An innovative road-bridge solution to give access to the future Zorrotzaurre Island in Bilbao (Spain)

Héctor BEADE
Designer and Project Manager
Arenas & Asociados
Santander, Spain
hbeade@arenasing.com

Guillermo CAPELLÁN
Technical Director
Arenas & Asociados
Santander, Spain
gcapellan@arenasing.com

Pablo ALFONSO
Civil Engineer
Arenas & Asociados
Santander, Spain
palfonso@arenasing.com

Marianela GARCÍA
Civil Engineer
Arenas & Asociados
Santander, Spain
mgarcia@arenasing.com

Juan RUÍZ
Civil Engineer
Arenas & Asociados
Santander, Spain
jruiz@arenasing.com

Raquel SOBRINO
Civil Engineer
Arenas & Asociados
Santander, Spain
rsobrino@arenasing.com

Raquel SOBRINO
Civil Engineer
Arenas & Asociados
Santander, Spain
rsobrino@arenasing.com

Summary

This article is focused on the first of the bridges that will materialise the connection of the future Zorrotzaurre Island in Bilbao (currently a peninsula) with the rest of the urban fabric. This bridge will clear the watercourse of the Deusto Canal, when completed, with a main span of 76.9 m and an average width of 28 m, carrying two 5-m-wide side pavements for pedestrians and cyclists and four 3.25-m-wide road lanes. Its innovative design concept combines two structural schemes: an inverted Fink truss (it will be the first road bridge in the world of this type to be built) and a three-span variable-height beam. This design (made of steel with a composite road deck) provides transparency and slenderness, fulfils the hydraulic requirements, has an accurate scale for an urban bridge (the height of the main mast is 15.4 m) and serves as a tribute to the sequence of cranes and towers that once were plentiful in the area.

Keywords: urban bridge; innovative design concept; inverted Fink truss; steel; locked coil rod cable; special foundations; dynamic behaviour; innovative structure; sustainability; maintenance.

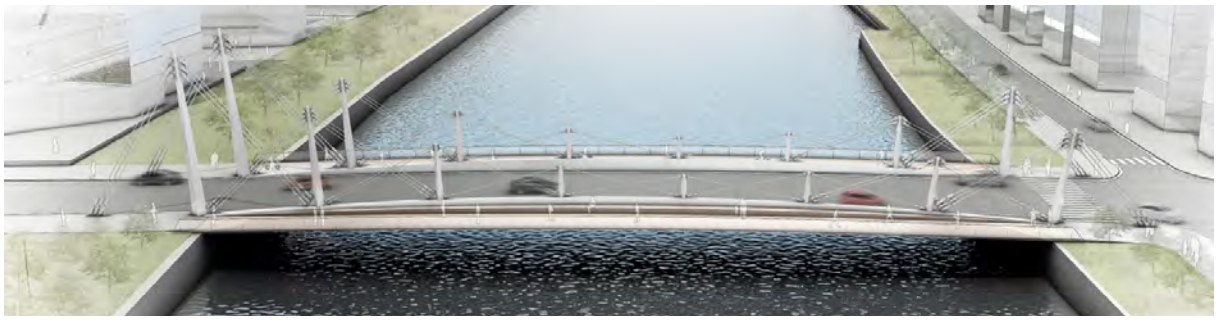

Fig. 1: Virtual image of the new access bridge to the future Zorrotzaurre Island

1. Historical context and antecedents

Industry has always been the main economic engine of Bilbao. The Nervión River, which divides the city into two, was traditionally used as an infrastructure to allow the access of boats to the city centre. The actions carried out during the last 20 years have deeply changed the city's appearance and recovered river and banks for leisure. A hard industrial city was turned into an attractive place to live in and a tourist destination, in a worldwide example of successful urban transformation.

This transformation continues and it will be focused in the peninsula of Zorrotzaurre for the next two decades. Its characteristic shape is the result of an ambitious intervention undertaken by the end of the 1950s: the opening up of a canal to bypass a meander of the river and to facilitate navigation for heavier crafts (Fig. 2). This development was never completely concluded, apparently due to the

https://doi.org/10.2749/222137814814067644