TUM Hyperloop
TUM School of Engineering and Design
Technical University of Munich

Development of a Guideway Design for the TUM Hyperloop Reference Track

Type: Master Thesis
Content: simulative / CAD
Possible start: 15.02.2026
Key words: Guideway, SOFiSTiK, Concrete Structure, Vehicle-Guideway Interaction, FEM

TUM Hyperloop

Our group is researching Hyperloop technology for passenger transport. We focus on electromagnetic levitation, suspension, and propulsion, as well as the simulation of high-speed aerodynamic phenomena, cooling systems, and topics related to vehicle structure and infrastructure. Depending on the topic, we develop new test benches and implement various experiments, computationally intensive simulations, or design new types of components. Our chair aims to motivate you and other students to develop modern technology for tomorrow, together as a strong team with the power of everyone.

Job Description

In this thesis, you will focus on the civil engineering challenges of the Hyperloop infrastructure. A novel integral guideway design is planned for the upcoming reference route, requiring comprehensive scientific investigation to ensure structural integrity and performance. Your primary objective is to model a guideway design using SOFiSTiK. You will simulate and analyze the structure under complex load scenarios, specifically focusing on the effects of vacuum pressure, static vehicle loads, and dynamic vehicle-guideway interaction.

Your Tasks

- Develop a parametric finite element model of the integral guideway in SOFiSTiK.
- Simulate critical load cases, including vacuum loads and thermal effects.
- Analyze the dynamic interaction between the vehicle and the guideway.
- Evaluate the structural behavior and optimize the design for the reference track.
- Document results and derive design recommendations for physical implementation.

Our Requirements

- Background in Civil Engineering, Structural Engineering, or a comparable field.
- Experience or willingness to learn finite element software, specifically SOFiSTiK.
- English, ideally also German language skills for communication and documentation.
- Perseverance to finish tasks with high reliability and on time.

Our Offer

- Working with students and researchers in a highly motivated young research team.
- Experience in a new field of research that is gaining importance.

Contact

If you are interested in working with our team, please send your application, motivational letter, and supporting documentation to Armin Kamberi (armin.kamberi@tum.de). If you have any questions, do not hesitate to contact us.