

Real condition experiment on a new bridge weigh-in-motion solution for the traffic assessment on road bridges

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Abstract

Weigh-in-Motion is currently the only way to precisely assess and monitor traffic loads on road bridges from real measurements. This assessment helps to detect potential overweight vehicles and to optimize the maintenance operations on the bridge thanks to an accurate knowledge of its real load conditions.

An experiment, performed on a precast prestressed concrete beam girders bridge overcrossing a highway in France, is described. The Weigh-in-Motion (WIM) system uses the bridge deck as a large scale, part of the weighing device, and measures strain in critical parts of the structure.

The system is able to get significantly accurate estimations of the gross weight of the vehicles on most types of bridges, including long span box girders, large composite decks or the multiple precast prestressed concrete beams considered in the study. However, the axle load estimation is still much less accurate and not presented here.

The experiment started in February 2019 and is still going on, also proving the robustness of the solution for an operation over long durations, as a permanent part of the bridge management through its whole lifecycle. Thus, the WIM sensors used are relevant for the Structural Health Monitoring of the bridge deck as well.

Keywords: weigh-in-motion (WIM); road bridge; structural health monitoring; traffic load; strain measurement; optical strand.