

## Three Pedestrian steel bridges in Spain.

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### ABSTRACT

Pedestrian bridges with small to medium spans open up the possibility to explore new forms, new materials and construction methods.

Three case studies of urban road and pedestrian Spanish bridges are presented in this paper:

- Vallparadis pedestrian bridge is a three 33-m span spatial steel truss of hollow tubes, a very slender and light structure, with a composite concrete-steel deck supported by a parabolic bottom chord and lateral ribs below deck level and at an inclined angle to vertical (completed in 2007).
- Matadepera pedestrian bridge is a very slender steel box girder with a length of 53 m (completed in 2007).
- Zumaia pedestrian bridge is a hybrid structure combining stainless steel and GFRP profiles and planks. The bridge is under construction.

The paper will focus on following aspects: conceptual design, structural behaviour and construction.

### 1 INTRODUCTION

Pedestrian bridges with small or medium spans offer an opportunity to explore new forms and construction methods, since the cost of construction depends mainly on the free span and the material, as long as they can be built using conventional methods. In urban zones the cost of the finishes, the restrictions of the site, the services affected, the traffic disruption and so on can reach similar levels to the cost of the structure itself.

The essence of engineering is using innovation as a route to progress for society. Most advances in structural engineering, particularly in the case of bridges, have come about through the introduction of new materials, new structural concepts, new construction processes, or by pushing existing knowledge to its limit.

Engineering design should transcend the purely analytical or pragmatic vision and offer opportunities for formal creativity. Fortunately some engineers are capable of breaking away from the preconceived models of bridge design; they incline piers or arches, create unnecessarily-curved bridge decks, introduce inclined planes or contoured shapes in the cross-section in order to achieve more expressive structures with ease and fluidity, even if it reduces the efficiency of the material or makes construction more difficult. The strictly cost-conscious way of designing was justified in many countries in the past because of the limited resources available. Unfortunately this approach persists even now; often solutions are selected based simply on the cost of construction; only occasionally is the global cost of the project considered, which takes into account future inspections or maintenance of the bridge and it is even rarer for the added value of the aesthetic or cultural dimension to be taken into account.

### 2 VALLPARADIS PEDESTRIAN BRIDGE IN TERRASSA

#### 2.1 Conceptual design

Terrassa, a city 26km north of Barcelona, has recently inaugurated a new pedestrian bridge over the Vallparadís Park. A new extension of this urban park, one of the biggest urban recreational areas of Catalonia, has finally been opened to the city. The pedestrian bridge connects two old residential areas.