

Being prepared for the '2020 Sulphur cap'!

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The implementation of the 'Global 0,50 % m/m Sulphur cap', as described in article 14 of the Marpol¹ Annex VI, is very close. From 1st January 2020, the restriction of the maximum Sulphur content in ships' fuels will come into force worldwide. The 70th MEPC² indicates that it is not likely to be postponed. The enforcement of this requirement represents a considerable tightening of the maximum of 3,5% m/m since 2012. Moreover, it will be in addition to other strict air emission requirements that are already applicable. This article considers possible technical provisions on board to meet these requirements and how simulator-based training can contribute to raising the awareness, knowledge and technical skills of marine engineers and other experts.

Alternatives to comply with the sulphur emission requirements are:

1. measures at the source by using a low sulphur fuel in liquid form such as MDO/MGO³, or in gaseous form such as LNG⁴; and
2. measures at the end through the application of scrubbers, the so called 'end of tail' solution.

MDO/MGO

There is still a two-year period to go in which the 0,5% m/m requirement will apply in Emission Control Areas (ECAs), meaning in daily practice that within ECAs a changeover must take place from HFO⁵ to MDO/MGO.

To get the correct viscosity, HFO needs to be heated, whereas MDO/MGO does not. During changeover from HFO to MDO/MGO it is important to cool down slowly while maintaining a minimum viscosity at the same time.

Cooling down too quickly can cause fuel pumps to get stuck. On the other hand, if the engine cools down too slowly, the viscosity may become too low or the light fuel may start to gas. The changeover of fuel therefore requires attention because loss of engine power must be prevented at all times. There are automatic systems that can provide a proper fuel changeover, but if something goes wrong, engineers should be able to change fuel in a safe way manually. Simulators are pre-eminently a means to become competent in this, but also allow experimentation with such systems, including the measurement and control equipment.

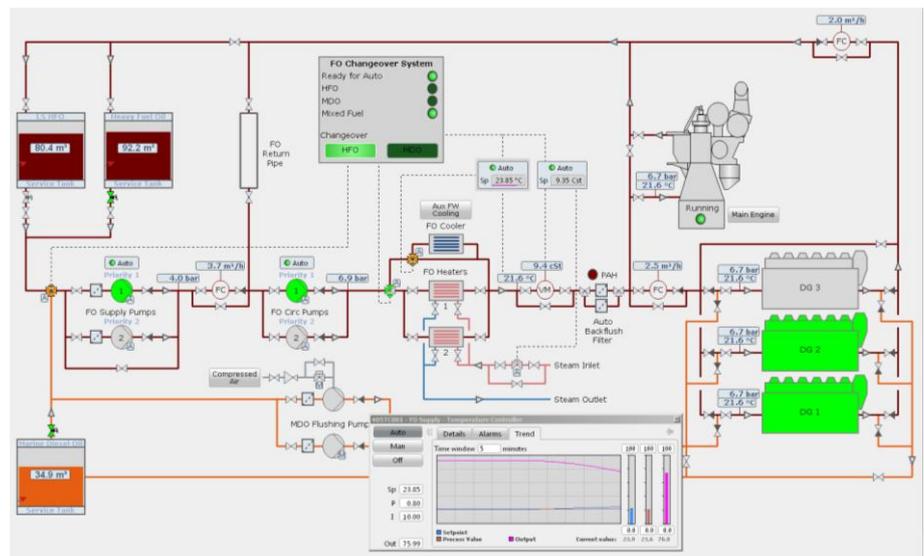


Figure 1: System for fuel changeover.

¹ MARPOL: International Convention for the Prevention of Pollution From Ships.

² MEPC: Marine Environment Protection Committee, a branch of International Maritime Organization (IMO).

³ MDO: Marine Diesel Oil, a distillate fuel with a low sulphur content. MGO: Marine Gas Oil, a light distillate fuel with a sulphur content of 0,1 % m/m.

⁴ LNG: Liquefied Natural Gas.

⁵ HFO: Heavy Fuel Oil, a heavy residual fuel with a maximum sulphur content of 3,5 % m/m.

LNG

For merely new ships LNG is expected to become more popular as fuel, especially now that there are more and more bunker locations in the world. Gas engines or 'dual fuel' engines, both four-stroke and even two-stroke engines are already being operational. On 1 January 2017, the IGF Code⁶ became into force. The Code contains requirements regarding the training of personnel, something that has also been made obligatory since 1 January 2017 via the STCW⁷ Code. For such training SIMWAVE has an engine room simulator model, with a 'dual fuel' diesel-electric propulsion plant.

Scrubbers (and SCR⁸)

To meet the sulphur emission requirements, ships may use techniques approved by the Flag State to clean the exhaust gases instead of using low-sulphur fuel.

One of those end of tail techniques is a SO_x scrubber with which the exhaust gases can be 'washed' clean. Different principles can be distinguished, the so-called wet and dry systems.

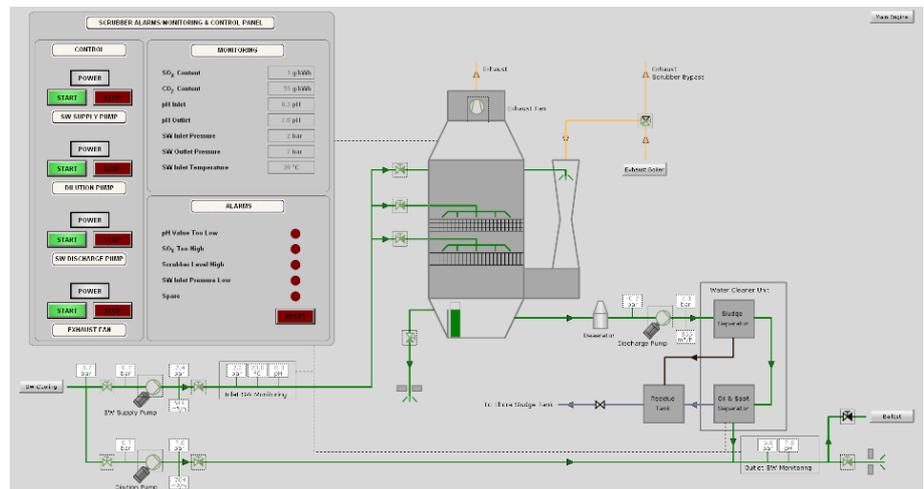


Figure 2: SO_x Scrubber system.

For example, the wet systems all consist of: a scrubber, often installed at a high place in the engine room; a treatment plant to purify the washing water, and a sludge treatment installation. The engine room simulator of SIMWAVE includes a model of a ship with such a scrubber system, with which the start-up and operations can be trained. Moreover, there is a model available with an SCR installation in which the nitrogen oxides (NO_x) are converted into nitrogen and water.

Simulation

A simulator is pre-eminently the tool to practice with theory and to experiment in an environment similar to being on board. Mistakes can be made and experiences can be evaluated and rehearsed. It is proven that learning is most effective when theory can be applied in practice. This is particularly so if there is a risk of damage when drills are conducted onboard.

Summary

To meet current and future environmental requirements, more and more technical installations are being placed on board ships. It requires insight and skills from the engineers to operate these plants. SIMWAVE can provide this with bespoke training in which in-depth knowledge of prevailing legislation and regulations, as well as technical knowledge is combined with skills in a realistic engine room environment. In short, SIMWAVE offers an excellent programme to properly prepare marine engineers for the '2020 Sulphur cap'.

For more information, please call 00 31 (0)10 310 76 00.

⁶ IGF Code: International Gas Code, with obligations regarding fuels with a low flashpoint, such as LNG.

⁷ STCW: The International Convention on Standards of Training, Certification and Watchkeeping.

⁸ SCR: Selective Catalytic Reduction.