Experimental Study of the Galloping Stability of Prismatic Beams.

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The phenomenon of self-induced vibrations, in cross-flow, of prismatic beams has been studied for decades, but it is still of great interest due to their important effects in many different industrial applications and there is not, in some cases, enough published information to establish criteria for geometric design (Alonso, 2009).

This paper presents the experimental study developed on a prismatic beam with "H" section, frequently used in applications as heat exchangers or in bridge decks, for example.

The purpose of this study is to understand the physical behavior of the air around this type of section, in order to reduce the aerodynamic loads, the onset speed of galloping and even to avoid it. To achieve this, a study of the influence of all geometric parameters that define the section has been developed (Barrero, 2009). Previously, the most interesting configurations have been selected using a smoke flow visualization technique in the wind-tunnel, then the corresponding static aerodynamic loads were measured and the parameters governing the phenomenon of galloping determined.

The results agree with the few published in the literature on this issue, in the range of Reynolds numbers, based on the chord, of 100,000 (Tamura 2003) and lead to physical comprehension of the problem and to important basic design criteria.

References

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