VARIABLE DEPTH FOOTBRIDGES

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Summary

Over the last 3 years, Mario Guisasola has drawn up the Project for various variable depth footbridges, with a series of basic characteristics:

- Span runs of between 44 and 82 m.
- Elastically restrained structures, on one or more abutments.
- A significant amount of the footbridges are located on rivers where the hydraulic clearance must not be affected, which required structures with limited depth under the paving.
- These are simple structures, with a great deal of attention to detail and the combination of materials to achieve a functional, resistant, economic end of product which fits in well with the environment where the structures are being built.
- For all the footbridges steel is used for the structure, wood for the paving, and stainless steel for the railings.
- The envisaged bridges explore the formal possibilities of the beam, with the work expressed by means of the depth variations adapted to the stresses.

Keywords: beam; restraining; double bolt hinge; variable depth; warped web, footbridge; aesthetic.

1. Design Conditions

The six Bridges present similar parameters. The depth of the beams above the pavement is less than 90 cm; thus, the railing isn´t interrupted. The thickness of the deck varies between 30 and 60 cm; this allows the inserting network service in the second case. The useful width of the footbridges varies between two and four meters. The end of the beams adapts to the terrain slope; that means assimilating slope to restraining and vertical wall to simple support. The depth in midspan is maximum, as well as in the restrainings, but in the simple supports the depth is minimum.

The deflection of the bridges was limited to L/1600 for an overload of 2 kN/m^2. This led to a good dynamic behaviour of the structure, and slender footbridges were obtained.

2. Green Band Footbridge over the Cidacos River in Calahorra, Spain (completed in 2007)

This bridge is a continuous girder with 3 uncompensated spans of 2.5, 44 and 2.5 m. The footbridge elevation follows the pattern of the bending moments for a continuous 3 span beam, with the material positioned on top in areas where the lower clearance must be relieved. To emphasize the end restraining, the web has been bent in the area corresponding to positive bending moments.