Recent monitoring of the Øresund Bridge: Observations of rain-wind induced cable vibrations

In 1999, 2m amplitude cable vibrations were observed on the Øresund Bridge. The vibrations were attributed to a change in cable shape due to sleet accretion. Subsequent monitoring of the bridge, though, revealed other vibration events due to rain-wind induced mechanisms and parametric excitation (Svensson et al., 2004) – albeit of smaller amplitudes. After two significant cable vibration events, inspections of the cable anchorages revealed failures in the damping systems that had been installed to prevent oscillations. Improvements in the damping systems were introduced and additional tuned mass dampers were installed on the longest and second longest cable pairs. Although the bridge has not suffered from any significant vibration events since the installation of the new damping systems, smaller amplitude vibrations are recorded from time to time. Peak to peak amplitudes of up to three cable diameters have been observed, although the most frequent observations are of smaller amplitude and are almost always in combination with rain. In this paper, several observations are made, regarding the rain-wind induced vibrations (RWIVs) of the cables, based on a relatively brief full-scale monitoring campaign from January 2010 – December 2010. The monitoring shows that there is a direct correlation between wind-cable angles, wind velocities and the amount of rainfall.

General information
Publication status: Published
Organisations: Department of Civil Engineering, Section for Structural Engineering
Contributors: Acampora, A., Georgakis, C.
Publication date: 2011

Host publication information
Title of host publication: International Conference on Wind Engineering
Volume: CD-ROM
URLs:
http://www.icwe13.org/
Source: orbit
Source ID: 278970
Research output: Chapter in Book/Report/Conference proceeding › Article in proceedings – Annual report year: 2011 › Research › peer-review