



Task for a master thesis

Topic: **Experimental Evaluation of Fracture Characteristics of Bolts under High Strain Rates**

In materials engineering, the mechanical behaviour is usually determined on unnotched specimens. Most metallic materials show higher strength and lower ductility under impact loading (i.e. at high strain rates) than under quasi-static loading. In principle, this behaviour should also apply to bolts, which differ significantly from an unnotched specimen. Extensive investigations are therefore now planned as part of a student project.

Subtasks:

- Creation of a schedule and coordination of this with the supervisor
- Literature research on impact testing of bolts (in particular with servohydraulic cylinders)
- Determination of the test specimens and parameters
 - E.g. bolt size, clamping length, tensile speeds; with the aim of being able to test over as wide a strain rate range as possible
- Construction of a test setup for impact testing of bolts
- Determination of the test rig stiffness
- Planning and execution of tests
- Evaluation of the tests from measurement data (each for different strain rates)
 - Ultimate Tensile Strength
 - Elongation at fracture
 - Absorbed energy
- Discussion of the results
- Preparation of a scientific poster
- Documentation of the results in the form of a written thesis

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