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Two-Stroke ME-GIE Engine Running on LNG and VOC

The Mitsui-MAN B&W 7G50ME-C9.5-GIE engine originally designed for combustion of ethane gas can also run on a mixture of LNG and volatile organic compounds (VOC) without affecting the gas mode efficiency. It has been found that the mixture can contain as much as 50% VOC.

The ME-GIE engine fully exploits the benefits of the diesel-type combustion which allows operation on almost any gas quality without efficiency reductions.

The design of a fuel gas supply system for the ME-GIE engine is shown below.

The opportunities in the development of this engine are numerous since the engine may run on VOC of various origin. It could be light hydrocarbons or VOC, i.e. methane, ethane, propane, i-butane, n-butane, i-pentane, n-pentane and n-hexane, emitted from crude oil when loading or unloading and during storage of the crude oil.

The amount of VOC emitted depends on the vessel's tank design, ambient conditions and sailing schedule. To control the cargo tank pressure, VOC is often discharged to the atmosphere, where the non-methane part reacts with nitrogen oxide in the presence of light and creates ozone and smog.

The burning of VOC opens for new applications of the engine, for example for shuttle tankers, for power generation in remote power plants or for off-shore applications, such as floating production storage and offloading vessels (FPSO), where VOC is abundant and poses a potential environmental hazard.

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