


PONTE SULLO STRETTO DI MESSINA



PROGETTO DEFINITIVO

EUROLINK S.C.p.A.

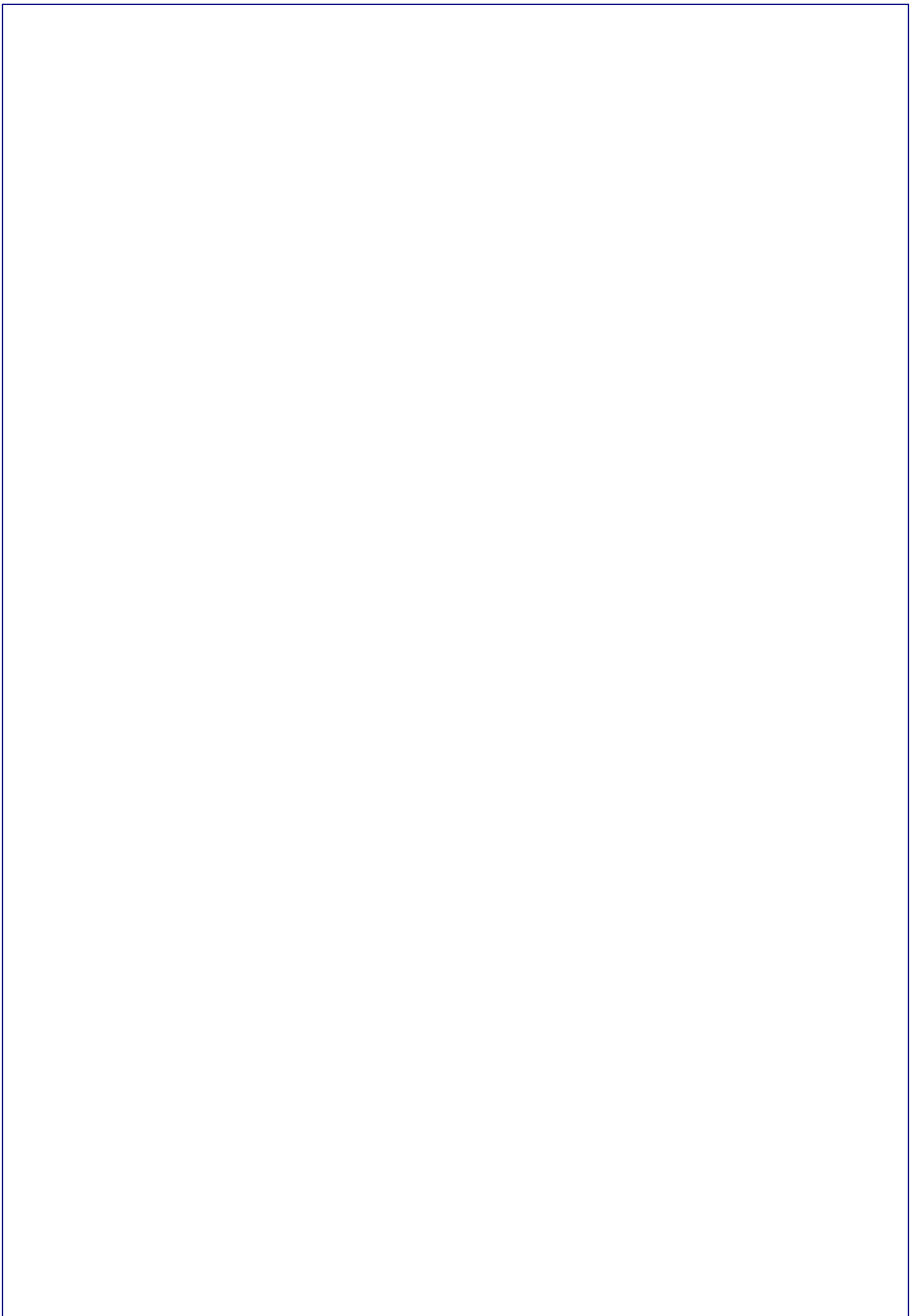
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F0	20-06-2011	Emissione finale	TOGG	JAPK	JEJE/SOLA



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1 Introduction

1.1 The Project

The Messina Strait Bridge will span the Messina Strait between Calabria on the Italian mainland and the island of Sicily. The suspension bridge crossing comprises a 3,300 m main span, which will be longest in the world when constructed.

The bridge carries four marked vehicle lanes, two emergency lanes and two rail lines. The bridge superstructure comprises three separate orthotropic deck steel box girders, one for each of the Sicily and Calabria bound roadways and one for the railway. The three box girders are connected by transverse steel box cross girders spaced at 30 m. The superstructure is supported by pairs of hanger cables connected to each cross beam end. The hangers are connected to pairs of main cables on each side of the bridge (four main cables), with each main cable having a diameter of 1.24 m. The main cables are anchored at each bridge end in massive reinforced concrete anchor blocks. The main cables are supported by two steel main towers, each with a height of 399 m above mean sea level. The main towers are founded on reinforced and post-tensioned concrete footings, which are supported on underlying rock formations.

1.2 Scope

This performance specification specifies the requirements for the design, manufacture, installation and testing of the crash barriers on the Messina Bridge. The crash barriers are located on both sides of the roadway on both roadway girders.

The scope of work covers detailed and workshop design, supply, installation, testing, commissioning, as-built documentation, operation & maintenance manuals and quality assurance activities, in accordance with general requirements of the contract and this performance specification.

The design of the crash barriers shall include integration of the crash barriers into the overall bridge design, considering interface requirements from other parts of the bridge project.

The interfaces to be considered include but are not limited to:

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- Clearance profile for road
- Connection to the roadway girder
- Hangers
- Access from roadway to service lane
- Water supply systems
- Dewatering
- Power supply and electrical systems
- Corrosion protection system
- Control and monitoring systems
- Safety and operation control/SCADA
- Communication systems

1.3 References

1.3.1 Design Specifications

- 1 GCG.G.02.01 rev.0. Construction of the street and railway connections: Norms for the execution of the civil works - street and railway infrastructures. Stretto di Messina, 2004 July 6.
- 2 GCG.G.03.02. Technical specifications for the construction of the suspension bridge - Structural steelwork and protective treatments, Stretto di Messina, 2004 July 30.
- 3 GCG.G.03.04. Specific Techniques for Construction of the Crossing, Section 3.2, Stretto di Messina, 2010, July 15.
- 4 GCG.F.04.01. Engineering – Definitive and detailed design: Basis of design and expected performance levels, Stretto di Messina, 2004 October 27.

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- 5 GCG.F.05.03 rev. 1. Technical specifications for the definitive and the executive project of the bridge - Design development requirements & guidelines. Stretto di Messina, 2004 October 22.
- 6 CG1000-P-RG-D-P-CG-00-00-00-00-13_A_Basis of Design_ANX. Basis of Design and Expected Performance Levels, Stretto di Messina, 2010, July 26.

1.3.2 Codes and Standards

- 7 EN-1317 Road restraint systems
- 8 EN 1990-2:2007 Basis of structural design
- 9 EN 1991 Eurocode 1: Actions on structures
- 10 EN 1993 Eurocode 3: Design of steel structures

1.3.3 Drawings

- CG1000-P-AX-D-P-SS-R4-00-00-00-00-06 Crash barrier
- CG1000-P-WX-D-P-SV-I3-00-00-00-00-04 Cross over - Plan and section

2 Crash Barriers



2.1 Introduction

This performance specification contains the requirements for the crash barriers to be used on the roadways of the Messina Strait Bridge.

2.2 General requirements

The performance specification for crash barriers contains the following:

- Functional requirements
- Operational requirements
- Structural requirements

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- Material requirements
- Codes and standards.

2.3 Functional requirements

2.3.1 General

The crash barriers must contain and redirect vehicles that are out of course. This must be done in a safe manner for the passengers and other road users.

The crash barrier must contain and redirect the vehicles without complete breakage of the principal longitudinal elements of the system. No major part of the crash barrier may detach or present an undue hazard to other traffic or personnel in a work zone.

At the cross overs and service areas the crash barriers shall be removable as shown on CG1000-P- WX-D-P-SV-I3-00-00-00-04 Cross over - Plan and section.

It shall be possible to pass through the crash barrier and locations of SOS-stations as indicated on CG1000-P-AX-D-P-SS-R4-00-00-00-06 Crash barrier.

It shall be ensured that the crash barriers are able to accommodate movements of expansion joints and still fulfill the requirements.



The connection to the deck shall have greater capacity than the posts, and the underlying structure shall have greater capacity than the connection. This is to prevent permanent deformations of the steel in the road girder in case of crash barrier failure.

2.4 Operational requirements

2.4.1 General

When installed the crash barrier shall have a continuous and smooth surface in the entire length of the bridge. Easy adjustment of both the horizontal and vertical alignment of the crash barrier shall be possible during installation.

The design of the crash barrier shall facilitate easy replacement of damaged parts.

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A plan for operation and maintenance of the crash barriers shall be provided including instructions on how to assemble and repair the crash barrier.

2.5 Structural requirements

The crash barriers must fulfil the requirements in EN 1317 corresponding to containment level H4b with a working width class W3 and an acceleration severity index (ASI) not greater than 1.4.

2.6 Material requirements

2.6.1 General

Materials, components and equipment must be of recognised and well-known make and available in Italy as standard components.

Replacement of installations and equipment with short service life must be easy. Components to be regularly inspected and maintained must be easily accessible and removable.

The manufacturer shall supply 200 m of crash barrier for maintenance or replacement.

The crash barrier shall be constructed using steel grade S355J2+N.

2.6.2 Corrosion protection

The facilities must be hot dip galvanized with minimum thickness of 150 µm to sustain the corrosive seawater environmental conditions present in the Strait of Messina for a period of minimum 50 years without maintenance.

Due attention must be paid regarding the steel composition in relation to hot dip galvanising (silicon content).

2.7 Codes and standards

The design of the crash barrier shall follow relevant Italian and European Norms (EN) and regulations.