



Crossing the Bjørnafjord with a multi-span suspension bridge on floating foundations – Challenges in design

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Abstract

As part of the ferry free E39 project, along the west coast of Norway, eight fjord crossings will be made. This means new technology has to be developed, as the fjords pose a great challenge related to environmental conditions, ship impact and topography.

This paper gives an overview of the technical challenges foreseen in the design and construction of a multi-span suspension bridge on floating tension legged platform foundations for the crossing of the Bjørnafjord. The crossing is approximately five kilometres wide, and has a depth up to 550 meters. The concept consists of a three-span suspension bridge with two land based towers, and two floaters midfjord.

The suggested solution is multidisciplinary involving structural complexity, aerodynamics and hydrodynamics. Although the bridge components are relatively well understood individually, the interaction between them needs further investigation. In this paper the effects of the components on the whole system are investigated. Different configurations are evaluated, and the interaction between the different components is investigated to understand the effects regarding construction and final design.

Keywords: Suspension bridge, Multi-span, Tension Legged Platform, Floating structure, Central node, End buffers, Top tie cable, Connections