



# PONTE SULLO STRETTO DI MESSINA



## PROGETTO DEFINITIVO

### EUROLINK S.C.p.A.

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<p><i>Unità Funzionale</i></p> <p><i>Tipo di sistema</i></p> <p><i>Raggruppamento di opere/attività</i></p> <p><i>Opera - tratto d'opera - parte d'opera</i></p> <p><i>Titolo del documento</i></p>	<p>OPERA D'ATTRAVERSAMENTO</p> <p>CONCEZIONE / DIMENSIONAMENTO GENERALE E DISEGNI D'ASSIEME</p> <p>SOVRASTRUTTURE</p> <p>GENERALE</p> <p>Dead Load Summary for Global IBDAS Model</p>	<p><b>PG0022_F0</b></p>
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REV	DATA	DESCRIZIONE	REDATTO	VERIFICATO	APPROVATO
F0	20/06/2011	EMISSIONE FINALE	LADI	KLO	KLO/LSJ

NOME DEL FILE: PG0022\_F0





		<b>Ponte sullo Stretto di Messina</b> <b>PROGETTO DEFINITIVO</b>		
Dead Load Summary for Global IBDAS Model		<i>Codice documento</i> PG0022_F0.docx	<i>Rev</i> F0	<i>Data</i> 20/06/2011

## INDICE

INDICE .....		3
1 Introduction .....		5
2 Input Values for Permanent Actions PP and PN .....		6



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<b>Dead Load Summary for Global IBDAS Model</b>		<i>Codice documento</i> PG0022_F0.docx	<i>Rev</i> F0	<i>Data</i> 20/06/2011

## 1 Introduction

This report presents dead loads applied in the global IBDAS model for global analyses of the Messina Strait Bridge.

The dead loads are used as input values for the global IBDAS model. Currently input values applied for the following model versions are enclosed:

- Model version 3.1 (input values from 02/06/2010)
- Model version 3.2 (input values from 13/08/2010)
- Model version 3.3f (input values from 21/04/2011)



Dead load contributions important for the determination of the cable curve are enclosed - i.e. dead load contributions from the suspended deck and the cables. The following actions are considered:

- Permanent actions PP (structural)
- Permanent actions PN (non-structural)

The following elements are considered for Permanent actions PP (structural):

- Cables
- Hangers
- Saddles
- Cable clamps
- Suspended deck, roadway girders
- Suspended deck, railway girders
- Suspended deck, cross girders
- Welds
- Painting

The following elements are considered for Permanent actions PN (non-structural):

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- Cables - wrapping, paint, hand strands
- Hangers - corrosion protection
- Roadway surfacing
- Roadway girders - equipment
- Railway girder - equipment
- Articulation - equipment

## 2 Input Values for Permanent Actions PP and PN

The following table shows the input values for the global IBDAS model.

**MESSINA BRIDGE - PROGETTO DEFINITIVO**

Global IBDAS-model, input values for permanent actions PP and PN

	Unit	Model update		
		Model 3.1 02/06/2010	Model 3.2 13/08/2010	Model 3.3f 21/04/2011
<b>PERMANENT ACTIONS PP (structural)</b>				
<b>Main cables</b>				
Metallic cross-sectional area (per cable, 4 no.):				
Main span	m <sup>2</sup>	0.918	0.945	1.015
Sicilia side span	m <sup>2</sup>	0.941	0.969	1.050
Calabria side span	m <sup>2</sup>	0.935	0.963	1.038
Overall diameter incl. wrapping (per cable, 4 no.):				
Main span	m	1.201	1.224	1.263
Sicilia side span	m	1.216	1.239	1.285
Calabria side span	m	1.212	1.235	1.278
<b>Hangers</b>				
Steel area (total at each end of cross girder):				
Hanger 1, 2, 5, 115, 118, 119	mm <sup>2</sup>	38948	2 x 19204	2 x 19204
Hanger 3, 4, 6-8, 112-114, 116, 117	mm <sup>2</sup>	23244	2 x 10198	2 x 9275
Hanger 9-20, 100-111	mm <sup>2</sup>	14358	2 x 6273	2 x 7179
Hanger 21-99	mm <sup>2</sup>	11622	2 x 5349	2 x 7179
Outer diameter incl. sheath (total at each end of cross girder):				
Hanger 1, 2, 5, 115, 118, 119	mm	4 x 142	2 x 192	2 x 192
Hanger 3, 4, 6-8, 112-114, 116, 117	mm	4 x 108	2 x 147	2 x 139
Hanger 9-20, 100-111	mm	2 x 119	2 x 113	2 x 119
Hanger 21-99	mm	2 x 108	2 x 106	2 x 119
<b>Saddles</b>				
Tower saddle trough (per saddle, each cable pair)	t	600	530	530
Tower saddle steelwork (to top of upper tower cross beam, per saddle, each cable pair)	t	500	1150	1150
Splay saddle (per saddle, each cable pair)	kN	3500	4900	4900
<b>Cable clamps</b>				
Weight (total per hanger group):				
Positions without hangers	kN	50	50	50
Hanger 1, 2, 5, 115, 118, 119	kN	125	125	125
Hanger 3, 4, 6-8, 112-114, 116, 117	kN	125	125	125
Hanger 9-20, 100-111	kN	150	150	150
Hanger 21-99	kN	150	150	150
<b>Suspended deck, roadway girders</b>				
Longitudinal steel (weight for 1 roadway girder):				
Section 2 (CS7)	kN/m	45.4	47.4	49.7
- Diaphragms etc.	kN/m		5.0	4.3
Section 3 (CS6)	kN/m	41.8	43.2	46.4
- Diaphragms etc.	kN/m		4.4	4.7
Section 4 (CS2)	kN/m	41.8	43.2	44.4
- Diaphragms etc.	kN/m		4.2	4.5
Section 5 (CS5)	kN/m	46	47.5	51.7
- Diaphragms etc.	kN/m		5.4	5.7
Section 6 (CS4)	kN/m	45.4	48.5	48.6
- Diaphragms etc.	kN/m		7.8	10.7
Section 7 (CS5)	kN/m	46	47.5	51.7
- Diaphragms etc.	kN/m		5.4	5.7
Section 8-10 (CS8)	kN/m	46.2	47.6	48.7
- Diaphragms etc.	kN/m		4.2	4.5
Section 11-27 (CS3)	kN/m	41.8	43.2	44.4
- Diaphragms etc.	kN/m		4.2	4.5
Section 28-39 (CS2)	kN/m	41.8	43.2	44.4
- Diaphragms etc.	kN/m		4.2	4.5
Section 40-60 (CS1)	kN/m	40.7	42.0	43.2
- Diaphragms etc.	kN/m		4.2	4.5
Additional load (weight for 1 roadway girder):				
Diaphragms, hanger anchorages, etc.	kN/m	4.2	0	0

**MESSINA BRIDGE - PROGETTO DEFINITIVO**

Global IBDAS-model, input values for permanent actions PP and PN

	Unit	Model update		
		Model 3.1 02/06/2010	Model 3.2 13/08/2010	Model 3.3f 21/04/2011
<b>Suspended deck, railway girder</b>				
Longitudinal steel:				
Section 0 (CF9b)	kN/m	43.60	30.0	30.9
- Diaphragms etc.	kN/m		7.9	3
Section 0 (CF9a)	kN/m	32.70	31.5	30.9
- Diaphragms etc.	kN/m		8.2	3
Section 1 (CF8)	kN/m	32.7	31.7	38.6
- Diaphragms etc.	kN/m		3.1	6.2
Section 2 (CF7)	kN/m	40.70	39.7	47.4
- Diaphragms etc.	kN/m		3.2	4.7
Section 3 (CF6)	kN/m	31.50	30.1	34.1
- Diaphragms etc.	kN/m		5.0	4.2
Section 4 (CF5)	kN/m	29.60	28.1	31.2
- Diaphragms etc.	kN/m		5.0	4.2
Section 5 (CF3)	kN/m	32.40	31.3	38.9
- Diaphragms etc.	kN/m		5.0	4.4
Section 6 (CF4)	kN/m	81.20	79.2	88.6
- Diaphragms etc.	kN/m		4.1	5.1
Section 7 (CF3)	kN/m	32.40	31.3	38.9
- Diaphragms etc.	kN/m		5.0	4.4
Section 8-10 (CF5)	kN/m	29.60	28.1	31.2
- Diaphragms etc.	kN/m		5.0	4.2
Section 11-27 (CF2)	kN/m	27.20	25.4	28.1
- Diaphragms etc.	kN/m		2.8	3.5
Section 28-60 (CF1)	kN/m	27.20	25.4	28.1
- Diaphragms etc.	kN/m		2.8	3.5
Additional load:				
- Diaphragms etc.	kN/m	2.40	0	0
<b>Suspended deck, cross girders</b>				
Section 1 (T7)	kN		1420	1644
Section 2 (T6)	kN		2810	2950
Section 3 (T1)	kN		1591	1614
Section 4 (T3)	kN		1980	2035
Section 5 (T4a)	kN		6540	7674
Section 6 (T4b)	kN		4145	4153
Section 7 (T3)	kN		1980	2035
Section 8-60 (T1)	kN		1591	1614
<b>Welds</b>				
Suspended deck:				
Roadway girder (weight for 1 roadway girder)	kN/m	pending	pending	0.35
Railway girder	kN/m	pending	pending	0.28
<b>Painting</b>				
Suspended deck:				
Roadway girder, external surfaces (weight for 1 roadway girder)	kN/m	pending	0.20	0.20
Roadway girder, internal surfaces (weight for 1 roadway girder)	kN/m	pending	0.42	0.42
Railway girder, external surfaces	kN/m	pending	0.19	0.19
Railway girder, internal surfaces	kN/m	pending	0.40	0.40
<b>PERMANENT ACTIONS PN (non-structural)</b>				
<b>Cables</b>				
Paint and surfacing (per cable, 4No)	kN/m	0.2	0.2	0.2
S-wire wrapping (per cable, 4No)	kN/m	1.0	1.0	1.0
Hand strand access system (per cable, 4No)	kN/m	0.2	0.2	0.2
<b>Hangers</b>				
Corrosion protection system (total each end of cross girder):				
Hanger 1, 2, 5, 115, 118, 119	kN/m	0.15	2 x 0.06	2 x 0.06
Hanger 3, 4, 6-8, 112-114, 116, 117	kN/m	0.08	2 x 0.04	2 x 0.04
Hanger 9-20, 100-111	kN/m	0.05	2 x 0.02	2 x 0.02
Hanger 21-99	kN/m	0.04	2 x 0.02	2 x 0.02
<b>Roadway surfacing</b>	kN/m <sup>2</sup>	1.00	1.00	1.00



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	Unit	Model update		
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<b>Roadway girder</b>				
Equipment (weight for 1 roadway girder):				
2 nos. parapets	kN/m	2.9	2.9	2.2
Outer service lane (grating, supporting structure, wind screen)	kN/m	12.1	12.5	11.3
Light masts	kN/m	0.2	0.2	0.2
Various cables etc. in deck interior (utilities)	kN/m	1.5	0.51	0.69
Traffic gantries	kN/m		0.1	0.1
Access walkways, interior	kN/m	0.5	0.5	0.5
Drainage system (without water)	kN/m	0.2	0.22	0.22
2 nos. wind screens along parapets (height 2.4m)	kN/m	2.5	2.5	2.5
Rails for waggon in road girder	kN/m			0.4
<i>Total roadway girder, equipment (weight for 1 roadway girder)</i>	<i>kN/m</i>	<i>19.9</i>	<i>19.43</i>	<i>18.11</i>
<b>Railway girder, equipment</b>				
Equipment:				
Rails and track equipment incl. catenary masts and cables	kN/m	10	10.5	9.0
2 nos. emergency walkways (parapet, grating, supporting structure, noise barrier and cable trays)	kN/m	9.3	9.5	6.7
Various cables etc. in deck interior (utilities)	kN/m	1.5	0.22	0.22
Fire main system (with water)	kN/m		1.31	1.31
Washing system (with water)	kN/m			0.10
Access walkways, interior	kN/m	0.3	0.3	0.3
Drainage system (without water)	kN/m	0.2	0.25	0.25
2 nos. solid walls along emergency walkways	kN/m	0.2	0.2	0.2
<i>Total railway girder, equipment</i>	<i>kN/m</i>	<i>21.5</i>	<i>22.28</i>	<i>18.08</i>
<b>Articulation</b>				
Cross girder (large)	kN/m		0.6	0.6
Cross girder (small)	kN/m		0.6	0.6
Cross at towers	kN/m		1.5	1.5