



E39 Bjørnafjorden Floating Bridge – Challenges and Solutions

Sverre Wiborg, Tina Vejrum, Erik A. Sundet

COWI AS, Oslo, Norway and Copenhagen, Denmark

Rolf Magne Larssen

Dr.ing. Aas-Jakobsen AS, Oslo, Norway

Per Norum Larsen

Johs. Holt AS, Oslo, Norway

Bernt Sørby, Rolf Åge Vågen

Global Maritime AS, Oslo, Norway

Stian Moe Johannesen

Norwegian Public Roads Administration, Norway

Contact: SWI@COWI.com

Abstract

The purpose of this paper is to investigate the main challenges and corresponding solutions for a floating bridge crossing Bjørnafjorden. The paper investigates challenges related to quantification of loads, design of permanent structures as well as temporary phases. The paper evaluates a curved bridge without mooring lines, but considerations are partly valid for a straight bridge anchored to the seabed as well. Both solutions have been used, but the length of the Bjørnafjorden crossing is significantly larger than previous bridges and thus more challenging.

Keywords: Floating bridge, stay-cable bridge, pontoons, environmental loads, temporary phases, marine operations.

1 Introduction

The Norwegian Public Roads Administration (NPRA) is currently planning a coastal route E39 whose objective is to connect Kristiansand to Trondheim without ferry crossings. As a part of this study, a group including COWI, Aas-Jakobsen,

Johs. Holt and Global Maritime assisted by NGI, L2 arkitekter and Skanska executed feasibility studies regarding a floating bridge for the crossing of Bjørnafjorden. The present paper investigates main technical challenges for such a crossing and describes corresponding solutions.