

Interview with Biofuel Experts

SEO Daesik, Senior Manager of R&D Team at HMM



Biofuels are being prioritized, especially for addressing GHG regulations for existing ships, due to their advantage of effectively reducing GHG emissions by blending a certain amount with traditional fossil fuels without modifying the engine or fuel supply system. Additionally, the recent surge in biofuel production has stabilized prices, making them even more preferable. In this issue, we feature an interview with Dae-Sik SEO, the Senior Researcher of HMM, who has been preparing for the use of biofuels for several years. Currently, HMM is using biofuels on container ships operating on European routes, playing a role as a first mover by reducing the Scope 3 emissions of shippers through their Green Sailing Service. The interview covers various aspects such as the purpose of using biofuels, fuel supply, demonstration, and technical solutions.

Q. HMM is one of the most proactive first movers in the maritime industry regarding decarbonization. Could you share HMM's approach to preparing for the decarbonization era?

A The topic of HMM's decarbonization policy is quite broad, so if I limit my discussion to the R&D sector, it is essential to be thoroughly prepared for all applicable technologies as new alternative fuels and various GHG reduction technologies are being developed. Without this preparation, we would face numerous trial and error phases at the actual implementation stage, which would cause us to miss the optimal time for application and result in significant opportunity costs for the company. Additionally, as regulations change and technologies advance rapidly, our R&D team aims to remain open-minded and flexible towards new and diverse technologies, free from preconceived judgments, and to always be prepared for their potential application.

Q. Recently, there has been a growing interest among shipping companies worldwide in using biofuels. Could you explain the reasons for this?

A When ordering new ships, our company primarily considers methanol and LNG fuels, and we are also considering ammonia fuel in the future. However, for existing ships, we see biofuels, which can be blended with existing HFO without any modifications, as the most economical solution. Biofuels are already being proactively applied to ships operating in the EU because the EU ETS is already in effect, and the FuelEU Maritime regulation will come into force next year. Furthermore, biofuels are necessary to improve the CII rating currently enforced by the IMO. While currently, ships with lower CII ratings are only required to establish corrective action plans, cargo owners and charterers are expected to begin avoiding ships with lower CII ratings from this year. Additionally, cargo owners are providing partial compensation for fuel costs as an incentive when using alternative fuels like biofuels to reduce Scope 3 GHG emissions. Therefore, HMM is offering a Green Sailing Service for cargo owners, and ultimately, the use of biofuels is driven by the need to comply with IMO and EU regulations as well as to meet cargo owner requirements.

Q. You have explained the importance of using biofuels very well. However, there are several concerns about whether it will be possible to provide sufficient quantities at reasonable prices, given the limitations of feedstock and competition with other industries.

How do you view the supply and demand issues for biofuels?

A From the shipping company's perspective, the most important factor for the sustainable use of biofuels, which are considerably more expensive than conventional HFO, is to secure fuel supply at a stable and acceptable price with minimal price volatility. The problem of limited feedstock cannot be easily overcome until breakthrough production methods, such as third-generation biofuels using algae, are developed. However, on the positive side, production volumes are rapidly increasing both domestically and internationally, along with a sharp rise in demand. Regarding competition with other industries, if the transition to electric vehicles accelerates in the automotive sector, which currently uses the most biofuels, aviation and shipping will eventually become the most significant demand sectors for biofuels. Especially in aviation, only high-quality biofuels can be used, which restricts feedstock and processes, making it very expensive. In contrast, the shipping industry can use a variety of feedstock, processes, and fuel qualities, giving it an advantage in terms of price and applicability compared to other industries.

Q. Next, I would like to ask about technical issues. What technical problems arise when using biofuels compared to conventional fossil fuels, and what methods are there to address these issues?

A Since biofuels are organic compounds, they are prone to oxidation. Simply put, it can be compared to food spoiling. Additionally, they contain bacteria that can proliferate and cause various problems. In short, biofuels contain unnecessary biochemical impurities compared to conventional fossil fuels, and these impurities can multiply over time, altering the fuel's properties. Therefore, continuous management is more necessary, which is a key difference from conventional fossil fuels.

Specifically, there are material issues. Metal parts of the fuel supply system or engine can corrode, and rubber components can harden. There can also be problems with pipes or valves becoming clogged with impurities.

Regarding engines, the engine itself can encounter issues due to impurities, or there can be an increase in nitrogen oxides. Fortunately, it has been reported that there are no problems with blends up to B30, and even B100 biofuels in the FAME series are known to be stable.

To address the issues with biofuels, methods such as removing moisture or heating to inhibit bacterial growth can be employed. However, the most crucial solution is to use up the fuel before problems arise. Therefore, our current principle is to consume all biofuels within three months after bunkering, and we plan to gradually extend the storage period after verification through testing.

Q. It seems that testing and demonstration are crucial for identifying and solving technical issues. Could you tell us about the demonstrations conducted so far and any future plans?

A Demonstration is the key to the use of biofuels, so our company has been proactively conducting demonstrations since 2019. First, because biofuels vary by producer, we test biofuels on land at KR's Green Ship Equipment Test and Certification Center (TCC) to check engine performance, exhaust gases, and any engine abnormalities. Additionally, we have completed successful demonstrations of B30 biodiesel and bio heavy fuel oil on actual ships, which are now being successfully used on vessels operating on European routes. Starting this year, we are preparing for the B100 demonstration in collaboration with fuel suppliers and KR.



Q. Since environmental regulations are just beginning to take effect, B30 should be sufficient to meet the regulations.

Why are you rushing to demonstrate B100?

A Currently, FuelEU Maritime has a flexibility mechanism called pooling. This system allows not only individual ships but also the entire fleet to meet regulatory compliance. In simple terms, even if some ships do not meet the regulations, if other ships in the fleet exceed the requirements and offset the non-compliant ships, the entire fleet is considered compliant. Therefore, deploying ships using B100 allows other ships in the fleet to use fossil fuels, providing more flexibility and freedom in fleet operations compared to using only B30. Another reason, as mentioned earlier, is that without prior testing and experience, we may encounter issues or miss the optimal application timing when we actually need to implement the fuel. Hence, we believe that proactively responding, even if it incurs some costs now, is ultimately a cost-saving measure.

Q. We understand that you plan to develop biofuel usage guidelines in collaboration with KR through this biofuel demonstration and make them available to all shipping companies.

Could you explain the reason for this?

A To use alternative fuels in the shipping industry, including biofuels, it is essential to secure stable fuel production and bunkering infrastructure. This kind of infrastructure cannot be established by the will or demand of just one or two shipping companies; it requires economies of scale through cooperation among shipping companies. When many domestic and international shipping companies express strong demand for biofuels to fuel producers and bunkering companies, large-scale infrastructure investments become feasible, and the benefits of these investments can be shared by all shipping companies. In this context, we hope that more shipping companies will be able to use biofuels.

Q. Thank you for your intention to promote the development of HMM by improving the collective benefits of the entire shipping industry. As a first mover with extensive experience in biofuels, what suggestions or advice would you give to shipping companies considering the use of biofuels?

A While biofuels are the focus of today's interview, we are considering various alternative fuels, including retrofitting existing ships. The key to selecting alternative fuels lies in how economically they can reduce greenhouse gases and how reliable the fuel supply can be secured. Especially regarding fuel supply, it is time to take immediate action. It is not desirable for large shipping companies to monopolize the alternative fuel supply chain for the continuous growth of the shipping industry. In this regard, joint response from shipping companies is crucial, and the later the participation, the more difficulties they may face in future fuel supply or technical issues.