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Construction of a foot-bridge in Mestre — Venice

Construction d'une passerelle pour piétons à Mestre – Venezia

Bau einer Fussgangerbrücke in Mestre – Venedig

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1. INTRODUCTION

To link a new residential area comprising approximately four thousand inhabitants to the centre of the city of Mestre - Venice and to sports facilities which are to be built in the future, the Venetian local government authorities built a 400m long, 4m wide foot bridge extending over a four - lane road (See Figs. 1 & 2) and a river (30 metres).

Access to the foot-bridge is by means of circular ramp with a 5% incline in keeping with Italian laws seeking to facilitate accessibility to the handicapped. Every 10 metres, there are small horizontal areas 1.5 metres long to allow them to rest.

There are also three elicoidal flights of stairs leading to the foot-bridge, thus linking the different settlements and ensuring safe crossing to the bus stops on the road below.

An asymmetric ribbon-like structure of reinforced concrete was adopted. Its design allows it to blend into its green and fluvial surroundings.

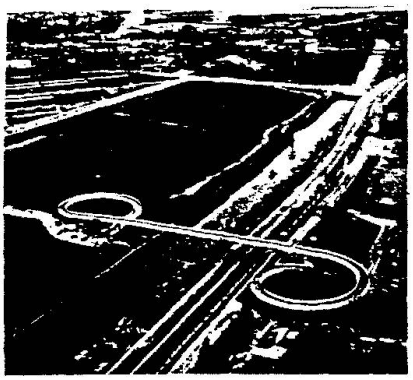

Fig. 1: Areal view with the Venetian Lagoon in the background.

2. STRUCTURAL AND GEOMETRIC TYPOLOGY

The ramp and foot-bridge are built in reinforced concrete. The two 28 metres long units were pre-compressed with 7 cables tautened later composed of 200 seven cm. wires.

The entire main structure is supported by means of continuous restraints or hinge restraints resting upon round reinforced concrete pillars.

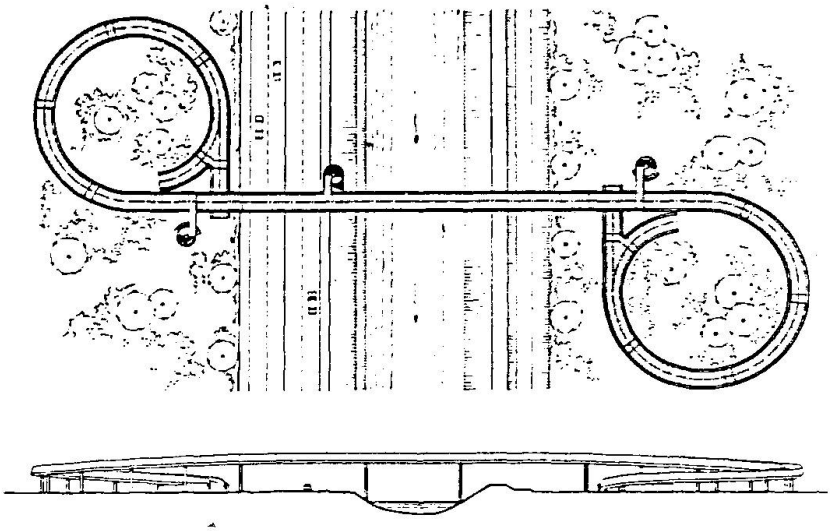

Fig.2: a) Plan
b) Prospect

The pillars' foundations rest upon foundation plinths with a 600 mm. diameter and 14,00 metres long with a capacity load of 600 KN. The curved part of the ramps have spans with a theoretical light of 10,54 metres measured in bridge - beams axis. The rectilinear parts of the ramp and the foot-bridge itself have theoretical light spans of 11.25, 11.25, 24.00, 20.00, 24.00, 11.25, 11.25 respectively. The transversal sector of the bridge-beams is constant and has a net height of the structural part equal to 0.85 metres. This enhanced the elegance and design of the structure, but also led to great problems in choosing the best suited system of cables of precompression of the quoin 28.00 metres long owing to the limited space available. The total extension in axis is of approximately 400 metres. Steel and teflon sliding bearings were used for support on the supper part of the pillars. They are 28,00 metres long and extend over the 24,00 metres spans and move 3,00 metres towards the 20,00 metre span and 1,00 metre towards the 11,25 span. The 14.00 metre long components covering the rest of the 20.00 metre span (20.00 - 3.00 - 3.00), rest upon reinforced neoprene. This system of sliding bearings ensures the absorption of axial dimensional changes due to temperature, shrinking and creeping of the components of the ramps and foot-bridge.

3 - MODES OF CONSTRUCTION

All the ramp and foot-bridge spans were partially pre-assembled on the ground. Each component part was equipped with a central structural nucleus, lightened in several ways (See Fig. 3) in the longer spans, self-sustaining, isostatic, on the spans. With the final casting, carried out in place, the structural continuity with the pillar was established with a fixed joint. The soffit of each component was made with smooth boards without any further covering. The reinforced concrete parapets are also prefabricated and covered with light-coloured, fine marble gravel. Furthermore, they are specially treated with a coating against graffiti or posters. To maintain the design of the structural part unaltered, the parapets were placed 10 cm. from each other. The paving is made of quartziferous sand subjected to polymerization. His isbunbroken and nonslip. The elicoidal stairs were completely prefabricated. For architectural reasons, concrete containing dark oxides and aggregate prophyry was used in their construction.

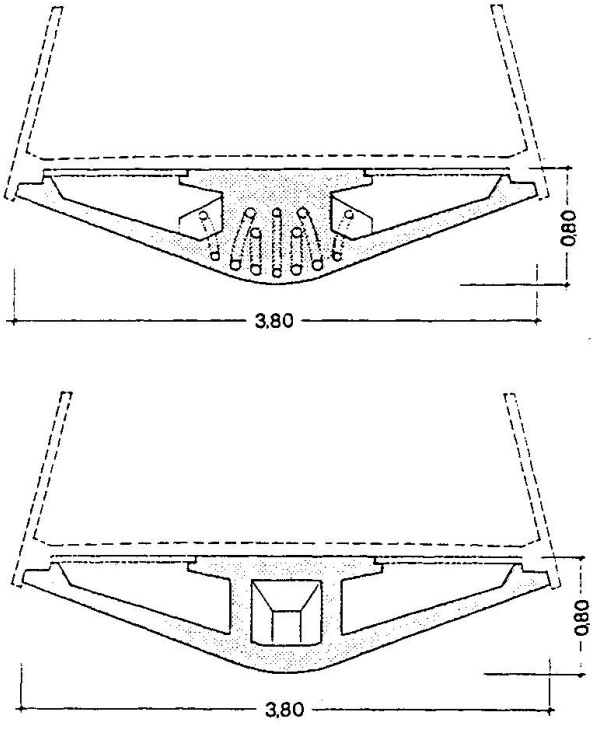

Fig.3): a) Section el. L = 28 m
Fig.3): b) Section el. L = 14 m