Material characterisation, validation & testing of polymeric compensators for hyperloop applications

Short Description

Hyperloop is the next evolution of rail-based transportation, combining the speed of aircraft and the efficiency of the railway industry. EuroTube is focusing on the implementation of hyperloop infrastructure utilizing pipes made out of concrete as the primary material. To securely and air-tightly connect these pipes together, polymeric compensators are used. These polymeric compensators offer advantages such as ease of installation and production. However, the long-term behavior and specific material properties of these compensators are yet to be fully understood in order to optimize their application for scalable hyperloop uses. This thesis aims to conduct a comprehensive research on these aspects through the use of numerical and experimental tools. To conduct air-tightness and structural studies, tests will be conducted at EuroTube's and Empa's facilities.

Partner	ETHZ, EuroTube Foundation
Start date	25.03.20XX
End date (planned)	28.06.20XX
Student(s)	XXXX XXXX
Internal supervisor	[ETF NAME], [Email address] [SL NAME], [Email address]
External supervisor	Daniel Elmeua Lehmann, daniel.elmeua@eurotube.org Antoine Juge, antoine.juge@eurotube.org

Work packages

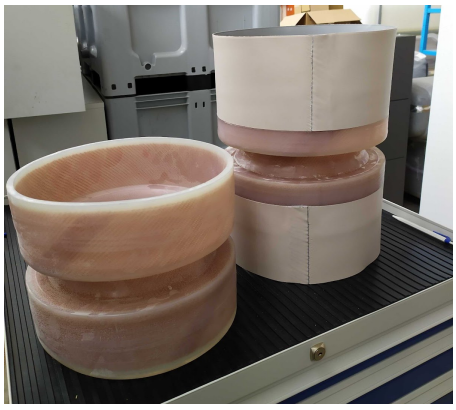
- Literature review on compensation joints for the vacuum and fluid industry
- Perform a material characterisation study of compensators through leakage tests with different types of bonding interface and through experimental cyclic and climate tests.
- Conduct FEA simulations to validate the experimental results. Full scale simulation of compensator.
- Summary of the results and compilation of a written report

Requirements

- High motivation and interest in the topic
- Able to work independently and be creative
- Methodological and goal-oriented working behavior
- Experience with FEA tools (e.g. Ansys)
  and practical experience in the laboratory with test benches
- Knowledge in material science and metrology
- Knowledge about hyperloop technologies is beneficial

Application

Please email your CV and transcript to daniel.elmeua@eurotube.org



Polymeric compensators at the EuroTube Foundation