NUMERICAL MODELING OF MAGNETO ELECTRIC CO-GENERATOR PLANT FOR SUSTAINABLE MARINE VESSEL POWER SYSTEM

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Abstract: The number of vessel around the world continued to increase yearly to fill the world trade demand. Consequently, the fuel usage increase due to increasing requirement for propulsion and electricity. Generator is the heart of a vessel that supplies electricity to most ship`s components. This study involves how to reduce the usage of generator in ship's operations. The Magneto Electric Co-generator Plant (MECP) is the combination of some equipment, electronic, circuit and recycling the shaft rotational energy for additional electrical distribution. MECP proposed to be installed at propeller shaft and main engine flywheel of UMT vessel. The regeneration system can supply electricity to auxiliaries' component of ship machineries. The total produced energy by MECP is computed by modeling numerically. Cost saved yearly is estimated based on the power produced and fuel cost. In this study, the possibility of the co-generator plant to be used for vessel is determined by considering the efficiency and cost saving. Cost saved is compared with initial installation cost in order to determine the cost beneficial. The MEPC produced 3.74 KW of power that can be used to supply the ship auxiliaries. It saved 1054 liters diesel per hour and RM 2.62 per hour in general operation cost. Major advantage included in this system is its environmental benefit because it reduces the amount of carbon dioxide footage approximated to 4.13 kg of CO2 per hour that could be emitted to atmosphere. The system could help in commitment maritime industry to climate change compliance.

Keyword: Numerical modeling, magneto electric, co-generator, Discovery 2, vessel power

AN HF RADAR OBSERVING SYSTEM FOR MONITORING THE SURFACE CIRCULATION IN THE STRAIT OF GIBRALTAR. DEPLOYEMENT AND FIRST RESULTS

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High Frequency (HF) coastal-based Radar is an unique technology to monitor, in real time, 2D surface currents and waves in the coastal areas. The Straits of Gibraltar, in particular, is an oceanographic region with unmatched confluence of important commerce, security, and oceanographic processes. The geographic scale of the Straits also are well matched to the remote sensing capabilities of a network of shorebased HF radar systems.

Initiated in the framework of the research project entitled "Analysis of the surface currents regime in the Strait of Gibraltar using a coastal-based HF radar system", funded by the Junta de Andalucia under the 'Proyectos de Excelencia' 2009 program, and now part of the TRADE project, two HF Radar stations operating at a central frequency of 24.8 MHz and a bandwidth of 150KHz, were deployed to monitor the circulation of the eastern area of the Strait of Gibraltar. One station has been deployed at Punta Carnero Lighthouse, at the southern entrance of the Bay of Algeciras, and the second station was located at the Ceuta Harbour, at the southern side of the Strait of Gibraltar. In this talk, the deployement and main characteristics of the radars (spatial resolution of the measured current fields, etc.) will be explained in detail. Moreover, a first preliminary study of the surface current fields obtained is also presented (Fig. 1), showing the great utility of this remote measuring surface current technology for different fields, ranging from physcial oceanography research to oil-spill and Search and Rescue applications.

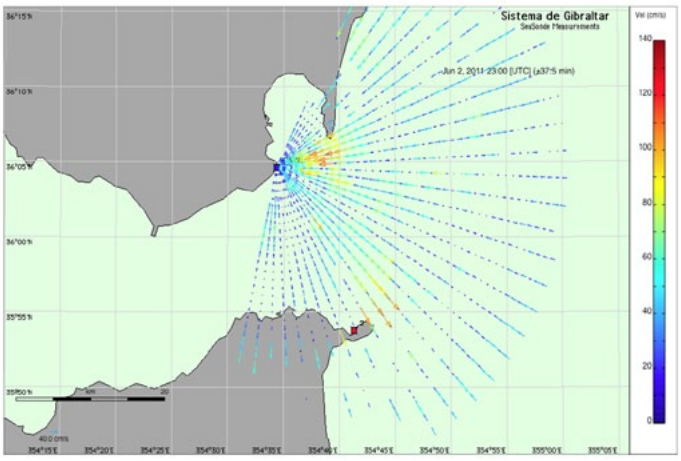

Fig. 1: Radial Velocities from HF Radar Station at Punta Carnero