

Vertical stiffness for tube bridges: Comparing pontoons and tethers

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Abstract

The present paper focuses on dynamic action challenges for Submerged Floating Tube Bridges (SFTB) over longer spans. Response analyses have been performed in time domain for a tether concept and a pontoon concept, respectively, using 3Dfloat software. Natural periods are compared with an analytic approach. Vertical displacements and accelerations are taken out for different swell and wind generated sea load cases.

Keywords: vertical stiffness; tethers; pontoons; natural periods; Submerged Floating Tube Bridge

1 Introduction

A feasibility study, "Ferry-free coastal route E39", carried out by the Norwegian Public Roads Administration (NPRA) has investigated the potential for a ferry-free coastal road route along the west coast of Norway [1], see Figure 1. The longer span fixed crossing is a major technical challenge extending existing technology. Crossing such wide and deep fjords is, however, achievable relying on proven technology [2].

Both floating bridge concepts and Submerged Floating Tube Bridge concepts (SFTB, also known as SFT or Archimedes Bridge) are evaluated by the NPRA.



Figure 1. Coastal route E39 on the west coast of Norway