

# ESTIMATION OF INHERENT RISKS FOR FIVE HYDROGEN TRANSPORT SCENARIOS PRODUCED IN THE OCEAN

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The objective of this study is to evaluate the inherent risks associated with five different scenarios for transporting hydrogen from the sea to the land. The authors identified four ship transport scenarios, namely pressurized hydrogen, liquefied hydrogen, ammonia, and liquid organic hydrogen carriers (LOHC), along with one pipeline transport scenario using pressurized hydrogen. To compare the risks associated with each scenario, the authors used the Dow Fire and Explosion Index, which is a widely used risk ranking tool.

This study found that the risk associated with the pressurized hydrogen-ship transportation scenario was very high due to the high pressure storage tank required. In contrast, the overall risk of the pressurized hydrogen-pipeline transportation scenario was low as it was a simple configuration. The liquefied hydrogen-ship transport scenario showed a higher risk compared to pressurized hydrogen-ship transport due to the high risk of fire-explosion and the use of a solid oxide fuel cell process that increased the risk. The LOHC-ship transportation scenario showed the highest risk among all five scenarios due to the toxicity and fire risk associated with LOHC and the large amount of LOHC required for transport. Finally, the ammonia-ship transportation scenario showed the lowest risk as the risk of fire was low, despite the high toxicity.

In conclusion, the authors identified and compared the risks associated with various scenarios for transporting hydrogen produced at sea to land. The findings of this study can be used to guide decision-making regarding the selection of the safest transportation method based on the specific requirements of each project.

This research was supported by Korea Research Institute of Ships and Ocean engineering a grant from Endowment Project of “Development of Evaluation Model for Hydrogen Offshore Supply Chain and Test Technologies for Hydrogen Equipment” funded by Ministry of Oceans and Fisheries(PES4790).

*Keywords:* Hydrogen, Offshore Supply Chain, Dow Fire and Explosion index, Ammonia, Liquid Organic Hydrogen Carriers

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