

BANSIGHT

ISSUE 8 // FEBRUARY 2024

ALTERNATIVE FUELS - BIOFUELS

THE MODERN SHIPPING WORLD FACES UNPRECEDENTED CHALLENGES IN DECARBONISATION AND ACHIEVING NET-ZERO EMISSIONS.

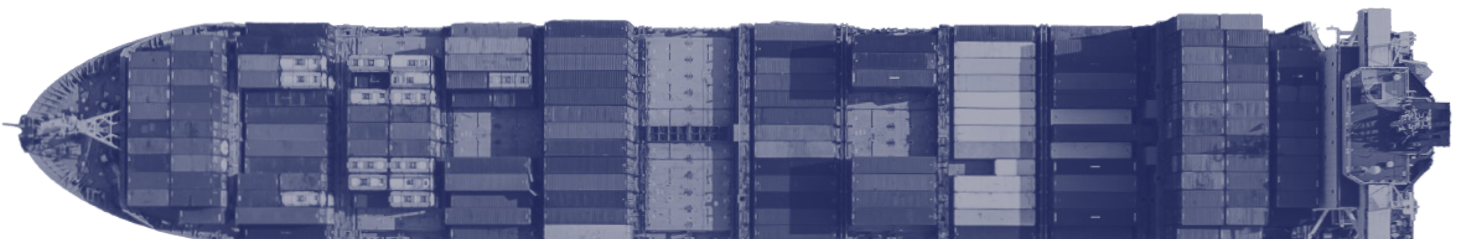
Decarbonising shipping is not only an environmental imperative but also an emerging area of innovation, reflecting the industry's shift towards alternative fuels.



OUR PARTNER FOR THIS ISSUE

Waves Group combines the expertise of Mwaves & Cwaves. They are completely independent Marine & Engineering Consultancy to the shipping and offshore energy industries for marine casualties, claims, disputes, litigation, platform decommissioning, renewable energy and other offshore projects.

Waves Group's philosophy is to deliver exceptional service to their clients at a competitive price. They are self-owned and have no third-party interests, therefore their only interest is in making sure that their clients receive the highest quality service. Waves Group provides technical support and advice with a 24/7 response service available for marine casualties, salvage, wreck removal projects and port damage claims Worldwide. They will always make cost savings where possible and minimise project risks.



LIQUEFIED NATURAL GAS (LNG) IS CURRENTLY TAKING THE LEAD AS A TRANSITIONAL FUEL; HOWEVER, SEVERAL ZERO-EMISSION FUELS SUCH AS METHANOL AND HYDROGEN ARE ALSO ON THE RISE.

It is uncertain which fuel will be the preferred choice of the future, and it is likely that a variety of alternative fuels will be required to meet future demand. Shipowners must conduct due diligence as part of their decision-making process, involving a comprehensive identification and risk assessment. This assessment requires consulting various stakeholders, including the engine maker, fuel supplier, classification society, H&M insurers and the ship's flag state.

KEY CONSIDERATIONS

1. SUITABILITY AND IMPACT ON THE ON BOARD ENGINES

Consult the engine maker to determine if the selected alternative fuel is suitable for on board engines or if retrofitting is required.

2. FUEL MANAGEMENT

Properly train the crew to handle alternative fuels, considering the operational hazards they may pose compared to fossil fuels.

3. HEALTH, SAFETY AND ENVIRONMENT (HSE)

While the alternative fuels may have their obvious environmental benefits, they may come with some increased safety risks. Therefore, any alternative fuel should be accompanied by a thorough assessment of its HSE risks, and this should form the basis of the on board safety measures for handling the fuel.

4. QUALITY

With the current lack of international standardisation, clear and detailed bunker specification needs to be developed by the shipowner to ensure suitable fuel is delivered.



Britannia's loss prevention department has teamed up with Waves Group to provide practical advice on the widely discussed alternative fuels: Biofuels, Liquefied Natural Gas, Methanol, Ammonia, and Hydrogen. The examination for each of these alternative fuel types will focus on good practices in storage, handling, bunkering, safety and emergency response.

In this guidance, we will focus on biofuels, specifically Fatty Acid Methyl Esters (FAME) and Hydrogenated Vegetable Oil (HVO). Biofuels offer benefits such as compatibility with many engines, requiring little modification, and the wide availability of certain types of biodiesels at competitive prices. However, the extent to which they reduce CO2 emissions is a subject of debate, given the variability in emissions along the supply chain. Additionally, sustainability issues, such as land use for palm oil production, may present challenges.





FATTY ACID METHYL ESTERS

FAME IS A FORM OF BIO DIESEL MADE FROM RENEWABLE FATS, OILS AND GREASES.

It is usually blended with a petroleum diesel fuel to make up a percentage of the fuel. A 100% biofuel or neat biofuel would be represented as B100 – 'B' For biofuel and 100 for the percentage. Most marine fuels will use a B7, but there is an increase in the market as higher percentage blends are being brought into use. Although it is widely used, it does present certain challenges when stored and used as a fuel on board a ship. Most blends below 20% are manageable but blends above this percentage level may require careful consideration when used on board a ship.

STORAGE

FAME is highly susceptible to oxidation and in neat condition, serves as an effective solvent. It also has a lower cloud point and increases in viscosity in cold conditions, leading to freezing or gelling. Therefore, it will be necessary to take the following precautions when using FAME:

1. **AVOID** storage duration of over 6 months to minimise the risk of oxidation
2. **IMPLEMENT** a fuel condition monitoring programme, periodically drawing samples sent to an onshore laboratory to ensure the fuels acid number and oxidation stability meet specification
3. **REGULARLY DRAIN** storage tanks to prevent microbial bacterial growth
4. **MAINTAIN** the fuel temperature at least 10°C above the pour point and store it in tanks located away from cold temperatures, potentially requiring the use of heating coils on board
5. **STORE** FAME only in clean tanks, as its solvency can result in deposits within the tank, which may then be present in filters and engine components

BUNKERING

FAME employs the same bunkering framework as diesel fuels. However, care must be taken during supply to ensure the fuel is not loaded into a tank containing non-compatible fuels.

HANDLING

When using FAME in higher concentrations, it is imperative to ensure compatibility with the engine, and at a minimum, the following steps should be taken:

1. Ensure a sufficient quantity of FAME is bunkered, considering its 14% lower calorific value compared to petroleum based fuel
2. Check with the engine manufacturer that the engines NOx compliance is not compromised due to operating parameters
3. Be aware that FAME fuel blends may cause damage to materials such as Teflon, Viton, fluorinated plastics and nylon, potentially contaminating and corroding fuel systems. Therefore, operators will have to ensure that the fuel system and any tank coatings can withstand the solubility used
4. Inspect, change or clean fuel filters as required
5. Drain water from the fuel tanks regularly
6. Prevent water ingress into the fuel
7. Flush the fuel system when not in use and conduct additional fuel filter services based on the blend percentage and feedstock used.

SAFETY

FAME is free of hazardous materials and is generally considered safe for use. If heated the vapours could irritate the mucous membranes and cause irritation, dizziness, eye irritation and nausea.

Prolonged or repeated contact is not known to cause significant skin irritation, and no hazards are expected from incidental ingestion. However, safety precautions and equipment for storing and handling FAME and diesel blends should be put in place. When handling the fuel blend, always wear personal protective equipment, including gloves, and wash exposed skin with soapy water.

Ensure the relevant Safety Data Sheet (SDS or MSDS) is reviewed for recommendations on safe handling, type of gloves, and related procedures before beginning work with FAME and biodiesel blends.

EMERGENCY RESPONSE

Personnel should approach a FAME or diesel blend fire with caution, using firefighting techniques similar to those for conventional diesel fuel fires. Suitable extinguishing equipment includes dry chemical foam, carbon dioxide, and water spray (fog). Avoid using a direct water jet when fighting a FAME fire.

HYDROGENATED VEGETABLE OIL

HYDROGENATED VEGETABLE OIL (HVO) SERVES AS A DIRECT REPLACEMENT FOR FOSSIL FUEL AS IT IS A HYDROTREATED VEGETABLE OIL, BUT IT CAN ALSO ENCOMPASS HYDROTREATED FATS, OILS AND GREASES. USING HVO DOES NOT TYPICALLY NECESSITATE ENGINE MODIFICATIONS.

STORAGE

HVO, being the closest to diesel, offers many advantages, the most prevalent being the long storage life of up to 10 years. As the hydrogenation process removes oxygen from the fuel there is a reduced risk of oxidation. It also does not absorb water and removes the risk of bacterial infestation of the fuel. To ensure optimal storage conditions:

- Maintain the temperature above -32°C
- Avoid heating above the flashpoint (approximately 61°C)

HANDLING

HVO adheres to the same standard as Diesel fuel ASTM and EN590, requiring:

- Regular dewatering of storage tanks
- The correct use of separators to minimise water ingress

BUNKERING

HVO uses the same framework as when bunkering diesel fuel.

SAFETY

HVO shares characteristics with diesel fuel, requiring protection against inhalation, skin and eye contact. Safety precautions and equipment for storing and handling HVO and diesel blends align with those for hydrocarbon-based

diesel fuels. Personal protective equipment including gloves should always be worn and skin that is inadvertently exposed to fuel should be washed with soapy water. The relevant Safety Data Sheet (SDS or MSDS) should also be reviewed for recommendations on safe handling, type of gloves, and related procedures before beginning work with HVO.

EMERGENCY RESPONSE

Approach an HVO fire with caution, employing firefighting techniques similar to those for conventional diesel fires. Suitable extinguishing equipment includes dry chemical foam, carbon dioxide, and water spray (fog). Avoid using a direct water jet when fighting an HVO fire.

For further considerations on risks associated with alternative fuels please see our [guidance on decarbonisation](#).

For further information, please do not hesitate to email lossprevention@tindallriley.com.



DISCLAIMER

This Loss Prevention Insight report is published by THE BRITANNIA STEAM SHIP INSURANCE ASSOCIATION EUROPE (the Association). Whilst the information is believed to be correct at the date of publication, the Association cannot, and does not, assume any responsibility for the completeness or accuracy of that information. The content of this publication does not constitute legal advice and Members should always contact the Association for specific advice on a particular matter.