

Assessment of load and stress states in hydrogen storage and transport systems

Description

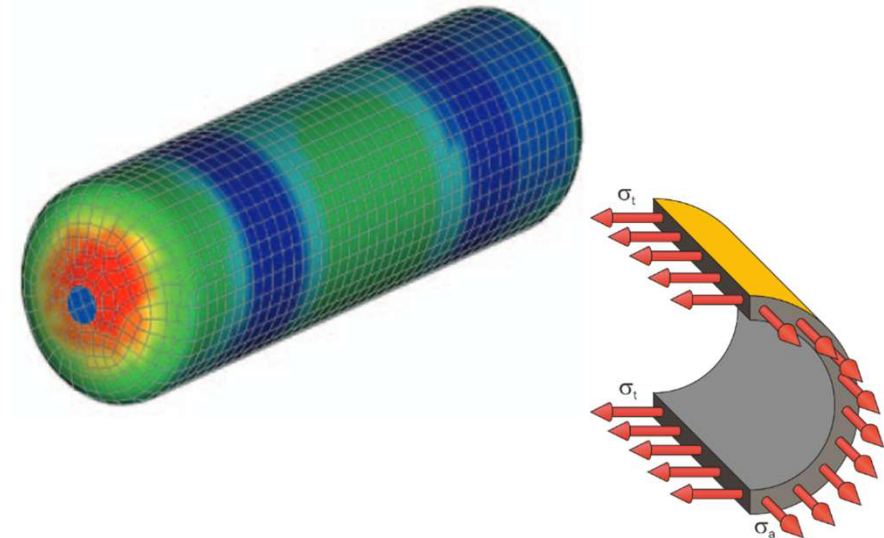
A key element on the way to a sustainable hydrogen economy is the implementation and development of novel materials for the storage and transport of compressed gaseous hydrogen. To define the necessary qualities and material properties of new materials, an assessment of the load conditions in operating conditions is essential.

Aim of this work is to determine the loads, stresses, and strains affecting tanks and pipelines during operation with compressed gaseous hydrogen. The operating states include e. g. filling and draining of tanks, external influences such as vibrations in mobile/transportable tanks and depend on the operating conditions (pressure, cycling pressure, material, temperature, etc.).

The most relevant use cases are to be simulated by FEM (Finite element method).

Work Packages

- Definition of scope, types of storage and transport systems, relevant material models (1 month)
- Analysis of dynamic loads and stresses from transport and mobility, NVH (1 month)
- Analysis of loads and stresses from inner pressure and cycling pressure operation, FEM calculations (2 months)
- Definition of material properties, strength, and characteristics of materials to be used for pressure tanks and pipelines (1 month)
- Written thesis (1 months)



Sources: Atul et al., Finite Element Analysis of Composite Overwrapped Pressure Vessel for Hydrogen Storage, 2016; Wikipedia.

- **Start:** immediately
- **Duration:** approx. 6 months
- **Paid Master Thesis**
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