



Very short range wind warning system for High Speed Train in The Netherlands

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Statistical techniques are used for the very short range (15 minutes forecasts), for supervision of the high speed train crossing the Hollandsch Diep in the southern part of the Netherlands. The train is not allowed to cross the bridge during occurrence of strong cross winds, and therefore needs to be warned in advance. A set of observational wind towers is set up around the bridge. Combined with statistical techniques a relationship between the wind gusts upstream and the bridge has been developed. In this way a warning can be given for when there is even the slightest chance (0.01%) of dangerous crosswinds.

There is not a one to one relationship between wind gust at one location and a location even at 5 km further downstream. The vortex responsible for the wind gust will change rapidly before it has moved 5km downstream. The statistical model takes the variability of the wind into account and is able to forecast the risk of high wind gusts.

The risk of wind gust exceeding given thresholds is determined by relationships between historical measurements on the bridge and measurements on eight surrounding stations. Operationally, observations of wind speed, direction and gusts are obtained every minute and arrive within the system no later than two minutes after measurement time. These observations are used as model input to be able to give the most accurate forecast every minute.