Modeling of hydrogen releases
Master Thesis

The DLR Institute of Maritime Energy Systems researches and develops innovative solutions for the defossilisation and emission reduction in shipping. In co-operation with industry, these solutions are put into practice. To this end, the institute is setting up a large-scale infrastructure to test and trial the newly developed energy systems in a standardized laboratory environment and under real conditions. The Energy Infrastructure department is researching systems for the storage and handling of renewable fuels. We are looking at import infrastructure as well as refueling infrastructure and fuel storage for maritime applications. We are looking for a student (m/f/d) in the field of mechanical engineering/ process engineering/ plant engineering/ shipbuilding or comparable for the Energy Infrastructure department.

Hydrogen is seen as a sustainable fuel of the future. Before it can be widely used on ships, a number of safety issues still need to be addressed. Hydrogen poses a particular danger when it is released, as flammable or even explosive gas clouds can form. The risk of release is particularly high when bunkering ("refueling") ships. Only very complex CFD models are currently available for modeling these gas clouds, and existing analytical models do not take sufficient account of the specific properties of hydrogen. The results of this master thesis should help to reduce the effort of a risk assessment of hydrogen applications by working on the following tasks.

We have planned the following tasks for you:

- Literature research of the different dispersion models
- Set up two realistic release scenarios
- Modeling the releases in Matlab using the researched dispersion models
- Modeling the releases using CFD
- Comparison of the results and investigation of possible correction factors for the analytical models

Qualifications:
- You are studying mechanical/ process engineering/ plant engineering/ shipbuilding or comparable.
- Initial experience in modeling gas clouds using computational fluid dynamics is mandatory
- Knowledge of the properties and hazards of hydrogen
- You enjoy teamwork
- our independent way of working, enthusiasm and thirst for knowledge round off your profile
- Good English language skills