



Reference report: Luxury yacht Adler Suprema

The Adler Suprema is a unique yacht. Constructed by engineers from the automotive, aerospace, and marine industries, it combines a sophisticated design and state-of-the-art technology.

The project

The design comes from NUVOLARI LENARD. Built in Monfalcone, Italy and equipped with a state-of-the-art drive system, the 23-meter-long yacht sets new standards in shipbuilding. Manufactured with a lightweight carbon construction, the luxury yacht achieves a top speed of 30 knots (56 km/h). It provides space for six to nine passengers as well as a two-person crew, and it has a maximum range of around 6480 kilometers. The complete ship was designed and built within three years.

The hybrid drive was thoroughly tested under realistic environmental conditions on a test bench a year and a half before installation. In an interdisciplinary effort, ARADEx supplied inverters and motors for the drive, the on-board and land system, as well as the knowhow for integration and commissioning, under the lead management of AVCON.

The drive

The drive train has a duplicate structure, each part consisting of a Caterpillar ship's engine with 1150 HP, an asynchronous motor with a peak power of 260 kW (350 HP), two clutches, one gear, and the ship's propeller (see diagram 1). Since the combustion engine and electric motor work on a single axis, this is referred to as a parallel hybrid. As an energy storage medium, there is also a battery with a total capacity of 170 kWh on board as well. Different operating modes are distinguished:

- + **Port mode:** Operates electrically; the speed is up to 11 knots
- + **Hybrid mode:** Is divided into single-diesel and dual-diesel mode.
- + **Battery mode:** The electric motors work as generators and charge the battery.
- + **Boost mode:** The combustion engines and electric motors work together.

The challenge

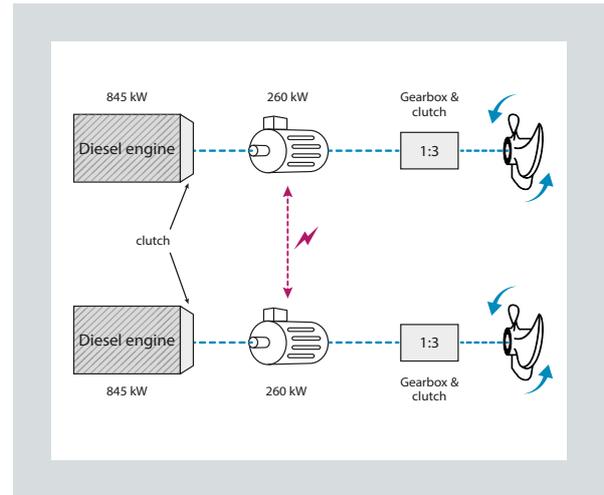
Electric ship drives use a DC link that normally carries several hundred amperes. In the case of fast load changes, however, voltage peaks can interfere with the system. An VECTONUM XS control from ARADEX is therefore used to keep the voltage stable at 650 V. If the voltage decreases, more energy is fed and the power drain is restricted. If the voltage increases sharply, the generators are slowed down. Since the on-board system is supplied by the DC link, the DC link must always function faultlessly.

The DC/DC converters for the battery connection to the DC link are also remarkable. They effectively protect the batteries against voltage ripples and surge voltages and increase the service life. In addition, charging and discharging currents can be optimally adapted to the battery type.

The drive of the Adler Suprema has been optimized for efficiency, low fuel consumption, and whisper-quiet operation. We are happy every time that a yacht leaves the Adler shipyard and sails to beautiful places around the world.

Highlights

- + Hybrid ship with battery system for environmentally compatible operation
- + Unique carbon design
- + Low fuel consumption and quiet when in purely electric mode
- + Coordinated components with a high efficiency
- + Boost mode for maximum acceleration



Sketch 1: Schematic representation of the drive system.



Interested? Give us a call!

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