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Strategy to Assess the Aerodynamic Performance of the Golden Gate Bridge during the Planned Seismic and Wind Retrofit Program

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1 Abstract

The Golden Gate Bridge is undergoing an important seismic and wind retrofit program that will include, among other modifications, the addition of jumping deterrent nets and the replacement of structural members. To proceed with these retrofitting activities, platforms and tarps will be temporarily installed on the deck and are expected to have an influence on the sensitivity of the structure to wind-induced vibrations. Given the transient nature of the structure during this work, a strategy combining experimental methods (sectional model testing) and numerical predictions (buffeting analysis in the time domain) was employed to evaluate the aerodynamic performance of the bridge and to guide the construction schemes. In particular, the percentage of the length of the main span and side spans that could be tarped without negatively influencing the aerodynamic stability of the deck was determined. The risks of vibrations such as vortex-induced oscillations, galloping and flutter instabilities were evaluated in detail considering a large number of deck tarping scenarios and were compared to desired aerodynamic performance criteria. The methodology applied for the evaluation of the aerodynamic performance is outlined in this paper along with a presentation of the main findings of the study highlighting the benefits of such an extensive evaluation.

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