Rail4Future

Projekttitel:	**Resilient Digital Railway Systems to enhance performance**
Projektnummer:	**882504**
Deliverable:	**3.1.1 Report on Load Modelling**

This deliverable outlines the work on load modelling within Area 3.1 of Rail4Future dealing with reliable bridge. Lifetime assessment using route specific fatigue load models for bridge structures can gain a significant advantage compared to the use of general load models e.g., taken from codified design. A clear methodology to derive the route specific load models from Weigh-In-Motion (WIM) data allows the infrastructure owner, together with calibrated models of the bridge structure and appropriate models for fatigue, to get a much more precise estimation of the remaining service life of a structure compared to current assessment procedures.

The railway section between Salzburg and Wörgl was chosen as demonstration section to show the impact of such route specific load models. The Bridge Eschenau, which is investigated in detail within Area 3.1 of Rail4Future is also located on this track.

As fatigue is a cumulative damage, route specific load models must also include historic loads. Therefore, the work covers methodologies for historic as well as actual/future load models. For historic load models, expert knowledge of the traffic development over time on the given route is essential. The methodology was developed, and the historic load model derived for the demonstration section Salzburg – Wörgl within the project.

For the actual load models the data from multiple WIM measurement sites in Austria were evaluated, the optimisation potential of route specific load models, compared to the standard train mix from codified design, was shown and the base methodology determined. An in-depth evaluation of the route specific traffic on the demonstration section was carried out. Final application and derivation of the route specific load model for the demonstration section will be done in the next project steps#.

For urban railway bridges the load models are in general less complex as urban public transport has only a limited set of specific trains (such as metro, tram) in service. For the bridge over the Schellhammergasse of the U6 Metro line in Vienna the effect of different load scenarios (passenger volume) will be evaluated using a calibrated numerical model of the bridge structure.