



Contribution ID: 144

Type: **Oral presentation (15min)**

Simulation of liquid level, temperature and pressure inside a 2000 liter liquid hydrogen tank during a truck transportation

Wednesday, 9 July 2014 12:30 (15 minutes)

Hydrogen is an ultimate energy source because only water is produced after the chemical reaction of hydrogen and oxygen. In the near future, a large amount of hydrogen, produced using sustainable/renewable energy, is expected to be consumed. Since liquid hydrogen (LH₂) has the advantage of high storage efficiency, it is greatly attractive as the ultimate medium for the worldwide storage and transport of large amount of hydrogen. Recently, development of LH₂ tanks and carriers as well as liquefied natural gas tanks and carriers are ongoing. It is important to elucidate the sloshing condition inside an LH₂ tank during transportation by truck and ship. To make a calculation model of the sloshing of LH₂ inside a tank, simulation of LH₂ level, temperature and pressure inside the tank during transportation were carried out using a multipurpose software ANSYS CFX. Calculated results are discussed in comparison with experimental results of a 2000 liter tank during transportation by truck.

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Session Classification: Wed-Mo-Orals Session 8

Track Classification: C-13: LNG and hydrogen systems