

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 DEFINITIVO

AUTOSTRADA A14 / TANGENZIALE


OPERE COMPLEMENTARI

PAVIMENTAZIONI

Dimensionamento delle nuove pavimentazioni e degli interventi di risanamento

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1 PREMESSA

Nel presente documento vengono illustrati i risultati del dimensionamento delle nuove pavimentazioni e degli interventi di risanamento delle pavimentazioni esistenti previste nell'ambito del progetto.

Per quanto attiene agli interventi di risanamento delle attuali corsie di marcia dinamica/emergenza e normale dell'autostrada A14 (future corsie di marcia lenta e marcia veloce), questi sono stati previsti laddove i risultati della 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 "Analisi delle caratteristiche strutturali delle pavimentazioni esistenti" allegata al presente progetto.

2 DESCRIZIONE DELLE SOVRASTRUTTURE DI PROGETTO

2.1 PAVIMENTAZIONI SU NUOVO SEDIME

2.1.1 Autostrada e tangenziale

Il progetto delle pavimentazioni per l'ampliamento della piattaforma della tangenziale (in seguito alla completa demolizione della sovrastruttura dell'attuale emergenza) e per la realizzazione della nuova piattaforma sia in autostrada che in tangenziale nel caso di varianti planimetriche e/o altimetriche, 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.

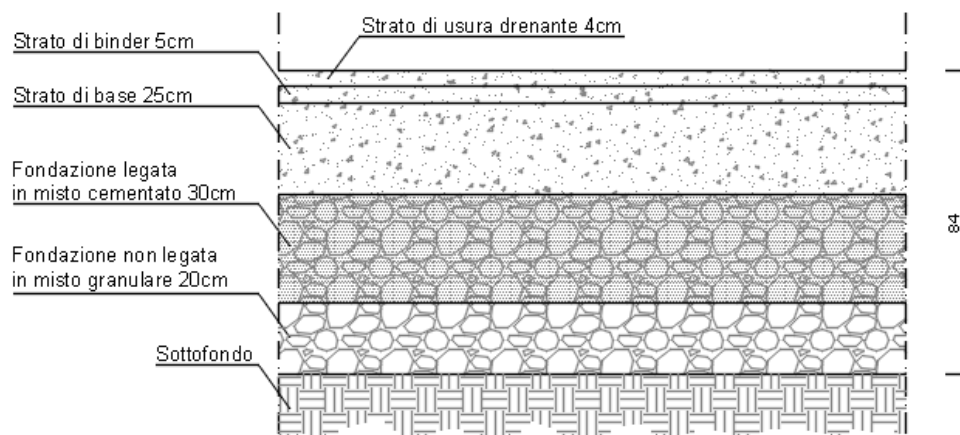


Figura 2-1. Composizione della sovrastruttura di progetto_Nuovo sedime A14 e tangenziale

Per l'adeguamento delle rampe degli svincoli esistenti è previsto l'impiego della suddetta sovrastruttura.

Lo strato di usura drenante verrà realizzato in un'unica fase sull'intera piattaforma.

Lungo le corsie specializzate di immissione/diversione è previsto uno strato di usura di tipo drenante in analogia con quanto previsto sull'asse principale (al fine di garantire la continuità idraulica sull'intera piattaforma per lo smaltimento delle acque).

Per i tratti su impalcato è prevista la stesa dei soli strati di binder e usura drenante/chiusa con l'interposizione tra la soletta e la pavimentazione di uno strato di impermeabilizzazione di spessore pari a 1 cm.

2.1.2 Nuovo svincolo di Lazzaretto

Per le rampe del nuovo svincolo di Lazzaretto è 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 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 10 cm;
- Fondazione legata in misto cementato di 20 cm;

- Fondazione non legata in misto granulare di 20 cm.

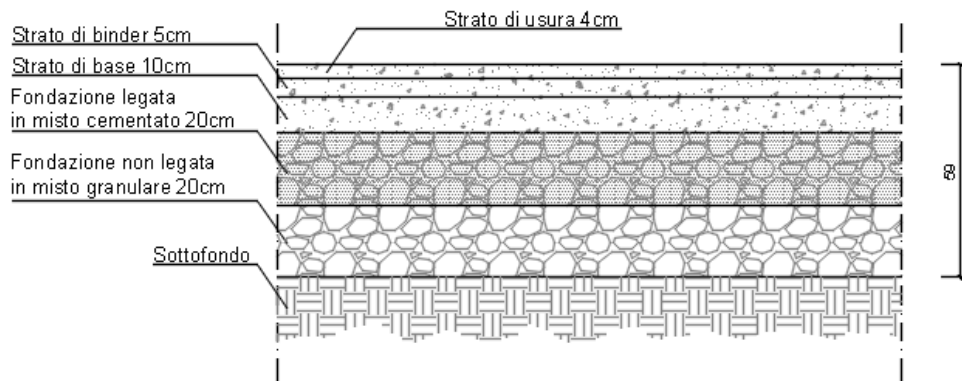


Figura 2-2. Composizione della sovrastruttura di progetto_Rampe nuovo svincolo Lazzaretto

In corrispondenza delle rampe di svincolo lo strato di usura dovrà essere realizzato in conglomerato bituminoso di tipo chiuso con bitumi modificati di tipo hard.

Lungo le corsie specializzate di immissione/diversione è previsto uno strato di usura di tipo drenante in analogia con quanto previsto sull'asse principale (al fine di garantire la continuità idraulica sull'intera piattaforma per lo smaltimento delle acque).

2.2 RISANAMENTO DELLE PAVIMENTAZIONI ESISTENTI

Il progetto prevede una serie di lavorazioni volte al risanamento sia superficiale che profondo della pavimentazione che vengono qui di seguito descritte.

2.2.1 Intervento di prima fase

La lavorazione che viene effettuata prima della fase di cantiere sia sulla piattaforma dell'autostrada che della tangenziale è la rimozione degli strati di binder e usura drenante attualmente in opera attraverso il seguente intervento:

- Fresatura conglomerati bituminosi per uno spessore di 8cm;
- Stesa strato di binder in CB con bitumi modificati tipo Hard di 4 cm.

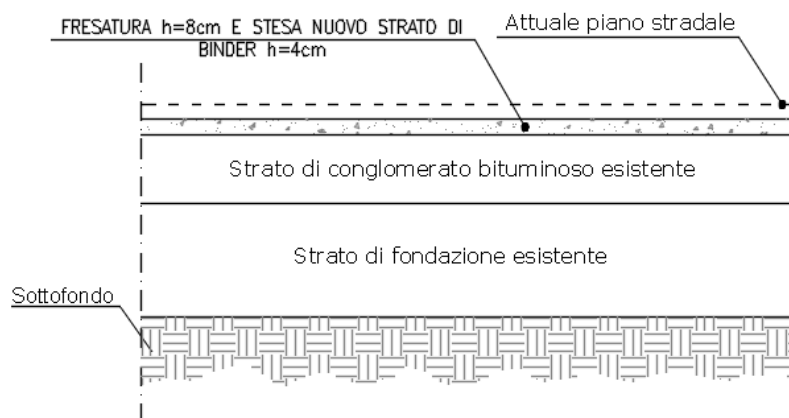


Figura 2-3. Intervento prima fase

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).

2.2.2 Risanamenti superficiali

Con riferimento ai risanamenti superficiali, codice 3, le lavorazioni che vengono effettuate dopo la fase di cantiere sono le seguenti:

- A. Realizzazione dello strato di usura drenante in conglomerato bituminoso in assenza di imbottitura attraverso il seguente intervento, denominato TIPO 3A:
 1. Realizzazione dello strato di usura drenante in conglomerato bituminoso (h=4cm).
- B. Realizzazione dello strato di usura drenante in conglomerato bituminoso in presenza di imbottitura attraverso il seguente intervento, denominato TIPO 3B:
 1. Imbottitura in conglomerato bituminoso;
 2. Realizzazione dello strato di collegamento (binder) in conglomerato bituminoso (h=5cm);
 3. Realizzazione dello strato di usura drenante in conglomerato bituminoso (h=4cm).

2.2.3 Risanamenti profondi

Per quanto riguarda i risanamenti profondi, codice 2, delle attuali corsie autostradali di marcia dinamica/emergenza (futura marcia lenta) e marcia normale (futura marcia veloce), sono previste quattro condizioni di intervento che hanno portato a definire 4 pacchetti di pavimentazione qui di seguito descritti.

Pacchetto di risanamento TIPO 2A

In corrispondenza dell'attuale corsia autostradale di marcia dinamica/emergenza (futura corsia di marcia lenta) in carreggiata sud, l'analisi dimensionale ha previsto l'impiego di un pacchetto di spessore complessivo pari a 64 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.

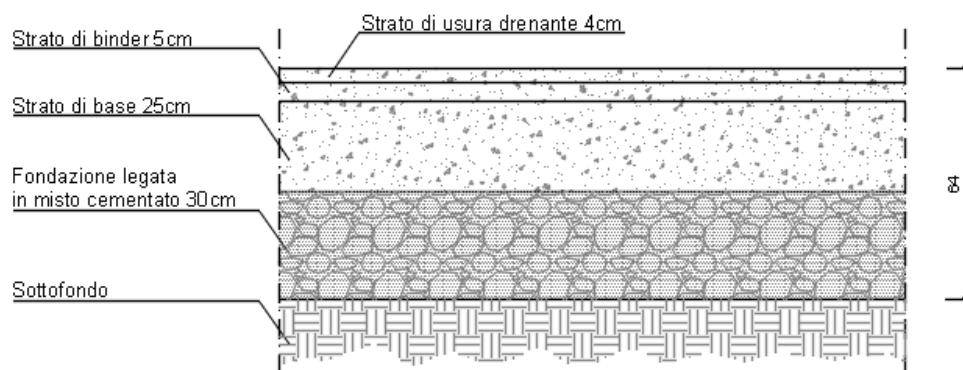


Figura 2-4. Pacchetto di risanamento TIPO 2A

L'intervento prevede la fresatura degli strati in conglomerato bituminoso e la demolizione della porzione restante di cassonetto necessaria a raggiungere la quota di posa della nuova sovrastruttura.

Pacchetto di risanamento TIPO 2B

In corrispondenza dell'attuale corsia autostradale di marcia dinamica/emergenza (futura corsia di marcia lenta) in carreggiata nord, l'analisi dimensionale ha previsto il rifacimento dei soli conglomerati bituminosi con una stratigrafia 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 20 cm.

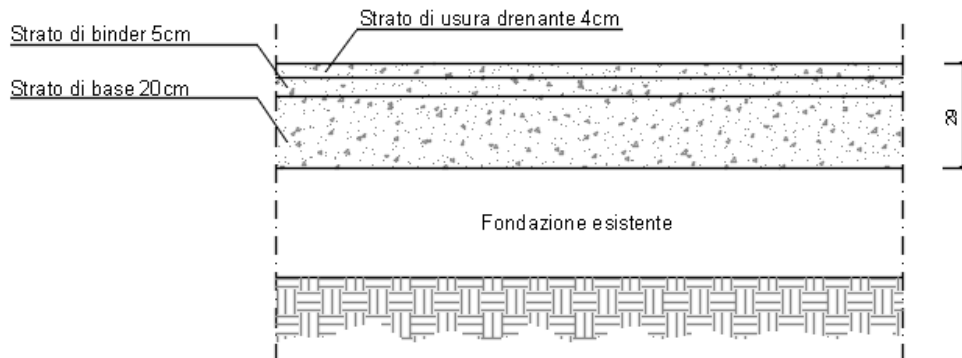


Figura 2-5. Pacchetto di risanamento TIPO 2B

L'intervento prevede la fresatura degli strati in conglomerato bituminoso fino a raggiungere la quota di posa dei nuovi strati.

Pacchetto di risanamento TIPO 2C

In corrispondenza dell'attuale corsia autostradale di marcia dinamica/emergenza (futura corsia di marcia lenta) in carreggiata nord, l'analisi dimensionale ha previsto il rifacimento dei soli conglomerati bituminosi con una stratigrafia 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.

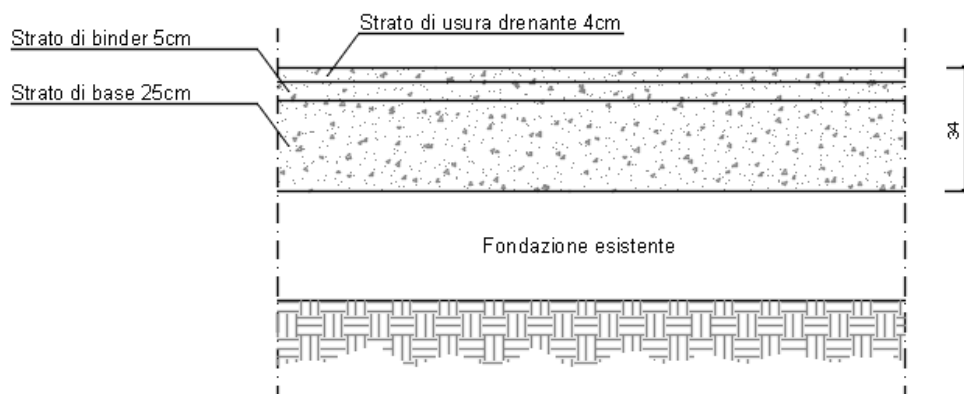


Figura 2-6. Pacchetto di risanamento TIPO 2C

L'intervento prevede la fresatura degli strati in conglomerato bituminoso fino a raggiungere la quota di posa dei nuovi strati.

Pacchetto di risanamento TIPO 2D

In corrispondenza dell'attuale corsia autostradale di marcia normale (futura marcia veloce) in entrambe le carreggiate, l'analisi dimensionale 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 20 cm;
- Fondazione legata in misto cementato di 30 cm.

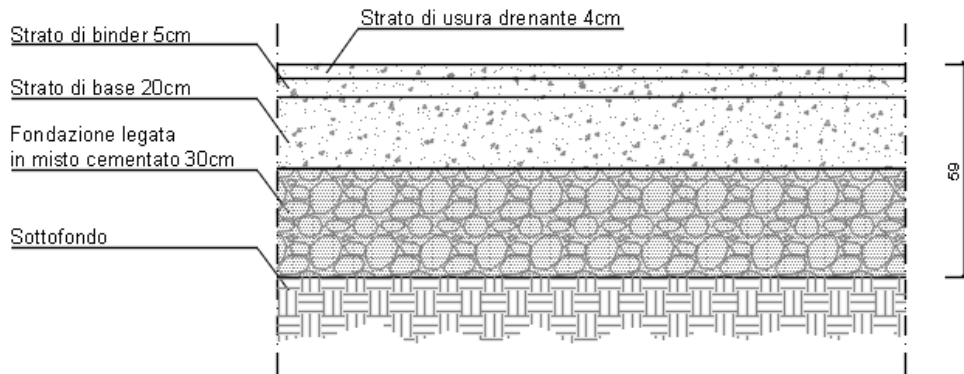


Figura 2-7. Pacchetto di risanamento TIPO 2D

L'intervento prevede la fresatura degli strati in conglomerato bituminoso e la demolizione della porzione restante di cassonetto necessaria a raggiungere la quota di posa della nuova sovrastruttura.

In Tabella 2-1 è riportato l'elenco delle tratte a cui corrispondono le suddette tipologie di risanamento.

CARREGGIATA SUD Marcia dinamica - L=3.50m			
Pk i	Pk f	Sviluppo [m]	Pacchetto
15300	15650	350	2A
15925	16200	275	2A

CARREGGIATA NORD Marcia dinamica - L=3.50m			
Pk i	Pk f	Sviluppo [m]	Pacchetto
11900	14300	2400	2B
15300	15650	350	2C
15890	17700	1810	2C

CARREGGIATA SUD Marcia normale - L=3.50m			
Pk i	Pk f	Sviluppo [m]	Pacchetto
8750	9095	345	2D
10615	15650	5035	2D
15925	18500	2575	2D

CARREGGIATA NORD Marcia normale - L=3.50m			
Pk i	Pk f	Sviluppo [m]	Pacchetto
10885	15650	4765	2D
15890	17900	2010	2D
19000	21090	2090	2D
21620	21700	80	2D

Tabella 2-1. Ubicazione risanamenti profondi

2.3 RIQUALIFICA DELLO SPARTITRAFFICO A14 - TANGENZIALE

Il progetto prevede l'impiego della seguente sovrastruttura:

- 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.

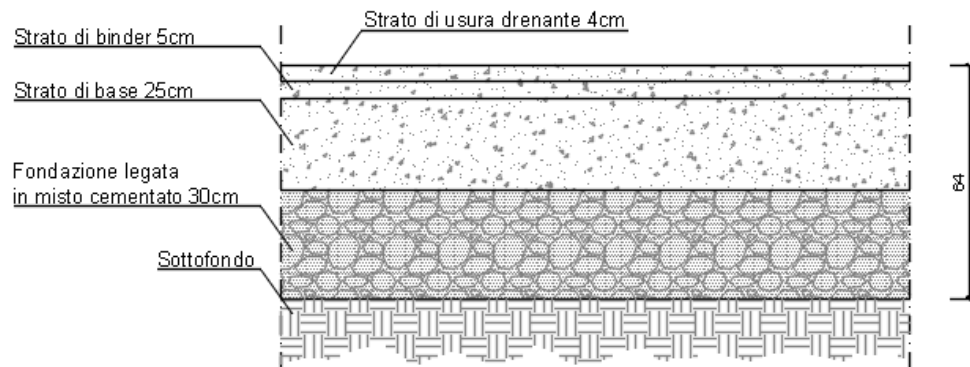


Figura 2-8. Composizione della sovrastruttura di progetto_Riqualifica spartitraffico A14 - Tangenziale

2.4 DATI DI INPUT

Per la valutazione della vita utile della sovrastruttura di progetto 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.

2.4.1 Caratteristiche di portanza del terreno di sottofondo

Le caratteristiche di portanza del terreno di sottofondo delle nuove pavimentazioni su nuovo sedime sono state desunte dalle prescrizioni contenute nel Capitolato Tecnico d'Appalto [1]. 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 M_d 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 [2] e riportata anche negli allegati al Catalogo delle Pavimentazioni Stradali [3]:

$$E_{dn} \text{ (MPa) } = 1.9 \div 2.1 M_d$$

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.

2.4.2 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.

2.4.3 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 di spessore pari a 20 cm.

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 retrocalcolo 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”.

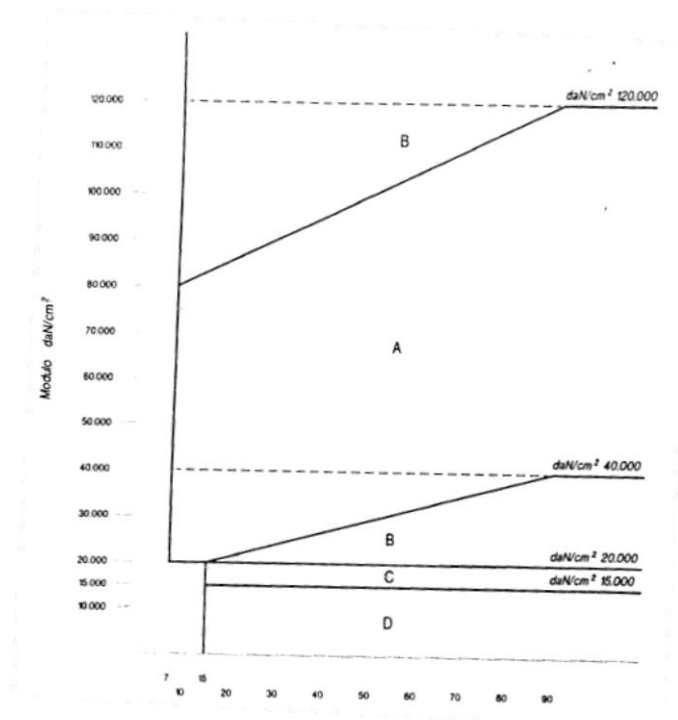


Figura 9 - Diagramma di controllo della media dei moduli dinamici relativi al misto cementato

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.

2.4.4 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 [4], 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).

In particolare il modulo complesso ridotto del bitume è stato determinato tramite correlazione con il modulo di rigidezza S_b .

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

- per miscele drenanti-fonoassorbenti una percentuale di bitume compresa tra il 5 ed il 6% ed una percentuale dei vuoti corrispondente a 50 rotazioni della pressa giratoria maggiore o uguale al 20%;
- 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 corrispondente 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 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 [5]. 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 S_b 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 tutte le miscele bituminose si è assunto un valore del rapporto di Poisson pari a 0.35.

2.4.5 Temperatura della pavimentazione

In mancanza di specifiche informazioni, si è fatto riferimento ai dati climatici rilevati negli ultimi 30 anni dalla stazione meteorologica 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.

2.4.6 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 pavimentazioni su nuovo sedime 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.

Per gli interventi di risanamento sulle attuali corsie di marcia dinamica e marcia normale dell'autostrada si è fatto riferimento al tratto elementare autostradale più carico dal punto di vista del traffico per ciascuna tipologia di risanamento.

Per l'infrastruttura è stato ipotizzato un periodo di progetto pari a 20 anni.

Per quanto riguarda la verifica della sovrastruttura per pavimentazioni su nuovo sedime in autostrada e tangenziale e per il risanamento 2D, presenti su entrambe le carreggiate, a partire dal dato di TGMA bidirezionale si è ipotizzata una suddivisione omogenea (50/50) tra le due direzioni di traffico.

Per quanto riguarda la verifica della sovrastruttura per i risanamenti 2A – 2B – 2C, presenti su una sola carreggiata, è stato utilizzato il dato di traffico presente sulla carreggiata in cui ricadono.

E' stata inoltre considerata una percentuale del traffico commerciale transitante pari al 70% nel caso di nuove pavimentazioni in autostrada e tangenziale, in quanto rappresenta la situazione più gravosa tra quelle presenti, mentre per quanto riguarda i risanamenti profondi in autostrada è stata considerata una percentuale del traffico commerciale transitante sulle future corsie di marcia lenta (attuale corsia dinamica/emergenza) e veloce dell'autostrada (attuale corsia di marcia normale) rispettivamente pari al 70% (interventi 2A – 2B – 2C) e 30% (intervento 2D).

Per le nuove rampe dello svincolo Lazzaretto la verifica è stata condotta facendo riferimento al volume di traffico commerciale che transiterà sulla rampa più carica ovvero l'uscita in carreggiata sud in tangenziale.

Il traffico commerciale di progetto transitante è stato successivamente determinato attraverso la conversione in passaggi di assi equivalenti singoli da 80 kN, secondo la metodologia proposta dall'Asphalt Institute [6], che a sua volta fa riferimento ai fattori di conversione proposti dall'AASHTO Guide [7].

Con riferimento agli spettri di traffico riportati nel Catalogo Italiano delle Pavimentazioni [3], si è assunto un coefficiente di equivalenza tra un generico veicolo commerciale ed un asse da 80 kN pari a 2.5.

In funzione di quanto riportato nel Catalogo Italiano delle Pavimentazioni [3], considerato che lo studio trasportistico evidenzia una 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 assunto pari a 3.0 (anziché lo standard pari a 2.5) ottenuto ridefinendo lo spettro relativo ad un'autostrada extraurbana ed in particolare prevedendo una componente maggiore di traffico relativa ai veicoli con classe di pedaggio 3-4-5 (3, 4, 5 o più assi) in funzione di quanto desunto dallo studio trasportistico. Per quanto riguarda le nuove rampe dello svincolo di Lazzaretto è stato assunto il coefficiente standard pari a 2.5.

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

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

2.5 CRITERI DI VERIFICA

I criteri di verifica utilizzati nel calcolo delle pavimentazioni sono quelli proposti dall'Asphalt Institute [6]. Questi trattano 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 quanto concerne la fessurazione, la legge di fatica considerata tiene conto degli effetti di **autoriparazione** del conglomerato bituminoso, derivanti dalle proprietà viscosi del legante e dal maggior tempo di riposo tra l'applicazione di un carico ed il successivo che vi è nel caso reale rispetto alle più severe prove di laboratorio. Secondo l'Asphalt Institute tali effetti sono responsabili di una vita utile effettiva superiore di 18,4 volte rispetto a quella misurata dalle corrispondenti prove di laboratorio: ciò è tenuto in conto nella legge considerata poiché essa, una volta derivata dalla regressione dei dati di laboratorio, viene successivamente modificata applicando un fattore di traslazione S_{FC} pari a 18,4.

La verifica razionale delle pavimentazioni è stata effettuata utilizzando una schematizzazione di multi-strato elastico ed impiegando il codice di calcolo KENLAYER [8]. Il traffico è stato espresso in termini di ripetizioni di assi equivalenti singoli a ruote gemellate da 80 kN. 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 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 state ipotizzate anche tra fondazione e terreno di sottofondo.

2.6 RISULTATI DELLE VERIFICHE

Nella tabella seguente si riportano in sintesi i dati di input utilizzati per le verifiche.

Tipologia sovrastruttura		Nuovo sedime A14 e tangenziale	Nuovo Svincolo Lazzaretto	2A	2B	2C	2D
Traffico							
numero assi medio mensile	80 kN/mese	738'532	63'837	608'737	754'976	648'455	316'514
Spessori sovrastruttura							
H ₁ USURA	cm	4	4	4	4	4	4
H ₂ BINDER	cm	5	5	5	5	5	5
H ₃ BASE	cm	25	10	25	20	25	20
H ₅ FONDAZIONE LEGATA	cm	30	20	30	-	-	30
H _{FONDAZIONE NON LEGATA}	cm	20	20	-	-	-	-
H _{FONDAZIONE ESISTENTE}	cm	-	-	-	30	30	-
H TOTALE	cm	84	59	64	59	64	59
Moduli elastici							
Conglomerati bituminosi E ₁ , E ₂ , E ₃	MPa	variabile	variabile	variabile	variabile	variabile	variabile
Misto cementato E ₄	MPa	3000	3000	3000	-	-	3000
Misto granulare non legato E ₅	MPa	268	-	-	-	-	-
Fondazione esistente	MPa	-	-	-	6314	2773	-
Sottofondo E ₆	MPa	120	120	120	203	146	120

Tabella 2-2. Riepilogo dati di input

Facendo riferimento ai criteri limite di progetto descritti in precedenza si è 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.

I risultati delle verifiche strutturali sono riportate integralmente nell'**Allegato D**.

Nella tabella seguente è riportata una sintesi dei risultati espressi sotto forma di:

- **danno elementare** relativo ad ogni mese dell'anno medio;
- **danno cumulativo** relativo all'anno medio, ottenuto come somma algebrica dei danni elementari sopra detti;
- **vita utile**, corrispondente al numero di anni necessari al raggiungimento di un valore unitario del danno.

DANNO ELEMENTARE	Nuovo sedime A14 e tangenziale	Nuovo Svincolo Lazzaretto	2A	2B	2C	2D
GEN	0.00065	0.000861	0.00057	0.00087	0.000561	0.000656
FEB	0.000888	0.001149	0.000784	0.001127	0.000772	0.000886
MAR	0.0014	0.001734	0.001249	0.001633	0.001234	0.001369
APR	0.002436	0.00282	0.002203	0.002558	0.002187	0.002313
MAG	0.004364	0.004636	0.004003	0.004156	0.004004	0.003993
GIU	0.007462	0.007291	0.006911	0.00673	0.00698	0.006588
LUG	0.01055	0.009833	0.009806	0.009471	0.009974	0.009129
AGO	0.009836	0.009235	0.009136	0.008817	0.00928	0.008542
SET	0.00609	0.00614	0.005622	0.005574	0.005656	0.005448
OTT	0.002951	0.003275	0.002681	0.002993	0.002667	0.002769
NOV	0.001245	0.001561	0.001107	0.001485	0.001093	0.001224
DIC	0.000757	0.000992	0.000666	0.000988	0.000656	0.00076
DANNO CUMULATO	0.048629	0.049527	0.044738	0.046402	0.045064	0.043676
VITA UTILE (anni)	20.56	20.19	22.35	21.55	22.19	22.90

Tabella 2-3. Risultati della verifica strutturale

Sulla base dei calcoli effettuati le sovrastrutture di progetto risultano verificate in quanto la vita utile di calcolo risulta superiore alla vita di progetto di 20 anni.

RIFERIMENTI BIBLIOGRAFICI

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- [4]. L. Francken e A. Vanelstraeten, "Complex Moduli of Bituminous Binders and Mixes. Interpretation and Evaluation", *Eurobitume Proceedings*, 1996.
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- [6]. "*Thickness Design – Highways and Streets*", Manual Series n. 1, Asphalt Institute, 1999.
- [7]. "*AASHTO Guide for Design of Pavement Structures*", AASHTO, 1993.
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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 **NUOVO SEDIME A14 E TANGENZIALE**

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 **NUOVO SVINCOLO LAZZARETTO**

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

MESE	T _{ARIA} (°C)	T _{PAV Usura} (°C)	T _{PAV Binder} (°C)	T _{PAV Base} (°C)
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
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 2A**

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 2B**

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 2C**

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

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	24.3
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 2D**

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

ALLEGATO B: ELABORAZIONE DEI DATI DI TRAFFICO

- Sovrastruttura **NUOVO SEDIME A14 E TANGENZIALE**

TGM 2030	22965
TGM 2040	23284

var med 2030/2040	0.14%
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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
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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

- Sovrastruttura **NUOVO SVINCOLO LAZZARETTO**

TGM 2030	838
TGM 2040	841

var med 2030/2040	0.04%
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	TGM
2030	838
2031	838
2032	839
2033	839
2034	839
2035	839
2036	840
2037	840
2038	840
2039	841
2040	841

MED 2030-2040	839
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TGM VP	839
% corsia più caricata	100%
coeff. eq assi 80 kN	2.5
n° assi 80 kN giorno	2099

Mese	n° assi 80 kN mese
GEN	65,061
FEB	58,764
MAR	65,061
APR	62,962
MAG	65,061
GIU	62,962
LUG	65,061
AGO	65,061
SET	62,962
OTT	65,061
NOV	62,962
DIC	65,061
Traffico medio	63,837

- Sovrastruttura 2A

TGM 2030	9,284
TGM 2040	9,780

var med 2030/2040	0.52%
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	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 BID	9530
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TGM VP BID	9530
% VP	70%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	20013

Mese	n° assi 80 kN mese
GEN	620,412
FEB	560,372
MAR	620,412
APR	600,398
MAG	620,412
GIU	600,398
LUG	620,412
AGO	620,412
SET	600,398
OTT	620,412
NOV	600,398
DIC	620,412
Traffico medio	608,737

- Sovrastruttura **2B**

TGM 2030	11,569
TGM 2040	12,074

var med 2030/2040	0.43%
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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 BID	11820
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TGM VP BID	11820
% VP	70%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	24821

Mese	n° assi 80 kN mese
GEN	769,455
FEB	694,992
MAR	769,455
APR	744,634
MAG	769,455
GIU	744,634
LUG	769,455
AGO	769,455
SET	744,634
OTT	769,455
NOV	744,634
DIC	769,455
Traffico medio	754,976

- Sovrastruttura 2C

TGM 2030	9,863
TGM 2040	10,446

var med 2030/2040	0.58%
-------------------	-------

	TGM
2030	9863
2031	9920
2032	9977
2033	10034
2034	10092
2035	10150
2036	10209
2037	10267
2038	10327
2039	10386
2040	10446

MED 2030-2040 BID	10152
-------------------	--------------

TGM VP BID	10152
% VP	70%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	21319

Mese	n° assi 80 kN mese
GEN	660,891
FEB	596,934
MAR	660,891
APR	639,572
MAG	660,891
GIU	639,572
LUG	660,891
AGO	660,891
SET	639,572
OTT	660,891
NOV	639,572
DIC	660,891
Traffico medio	648,455

- Sovrastruttura 2D

TGM 2030	22,965
TGM 2040	23,284

var med 2030/2040	0.14%
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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
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TGM VP BID	23124
% VP	30%
coeff. eq assi 80 kN	3
n° assi 80 kN giorno	10406

Mese	n° assi 80 kN mese
GEN	322,584
FEB	291,366
MAR	322,584
APR	312,178
MAG	322,584
GIU	312,178
LUG	322,584
AGO	322,584
SET	312,178
OTT	322,584
NOV	312,178
DIC	322,584
Traffico medio	316,514

ALLEGATO C: ELABORAZIONE DEI DATI RELATIVI ALLE MISCELE BITUMINOSE

- Sovrastruttura **NUOVO SEDIME A14 E TANGENZIALE**

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 **NUOVO SVINCOLO LAZZARETTO**

USURA CHIUSA (CON BITUMI HARD)						
G_b (g/cm ³)	1.02					
G_g (g/cm ³)	2.85					
G_m (g/cm ³)	2.467					
P_b	5.75%					
P_{bm}	5.437					
Calcolo degli indici V_g, V_b, V_a						
V_g [%]	81.6					
V_b [%]	13.4					
V_a [%]	5.0					
Calcolo del modulo elastico						
	T_{pav} (°C)	S_b (MPa)	B^*	R^*	Einf (MPa)	E (MPa)
GEN	3.6	381.8	0.127	0.501	28936	14500
FEB	7.6	217.5	0.073	0.394	28936	11400
MAR	13.0	102.8	0.034	0.276	28936	7990
APR	19.1	44.2	0.015	0.177	28936	5108
MAG	25.2	19.0	0.006	0.107	28936	3106
GIU	30.6	9.0	0.003	0.066	28936	1914
LUG	34.0	5.6	0.002	0.048	28936	1386
AGO	33.3	6.2	0.002	0.051	28936	1480
SET	28.6	11.9	0.004	0.080	28936	2306
OTT	20.0	39.2	0.013	0.165	28936	4772
NOV	11.7	123.9	0.041	0.303	28936	8764
DIC	5.6	288.2	0.096	0.446	28936	12892

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	4.0	359.9	0.120	0.607	32851	19951
FEB	7.9	210.2	0.070	0.505	32851	16589
MAR	13.1	102.7	0.034	0.381	32851	12505
APR	18.9	45.8	0.015	0.263	32851	8656
MAG	24.7	20.5	0.007	0.173	32851	5683
GIU	29.8	10.0	0.003	0.114	32851	3740
LUG	33.1	6.4	0.002	0.086	32851	2819
AGO	32.4	7.0	0.002	0.091	32851	2987
SET	27.9	13.1	0.004	0.134	32851	4397
OTT	20.8	35.0	0.012	0.230	32851	7568
NOV	11.8	122.8	0.041	0.410	32851	13473
DIC	5.9	275.1	0.092	0.555	32851	18246

- Sovrastruttura **2A**

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 2B

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 2C

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 2D

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

ALLEGATO D: VERIFICA STRUTTURALE DELLE PAVIMENTAZIONI

- Sovrastruttura **NUOVO SEDIME A14 E 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)----- = 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/m³, 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 (LNCT) 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 COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL (STRAIN)	MAJOR PRINCIPAL (STRAIN)	MINOR PRINCIPAL (STRAIN)	INTERMEDIATE STRESS
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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 COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
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 COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
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

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

NO.	COORDINATE	VERTICAL DISPL. (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

NO.	COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01680	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	

1	(STRAIN)	-2.926E-05	6.679E-05	6.974E-05	-2.926E-05	-2.605E-05
	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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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 COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01615	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 COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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 P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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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 NO.	VERTICAL COORDINATE P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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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 RATIO = 4.863E-02 DESIGN LIFE IN YEARS = 20.56

- Sovrastruttura **NUOVO SVINCOLO LAZZARETTO**

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/m³, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 10 20 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 1.450E+07 2 1.735E+07
 3 1.995E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 1.140E+07 2 1.406E+07
 3 1.659E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 7.990E+06 2 1.024E+07
 3 1.251E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 5.108E+06 2 6.822E+06
 3 8.656E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 3.106E+06 2 4.312E+06
 3 5.683E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 1.914E+06 2 2.744E+06
 3 3.740E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 1.386E+06 2 2.025E+06
 3 2.819E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 1.480E+06 2 2.155E+06
 3 2.987E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 2.306E+06 2 3.267E+06
 3 4.397E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 4.772E+06 2 5.889E+06
 3 7.568E+06 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 8.764E+06 2 1.113E+07
 3 1.347E+07 4 3.000E+06 5 2.680E+05 6 1.200E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 1.289E+07 2 1.566E+07
 3 1.825E+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 : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 63837
 LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 63837

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

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01685	454.519	463.245	124.581	133.309	
	(STRAIN)	-4.175E-06	2.082E-05	2.150E-05	-4.854E-06	-4.175E-06	
1	19.00000	0.01660	71.492	71.492	-1060.617	-912.698	
	(STRAIN)	-3.840E-05	3.820E-05	3.820E-05	-3.840E-05	-2.840E-05	
1	39.00010	0.01637	22.461	23.113	3.330	4.158	
	(STRAIN)	-2.828E-05	7.166E-05	7.507E-05	-2.828E-05	-2.395E-05	
1	59.00010	0.01498	14.496	14.705	2.268	2.586	
	(STRAIN)	-3.874E-05	1.039E-04	1.064E-04	-3.874E-05	-3.502E-05	
2	9.00000	0.01706	217.562	311.255	68.643	93.214	
	(STRAIN)	-2.291E-06	7.385E-06	1.468E-05	-4.203E-06	-2.291E-06	
2	19.00000	0.01686	61.589	61.589	-1050.697	-828.704	
	(STRAIN)	-3.921E-05	3.606E-05	3.606E-05	-3.921E-05	-2.419E-05	
2	39.00010	0.01665	23.526	23.634	3.381	4.764	
	(STRAIN)	-2.977E-05	7.546E-05	7.603E-05	-2.977E-05	-2.254E-05	
2	59.00010	0.01519	15.051	15.091	2.298	2.655	
	(STRAIN)	-4.000E-05	1.088E-04	1.093E-04	-4.001E-05	-3.584E-05	
3	9.00000	0.01707	54.835	175.008	54.824	70.441	
	(STRAIN)	-5.764E-07	-1.791E-06	7.560E-06	-1.792E-06	-5.764E-07	
3	19.00000	0.01691	53.972	53.972	-1019.560	-752.580	
	(STRAIN)	-3.885E-05	3.379E-05	3.379E-05	-3.885E-05	-2.078E-05	
3	39.00010	0.01672	23.672	23.672	3.382	4.928	
	(STRAIN)	-3.007E-05	7.593E-05	7.593E-05	-3.007E-05	-2.199E-05	
3	59.00010	0.01524	15.159	15.159	2.301	2.669	
	(STRAIN)	-4.025E-05	1.098E-04	1.098E-04	-4.025E-05	-3.596E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.175E-06
 ALLOWABLE LOAD REPETITIONS = 1.643E+11 DAMAGE RATIO = 3.885E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.921E-05
 ALLOWABLE LOAD REPETITIONS = 7.415E+07 DAMAGE RATIO = 8.609E-04

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.593E-05
 ALLOWABLE LOAD REPETITIONS = 3.790E+09 DAMAGE RATIO = 1.684E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.098E-04
 ALLOWABLE LOAD REPETITIONS = 7.281E+08 DAMAGE RATIO = 8.768E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01770	462.457	470.126	132.595	140.718	
		(STRAIN) -5.040E-06	2.590E-05	2.664E-05	-5.776E-06	-4.996E-06	
1	19.00000	0.01741	82.412	82.412	-1001.075	-856.861	
		(STRAIN) -4.401E-05	4.417E-05	4.417E-05	-4.401E-05	-3.227E-05	
1	39.00010	0.01714	24.861	25.623	3.327	4.296	
		(STRAIN) -3.224E-05	8.025E-05	8.423E-05	-3.224E-05	-2.718E-05	
1	59.00010	0.01560	15.723	15.965	2.263	2.630	
		(STRAIN) -4.312E-05	1.139E-04	1.167E-04	-4.312E-05	-3.885E-05	
2	9.00000	0.01793	222.590	317.203	70.069	97.450	
		(STRAIN) -2.710E-06	9.307E-06	1.839E-05	-5.339E-06	-2.710E-06	
2	19.00000	0.01770	70.525	70.525	-989.700	-770.157	
		(STRAIN) -4.490E-05	4.138E-05	4.138E-05	-4.490E-05	-2.703E-05	
2	39.00010	0.01746	26.083	26.209	3.380	5.005	
		(STRAIN) -3.398E-05	8.462E-05	8.528E-05	-3.398E-05	-2.549E-05	
2	59.00010	0.01583	16.357	16.404	2.294	2.708	
		(STRAIN) -4.459E-05	1.195E-04	1.200E-04	-4.459E-05	-3.976E-05	
3	9.00000	0.01793	57.724	174.245	57.713	72.381	
		(STRAIN) -6.263E-07	-2.034E-06	9.156E-06	-2.035E-06	-6.263E-07	
3	19.00000	0.01775	61.436	61.437	-958.781	-693.754	
		(STRAIN) -4.446E-05	3.857E-05	3.857E-05	-4.446E-05	-2.289E-05	
3	39.00010	0.01753	26.254	26.254	3.379	5.198	
		(STRAIN) -3.434E-05	8.516E-05	8.516E-05	-3.434E-05	-2.483E-05	
3	59.00010	0.01588	16.485	16.485	2.296	2.723	
		(STRAIN) -4.490E-05	1.206E-04	1.206E-04	-4.490E-05	-3.991E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.040E-06
 ALLOWABLE LOAD REPETITIONS = 1.058E+11 DAMAGE RATIO = 6.031E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.490E-05
 ALLOWABLE LOAD REPETITIONS = 5.557E+07 DAMAGE RATIO = 1.149E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.516E-05
 ALLOWABLE LOAD REPETITIONS = 2.267E+09 DAMAGE RATIO = 2.816E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.206E-04
 ALLOWABLE LOAD REPETITIONS = 4.766E+08 DAMAGE RATIO = 1.339E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01897	474.257	480.266	140.121	146.530	
		(STRAIN) -6.947E-06	3.631E-05	3.710E-05	-7.740E-06	-6.895E-06	
1	19.00000	0.01860	101.085	101.085	-905.599	-768.448	
		(STRAIN) -5.374E-05	5.494E-05	5.494E-05	-5.374E-05	-3.893E-05	
1	39.00010	0.01827	28.681	29.628	3.247	4.458	
		(STRAIN) -3.876E-05	9.411E-05	9.905E-05	-3.876E-05	-3.243E-05	
1	59.00010	0.01649	17.594	17.892	2.218	2.666	
		(STRAIN) -5.005E-05	1.293E-04	1.328E-04	-5.005E-05	-4.482E-05	
2	9.00000	0.01923	230.390	324.692	70.141	98.881	
		(STRAIN) -3.839E-06	1.350E-05	2.593E-05	-7.627E-06	-3.839E-06	

2	19.00000	0.01894	85.534	85.534	-892.143	-678.180
	(STRAIN)	-5.476E-05	5.079E-05	5.079E-05	-5.476E-05	-3.166E-05
2	39.00010	0.01865	30.161	30.315	3.297	5.346
	(STRAIN)	-4.092E-05	9.941E-05	1.002E-04	-4.092E-05	-3.022E-05
2	59.00010	0.01676	18.358	18.416	2.248	2.759
	(STRAIN)	-5.185E-05	1.361E-04	1.368E-04	-5.185E-05	-4.589E-05
3	9.00000	0.01921	62.538	169.996	62.522	70.740
	(STRAIN)	-1.039E-06	-2.120E-06	1.205E-05	-2.122E-06	-1.039E-06
3	19.00000	0.01899	73.791	73.791	-861.844	-602.054
	(STRAIN)	-5.413E-05	4.687E-05	4.687E-05	-5.413E-05	-2.609E-05
3	39.00010	0.01873	30.369	30.369	3.295	5.590
	(STRAIN)	-4.137E-05	1.001E-04	1.001E-04	-4.137E-05	-2.939E-05
3	59.00010	0.01682	18.521	18.521	2.250	2.778
	(STRAIN)	-5.225E-05	1.376E-04	1.376E-04	-5.225E-05	-4.609E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.947E-06
 ALLOWABLE LOAD REPETITIONS = 4.824E+10 DAMAGE RATIO = 1.323E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.476E-05
 ALLOWABLE LOAD REPETITIONS = 3.681E+07 DAMAGE RATIO = 1.734E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.001E-04
 ALLOWABLE LOAD REPETITIONS = 1.102E+09 DAMAGE RATIO = 5.794E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.376E-04
 ALLOWABLE LOAD REPETITIONS = 2.647E+08 DAMAGE RATIO = 2.412E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
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1	9.00000	0.02057	489.420	493.452	144.327	147.665	
	(STRAIN)	-1.108E-05	5.655E-05	5.735E-05	-1.174E-05	-1.108E-05	
1	19.00000	0.02005	128.698	128.698	-778.129	-652.318	
	(STRAIN)	-6.872E-05	7.271E-05	7.271E-05	-6.872E-05	-4.910E-05	
1	39.00010	0.01963	33.794	35.002	3.010	4.588	
	(STRAIN)	-4.786E-05	1.130E-04	1.193E-04	-4.786E-05	-3.961E-05	
1	59.00010	0.01754	19.956	20.332	2.099	2.665	
	(STRAIN)	-5.917E-05	1.492E-04	1.536E-04	-5.917E-05	-5.256E-05	
2	9.00000	0.02084	240.758	332.803	67.860	94.836	
	(STRAIN)	-6.654E-06	2.222E-05	4.044E-05	-1.199E-05	-6.654E-06	
2	19.00000	0.02045	107.095	107.095	-762.463	-558.570	
	(STRAIN)	-6.983E-05	6.579E-05	6.579E-05	-6.983E-05	-3.803E-05	
2	39.00010	0.02008	35.622	35.816	3.051	5.739	
	(STRAIN)	-5.064E-05	1.195E-04	1.205E-04	-5.064E-05	-3.660E-05	
2	59.00010	0.01786	20.898	20.972	2.128	2.779	
	(STRAIN)	-6.144E-05	1.576E-04	1.584E-04	-6.144E-05	-5.384E-05	
3	9.00000	0.02080	69.381	161.132	63.220	69.362	
	(STRAIN)	-2.558E-06	-1.339E-06	1.682E-05	-2.558E-06	-1.343E-06	
3	19.00000	0.02051	91.031	91.031	-733.392	-483.516	
	(STRAIN)	-6.886E-05	5.972E-05	5.972E-05	-6.886E-05	-2.989E-05	
3	39.00010	0.02018	35.872	35.872	3.046	6.061	
	(STRAIN)	-5.122E-05	1.203E-04	1.203E-04	-5.122E-05	-3.547E-05	
3	59.00010	0.01793	21.109	21.109	2.129	2.804	
	(STRAIN)	-6.197E-05	1.595E-04	1.595E-04	-6.197E-05	-5.410E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.108E-05
 ALLOWABLE LOAD REPETITIONS = 1.471E+10 DAMAGE RATIO = 4.341E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.983E-05
 ALLOWABLE LOAD REPETITIONS = 2.264E+07 DAMAGE RATIO = 2.820E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.203E-04
 ALLOWABLE LOAD REPETITIONS = 4.836E+08 DAMAGE RATIO = 1.320E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.595E-04
 ALLOWABLE LOAD REPETITIONS = 1.367E+08 DAMAGE RATIO = 4.670E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02231	506.537	508.816	143.912	144.542	
		(STRAIN) -1.966E-05	9.388E-05	9.459E-05	-1.966E-05	-1.946E-05	
1	19.00000	0.02152	163.715	163.715	-635.277	-524.285	
		(STRAIN) -8.957E-05	1.002E-04	1.002E-04	-8.957E-05	-6.321E-05	
1	39.00010	0.02100	39.552	41.065	2.587	4.637	
		(STRAIN) -5.856E-05	1.345E-04	1.424E-04	-5.856E-05	-4.785E-05	
1	59.00010	0.01856	22.438	22.906	1.906	2.614	
		(STRAIN) -6.918E-05	1.704E-04	1.758E-04	-6.918E-05	-6.093E-05	
2	9.00000	0.02255	252.605	340.879	63.560	85.638	
		(STRAIN) -1.297E-05	3.931E-05	6.694E-05	-1.988E-05	-1.297E-05	
2	19.00000	0.02199	133.332	133.332	-618.228	-428.708	
		(STRAIN) -9.059E-05	8.793E-05	8.793E-05	-9.059E-05	-4.557E-05	
2	39.00010	0.02154	41.763	42.000	2.605	6.120	
		(STRAIN) -6.210E-05	1.425E-04	1.437E-04	-6.210E-05	-4.374E-05	
2	59.00010	0.01894	23.586	23.677	1.930	2.752	
		(STRAIN) -7.202E-05	1.806E-04	1.817E-04	-7.202E-05	-6.242E-05	
3	9.00000	0.02246	77.340	149.027	50.524	77.319	
		(STRAIN) -6.655E-06	1.740E-06	2.418E-05	-6.655E-06	1.734E-06	
3	19.00000	0.02206	111.201	111.201	-591.522	-356.528	
		(STRAIN) -8.897E-05	7.795E-05	7.795E-05	-8.897E-05	-3.315E-05	
3	39.00010	0.02166	42.044	42.044	2.596	6.541	
		(STRAIN) -6.283E-05	1.432E-04	1.432E-04	-6.283E-05	-4.222E-05	
3	59.00010	0.01903	23.849	23.849	1.930	2.784	
		(STRAIN) -7.269E-05	1.830E-04	1.830E-04	-7.269E-05	-6.273E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.966E-05
 ALLOWABLE LOAD REPETITIONS = 3.293E+09 DAMAGE RATIO = 1.939E-05

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -9.059E-05
 ALLOWABLE LOAD REPETITIONS = 1.377E+07 DAMAGE RATIO = 4.636E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.432E-04
 ALLOWABLE LOAD REPETITIONS = 2.210E+08 DAMAGE RATIO = 2.889E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.830E-04
 ALLOWABLE LOAD REPETITIONS = 7.376E+07 DAMAGE RATIO = 8.654E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02393	522.834	523.978	137.885	142.379	
		(STRAIN) -3.475E-05	1.547E-04	1.552E-04	-3.475E-05	-3.254E-05	
1	19.00000	0.02276	199.969	199.969	-504.321	-408.557	
		(STRAIN) -1.153E-04	1.389E-04	1.389E-04	-1.153E-04	-8.075E-05	
1	39.00010	0.02212	44.826	46.625	2.069	4.610	
		(STRAIN) -6.875E-05	1.546E-04	1.640E-04	-6.875E-05	-5.548E-05	
1	59.00010	0.01937	24.560	25.113	1.688	2.534	
		(STRAIN) -7.809E-05	1.887E-04	1.952E-04	-7.809E-05	-6.822E-05	

2	9.00000	0.02409	263.744	347.992	58.812	74.630
	(STRAIN)	-2.469E-05	6.836E-05	1.098E-04	-3.248E-05	-2.469E-05
2	19.00000	0.02329	159.184	159.184	-487.524	-313.876
	(STRAIN)	-1.159E-04	1.176E-04	1.176E-04	-1.159E-04	-5.319E-05
2	39.00010	0.02274	47.364	47.638	2.056	6.433
	(STRAIN)	-7.303E-05	1.637E-04	1.651E-04	-7.303E-05	-5.016E-05
2	59.00010	0.01980	25.897	26.004	1.704	2.696
	(STRAIN)	-8.147E-05	2.008E-04	2.020E-04	-8.147E-05	-6.989E-05
3	9.00000	0.02390	84.792	136.943	36.432	84.763
	(STRAIN)	-1.500E-05	8.791E-06	3.445E-05	-1.500E-05	8.777E-06
3	19.00000	0.02335	130.009	130.009	-464.085	-245.869
	(STRAIN)	-1.132E-04	1.012E-04	1.012E-04	-1.132E-04	-3.447E-05
3	39.00010	0.02288	47.652	47.652	2.037	6.957
	(STRAIN)	-7.390E-05	1.644E-04	1.644E-04	-7.390E-05	-4.820E-05
3	59.00010	0.01990	26.207	26.207	1.703	2.735
	(STRAIN)	-8.228E-05	2.036E-04	2.036E-04	-8.228E-05	-7.024E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.475E-05
 ALLOWABLE LOAD REPETITIONS = 7.432E+08 DAMAGE RATIO = 8.590E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.159E-04
 ALLOWABLE LOAD REPETITIONS = 8.755E+06 DAMAGE RATIO = 7.291E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.644E-04
 ALLOWABLE LOAD REPETITIONS = 1.193E+08 DAMAGE RATIO = 5.349E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 2.036E-04
 ALLOWABLE LOAD REPETITIONS = 4.579E+07 DAMAGE RATIO = 1.394E-03

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02501	533.070	533.740	133.635	140.499	
	(STRAIN)	-5.054E-05	2.157E-04	2.162E-04	-5.054E-05	-4.596E-05	
1	19.00000	0.02346	223.872	223.872	-425.411	-339.420	
	(STRAIN)	-1.366E-04	1.744E-04	1.744E-04	-1.366E-04	-9.538E-05	
1	39.00010	0.02275	47.984	49.953	1.703	4.566	
	(STRAIN)	-7.502E-05	1.668E-04	1.770E-04	-7.502E-05	-6.006E-05	
1	59.00010	0.01982	25.763	26.369	1.543	2.475	
	(STRAIN)	-8.328E-05	1.993E-04	2.063E-04	-8.328E-05	-7.242E-05	
2	9.00000	0.02505	270.569	352.245	55.812	67.267	
	(STRAIN)	-3.731E-05	9.821E-05	1.527E-04	-4.494E-05	-3.731E-05	
2	19.00000	0.02401	175.500	175.500	-409.730	-246.835	
	(STRAIN)	-1.365E-04	1.438E-04	1.438E-04	-1.365E-04	-5.848E-05	
2	39.00010	0.02341	50.699	50.992	1.665	6.611	
	(STRAIN)	-7.976E-05	1.764E-04	1.779E-04	-7.976E-05	-5.392E-05	
2	59.00010	0.02027	27.213	27.330	1.553	2.651	
	(STRAIN)	-8.699E-05	2.124E-04	2.137E-04	-8.699E-05	-7.418E-05	
3	9.00000	0.02476	89.217	129.444	27.173	89.180	
	(STRAIN)	-2.437E-05	1.699E-05	4.381E-05	-2.437E-05	1.697E-05	
3	19.00000	0.02407	141.256	141.256	-388.899	-182.275	
	(STRAIN)	-1.329E-04	1.210E-04	1.210E-04	-1.329E-04	-3.391E-05	
3	39.00010	0.02355	50.976	50.976	1.640	7.203	
	(STRAIN)	-8.072E-05	1.770E-04	1.770E-04	-8.072E-05	-5.166E-05	
3	59.00010	0.02038	27.550	27.550	1.552	2.695	
	(STRAIN)	-8.789E-05	2.154E-04	2.154E-04	-8.789E-05	-7.455E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.054E-05
 ALLOWABLE LOAD REPETITIONS = 2.807E+08 DAMAGE RATIO = 2.274E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.366E-04
 ALLOWABLE LOAD REPETITIONS = 6.492E+06 DAMAGE RATIO = 9.833E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.770E-04
 ALLOWABLE LOAD REPETITIONS = 8.567E+07 DAMAGE RATIO = 7.452E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 2.154E-04
 ALLOWABLE LOAD REPETITIONS = 3.556E+07 DAMAGE RATIO = 1.795E-03

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02479	531.039	531.791	134.485	140.885	
		(STRAIN) -4.685E-05	2.016E-04	2.021E-04	-4.685E-05	-4.284E-05	
1	19.00000	0.02333	219.071	219.071	-440.837	-352.902	
		(STRAIN) -1.319E-04	1.663E-04	1.663E-04	-1.319E-04	-9.216E-05	
1	39.00010	0.02263	47.369	49.305	1.777	4.576	
		(STRAIN) -7.379E-05	1.644E-04	1.745E-04	-7.379E-05	-5.917E-05	
1	59.00010	0.01973	25.532	26.128	1.572	2.487	
		(STRAIN) -8.228E-05	1.973E-04	2.042E-04	-8.228E-05	-7.161E-05	
2	9.00000	0.02486	269.230	351.414	56.400	68.736	
		(STRAIN) -3.434E-05	9.127E-05	1.428E-04	-4.207E-05	-3.434E-05	
2	19.00000	0.02387	172.263	172.263	-424.864	-259.790	
		(STRAIN) -1.320E-04	1.379E-04	1.379E-04	-1.320E-04	-5.737E-05	
2	39.00010	0.02328	50.050	50.340	1.744	6.577	
		(STRAIN) -7.844E-05	1.739E-04	1.754E-04	-7.844E-05	-5.320E-05	
2	59.00010	0.02019	26.960	27.076	1.583	2.661	
		(STRAIN) -8.593E-05	2.101E-04	2.115E-04	-8.593E-05	-7.336E-05	
3	9.00000	0.02459	88.361	130.918	29.019	88.325	
		(STRAIN) -2.214E-05	1.503E-05	4.170E-05	-2.214E-05	1.501E-05	
3	19.00000	0.02394	139.087	139.087	-403.493	-194.556	
		(STRAIN) -1.286E-04	1.166E-04	1.166E-04	-1.286E-04	-3.415E-05	
3	39.00010	0.02342	50.331	50.331	1.721	7.155	
		(STRAIN) -7.938E-05	1.746E-04	1.746E-04	-7.938E-05	-5.099E-05	
3	59.00010	0.02029	27.292	27.292	1.582	2.703	
		(STRAIN) -8.680E-05	2.132E-04	2.132E-04	-8.680E-05	-7.372E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.685E-05
 ALLOWABLE LOAD REPETITIONS = 3.417E+08 DAMAGE RATIO = 1.868E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.320E-04
 ALLOWABLE LOAD REPETITIONS = 6.912E+06 DAMAGE RATIO = 9.235E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.746E-04
 ALLOWABLE LOAD REPETITIONS = 9.120E+07 DAMAGE RATIO = 6.999E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 2.132E-04
 ALLOWABLE LOAD REPETITIONS = 3.729E+07 DAMAGE RATIO = 1.712E-03

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02331	516.663	518.179	140.329	143.368	
		(STRAIN) -2.792E-05	1.276E-04	1.282E-04	-2.792E-05	-2.667E-05	
1	19.00000	0.02231	185.960	185.960	-553.192	-451.602	
		(STRAIN) -1.047E-04	1.223E-04	1.223E-04	-1.047E-04	-7.347E-05	
1	39.00010	0.02172	42.861	44.553	2.276	4.627	

1	(STRAIN)	-6.491E-05	1.471E-04	1.559E-04	-6.491E-05	-5.263E-05
	59.00010	0.01908	23.786	24.307	1.773	2.566
	(STRAIN)	-7.480E-05	1.820E-04	1.881E-04	-7.480E-05	-6.555E-05
2	9.00000	0.02351	259.557	345.350	60.636	78.949
	(STRAIN)	-1.933E-05	5.531E-05	9.077E-05	-2.690E-05	-1.933E-05
2	19.00000	0.02282	149.356	149.356	-536.099	-356.243
	(STRAIN)	-1.055E-04	1.050E-04	1.050E-04	-1.055E-04	-5.023E-05
2	39.00010	0.02230	45.281	45.542	2.276	6.320
	(STRAIN)	-6.891E-05	1.557E-04	1.571E-04	-6.891E-05	-4.779E-05
2	59.00010	0.01949	25.052	25.153	1.792	2.720
	(STRAIN)	-7.798E-05	1.934E-04	1.946E-04	-7.798E-05	-6.715E-05
3	9.00000	0.02337	82.015	141.519	41.903	81.990
	(STRAIN)	-1.112E-05	5.457E-06	3.005E-05	-1.112E-05	5.447E-06
3	19.00000	0.02288	122.985	122.985	-511.285	-286.440
	(STRAIN)	-1.033E-04	9.147E-05	9.147E-05	-1.033E-04	-3.424E-05
3	39.00010	0.02243	45.569	45.569	2.261	6.804
	(STRAIN)	-6.973E-05	1.565E-04	1.565E-04	-6.973E-05	-4.600E-05
3	59.00010	0.01959	25.345	25.345	1.792	2.756
	(STRAIN)	-7.874E-05	1.960E-04	1.960E-04	-7.874E-05	-6.749E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.792E-05
 ALLOWABLE LOAD REPETITIONS = 1.315E+09 DAMAGE RATIO = 4.855E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.055E-04
 ALLOWABLE LOAD REPETITIONS = 1.040E+07 DAMAGE RATIO = 6.140E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.565E-04
 ALLOWABLE LOAD REPETITIONS = 1.487E+08 DAMAGE RATIO = 4.294E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.960E-04
 ALLOWABLE LOAD REPETITIONS = 5.423E+07 DAMAGE RATIO = 1.177E-03

DAMAGE ANALYSIS OF PERIOD NO. 10 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
1	9.00000	0.02104	490.993	494.455	138.341	139.615
	(STRAIN)	-1.390E-05	6.665E-05	6.744E-05	-1.419E-05	-1.390E-05
1	19.00000	0.02044	137.993	137.993	-728.868	-608.513
	(STRAIN)	-7.455E-05	8.009E-05	8.009E-05	-7.455E-05	-5.308E-05
1	39.00010	0.02000	35.316	36.603	2.901	4.605
	(STRAIN)	-5.068E-05	1.187E-04	1.254E-04	-5.068E-05	-4.178E-05
1	59.00010	0.01781	20.615	21.015	2.051	2.654
	(STRAIN)	-6.181E-05	1.548E-04	1.594E-04	-6.181E-05	-5.477E-05
2	9.00000	0.02130	242.742	330.985	63.121	85.500
	(STRAIN)	-8.904E-06	2.714E-05	4.737E-05	-1.403E-05	-8.904E-06
2	19.00000	0.02086	114.028	114.028	-713.000	-515.039
	(STRAIN)	-7.567E-05	7.186E-05	7.186E-05	-7.567E-05	-4.036E-05
2	39.00010	0.02047	37.243	37.447	2.935	5.844
	(STRAIN)	-5.366E-05	1.256E-04	1.266E-04	-5.366E-05	-3.847E-05
2	59.00010	0.01815	21.611	21.689	2.078	2.775
	(STRAIN)	-6.423E-05	1.637E-04	1.646E-04	-6.423E-05	-5.610E-05
3	9.00000	0.02125	71.809	151.633	53.124	71.787
	(STRAIN)	-4.258E-06	2.566E-08	1.832E-05	-4.258E-06	2.083E-08
3	19.00000	0.02093	96.358	96.358	-684.953	-441.596
	(STRAIN)	-7.454E-05	6.483E-05	6.483E-05	-7.454E-05	-3.113E-05
3	39.00010	0.02058	37.500	37.500	2.929	6.192
	(STRAIN)	-5.428E-05	1.263E-04	1.263E-04	-5.428E-05	-3.724E-05
3	59.00010	0.01823	21.836	21.836	2.079	2.801
	(STRAIN)	-6.480E-05	1.657E-04	1.657E-04	-6.480E-05	-5.637E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.390E-05
 ALLOWABLE LOAD REPETITIONS = 7.893E+09 DAMAGE RATIO = 8.088E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.567E-05
 ALLOWABLE LOAD REPETITIONS = 1.949E+07 DAMAGE RATIO = 3.275E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.263E-04
 ALLOWABLE LOAD REPETITIONS = 3.881E+08 DAMAGE RATIO = 1.645E-04

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.657E-04
 ALLOWABLE LOAD REPETITIONS = 1.151E+08 DAMAGE RATIO = 5.544E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
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1	9.00000	0.01864	471.165	477.608	138.580	145.512	
		(STRAIN)	-6.364E-06	3.320E-05	3.398E-05	-7.145E-06	-6.304E-06
1	19.00000	0.01829	95.930	95.930	-931.143	-791.965	
		(STRAIN)	-5.103E-05	5.188E-05	5.188E-05	-5.103E-05	-3.708E-05
1	39.00010	0.01798	27.659	28.555	3.277	4.421	
		(STRAIN)	-3.699E-05	9.038E-05	9.506E-05	-3.699E-05	-3.102E-05
1	59.00010	0.01626	17.103	17.386	2.234	2.660	
		(STRAIN)	-4.820E-05	1.253E-04	1.286E-04	-4.820E-05	-4.323E-05
2	9.00000	0.01889	228.316	322.856	70.316	98.977	
		(STRAIN)	-3.472E-06	1.222E-05	2.369E-05	-6.949E-06	-3.472E-06
2	19.00000	0.01862	81.423	81.423	-918.209	-702.549	
		(STRAIN)	-5.202E-05	4.815E-05	4.815E-05	-5.202E-05	-3.041E-05
2	39.00010	0.01834	29.069	29.216	3.328	5.260	
		(STRAIN)	-3.904E-05	9.543E-05	9.620E-05	-3.904E-05	-2.895E-05
2	59.00010	0.01652	17.832	17.887	2.265	2.749	
		(STRAIN)	-4.991E-05	1.317E-04	1.323E-04	-4.991E-05	-4.426E-05
3	9.00000	0.01888	61.214	171.402	61.199	71.606	
		(STRAIN)	-8.810E-07	-2.142E-06	1.123E-05	-2.144E-06	-8.810E-07
3	19.00000	0.01867	70.429	70.429	-887.702	-626.273	
		(STRAIN)	-5.145E-05	4.456E-05	4.456E-05	-5.145E-05	-2.525E-05
3	39.00010	0.01842	29.268	29.268	3.327	5.489	
		(STRAIN)	-3.946E-05	9.605E-05	9.605E-05	-3.946E-05	-2.817E-05
3	59.00010	0.01658	17.986	17.986	2.266	2.767	
		(STRAIN)	-5.029E-05	1.331E-04	1.331E-04	-5.029E-05	-4.445E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.364E-06
 ALLOWABLE LOAD REPETITIONS = 5.998E+10 DAMAGE RATIO = 1.064E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.202E-05
 ALLOWABLE LOAD REPETITIONS = 4.090E+07 DAMAGE RATIO = 1.561E-03

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.605E-05
 ALLOWABLE LOAD REPETITIONS = 1.323E+09 DAMAGE RATIO = 4.826E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.331E-04
 ALLOWABLE LOAD REPETITIONS = 3.070E+08 DAMAGE RATIO = 2.079E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
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1	9.00000	0.01726	458.399	466.621	128.839	137.337	
		(STRAIN)	-4.562E-06	2.314E-05	2.384E-05	-5.270E-06	-4.538E-06

1	19.00000	0.01699	76.650	76.650	-1032.143	-885.897
	(STRAIN)	-4.105E-05	4.099E-05	4.099E-05	-4.105E-05	-3.022E-05
1	39.00010	0.01675	23.612	24.316	3.334	4.228
	(STRAIN)	-3.016E-05	7.577E-05	7.945E-05	-3.016E-05	-2.549E-05
1	59.00010	0.01528	15.090	15.314	2.268	2.610
	(STRAIN)	-4.084E-05	1.087E-04	1.114E-04	-4.084E-05	-3.686E-05
2	9.00000	0.01748	219.994	314.271	69.504	95.667
	(STRAIN)	-2.468E-06	8.248E-06	1.637E-05	-4.723E-06	-2.468E-06
2	19.00000	0.01727	65.826	65.826	-1021.524	-800.582
	(STRAIN)	-4.189E-05	3.856E-05	3.856E-05	-4.189E-05	-2.554E-05
2	39.00010	0.01705	24.752	24.869	3.386	4.883
	(STRAIN)	-3.177E-05	7.984E-05	8.045E-05	-3.177E-05	-2.395E-05
2	59.00010	0.01550	15.682	15.726	2.298	2.682
	(STRAIN)	-4.221E-05	1.139E-04	1.144E-04	-4.221E-05	-3.773E-05
3	9.00000	0.01749	56.203	174.890	56.191	71.746
	(STRAIN)	-5.831E-07	-1.923E-06	8.307E-06	-1.924E-06	-5.831E-07
3	19.00000	0.01732	57.524	57.524	-990.480	-724.312
	(STRAIN)	-4.149E-05	3.605E-05	3.605E-05	-4.149E-05	-2.180E-05
3	39.00010	0.01711	24.910	24.910	3.385	5.060
	(STRAIN)	-3.210E-05	8.034E-05	8.034E-05	-3.210E-05	-2.335E-05
3	59.00010	0.01555	15.800	15.800	2.301	2.697
	(STRAIN)	-4.248E-05	1.150E-04	1.150E-04	-4.248E-05	-3.786E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.562E-06
 ALLOWABLE LOAD REPETITIONS = 1.340E+11 DAMAGE RATIO = 4.765E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.189E-05
 ALLOWABLE LOAD REPETITIONS = 6.435E+07 DAMAGE RATIO = 9.920E-04

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.034E-05
 ALLOWABLE LOAD REPETITIONS = 2.942E+09 DAMAGE RATIO = 2.170E-05

AT TOP OF LAYER 6 COMPRESSIVE STRAIN = 1.150E-04
 ALLOWABLE LOAD REPETITIONS = 5.907E+08 DAMAGE RATIO = 1.081E-04

* SUMMARY OF DAMAGE ANALYSIS *

AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 5.843E-04
 AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.953E-02
 AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 3.168E-03
 AT TOP OF LAYER 6 SUM OF DAMAGE RATIO = 8.744E-03

MAXIMUM DAMAGE RATIO = 4.953E-02 DESIGN LIFE IN YEARS = 20.19

- Sovrastruttura 2A

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/m³, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 30
 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 1.200E+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 : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 608737
 LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 608737

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

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

NO.	COORDINATE P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01092	545.941	547.853	270.237	276.015
	(STRAIN)	-8.955E-07	2.041E-05	2.056E-05	-1.044E-06	-5.946E-07
1	34.00000	0.01061	25.202	25.202	-463.873	-410.511
	(STRAIN)	-1.669E-05	1.680E-05	1.680E-05	-1.669E-05	-1.304E-05
1	34.00010	0.01061	25.202	61.753	25.202	56.264
	(STRAIN)	1.151E-05	-1.434E-06	1.380E-05	-1.434E-06	1.151E-05
1	64.00010	0.01048	7.316	7.378	2.568	2.684
	(STRAIN)	-1.214E-05	4.325E-05	4.398E-05	-1.214E-05	-1.079E-05
2	9.00000	0.01093	275.629	420.467	166.175	232.081
	(STRAIN)	1.542E-06	4.931E-06	1.620E-05	-3.586E-06	1.542E-06
2	34.00000	0.01071	26.088	26.088	-482.208	-425.616
	(STRAIN)	-1.737E-05	1.744E-05	1.744E-05	-1.737E-05	-1.349E-05
2	34.00010	0.01071	26.088	63.994	26.088	58.975
	(STRAIN)	1.215E-05	-1.552E-06	1.424E-05	-1.552E-06	1.215E-05
2	64.00010	0.01057	7.537	7.549	2.604	2.732
	(STRAIN)	-1.257E-05	4.498E-05	4.513E-05	-1.257E-05	-1.108E-05
3	9.00000	0.01099	88.630	325.982	88.623	206.056
	(STRAIN)	3.513E-06	-5.625E-06	1.284E-05	-5.625E-06	3.513E-06
3	34.00000	0.01082	25.950	25.950	-484.126	-424.173
	(STRAIN)	-1.749E-05	1.744E-05	1.744E-05	-1.749E-05	-1.338E-05
3	34.00010	0.01082	25.950	64.300	25.950	59.247
	(STRAIN)	1.223E-05	-1.646E-06	1.433E-05	-1.646E-06	1.223E-05
3	64.00010	0.01069	7.651	7.651	2.656	2.788
	(STRAIN)	-1.266E-05	4.561E-05	4.561E-05	-1.266E-05	-1.113E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -8.955E-07
 ALLOWABLE LOAD REPETITIONS = 2.607E+13 DAMAGE RATIO = 2.335E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.749E-05
 ALLOWABLE LOAD REPETITIONS = 1.068E+09 DAMAGE RATIO = 5.700E-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 = 4.561E-05
 ALLOWABLE LOAD REPETITIONS = 3.711E+10 DAMAGE RATIO = 1.640E-05

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

NO.	COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01158	548.974	550.679	265.383	270.794	
		(STRAIN) -1.411E-06	2.566E-05	2.582E-05	-1.574E-06	-1.055E-06	
1	34.00000	0.01121	29.074	29.074	-443.693	-390.916	
		(STRAIN) -1.926E-05	1.951E-05	1.951E-05	-1.926E-05	-1.493E-05	
1	34.00010	0.01121	29.074	70.522	29.074	64.088	
		(STRAIN) 1.306E-05	-1.526E-06	1.574E-05	-1.526E-06	1.306E-05	
1	64.00010	0.01106	8.122	8.196	2.765	2.900	
		(STRAIN) -1.395E-05	4.856E-05	4.942E-05	-1.395E-05	-1.237E-05	
2	9.00000	0.01159	276.830	415.944	160.783	223.101	
		(STRAIN) 1.511E-06	6.671E-06	2.003E-05	-4.473E-06	1.511E-06	
2	34.00000	0.01132	30.108	30.108	-461.599	-405.414	
		(STRAIN) -2.006E-05	2.027E-05	2.027E-05	-2.006E-05	-1.546E-05	
2	34.00010	0.01132	30.108	73.144	30.108	67.255	
		(STRAIN) 1.381E-05	-1.664E-06	1.627E-05	-1.664E-06	1.381E-05	
2	64.00010	0.01116	8.380	8.395	2.806	2.956	
		(STRAIN) -1.445E-05	5.058E-05	5.075E-05	-1.445E-05	-1.270E-05	
3	9.00000	0.01163	88.459	310.827	88.452	194.221	
		(STRAIN) 3.875E-06	-6.281E-06	1.507E-05	-6.282E-06	3.875E-06	
3	34.00000	0.01143	29.918	29.918	-463.027	-403.429	
		(STRAIN) -2.019E-05	2.024E-05	2.024E-05	-2.019E-05	-1.530E-05	
3	34.00010	0.01143	29.918	73.418	29.918	67.487	
		(STRAIN) 1.388E-05	-1.769E-06	1.636E-05	-1.769E-06	1.388E-05	
3	64.00010	0.01128	8.485	8.485	2.852	3.006	
		(STRAIN) -1.454E-05	5.119E-05	5.119E-05	-1.454E-05	-1.274E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.411E-06
 ALLOWABLE LOAD REPETITIONS = 6.993E+12 DAMAGE RATIO = 8.705E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.019E-05
 ALLOWABLE LOAD REPETITIONS = 7.765E+08 DAMAGE RATIO = 7.839E-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 = 5.119E-05
 ALLOWABLE LOAD REPETITIONS = 2.214E+10 DAMAGE RATIO = 2.749E-05

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

NO.	COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01263	553.163	554.573	256.804	261.484	
		(STRAIN) -2.628E-06	3.625E-05	3.644E-05	-2.814E-06	-2.197E-06	
1	34.00000	0.01214	35.828	35.828	-410.752	-359.144	
		(STRAIN) -2.380E-05	2.442E-05	2.442E-05	-2.380E-05	-1.823E-05	
1	34.00010	0.01214	35.828	85.470	35.828	77.361	
		(STRAIN) 1.568E-05	-1.626E-06	1.906E-05	-1.626E-06	1.568E-05	
1	64.00010	0.01196	9.443	9.537	3.066	3.235	
		(STRAIN) -1.703E-05	5.737E-05	5.848E-05	-1.703E-05	-1.505E-05	
2	9.00000	0.01262	278.580	409.323	151.895	208.579	
		(STRAIN) 1.187E-06	1.041E-05	2.765E-05	-6.286E-06	1.187E-06	

2	34.00000	0.01227	37.125	37.125	-427.861	-372.541
	(STRAIN)	-2.483E-05	2.538E-05	2.538E-05	-2.483E-05	-1.886E-05
2	34.00010	0.01227	37.125	88.767	37.125	81.329
	(STRAIN)	1.662E-05	-1.800E-06	1.972E-05	-1.800E-06	1.662E-05
2	64.00010	0.01208	9.765	9.783	3.116	3.305
	(STRAIN)	-1.766E-05	5.991E-05	6.013E-05	-1.766E-05	-1.546E-05
3	9.00000	0.01263	88.372	288.228	88.364	175.977
	(STRAIN)	4.313E-06	-7.236E-06	1.911E-05	-7.237E-06	4.313E-06
3	34.00000	0.01238	36.845	36.845	-428.940	-370.134
	(STRAIN)	-2.498E-05	2.532E-05	2.532E-05	-2.498E-05	-1.863E-05
3	34.00010	0.01238	36.845	89.031	36.845	81.533
	(STRAIN)	1.669E-05	-1.932E-06	1.981E-05	-1.932E-06	1.669E-05
3	64.00010	0.01218	9.860	9.860	3.150	3.345
	(STRAIN)	-1.776E-05	6.051E-05	6.051E-05	-1.776E-05	-1.549E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.628E-06
 ALLOWABLE LOAD REPETITIONS = 1.183E+12 DAMAGE RATIO = 5.148E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.498E-05
 ALLOWABLE LOAD REPETITIONS = 4.873E+08 DAMAGE RATIO = 1.249E-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 = 6.051E-05
 ALLOWABLE LOAD REPETITIONS = 1.047E+10 DAMAGE RATIO = 5.816E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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1	9.00000	0.01405	558.093	559.163	244.598	248.091
	(STRAIN)	-5.349E-06	5.647E-05	5.669E-05	-5.561E-06	-4.870E-06
1	34.00000	0.01336	46.134	46.134	-365.151	-315.531
	(STRAIN)	-3.094E-05	3.249E-05	3.249E-05	-3.094E-05	-2.329E-05
1	34.00010	0.01336	46.134	107.557	46.134	96.838
	(STRAIN)	1.947E-05	-1.655E-06	2.394E-05	-1.655E-06	1.947E-05
1	64.00010	0.01312	11.288	11.416	3.444	3.665
	(STRAIN)	-2.157E-05	6.995E-05	7.144E-05	-2.157E-05	-1.899E-05
2	9.00000	0.01403	280.785	401.622	139.400	189.042
	(STRAIN)	-4.629E-08	1.811E-05	4.202E-05	-9.869E-06	-4.632E-08
2	34.00000	0.01353	47.833	47.833	-380.967	-327.197
	(STRAIN)	-3.235E-05	3.378E-05	3.378E-05	-3.235E-05	-2.406E-05
2	34.00010	0.01353	47.833	111.898	47.833	102.030
	(STRAIN)	2.070E-05	-1.883E-06	2.481E-05	-1.883E-06	2.070E-05
2	64.00010	0.01328	11.708	11.733	3.506	3.756
	(STRAIN)	-2.241E-05	7.328E-05	7.357E-05	-2.241E-05	-1.949E-05
3	9.00000	0.01397	88.505	259.850	88.495	152.329
	(STRAIN)	4.457E-06	-8.172E-06	2.573E-05	-8.174E-06	4.457E-06
3	34.00000	0.01361	47.423	47.423	-381.996	-324.645
	(STRAIN)	-3.256E-05	3.367E-05	3.367E-05	-3.256E-05	-2.371E-05
3	34.00010	0.01361	47.423	112.230	47.423	102.271
	(STRAIN)	2.079E-05	-2.067E-06	2.494E-05	-2.067E-06	2.079E-05
3	64.00010	0.01336	11.801	11.801	3.529	3.787
	(STRAIN)	-2.255E-05	7.396E-05	7.396E-05	-2.255E-05	-1.954E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.349E-06
 ALLOWABLE LOAD REPETITIONS = 1.613E+11 DAMAGE RATIO = 3.774E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.256E-05
 ALLOWABLE LOAD REPETITIONS = 2.763E+08 DAMAGE RATIO = 2.203E-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 = 1.428E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01576	563.254	563.999	230.538	232.423	
		(STRAIN)	-1.095E-05	9.299E-05	9.322E-05	-1.118E-05	-1.059E-05
1	34.00000	0.01471	59.806	59.806	-311.117	-264.344	
		(STRAIN)	-4.108E-05	4.480E-05	4.480E-05	-4.108E-05	-3.025E-05
1	34.00010	0.01471	59.806	135.767	59.806	121.507	
		(STRAIN)	2.420E-05	-1.504E-06	3.015E-05	-1.504E-06	2.420E-05
1	64.00010	0.01441	13.499	13.672	3.837	4.128	
		(STRAIN)	-2.736E-05	8.537E-05	8.739E-05	-2.736E-05	-2.397E-05
2	9.00000	0.01568	283.253	394.433	124.393	166.954	
		(STRAIN)	-3.394E-06	3.302E-05	6.783E-05	-1.672E-05	-3.394E-06
2	34.00000	0.01493	62.033	62.033	-325.154	-273.677	
		(STRAIN)	-4.306E-05	4.659E-05	4.659E-05	-4.306E-05	-3.114E-05
2	34.00010	0.01493	62.033	141.504	62.033	128.318	
		(STRAIN)	2.581E-05	-1.807E-06	3.131E-05	-1.807E-06	2.581E-05
2	64.00010	0.01461	14.050	14.084	3.915	4.248	
		(STRAIN)	-2.848E-05	8.976E-05	9.015E-05	-2.848E-05	-2.460E-05
3	9.00000	0.01554	88.905	229.142	88.892	126.100	
		(STRAIN)	3.430E-06	-8.216E-06	3.569E-05	-8.220E-06	3.430E-06
3	34.00000	0.01500	61.454	61.454	-326.259	-271.100	
		(STRAIN)	-4.337E-05	4.640E-05	4.640E-05	-4.337E-05	-3.060E-05
3	34.00010	0.01500	61.454	142.011	61.454	128.681	
		(STRAIN)	2.594E-05	-2.073E-06	3.149E-05	-2.073E-06	2.594E-05
3	64.00010	0.01468	14.158	14.158	3.930	4.275	
		(STRAIN)	-2.869E-05	9.064E-05	9.064E-05	-2.869E-05	-2.467E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.095E-05
 ALLOWABLE LOAD REPETITIONS = 2.260E+10 DAMAGE RATIO = 2.694E-05

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.337E-05
 ALLOWABLE LOAD REPETITIONS = 1.521E+08 DAMAGE RATIO = 4.003E-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 = 9.064E-05
 ALLOWABLE LOAD REPETITIONS = 1.715E+09 DAMAGE RATIO = 3.549E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01755	567.989	568.483	217.641	217.888	
		(STRAIN)	-2.088E-05	1.514E-04	1.516E-04	-2.099E-05	-2.087E-05
1	34.00000	0.01596	74.756	74.756	-257.979	-214.474	
		(STRAIN)	-5.366E-05	6.162E-05	6.162E-05	-5.366E-05	-3.858E-05
1	34.00010	0.01596	74.756	165.458	74.756	147.257	
		(STRAIN)	2.907E-05	-1.141E-06	3.665E-05	-1.141E-06	2.907E-05
1	64.00010	0.01559	15.689	15.912	4.168	4.536	
		(STRAIN)	-3.343E-05	1.010E-04	1.036E-04	-3.343E-05	-2.914E-05

2	9.00000	0.01736	285.628	389.098	109.583	146.480
	(STRAIN)	-1.023E-05	5.824E-05	1.091E-04	-2.838E-05	-1.023E-05
2	34.00000	0.01623	77.545	77.545	-270.036	-221.257
	(STRAIN)	-5.639E-05	6.403E-05	6.403E-05	-5.639E-05	-3.949E-05
2	34.00010	0.01623	77.545	172.727	77.545	155.807
	(STRAIN)	3.108E-05	-1.529E-06	3.813E-05	-1.529E-06	3.108E-05
2	64.00010	0.01583	16.381	16.424	4.262	4.687
	(STRAIN)	-3.486E-05	1.065E-04	1.070E-04	-3.486E-05	-2.989E-05
3	9.00000	0.01711	89.449	201.133	89.432	101.845
	(STRAIN)	5.383E-08	-6.046E-06	4.891E-05	-6.054E-06	5.379E-08
3	34.00000	0.01629	76.770	76.770	-271.141	-218.585
	(STRAIN)	-5.685E-05	6.369E-05	6.369E-05	-5.685E-05	-3.864E-05
3	34.00010	0.01629	76.770	173.460	76.770	156.327
	(STRAIN)	3.126E-05	-1.892E-06	3.840E-05	-1.892E-06	3.126E-05
3	64.00010	0.01589	16.518	16.518	4.275	4.717
	(STRAIN)	-3.516E-05	1.077E-04	1.077E-04	-3.516E-05	-3.000E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.088E-05
 ALLOWABLE LOAD REPETITIONS = 3.971E+09 DAMAGE RATIO = 1.533E-04
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.685E-05
 ALLOWABLE LOAD REPETITIONS = 8.808E+07 DAMAGE RATIO = 6.911E-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 = 1.077E-04
 ALLOWABLE LOAD REPETITIONS = 7.930E+08 DAMAGE RATIO = 7.676E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01883	570.974	571.338	209.179	210.118	
	(STRAIN)	-3.177E-05	2.094E-04	2.096E-04	-3.176E-05	-3.114E-05	
1	34.00000	0.01672	85.114	85.114	-223.841	-182.660	
	(STRAIN)	-6.390E-05	7.659E-05	7.659E-05	-6.390E-05	-4.517E-05	
1	34.00010	0.01672	85.114	185.428	85.114	164.464	
	(STRAIN)	3.228E-05	-7.865E-07	4.101E-05	-7.865E-07	3.228E-05	
1	64.00010	0.01630	17.096	17.355	4.353	4.774	
	(STRAIN)	-3.749E-05	1.112E-04	1.142E-04	-3.749E-05	-3.257E-05	
2	9.00000	0.01853	287.152	386.451	100.127	134.048	
	(STRAIN)	-1.790E-05	8.416E-05	1.503E-04	-4.051E-05	-1.790E-05	
2	34.00000	0.01702	88.277	88.277	-234.520	-187.688	
	(STRAIN)	-6.727E-05	7.951E-05	7.951E-05	-6.727E-05	-4.598E-05	
2	34.00010	0.01702	88.277	193.754	88.277	174.193	
	(STRAIN)	3.456E-05	-1.237E-06	4.271E-05	-1.237E-06	3.456E-05	
2	64.00010	0.01657	17.885	17.935	4.456	4.947	
	(STRAIN)	-3.914E-05	1.175E-04	1.181E-04	-3.914E-05	-3.341E-05	
3	9.00000	0.01818	89.834	184.024	87.000	89.814	
	(STRAIN)	-4.367E-06	-2.477E-06	6.031E-05	-4.367E-06	-2.491E-06	
3	34.00000	0.01709	87.353	87.353	-235.566	-184.901	
	(STRAIN)	-6.784E-05	7.899E-05	7.899E-05	-6.784E-05	-4.481E-05	
3	34.00010	0.01709	87.353	194.644	87.353	174.812	
	(STRAIN)	3.477E-05	-1.670E-06	4.303E-05	-1.670E-06	3.477E-05	
3	64.00010	0.01664	18.046	18.046	4.471	4.981	
	(STRAIN)	-3.950E-05	1.189E-04	1.189E-04	-3.950E-05	-3.355E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.177E-05
 ALLOWABLE LOAD REPETITIONS = 1.293E+09 DAMAGE RATIO = 4.706E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.784E-05
 ALLOWABLE LOAD REPETITIONS = 6.208E+07 DAMAGE RATIO = 9.806E-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 = 1.189E-04
 ALLOWABLE LOAD REPETITIONS = 5.093E+08 DAMAGE RATIO = 1.195E-03

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01856	570.378	570.766	210.852	211.582	
	(STRAIN)	-2.922E-05	1.960E-04	1.963E-04	-2.922E-05	-2.876E-05	
1	34.00000	0.01657	83.000	83.000	-230.658	-189.000	
	(STRAIN)	-6.167E-05	7.324E-05	7.324E-05	-6.167E-05	-4.375E-05	
1	34.00010	0.01657	83.000	181.389	83.000	160.990	
	(STRAIN)	3.163E-05	-8.651E-07	4.013E-05	-8.651E-07	3.163E-05	
1	64.00010	0.01616	16.815	17.067	4.317	4.728	
	(STRAIN)	-3.667E-05	1.091E-04	1.121E-04	-3.667E-05	-3.188E-05	
2	9.00000	0.01829	286.847	386.935	102.009	136.482	
	(STRAIN)	-1.608E-05	7.812E-05	1.408E-04	-3.768E-05	-1.608E-05	
2	34.00000	0.01686	86.088	86.088	-241.618	-194.385	
	(STRAIN)	-6.490E-05	7.605E-05	7.605E-05	-6.490E-05	-4.459E-05	
2	34.00010	0.01686	86.088	189.499	86.088	170.481	
	(STRAIN)	3.386E-05	-1.302E-06	4.179E-05	-1.302E-06	3.386E-05	
2	64.00010	0.01642	17.584	17.633	4.419	4.897	
	(STRAIN)	-3.827E-05	1.153E-04	1.159E-04	-3.827E-05	-3.270E-05	
3	9.00000	0.01796	89.756	187.393	89.744	89.912	
	(STRAIN)	-3.284E-06	-3.386E-06	5.778E-05	-3.394E-06	-3.288E-06	
3	34.00000	0.01693	85.195	85.195	-242.680	-191.625	
	(STRAIN)	-6.545E-05	7.557E-05	7.557E-05	-6.545E-05	-4.349E-05	
3	34.00010	0.01693	85.195	190.358	85.195	171.081	
	(STRAIN)	3.406E-05	-1.721E-06	4.210E-05	-1.721E-06	3.406E-05	
3	64.00010	0.01649	17.741	17.741	4.434	4.930	
	(STRAIN)	-3.862E-05	1.166E-04	1.166E-04	-3.862E-05	-3.283E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.922E-05
 ALLOWABLE LOAD REPETITIONS = 1.615E+09 DAMAGE RATIO = 3.768E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.545E-05
 ALLOWABLE LOAD REPETITIONS = 6.663E+07 DAMAGE RATIO = 9.136E-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 = 1.166E-04
 ALLOWABLE LOAD REPETITIONS = 5.547E+08 DAMAGE RATIO = 1.097E-03

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01685	566.203	566.785	222.436	223.299	
	(STRAIN)	-1.632E-05	1.255E-04	1.258E-04	-1.656E-05	-1.620E-05	
1	34.00000	0.01549	68.874	68.874	-278.276	-233.470	
	(STRAIN)	-4.846E-05	5.446E-05	5.446E-05	-4.846E-05	-3.518E-05	
1	34.00010	0.01549	68.874	153.906	68.874	137.263	

1	(STRAIN)	2.719E-05	-1.306E-06	3.412E-05	-1.306E-06	2.719E-05
	64.00010	0.01515	14.852	15.056	4.048	4.385
	(STRAIN)	-3.107E-05	9.498E-05	9.735E-05	-3.107E-05	-2.714E-05
2	9.00000	0.01671	284.723	390.951	115.235	154.146
	(STRAIN)	-7.047E-06	4.692E-05	9.082E-05	-2.313E-05	-7.047E-06
2	34.00000	0.01574	71.445	71.445	-291.113	-241.255
	(STRAIN)	-5.088E-05	5.661E-05	5.661E-05	-5.088E-05	-3.610E-05
2	34.00010	0.01574	71.445	160.572	71.445	145.133
	(STRAIN)	2.904E-05	-1.660E-06	3.548E-05	-1.660E-06	2.904E-05
2	64.00010	0.01537	15.488	15.528	4.135	4.525
	(STRAIN)	-3.238E-05	1.001E-04	1.005E-04	-3.238E-05	-2.784E-05
3	9.00000	0.01650	89.229	211.614	89.214	110.942
	(STRAIN)	1.730E-06	-7.243E-06	4.334E-05	-7.249E-06	1.730E-06
3	34.00000	0.01581	70.748	70.748	-292.232	-238.632
	(STRAIN)	-5.128E-05	5.634E-05	5.634E-05	-5.128E-05	-3.538E-05
3	34.00010	0.01581	70.749	161.215	70.749	145.592
	(STRAIN)	2.920E-05	-1.984E-06	3.571E-05	-1.984E-06	2.920E-05
3	64.00010	0.01544	15.613	15.613	4.149	4.553
	(STRAIN)	-3.264E-05	1.011E-04	1.011E-04	-3.264E-05	-2.794E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.632E-05
 ALLOWABLE LOAD REPETITIONS = 7.705E+09 DAMAGE RATIO = 7.901E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.128E-05
 ALLOWABLE LOAD REPETITIONS = 1.083E+08 DAMAGE RATIO = 5.622E-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 = 1.011E-04
 ALLOWABLE LOAD REPETITIONS = 1.051E+09 DAMAGE RATIO = 5.790E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01459	559.789	560.747	240.054	243.063
	(STRAIN)	-6.789E-06	6.629E-05	6.651E-05	-7.010E-06	-6.320E-06
1	34.00000	0.01380	50.303	50.303	-348.001	-299.230
	(STRAIN)	-3.394E-05	3.601E-05	3.601E-05	-3.394E-05	-2.537E-05
1	34.00010	0.01380	50.303	116.279	50.303	104.488
	(STRAIN)	2.095E-05	-1.630E-06	2.586E-05	-1.630E-06	2.095E-05
1	64.00010	0.01354	11.987	12.129	3.575	3.817
	(STRAIN)	-2.336E-05	7.478E-05	7.643E-05	-2.336E-05	-2.054E-05
2	9.00000	0.01455	281.579	399.128	134.654	181.900
	(STRAIN)	-8.361E-07	2.201E-05	4.896E-05	-1.167E-05	-8.360E-07
2	34.00000	0.01398	52.163	52.163	-363.280	-310.186
	(STRAIN)	-3.551E-05	3.745E-05	3.745E-05	-3.551E-05	-2.619E-05
2	34.00010	0.01398	52.163	121.044	52.163	110.176
	(STRAIN)	2.229E-05	-1.881E-06	2.682E-05	-1.881E-06	2.229E-05
2	64.00010	0.01371	12.448	12.475	3.642	3.918
	(STRAIN)	-2.429E-05	7.844E-05	7.876E-05	-2.429E-05	-2.108E-05
3	9.00000	0.01447	88.609	249.813	88.598	143.816
	(STRAIN)	4.308E-06	-8.347E-06	2.861E-05	-8.350E-06	4.308E-06
3	34.00000	0.01406	51.702	51.702	-364.333	-307.626
	(STRAIN)	-3.574E-05	3.732E-05	3.732E-05	-3.574E-05	-2.578E-05
3	34.00010	0.01406	51.702	121.423	51.702	110.448
	(STRAIN)	2.239E-05	-2.088E-06	2.696E-05	-2.088E-06	2.239E-05
3	64.00010	0.01379	12.543	12.543	3.662	3.946
	(STRAIN)	-2.445E-05	7.917E-05	7.917E-05	-2.445E-05	-2.113E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.789E-06
 ALLOWABLE LOAD REPETITIONS = 8.346E+10 DAMAGE RATIO = 7.294E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.574E-05
 ALLOWABLE LOAD REPETITIONS = 2.270E+08 DAMAGE RATIO = 2.681E-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 = 7.917E-05
 ALLOWABLE LOAD REPETITIONS = 3.143E+09 DAMAGE RATIO = 1.937E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.01235	552.099	553.584	259.165	264.056	
		(STRAIN)	-2.247E-06	3.311E-05	3.329E-05	-2.427E-06	-1.834E-06
1	34.00000	0.01189	33.947	33.947	-419.654	-367.706	
		(STRAIN)	-2.253E-05	2.303E-05	2.303E-05	-2.253E-05	-1.731E-05
1	34.00010	0.01189	33.947	81.349	33.947	73.709	
		(STRAIN)	1.496E-05	-1.606E-06	1.814E-05	-1.606E-06	1.496E-05
1	64.00010	0.01172	9.085	9.174	2.987	3.147	
		(STRAIN)	-1.618E-05	5.497E-05	5.600E-05	-1.618E-05	-1.431E-05
2	9.00000	0.01235	278.125	411.021	154.309	212.476	
		(STRAIN)	1.313E-06	9.277E-06	2.540E-05	-5.744E-06	1.313E-06
2	34.00000	0.01202	35.171	35.171	-436.990	-381.414	
		(STRAIN)	-2.349E-05	2.393E-05	2.393E-05	-2.349E-05	-1.791E-05
2	34.00010	0.01202	35.171	84.457	35.171	77.453	
		(STRAIN)	1.585E-05	-1.769E-06	1.877E-05	-1.769E-06	1.585E-05
2	64.00010	0.01184	9.389	9.406	3.034	3.213	
		(STRAIN)	-1.678E-05	5.736E-05	5.756E-05	-1.678E-05	-1.470E-05
3	9.00000	0.01236	88.377	294.125	88.369	180.796	
		(STRAIN)	4.217E-06	-6.995E-06	1.797E-05	-6.996E-06	4.217E-06
3	34.00000	0.01213	34.915	34.915	-438.125	-379.082	
		(STRAIN)	-2.363E-05	2.388E-05	2.388E-05	-2.363E-05	-1.770E-05
3	34.00010	0.01213	34.915	84.718	34.915	77.661	
		(STRAIN)	1.592E-05	-1.893E-06	1.886E-05	-1.893E-06	1.592E-05
3	64.00010	0.01194	9.486	9.486	3.072	3.255	
		(STRAIN)	-1.687E-05	5.796E-05	5.796E-05	-1.687E-05	-1.473E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.247E-06
 ALLOWABLE LOAD REPETITIONS = 1.845E+12 DAMAGE RATIO = 3.300E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.363E-05
 ALLOWABLE LOAD REPETITIONS = 5.497E+08 DAMAGE RATIO = 1.107E-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 = 5.796E-05
 ALLOWABLE LOAD REPETITIONS = 1.269E+10 DAMAGE RATIO = 4.796E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.01124	547.446	549.257	267.982	273.597	
		(STRAIN)	-1.122E-06	2.281E-05	2.297E-05	-1.278E-06	-7.940E-07

1	34.00000	0.01090	27.025	27.025	-454.250	-401.154
	(STRAIN)	-1.790E-05	1.807E-05	1.807E-05	-1.790E-05	-1.393E-05
1	34.00010	0.01090	27.025	65.900	27.025	59.968
	(STRAIN)	1.225E-05	-1.481E-06	1.472E-05	-1.481E-06	1.225E-05
1	64.00010	0.01076	7.700	7.768	2.663	2.788
	(STRAIN)	-1.300E-05	4.577E-05	4.656E-05	-1.300E-05	-1.153E-05
2	9.00000	0.01125	276.219	418.266	163.607	227.798
	(STRAIN)	1.541E-06	5.715E-06	1.796E-05	-3.991E-06	1.541E-06
2	34.00000	0.01100	27.980	27.980	-472.387	-415.976
	(STRAIN)	-1.863E-05	1.876E-05	1.876E-05	-1.863E-05	-1.442E-05
2	34.00010	0.01100	27.980	68.320	27.980	62.893
	(STRAIN)	1.294E-05	-1.608E-06	1.520E-05	-1.608E-06	1.294E-05
2	64.00010	0.01086	7.939	7.952	2.702	2.840
	(STRAIN)	-1.346E-05	4.764E-05	4.780E-05	-1.346E-05	-1.185E-05
3	9.00000	0.01130	88.535	318.602	88.527	200.340
	(STRAIN)	3.693E-06	-5.944E-06	1.389E-05	-5.944E-06	3.693E-06
3	34.00000	0.01112	27.818	27.818	-474.036	-414.239
	(STRAIN)	-1.876E-05	1.875E-05	1.875E-05	-1.876E-05	-1.429E-05
3	34.00010	0.01112	27.818	68.609	27.818	63.144
	(STRAIN)	1.301E-05	-1.707E-06	1.529E-05	-1.707E-06	1.301E-05
3	64.00010	0.01097	8.048	8.048	2.751	2.893
	(STRAIN)	-1.355E-05	4.826E-05	4.826E-05	-1.355E-05	-1.189E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.122E-06
 ALLOWABLE LOAD REPETITIONS = 1.355E+13 DAMAGE RATIO = 4.493E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.876E-05
 ALLOWABLE LOAD REPETITIONS = 9.139E+08 DAMAGE RATIO = 6.661E-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 = 4.826E-05
 ALLOWABLE LOAD REPETITIONS = 2.882E+10 DAMAGE RATIO = 2.112E-05

* SUMMARY OF DAMAGE ANALYSIS *

AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 1.119E-03
 AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.474E-02
 AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 0.000E+00
 AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 4.502E-03

MAXIMUM DAMAGE RATIO = 4.474E-02 DESIGN LIFE IN YEARS = 22.35

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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/m³, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 20 30
 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 1.979E+07 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
 3 1.650E+07 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 1.250E+07 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
 3 8.721E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
 3 5.781E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
 3 3.844E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
 3 2.918E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
 3 3.087E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
 3 4.501E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
 3 7.647E+06 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
 3 1.345E+07 4 6.314E+06 5 2.030E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
 3 1.812E+07 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 : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 754976
 LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 754976

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

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.00834	542.980	544.953	236.556	243.300
	(STRAIN)	-2.114E-06	2.158E-05	2.173E-05	-2.267E-06	-1.742E-06
1	29.00000	0.00804	60.875	60.875	-473.029	-406.144
	(STRAIN)	-1.779E-05	1.862E-05	1.862E-05	-1.779E-05	-1.323E-05
1	29.00010	0.00804	60.875	141.318	60.875	126.836
	(STRAIN)	1.208E-05	-9.763E-07	1.495E-05	-9.763E-07	1.208E-05
1	59.00010	0.00790	11.729	11.866	3.468	3.712
	(STRAIN)	-1.361E-05	4.336E-05	4.430E-05	-1.361E-05	-1.193E-05
2	9.00000	0.00836	272.879	400.087	148.412	198.878
	(STRAIN)	3.979E-07	6.156E-06	1.606E-05	-3.529E-06	3.979E-07
2	29.00000	0.00815	60.916	60.916	-488.220	-407.367
	(STRAIN)	-1.854E-05	1.891E-05	1.891E-05	-1.854E-05	-1.303E-05
2	29.00010	0.00815	60.916	145.890	60.916	131.648
	(STRAIN)	1.266E-05	-1.341E-06	1.548E-05	-1.341E-06	1.266E-05
2	59.00010	0.00800	12.173	12.199	3.531	3.812
	(STRAIN)	-1.416E-05	4.544E-05	4.563E-05	-1.416E-05	-1.222E-05
3	9.00000	0.00834	86.032	289.397	86.024	172.201
	(STRAIN)	2.352E-06	-4.353E-06	1.147E-05	-4.354E-06	2.352E-06
3	29.00000	0.00819	59.135	59.135	-486.345	-396.459
	(STRAIN)	-1.861E-05	1.860E-05	1.860E-05	-1.861E-05	-1.248E-05
3	29.00010	0.00819	59.135	145.647	59.135	130.833
	(STRAIN)	1.261E-05	-1.581E-06	1.555E-05	-1.581E-06	1.261E-05
3	59.00010	0.00805	12.265	12.265	3.551	3.842
	(STRAIN)	-1.425E-05	4.585E-05	4.585E-05	-1.425E-05	-1.224E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.114E-06
 ALLOWABLE LOAD REPETITIONS = 1.544E+12 DAMAGE RATIO = 4.890E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.861E-05
 ALLOWABLE LOAD REPETITIONS = 8.677E+08 DAMAGE RATIO = 8.701E-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 = 4.585E-05
 ALLOWABLE LOAD REPETITIONS = 3.624E+10 DAMAGE RATIO = 2.083E-05

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

NO.	COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.00874	546.621	548.249	229.402	235.002	
		(STRAIN) -3.026E-06	2.728E-05	2.744E-05	-3.182E-06	-2.644E-06	
1	29.00000	0.00839	68.622	68.622	-439.793	-374.811	
		(STRAIN) -2.016E-05	2.143E-05	2.143E-05	-2.016E-05	-1.484E-05	
1	29.00010	0.00839	68.622	156.801	68.622	140.334	
		(STRAIN) 1.330E-05	-8.967E-07	1.656E-05	-8.967E-07	1.330E-05	
1	59.00010	0.00823	12.678	12.834	3.629	3.906	
		(STRAIN) -1.511E-05	4.730E-05	4.838E-05	-1.511E-05	-1.320E-05	
2	9.00000	0.00875	274.789	395.866	140.905	186.703	
		(STRAIN) -8.302E-08	8.376E-06	2.000E-05	-4.481E-06	-8.301E-08	
2	29.00000	0.00850	68.579	68.579	-454.006	-374.672	
		(STRAIN) -2.102E-05	2.173E-05	2.173E-05	-2.102E-05	-1.453E-05	
2	29.00010	0.00850	68.579	161.935	68.579	145.667	
		(STRAIN) 1.394E-05	-1.318E-06	1.716E-05	-1.318E-06	1.394E-05	
2	59.00010	0.00834	13.178	13.208	3.698	4.018	
		(STRAIN) -1.572E-05	4.965E-05	4.986E-05	-1.572E-05	-1.352E-05	
3	9.00000	0.00872	86.617	272.136	86.608	157.539	
		(STRAIN) 2.275E-06	-4.536E-06	1.328E-05	-4.537E-06	2.275E-06	
3	29.00000	0.00854	66.495	66.495	-452.241	-363.794	
		(STRAIN) -2.110E-05	2.134E-05	2.134E-05	-2.110E-05	-1.386E-05	
3	29.00010	0.00854	66.496	161.669	66.496	144.719	
		(STRAIN) 1.389E-05	-1.600E-06	1.724E-05	-1.600E-06	1.389E-05	
3	59.00010	0.00838	13.276	13.276	3.715	4.047	
		(STRAIN) -1.584E-05	5.011E-05	5.011E-05	-1.584E-05	-1.354E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.026E-06
 ALLOWABLE LOAD REPETITIONS = 5.671E+11 DAMAGE RATIO = 1.331E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.110E-05
 ALLOWABLE LOAD REPETITIONS = 6.701E+08 DAMAGE RATIO = 1.127E-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 = 5.011E-05
 ALLOWABLE LOAD REPETITIONS = 2.436E+10 DAMAGE RATIO = 3.099E-05

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

NO.	COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.00934	551.688	552.872	218.004	221.749	
		(STRAIN) -5.030E-06	3.880E-05	3.896E-05	-5.187E-06	-4.693E-06	
1	29.00000	0.00888	81.200	81.200	-388.802	-327.085	
		(STRAIN) -2.421E-05	2.653E-05	2.653E-05	-2.421E-05	-1.755E-05	
1	29.00010	0.00888	81.200	181.166	81.200	161.455	
		(STRAIN) 1.518E-05	-7.056E-07	1.908E-05	-7.056E-07	1.518E-05	
1	59.00010	0.00869	14.108	14.297	3.849	4.178	
		(STRAIN) -1.744E-05	5.331E-05	5.461E-05	-1.744E-05	-1.517E-05	
2	9.00000	0.00934	277.581	390.323	128.964	168.081	
		(STRAIN) -1.335E-06	1.310E-05	2.796E-05	-6.492E-06	-1.335E-06	

2	29.00000	0.00901	80.961	80.961	-401.441	-324.801
	(STRAIN)	-2.528E-05	2.680E-05	2.680E-05	-2.528E-05	-1.701E-05
2	29.00010	0.00901	80.960	187.178	80.960	167.558
	(STRAIN)	1.592E-05	-1.223E-06	1.980E-05	-1.223E-06	1.592E-05
2	59.00010	0.00882	14.697	14.734	3.927	4.311
	(STRAIN)	-1.818E-05	5.610E-05	5.635E-05	-1.818E-05	-1.553E-05
3	9.00000	0.00928	87.649	246.957	87.638	135.539
	(STRAIN)	1.800E-06	-4.513E-06	1.649E-05	-4.515E-06	1.800E-06
3	29.00000	0.00905	78.353	78.353	-399.846	-313.996
	(STRAIN)	-2.538E-05	2.625E-05	2.625E-05	-2.538E-05	-1.611E-05
3	29.00010	0.00905	78.354	186.873	78.354	166.379
	(STRAIN)	1.585E-05	-1.577E-06	1.991E-05	-1.577E-06	1.585E-05
3	59.00010	0.00886	14.811	14.811	3.940	4.340
	(STRAIN)	-1.833E-05	5.665E-05	5.665E-05	-1.833E-05	-1.557E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.030E-06
 ALLOWABLE LOAD REPETITIONS = 1.396E+11 DAMAGE RATIO = 5.409E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.538E-05
 ALLOWABLE LOAD REPETITIONS = 4.622E+08 DAMAGE RATIO = 1.633E-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 = 5.665E-05
 ALLOWABLE LOAD REPETITIONS = 1.407E+10 DAMAGE RATIO = 5.367E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. P. STRAIN	VERTICAL (HORIZONTAL) STRAIN	STRESS	STRESS	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE PRINCIPAL STRESS (STRAIN)
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1	9.00000	0.01012	557.624	558.372	203.774	205.039
	(STRAIN)	-9.147E-06	6.072E-05	6.087E-05	-9.296E-06	-9.046E-06
1	29.00000	0.00946	98.342	98.342	-324.477	-267.398
	(STRAIN)	-3.042E-05	3.503E-05	3.503E-05	-3.042E-05	-2.159E-05
1	29.00010	0.00946	98.342	213.020	98.342	188.870
	(STRAIN)	1.758E-05	-3.374E-07	2.237E-05	-3.374E-07	1.758E-05
1	59.00010	0.00924	15.876	16.108	4.082	4.484
	(STRAIN)	-2.047E-05	6.087E-05	6.247E-05	-2.047E-05	-1.770E-05
2	9.00000	0.01009	280.998	384.900	113.371	145.110
	(STRAIN)	-4.293E-06	2.260E-05	4.316E-05	-1.057E-05	-4.293E-06
2	29.00000	0.00961	97.701	97.701	-335.042	-262.370
	(STRAIN)	-3.181E-05	3.518E-05	3.518E-05	-3.181E-05	-2.056E-05
2	29.00010	0.00961	97.700	220.144	97.700	195.845
	(STRAIN)	1.843E-05	-9.973E-07	2.324E-05	-9.973E-07	1.843E-05
2	59.00010	0.00938	16.584	16.629	4.171	4.644
	(STRAIN)	-2.137E-05	6.424E-05	6.455E-05	-2.137E-05	-1.811E-05
3	9.00000	0.00998	89.099	216.903	89.085	108.666
	(STRAIN)	2.301E-07	-3.642E-06	2.165E-05	-3.645E-06	2.301E-07
3	29.00000	0.00965	94.305	94.305	-333.636	-251.672
	(STRAIN)	-3.194E-05	3.430E-05	3.430E-05	-3.194E-05	-1.925E-05
3	29.00010	0.00965	94.306	219.761	94.306	194.285
	(STRAIN)	1.834E-05	-1.458E-06	2.338E-05	-1.458E-06	1.834E-05
3	59.00010	0.00942	16.723	16.723	4.184	4.676
	(STRAIN)	-2.156E-05	6.492E-05	6.492E-05	-2.156E-05	-1.816E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -9.147E-06
 ALLOWABLE LOAD REPETITIONS = 2.760E+10 DAMAGE RATIO = 2.736E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.194E-05
 ALLOWABLE LOAD REPETITIONS = 2.951E+08 DAMAGE RATIO = 2.558E-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 = 6.492E-05
 ALLOWABLE LOAD REPETITIONS = 7.639E+09 DAMAGE RATIO = 9.883E-05

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01103	563.656	564.071	188.418	189.877
	(STRAIN)	-1.750E-05	9.998E-05	1.001E-04	-1.750E-05	-1.704E-05
1	29.00000	0.01002	117.856	117.856	-257.176	-205.517
	(STRAIN)	-3.918E-05	4.840E-05	4.840E-05	-3.918E-05	-2.711E-05
1	29.00010	0.01002	117.856	247.629	117.856	218.423
	(STRAIN)	2.012E-05	2.128E-07	2.590E-05	2.128E-07	2.012E-05
1	59.00010	0.00976	17.683	17.963	4.279	4.763
	(STRAIN)	-2.370E-05	6.874E-05	7.067E-05	-2.370E-05	-2.036E-05
2	9.00000	0.01091	284.545	380.929	96.738	122.104
	(STRAIN)	-1.045E-05	4.040E-05	7.058E-05	-1.840E-05	-1.045E-05
2	29.00000	0.01020	116.544	116.544	-265.531	-197.646
	(STRAIN)	-4.102E-05	4.820E-05	4.820E-05	-4.102E-05	-2.517E-05
2	29.00010	0.01020	116.544	255.883	116.544	226.117
	(STRAIN)	2.107E-05	-6.266E-07	2.696E-05	-6.266E-07	2.107E-05
2	59.00010	0.00993	18.521	18.575	4.379	4.954
	(STRAIN)	-2.479E-05	7.274E-05	7.311E-05	-2.479E-05	-2.083E-05
3	9.00000	0.01074	90.693	187.055	81.670	90.674
	(STRAIN)	-3.603E-06	-7.780E-07	2.939E-05	-3.603E-06	-7.839E-07
3	29.00000	0.01024	112.132	112.132	-264.321	-187.110
	(STRAIN)	-4.118E-05	4.673E-05	4.673E-05	-4.118E-05	-2.315E-05
3	29.00010	0.01024	112.133	255.339	112.133	223.995
	(STRAIN)	2.093E-05	-1.220E-06	2.713E-05	-1.220E-06	2.093E-05
3	59.00010	0.00997	18.691	18.691	4.393	4.992
	(STRAIN)	-2.503E-05	7.358E-05	7.358E-05	-2.503E-05	-2.089E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.750E-05
 ALLOWABLE LOAD REPETITIONS = 4.827E+09 DAMAGE RATIO = 1.564E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.118E-05
 ALLOWABLE LOAD REPETITIONS = 1.817E+08 DAMAGE RATIO = 4.156E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.128E-07
 ALLOWABLE LOAD REPETITIONS = 1.014E+21 DAMAGE RATIO = 7.445E-16

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.358E-05
 ALLOWABLE LOAD REPETITIONS = 4.361E+09 DAMAGE RATIO = 1.731E-04

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01201	568.891	569.110	175.681	179.483
	(STRAIN)	-3.146E-05	1.620E-04	1.621E-04	-3.146E-05	-2.959E-05
1	29.00000	0.01047	135.796	135.796	-199.836	-153.222
	(STRAIN)	-5.040E-05	6.748E-05	6.748E-05	-5.040E-05	-3.403E-05
1	29.00010	0.01047	135.796	278.062	135.796	244.226
	(STRAIN)	2.229E-05	8.274E-07	2.899E-05	8.274E-07	2.229E-05
1	59.00010	0.01016	19.182	19.506	4.412	4.972
	(STRAIN)	-2.650E-05	7.536E-05	7.760E-05	-2.650E-05	-2.264E-05

2	9.00000	0.01175	287.591	378.781	82.590	103.701
	(STRAIN)	-2.106E-05	6.942E-05	1.143E-04	-3.144E-05	-2.106E-05
2	29.00000	0.01067	133.634	133.634	-206.342	-143.037
	(STRAIN)	-5.282E-05	6.658E-05	6.658E-05	-5.282E-05	-3.059E-05
2	29.00010	0.01067	133.632	287.202	133.632	252.285
	(STRAIN)	2.329E-05	-1.963E-07	3.021E-05	-1.963E-07	2.329E-05
2	59.00010	0.01035	20.134	20.197	4.520	5.189
	(STRAIN)	-2.775E-05	7.993E-05	8.036E-05	-2.775E-05	-2.314E-05
3	9.00000	0.01147	92.016	162.643	59.691	91.989
	(STRAIN)	-1.073E-05	5.178E-06	3.993E-05	-1.073E-05	5.165E-06
3	29.00000	0.01070	128.160	128.160	-205.342	-132.724
	(STRAIN)	-5.300E-05	6.412E-05	6.412E-05	-5.300E-05	-2.750E-05
3	29.00010	0.01070	128.161	286.425	128.161	249.503
	(STRAIN)	2.310E-05	-9.220E-07	3.041E-05	-9.220E-07	2.310E-05
3	59.00010	0.01040	20.334	20.334	4.535	5.235
	(STRAIN)	-2.804E-05	8.092E-05	8.092E-05	-2.804E-05	-2.322E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.146E-05
 ALLOWABLE LOAD REPETITIONS = 1.030E+09 DAMAGE RATIO = 7.327E-04
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.300E-05
 ALLOWABLE LOAD REPETITIONS = 1.122E+08 DAMAGE RATIO = 6.730E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 8.274E-07
 ALLOWABLE LOAD REPETITIONS = 2.321E+18 DAMAGE RATIO = 3.253E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.092E-05
 ALLOWABLE LOAD REPETITIONS = 2.850E+09 DAMAGE RATIO = 2.649E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01275	572.007	572.145	169.397	174.524	
	(STRAIN)	-4.540E-05	2.230E-04	2.231E-04	-4.540E-05	-4.198E-05	
1	29.00000	0.01071	146.539	146.539	-167.277	-123.695	
	(STRAIN)	-6.006E-05	8.511E-05	8.511E-05	-6.006E-05	-3.990E-05	
1	29.00010	0.01071	146.539	295.696	146.539	259.104	
	(STRAIN)	2.353E-05	1.242E-06	3.077E-05	1.242E-06	2.353E-05	
1	59.00010	0.01038	20.014	20.363	4.474	5.078	
	(STRAIN)	-2.809E-05	7.908E-05	8.149E-05	-2.809E-05	-2.392E-05	
2	9.00000	0.01236	289.343	378.041	74.679	93.945	
	(STRAIN)	-3.185E-05	9.840E-05	1.575E-04	-4.469E-05	-3.185E-05	
2	29.00000	0.01092	143.742	143.742	-172.771	-112.268	
	(STRAIN)	-6.298E-05	8.344E-05	8.344E-05	-6.298E-05	-3.499E-05	
2	29.00010	0.01092	143.741	305.281	143.741	267.230	
	(STRAIN)	2.454E-05	9.709E-08	3.208E-05	9.709E-08	2.454E-05	
2	59.00010	0.01058	21.033	21.100	4.586	5.312	
	(STRAIN)	-2.945E-05	8.398E-05	8.444E-05	-2.945E-05	-2.445E-05	
3	9.00000	0.01197	92.701	149.093	47.706	92.667	
	(STRAIN)	-1.822E-05	1.177E-05	4.936E-05	-1.822E-05	1.175E-05	
3	29.00000	0.01096	137.566	137.566	-171.928	-102.139	
	(STRAIN)	-6.316E-05	8.001E-05	8.001E-05	-6.316E-05	-3.088E-05	
3	29.00010	0.01096	137.567	304.321	137.567	263.976	
	(STRAIN)	2.431E-05	-7.138E-07	3.230E-05	-7.138E-07	2.431E-05	
3	59.00010	0.01063	21.249	21.249	4.602	5.362	
	(STRAIN)	-2.976E-05	8.504E-05	8.504E-05	-2.976E-05	-2.453E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.540E-05
 ALLOWABLE LOAD REPETITIONS = 3.996E+08 DAMAGE RATIO = 1.889E-03

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.316E-05
 ALLOWABLE LOAD REPETITIONS = 7.971E+07 DAMAGE RATIO = 9.471E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.242E-06
 ALLOWABLE LOAD REPETITIONS = 3.771E+17 DAMAGE RATIO = 2.002E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.504E-05
 ALLOWABLE LOAD REPETITIONS = 2.281E+09 DAMAGE RATIO = 3.309E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01259	571.396	571.549	170.533	175.407	
		(STRAIN) -4.218E-05	2.090E-04	2.090E-04	-4.218E-05	-3.913E-05	
1	29.00000	0.01067	144.445	144.445	-173.526	-129.352	
		(STRAIN) -5.791E-05	8.112E-05	8.112E-05	-5.791E-05	-3.860E-05	
1	29.00010	0.01067	144.445	292.292	144.445	256.238	
		(STRAIN) 2.329E-05	1.158E-06	3.043E-05	1.158E-06	2.329E-05	
1	59.00010	0.01034	19.856	20.200	4.463	5.059	
		(STRAIN) -2.779E-05	7.837E-05	8.075E-05	-2.779E-05	-2.368E-05	
2	9.00000	0.01223	289.005	378.156	76.186	95.769	
		(STRAIN) -2.935E-05	9.171E-05	1.476E-04	-4.162E-05	-2.935E-05	
2	29.00000	0.01087	141.780	141.780	-179.210	-118.159	
		(STRAIN) -6.072E-05	7.963E-05	7.963E-05	-6.072E-05	-3.403E-05	
2	29.00010	0.01087	141.779	301.796	141.779	264.360	
		(STRAIN) 2.431E-05	3.795E-08	3.172E-05	3.794E-08	2.431E-05	
2	59.00010	0.01054	20.862	20.928	4.574	5.289	
		(STRAIN) -2.913E-05	8.320E-05	8.366E-05	-2.913E-05	-2.420E-05	
3	9.00000	0.01187	92.575	151.680	49.974	92.543	
		(STRAIN) -1.648E-05	1.021E-05	4.724E-05	-1.648E-05	1.019E-05	
3	29.00000	0.01091	135.745	135.745	-178.335	-107.991	
		(STRAIN) -6.091E-05	7.642E-05	7.642E-05	-6.091E-05	-3.015E-05	
3	29.00010	0.01091	135.746	300.875	135.746	261.202	
		(STRAIN) 2.408E-05	-7.560E-07	3.194E-05	-7.560E-07	2.408E-05	
3	59.00010	0.01058	21.075	21.075	4.590	5.338	
		(STRAIN) -2.943E-05	8.425E-05	8.425E-05	-2.943E-05	-2.428E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.218E-05
 ALLOWABLE LOAD REPETITIONS = 4.825E+08 DAMAGE RATIO = 1.565E-03

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.091E-05
 ALLOWABLE LOAD REPETITIONS = 8.562E+07 DAMAGE RATIO = 8.817E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.158E-06
 ALLOWABLE LOAD REPETITIONS = 5.148E+17 DAMAGE RATIO = 1.467E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.425E-05
 ALLOWABLE LOAD REPETITIONS = 2.378E+09 DAMAGE RATIO = 3.174E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01162	566.956	567.238	180.122	183.068	
		(STRAIN) -2.525E-05	1.346E-04	1.347E-04	-2.525E-05	-2.403E-05	
1	29.00000	0.01031	129.111	129.111	-220.747	-172.249	
		(STRAIN) -4.569E-05	5.925E-05	5.925E-05	-4.569E-05	-3.115E-05	
1	29.00010	0.01031	129.111	266.869	129.111	234.754	

1	(STRAIN)	2.150E-05	5.868E-07	2.786E-05	5.868E-07	2.150E-05
1	59.00010	0.01002	18.640	18.948	4.367	4.899
	(STRAIN)	-2.547E-05	7.296E-05	7.508E-05	-2.547E-05	-2.181E-05
2	9.00000	0.01142	286.475	379.439	87.729	110.256
	(STRAIN)	-1.630E-05	5.653E-05	9.495E-05	-2.561E-05	-1.630E-05
2	29.00000	0.01050	127.294	127.294	-227.920	-162.892
	(STRAIN)	-4.787E-05	5.867E-05	5.867E-05	-4.787E-05	-2.837E-05
2	29.00010	0.01050	127.293	275.697	127.293	242.713
	(STRAIN)	2.248E-05	-3.658E-07	2.901E-05	-3.658E-07	2.248E-05
2	59.00010	0.01020	19.550	19.609	4.472	5.106
	(STRAIN)	-2.667E-05	7.732E-05	7.772E-05	-2.667E-05	-2.230E-05
3	9.00000	0.01119	91.545	171.453	67.587	91.521
	(STRAIN)	-7.486E-06	2.415E-06	3.544E-05	-7.486E-06	2.405E-06
3	29.00000	0.01054	122.231	122.231	-226.836	-152.485
	(STRAIN)	-4.805E-05	5.666E-05	5.666E-05	-4.805E-05	-2.575E-05
3	29.00010	0.01054	122.232	275.017	122.232	240.194
	(STRAIN)	2.231E-05	-1.041E-06	2.921E-05	-1.041E-06	2.231E-05
3	59.00010	0.01024	19.739	19.739	4.487	5.149
	(STRAIN)	-2.694E-05	7.825E-05	7.825E-05	-2.694E-05	-2.237E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.525E-05
 ALLOWABLE LOAD REPETITIONS = 1.831E+09 DAMAGE RATIO = 4.124E-04
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.805E-05
 ALLOWABLE LOAD REPETITIONS = 1.355E+08 DAMAGE RATIO = 5.574E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.868E-07
 ALLOWABLE LOAD REPETITIONS = 1.080E+19 DAMAGE RATIO = 6.988E-14

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 7.825E-05
 ALLOWABLE LOAD REPETITIONS = 3.311E+09 DAMAGE RATIO = 2.280E-04

DAMAGE ANALYSIS OF PERIOD NO. 10 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	0.01041	559.635	560.259	198.981	199.391
	(STRAIN)	-1.127E-05	7.132E-05	7.146E-05	-1.136E-05	-1.127E-05
1	29.00000	0.00965	104.651	104.651	-302.092	-246.754
	(STRAIN)	-3.300E-05	3.881E-05	3.881E-05	-3.300E-05	-2.323E-05
1	29.00010	0.00965	104.651	224.391	104.651	198.605
	(STRAIN)	1.843E-05	-1.739E-07	2.353E-05	-1.739E-07	1.843E-05
1	59.00010	0.00941	16.482	16.730	4.153	4.581
	(STRAIN)	-2.153E-05	6.350E-05	6.520E-05	-2.153E-05	-1.858E-05
2	9.00000	0.01035	282.178	383.396	107.857	137.321
	(STRAIN)	-5.878E-06	2.733E-05	5.053E-05	-1.263E-05	-5.878E-06
2	29.00000	0.00981	103.819	103.819	-311.923	-240.772
	(STRAIN)	-3.452E-05	3.887E-05	3.887E-05	-3.452E-05	-2.196E-05
2	29.00010	0.00981	103.819	231.898	103.819	205.846
	(STRAIN)	1.931E-05	-8.896E-07	2.447E-05	-8.896E-07	1.931E-05
2	59.00010	0.00957	17.233	17.280	4.246	4.751
	(STRAIN)	-2.250E-05	6.707E-05	6.740E-05	-2.250E-05	-1.901E-05
3	9.00000	0.01023	89.626	206.813	89.610	99.555
	(STRAIN)	-7.121E-07	-2.988E-06	2.388E-05	-2.992E-06	-7.121E-07
3	29.00000	0.00985	100.110	100.110	-310.580	-230.120
	(STRAIN)	-3.466E-05	3.784E-05	3.784E-05	-3.466E-05	-2.046E-05
3	29.00010	0.00985	100.111	231.472	100.111	204.121
	(STRAIN)	1.920E-05	-1.392E-06	2.461E-05	-1.392E-06	1.920E-05
3	59.00010	0.00961	17.382	17.382	4.258	4.785
	(STRAIN)	-2.270E-05	6.781E-05	6.781E-05	-2.270E-05	-1.907E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.127E-05
 ALLOWABLE LOAD REPETITIONS = 1.574E+10 DAMAGE RATIO = 4.797E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.466E-05
 ALLOWABLE LOAD REPETITIONS = 2.523E+08 DAMAGE RATIO = 2.993E-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 = 6.781E-05
 ALLOWABLE LOAD REPETITIONS = 6.289E+09 DAMAGE RATIO = 1.201E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.00918	550.400	551.691	221.014	225.254	
		(STRAIN)	-4.419E-06	3.538E-05	3.554E-05	-4.576E-06	-4.061E-06
1	29.00000	0.00875	77.812	77.812	-402.198	-339.586	
		(STRAIN)	-2.309E-05	2.508E-05	2.508E-05	-2.309E-05	-1.680E-05
1	29.00010	0.00875	77.811	174.690	77.811	155.854	
		(STRAIN)	1.469E-05	-7.642E-07	1.842E-05	-7.642E-07	1.469E-05
1	59.00010	0.00857	13.735	13.915	3.794	4.109	
		(STRAIN)	-1.683E-05	5.173E-05	5.297E-05	-1.683E-05	-1.465E-05
2	9.00000	0.00919	276.858	391.669	132.144	172.949	
		(STRAIN)	-9.333E-07	1.167E-05	2.560E-05	-5.884E-06	-9.333E-07
2	29.00000	0.00888	77.633	77.633	-415.257	-337.869	
		(STRAIN)	-2.410E-05	2.537E-05	2.537E-05	-2.410E-05	-1.633E-05
2	29.00010	0.00888	77.632	180.470	77.632	161.760	
		(STRAIN)	1.540E-05	-1.255E-06	1.910E-05	-1.255E-06	1.540E-05
2	59.00010	0.00870	14.300	14.335	3.870	4.237	
		(STRAIN)	-1.753E-05	5.440E-05	5.464E-05	-1.753E-05	-1.500E-05
3	9.00000	0.00914	87.365	253.441	87.355	141.259	
		(STRAIN)	1.975E-06	-4.563E-06	1.558E-05	-4.564E-06	1.975E-06
3	29.00000	0.00892	75.171	75.171	-413.620	-327.045	
		(STRAIN)	-2.419E-05	2.486E-05	2.486E-05	-2.419E-05	-1.551E-05
3	29.00010	0.00892	75.171	180.177	75.171	160.647	
		(STRAIN)	1.533E-05	-1.589E-06	1.920E-05	-1.589E-06	1.533E-05
3	59.00010	0.00874	14.410	14.410	3.884	4.265	
		(STRAIN)	-1.766E-05	5.493E-05	5.493E-05	-1.766E-05	-1.503E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.419E-06
 ALLOWABLE LOAD REPETITIONS = 1.991E+11 DAMAGE RATIO = 3.791E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.419E-05
 ALLOWABLE LOAD REPETITIONS = 5.085E+08 DAMAGE RATIO = 1.485E-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 = 5.493E-05
 ALLOWABLE LOAD REPETITIONS = 1.615E+10 DAMAGE RATIO = 4.675E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.00853	544.783	546.583	233.150	239.355	
		(STRAIN)	-2.522E-06	2.418E-05	2.434E-05	-2.677E-06	-2.142E-06

1	29.00000	0.00821	64.572	64.572	-456.985	-390.994
	(STRAIN)	-1.891E-05	1.994E-05	1.994E-05	-1.891E-05	-1.399E-05
1	29.00010	0.00821	64.572	148.757	64.572	133.328
	(STRAIN)	1.267E-05	-9.422E-07	1.572E-05	-9.422E-07	1.267E-05
1	59.00010	0.00806	12.189	12.335	3.548	3.808
	(STRAIN)	-1.433E-05	4.526E-05	4.627E-05	-1.433E-05	-1.254E-05
2	9.00000	0.00855	273.814	397.991	144.819	193.008
	(STRAIN)	1.931E-07	7.158E-06	1.786E-05	-3.960E-06	1.931E-07
2	29.00000	0.00832	64.577	64.577	-471.708	-391.563
	(STRAIN)	-1.971E-05	2.023E-05	2.023E-05	-1.971E-05	-1.374E-05
2	29.00010	0.00832	64.577	153.598	64.577	138.394
	(STRAIN)	1.328E-05	-1.334E-06	1.629E-05	-1.334E-06	1.328E-05
2	59.00010	0.00817	12.659	12.688	3.614	3.913
	(STRAIN)	-1.491E-05	4.748E-05	4.767E-05	-1.491E-05	-1.284E-05
3	9.00000	0.00853	86.304	280.966	86.295	165.092
	(STRAIN)	2.334E-06	-4.457E-06	1.232E-05	-4.458E-06	2.334E-06
3	29.00000	0.00836	62.653	62.653	-469.885	-380.668
	(STRAIN)	-1.978E-05	1.988E-05	1.988E-05	-1.978E-05	-1.314E-05
3	29.00010	0.00836	62.654	153.344	62.654	137.515
	(STRAIN)	1.323E-05	-1.593E-06	1.636E-05	-1.593E-06	1.323E-05
3	59.00010	0.00821	12.755	12.755	3.632	3.943
	(STRAIN)	-1.501E-05	4.791E-05	4.791E-05	-1.501E-05	-1.287E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.522E-06
ALLOWABLE LOAD REPETITIONS = 9.423E+11 DAMAGE RATIO = 8.012E-07
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.978E-05
ALLOWABLE LOAD REPETITIONS = 7.644E+08 DAMAGE RATIO = 9.877E-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 = 4.791E-05
ALLOWABLE LOAD REPETITIONS = 2.979E+10 DAMAGE RATIO = 2.535E-05

* SUMMARY OF DAMAGE ANALYSIS *

AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 4.843E-03
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.640E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 3.865E-12
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 1.711E-03

MAXIMUM DAMAGE RATIO = 4.640E-02 DESIGN LIFE IN YEARS = 21.55

- Sovrastruttura 2C

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/m³, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 25 30
 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 2.773E+06 5 1.460E+05

FOR PERIOD NO. 2 LAYER NO. AND MODULUS ARE : 1 5.122E+06 2 1.406E+07
 3 1.646E+07 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 3 LAYER NO. AND MODULUS ARE : 1 3.633E+06 2 1.024E+07
 3 1.250E+07 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 4 LAYER NO. AND MODULUS ARE : 1 2.351E+06 2 6.822E+06
 3 8.753E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 5 LAYER NO. AND MODULUS ARE : 1 1.444E+06 2 4.312E+06
 3 5.831E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 6 LAYER NO. AND MODULUS ARE : 1 8.971E+05 2 2.744E+06
 3 3.897E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 7 LAYER NO. AND MODULUS ARE : 1 6.524E+05 2 2.025E+06
 3 2.969E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 8 LAYER NO. AND MODULUS ARE : 1 6.962E+05 2 2.155E+06
 3 3.139E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 9 LAYER NO. AND MODULUS ARE : 1 1.078E+06 2 3.267E+06
 3 4.553E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 10 LAYER NO. AND MODULUS ARE : 1 2.010E+06 2 5.889E+06
 3 7.687E+06 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 11 LAYER NO. AND MODULUS ARE : 1 3.974E+06 2 1.113E+07
 3 1.344E+07 4 2.773E+06 5 1.460E+05

FOR PERIOD NO. 12 LAYER NO. AND MODULUS ARE : 1 5.765E+06 2 1.566E+07
 3 1.806E+07 4 2.773E+06 5 1.460E+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 : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 648455
 LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 648455

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

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS	VERTICAL PRINCIPAL STRESS	MAJOR PRINCIPAL STRESS	MINOR PRINCIPAL STRESS	INTERMEDIATE STRESS
	(HORIZONTAL P. STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	(STRAIN)	(STRESS)
1	9.00000	0.00964	545.930	547.794	263.606	269.362	
	(STRAIN)	-1.146E-06	2.068E-05	2.082E-05	-1.291E-06	-8.432E-07	
1	34.00000	0.00933	24.979	24.979	-451.812	-398.415	
	(STRAIN)	-1.629E-05	1.636E-05	1.636E-05	-1.629E-05	-1.263E-05	
1	34.00010	0.00933	24.979	56.313	24.979	51.249	
	(STRAIN)	1.115E-05	-6.894E-07	1.344E-05	-6.894E-07	1.115E-05	
1	64.00010	0.00919	8.275	8.350	2.852	2.990	
	(STRAIN)	-1.153E-05	4.046E-05	4.119E-05	-1.153E-05	-1.021E-05	
2	9.00000	0.00965	275.611	416.697	163.235	225.428	
	(STRAIN)	1.294E-06	5.199E-06	1.618E-05	-3.545E-06	1.294E-06	
2	34.00000	0.00943	25.864	25.864	-470.140	-413.461	
	(STRAIN)	-1.697E-05	1.700E-05	1.700E-05	-1.697E-05	-1.309E-05	
2	34.00010	0.00943	25.864	58.398	25.864	53.755	
	(STRAIN)	1.179E-05	-7.841E-07	1.388E-05	-7.841E-07	1.179E-05	
2	64.00010	0.00928	8.539	8.554	2.895	3.048	
	(STRAIN)	-1.196E-05	4.217E-05	4.231E-05	-1.196E-05	-1.049E-05	
3	9.00000	0.00968	88.609	319.013	88.602	199.129	
	(STRAIN)	3.255E-06	-5.346E-06	1.258E-05	-5.346E-06	3.255E-06	
3	34.00000	0.00952	25.735	25.735	-471.538	-411.477	
	(STRAIN)	-1.707E-05	1.698E-05	1.698E-05	-1.707E-05	-1.296E-05	
3	34.00010	0.00952	25.735	58.615	25.735	53.936	
	(STRAIN)	1.185E-05	-8.666E-07	1.396E-05	-8.666E-07	1.185E-05	
3	64.00010	0.00937	8.643	8.643	2.940	3.097	
	(STRAIN)	-1.203E-05	4.266E-05	4.266E-05	-1.203E-05	-1.052E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.146E-06
 ALLOWABLE LOAD REPETITIONS = 1.158E+13 DAMAGE RATIO = 5.599E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.707E-05
 ALLOWABLE LOAD REPETITIONS = 1.156E+09 DAMAGE RATIO = 5.609E-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 = 4.266E-05
 ALLOWABLE LOAD REPETITIONS = 5.008E+10 DAMAGE RATIO = 1.295E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01023	548.955	550.621	259.033	264.438	
		(STRAIN) -1.706E-06	2.598E-05	2.614E-05	-1.866E-06	-1.347E-06	
1	34.00000	0.00986	28.758	28.758	-432.062	-379.232	
		(STRAIN) -1.880E-05	1.900E-05	1.900E-05	-1.880E-05	-1.446E-05	
1	34.00010	0.00986	28.758	64.240	28.758	58.301	
		(STRAIN) 1.264E-05	-6.770E-07	1.532E-05	-6.770E-07	1.264E-05	
1	64.00010	0.00970	9.181	9.271	3.064	3.225	
		(STRAIN) -1.325E-05	4.541E-05	4.627E-05	-1.325E-05	-1.171E-05	
2	9.00000	0.01024	276.803	412.485	157.817	216.750	
		(STRAIN) 1.220E-06	6.986E-06	2.002E-05	-4.440E-06	1.220E-06	
2	34.00000	0.00997	29.792	29.792	-449.968	-393.671	
		(STRAIN) -1.960E-05	1.975E-05	1.975E-05	-1.960E-05	-1.498E-05	
2	34.00010	0.00997	29.792	66.681	29.792	61.228	
		(STRAIN) 1.338E-05	-7.882E-07	1.584E-05	-7.882E-07	1.338E-05	
2	64.00010	0.00980	9.490	9.507	3.113	3.293	
		(STRAIN) -1.374E-05	4.740E-05	4.756E-05	-1.374E-05	-1.202E-05	
3	9.00000	0.01025	88.429	304.288	88.421	187.734	
		(STRAIN) 3.577E-06	-5.959E-06	1.477E-05	-5.960E-06	3.577E-06	
3	34.00000	0.01006	29.614	29.614	-451.121	-391.392	
		(STRAIN) -1.971E-05	1.971E-05	1.971E-05	-1.971E-05	-1.482E-05	
3	34.00010	0.01006	29.614	66.889	29.614	61.391	
		(STRAIN) 1.344E-05	-8.858E-07	1.592E-05	-8.858E-07	1.344E-05	
3	64.00010	0.00988	9.586	9.586	3.150	3.335	
		(STRAIN) -1.382E-05	4.789E-05	4.789E-05	-1.382E-05	-1.205E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.706E-06
 ALLOWABLE LOAD REPETITIONS = 3.738E+12 DAMAGE RATIO = 1.735E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.971E-05
 ALLOWABLE LOAD REPETITIONS = 8.396E+08 DAMAGE RATIO = 7.723E-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 = 4.789E-05
 ALLOWABLE LOAD REPETITIONS = 2.984E+10 DAMAGE RATIO = 2.173E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01117	553.130	554.514	250.972	255.680	
		(STRAIN) -3.000E-06	3.665E-05	3.683E-05	-3.183E-06	-2.562E-06	
1	34.00000	0.01069	35.345	35.345	-400.014	-348.317	
		(STRAIN) -2.323E-05	2.378E-05	2.378E-05	-2.323E-05	-1.765E-05	
1	34.00010	0.01069	35.345	77.765	35.345	70.268	
		(STRAIN) 1.514E-05	-5.997E-07	1.852E-05	-5.997E-07	1.514E-05	
1	64.00010	0.01049	10.664	10.779	3.385	3.586	
		(STRAIN) -1.617E-05	5.363E-05	5.473E-05	-1.617E-05	-1.425E-05	
2	9.00000	0.01116	278.538	406.353	148.965	202.786	
		(STRAIN) 8.227E-07	1.081E-05	2.766E-05	-6.272E-06	8.227E-07	

2	34.00000	0.01082	36.641	36.641	-417.130	-361.662
	(STRAIN)	-2.427E-05	2.473E-05	2.473E-05	-2.427E-05	-1.828E-05
2	34.00010	0.01082	36.641	80.836	36.641	73.935
	(STRAIN)	1.607E-05	-7.399E-07	1.918E-05	-7.399E-07	1.607E-05
2	64.00010	0.01061	11.049	11.072	3.444	3.671
	(STRAIN)	-1.680E-05	5.612E-05	5.634E-05	-1.680E-05	-1.463E-05
3	9.00000	0.01114	88.326	282.370	88.317	170.189
	(STRAIN)	3.950E-06	-6.842E-06	1.874E-05	-6.843E-06	3.950E-06
3	34.00000	0.01089	36.384	36.384	-418.194	-359.216
	(STRAIN)	-2.441E-05	2.467E-05	2.467E-05	-2.441E-05	-1.804E-05
3	34.00010	0.01089	36.384	81.071	36.384	74.106
	(STRAIN)	1.613E-05	-8.692E-07	1.927E-05	-8.692E-07	1.613E-05
3	64.00010	0.01068	11.141	11.141	3.471	3.705
	(STRAIN)	-1.690E-05	5.665E-05	5.665E-05	-1.690E-05	-1.466E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.000E-06
 ALLOWABLE LOAD REPETITIONS = 7.647E+11 DAMAGE RATIO = 8.480E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.441E-05
 ALLOWABLE LOAD REPETITIONS = 5.256E+08 DAMAGE RATIO = 1.234E-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 = 5.665E-05
 ALLOWABLE LOAD REPETITIONS = 1.406E+10 DAMAGE RATIO = 4.610E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. P. STRAIN	VERTICAL (HORIZONTAL STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
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1	9.00000	0.01246	558.039	559.097	239.581	243.137
	(STRAIN)	-5.830E-06	5.698E-05	5.719E-05	-6.039E-06	-5.335E-06
1	34.00000	0.01176	45.402	45.402	-355.931	-306.166
	(STRAIN)	-3.024E-05	3.166E-05	3.166E-05	-3.024E-05	-2.256E-05
1	34.00010	0.01176	45.402	97.803	45.402	87.867
	(STRAIN)	1.878E-05	-3.660E-07	2.325E-05	-3.660E-07	1.878E-05
1	64.00010	0.01151	12.739	12.895	3.783	4.046
	(STRAIN)	-2.050E-05	6.538E-05	6.687E-05	-2.050E-05	-1.798E-05
2	9.00000	0.01242	280.720	399.278	136.659	184.113
	(STRAIN)	-5.080E-07	1.861E-05	4.207E-05	-9.898E-06	-5.079E-07
2	34.00000	0.01193	47.100	47.100	-371.772	-317.795
	(STRAIN)	-3.165E-05	3.295E-05	3.295E-05	-3.165E-05	-2.332E-05
2	34.00010	0.01193	47.100	101.851	47.100	92.667
	(STRAIN)	1.999E-05	-5.516E-07	2.413E-05	-5.516E-07	1.999E-05
2	64.00010	0.01166	13.243	13.273	3.858	4.158
	(STRAIN)	-2.134E-05	6.866E-05	6.895E-05	-2.134E-05	-1.845E-05
3	9.00000	0.01235	88.437	254.912	88.426	147.484
	(STRAIN)	4.004E-06	-7.680E-06	2.526E-05	-7.683E-06	4.004E-06
3	34.00000	0.01199	46.729	46.729	-372.931	-315.349
	(STRAIN)	-3.186E-05	3.286E-05	3.286E-05	-3.186E-05	-2.298E-05
3	34.00010	0.01199	46.729	102.190	46.729	92.909
	(STRAIN)	2.008E-05	-7.379E-07	2.426E-05	-7.379E-07	2.008E-05
3	64.00010	0.01172	13.344	13.344	3.875	4.186
	(STRAIN)	-2.149E-05	6.931E-05	6.931E-05	-2.149E-05	-1.850E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.830E-06
 ALLOWABLE LOAD REPETITIONS = 1.215E+11 DAMAGE RATIO = 5.336E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.186E-05
 ALLOWABLE LOAD REPETITIONS = 2.965E+08 DAMAGE RATIO = 2.187E-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 = 6.931E-05
 ALLOWABLE LOAD REPETITIONS = 5.700E+09 DAMAGE RATIO = 1.138E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01401	563.178	563.920	226.529	228.539	
		(STRAIN)	-1.155E-05	9.361E-05	9.384E-05	-1.179E-05	-1.116E-05
1	34.00000	0.01296	58.786	58.786	-303.915	-256.932	
		(STRAIN)	-4.023E-05	4.375E-05	4.375E-05	-4.023E-05	-2.935E-05
1	34.00010	0.01296	58.786	123.530	58.786	110.265	
		(STRAIN)	2.333E-05	1.217E-07	2.931E-05	1.217E-07	2.333E-05
1	64.00010	0.01264	15.237	15.449	4.191	4.539	
		(STRAIN)	-2.605E-05	7.987E-05	8.190E-05	-2.605E-05	-2.272E-05
2	9.00000	0.01392	283.163	392.725	122.039	163.099	
		(STRAIN)	-3.958E-06	3.363E-05	6.793E-05	-1.681E-05	-3.959E-06
2	34.00000	0.01318	61.013	61.013	-318.000	-266.252	
		(STRAIN)	-4.222E-05	4.554E-05	4.554E-05	-4.222E-05	-3.024E-05
2	34.00010	0.01318	61.013	128.892	61.013	116.565	
		(STRAIN)	2.491E-05	-1.266E-07	3.047E-05	-1.266E-07	2.491E-05
2	64.00010	0.01283	15.898	15.939	4.284	4.686	
		(STRAIN)	-2.716E-05	8.420E-05	8.459E-05	-2.716E-05	-2.331E-05
3	9.00000	0.01376	88.812	225.259	88.799	122.336	
		(STRAIN)	2.879E-06	-7.616E-06	3.510E-05	-7.621E-06	2.879E-06
3	34.00000	0.01323	60.489	60.489	-319.244	-263.787	
		(STRAIN)	-4.255E-05	4.537E-05	4.537E-05	-4.255E-05	-2.971E-05
3	34.00010	0.01323	60.489	129.422	60.489	116.940	
		(STRAIN)	2.505E-05	-3.973E-07	3.068E-05	-3.973E-07	2.505E-05
3	64.00010	0.01288	16.028	16.028	4.298	4.715	
		(STRAIN)	-2.739E-05	8.509E-05	8.509E-05	-2.739E-05	-2.339E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.155E-05
 ALLOWABLE LOAD REPETITIONS = 1.892E+10 DAMAGE RATIO = 3.426E-05

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.255E-05
 ALLOWABLE LOAD REPETITIONS = 1.620E+08 DAMAGE RATIO = 4.004E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.217E-07
 ALLOWABLE LOAD REPETITIONS = 1.236E+22 DAMAGE RATIO = 5.248E-17

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 8.509E-05
 ALLOWABLE LOAD REPETITIONS = 2.276E+09 DAMAGE RATIO = 2.850E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01566	567.896	568.393	214.660	214.975	
		(STRAIN)	-2.153E-05	1.521E-04	1.524E-04	-2.169E-05	-2.154E-05
1	34.00000	0.01408	73.507	73.507	-252.788	-209.018	
		(STRAIN)	-5.270E-05	6.035E-05	6.035E-05	-5.270E-05	-3.754E-05
1	34.00010	0.01408	73.507	150.814	73.507	133.808	
		(STRAIN)	2.803E-05	8.480E-07	3.570E-05	8.481E-07	2.803E-05
1	64.00010	0.01367	17.726	18.000	4.529	4.971	
		(STRAIN)	-3.191E-05	9.463E-05	9.726E-05	-3.191E-05	-2.767E-05

2	9.00000	0.01547	285.520	387.895	107.711	143.651
	(STRAIN)	-1.087E-05	5.894E-05	1.093E-04	-2.855E-05	-1.086E-05
2	34.00000	0.01434	76.298	76.298	-264.914	-215.812
	(STRAIN)	-5.546E-05	6.276E-05	6.276E-05	-5.546E-05	-3.844E-05
2	34.00010	0.01434	76.298	157.627	76.298	141.725
	(STRAIN)	3.002E-05	5.266E-07	3.719E-05	5.266E-07	3.002E-05
2	64.00010	0.01391	18.558	18.612	4.641	5.157
	(STRAIN)	-3.333E-05	1.001E-04	1.006E-04	-3.333E-05	-2.838E-05
3	9.00000	0.01520	89.339	198.234	89.322	99.085
	(STRAIN)	-5.683E-07	-5.364E-06	4.821E-05	-5.372E-06	-5.682E-07
3	34.00000	0.01439	75.589	75.589	-266.109	-213.202
	(STRAIN)	-5.593E-05	6.245E-05	6.245E-05	-5.593E-05	-3.760E-05
3	34.00010	0.01439	75.589	158.375	75.589	142.240
	(STRAIN)	3.020E-05	1.571E-07	3.747E-05	1.571E-07	3.020E-05
3	64.00010	0.01396	18.731	18.731	4.656	5.193
	(STRAIN)	-3.365E-05	1.013E-04	1.013E-04	-3.365E-05	-2.851E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.153E-05
 ALLOWABLE LOAD REPETITIONS = 3.588E+09 DAMAGE RATIO = 1.807E-04
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.593E-05
 ALLOWABLE LOAD REPETITIONS = 9.291E+07 DAMAGE RATIO = 6.980E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 8.480E-07
 ALLOWABLE LOAD REPETITIONS = 2.078E+18 DAMAGE RATIO = 3.121E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.013E-04
 ALLOWABLE LOAD REPETITIONS = 1.042E+09 DAMAGE RATIO = 6.224E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01686	570.874	571.243	206.904	207.703	
	(STRAIN)	-3.246E-05	2.102E-04	2.104E-04	-3.245E-05	-3.192E-05	
1	34.00000	0.01476	83.772	83.772	-219.872	-178.404	
	(STRAIN)	-6.290E-05	7.517E-05	7.517E-05	-6.290E-05	-4.405E-05	
1	34.00010	0.01476	83.772	169.303	83.772	149.651	
	(STRAIN)	3.115E-05	1.454E-06	4.001E-05	1.454E-06	3.115E-05	
1	64.00010	0.01430	19.336	19.654	4.715	5.223	
	(STRAIN)	-3.586E-05	1.043E-04	1.074E-04	-3.586E-05	-3.099E-05	
2	9.00000	0.01655	287.038	385.515	98.589	131.831	
	(STRAIN)	-1.857E-05	8.489E-05	1.505E-04	-4.073E-05	-1.857E-05	
2	34.00000	0.01505	86.940	86.940	-230.631	-183.456	
	(STRAIN)	-6.630E-05	7.810E-05	7.810E-05	-6.630E-05	-4.485E-05	
2	34.00010	0.01505	86.940	177.124	86.940	158.669	
	(STRAIN)	3.341E-05	1.079E-06	4.173E-05	1.079E-06	3.341E-05	
2	64.00010	0.01456	20.287	20.349	4.838	5.436	
	(STRAIN)	-3.750E-05	1.106E-04	1.112E-04	-3.751E-05	-3.177E-05	
3	9.00000	0.01619	89.718	181.716	84.836	89.698	
	(STRAIN)	-5.016E-06	-1.762E-06	5.956E-05	-5.016E-06	-1.775E-06	
3	34.00000	0.01512	86.087	86.087	-231.733	-180.697	
	(STRAIN)	-6.690E-05	7.762E-05	7.762E-05	-6.690E-05	-4.369E-05	
3	34.00010	0.01512	86.087	178.012	86.087	159.260	
	(STRAIN)	3.362E-05	6.378E-07	4.208E-05	6.378E-07	3.362E-05	
3	64.00010	0.01462	20.491	20.491	4.857	5.479	
	(STRAIN)	-3.788E-05	1.120E-04	1.120E-04	-3.788E-05	-3.192E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.246E-05
 ALLOWABLE LOAD REPETITIONS = 1.206E+09 DAMAGE RATIO = 5.379E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.690E-05
 ALLOWABLE LOAD REPETITIONS = 6.501E+07 DAMAGE RATIO = 9.974E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.454E-06
 ALLOWABLE LOAD REPETITIONS = 1.857E+17 DAMAGE RATIO = 3.492E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.120E-04
 ALLOWABLE LOAD REPETITIONS = 6.641E+08 DAMAGE RATIO = 9.765E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01661	570.279	570.672	208.478	209.033	
		(STRAIN)	-2.990E-05	1.968E-04	1.970E-04	-2.989E-05	-2.955E-05
1	34.00000	0.01463	81.672	81.672	-226.452	-184.510	
		(STRAIN)	-6.068E-05	7.185E-05	7.185E-05	-6.068E-05	-4.264E-05
1	34.00010	0.01463	81.672	165.554	81.672	146.445	
		(STRAIN)	3.052E-05	1.324E-06	3.914E-05	1.324E-06	3.052E-05
1	64.00010	0.01417	19.014	19.323	4.680	5.175	
		(STRAIN)	-3.506E-05	1.024E-04	1.054E-04	-3.506E-05	-3.032E-05
2	9.00000	0.01633	286.734	385.948	100.403	134.146	
		(STRAIN)	-1.674E-05	7.885E-05	1.410E-04	-3.788E-05	-1.674E-05
2	34.00000	0.01491	84.764	84.764	-237.490	-189.917	
		(STRAIN)	-6.394E-05	7.467E-05	7.467E-05	-6.394E-05	-4.348E-05
2	34.00010	0.01491	84.764	173.169	84.764	155.240	
		(STRAIN)	3.273E-05	9.599E-07	4.081E-05	9.599E-07	3.273E-05
2	64.00010	0.01443	19.941	20.001	4.801	5.382	
		(STRAIN)	-3.666E-05	1.085E-04	1.091E-04	-3.666E-05	-3.109E-05
3	9.00000	0.01599	89.641	184.970	87.640	89.622	
		(STRAIN)	-3.929E-06	-2.675E-06	5.705E-05	-3.929E-06	-2.688E-06
3	34.00000	0.01497	83.942	83.942	-238.614	-187.190	
		(STRAIN)	-6.451E-05	7.423E-05	7.423E-05	-6.451E-05	-4.239E-05
3	34.00010	0.01497	83.942	174.030	83.942	155.817	
		(STRAIN)	3.293E-05	5.337E-07	4.114E-05	5.337E-07	3.293E-05
3	64.00010	0.01449	20.138	20.138	4.819	5.423	
		(STRAIN)	-3.703E-05	1.099E-04	1.099E-04	-3.703E-05	-3.123E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.990E-05
 ALLOWABLE LOAD REPETITIONS = 1.497E+09 DAMAGE RATIO = 4.331E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.451E-05
 ALLOWABLE LOAD REPETITIONS = 6.988E+07 DAMAGE RATIO = 9.280E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.324E-06
 ALLOWABLE LOAD REPETITIONS = 2.826E+17 DAMAGE RATIO = 2.295E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.099E-04
 ALLOWABLE LOAD REPETITIONS = 7.245E+08 DAMAGE RATIO = 8.950E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01501	566.115	566.699	219.063	220.029	
		(STRAIN)	-1.699E-05	1.262E-04	1.264E-04	-1.723E-05	-1.683E-05
1	34.00000	0.01366	67.703	67.703	-272.325	-227.274	
		(STRAIN)	-4.754E-05	5.327E-05	5.327E-05	-4.754E-05	-3.419E-05
1	34.00010	0.01366	67.703	140.170	67.703	124.649	

1	(STRAIN)	2.621E-05	5.403E-07	3.321E-05	5.402E-07	2.621E-05
	64.00010	0.01328	16.773	17.022	4.407	4.812
	(STRAIN)	-2.963E-05	8.894E-05	9.133E-05	-2.963E-05	-2.575E-05
2	9.00000	0.01486	284.621	389.569	113.170	150.933
	(STRAIN)	-7.661E-06	4.759E-05	9.096E-05	-2.327E-05	-7.661E-06
2	34.00000	0.01390	70.275	70.275	-285.225	-235.061
	(STRAIN)	-4.998E-05	5.543E-05	5.543E-05	-4.998E-05	-3.510E-05
2	34.00010	0.01390	70.274	146.412	70.274	131.933
	(STRAIN)	2.804E-05	2.482E-07	3.457E-05	2.482E-07	2.804E-05
2	64.00010	0.01350	17.537	17.586	4.512	4.983
	(STRAIN)	-3.093E-05	9.397E-05	9.444E-05	-3.093E-05	-2.641E-05
3	9.00000	0.01464	89.125	208.347	89.110	107.807
	(STRAIN)	1.132E-06	-6.589E-06	4.268E-05	-6.596E-06	1.132E-06
3	34.00000	0.01396	69.641	69.641	-286.454	-232.520
	(STRAIN)	-5.039E-05	5.519E-05	5.519E-05	-5.039E-05	-3.440E-05
3	34.00010	0.01396	69.641	147.076	69.641	132.395
	(STRAIN)	2.821E-05	-8.174E-08	3.482E-05	-8.173E-08	2.821E-05
3	64.00010	0.01356	17.692	17.692	4.526	5.015
	(STRAIN)	-3.121E-05	9.504E-05	9.504E-05	-3.121E-05	-2.652E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.699E-05
 ALLOWABLE LOAD REPETITIONS = 6.740E+09 DAMAGE RATIO = 9.622E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.039E-05
 ALLOWABLE LOAD REPETITIONS = 1.147E+08 DAMAGE RATIO = 5.656E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 5.403E-07
 ALLOWABLE LOAD REPETITIONS = 1.564E+19 DAMAGE RATIO = 4.146E-14

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 9.504E-05
 ALLOWABLE LOAD REPETITIONS = 1.387E+09 DAMAGE RATIO = 4.676E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01294	559.728	560.677	235.357	238.444
	(STRAIN)	-7.310E-06	6.683E-05	6.705E-05	-7.528E-06	-6.821E-06
1	34.00000	0.01215	49.477	49.477	-339.406	-290.468
	(STRAIN)	-3.318E-05	3.512E-05	3.512E-05	-3.318E-05	-2.459E-05
1	34.00010	0.01215	49.477	105.738	49.477	94.799
	(STRAIN)	2.019E-05	-2.371E-07	2.512E-05	-2.371E-07	2.019E-05
1	64.00010	0.01188	13.528	13.700	3.920	4.208
	(STRAIN)	-2.222E-05	6.992E-05	7.157E-05	-2.222E-05	-1.945E-05
2	9.00000	0.01290	281.506	396.999	132.020	177.310
	(STRAIN)	-1.332E-06	2.255E-05	4.903E-05	-1.171E-05	-1.332E-06
2	34.00000	0.01233	51.336	51.336	-354.717	-301.396
	(STRAIN)	-3.476E-05	3.655E-05	3.655E-05	-3.476E-05	-2.540E-05
2	34.00010	0.01233	51.336	110.186	51.336	100.057
	(STRAIN)	2.152E-05	-4.415E-07	2.609E-05	-4.415E-07	2.152E-05
2	64.00010	0.01204	14.079	14.113	4.000	4.331
	(STRAIN)	-2.313E-05	7.352E-05	7.384E-05	-2.313E-05	-1.996E-05
3	9.00000	0.01279	88.533	245.214	88.522	139.319
	(STRAIN)	3.823E-06	-7.820E-06	2.810E-05	-7.822E-06	3.823E-06
3	34.00000	0.01239	50.919	50.919	-355.915	-298.954
	(STRAIN)	-3.501E-05	3.644E-05	3.644E-05	-3.501E-05	-2.500E-05
3	34.00010	0.01239	50.919	110.580	50.919	100.338
	(STRAIN)	2.162E-05	-6.527E-07	2.624E-05	-6.527E-07	2.162E-05
3	64.00010	0.01210	14.187	14.187	4.016	4.358
	(STRAIN)	-2.331E-05	7.423E-05	7.423E-05	-2.331E-05	-2.002E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -7.310E-06
 ALLOWABLE LOAD REPETITIONS = 6.544E+10 DAMAGE RATIO = 9.910E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.501E-05
 ALLOWABLE LOAD REPETITIONS = 2.431E+08 DAMAGE RATIO = 2.667E-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 = 7.423E-05
 ALLOWABLE LOAD REPETITIONS = 4.193E+09 DAMAGE RATIO = 1.547E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.01092	552.070	553.526	253.192	258.092	
		(STRAIN)	-2.598E-06	3.348E-05	3.366E-05	-2.775E-06	-2.180E-06
1	34.00000	0.01047	33.511	33.511	-408.655	-356.628	
		(STRAIN)	-2.199E-05	2.242E-05	2.242E-05	-2.199E-05	-1.676E-05
1	34.00010	0.01047	33.511	74.034	33.511	66.974	
		(STRAIN)	1.446E-05	-6.278E-07	1.764E-05	-6.278E-07	1.446E-05
1	64.00010	0.01028	10.262	10.370	3.301	3.491	
		(STRAIN)	-1.536E-05	5.139E-05	5.242E-05	-1.536E-05	-1.355E-05
2	9.00000	0.01092	278.087	407.921	151.360	206.525	
		(STRAIN)	9.684E-07	9.650E-06	2.540E-05	-5.724E-06	9.685E-07
2	34.00000	0.01059	34.734	34.734	-425.996	-370.281	
		(STRAIN)	-2.296E-05	2.332E-05	2.332E-05	-2.296E-05	-1.736E-05
2	34.00010	0.01059	34.734	76.928	34.734	70.434	
		(STRAIN)	1.533E-05	-7.599E-07	1.826E-05	-7.599E-07	1.533E-05
2	64.00010	0.01039	10.626	10.647	3.358	3.571	
		(STRAIN)	-1.596E-05	5.374E-05	5.394E-05	-1.596E-05	-1.391E-05
3	9.00000	0.01090	88.336	288.084	88.327	174.820	
		(STRAIN)	3.871E-06	-6.621E-06	1.761E-05	-6.622E-06	3.871E-06
3	34.00000	0.01067	34.498	34.498	-427.059	-367.856	
		(STRAIN)	-2.309E-05	2.326E-05	2.326E-05	-2.309E-05	-1.715E-05
3	34.00010	0.01067	34.498	77.151	34.498	70.599	
		(STRAIN)	1.539E-05	-8.798E-07	1.835E-05	-8.798E-07	1.539E-05
3	64.00010	0.01047	10.718	10.718	3.387	3.607	
		(STRAIN)	-1.605E-05	5.425E-05	5.425E-05	-1.605E-05	-1.394E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.598E-06
 ALLOWABLE LOAD REPETITIONS = 1.144E+12 DAMAGE RATIO = 5.670E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.309E-05
 ALLOWABLE LOAD REPETITIONS = 5.933E+08 DAMAGE RATIO = 1.093E-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 = 5.425E-05
 ALLOWABLE LOAD REPETITIONS = 1.707E+10 DAMAGE RATIO = 3.799E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.00992	547.432	549.198	261.481	267.081	
		(STRAIN)	-1.394E-06	2.310E-05	2.325E-05	-1.546E-06	-1.063E-06

1	34.00000	0.00959	26.758	26.758	-442.382	-389.243
	(STRAIN)	-1.747E-05	1.759E-05	1.759E-05	-1.747E-05	-1.350E-05
1	34.00010	0.00959	26.758	60.062	26.758	54.587
	(STRAIN)	1.186E-05	-6.867E-07	1.433E-05	-6.867E-07	1.186E-05
1	64.00010	0.00944	8.707	8.789	2.955	3.103
	(STRAIN)	-1.234E-05	4.281E-05	4.360E-05	-1.234E-05	-1.092E-05
2	9.00000	0.00993	276.196	414.645	160.651	221.285
	(STRAIN)	1.273E-06	6.005E-06	1.794E-05	-3.954E-06	1.273E-06
2	34.00000	0.00969	27.713	27.713	-460.515	-404.005
	(STRAIN)	-1.820E-05	1.829E-05	1.829E-05	-1.820E-05	-1.398E-05
2	34.00010	0.00969	27.713	62.314	27.713	57.291
	(STRAIN)	1.254E-05	-7.891E-07	1.481E-05	-7.891E-07	1.254E-05
2	64.00010	0.00953	8.992	9.008	3.001	3.166
	(STRAIN)	-1.280E-05	4.465E-05	4.480E-05	-1.280E-05	-1.121E-05
3	9.00000	0.00996	88.509	311.839	88.502	193.624
	(STRAIN)	3.416E-06	-5.644E-06	1.361E-05	-5.645E-06	3.416E-06
3	34.00000	0.00978	27.561	27.561	-461.770	-401.853
	(STRAIN)	-1.831E-05	1.826E-05	1.826E-05	-1.831E-05	-1.383E-05
3	34.00010	0.00978	27.561	62.524	27.561	57.461
	(STRAIN)	1.260E-05	-8.784E-07	1.488E-05	-8.784E-07	1.260E-05
3	64.00010	0.00962	9.092	9.092	3.042	3.212
	(STRAIN)	-1.288E-05	4.514E-05	4.514E-05	-1.288E-05	-1.124E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.394E-06
ALLOWABLE LOAD REPETITIONS = 6.636E+12 DAMAGE RATIO = 9.772E-08
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -1.831E-05
ALLOWABLE LOAD REPETITIONS = 9.889E+08 DAMAGE RATIO = 6.557E-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 = 4.514E-05
ALLOWABLE LOAD REPETITIONS = 3.888E+10 DAMAGE RATIO = 1.668E-05

* SUMMARY OF DAMAGE ANALYSIS *

AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 1.299E-03
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.506E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 6.140E-12
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 3.650E-03

MAXIMUM DAMAGE RATIO = 4.506E-02 DESIGN LIFE IN YEARS = 22.19

- Sovrastruttura 2D

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/m³, and temperature in C

THICKNESSES OF LAYERS (TH) ARE : 4 5 20 30
 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 1.979E+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 1.650E+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 8.721E+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 5.781E+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 3.844E+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 2.918E+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 3.087E+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 4.501E+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 7.647E+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 1.345E+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 1.812E+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 : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 2 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 3 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 4 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 5 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 6 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 7 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 8 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 9 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 10 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 11 FOR EACH LOAD GROUP ARE : 316514
 LOAD REPETITIONS (TNLR) IN PERIOD 12 FOR EACH LOAD GROUP ARE : 316514

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

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

NO.	COORDINATE P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS (STRAIN)
1	9.00000	0.01247	539.579	542.956	280.244	292.053
	(STRAIN)	-4.295E-07	1.949E-05	1.975E-05	-6.922E-07	2.267E-07
1	29.00000	0.01218	37.296	37.296	-589.396	-515.470
	(STRAIN)	-2.132E-05	2.142E-05	2.142E-05	-2.132E-05	-1.628E-05
1	29.00010	0.01218	37.296	86.612	37.296	78.460
	(STRAIN)	1.583E-05	-1.324E-06	1.922E-05	-1.324E-06	1.583E-05
1	59.00010	0.01199	9.467	9.561	3.078	3.249
	(STRAIN)	-1.705E-05	5.749E-05	5.858E-05	-1.705E-05	-1.505E-05
2	9.00000	0.01252	269.265	422.766	169.604	249.399
	(STRAIN)	2.425E-06	3.971E-06	1.592E-05	-3.784E-06	2.425E-06
2	29.00000	0.01231	37.502	37.502	-607.817	-520.825
	(STRAIN)	-2.216E-05	2.185E-05	2.185E-05	-2.216E-05	-1.623E-05
2	29.00010	0.01231	37.502	89.290	37.502	81.373
	(STRAIN)	1.656E-05	-1.721E-06	1.986E-05	-1.721E-06	1.656E-05
2	59.00010	0.01212	9.785	9.803	3.127	3.321
	(STRAIN)	-1.769E-05	5.999E-05	6.020E-05	-1.769E-05	-1.543E-05
3	9.00000	0.01256	82.421	337.230	82.414	222.959
	(STRAIN)	4.386E-06	-6.551E-06	1.328E-05	-6.551E-06	4.386E-06
3	29.00000	0.01241	36.599	36.600	-605.712	-509.729
	(STRAIN)	-2.224E-05	2.157E-05	2.157E-05	-2.224E-05	-1.569E-05
3	29.00010	0.01241	36.600	89.187	36.600	80.986
	(STRAIN)	1.651E-05	-1.981E-06	1.993E-05	-1.981E-06	1.651E-05
3	59.00010	0.01221	9.877	9.877	3.160	3.361
	(STRAIN)	-1.779E-05	6.057E-05	6.057E-05	-1.779E-05	-1.545E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -4.295E-07
 ALLOWABLE LOAD REPETITIONS = 2.926E+14 DAMAGE RATIO = 1.082E-09
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.224E-05
 ALLOWABLE LOAD REPETITIONS = 4.827E+08 DAMAGE RATIO = 6.557E-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 = 6.057E-05
 ALLOWABLE LOAD REPETITIONS = 1.042E+10 DAMAGE RATIO = 3.036E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01317	542.984	545.904	273.135	284.012	
		(STRAIN) -9.531E-07	2.468E-05	2.496E-05	-1.233E-06	-1.886E-07	
1	29.00000	0.01281	42.861	42.861	-559.034	-486.321	
		(STRAIN) -2.447E-05	2.477E-05	2.477E-05	-2.447E-05	-1.852E-05	
1	29.00010	0.01281	42.861	98.133	42.861	88.632	
		(STRAIN) 1.779E-05	-1.277E-06	2.175E-05	-1.277E-06	1.779E-05	
1	59.00010	0.01260	10.419	10.529	3.275	3.474	
		(STRAIN) -1.938E-05	6.396E-05	6.524E-05	-1.938E-05	-1.707E-05	
2	9.00000	0.01322	270.927	416.775	163.736	237.630	
		(STRAIN) 2.451E-06	5.648E-06	1.965E-05	-4.645E-06	2.451E-06	
2	29.00000	0.01296	43.067	43.067	-576.730	-490.597	
		(STRAIN) -2.546E-05	2.525E-05	2.525E-05	-2.546E-05	-1.841E-05	
2	29.00010	0.01296	43.067	101.230	43.067	91.971	
		(STRAIN) 1.863E-05	-1.744E-06	2.249E-05	-1.744E-06	1.863E-05	
2	59.00010	0.01274	10.786	10.807	3.331	3.557	
		(STRAIN) -2.012E-05	6.685E-05	6.710E-05	-2.012E-05	-1.748E-05	
3	9.00000	0.01324	82.758	320.068	82.751	208.682	
		(STRAIN) 4.815E-06	-7.277E-06	1.551E-05	-7.278E-06	4.815E-06	
3	29.00000	0.01305	41.980	41.980	-574.597	-479.382	
		(STRAIN) -2.554E-05	2.490E-05	2.490E-05	-2.554E-05	-1.775E-05	
3	29.00010	0.01305	41.980	101.086	41.980	91.484	
		(STRAIN) 1.857E-05	-2.054E-06	2.257E-05	-2.054E-06	1.857E-05	
3	59.00010	0.01283	10.875	10.875	3.358	3.592	
		(STRAIN) -2.024E-05	6.746E-05	6.746E-05	-2.024E-05	-1.751E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -9.531E-07
 ALLOWABLE LOAD REPETITIONS = 2.541E+13 DAMAGE RATIO = 1.246E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.554E-05
 ALLOWABLE LOAD REPETITIONS = 3.573E+08 DAMAGE RATIO = 8.859E-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 = 6.746E-05
 ALLOWABLE LOAD REPETITIONS = 6.436E+09 DAMAGE RATIO = 4.918E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01424	547.750	550.040	261.013	270.278	
		(STRAIN) -2.246E-06	3.525E-05	3.555E-05	-2.549E-06	-1.327E-06	
1	29.00000	0.01378	52.433	52.433	-510.351	-439.953	
		(STRAIN) -2.997E-05	3.080E-05	3.080E-05	-2.997E-05	-2.237E-05	
1	29.00010	0.01378	52.433	117.361	52.433	105.508	
		(STRAIN) 2.102E-05	-1.095E-06	2.596E-05	-1.095E-06	2.102E-05	
1	59.00010	0.01352	11.934	12.073	3.562	3.808	
		(STRAIN) -2.325E-05	7.442E-05	7.604E-05	-2.325E-05	-2.038E-05	
2	9.00000	0.01429	273.404	408.231	153.792	218.719	
		(STRAIN) 2.149E-06	9.358E-06	2.713E-05	-6.410E-06	2.149E-06	

2	29.00000	0.01396	52.612	52.612	-526.767	-442.401
	(STRAIN)	-3.122E-05	3.134E-05	3.134E-05	-3.122E-05	-2.211E-05
2	29.00010	0.01396	52.612	121.165	52.612	109.545
	(STRAIN)	2.203E-05	-1.688E-06	2.688E-05	-1.688E-06	2.203E-05
2	59.00010	0.01369	12.386	12.413	3.628	3.911
	(STRAIN)	-2.418E-05	7.800E-05	7.831E-05	-2.418E-05	-2.088E-05
3	9.00000	0.01427	83.478	294.255	83.470	186.446
	(STRAIN)	5.297E-06	-8.277E-06	1.951E-05	-8.278E-06	5.297E-06
3	29.00000	0.01403	51.194	51.194	-524.767	-431.186
	(STRAIN)	-3.133E-05	3.085E-05	3.085E-05	-3.133E-05	-2.123E-05
3	29.00010	0.01403	51.194	120.987	51.194	108.910
	(STRAIN)	2.196E-05	-2.093E-06	2.699E-05	-2.093E-06	2.195E-05
3	59.00010	0.01376	12.478	12.478	3.647	3.940
	(STRAIN)	-2.434E-05	7.869E-05	7.869E-05	-2.434E-05	-2.091E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.246E-06
 ALLOWABLE LOAD REPETITIONS = 1.981E+12 DAMAGE RATIO = 1.597E-07
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -3.133E-05
 ALLOWABLE LOAD REPETITIONS = 2.311E+08 DAMAGE RATIO = 1.369E-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 = 3.229E+09 DAMAGE RATIO = 9.803E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
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1	9.00000	0.01565	553.452	555.059	244.410	251.304
	(STRAIN)	-5.226E-06	5.561E-05	5.593E-05	-5.543E-06	-4.179E-06
1	29.00000	0.01499	66.705	66.705	-444.776	-378.130
	(STRAIN)	-3.850E-05	4.068E-05	4.068E-05	-3.850E-05	-2.819E-05
1	29.00010	0.01499	66.704	144.851	66.704	129.440
	(STRAIN)	2.552E-05	-6.229E-07	3.194E-05	-6.229E-07	2.552E-05
1	59.00010	0.01466	13.968	14.151	3.897	4.214
	(STRAIN)	-2.874E-05	8.876E-05	9.089E-05	-2.874E-05	-2.504E-05
2	9.00000	0.01568	276.584	398.784	139.510	193.645
	(STRAIN)	7.684E-07	1.718E-05	4.136E-05	-9.944E-06	7.684E-07
2	29.00000	0.01521	66.769	66.769	-459.276	-377.931
	(STRAIN)	-4.018E-05	4.126E-05	4.126E-05	-4.018E-05	-2.758E-05
2	29.00010	0.01521	66.769	149.674	66.769	134.424
	(STRAIN)	2.677E-05	-1.419E-06	3.313E-05	-1.419E-06	2.677E-05
2	59.00010	0.01487	14.544	14.579	3.976	4.345
	(STRAIN)	-2.995E-05	9.334E-05	9.375E-05	-2.995E-05	-2.564E-05
3	9.00000	0.01561	84.698	261.823	84.688	157.581
	(STRAIN)	5.321E-06	-9.101E-06	2.595E-05	-9.103E-06	5.321E-06
3	29.00000	0.01528	64.819	64.819	-457.519	-366.822
	(STRAIN)	-4.034E-05	4.052E-05	4.052E-05	-4.034E-05	-2.630E-05
3	29.00010	0.01528	64.820	149.472	64.820	133.572
	(STRAIN)	2.667E-05	-1.980E-06	3.329E-05	-1.980E-06	2.667E-05
3	59.00010	0.01494	14.654	14.654	3.990	4.373
	(STRAIN)	-3.018E-05	9.424E-05	9.424E-05	-3.018E-05	-2.570E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -5.226E-06
 ALLOWABLE LOAD REPETITIONS = 1.742E+11 DAMAGE RATIO = 1.817E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.034E-05
 ALLOWABLE LOAD REPETITIONS = 1.369E+08 DAMAGE RATIO = 2.313E-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 = 9.424E-05
 ALLOWABLE LOAD REPETITIONS = 1.440E+09 DAMAGE RATIO = 2.198E-04

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01728	559.499	560.509	226.006	230.012	
	(STRAIN)	-1.144E-05	9.266E-05	9.298E-05	-1.175E-05	-1.050E-05	
1	29.00000	0.01628	85.024	85.024	-369.893	-308.319	
	(STRAIN)	-5.046E-05	5.577E-05	5.577E-05	-5.046E-05	-3.609E-05	
1	29.00010	0.01628	85.024	178.423	85.024	158.393	
	(STRAIN)	3.084E-05	2.733E-07	3.919E-05	2.733E-07	3.084E-05	
1	59.00010	0.01586	16.279	16.518	4.211	4.620	
	(STRAIN)	-3.537E-05	1.054E-04	1.082E-04	-3.537E-05	-3.060E-05	
2	9.00000	0.01725	280.165	390.634	122.269	165.964	
	(STRAIN)	-3.143E-06	3.261E-05	6.720E-05	-1.682E-05	-3.143E-06	
2	29.00000	0.01655	84.792	84.792	-382.006	-304.937	
	(STRAIN)	-5.275E-05	5.626E-05	5.626E-05	-5.275E-05	-3.475E-05	
2	29.00010	0.01655	84.792	184.468	84.792	164.398	
	(STRAIN)	3.236E-05	-8.084E-07	4.072E-05	-8.084E-07	3.236E-05	
2	59.00010	0.01612	17.009	17.055	4.305	4.787	
	(STRAIN)	-3.693E-05	1.113E-04	1.118E-04	-3.693E-05	-3.131E-05	
3	9.00000	0.01711	86.336	227.211	86.324	125.991	
	(STRAIN)	3.770E-06	-8.646E-06	3.546E-05	-8.650E-06	3.770E-06	
3	29.00000	0.01661	82.075	82.075	-380.456	-293.921	
	(STRAIN)	-5.298E-05	5.502E-05	5.502E-05	-5.298E-05	-3.278E-05	
3	29.00010	0.01661	82.076	184.216	82.076	163.201	
	(STRAIN)	3.221E-05	-1.593E-06	4.097E-05	-1.593E-06	3.221E-05	
3	59.00010	0.01618	17.154	17.154	4.318	4.820	
	(STRAIN)	-3.726E-05	1.125E-04	1.125E-04	-3.726E-05	-3.141E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.144E-05
 ALLOWABLE LOAD REPETITIONS = 1.958E+10 DAMAGE RATIO = 1.617E-05

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -5.298E-05
 ALLOWABLE LOAD REPETITIONS = 7.927E+07 DAMAGE RATIO = 3.993E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.733E-07
 ALLOWABLE LOAD REPETITIONS = 3.308E+20 DAMAGE RATIO = 9.567E-16

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.125E-04
 ALLOWABLE LOAD REPETITIONS = 6.521E+08 DAMAGE RATIO = 4.854E-04

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

POINT NO.	VERTICAL COORDINATE (P. STRAIN)	VERTICAL DISPL. (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR STRESS (STRAIN)	MINOR STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01891	565.052	565.649	209.850	211.001	
	(STRAIN)	-2.229E-05	1.522E-04	1.525E-04	-2.259E-05	-2.202E-05	
1	29.00000	0.01740	104.282	104.282	-299.407	-243.323	
	(STRAIN)	-6.523E-05	7.655E-05	7.655E-05	-6.523E-05	-4.553E-05	
1	29.00010	0.01740	104.282	211.973	104.282	187.059	
	(STRAIN)	3.600E-05	1.508E-06	4.638E-05	1.508E-06	3.600E-05	
1	59.00010	0.01690	18.430	18.728	4.445	4.951	
	(STRAIN)	-4.189E-05	1.213E-04	1.247E-04	-4.189E-05	-3.598E-05	

2	9.00000	0.01878	283.566	385.191	105.515	141.113
	(STRAIN)	-1.116E-05	5.892E-05	1.089E-04	-2.868E-05	-1.116E-05
2	29.00000	0.01772	103.529	103.529	-309.166	-236.887
	(STRAIN)	-6.829E-05	7.665E-05	7.665E-05	-6.829E-05	-4.290E-05
2	29.00010	0.01772	103.528	219.176	103.528	193.867
	(STRAIN)	3.773E-05	8.903E-08	4.828E-05	8.905E-08	3.773E-05
2	59.00010	0.01720	19.317	19.375	4.552	5.155
	(STRAIN)	-4.383E-05	1.284E-04	1.291E-04	-4.383E-05	-3.680E-05
3	9.00000	0.01853	88.026	196.512	88.009	97.566
	(STRAIN)	-7.346E-07	-5.429E-06	4.795E-05	-5.437E-06	-7.347E-07
3	29.00000	0.01778	99.886	99.886	-307.766	-225.968
	(STRAIN)	-6.859E-05	7.458E-05	7.458E-05	-6.859E-05	-3.986E-05
3	29.00010	0.01778	99.887	218.798	99.887	192.177
	(STRAIN)	3.750E-05	-9.523E-07	4.859E-05	-9.523E-07	3.750E-05
3	59.00010	0.01727	19.501	19.501	4.567	5.197
	(STRAIN)	-4.426E-05	1.300E-04	1.300E-04	-4.426E-05	-3.692E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -2.229E-05
 ALLOWABLE LOAD REPETITIONS = 3.203E+09 DAMAGE RATIO = 9.883E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.859E-05
 ALLOWABLE LOAD REPETITIONS = 4.804E+07 DAMAGE RATIO = 6.588E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 1.508E-06
 ALLOWABLE LOAD REPETITIONS = 1.579E+17 DAMAGE RATIO = 2.004E-12

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.300E-04
 ALLOWABLE LOAD REPETITIONS = 3.416E+08 DAMAGE RATIO = 9.264E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.02006	568.519	568.923	200.026	200.701	
	(STRAIN)	-3.424E-05	2.114E-04	2.117E-04	-3.424E-05	-3.379E-05	
1	29.00000	0.01806	117.170	117.170	-255.864	-203.492	
	(STRAIN)	-7.732E-05	9.524E-05	9.524E-05	-7.732E-05	-5.310E-05	
1	29.00010	0.01806	117.170	233.556	117.170	205.370	
	(STRAIN)	3.923E-05	2.480E-06	5.097E-05	2.480E-06	3.923E-05	
1	59.00010	0.01749	19.741	20.077	4.561	5.133	
	(STRAIN)	-4.603E-05	1.311E-04	1.350E-04	-4.603E-05	-3.935E-05	
2	9.00000	0.01981	285.701	382.767	95.085	126.478	
	(STRAIN)	-2.013E-05	8.600E-05	1.507E-04	-4.106E-05	-2.013E-05	
2	29.00000	0.01841	115.931	115.931	-264.160	-195.206	
	(STRAIN)	-8.101E-05	9.482E-05	9.482E-05	-8.101E-05	-4.911E-05	
2	29.00010	0.01841	115.930	241.445	115.930	212.543	
	(STRAIN)	4.107E-05	8.110E-07	5.311E-05	8.110E-07	4.107E-05	
2	59.00010	0.01782	20.729	20.794	4.676	5.360	
	(STRAIN)	-4.821E-05	1.391E-04	1.398E-04	-4.821E-05	-4.023E-05	
3	9.00000	0.01946	89.097	178.323	80.672	89.076	
	(STRAIN)	-6.378E-06	-7.623E-07	5.871E-05	-6.378E-06	-7.765E-07	
3	29.00000	0.01847	111.592	111.592	-262.865	-184.386	
	(STRAIN)	-8.134E-05	9.188E-05	9.188E-05	-8.134E-05	-4.504E-05	
3	29.00010	0.01847	111.593	240.931	111.593	210.435	
	(STRAIN)	4.077E-05	-4.161E-07	5.347E-05	-4.161E-07	4.077E-05	
3	59.00010	0.01790	20.938	20.938	4.693	5.408	
	(STRAIN)	-4.872E-05	1.408E-04	1.408E-04	-4.872E-05	-4.037E-05	

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.424E-05
 ALLOWABLE LOAD REPETITIONS = 1.011E+09 DAMAGE RATIO = 3.131E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -8.134E-05
 ALLOWABLE LOAD REPETITIONS = 3.467E+07 DAMAGE RATIO = 9.129E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.480E-06
 ALLOWABLE LOAD REPETITIONS = 1.704E+16 DAMAGE RATIO = 1.857E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.408E-04
 ALLOWABLE LOAD REPETITIONS = 2.386E+08 DAMAGE RATIO = 1.327E-03

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01982	567.830	568.268	202.111	202.465	
		(STRAIN)	-3.138E-05	1.977E-04	1.980E-04	-3.139E-05	-3.117E-05
1	29.00000	0.01793	114.569	114.569	-264.448	-211.325	
		(STRAIN)	-7.468E-05	9.104E-05	9.104E-05	-7.468E-05	-5.146E-05
1	29.00010	0.01793	114.569	229.253	114.569	201.726	
		(STRAIN)	3.859E-05	2.275E-06	5.006E-05	2.275E-06	3.859E-05
1	59.00010	0.01738	19.484	19.812	4.540	5.098	
		(STRAIN)	-4.520E-05	1.291E-04	1.330E-04	-4.520E-05	-3.869E-05
2	9.00000	0.01960	285.278	383.192	97.140	129.314	
		(STRAIN)	-1.801E-05	7.970E-05	1.410E-04	-3.816E-05	-1.801E-05
2	29.00000	0.01827	113.437	113.437	-273.031	-203.399	
		(STRAIN)	-7.823E-05	9.075E-05	9.075E-05	-7.823E-05	-4.779E-05
2	29.00010	0.01827	113.436	237.009	113.436	208.837	
		(STRAIN)	4.041E-05	6.582E-07	5.215E-05	6.582E-07	4.041E-05
2	59.00010	0.01770	20.452	20.515	4.653	5.321	
		(STRAIN)	-4.734E-05	1.370E-04	1.377E-04	-4.734E-05	-3.955E-05
3	9.00000	0.01927	88.886	181.866	83.960	88.866	
		(STRAIN)	-5.010E-06	-1.924E-06	5.633E-05	-5.010E-06	-1.937E-06
3	29.00000	0.01834	109.245	109.245	-271.713	-192.557	
		(STRAIN)	-7.856E-05	8.801E-05	8.801E-05	-7.856E-05	-4.395E-05
3	29.00010	0.01834	109.245	236.526	109.245	206.820	
		(STRAIN)	4.013E-05	-5.304E-07	5.250E-05	-5.305E-07	4.013E-05
3	59.00010	0.01778	20.656	20.656	4.670	5.368	
		(STRAIN)	-4.783E-05	1.387E-04	1.387E-04	-4.783E-05	-3.969E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -3.138E-05
 ALLOWABLE LOAD REPETITIONS = 1.277E+09 DAMAGE RATIO = 2.478E-04

AT BOTTOM OF LAYER 3 TENSILE STRAIN = -7.856E-05
 ALLOWABLE LOAD REPETITIONS = 3.705E+07 DAMAGE RATIO = 8.542E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 2.275E-06
 ALLOWABLE LOAD REPETITIONS = 2.507E+16 DAMAGE RATIO = 1.262E-11

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.387E-04
 ALLOWABLE LOAD REPETITIONS = 2.555E+08 DAMAGE RATIO = 1.239E-03

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (HORIZONTAL P. STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01827	562.961	563.699	215.771	217.996	
		(STRAIN)	-1.740E-05	1.258E-04	1.261E-04	-1.770E-05	-1.678E-05
1	29.00000	0.01699	96.799	96.799	-325.947	-267.720	
		(STRAIN)	-5.913E-05	6.767E-05	6.767E-05	-5.913E-05	-4.166E-05
1	29.00010	0.01699	96.799	199.132	96.799	176.116	

	(STRAIN)	3.404E-05	9.956E-07	4.363E-05	9.956E-07	3.404E-05
1	59.00010	0.01652	17.624	17.899	4.364	4.832
	(STRAIN)	-3.941E-05	1.153E-04	1.185E-04	-3.941E-05	-3.394E-05
2	9.00000	0.01819	282.279	387.009	111.858	150.316
	(STRAIN)	-7.435E-06	4.710E-05	9.039E-05	-2.333E-05	-7.435E-06
2	29.00000	0.01729	96.276	96.276	-336.599	-262.429
	(STRAIN)	-6.187E-05	6.797E-05	6.797E-05	-6.187E-05	-3.962E-05
2	29.00010	0.01729	96.275	205.901	96.275	182.648
	(STRAIN)	3.570E-05	-2.873E-07	4.539E-05	-2.873E-07	3.570E-05
2	59.00010	0.01680	18.451	18.504	4.466	5.022
	(STRAIN)	-4.120E-05	1.220E-04	1.226E-04	-4.120E-05	-3.472E-05
3	9.00000	0.01799	87.379	207.878	87.364	108.118
	(STRAIN)	1.464E-06	-7.107E-06	4.269E-05	-7.113E-06	1.464E-06
3	29.00000	0.01735	93.009	93.009	-335.143	-251.469
	(STRAIN)	-6.214E-05	6.628E-05	6.628E-05	-6.214E-05	-3.704E-05
3	29.00010	0.01735	93.010	205.583	93.010	181.167
	(STRAIN)	3.551E-05	-1.226E-06	4.568E-05	-1.226E-06	3.551E-05
3	59.00010	0.01687	18.619	18.619	4.480	5.060
	(STRAIN)	-4.160E-05	1.234E-04	1.234E-04	-4.160E-05	-3.483E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.740E-05
 ALLOWABLE LOAD REPETITIONS = 6.239E+09 DAMAGE RATIO = 5.073E-05
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -6.214E-05
 ALLOWABLE LOAD REPETITIONS = 5.809E+07 DAMAGE RATIO = 5.448E-03

AT TOP OF LAYER 4 COMPRESSIVE STRAIN = 9.956E-07
 ALLOWABLE LOAD REPETITIONS = 1.013E+18 DAMAGE RATIO = 3.124E-13

AT TOP OF LAYER 5 COMPRESSIVE STRAIN = 1.234E-04
 ALLOWABLE LOAD REPETITIONS = 4.314E+08 DAMAGE RATIO = 7.336E-04

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

NO.	COORDINATE	VERTICAL DISPL.	VERTICAL PRINCIPAL STRESS (STRAIN)	MAJOR PRINCIPAL STRESS (STRAIN)	MINOR PRINCIPAL STRESS (STRAIN)	INTERMEDIATE STRESS
1	9.00000	0.01617	555.433	556.828	238.380	244.373
	(STRAIN)	-6.818E-06	6.554E-05	6.586E-05	-7.139E-06	-5.765E-06
1	29.00000	0.01542	72.364	72.364	-420.670	-355.569
	(STRAIN)	-4.205E-05	4.499E-05	4.499E-05	-4.205E-05	-3.056E-05
1	29.00010	0.01542	72.363	155.412	72.363	138.579
	(STRAIN)	2.721E-05	-3.781E-07	3.423E-05	-3.781E-07	2.721E-05
1	59.00010	0.01506	14.714	14.914	4.005	4.351
	(STRAIN)	-3.084E-05	9.409E-05	9.643E-05	-3.084E-05	-2.681E-05
2	9.00000	0.01619	277.737	395.870	134.049	184.608
	(STRAIN)	-1.466E-07	2.120E-05	4.828E-05	-1.174E-05	-1.466E-07
2	29.00000	0.01566	72.356	72.356	-434.421	-354.359
	(STRAIN)	-4.390E-05	4.556E-05	4.556E-05	-4.390E-05	-2.977E-05
2	29.00010	0.01566	72.355	160.623	72.355	143.903
	(STRAIN)	2.855E-05	-1.259E-06	3.552E-05	-1.259E-06	2.855E-05
2	59.00010	0.01529	15.338	15.376	4.090	4.493
	(STRAIN)	-3.215E-05	9.908E-05	9.953E-05	-3.215E-05	-2.744E-05
3	9.00000	0.01609	85.202	250.430	85.191	147.256
	(STRAIN)	5.058E-06	-9.167E-06	2.871E-05	-9.169E-06	5.058E-06
3	29.00000	0.01572	70.180	70.180	-432.740	-343.283
	(STRAIN)	-4.409E-05	4.469E-05	4.469E-05	-4.409E-05	-2.830E-05
3	29.00010	0.01572	70.180	160.411	70.180	142.956
	(STRAIN)	2.844E-05	-1.887E-06	3.571E-05	-1.887E-06	2.844E-05
3	59.00010	0.01535	15.458	15.458	4.103	4.523
	(STRAIN)	-3.241E-05	1.001E-04	1.001E-04	-3.241E-05	-2.752E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.818E-06
 ALLOWABLE LOAD REPETITIONS = 8.230E+10 DAMAGE RATIO = 3.846E-06
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -4.409E-05
 ALLOWABLE LOAD REPETITIONS = 1.143E+08 DAMAGE RATIO = 2.769E-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 = 1.001E-04
 ALLOWABLE LOAD REPETITIONS = 1.101E+09 DAMAGE RATIO = 2.875E-04

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.01396	546.533	548.980	264.306	274.017	
		(STRAIN)	-1.837E-06	3.210E-05	3.240E-05	-2.134E-06	-9.556E-07
1	29.00000	0.01353	49.784	49.784	-523.399	-452.339	
		(STRAIN)	-2.843E-05	2.909E-05	2.909E-05	-2.843E-05	-2.130E-05
1	29.00010	0.01353	49.784	112.110	49.784	100.911	
		(STRAIN)	2.015E-05	-1.157E-06	2.481E-05	-1.157E-06	2.015E-05
1	59.00010	0.01328	11.529	11.660	3.489	3.722	
		(STRAIN)	-2.220E-05	7.160E-05	7.313E-05	-2.220E-05	-1.948E-05
2	9.00000	0.01401	272.755	410.391	156.518	223.774	
		(STRAIN)	2.279E-06	8.221E-06	2.492E-05	-5.881E-06	2.279E-06
2	29.00000	0.01370	49.975	49.975	-540.172	-455.289	
		(STRAIN)	-2.961E-05	2.962E-05	2.962E-05	-2.961E-05	-2.109E-05
2	29.00010	0.01370	49.975	115.721	49.975	104.760	
		(STRAIN)	2.111E-05	-1.715E-06	2.568E-05	-1.715E-06	2.111E-05
2	59.00010	0.01344	11.957	11.982	3.552	3.819	
		(STRAIN)	-2.307E-05	7.499E-05	7.528E-05	-2.307E-05	-1.996E-05
3	9.00000	0.01400	83.267	301.004	83.259	192.333	
		(STRAIN)	5.198E-06	-8.034E-06	1.838E-05	-8.035E-06	5.198E-06
3	29.00000	0.01377	48.650	48.650	-538.126	-444.063	
		(STRAIN)	-2.972E-05	2.917E-05	2.917E-05	-2.972E-05	-2.028E-05
3	29.00010	0.01377	48.650	115.549	48.650	104.165	
		(STRAIN)	2.104E-05	-2.093E-06	2.578E-05	-2.093E-06	2.104E-05
3	59.00010	0.01352	12.047	12.047	3.573	3.849	
		(STRAIN)	-2.322E-05	7.565E-05	7.565E-05	-2.322E-05	-1.999E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -1.837E-06
 ALLOWABLE LOAD REPETITIONS = 3.581E+12 DAMAGE RATIO = 8.838E-08
 AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.972E-05
 ALLOWABLE LOAD REPETITIONS = 2.585E+08 DAMAGE RATIO = 1.224E-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 = 7.565E-05
 ALLOWABLE LOAD REPETITIONS = 3.851E+09 DAMAGE RATIO = 8.219E-05

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

POINT NO.	VERTICAL COORDINATE	VERTICAL DISPL. (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	0.01281	541.265	544.416	276.912	288.286	
		(STRAIN)	-6.564E-07	2.186E-05	2.213E-05	-9.279E-07	5.241E-08

1	29.00000	0.01249	39.922	39.922	-574.870	-501.499
	(STRAIN)	-2.280E-05	2.299E-05	2.299E-05	-2.280E-05	-1.734E-05
1	29.00010	0.01249	39.922	92.084	39.922	83.297
	(STRAIN)	1.677E-05	-1.308E-06	2.043E-05	-1.308E-06	1.677E-05
1	59.00010	0.01229	9.923	10.025	3.174	3.358
	(STRAIN)	-1.816E-05	6.058E-05	6.176E-05	-1.816E-05	-1.601E-05
2	9.00000	0.01286	270.077	419.838	166.830	243.782
	(STRAIN)	2.455E-06	4.721E-06	1.763E-05	-4.178E-06	2.455E-06
2	29.00000	0.01263	40.130	40.130	-592.951	-506.346
	(STRAIN)	-2.371E-05	2.344E-05	2.344E-05	-2.371E-05	-1.726E-05
2	29.00010	0.01263	40.130	94.960	40.130	86.413
	(STRAIN)	1.755E-05	-1.738E-06	2.111E-05	-1.738E-06	1.755E-05
2	59.00010	0.01242	10.265	10.285	3.226	3.436
	(STRAIN)	-1.885E-05	6.327E-05	6.350E-05	-1.885E-05	-1.641E-05
3	9.00000	0.01289	82.569	328.894	82.563	216.085
	(STRAIN)	4.602E-06	-6.906E-06	1.432E-05	-6.907E-06	4.602E-06
3	29.00000	0.01272	39.141	39.141	-590.814	-495.170
	(STRAIN)	-2.379E-05	2.313E-05	2.313E-05	-2.379E-05	-1.667E-05
3	29.00010	0.01272	39.141	94.835	39.141	85.977
	(STRAIN)	1.749E-05	-2.021E-06	2.119E-05	-2.021E-06	1.749E-05
3	59.00010	0.01251	10.354	10.354	3.256	3.473
	(STRAIN)	-1.895E-05	6.386E-05	6.386E-05	-1.895E-05	-1.643E-05

AT BOTTOM OF LAYER 2 TENSILE STRAIN = -6.564E-07
ALLOWABLE LOAD REPETITIONS = 7.904E+13 DAMAGE RATIO = 4.004E-09
AT BOTTOM OF LAYER 3 TENSILE STRAIN = -2.379E-05
ALLOWABLE LOAD REPETITIONS = 4.166E+08 DAMAGE RATIO = 7.598E-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 = 6.386E-05
ALLOWABLE LOAD REPETITIONS = 8.228E+09 DAMAGE RATIO = 3.847E-05

* SUMMARY OF DAMAGE ANALYSIS *

AT BOTTOM OF LAYER 2 SUM OF DAMAGE RATIO = 7.325E-04
AT BOTTOM OF LAYER 3 SUM OF DAMAGE RATIO = 4.368E-02
AT TOP OF LAYER 4 SUM OF DAMAGE RATIO = 3.351E-11
AT TOP OF LAYER 5 SUM OF DAMAGE RATIO = 5.516E-03

MAXIMUM DAMAGE RATIO = 4.368E-02 DESIGN LIFE IN YEARS = 22.89