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제목: Full Scale Monitoring and Performance Evaluation of Suspension Bridge Excited by Wind and Traffic Induced Action

Abstract

Norway's national road network along the west coast has been very dependent on ferry transport across the many wide and deep fjords that cut through the Norwegian coastline. The Norwegian Parliament has agreed on a transport plan to realize a ferry free road (E39) between Kristiansand in the south and Trondheim in the north by 2030 [1]. To achieve this goal, new standards need to be set in long span bridging and/or tunneling, as the fjords that need crossing are between 1.6 and 5 km long and up to 500 m deep. A development of this type requires research on many levels. One important aspect is to investigate the loading and response of suspension bridges. For this purpose, a full-scale monitoring program was initiated on the Lysefjord suspension Bridge, near Stavanger in Norway. The establishment of a full-scale suspension bridge laboratory of this type is important for future development of fjord crossings, as relatively few studies of full-scale bridge in complex terrains such as fjords are available. In traditional design of long span bridges, there are many sources of uncertainty. Monitoring of real life structures is therefore important to assess the traditional design process through validation of structural modelling procedures and the associated simplifications. A full-scale laboratory of this type can also be utilized for testing new monitoring equipment and methods as well as to develop information systems that can be used for facility management and road safety procedures. For most strait crossings, wind loads are the governing design factor. In relation to that, various research activities devoted to the assessment of wind conditions and validation of the computational models for wind-induced vibrations have been initiated, in which the complex flow conditions at the Lysefjord inlet play an important part. The studies so far have focused on mean wind and turbulence statistics, wind spectra, coherence, co-coherence, and length scales of the flow, all of which are key parameters for wind load modelling. The presentation will show the Lysefjord full-scale laboratory as well as the on-going research and some current results.

일시: **2016**년 **8**월 **4**일 (목) 오후 **4**시

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