



## A Review of North American Railway Bridge Research

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## Summary

The paper gives a brief overview of current research work undertaken at the North American Facility for Accelerated Service Testing (FAST) railway test facility and on several railroads that are members of the Association of American Railroads (AAR).

**Keywords:** Railway research, North America, railway bridge, testing, steel bridge, concrete bridge, increased loading, timber bridge, fatigue, bridge joint

## 1. Introduction

The least expensive way to increase railway capacity is to put more into a car. Nevertheless, this does put considerable strain on the infrastructure, in particular on the bridges.

North American railways moved to 119-tonne gross weight cars in the 1960's and had serious problems and horrendous expenses in the 1970's due to unexpected infrastructure costs.

The industry decided to be sure of the economics of increasing load again, and did extensive studies based on actual field and laboratory testing before recommending the change to 130 tonne gross cars in the late 1990s. These studies were based on a comparison of the entire costs of running 130 Tonne, 16.15 m coal cars vs. then conventional equipment (119 tonne) on typical lines from each of the major railroads together with analysis of the data obtained from studies at the FAST Facility described below. The increase in car loading gave an 11% productivity improvement, but clearly the increased load would have effects on the infrastructure.

## 2. Industry Wide Economic Studies

The six routes, 4 level and 2 mountain, to which estimated economic costs to accommodate 130 tonne cars were evaluated had a total route mileage of just over 7400 km varying from about 3 m per km to 17 m per km of bridge plant.

As a result of the Economic studies and research on its effects at the FAST Facility and on various full-scale field studies a number of very effective mitigation measures were developed, and the increased infrastructures costs were included in implementation strategies.

Furthermore, since the implementation of 130 tonne cars the maintenance costs on a number of lines have been very carefully monitored and critical maintenance problems have been monitored with field instrumentation to see if predictions were in fact valid.