1

Hybrid tender propulsion

Sophisticated powertrain design suits the operational profile of a diesel-electric tender

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German shipyard Fassmer has built the world's first cruise tender powered by a diesel-electric hybrid propulsion system, constructing the vessel at its site in Berne, Germany. The PLL 1099 is a combined tender and lifeboat that is able to carry 114 people during tender operations. The first sea trials have been completed successfully, and the boat will be delivered in April 2021.

While in electric mode, the tender does not produce any polluting emissions, and offers quiet, smooth operation due to the elimination of engine noise and the reduction in vibration. Passengers on board can now enjoy higher levels of comfort.

The powertrain design couples a traditional diesel engine with Transfluid's hybrid HTM700-20W, which also includes an in-house-developed gearbox for a perfectly integrated system. This configuration obtained the first type approval given by DNV GL to a hybrid system.

The hybrid propulsion offers three operation modes: diesel (lifeboat operation, transit); diesel and electric drive (boost mode, increased speed); and electric, with no engine noise, no air pollution and reduced vibration (tender operations, shore operations, boarding).

In addition to these modes, the system offers regeneration mode, available in cruising and steady conditions. Here, diesel power is used to recharge the batteries, with the electric machine working as a powerful generator. This makes it possible for the tender to operate largely independently from its charging point - suited to its main, 'taxi' operation profile, which has limited access to shore power.

2

1. The Fassmer PLL 1099 tender utilizes Transfluid's HTM700-20W technology

2. The system design also calls for Transfluid's $LiFePO_4$ battery pack

Safety first

Transfluid's $LiFePO_4$ battery pack, with proprietary DNV GL type approval and NMA Test 1 Extension, offers the highest available safety levels in marine industry energy storage. With a total of almost 40kWh energy stored on board the vessel, the tender can achieve a continuous full-electric range of 1.5 hours of operation at cruising speed around 6kts.

Due to its lifeboat functions, the Fassmer tender also demanded a focus on reliability and safety. For this reason, the parallel hybrid system by Transfluid was an obvious choice. The architecture of the hybrid module makes it possible to have a double propulsion system for each shaftline, while each powertrain has a 'Come Home' independent safety protocol that grants the vessel full redundancy for the entire propulsion control system.