



The Submerged Floating Tube Bridge as an alternative for a crossing: pros and cons

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Abstract

The paper describes the pros and cons of the Submerged Floating Tube Bridge (SFTB) as an alternative solution for different types of crossing, having their own characteristics in terms of depth, width, geotechnical properties of the seabed, exposure of the area to the different types of loads and so on.

The analysis is based on several feasibility studies performed by the Norwegian Public Roads Administration (NPRA) in the last years for the E39 project, where different solutions of SFTBs have been compared to floating bridges and suspension bridges on tension leg platforms. An additional evaluation of the SFTB compared to more traditional bridges is described here.

Different technical solutions for the SFTB can overcome local specific challenges of the crossing; for this reason it is important to know the advantages and disadvantages of the different SFTBs structures, in order to choose the best one for each specific site. A comparison between the SFTB and the other type of bridges will help to understand when this type of structure can be competitive and when it will not be.

Keywords: Design, Bridges, Crossings, Floating Structures, Concrete

1 Introduction

In the last twenty years a one hundred years-old concept has been proposed worldwide for different crossings: the Submerged Floating Tube Bridge (SFTB). This structure, also called Archimede's bridge, takes advantage of Archimede's force to face the vertical loads, thanks to the fact that it is submerged at a specific depth under the sea surface.

Different proposals were presented, for lake or sea crossings, from Qiandao lake in China to the Messina Strait in Italy. In Norway, sketches of a

SFTB were presented in 1948 for the Karmsund crossing and, later, in 1996, for crossing the Høgsfjord. In the recent years the SFTB had an important role in the feasibility studies for the crossings along the E39 project.

The experience of the Norwegian Public Road Administration with these studies has allowed to develop the detailed knowledge of the structure, highlighting the pros and cons of this concept.

2 The experience with the E39

Along the west coast of Norway, an 1100 km European road includes seven crossings that