

## Fatigue assessment of footbridges under live loads

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### ABSTRACT

Recently built footbridges show a clear trend to increase their slenderness due to the improvement of mechanical properties of materials used in construction and greater aesthetic requirements of current society [1]. Such an increase in slenderness is related to a higher risk of vibrational problems for these structures. This fact is accentuated in footbridges where the monumental character that the work usually acquires guarantees its use by a large number of pedestrians [2].

After the vibrational phenomena occurred at the Millennium Footbridge (London) [3] the scientific community made a great effort to model pedestrian-induced loads on footbridges. However, this effort has been focused on the analysis of the comfort level of the structure, and has not yet been examined in detail, how these phenomena can affect behaviour of structure in U.L.S. Among the phenomena induced by vibrations that can cause structural failure, the most important is fatigue [4].

Fatigue analysis has been widely studied in the case of road and railway bridges at service loads [5], but there are very few publications in relation to fatigue problems caused by pedestrian loading.

This paper presents a bibliographical review of the existing methods to evaluate the fatigue behaviour of footbridges under the action of service loads. Subsequently, based on the results obtained from this review process, a preliminary procedure for its implementation is established and its practical application is performed on a real footbridge.

### REFERENCES

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