

Aerodynamics and Aeroelastics Studies of Hanger Bridge with H-Beam Profile Using Wind Tunnel

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Abstract : Aerodynamic and aeroelastics studies on the hanger bridge profile are important to analyze the aerodynamic phenomenon and Aeroelastics stability of hanger. Wind tunnel tests were conducted on a model of H-beam profile from hanger bridge. The purpose of this study is to investigate steady aerodynamic characteristics such as lift coefficient (Cl), drag coefficient (Cd), and moment coefficient (Cm) under the different angle of attack for preliminary prediction of aeroelastics stability problems. After investigation the steady aerodynamics characteristics from the model, dynamic testing is also conducted in wind tunnel to know the aeroelastics phenomenon which occurs at the H-beam hanger bridge profile. The studies show that the torsional vortex induced vibration occur when the wind speed is 7.32 m/s until 9.19 m/s with maximum amplitude occur when the wind speed is 8.41 m/s. The result of wind tunnel testing is matching to hanger vibration where occur in the field, so wind tunnel studies has successful to model the problem. In order that the H-beam profile is not good enough for the hanger bridge and need to be modified to minimize the Aeroelastics problem. The modification can be done with structure dynamics modification or aerodynamics modification.

Keywords : aerodynamics, aeroelastic, hanger bridge, h-beam profile, vortex induced vibration, wind tunnel

Conference Title : ICAAF 2016 : International Conference on Aeroelasticity, Aerodynamic Forces and Aerostructures

Conference Location : Barcelona, Spain

Conference Dates : August 11-12, 2016