

Multi span suspension bridge on floating foundations – behaviour under operation

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Abstract

A multi-span suspension bridge on floating supports has been evaluated and found to be a suitable option for the crossing of Bjørnafjorden on the West Coast of Norway. The proposed concept combines known technologies such as a multi-span suspension system, floating supports inspired by the tension-leg platforms technology commonly used in the offshore industry and a top cable connecting the top of the four pylons.

Such a construction would pioneer the field of strait crossings at extreme depths for which conventional bridges are not suitable. The absence of similar constructions and therefore the lack of references constitute significant challenges for the design group.

The present article describes the global behaviour of the structure under normal operating conditions and summarizes the main findings from the investigations carried out in the initial study phases.

Keywords: Bridges, offshore structures, suspension bridges, floating bridges

1 Introduction

The Norwegian Public Roads Administration (NPRA) has initiated one of the most ambitious and ground-breaking large scaled infrastructure programs whose objective is to connect Kristiansand to Trondheim without ferry crossing.

The present paper deals exclusively with the feasibility study that is being conducted regarding a multi-span suspension bridge on floating supports for the crossing of Bjørnafjorden whose combined constraints in terms of depth of the seabed and total length would be unprecedented. The length of the different alternatives exceeds 4,000 m while the maximum depth of the fjord is about 550 m. A consortium consisting of Aas Jakobsen, COWI and Johs. Holt assisted by Aker Solutions, Moss Maritime, NGI, Plan Arkitekt and

Wind onDemand have investigated the feasibility of building such a bridge.

This paper summarizes the main conclusions and findings related to the global response of the construction under normal operating conditions.

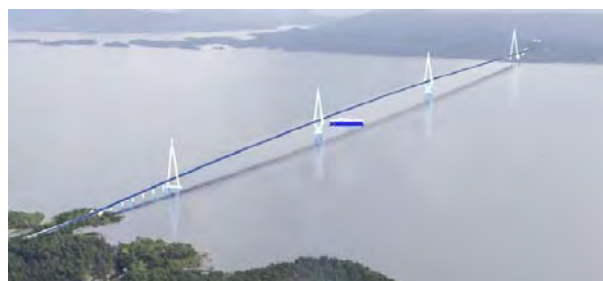


Figure 1. Suspension Bridge over Bjørnafjorden