Contribution ID: **183** Type: **not specified**

Hybrid system design and performance basing on actual vessel operational data

Thursday, 21 June 2018 09:45 (15 minutes)

The recent trend of marine industry towards more efficient and versatile ships and lower emission has increased the interest in hybrid solutions.
However, the spread of this technology has been limited by several factors both economical and technical.
Among these, a recurrent issue is the sizing of Energy Storage System (ESS) which is strictly connected to the vessel's typology, its operation and its control system .
This paper presents an algorithm, developed within Wärtsilä Italia spa, for the extraction of sequential operating modes
from data recorded on board of vessel, in order to properly design a feasible ESS.
The paper shows a technical economic analysis carried on a small cruise vessel in order to identify competitive hybrid solutions
compared to traditional configurations (engines running on conventional fuel or Liquid Natural Gas).
Finally the paper compares two case studies of a small vessel powered only by fuel cells (in place of conventional engines) and batteries, in order to prove the potential benefits
derived from such innovative technologies with different operational profiles, also in hybrid mode.

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Session Classification: Machinery and Systems Design

Track Classification: Environment protection, electric system and ship energy efficiency