

## FATIGUE TESTS OF VEHICLES - AN IMPORTANT PART OF THEIR DEVELOPMENT AND ENGINEERING EDUCATION

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**Keywords:** Fatigue tests; Development of rail and road vehicles; Collaboration of research centers with industry; Impact on university education

**Summary:** Fatigue tests can be classified with respect to various criteria. For instance, the following sorting is a common one: by the size of the structure tested (test specimen of a material, structural node, vehicle substructure or component, and the entire vehicle); by the controlling quantity (force, displacement, strain, acceleration, temperature); by the number of controlling quantities (a single controlling quantity, multiple controlling quantities); by the number of load directions (uniaxial loading vs. multi-axial loading); by the load-time profile (harmonic profile, a range of harmonic cycle blocks, a random process). Fatigue tests may, however, be classified in other ways as well, depending on their role in research and development: tests intended to provide new fundamental scientific findings in the field of fatigue of materials and structures; tests intended to provide input data for expert reports and fatigue life calculations; tests mapping the impact of metallurgical production or subsequent processing upon final fatigue strength and life; tests conducted as part of a product development process (designers typically use these to validate design assumptions, results of computations, and computational models); prescribed fatigue tests (unless these are completed successfully, the product must not be introduced to the market or put into service); tests aimed to identify and remove causes of fatigue failures in service. A special case of fatigue testing is virtual fatigue tests. Various computational programs for multi-body simulation and finite element method are used to implement these virtual tests. A suitable fatigue postprocessor is necessary for this type of activity. The listed types of fatigue tests apply to the development of rail and road vehicles. The paper (or poster) presents interesting examples of fatigue tests, which have been performed mostly in collaboration with Skoda Transportation (production company) in laboratories of the Research and Testing Institute (private research organisation) and the Regional Technological Institute (university research center). Practical experience and a quality experimental base in the region are also a prerequisite for quality university education in this field. The paper will briefly present the curriculum of the course Operational Strength and Fatigue Life of Vehicles.