

Institute of Structural Durability and Railway Technology

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Focus of the Institute

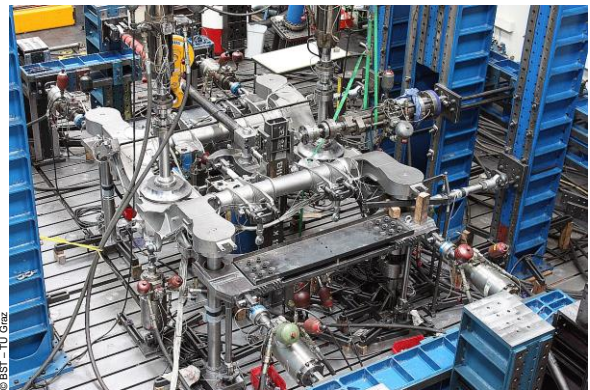
In the course of the research and teaching activities, the Institute deals with the following topics:

- Structural durability assessment of lightweight mechanical structures with focus on rail vehicles
- Mapping of the entire process steps for the development of elaborate design methods
- Set-up of advanced simulation concepts for the fatigue design process
- Development of experimental test methods for representative specimens and real systems

Research

A development of innovative components is essential for implementing new design concepts in mechanical and rail vehicle engineering. Research at the Institute, in close cooperation with partners from industry and science, contributes to a pre-development of modern rail vehicle structures and provides methods for the fatigue design of components and entire systems.

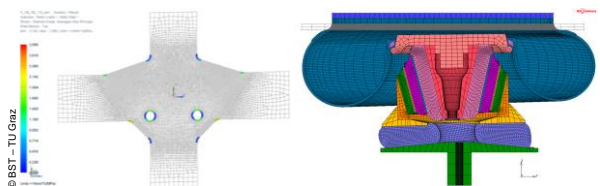
The modern testing infrastructure facilitates analyses on several size scales, from representative specimens to real systems, such as crack propagation tests at railway axles as well as fatigue tests of bogie frames. A significant aspect in the research activity is the development of new simulation concepts as basis for a modern engineering design process, which enables an application of the scientific results.



Fatigue test of a bogie frame

Vision

Fatigue strength, a cross-sectional science, is subject to a wide range of effects. Aim is to comprehensively evaluate the behaviour of components and rail vehicle structures during operation, considering the essential aspects and their interactions, such as the design and loading as well as material and manufacturing.



Numerical simulation: Local stress state at a welded cruciform joint (left) and model of air suspension (right)

Mission

Digitization and automation are also integrated in the design process, whereby an application of advanced simulation techniques sustainably optimizes a modern fatigue design and accurate dimensioning of lightweight components.

Teaching

The teaching at the Institute focuses on the two topics of Structural Durability and Railway Technology in theory as well as practice. The following courses are exemplarily given:

- Structural Durability
- Structural Durability Assessment
- Railway Technology
- FE Analysis for Structural Durability Assessment



Crack propagation test at a railway axle