.883E-05	7.215E-05	7.215E-05	-6.883E-05	-4.936E-05
3	34.00010	0.02206	53.248	180.522	53.248	159.547
	(STRAIN)	3.370E-05	-1.059E-05	4.244E-05	-1.059E-05	3.370E-05
3	54.00010	0.02187	17.779	17.779	6.229	6.752
	(STRAIN)	-3.937E-05	1.383E-04	1.383E-04	-3.937E-05	-3.134E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.391E-05
ALLOWABLE LOAD REPETITIONS = 1.511E+10 DAMAGE RATIO = 1.878E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.883E-05
ALLOWABLE LOAD REPETITIONS = 4.694E+07 DAMAGE RATIO = 6.044E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.383E-04
ALLOWABLE LOAD REPETITIONS = 2.585E+08 DAMAGE RATIO = 1.097E-03

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.02517	568.962	569.664	237.852	240.100
	(STRAIN)	-2.203E-05	1.982E-04	1.987E-04	-2.250E-05	-2.100E-05
1	34.00000	0.02310	63.910	63.910	-300.329	-253.443

	(STRAIN)	-7.881E-05	8.681E-05	8.681E-05	-7.881E-05	-5.749E-05
1	34.00010	0.02310	63.910	200.544	63.910	173.729
	(STRAIN)	3.587E-05	-9.886E-06	4.704E-05	-9.886E-06	3.587E-05
1	54.00010	0.02288	19.064	19.321	6.577	7.046
	(STRAIN)	-4.363E-05	1.485E-04	1.524E-04	-4.363E-05	-3.641E-05
2	9.00000	0.02499	284.876	394.664	120.023	166.501
	(STRAIN)	-6.735E-06	7.217E-05	1.454E-04	-3.772E-05	-6.735E-06
2	34.00000	0.02352	64.374	64.374	-315.737	-264.718
	(STRAIN)	-8.273E-05	9.011E-05	9.011E-05	-8.273E-05	-5.953E-05
2	34.00010	0.02352	64.374	210.176	64.374	185.304
	(STRAIN)	3.889E-05	-1.150E-05	4.925E-05	-1.150E-05	3.889E-05
2	54.00010	0.02330	19.987	20.035	6.787	7.377
	(STRAIN)	-4.591E-05	1.572E-04	1.579E-04	-4.591E-05	-3.683E-05
3	9.00000	0.02466	87.494	214.965	87.480	119.820
	(STRAIN)	6.895E-06	-1.465E-05	7.032E-05	-1.466E-05	6.895E-06
3	34.00000	0.02361	62.816	62.816	-317.906	-263.417
	(STRAIN)	-8.343E-05	8.969E-05	8.969E-05	-8.343E-05	-5.865E-05
3	34.00010	0.02361	62.816	211.414	62.816	186.358
	(STRAIN)	3.927E-05	-1.221E-05	4.971E-05	-1.221E-05	3.927E-05
3	54.00010	0.02339	20.171	20.171	6.822	7.448
	(STRAIN)	-4.643E-05	1.589E-04	1.589E-04	-4.643E-05	-3.681E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.203E-05
ALLOWABLE LOAD REPETITIONS = 4.314E+09 DAMAGE RATIO = 6.576E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.343E-05
ALLOWABLE LOAD REPETITIONS = 3.143E+07 DAMAGE RATIO = 9.025E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.589E-04
ALLOWABLE LOAD REPETITIONS = 1.387E+08 DAMAGE RATIO = 2.045E-03

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.02476	568.368	569.106	239.581	242.065
	(STRAIN)	-2.011E-05	1.854E-04	1.859E-04	-2.057E-05	-1.902E-05
1	34.00000	0.02280	61.910	61.910	-307.427	-260.103
	(STRAIN)	-7.585E-05	8.301E-05	8.301E-05	-7.585E-05	-5.549E-05
1	34.00010	0.02280	61.910	194.498	61.910	168.634
	(STRAIN)	3.484E-05	-9.624E-06	4.562E-05	-9.624E-06	3.484E-05
1	54.00010	0.02258	18.608	18.855	6.465	6.918
	(STRAIN)	-4.225E-05	1.446E-04	1.484E-04	-4.225E-05	-3.527E-05
2	9.00000	0.02460	284.574	395.418	121.920	169.210
	(STRAIN)	-5.503E-06	6.677E-05	1.362E-04	-3.513E-05	-5.503E-06
2	34.00000	0.02321	62.321	62.321	-323.080	-271.691
	(STRAIN)	-7.959E-05	8.618E-05	8.618E-05	-7.959E-05	-5.748E-05
2	34.00010	0.02321	62.321	203.766	62.321	179.758
	(STRAIN)	3.775E-05	-1.119E-05	4.775E-05	-1.119E-05	3.775E-05
2	54.00010	0.02299	19.499	19.545	6.668	7.238
	(STRAIN)	-4.445E-05	1.529E-04	1.537E-04	-4.445E-05	-3.568E-05
3	9.00000	0.02429	87.420	218.609	87.406	123.007
	(STRAIN)	7.380E-06	-1.492E-05	6.727E-05	-1.492E-05	7.380E-06
3	34.00000	0.02330	60.800	60.800	-325.244	-270.393
	(STRAIN)	-8.025E-05	8.579E-05	8.579E-05	-8.025E-05	-5.666E-05
3	34.00010	0.02330	60.800	204.934	60.800	180.738
	(STRAIN)	3.810E-05	-1.187E-05	4.818E-05	-1.187E-05	3.810E-05
3	54.00010	0.02308	19.675	19.675	6.702	7.305
	(STRAIN)	-4.495E-05	1.546E-04	1.546E-04	-4.495E-05	-3.566E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.011E-05
ALLOWABLE LOAD REPETITIONS = 5.526E+09 DAMAGE RATIO = 5.134E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.025E-05
ALLOWABLE LOAD REPETITIONS = 3.406E+07 DAMAGE RATIO = 8.329E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.546E-04
ALLOWABLE LOAD REPETITIONS = 1.569E+08 DAMAGE RATIO = 1.809E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.02210	564.277	565.284	251.584	255.549
	(STRAIN)	-1.051E-05	1.183E-04	1.187E-04	-1.093E-05	-9.293E-06
1	34.00000	0.02076	49.266	49.266	-354.747	-304.739
	(STRAIN)	-5.827E-05	6.151E-05	6.151E-05	-5.827E-05	-4.345E-05
1	34.00010	0.02076	49.266	156.093	49.266	136.151
	(STRAIN)	2.827E-05	-7.932E-06	3.658E-05	-7.932E-06	2.827E-05
1	54.00010	0.02059	15.641	15.826	5.702	6.057
	(STRAIN)	-3.353E-05	1.194E-04	1.222E-04	-3.353E-05	-2.808E-05
2	9.00000	0.02204	282.550	401.213	134.555	187.833
	(STRAIN)	9.634E-08	3.924E-05	8.828E-05	-2.192E-05	9.628E-08
2	34.00000	0.02109	49.407	49.407	-371.882	-318.219
	(STRAIN)	-6.101E-05	6.390E-05	6.390E-05	-6.101E-05	-4.510E-05
2	34.00010	0.02109	49.407	163.135	49.407	144.523
	(STRAIN)	3.046E-05	-9.169E-06	3.822E-05	-9.169E-06	3.046E-05
2	54.00010	0.02091	16.331	16.365	5.863	6.305
	(STRAIN)	-3.522E-05	1.258E-04	1.264E-04	-3.522E-05	-2.842E-05
3	9.00000	0.02185	86.996	243.831	86.985	144.910
	(STRAIN)	8.916E-06	-1.502E-05	4.980E-05	-1.502E-05	8.916E-06
3	34.00000	0.02117	48.140	48.140	-373.889	-316.817
	(STRAIN)	-6.146E-05	6.367E-05	6.367E-05	-6.146E-05	-4.454E-05
3	34.00010	0.02117	48.140	163.877	48.140	145.078
	(STRAIN)	3.069E-05	-9.700E-06	3.852E-05	-9.700E-06	3.069E-05
3	54.00010	0.02100	16.458	16.458	5.888	6.356
	(STRAIN)	-3.558E-05	1.270E-04	1.270E-04	-3.558E-05	-2.838E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.051E-05
ALLOWABLE LOAD REPETITIONS = 3.272E+10 DAMAGE RATIO = 8.671E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.146E-05
ALLOWABLE LOAD REPETITIONS = 5.964E+07 DAMAGE RATIO = 4.757E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.270E-04
ALLOWABLE LOAD REPETITIONS = 3.782E+08 DAMAGE RATIO = 7.501E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01869	558.143	559.603	268.810	274.537
	(STRAIN)	-3.595E-06	6.240E-05	6.273E-05	-3.929E-06	-2.616E-06
1	34.00000	0.01789	34.297	34.297	-418.648	-365.715
	(STRAIN)	-3.937E-05	4.017E-05	4.017E-05	-3.937E-05	-3.008E-05
1	34.00010	0.01789	34.297	110.046	34.297	96.857
	(STRAIN)	2.026E-05	-5.810E-06	2.575E-05	-5.810E-06	2.026E-05
1	54.00010	0.01778	11.860	11.978	4.631	4.870
	(STRAIN)	-2.316E-05	8.805E-05	8.986E-05	-2.316E-05	-1.949E-05
2	9.00000	0.01869	279.730	411.531	151.478	214.569
	(STRAIN)	2.974E-06	1.791E-05	4.813E-05	-1.149E-05	2.974E-06
2	34.00000	0.01812	34.247	34.247	-437.352	-381.227
	(STRAIN)	-4.110E-05	4.173E-05	4.173E-05	-4.110E-05	-3.124E-05
2	34.00010	0.01812	34.247	114.618	34.247	102.229
	(STRAIN)	2.167E-05	-6.655E-06	2.683E-05	-6.655E-06	2.167E-05
2	54.00010	0.01800	12.320	12.342	4.741	5.036

(STRAIN) -2.428E-05 9.231E-05 9.264E-05 -2.428E-05 -1.975E-05

3 9.00000 0.01864 86.711 281.173 86.702 176.615
(STRAIN) 8.127E-06 -1.248E-05 3.210E-05 -1.248E-05 8.127E-06
3 34.00000 0.01823 33.346 33.346 -438.905 -379.435
(STRAIN) -4.134E-05 4.160E-05 4.160E-05 -4.134E-05 -3.089E-05
3 34.00010 0.01823 33.346 114.963 33.346 102.418
(STRAIN) 2.178E-05 -7.000E-06 2.701E-05 -7.000E-06 2.178E-05
3 54.00010 0.01811 12.413 12.413 4.769 5.080
(STRAIN) -2.449E-05 9.311E-05 9.311E-05 -2.449E-05 -1.970E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.595E-06
ALLOWABLE LOAD REPETITIONS = 6.765E+11 DAMAGE RATIO = 4.194E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.134E-05
ALLOWABLE LOAD REPETITIONS = 1.407E+08 DAMAGE RATIO = 2.017E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.311E-05
ALLOWABLE LOAD REPETITIONS = 1.520E+09 DAMAGE RATIO = 1.866E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

1 9.00000 0.01547 550.840 552.863 285.548 292.599
(STRAIN) -6.863E-07 3.125E-05 3.150E-05 -9.313E-07 -7.594E-08
1 34.00000 0.01501 22.366 22.366 -479.904 -425.019
(STRAIN) -2.522E-05 2.523E-05 2.523E-05 -2.522E-05 -1.971E-05
1 34.00010 0.01501 22.366 72.639 22.366 64.560
(STRAIN) 1.360E-05 -3.978E-06 1.697E-05 -3.978E-06 1.360E-05
1 54.00010 0.01494 8.515 8.584 3.569 3.719
(STRAIN) -1.486E-05 6.124E-05 6.229E-05 -1.486E-05 -1.255E-05

2 9.00000 0.01549 276.719 424.776 167.404 241.892
(STRAIN) 3.112E-06 7.337E-06 2.530E-05 -5.925E-06 3.112E-06
2 34.00000 0.01516 22.266 22.266 -499.638 -441.934
(STRAIN) -2.624E-05 2.617E-05 2.617E-05 -2.624E-05 -2.045E-05
2 34.00010 0.01516 22.266 75.398 22.266 67.768
(STRAIN) 1.445E-05 -4.509E-06 1.763E-05 -4.509E-06 1.445E-05
2 54.00010 0.01509 8.799 8.812 3.639 3.821
(STRAIN) -1.554E-05 6.385E-05 6.404E-05 -1.554E-05 -1.274E-05

3 9.00000 0.01556 86.937 322.706 86.930 210.424
(STRAIN) 6.025E-06 -8.955E-06 1.965E-05 -8.956E-06 6.025E-06
3 34.00000 0.01532 21.725 21.725 -501.336 -440.358
(STRAIN) -2.640E-05 2.614E-05 2.614E-05 -2.640E-05 -2.027E-05
3 34.00010 0.01532 21.725 75.648 21.725 67.906
(STRAIN) 1.452E-05 -4.721E-06 1.775E-05 -4.721E-06 1.452E-05
3 54.00010 0.01524 8.905 8.905 3.689 3.880
(STRAIN) -1.566E-05 6.459E-05 6.459E-05 -1.566E-05 -1.272E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.863E-07
ALLOWABLE LOAD REPETITIONS = 9.143E+13 DAMAGE RATIO = 3.103E-09
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.640E-05
ALLOWABLE LOAD REPETITIONS = 3.820E+08 DAMAGE RATIO = 7.427E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.459E-05
ALLOWABLE LOAD REPETITIONS = 7.819E+09 DAMAGE RATIO = 3.628E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT VERTICAL VERTICAL VERTICAL MAJOR MINOR INTERMEDIATE
DISPL. PRINCIPAL PRINCIPAL PRINCIPAL
NO. COORDINATE (HORIZONTAL STRESS STRESS STRESS STRESS
P. STRAIN) (STRAIN) (STRAIN) (STRAIN) (STRAIN)

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 1     9.00000    0.01396     546.390     548.738     292.599     300.085
       (STRAIN)  -8.411E-08   2.159E-05   2.179E-05  -2.866E-07   3.586E-07
 1    34.00000    0.01362      17.606      17.606    -508.308    -452.860
       (STRAIN)  -1.971E-05   1.960E-05   1.960E-05  -1.971E-05  -1.556E-05
 1    34.00010    0.01362      17.606      57.456      17.606      51.320
       (STRAIN)   1.085E-05  -3.196E-06   1.341E-05  -3.196E-06   1.085E-05
 1    54.00010    0.01356       7.053       7.104       3.064       3.179
       (STRAIN)  -1.153E-05   4.984E-05   5.062E-05  -1.153E-05  -9.759E-06

 2     9.00000    0.01398     275.040     432.248     174.696     254.995
       (STRAIN)   2.718E-06   4.445E-06   1.800E-05  -4.204E-06   2.718E-06
 2    34.00000    0.01374      17.510      17.510    -528.357    -470.252
       (STRAIN)  -2.048E-05   2.032E-05   2.032E-05  -2.048E-05  -1.613E-05
 2    34.00010    0.01374      17.510      59.538      17.510      53.731
       (STRAIN)   1.149E-05  -3.603E-06   1.391E-05  -3.603E-06   1.149E-05
 2    54.00010    0.01368       7.270       7.280       3.119       3.257
       (STRAIN)  -1.204E-05   5.183E-05   5.197E-05  -1.204E-05  -9.914E-06

 3     9.00000    0.01408      87.330     345.436      87.323     228.026
       (STRAIN)   4.888E-06  -7.239E-06   1.501E-05  -7.239E-06   4.888E-06
 3    34.00000    0.01390      17.130      17.130    -531.040    -469.699
       (STRAIN)  -2.063E-05   2.034E-05   2.034E-05  -2.063E-05  -1.604E-05
 3    34.00010    0.01390      17.130      59.841      17.130      53.944
       (STRAIN)   1.157E-05  -3.772E-06   1.402E-05  -3.772E-06   1.157E-05
 3    54.00010    0.01384       7.392       7.392       3.181       3.327
       (STRAIN)  -1.216E-05   5.262E-05   5.262E-05  -1.216E-05  -9.917E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -8.411E-08
ALLOWABLE LOAD REPETITIONS =   6.831E+16  DAMAGE RATIO =   4.153E-12
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.063E-05
ALLOWABLE LOAD REPETITIONS =   6.680E+08  DAMAGE RATIO =   4.247E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   5.262E-05
ALLOWABLE LOAD REPETITIONS =   1.956E+10  DAMAGE RATIO =   1.450E-05

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 1.474E-04
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 3.787E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 6.540E-03
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MAXIMUM DAMAGE RATO = 3.787E-02 DESIGN LIFE IN YEARS = 26.41

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	1.92E-05	19714	2859282.882	11	5	7.95E+08	283,702	3.57E-04
2	2.23E-05	16460	2387286.382	11	5	5.62E+08	283,702	5.05E-04
3	2.80E-05	12502	1813287.803	11	5	3.36E+08	283,702	8.44E-04
4	3.73E-05	8753	1269557.481	11	5	1.77E+08	283,702	1.60E-03
5	5.11E-05	5831	845645.5593	11	5	8.90E+07	283,702	3.19E-03
6	6.88E-05	3897	565140.5798	11	5	4.72E+07	283,702	6.01E-03
7	8.34E-05	2969	430600.9563	11	5	3.16E+07	283,702	8.98E-03
8	8.03E-05	3139	455224.7323	11	5	3.42E+07	283,702	8.29E-03
9	6.15E-05	4553	660386.2812	11	5	6.00E+07	283,702	4.73E-03
10	4.13E-05	7687	1114901.631	11	5	1.41E+08	283,702	2.01E-03
11	2.64E-05	13442	1949529.725	11	5	3.84E+08	283,702	7.39E-04
12	2.06E-05	18064	2619893.15	11	5	6.71E+08	283,702	4.23E-04
							3.40E+06	3.77E-02

26.54

VITA UTILE

- Sovrastruttura **P2F**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0.001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 30 20
POISSON'S RATIOS OF LAYERS (PR) ARE : 0.35 0.35 0.35 0.25 0.4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6.452E+06 2 1.735E+07
3 1.964E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
3 1.642E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
3 1.250E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
3 8.786E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
3 5.880E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
3 3.950E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
3 3.020E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
3 3.191E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
3 4.606E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
3 7.727E+06 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
3 1.343E+07 4 3.000E+06 5 9.100E+04

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
3 1.800E+07 4 3.000E+06 5 9.100E+04

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8.92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31.5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0.000 0.000 2 0.000 8.900
3 0.000 15.800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 661973

LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 661973
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 661973

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0.495 3.291 0.854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0.4 3.291 0.854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1.365E-09 4.477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1.365E-09 4.477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01191	548.794	550.113	270.962	273.349
	(STRAIN)	-8.915E-07	2.063E-05	2.073E-05	-9.943E-07	-8.086E-07
1	39.00000	0.01159	11.392	11.392	-406.586	-366.303
	(STRAIN)	-1.438E-05	1.436E-05	1.436E-05	-1.438E-05	-1.161E-05
1	39.00010	0.01159	11.392	38.595	11.392	34.726
	(STRAIN)	7.410E-06	-2.313E-06	9.022E-06	-2.313E-06	7.410E-06
1	59.00010	0.01155	5.140	5.171	2.358	2.431
	(STRAIN)	-7.500E-06	3.529E-05	3.577E-05	-7.499E-06	-6.382E-06
2	9.00000	0.01191	278.877	423.168	166.355	228.737
	(STRAIN)	1.291E-06	5.193E-06	1.642E-05	-3.563E-06	1.291E-06
2	39.00000	0.01168	11.673	11.673	-423.590	-384.694
	(STRAIN)	-1.492E-05	1.500E-05	1.500E-05	-1.492E-05	-1.225E-05
2	39.00010	0.01168	11.673	40.121	11.673	36.637
	(STRAIN)	7.896E-06	-2.505E-06	9.348E-06	-2.505E-06	7.896E-06
2	59.00010	0.01164	5.285	5.291	2.396	2.480
	(STRAIN)	-7.827E-06	3.662E-05	3.671E-05	-7.827E-06	-6.536E-06
3	9.00000	0.01194	92.018	327.699	92.011	204.621
	(STRAIN)	3.327E-06	-5.435E-06	1.290E-05	-5.436E-06	3.327E-06
3	39.00000	0.01177	11.672	11.672	-429.550	-389.843
	(STRAIN)	-1.514E-05	1.520E-05	1.520E-05	-1.514E-05	-1.241E-05
3	39.00010	0.01177	11.672	40.643	11.672	37.184
	(STRAIN)	8.035E-06	-2.595E-06	9.476E-06	-2.595E-06	8.035E-06
3	59.00010	0.01173	5.418	5.418	2.464	2.552
	(STRAIN)	-7.951E-06	3.749E-05	3.749E-05	-7.951E-06	-6.607E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.915E-07
ALLOWABLE LOAD REPETITIONS = 2.645E+13 DAMAGE RATIO = 2.502E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.514E-05
ALLOWABLE LOAD REPETITIONS = 1.724E+09 DAMAGE RATIO = 3.841E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 3.749E-05
ALLOWABLE LOAD REPETITIONS = 8.927E+10 DAMAGE RATIO = 7.415E-06

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01269	551.621	552.848	269.202	271.635
	(STRAIN)	-1.260E-06	2.574E-05	2.586E-05	-1.378E-06	-1.144E-06
1	39.00000	0.01230	13.202	13.202	-395.368	-355.194
	(STRAIN)	-1.679E-05	1.681E-05	1.681E-05	-1.679E-05	-1.349E-05
1	39.00010	0.01230	13.203	44.739	13.203	40.147
	(STRAIN)	8.554E-06	-2.673E-06	1.047E-05	-2.673E-06	8.554E-06

1	59.00010	0.01226	5.793	5.831	2.605	2.690
	(STRAIN)	-8.833E-06	4.022E-05	4.080E-05	-8.833E-06	-7.516E-06
2	9.00000	0.01268	279.768	420.123	162.306	223.228
	(STRAIN)	1.378E-06	6.808E-06	2.029E-05	-4.472E-06	1.378E-06
2	39.00000	0.01240	13.541	13.541	-412.255	-373.424
	(STRAIN)	-1.744E-05	1.758E-05	1.758E-05	-1.744E-05	-1.425E-05
2	39.00010	0.01240	13.541	46.551	13.541	42.423
	(STRAIN)	9.133E-06	-2.901E-06	1.085E-05	-2.901E-06	9.133E-06
2	59.00010	0.01235	5.964	5.971	2.648	2.748
	(STRAIN)	-9.222E-06	4.179E-05	4.190E-05	-9.222E-06	-7.693E-06
3	9.00000	0.01273	91.480	315.036	91.472	195.661
	(STRAIN)	3.797E-06	-6.207E-06	1.526E-05	-6.208E-06	3.797E-06
3	39.00000	0.01253	13.519	13.519	-416.994	-377.339
	(STRAIN)	-1.764E-05	1.776E-05	1.776E-05	-1.764E-05	-1.438E-05
3	39.00010	0.01253	13.519	47.065	13.519	42.969
	(STRAIN)	9.274E-06	-2.997E-06	1.098E-05	-2.997E-06	9.274E-06
3	59.00010	0.01248	6.098	6.098	2.718	2.821
	(STRAIN)	-9.342E-06	4.267E-05	4.267E-05	-9.342E-06	-7.749E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.260E-06
ALLOWABLE LOAD REPETITIONS = 1.015E+13 DAMAGE RATIO = 6.521E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.764E-05
ALLOWABLE LOAD REPETITIONS = 1.212E+09 DAMAGE RATIO = 5.460E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4.267E-05
ALLOWABLE LOAD REPETITIONS = 5.002E+10 DAMAGE RATIO = 1.323E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01397	555.491	556.584	265.429	267.794
	(STRAIN)	-2.113E-06	3.598E-05	3.613E-05	-2.256E-06	-1.944E-06
1	39.00000	0.01346	16.457	16.457	-376.679	-336.802
	(STRAIN)	-2.116E-05	2.129E-05	2.129E-05	-2.116E-05	-1.686E-05
1	39.00010	0.01346	16.456	55.728	16.456	49.803
	(STRAIN)	1.059E-05	-3.309E-06	1.305E-05	-3.309E-06	1.059E-05
1	59.00010	0.01341	6.922	6.972	3.016	3.126
	(STRAIN)	-1.124E-05	4.884E-05	4.962E-05	-1.124E-05	-9.558E-06
2	9.00000	0.01395	281.025	415.476	155.794	214.145
	(STRAIN)	1.387E-06	1.020E-05	2.793E-05	-6.306E-06	1.387E-06
2	39.00000	0.01358	16.908	16.908	-393.335	-354.719
	(STRAIN)	-2.201E-05	2.230E-05	2.230E-05	-2.201E-05	-1.784E-05
2	39.00010	0.01358	16.908	58.073	16.908	52.760
	(STRAIN)	1.134E-05	-3.600E-06	1.355E-05	-3.600E-06	1.134E-05
2	59.00010	0.01352	7.141	7.150	3.071	3.199
	(STRAIN)	-1.174E-05	5.086E-05	5.101E-05	-1.174E-05	-9.774E-06
3	9.00000	0.01401	90.800	296.360	90.791	182.009
	(STRAIN)	4.541E-06	-7.483E-06	1.962E-05	-7.484E-06	4.541E-06
3	39.00000	0.01374	16.840	16.840	-396.667	-357.206
	(STRAIN)	-2.220E-05	2.245E-05	2.245E-05	-2.220E-05	-1.794E-05
3	39.00010	0.01374	16.840	58.566	16.840	53.299
	(STRAIN)	1.148E-05	-3.709E-06	1.368E-05	-3.709E-06	1.148E-05
3	59.00010	0.01368	7.268	7.268	3.136	3.269
	(STRAIN)	-1.186E-05	5.171E-05	5.171E-05	-1.186E-05	-9.806E-06

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.113E-06
ALLOWABLE LOAD REPETITIONS = 2.425E+12 DAMAGE RATIO = 2.730E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.220E-05
ALLOWABLE LOAD REPETITIONS = 7.184E+08 DAMAGE RATIO = 9.215E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5.171E-05
ALLOWABLE LOAD REPETITIONS = 2.115E+10 DAMAGE RATIO = 3.130E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01582	559.987	560.914	259.163	261.301
	(STRAIN)	-4.010E-06	5.533E-05	5.552E-05	-4.194E-06	-3.771E-06
1	39.00000	0.01511	21.685	21.685	-349.779	-310.524
	(STRAIN)	-2.830E-05	2.877E-05	2.877E-05	-2.830E-05	-2.227E-05
1	39.00010	0.01511	21.685	73.266	21.685	65.124
	(STRAIN)	1.380E-05	-4.304E-06	1.719E-05	-4.304E-06	1.380E-05
1	59.00010	0.01503	8.639	8.710	3.613	3.761
	(STRAIN)	-1.511E-05	6.220E-05	6.330E-05	-1.511E-05	-1.284E-05
2	9.00000	0.01578	282.553	409.645	146.751	201.478
	(STRAIN)	9.878E-07	1.703E-05	4.218E-05	-9.842E-06	9.878E-07
2	39.00000	0.01526	22.341	22.341	-366.003	-327.878
	(STRAIN)	-2.949E-05	3.018E-05	3.018E-05	-2.949E-05	-2.363E-05
2	39.00010	0.01526	22.341	76.513	22.341	69.242
	(STRAIN)	1.484E-05	-4.699E-06	1.787E-05	-4.699E-06	1.484E-05
2	59.00010	0.01518	8.938	8.952	3.687	3.862
	(STRAIN)	-1.581E-05	6.498E-05	6.519E-05	-1.581E-05	-1.312E-05
3	9.00000	0.01579	90.115	273.083	90.106	164.432
	(STRAIN)	5.470E-06	-9.236E-06	2.697E-05	-9.238E-06	5.470E-06
3	39.00000	0.01542	22.202	22.202	-368.360	-329.362
	(STRAIN)	-2.969E-05	3.032E-05	3.032E-05	-2.969E-05	-2.370E-05
3	39.00010	0.01542	22.202	77.011	22.202	69.813
	(STRAIN)	1.500E-05	-4.835E-06	1.800E-05	-4.835E-06	1.500E-05
3	59.00010	0.01534	9.048	9.048	3.737	3.919
	(STRAIN)	-1.594E-05	6.578E-05	6.578E-05	-1.594E-05	-1.313E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.010E-06
ALLOWABLE LOAD REPETITIONS = 4.163E+11 DAMAGE RATIO = 1.590E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.969E-05
ALLOWABLE LOAD REPETITIONS = 3.730E+08 DAMAGE RATIO = 1.775E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6.578E-05
ALLOWABLE LOAD REPETITIONS = 7.205E+09 DAMAGE RATIO = 9.187E-05

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01821	564.641	565.391	250.923	252.555
	(STRAIN)	-7.966E-06	9.002E-05	9.026E-05	-8.200E-06	-7.689E-06
1	39.00000	0.01714	29.208	29.208	-315.866	-277.678
	(STRAIN)	-3.893E-05	4.030E-05	4.030E-05	-3.893E-05	-3.016E-05
1	39.00010	0.01714	29.208	98.311	29.208	86.848
	(STRAIN)	1.832E-05	-5.694E-06	2.310E-05	-5.694E-06	1.832E-05
1	59.00010	0.01703	10.952	11.057	4.366	4.571
	(STRAIN)	-2.071E-05	8.061E-05	8.222E-05	-2.071E-05	-1.757E-05
2	9.00000	0.01812	284.231	403.529	135.728	186.306
	(STRAIN)	-5.645E-07	3.009E-05	6.745E-05	-1.640E-05	-5.645E-07
2	39.00000	0.01735	30.207	30.207	-331.360	-294.098
	(STRAIN)	-4.064E-05	4.237E-05	4.237E-05	-4.064E-05	-3.209E-05
2	39.00010	0.01735	30.208	102.933	30.208	92.755
	(STRAIN)	1.982E-05	-6.238E-06	2.406E-05	-6.238E-06	1.982E-05
2	59.00010	0.01724	11.373	11.393	4.468	4.713
	(STRAIN)	-2.169E-05	8.454E-05	8.484E-05	-2.169E-05	-1.793E-05
3	9.00000	0.01803	89.559	247.628	89.548	144.641

	(STRAIN)	6.176E-06	-1.107E-05	3.842E-05	-1.107E-05	6.176E-06
3	39.00000	0.01747	29.995	29.995	-333.469	-295.300
	(STRAIN)	-4.092E-05	4.253E-05	4.253E-05	-4.092E-05	-3.216E-05
3	39.00010	0.01747	29.995	103.567	29.995	93.513
	(STRAIN)	2.004E-05	-6.425E-06	2.423E-05	-6.425E-06	2.004E-05
3	59.00010	0.01737	11.472	11.472	4.502	4.757
	(STRAIN)	-2.187E-05	8.537E-05	8.537E-05	-2.187E-05	-1.794E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.966E-06
ALLOWABLE LOAD REPETITIONS = 6.435E+10 DAMAGE RATIO = 1.029E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.092E-05
ALLOWABLE LOAD REPETITIONS = 1.829E+08 DAMAGE RATIO = 3.620E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.537E-05
ALLOWABLE LOAD REPETITIONS = 2.243E+09 DAMAGE RATIO = 2.952E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.02087	568.915	569.503	242.299	243.245
	(STRAIN)	-1.508E-05	1.453E-04	1.456E-04	-1.537E-05	-1.490E-05
1	39.00000	0.01926	38.395	38.395	-279.578	-242.844
	(STRAIN)	-5.267E-05	5.601E-05	5.601E-05	-5.267E-05	-4.011E-05
1	39.00010	0.01926	38.395	128.700	38.395	113.022
	(STRAIN)	2.375E-05	-7.345E-06	3.028E-05	-7.345E-06	2.375E-05
1	59.00010	0.01912	13.601	13.750	5.167	5.442
	(STRAIN)	-2.758E-05	1.022E-04	1.045E-04	-2.758E-05	-2.336E-05
2	9.00000	0.02070	285.870	398.246	124.304	171.064
	(STRAIN)	-4.311E-06	5.218E-05	1.075E-04	-2.732E-05	-4.311E-06
2	39.00000	0.01954	39.885	39.885	-294.059	-257.990
	(STRAIN)	-5.512E-05	5.902E-05	5.902E-05	-5.512E-05	-4.279E-05
2	39.00010	0.01954	39.886	135.102	39.886	121.278
	(STRAIN)	2.584E-05	-8.070E-06	3.160E-05	-8.070E-06	2.584E-05
2	59.00010	0.01940	14.176	14.205	5.305	5.636
	(STRAIN)	-2.892E-05	1.076E-04	1.080E-04	-2.892E-05	-2.383E-05
3	9.00000	0.02048	89.206	223.458	89.192	125.403
	(STRAIN)	5.822E-06	-1.199E-05	5.407E-05	-1.199E-05	5.822E-06
3	39.00000	0.01963	39.632	39.632	-296.294	-259.271
	(STRAIN)	-5.555E-05	5.926E-05	5.926E-05	-5.555E-05	-4.290E-05
3	39.00010	0.01963	39.632	136.061	39.632	122.442
	(STRAIN)	2.617E-05	-8.331E-06	3.185E-05	-8.331E-06	2.617E-05
3	59.00010	0.01949	14.288	14.288	5.330	5.677
	(STRAIN)	-2.918E-05	1.086E-04	1.086E-04	-2.918E-05	-2.384E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.508E-05
ALLOWABLE LOAD REPETITIONS = 1.160E+10 DAMAGE RATIO = 5.707E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.555E-05
ALLOWABLE LOAD REPETITIONS = 9.392E+07 DAMAGE RATIO = 7.048E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.086E-04
ALLOWABLE LOAD REPETITIONS = 7.626E+08 DAMAGE RATIO = 8.680E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.02284	571.647	572.136	236.534	236.980
	(STRAIN)	-2.276E-05	2.003E-04	2.007E-04	-2.304E-05	-2.274E-05
1	39.00000	0.02071	45.497	45.497	-254.143	-218.602

```
        (STRAIN)  -6.409E-05   6.985E-05   6.985E-05  -6.409E-05  -4.820E-05
 1      39.00010    0.02071     45.498     152.113     45.498     133.084
        (STRAIN)   2.789E-05  -8.600E-06   3.582E-05  -8.600E-06   2.789E-05
 1      59.00010    0.02055     15.556      15.741      5.722      6.051
        (STRAIN)  -3.291E-05   1.184E-04   1.212E-04  -3.291E-05  -2.785E-05

 2       9.00000    0.02258     286.968     395.194     116.506     160.973
        (STRAIN)  -8.948E-06   7.504E-05   1.472E-04  -3.859E-05  -8.948E-06
 2      39.00000    0.02105     47.419      47.419     -267.778    -232.688
        (STRAIN)  -6.719E-05   7.370E-05   7.370E-05  -6.719E-05  -5.151E-05
 2      39.00010    0.02105     47.419      159.958     47.419     143.266
        (STRAIN)   3.047E-05  -9.462E-06   3.743E-05  -9.462E-06   3.047E-05
 2      59.00010    0.02088     16.254      16.289      5.887      6.287
        (STRAIN)  -3.454E-05   1.249E-04   1.255E-04  -3.454E-05  -2.839E-05

 3       9.00000    0.02225     89.059      207.837     89.043     112.793
        (STRAIN)   4.387E-06  -1.143E-05   6.774E-05  -1.144E-05   4.387E-06
 3      39.00000    0.02114     47.163      47.163     -270.093    -234.009
        (STRAIN)  -6.778E-05   7.403E-05   7.403E-05  -6.778E-05  -5.165E-05
 3      39.00010    0.02114     47.163      161.237     47.163     144.828
        (STRAIN)   3.091E-05  -9.784E-06   3.775E-05  -9.784E-06   3.091E-05
 3      59.00010    0.02097     16.388      16.388      5.914      6.333
        (STRAIN)  -3.488E-05   1.263E-04   1.263E-04  -3.488E-05  -2.844E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -2.276E-05
ALLOWABLE LOAD REPETITIONS =   3.876E+09  DAMAGE RATIO =   1.708E-04
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -6.778E-05
ALLOWABLE LOAD REPETITIONS =   6.138E+07  DAMAGE RATIO =   1.078E-02

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   1.263E-04
ALLOWABLE LOAD REPETITIONS =   3.889E+08  DAMAGE RATIO =   1.702E-03

DAMAGE ANALYSIS OF PERIOD NO.  8  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1       9.00000    0.02243     571.098     571.606     237.712     238.235
        (STRAIN)  -2.090E-05   1.876E-04   1.880E-04  -2.122E-05  -2.090E-05
 1      39.00000    0.02042     43.991      43.991     -259.383    -223.585
        (STRAIN)  -6.160E-05   6.677E-05   6.677E-05  -6.160E-05  -4.645E-05
 1      39.00010    0.02042     43.992      147.152     43.992     128.840
        (STRAIN)   2.702E-05  -8.335E-06   3.465E-05  -8.335E-06   2.702E-05
 1      59.00010    0.02026     15.147      15.324      5.608      5.926
        (STRAIN)  -3.178E-05   1.150E-04   1.177E-04  -3.178E-05  -2.689E-05

 2       9.00000    0.02218     286.744     395.783     118.099     163.013
        (STRAIN)  -7.818E-06   6.970E-05   1.380E-04  -3.596E-05  -7.818E-06
 2      39.00000    0.02074     45.818      45.818     -273.202    -237.903
        (STRAIN)  -6.456E-05   7.043E-05   7.043E-05  -6.456E-05  -4.962E-05
 2      39.00010    0.02074     45.818      154.687     45.818     138.606
        (STRAIN)   2.949E-05  -9.168E-06   3.619E-05  -9.168E-06   2.949E-05
 2      59.00010    0.02058     15.819      15.853      5.768      6.152
        (STRAIN)  -3.334E-05   1.213E-04   1.218E-04  -3.334E-05  -2.742E-05

 3       9.00000    0.02188     89.084      210.982     89.069     115.340
        (STRAIN)   4.790E-06  -1.166E-05   6.471E-05  -1.167E-05   4.790E-06
 3      39.00000    0.02083     45.561      45.561     -275.506    -239.220
        (STRAIN)  -6.511E-05   7.074E-05   7.074E-05  -6.511E-05  -4.975E-05
 3      39.00010    0.02083     45.561      155.895     45.561     140.079
        (STRAIN)   2.990E-05  -9.477E-06   3.650E-05  -9.477E-06   2.990E-05
 3      59.00010    0.02067     15.948      15.948      5.794      6.198
        (STRAIN)  -3.367E-05   1.225E-04   1.225E-04  -3.367E-05  -2.746E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -2.090E-05
ALLOWABLE LOAD REPETITIONS =   4.866E+09  DAMAGE RATIO =   1.361E-04
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -6.511E-05
ALLOWABLE LOAD REPETITIONS =   6.685E+07  DAMAGE RATIO =   9.902E-03
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AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.225E-04
ALLOWABLE LOAD REPETITIONS = 4.446E+08 DAMAGE RATIO = 1.489E-03

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01981	567.297	567.946	245.639	246.875
	(STRAIN)	-1.184E-05	1.208E-04	1.211E-04	-1.211E-05	-1.160E-05
1	39.00000	0.01843	34.644	34.644	-293.852	-256.510
	(STRAIN)	-4.694E-05	4.934E-05	4.934E-05	-4.694E-05	-3.599E-05
1	39.00010	0.01843	34.644	116.312	34.644	102.373
	(STRAIN)	2.154E-05	-6.676E-06	2.735E-05	-6.676E-06	2.154E-05
1	59.00010	0.01831	12.539	12.670	4.853	5.099
	(STRAIN)	-2.477E-05	9.347E-05	9.548E-05	-2.477E-05	-2.099E-05
2	9.00000	0.01967	285.239	400.184	128.755	176.939
	(STRAIN)	-2.507E-06	4.225E-05	8.976E-05	-2.242E-05	-2.507E-06
2	39.00000	0.01868	35.926	35.926	-308.761	-272.196
	(STRAIN)	-4.908E-05	5.194E-05	5.194E-05	-4.908E-05	-3.836E-05
2	39.00010	0.01868	35.926	121.976	35.926	109.650
	(STRAIN)	2.339E-05	-7.327E-06	2.853E-05	-7.327E-06	2.339E-05
2	59.00010	0.01856	13.050	13.075	4.976	5.271
	(STRAIN)	-2.596E-05	9.826E-05	9.864E-05	-2.596E-05	-2.142E-05
3	9.00000	0.01951	89.321	232.665	89.309	132.776
	(STRAIN)	6.149E-06	-1.181E-05	4.743E-05	-1.182E-05	6.149E-06
3	39.00000	0.01879	35.682	35.682	-310.933	-273.430
	(STRAIN)	-4.944E-05	5.215E-05	5.215E-05	-4.944E-05	-3.845E-05
3	39.00010	0.01879	35.682	122.786	35.682	110.630
	(STRAIN)	2.367E-05	-7.557E-06	2.874E-05	-7.557E-06	2.367E-05
3	59.00010	0.01866	13.154	13.154	5.004	5.313
	(STRAIN)	-2.619E-05	9.920E-05	9.920E-05	-2.619E-05	-2.143E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.184E-05
ALLOWABLE LOAD REPETITIONS = 2.215E+10 DAMAGE RATIO = 2.989E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.944E-05
ALLOWABLE LOAD REPETITIONS = 1.209E+08 DAMAGE RATIO = 5.476E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0.000E+00
ALLOWABLE LOAD REPETITIONS = 1.000E+30 DAMAGE RATIO = 0.000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.920E-05
ALLOWABLE LOAD REPETITIONS = 1.145E+09 DAMAGE RATIO = 5.782E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9.00000	0.01656	561.520	562.389	256.630	258.613
	(STRAIN)	-5.019E-06	6.468E-05	6.487E-05	-5.217E-06	-4.762E-06
1	39.00000	0.01574	23.901	23.901	-339.283	-300.326
	(STRAIN)	-3.139E-05	3.206E-05	3.206E-05	-3.139E-05	-2.458E-05
1	39.00010	0.01574	23.902	80.666	23.902	71.560
	(STRAIN)	1.514E-05	-4.718E-06	1.893E-05	-4.718E-06	1.514E-05
1	59.00010	0.01566	9.337	9.418	3.846	4.011
	(STRAIN)	-1.676E-05	6.771E-05	6.896E-05	-1.676E-05	-1.423E-05
2	9.00000	0.01650	283.094	407.616	143.299	196.686
	(STRAIN)	6.563E-07	2.046E-05	4.901E-05	-1.158E-05	6.564E-07
2	39.00000	0.01591	24.654	24.654	-355.304	-317.420
	(STRAIN)	-3.272E-05	3.366E-05	3.366E-05	-3.272E-05	-2.610E-05
2	39.00010	0.01591	24.654	84.310	24.654	76.191
	(STRAIN)	1.632E-05	-5.157E-06	1.970E-05	-5.157E-06	1.632E-05
2	59.00010	0.01583	9.672	9.687	3.928	4.123

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      (STRAIN)  -1.754E-05   7.082E-05   7.106E-05  -1.754E-05  -1.454E-05

 3     9.00000    0.01649     89.913     264.827     89.903     158.073
      (STRAIN)   5.759E-06  -9.865E-06   3.023E-05  -9.868E-06   5.759E-06
 3    39.00000    0.01606     24.488      24.488    -357.507    -318.738
      (STRAIN)  -3.294E-05   3.380E-05   3.380E-05  -3.294E-05  -2.617E-05
 3    39.00010    0.01606     24.488      84.832      24.488      76.801
      (STRAIN)   1.649E-05  -5.307E-06   1.984E-05  -5.307E-06   1.649E-05
 3    59.00010    0.01597      9.776       9.776       3.973       4.176
      (STRAIN)  -1.768E-05   7.161E-05   7.161E-05  -1.768E-05  -1.454E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -5.019E-06
ALLOWABLE LOAD REPETITIONS =   2.255E+11  DAMAGE RATIO =   2.935E-06
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -3.294E-05
ALLOWABLE LOAD REPETITIONS =   2.957E+08  DAMAGE RATIO =   2.238E-03

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   7.161E-05
ALLOWABLE LOAD REPETITIONS =   4.924E+09  DAMAGE RATIO =   1.344E-04

DAMAGE ANALYSIS OF PERIOD NO.  11  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)

 1     9.00000    0.01362     554.513     555.640     266.517     268.938
      (STRAIN)  -1.847E-06   3.295E-05   3.309E-05  -1.985E-06  -1.691E-06
 1    39.00000    0.01315      15.538      15.538    -381.785    -341.814
      (STRAIN)  -1.992E-05   2.001E-05   2.001E-05  -1.992E-05  -1.591E-05
 1    39.00010    0.01315      15.538      52.631      15.538      47.086
      (STRAIN)   1.001E-05  -3.131E-06   1.232E-05  -3.131E-06   1.001E-05
 1    59.00010    0.01309       6.608       6.655       2.904       3.006
      (STRAIN)  -1.056E-05   4.643E-05   4.715E-05  -1.056E-05  -8.981E-06

 2     9.00000    0.01360     280.703     416.694     157.550     216.607
      (STRAIN)   1.404E-06   9.180E-06   2.568E-05  -5.761E-06   1.404E-06
 2    39.00000    0.01326      15.956      15.956    -398.509    -359.821
      (STRAIN)  -2.071E-05   2.095E-05   2.095E-05  -2.071E-05  -1.682E-05
 2    39.00010    0.01326      15.956      54.823      15.956      49.848
      (STRAIN)   1.072E-05  -3.404E-06   1.279E-05  -3.404E-06   1.072E-05
 2    59.00010    0.01321       6.813       6.822       2.955       3.075
      (STRAIN)  -1.103E-05   4.833E-05   4.846E-05  -1.103E-05  -9.186E-06

 3     9.00000    0.01366      90.965     301.213      90.956     185.600
      (STRAIN)   4.344E-06  -7.137E-06   1.837E-05  -7.138E-06   4.344E-06
 3    39.00000    0.01341      15.901      15.901    -402.152    -362.626
      (STRAIN)  -2.091E-05   2.111E-05   2.111E-05  -2.091E-05  -1.693E-05
 3    39.00010    0.01341      15.901      55.321      15.901      50.388
      (STRAIN)   1.086E-05  -3.509E-06   1.292E-05  -3.509E-06   1.086E-05
 3    59.00010    0.01336       6.943       6.943       3.022       3.147
      (STRAIN)  -1.115E-05   4.919E-05   4.919E-05  -1.115E-05  -9.225E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.847E-06
ALLOWABLE LOAD REPETITIONS =   3.517E+12  DAMAGE RATIO =   1.882E-07
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -2.091E-05
ALLOWABLE LOAD REPETITIONS =   8.234E+08  DAMAGE RATIO =   8.040E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4.919E-05
ALLOWABLE LOAD REPETITIONS =   2.647E+10  DAMAGE RATIO =   2.501E-05

DAMAGE ANALYSIS OF PERIOD NO.  12  LOAD GROUP NO.  1

 POINT    VERTICAL  VERTICAL   VERTICAL    MAJOR      MINOR   INTERMEDIATE
                    DISPL.                PRINCIPAL  PRINCIPAL  PRINCIPAL
  NO.   COORDINATE (HORIZONTAL  STRESS      STRESS     STRESS     STRESS
                    P. STRAIN) (STRAIN)    (STRAIN)   (STRAIN)   (STRAIN)
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 1     9.00000    0.01228     550.200     551.473     270.199     272.608
       (STRAIN)  -1.054E-06   2.297E-05   2.308E-05  -1.164E-06  -9.562E-07
 1    39.00000    0.01193      12.240      12.240    -401.256    -361.019
       (STRAIN)  -1.551E-05   1.550E-05   1.550E-05  -1.551E-05  -1.249E-05
 1    39.00010    0.01193      12.240      41.474      12.240      37.268
       (STRAIN)   7.947E-06  -2.482E-06   9.699E-06  -2.482E-06   7.947E-06
 1    59.00010    0.01189       5.448       5.482       2.475       2.554
       (STRAIN)  -8.123E-06   3.761E-05   3.814E-05  -8.123E-06  -6.913E-06

 2     9.00000    0.01228     279.318     421.697     164.414     226.119
       (STRAIN)   1.339E-06   5.925E-06   1.820E-05  -3.979E-06   1.339E-06
 2    39.00000    0.01202      12.547      12.547    -418.206    -379.333
       (STRAIN)  -1.610E-05   1.620E-05   1.620E-05  -1.610E-05  -1.318E-05
 2    39.00010    0.01202      12.547      43.132      12.547      39.349
       (STRAIN)   8.476E-06  -2.691E-06   1.005E-05  -2.691E-06   8.476E-06
 2    59.00010    0.01198       5.605       5.612       2.516       2.607
       (STRAIN)  -8.479E-06   3.905E-05   3.915E-05  -8.479E-06  -7.077E-06

 3     9.00000    0.01232      91.747     321.516      91.739     200.281
       (STRAIN)   3.552E-06  -5.802E-06   1.400E-05  -5.803E-06   3.552E-06
 3    39.00000    0.01213      12.537      12.537    -423.547    -383.858
       (STRAIN)  -1.631E-05   1.639E-05   1.639E-05  -1.631E-05  -1.333E-05
 3    39.00010    0.01213      12.537      43.652      12.537      39.897
       (STRAIN)   8.616E-06  -2.784E-06   1.018E-05  -2.784E-06   8.616E-06
 3    59.00010    0.01209       5.740       5.740       2.585       2.680
       (STRAIN)  -8.602E-06   3.993E-05   3.993E-05  -8.602E-06  -7.141E-06

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1.054E-06
ALLOWABLE LOAD REPETITIONS =   1.662E+13  DAMAGE RATIO =   3.982E-08
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -1.631E-05
ALLOWABLE LOAD REPETITIONS =   1.452E+09  DAMAGE RATIO =   4.558E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0.000E+00
ALLOWABLE LOAD REPETITIONS =   1.000E+30  DAMAGE RATIO =   0.000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   3.993E-05
ALLOWABLE LOAD REPETITIONS =   6.732E+10  DAMAGE RATIO =   9.834E-06

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 4.092E-04
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 4.395E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 0.000E+00
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 5.246E-03
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MAXIMUM DAMAGE RATO = 4.395E-02 DESIGN LIFE IN YEARS = 22.75

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	1.51E-05	19635	2847870.312	11	5	1.73E+09	661,973	3.82E-04
2	1.76E-05	16417	2381064.367	11	5	1.22E+09	661,973	5.43E-04
3	2.22E-05	12501	1813154.687	11	5	7.22E+08	661,973	9.17E-04
4	2.97E-05	8786	1274280.728	11	5	3.75E+08	661,973	1.77E-03
5	4.09E-05	5880	852854.6821	11	5	1.84E+08	661,973	3.60E-03
6	5.56E-05	3950	572858.0675	11	5	9.44E+07	661,973	7.01E-03
7	6.78E-05	3020	438041.4408	11	5	6.17E+07	661,973	1.07E-02
8	6.51E-05	3191	462749.038	11	5	6.72E+07	661,973	9.85E-03
9	4.94E-05	4606	668070.6324	11	5	1.22E+08	661,973	5.45E-03
10	3.29E-05	7727	1120709.116	11	5	2.97E+08	661,973	2.23E-03
11	2.09E-05	13431	1948008.301	11	5	8.27E+08	661,973	8.00E-04
12	1.63E-05	18003	2611106.462	11	5	1.46E+09	661,973	4.54E-04
							7.94E+06	4.37E-02

22.87

VITA UTILE

- Sovrastruttura **P5A**

MATL = 1 FOR LINEAR ELASTIC LAYERED SYSTEM
NDAMA=2, SO DAMAGE ANALYSIS WITH DETAILED PRINTOUT WILL BE PERFORMED
NUMBER OF PERIODS PER YEAR (NPY) = 12
NUMBER OF LOAD GROUPS (NLG) = 1
TOLERANCE FOR INTEGRATION (DEL) -- = 0,001
NUMBER OF LAYERS (NL)---------- = 5
NUMBER OF Z COORDINATES (NZ)------ = 0
LIMIT OF INTEGRATION CYCLES (ICL)- = 90
COMPUTING CODE (NSTD)---------- = 9
SYSTEM OF UNITS (NUNIT)----------= 1

Length and displacement in cm, stress and modulus in kPa
unit weight in kN/m^3, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 35
POISSON'S RATIOS OF LAYERS (PR) ARE : 0,35 0,35 0,35 0,4 0,4
CONDITIONS OF INTERFACES (INT) ARE : 1 1 0 1

FOR PERIOD NO. 1 LAYER NO. AND MODULUS ARE : 1 6,452E+06 2 1,735E+07
3 1,971E+07 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5,122E+06 2 1,406E+07
3 1,646E+07 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3,633E+06 2 1,024E+07
3 1,250E+07 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2,351E+06 2 6,822E+06
3 8,753E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1,444E+06 2 4,312E+06
3 5,831E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8,971E+05 2 2,744E+06
3 3,897E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6,524E+05 2 2,025E+06
3 2,969E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6,962E+05 2 2,155E+06
3 3,139E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1,078E+06 2 3,267E+06
3 4,553E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2,010E+06 2 5,889E+06
3 7,687E+06 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3,974E+06 2 1,113E+07
3 1,344E+07 4 3,000E+06 5 1,200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5,765E+06 2 1,566E+07
3 1,806E+07 4 3,000E+06 5 1,200E+05

LOAD GROUP NO. 1 HAS 2 CONTACT AREAS
CONTACT RADIUS (CR)---------- = 8,92
CONTACT PRESSURE (CP)---------- = 800
NO. OF POINTS AT WHICH RESULTS ARE DESIRED (NPT)-- = 3
WHEEL SPACING ALONG X-AXIS (XW)---------- = 0
WHEEL SPACING ALONG Y-AXIS (YW)---------- = 31,5

RESPONSE PT. NO. AND (XPT, YPT) ARE: 1 0,000 0,000 2 0,000 8,900
3 0,000 15,800

NUMBER OF LAYERS FOR BOTTOM TENSION (NLBT)---- = 2
NUMBER OF LAYERS FOR TOP COMPRESSION (NLTC)--- = 2
LAYER NO. FOR BOTTOM TENSION (LNBT) ARE: 2 3
LAYER NO. FOR TOP COMPRESSION (LNTC) ARE: 4 5

LOAD REPETITIONS (TNLR) IN PERIOD 1 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 738532

LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 738532
LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 738532

DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 2 ARE: 0,495 3,291 0,854
DAMAGE COEF.'S (FT) FOR BOTTOM TENSION OF LAYER 3 ARE: 0,4 3,291 0,854

DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 4 ARE: 1,365E-09 4,477
DAMAGE COEFICIENTS (FT) FOR TOP COMPRESSION OF LAYER 5 ARE: 1,365E-09 4,477

DAMAGE ANALYSIS OF PERIOD NO. 1 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9,00000	0,01059	546,556	548,223	260,048	264,808
	(STRAIN)	-1,284E-06	2,088E-05	2,101E-05	-1,413E-06	-1,043E-06
1	34,00000	0,01028	30,714	30,714	-440,349	-388,321
	(STRAIN)	-1,599E-05	1,627E-05	1,627E-05	-1,599E-05	-1,243E-05
1	34,00010	0,01028	30,714	79,373	30,714	75,894
	(STRAIN)	1,062E-05	-1,046E-05	1,224E-05	-1,046E-05	1,062E-05
1	69,00010	0,01014	6,883	6,941	2,145	2,248
	(STRAIN)	-1,276E-05	4,252E-05	4,320E-05	-1,276E-05	-1,155E-05
2	9,00000	0,01060	276,310	415,091	161,162	220,468
	(STRAIN)	1,082E-06	5,428E-06	1,623E-05	-3,532E-06	1,082E-06
2	34,00000	0,01037	32,080	32,080	-457,673	-402,072
	(STRAIN)	-1,665E-05	1,689E-05	1,689E-05	-1,665E-05	-1,284E-05
2	34,00010	0,01037	32,080	82,273	32,080	79,360
	(STRAIN)	1,121E-05	-1,086E-05	1,257E-05	-1,086E-05	1,121E-05
2	69,00010	0,01022	7,079	7,090	2,171	2,281
	(STRAIN)	-1,315E-05	4,411E-05	4,425E-05	-1,315E-05	-1,186E-05
3	9,00000	0,01065	89,326	314,933	89,319	194,513
	(STRAIN)	3,056E-06	-5,129E-06	1,243E-05	-5,129E-06	3,056E-06
3	34,00000	0,01048	32,020	32,020	-459,691	-400,653
	(STRAIN)	-1,677E-05	1,690E-05	1,690E-05	-1,677E-05	-1,273E-05
3	34,00010	0,01048	32,020	82,650	32,020	79,809
	(STRAIN)	1,131E-05	-1,099E-05	1,264E-05	-1,099E-05	1,131E-05
3	69,00010	0,01033	7,193	7,193	2,222	2,334
	(STRAIN)	-1,324E-05	4,475E-05	4,475E-05	-1,324E-05	-1,193E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1,284E-06
ALLOWABLE LOAD REPETITIONS = 7,971E+12 DAMAGE RATIO = 9,265E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1,677E-05
ALLOWABLE LOAD REPETITIONS = 1,225E+09 DAMAGE RATIO = 6,029E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4,475E-05
ALLOWABLE LOAD REPETITIONS = 4,040E+10 DAMAGE RATIO = 1,828E-05

DAMAGE ANALYSIS OF PERIOD NO. 2 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9,00000	0,01118	549,650	551,111	254,492	258,804
	(STRAIN)	-1,921E-06	2,628E-05	2,642E-05	-2,061E-06	-1,647E-06
1	34,00000	0,01081	35,266	35,266	-418,037	-366,774
	(STRAIN)	-1,835E-05	1,883E-05	1,883E-05	-1,835E-05	-1,414E-05
1	34,00010	0,01081	35,266	89,863	35,266	85,823

	(STRAIN)	1,192E-05	-1,167E-05	1,381E-05	-1,167E-05	1,192E-05
1	69,00010	0,01065	7,578	7,647	2,282	2,402
	(STRAIN)	-1,447E-05	4,730E-05	4,811E-05	-1,447E-05	-1,308E-05
2	9,00000	0,01118	277,580	410,542	155,095	210,651
	(STRAIN)	9,018E-07	7,329E-06	2,010E-05	-4,433E-06	9,018E-07
2	34,00000	0,01091	36,844	36,844	-434,800	-379,738
	(STRAIN)	-1,912E-05	1,956E-05	1,956E-05	-1,912E-05	-1,461E-05
2	34,00010	0,01091	36,845	93,220	36,845	89,829
	(STRAIN)	1,260E-05	-1,212E-05	1,418E-05	-1,213E-05	1,260E-05
2	69,00010	0,01074	7,804	7,817	2,312	2,440
	(STRAIN)	-1,493E-05	4,915E-05	4,931E-05	-1,493E-05	-1,343E-05
3	9,00000	0,01122	89,226	298,979	89,218	181,818
	(STRAIN)	3,269E-06	-5,623E-06	1,452E-05	-5,624E-06	3,269E-06
3	34,00000	0,01102	36,743	36,743	-436,281	-377,723
	(STRAIN)	-1,926E-05	1,954E-05	1,954E-05	-1,926E-05	-1,445E-05
3	34,00010	0,01102	36,743	93,534	36,743	90,224
	(STRAIN)	1,270E-05	-1,225E-05	1,425E-05	-1,225E-05	1,270E-05
3	69,00010	0,01085	7,911	7,911	2,358	2,488
	(STRAIN)	-1,501E-05	4,977E-05	4,977E-05	-1,501E-05	-1,349E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1,921E-06
ALLOWABLE LOAD REPETITIONS = 2,531E+12 DAMAGE RATIO = 2,918E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1,926E-05
ALLOWABLE LOAD REPETITIONS = 9,074E+08 DAMAGE RATIO = 8,139E-04

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 4,977E-05
ALLOWABLE LOAD REPETITIONS = 2,511E+10 DAMAGE RATIO = 2,941E-05

DAMAGE ANALYSIS OF PERIOD NO. 3 LOAD GROUP NO. 1

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9,00000	0,01210	553,930	555,104	245,019	248,474
	(STRAIN)	-3,383E-06	3,719E-05	3,734E-05	-3,538E-06	-3,083E-06
1	34,00000	0,01161	43,065	43,065	-382,115	-332,298
	(STRAIN)	-2,247E-05	2,344E-05	2,344E-05	-2,247E-05	-1,709E-05
1	34,00010	0,01161	43,065	107,305	43,065	102,295
	(STRAIN)	1,405E-05	-1,359E-05	1,639E-05	-1,359E-05	1,405E-05
1	69,00010	0,01142	8,686	8,773	2,484	2,631
	(STRAIN)	-1,731E-05	5,505E-05	5,606E-05	-1,731E-05	-1,560E-05
2	9,00000	0,01209	279,431	404,042	145,195	195,035
	(STRAIN)	2,736E-07	1,140E-05	2,783E-05	-6,297E-06	2,736E-07
2	34,00000	0,01174	45,003	45,003	-397,873	-343,889
	(STRAIN)	-2,346E-05	2,437E-05	2,437E-05	-2,346E-05	-1,763E-05
2	34,00010	0,01174	45,003	111,443	45,003	107,219
	(STRAIN)	1,488E-05	-1,415E-05	1,685E-05	-1,415E-05	1,488E-05
2	69,00010	0,01153	8,964	8,981	2,518	2,677
	(STRAIN)	-1,788E-05	5,732E-05	5,752E-05	-1,788E-05	-1,602E-05
3	9,00000	0,01210	89,243	275,320	89,233	162,424
	(STRAIN)	3,401E-06	-6,246E-06	1,828E-05	-6,247E-06	3,401E-06
3	34,00000	0,01184	44,830	44,830	-398,894	-341,326
	(STRAIN)	-2,361E-05	2,431E-05	2,431E-05	-2,361E-05	-1,739E-05
3	34,00010	0,01184	44,830	111,691	44,830	107,564
	(STRAIN)	1,498E-05	-1,429E-05	1,691E-05	-1,429E-05	1,499E-05
3	69,00010	0,01163	9,060	9,060	2,556	2,718
	(STRAIN)	-1,797E-05	5,792E-05	5,792E-05	-1,797E-05	-1,607E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3,383E-06
ALLOWABLE LOAD REPETITIONS = 5,150E+11 DAMAGE RATIO = 1,434E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2,361E-05
ALLOWABLE LOAD REPETITIONS = 5,870E+08 DAMAGE RATIO = 1,258E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5,792E-05
ALLOWABLE LOAD REPETITIONS = 1,273E+10 DAMAGE RATIO = 5,801E-05

DAMAGE ANALYSIS OF PERIOD NO. 4 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9,00000	0,01334	558,960	559,816	232,089	234,206
	(STRAIN)	-6,548E-06	5,797E-05	5,813E-05	-6,716E-06	-6,297E-06
1	34,00000	0,01264	54,615	54,615	-333,488	-285,995
	(STRAIN)	-2,885E-05	3,101E-05	3,101E-05	-2,885E-05	-2,152E-05
1	34,00010	0,01264	54,615	132,088	54,615	125,623
	(STRAIN)	1,698E-05	-1,616E-05	2,000E-05	-1,616E-05	1,698E-05
1	69,00010	0,01238	10,173	10,286	2,721	2,909
	(STRAIN)	-2,131E-05	6,563E-05	6,696E-05	-2,131E-05	-1,912E-05
2	9,00000	0,01329	281,749	396,762	131,559	174,549
	(STRAIN)	-1,519E-06	1,969E-05	4,245E-05	-1,003E-05	-1,519E-06
2	34,00000	0,01279	57,074	57,074	-347,707	-295,533
	(STRAIN)	-3,019E-05	3,224E-05	3,224E-05	-3,019E-05	-2,214E-05
2	34,00010	0,01279	57,074	137,372	57,074	131,889
	(STRAIN)	1,804E-05	-1,688E-05	2,060E-05	-1,688E-05	1,804E-05
2	69,00010	0,01252	10,526	10,548	2,762	2,968
	(STRAIN)	-2,204E-05	6,855E-05	6,880E-05	-2,204E-05	-1,963E-05
3	9,00000	0,01324	89,491	246,018	89,480	137,744
	(STRAIN)	2,978E-06	-6,570E-06	2,440E-05	-6,572E-06	2,978E-06
3	34,00000	0,01288	56,788	56,788	-348,507	-292,640
	(STRAIN)	-3,038E-05	3,212E-05	3,212E-05	-3,038E-05	-2,177E-05
3	34,00010	0,01288	56,788	137,604	56,788	132,230
	(STRAIN)	1,816E-05	-1,705E-05	2,067E-05	-1,705E-05	1,816E-05
3	69,00010	0,01261	10,617	10,617	2,789	3,000
	(STRAIN)	-2,215E-05	6,918E-05	6,918E-05	-2,215E-05	-1,969E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6,548E-06
ALLOWABLE LOAD REPETITIONS = 8,293E+10 DAMAGE RATIO = 8,906E-06
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3,038E-05
ALLOWABLE LOAD REPETITIONS = 3,468E+08 DAMAGE RATIO = 2,130E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 6,918E-05
ALLOWABLE LOAD REPETITIONS = 5,748E+09 DAMAGE RATIO = 1,285E-04

DAMAGE ANALYSIS OF PERIOD NO. 5 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9,00000	0,01478	564,187	564,756	217,912	218,406
	(STRAIN)	-1,288E-05	9,538E-05	9,556E-05	-1,303E-05	-1,288E-05
1	34,00000	0,01372	69,303	69,303	-277,766	-233,406
	(STRAIN)	-3,779E-05	4,257E-05	4,257E-05	-3,779E-05	-2,752E-05
1	34,00010	0,01372	69,302	162,107	69,302	153,777
	(STRAIN)	2,040E-05	-1,902E-05	2,429E-05	-1,902E-05	2,040E-05
1	69,00010	0,01340	11,857	12,006	2,945	3,186
	(STRAIN)	-2,610E-05	7,788E-05	7,961E-05	-2,610E-05	-2,329E-05
2	9,00000	0,01467	284,293	390,319	115,750	152,236
	(STRAIN)	-5,772E-06	3,557E-05	6,877E-05	-1,720E-05	-5,772E-06
2	34,00000	0,01391	72,390	72,390	-290,001	-240,351
	(STRAIN)	-3,966E-05	4,425E-05	4,425E-05	-3,966E-05	-2,816E-05
2	34,00010	0,01391	72,390	168,819	72,390	161,690
	(STRAIN)	2,174E-05	-1,994E-05	2,506E-05	-1,994E-05	2,174E-05
2	69,00010	0,01357	12,306	12,335	2,993	3,260
	(STRAIN)	-2,704E-05	8,161E-05	8,194E-05	-2,704E-05	-2,392E-05

3	9,00000	0,01454	89,969	215,101	89,954	111,218
	(STRAIN)	1,032E-06	-5,621E-06	3,356E-05	-5,626E-06	1,032E-06
3	34,00000	0,01399	71,945	71,945	-290,729	-237,273
	(STRAIN)	-3,994E-05	4,403E-05	4,403E-05	-3,994E-05	-2,756E-05
3	34,00010	0,01399	71,945	169,103	71,945	162,092
	(STRAIN)	2,189E-05	-2,018E-05	2,516E-05	-2,018E-05	2,189E-05
3	69,00010	0,01364	12,402	12,402	3,012	3,286
	(STRAIN)	-2,719E-05	8,236E-05	8,236E-05	-2,719E-05	-2,400E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1,288E-05
ALLOWABLE LOAD REPETITIONS = 1,322E+10 DAMAGE RATIO = 5,585E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3,994E-05
ALLOWABLE LOAD REPETITIONS = 1,995E+08 DAMAGE RATIO = 3,702E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8,236E-05
ALLOWABLE LOAD REPETITIONS = 2,634E+09 DAMAGE RATIO = 2,804E-04

DAMAGE ANALYSIS OF PERIOD NO. 6 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9,00000	0,01627	568,919	569,280	204,604	205,840
	(STRAIN)	-2,431E-05	1,549E-04	1,551E-04	-2,430E-05	-2,370E-05
1	34,00000	0,01467	84,581	84,581	-225,259	-184,278
	(STRAIN)	-4,885E-05	5,849E-05	5,849E-05	-4,885E-05	-3,466E-05
1	34,00010	0,01467	84,581	191,861	84,581	181,575
	(STRAIN)	2,367E-05	-2,160E-05	2,847E-05	-2,160E-05	2,367E-05
1	69,00010	0,01428	13,420	13,605	3,113	3,409
	(STRAIN)	-3,077E-05	8,948E-05	9,163E-05	-3,077E-05	-2,732E-05
2	9,00000	0,01605	286,667	385,846	100,881	132,542
	(STRAIN)	-1,378E-05	6,205E-05	1,108E-04	-2,936E-05	-1,378E-05
2	34,00000	0,01490	88,265	88,265	-235,443	-188,593
	(STRAIN)	-5,141E-05	6,074E-05	6,074E-05	-5,141E-05	-3,518E-05
2	34,00010	0,01490	88,265	199,997	88,265	191,117
	(STRAIN)	2,527E-05	-2,273E-05	2,941E-05	-2,273E-05	2,527E-05
2	69,00010	0,01447	13,965	14,001	3,168	3,499
	(STRAIN)	-3,193E-05	9,403E-05	9,445E-05	-3,193E-05	-2,807E-05
3	9,00000	0,01580	90,512	187,869	87,715	90,493
	(STRAIN)	-3,539E-06	-2,163E-06	4,574E-05	-3,539E-06	-2,173E-06
3	34,00000	0,01497	87,620	87,620	-236,106	-185,355
	(STRAIN)	-5,182E-05	6,034E-05	6,034E-05	-5,182E-05	-3,423E-05
3	34,00010	0,01497	87,620	200,356	87,620	191,592
	(STRAIN)	2,547E-05	-2,305E-05	2,956E-05	-2,305E-05	2,547E-05
3	69,00010	0,01454	14,075	14,075	3,181	3,522
	(STRAIN)	-3,215E-05	9,495E-05	9,495E-05	-3,215E-05	-2,817E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2,431E-05
ALLOWABLE LOAD REPETITIONS = 2,409E+09 DAMAGE RATIO = 3,065E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5,182E-05
ALLOWABLE LOAD REPETITIONS = 1,195E+08 DAMAGE RATIO = 6,180E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9,495E-05
ALLOWABLE LOAD REPETITIONS = 1,393E+09 DAMAGE RATIO = 5,303E-04

DAMAGE ANALYSIS OF PERIOD NO. 7 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL STRESS (STRAIN)	VERTICAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
1	9,00000	0,01735	571,861	572,120	196,916	199,233
	(STRAIN)	-3,607E-05	2,139E-04	2,140E-04	-3,607E-05	-3,453E-05

1	34,00000	0,01522	94,719	94,719	-192,824	-154,129
	(STRAIN)	-5,794E-05	7,281E-05	7,281E-05	-5,794E-05	-4,035E-05
1	34,00010	0,01522	94,718	210,883	94,718	199,301
	(STRAIN)	2,569E-05	-2,312E-05	3,109E-05	-2,312E-05	2,569E-05
1	69,00010	0,01478	14,370	14,579	3,197	3,530
	(STRAIN)	-3,372E-05	9,663E-05	9,907E-05	-3,372E-05	-2,984E-05
2	9,00000	0,01700	288,144	383,770	91,811	121,140
	(STRAIN)	-2,237E-05	8,895E-05	1,527E-04	-4,192E-05	-2,237E-05
2	34,00000	0,01547	98,758	98,758	-201,670	-156,750
	(STRAIN)	-6,109E-05	7,552E-05	7,552E-05	-6,109E-05	-4,067E-05
2	34,00010	0,01547	98,758	219,927	98,758	209,861
	(STRAIN)	2,746E-05	-2,439E-05	3,216E-05	-2,439E-05	2,746E-05
2	69,00010	0,01500	14,978	15,019	3,256	3,630
	(STRAIN)	-3,503E-05	1,017E-04	1,022E-04	-3,503E-05	-3,066E-05
3	9,00000	0,01665	90,850	171,770	73,901	90,826
	(STRAIN)	-8,891E-06	2,406E-06	5,635E-05	-8,891E-06	2,390E-06
3	34,00000	0,01554	97,956	97,956	-202,275	-153,403
	(STRAIN)	-6,159E-05	7,492E-05	7,492E-05	-6,159E-05	-3,937E-05
3	34,00010	0,01554	97,956	220,322	97,956	210,369
	(STRAIN)	2,769E-05	-2,477E-05	3,233E-05	-2,477E-05	2,769E-05
3	69,00010	0,01506	15,101	15,101	3,267	3,653
	(STRAIN)	-3,528E-05	1,028E-04	1,028E-04	-3,528E-05	-3,079E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3,607E-05
ALLOWABLE LOAD REPETITIONS = 8,517E+08 DAMAGE RATIO = 8,671E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6,159E-05
ALLOWABLE LOAD REPETITIONS = 8,533E+07 DAMAGE RATIO = 8,655E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1,028E-04
ALLOWABLE LOAD REPETITIONS = 9,772E+08 DAMAGE RATIO = 7,558E-04

DAMAGE ANALYSIS OF PERIOD NO. 8 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9,00000	0,01712	571,276	571,554	198,376	200,466
	(STRAIN)	-3,334E-05	2,003E-04	2,005E-04	-3,333E-05	-3,203E-05
1	34,00000	0,01512	92,678	92,678	-199,217	-160,060
	(STRAIN)	-5,596E-05	6,959E-05	6,959E-05	-5,596E-05	-3,912E-05
1	34,00010	0,01512	92,678	207,097	92,678	195,776
	(STRAIN)	2,529E-05	-2,282E-05	3,057E-05	-2,282E-05	2,529E-05
1	69,00010	0,01468	14,184	14,388	3,181	3,507
	(STRAIN)	-3,314E-05	9,523E-05	9,760E-05	-3,314E-05	-2,934E-05
2	9,00000	0,01680	287,852	384,140	93,588	123,335
	(STRAIN)	-2,036E-05	8,271E-05	1,430E-04	-3,899E-05	-2,036E-05
2	34,00000	0,01536	96,648	96,648	-208,331	-163,019
	(STRAIN)	-5,897E-05	7,220E-05	7,220E-05	-5,897E-05	-3,948E-05
2	34,00010	0,01536	96,648	215,960	96,648	206,136
	(STRAIN)	2,703E-05	-2,406E-05	3,162E-05	-2,406E-05	2,703E-05
2	69,00010	0,01490	14,779	14,819	3,240	3,605
	(STRAIN)	-3,442E-05	1,002E-04	1,007E-04	-3,442E-05	-3,015E-05
3	9,00000	0,01647	90,785	174,905	76,581	90,762
	(STRAIN)	-7,612E-06	1,287E-06	5,399E-05	-7,612E-06	1,273E-06
3	34,00000	0,01543	95,880	95,880	-208,949	-159,694
	(STRAIN)	-5,946E-05	7,166E-05	7,166E-05	-5,946E-05	-3,827E-05
3	34,00010	0,01543	95,880	216,350	95,880	206,638
	(STRAIN)	2,725E-05	-2,444E-05	3,178E-05	-2,444E-05	2,725E-05
3	69,00010	0,01496	14,899	14,899	3,251	3,628
	(STRAIN)	-3,466E-05	1,012E-04	1,012E-04	-3,466E-05	-3,027E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3,334E-05
ALLOWABLE LOAD REPETITIONS = 1,047E+09 DAMAGE RATIO = 7,054E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5,946E-05
ALLOWABLE LOAD REPETITIONS = 9,140E+07 DAMAGE RATIO = 8,080E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1,012E-04
ALLOWABLE LOAD REPETITIONS = 1,046E+09 DAMAGE RATIO = 7,063E-04

DAMAGE ANALYSIS OF PERIOD NO. 9 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9,00000	0,01569	567,143	567,576	209,633	210,210
	(STRAIN)	-1,916E-05	1,286E-04	1,288E-04	-1,916E-05	-1,892E-05
1	34,00000	0,01432	78,664	78,664	-245,030	-202,730
	(STRAIN)	-4,428E-05	5,170E-05	5,170E-05	-4,428E-05	-3,174E-05
1	34,00010	0,01432	78,664	180,500	78,664	170,972
	(STRAIN)	2,244E-05	-2,064E-05	2,688E-05	-2,064E-05	2,244E-05
1	69,00010	0,01396	12,835	13,005	3,054	3,329
	(STRAIN)	-2,900E-05	8,511E-05	8,710E-05	-2,900E-05	-2,579E-05
2	9,00000	0,01551	285,772	387,363	106,462	139,791
	(STRAIN)	-1,012E-05	5,021E-05	9,220E-05	-2,389E-05	-1,012E-05
2	34,00000	0,01453	82,124	82,124	-256,005	-208,054
	(STRAIN)	-4,654E-05	5,371E-05	5,371E-05	-4,654E-05	-3,233E-05
2	34,00010	0,01453	82,124	188,093	82,124	179,895
	(STRAIN)	2,394E-05	-2,169E-05	2,776E-05	-2,169E-05	2,394E-05
2	69,00010	0,01414	13,343	13,376	3,107	3,413
	(STRAIN)	-3,007E-05	8,934E-05	8,973E-05	-3,007E-05	-2,650E-05
3	9,00000	0,01531	90,303	197,938	90,286	96,401
	(STRAIN)	-1,371E-06	-3,891E-06	4,059E-05	-3,898E-06	-1,371E-06
3	34,00000	0,01461	81,562	81,562	-256,697	-204,878
	(STRAIN)	-4,690E-05	5,339E-05	5,339E-05	-4,690E-05	-3,153E-05
3	34,00010	0,01461	81,562	188,422	81,562	180,345
	(STRAIN)	2,412E-05	-2,198E-05	2,789E-05	-2,198E-05	2,412E-05
3	69,00010	0,01421	13,447	13,447	3,122	3,437
	(STRAIN)	-3,026E-05	9,020E-05	9,020E-05	-3,026E-05	-2,659E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1,916E-05
ALLOWABLE LOAD REPETITIONS = 4,538E+09 DAMAGE RATIO = 1,627E-04
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4,690E-05
ALLOWABLE LOAD REPETITIONS = 1,452E+08 DAMAGE RATIO = 5,085E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9,020E-05
ALLOWABLE LOAD REPETITIONS = 1,753E+09 DAMAGE RATIO = 4,213E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9,00000	0,01379	560,683	561,439	227,419	229,028
	(STRAIN)	-8,188E-06	6,803E-05	6,821E-05	-8,362E-06	-7,993E-06
1	34,00000	0,01299	59,168	59,168	-315,565	-269,026
	(STRAIN)	-3,150E-05	3,431E-05	3,431E-05	-3,150E-05	-2,332E-05
1	34,00010	0,01299	59,168	141,558	59,168	134,519
	(STRAIN)	1,808E-05	-1,709E-05	2,136E-05	-1,709E-05	1,808E-05
1	69,00010	0,01272	10,717	10,841	2,798	3,003
	(STRAIN)	-2,283E-05	6,956E-05	7,101E-05	-2,283E-05	-2,044E-05
2	9,00000	0,01373	282,575	394,483	126,485	167,226
	(STRAIN)	-2,566E-06	2,388E-05	4,953E-05	-1,191E-05	-2,566E-06
2	34,00000	0,01316	61,827	61,827	-329,170	-277,756
	(STRAIN)	-3,299E-05	3,568E-05	3,568E-05	-3,299E-05	-2,396E-05
2	34,00010	0,01316	61,827	147,292	61,827	141,301
	(STRAIN)	1,922E-05	-1,787E-05	2,201E-05	-1,787E-05	1,922E-05

2	69,00010	0,01287	11,100	11,124	2,842	3,066
	(STRAIN)	-2,362E-05	7,273E-05	7,301E-05	-2,362E-05	-2,100E-05
3	9,00000	0,01366	89,627	235,808	89,615	129,023
	(STRAIN)	2,568E-06	-6,463E-06	2,705E-05	-6,465E-06	2,568E-06
3	34,00000	0,01325	61,495	61,495	-329,939	-274,795
	(STRAIN)	-3,321E-05	3,553E-05	3,553E-05	-3,321E-05	-2,353E-05
3	34,00010	0,01325	61,495	147,533	61,495	141,658
	(STRAIN)	1,935E-05	-1,806E-05	2,209E-05	-1,806E-05	1,935E-05
3	69,00010	0,01295	11,191	11,191	2,865	3,096
	(STRAIN)	-2,375E-05	7,339E-05	7,339E-05	-2,375E-05	-2,106E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8,188E-06
ALLOWABLE LOAD REPETITIONS = 4,505E+10 DAMAGE RATIO = 1,639E-05
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3,321E-05
ALLOWABLE LOAD REPETITIONS = 2,892E+08 DAMAGE RATIO = 2,554E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7,339E-05
ALLOWABLE LOAD REPETITIONS = 4,412E+09 DAMAGE RATIO = 1,674E-04

DAMAGE ANALYSIS OF PERIOD NO. 11 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9,00000	0,01186	552,843	554,089	247,596	251,287
	(STRAIN)	-2,930E-06	3,395E-05	3,410E-05	-3,081E-06	-2,633E-06
1	34,00000	0,01140	40,912	40,912	-391,761	-341,531
	(STRAIN)	-2,132E-05	2,214E-05	2,214E-05	-2,132E-05	-1,627E-05
1	34,00010	0,01140	40,912	102,551	40,912	97,809
	(STRAIN)	1,347E-05	-1,308E-05	1,569E-05	-1,308E-05	1,347E-05
1	69,00010	0,01122	8,390	8,471	2,432	2,571
	(STRAIN)	-1,654E-05	5,296E-05	5,391E-05	-1,654E-05	-1,492E-05
2	9,00000	0,01185	278,950	405,689	147,870	199,194
	(STRAIN)	4,896E-07	1,017E-05	2,554E-05	-5,737E-06	4,896E-07
2	34,00000	0,01152	42,751	42,751	-407,800	-353,503
	(STRAIN)	-2,225E-05	2,300E-05	2,300E-05	-2,225E-05	-1,679E-05
2	34,00010	0,01152	42,751	106,474	42,751	102,481
	(STRAIN)	1,426E-05	-1,361E-05	1,613E-05	-1,361E-05	1,426E-05
2	69,00010	0,01132	8,653	8,669	2,465	2,616
	(STRAIN)	-1,707E-05	5,512E-05	5,530E-05	-1,707E-05	-1,532E-05
3	9,00000	0,01187	89,221	281,472	89,212	167,521
	(STRAIN)	3,395E-06	-6,104E-06	1,722E-05	-6,105E-06	3,395E-06
3	34,00000	0,01163	42,597	42,597	-408,908	-351,051
	(STRAIN)	-2,239E-05	2,296E-05	2,296E-05	-2,239E-05	-1,658E-05
3	34,00010	0,01163	42,597	106,736	42,597	102,834
	(STRAIN)	1,437E-05	-1,374E-05	1,619E-05	-1,374E-05	1,437E-05
3	69,00010	0,01143	8,752	8,752	2,505	2,658
	(STRAIN)	-1,716E-05	5,572E-05	5,572E-05	-1,716E-05	-1,537E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2,930E-06
ALLOWABLE LOAD REPETITIONS = 7,701E+11 DAMAGE RATIO = 9,590E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2,239E-05
ALLOWABLE LOAD REPETITIONS = 6,567E+08 DAMAGE RATIO = 1,125E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 0,000E+00
ALLOWABLE LOAD REPETITIONS = 1,000E+30 DAMAGE RATIO = 0,000E+00

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 5,572E-05
ALLOWABLE LOAD REPETITIONS = 1,514E+10 DAMAGE RATIO = 4,877E-05

DAMAGE ANALYSIS OF PERIOD NO. 12 LOAD GROUP NO. 1

POINT NO.	VERTICAL DISPL. COORDINATE (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS

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 1     9,00000    0,01087     548,091     549,656     257,446     261,999
       (STRAIN)  -1,566E-06   2,335E-05   2,349E-05  -1,700E-06  -1,308E-06
 1     34,00000    0,01053     32,864      32,864    -429,681    -378,005
       (STRAIN)  -1,710E-05   1,747E-05   1,747E-05  -1,710E-05  -1,324E-05
 1     34,00010    0,01053     32,864      84,359      32,864      80,615
       (STRAIN)   1,124E-05  -1,104E-05   1,299E-05  -1,104E-05   1,124E-05
 1     69,00010    0,01039      7,216       7,279       2,212       2,323
       (STRAIN)  -1,357E-05   4,481E-05   4,555E-05  -1,357E-05  -1,228E-05

 2     9,00000    0,01088     276,933     412,867     158,269     215,770
       (STRAIN)   1,013E-06   6,285E-06   1,800E-05  -3,943E-06   1,013E-06
 2     34,00000    0,01063     34,331      34,331    -446,743    -391,386
       (STRAIN)  -1,781E-05   1,814E-05   1,814E-05  -1,781E-05  -1,368E-05
 2     34,00010    0,01063     34,331      87,474      34,331      84,336
       (STRAIN)   1,187E-05  -1,146E-05   1,334E-05  -1,146E-05   1,187E-05
 2     69,00010    0,01047      7,426       7,438       2,239       2,358
       (STRAIN)  -1,399E-05   4,652E-05   4,666E-05  -1,399E-05  -1,261E-05

 3     9,00000    0,01092      89,265     307,158      89,257     188,373
       (STRAIN)   3,169E-06  -5,374E-06   1,341E-05  -5,374E-06   3,169E-06
 3     34,00000    0,01075     34,251      34,251    -448,473    -389,650
       (STRAIN)  -1,794E-05   1,814E-05   1,814E-05  -1,794E-05  -1,355E-05
 3     34,00010    0,01075     34,251      87,819      34,251      84,757
       (STRAIN)   1,198E-05  -1,159E-05   1,341E-05  -1,159E-05   1,198E-05
 3     69,00010    0,01058      7,537       7,537       2,288       2,409
       (STRAIN)  -1,408E-05   4,715E-05   4,715E-05  -1,408E-05  -1,267E-05

AT BOTTOM OF LAYER  2   TENSILE STRAIN =  -1,566E-06
ALLOWABLE LOAD REPETITIONS =   4,523E+12  DAMAGE RATIO =   1,633E-07
AT BOTTOM OF LAYER  3   TENSILE STRAIN =  -1,794E-05
ALLOWABLE LOAD REPETITIONS =   1,058E+09  DAMAGE RATIO =   6,983E-04

AT TOP OF LAYER  4   COMPRESSIVE STRAIN =   0,000E+00
ALLOWABLE LOAD REPETITIONS =   1,000E+30  DAMAGE RATIO =   0,000E+00

AT TOP OF LAYER  5   COMPRESSIVE STRAIN =   4,715E-05
ALLOWABLE LOAD REPETITIONS =   3,199E+10  DAMAGE RATIO =   2,308E-05

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* SUMMARY OF DAMAGE ANALYSIS *
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AT BOTTOM OF LAYER  2     SUM OF DAMAGE RATIO = 2,126E-03
AT BOTTOM OF LAYER  3     SUM OF DAMAGE RATIO = 4,088E-02
AT TOP OF LAYER  4        SUM OF DAMAGE RATIO = 0,000E+00
AT TOP OF LAYER  5        SUM OF DAMAGE RATIO = 3,168E-03
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MAXIMUM DAMAGE RATO = 4,088E-02 DESIGN LIFE IN YEARS = 24,46

mesi	tensile strain	E* [Mpa]	E* [psi]	Vb [%]	Va [%]	N Asphalt Institute	n_mese	danno n/N
1	1.68E-05	19714	2859282.882	11	5	1.23E+09	738,532	5.99E-04
2	1.93E-05	16460	2387286.382	11	5	9.11E+08	738,532	8.10E-04
3	2.36E-05	12502	1813287.803	11	5	5.90E+08	738,532	1.25E-03
4	3.04E-05	8753	1269557.481	11	5	3.49E+08	738,532	2.12E-03
5	3.99E-05	5831	845645.5593	11	5	2.01E+08	738,532	3.68E-03
6	5.18E-05	3897	565140.5798	11	5	1.20E+08	738,532	6.15E-03
7	6.16E-05	2969	430600.9563	11	5	8.58E+07	738,532	8.61E-03
8	5.95E-05	3139	455224.7323	11	5	9.19E+07	738,532	8.04E-03
9	4.69E-05	4553	660386.2812	11	5	1.46E+08	738,532	5.06E-03
10	3.32E-05	7687	1114901.631	11	5	2.91E+08	738,532	2.54E-03
11	2.24E-05	13442	1949529.725	11	5	6.60E+08	738,532	1.12E-03
12	1.79E-05	18064	2619893.15	11	5	1.06E+09	738,532	6.95E-04
							8.86E+06	4.07E-02

24.58
VITA UTILE