



METRO PROJECT

3rd NEWSLETTER - December 2020

Presentation of METRO project in Poreč, Istria

On Saturday, September 19, 2020, IDA employees participated in the 11th Session of the Coordination of County Youth Councils of the Republic of Croatia, which was held at the Istrian Parliament in Poreč.

Representatives of the Istrian Development Agency held a presentation on "Economy and Youth in Istria County" and presented the results of 20 years of work of the Istrian Development Agency with emphasis on development programs and projects, which IDA implements with the financial support of EU funds.



Through the presentation, current projects implemented by IDA were presented with special emphasis on METRO project.



IDA's employees presented pilot activities which will be done in Region of Istria within METRO project – installation of interactive totems (screens) on 3 locations in istrian harbours.



Charging stations and peer infrastructure

University of Trieste, Faculty of Maritime studies from Rijeka and Port Network Authority of the Eastern Adriatic Sea were made a report on Charging stations and peer infrastructure within the METRO project. The report goal was to provide a general insight about the technologies available for introducing charging stations in existing port infrastructure, and then to define a methodology to design the overall system by correctly integrating all the available elements. Such a goal has been reached by means of the several Sections of the report, whose main contribution can be summarized as follows:

- Section 2 presented the port infrastructure of the ports in study, considering in particular their electrical power system actual state and its possible future modifications. Specific attention is given to the Brestova and Porozina ports, since they are the ports of the Case Study route. However, also the port of Trieste has been briefly examined, because it is expected to include a more detailed study about this port in the final deliverables at the end of the project.
- Section 3 presents the actual high and low power shore connection apparatuses. These can be used, as they are or by taking their base technology and modifying it, to interface the ship to the port infrastructure, for recharging the onboard energy storage systems and achieve an improved environmental friendliness for the entire route.
- In Section 4 the energy storage systems topic is addressed. Specifically, the most significant energy storage technologies applicable to the study case are presented with their pros and cons, and a brief comparison among them is made. Then, the power converters usable for interfacing the energy storage systems to the electrical power system are presented, as well as a collection of existing examples of integration of energy storage systems in the power grid.

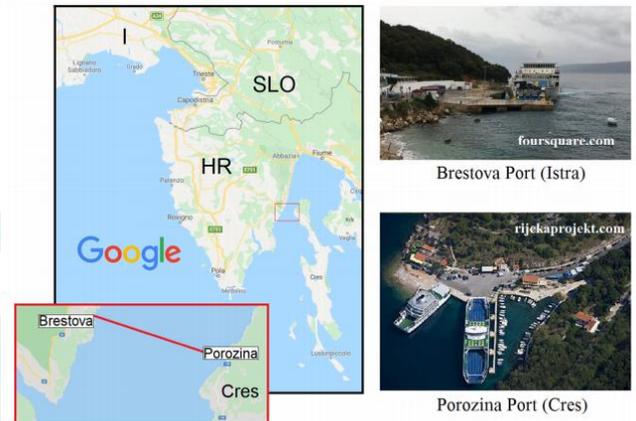


Figure 1 - Brestova-Porozina round trip (Istra-Cres, Croatia) [1].

- Section 5 provides an overview about the power quality issues that can arise for the power system when power converters are introduced.

The proposed methodology takes into account several different inputs to provide an integrated design of the overall infrastructure, with the aim of maximizing the effectiveness of the ship recharge and reduce as much as possible its environmental footprint. Remarks about the impact on the port in terms of available spaces and costs, and about the most suitable energy storage technology are also made, by considering the two possible solutions developed for the case study: a low power low voltage shore connection, and a high power medium voltage one.

In general, the results of the study remark the need of designing, analyzing, and comparing the system as a whole (ship design + ship operation + shore connection technology + port electrical infrastructure), in order to have the correct amount of information to choose the best solution for the specific application. This also demonstrate why actions aimed at decreasing the environmental footprint of a transportation mean cannot be successful if they don't take into account the overall system where such transportation mean is to be used and integrated. Thus, such a conclusion highlights the strength of the inclusive approach promoted by this research project.



The METRO project was presented at the 24th Symposium on the Theory and Practice of Shipbuilding – SORTA 2020

On October 15 and 16, 2020, the Faculty of Engineering, University of Rijeka has organized the 24th Symposium on the Theory and Practice of Shipbuilding - in memoriam prof. Leopold Sorta. This 24th Symposium (the first was held in 1974) testifies to the continuous presence of the shipbuilding profession and science in Croatia, and the goal was to promote the existing educational, scientific, research and development capacities of Croatian shipbuilding, which are ready to participate, both now and in future, in the evolution of the shipbuilding profession and everything related to it, and finally the progress of the Croatian economy.

Croatia and beyond, the COVID-19 pandemic, which prevented participants from meeting directly due to uncertainty regarding travel restrictions, physical distance and other epidemiological measures. In order to adapt to the current situation, the Symposium was held entirely in an “online” environment.

Within a framework of the METRO project, the paper titled “An Overview of Measures for Improving the Energy Performance of Ships”, was presented at the Symposium. The authors are L. Novak, D. Majnarić and R. Dejhalla, all from the Faculty of Engineering in Rijeka. This paper provides an overview of measures that ship designers and shipbuilders have at their disposal in order to increase the energy performance of the ship. The primary goal is to maximize the energy efficiency of ships, i.e. to reduce the carbon emissions to a minimum. In this regard, within the project activity “Hull modelling and design”, the paper focuses on some of these opportunities, some of which are regulated by mandatory regulations and rules, while other are applied on a voluntary basis. Increasing the energy efficiency of a ship is one of the steps towards creating “greener” shipping sector. Some of these measures were implemented in the design of new hybrid

vessels within the project METRO. Paper is available online in the web edition of the Book of Proceedings.



24th Symposium on the Theory and Practice of Shipbuilding
(in memoriam prof. Leopold Sorta)
with International participation



15.10.-16.10.2020. – **online event**
in the organization of the University of Rijeka - Faculty of Engineering

SORTA2020 web page: <https://indico.riteh.hr/event/2/>



Sveučilište u Rijeci
TEHNIČKI FAKULTET

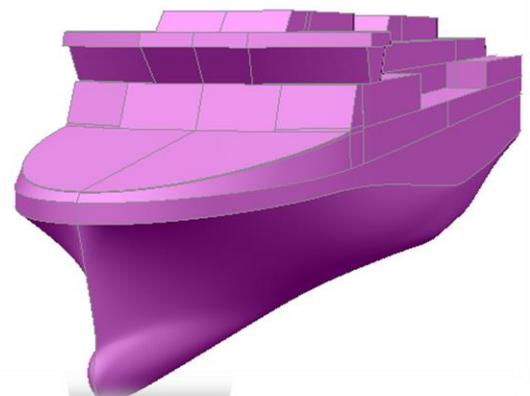
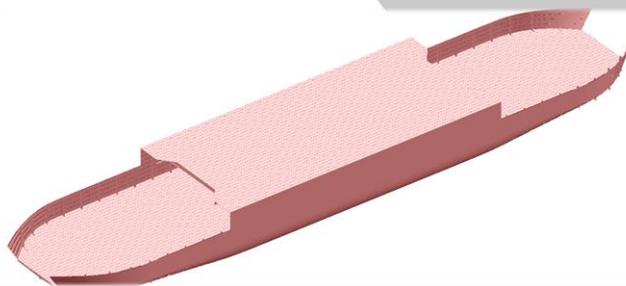
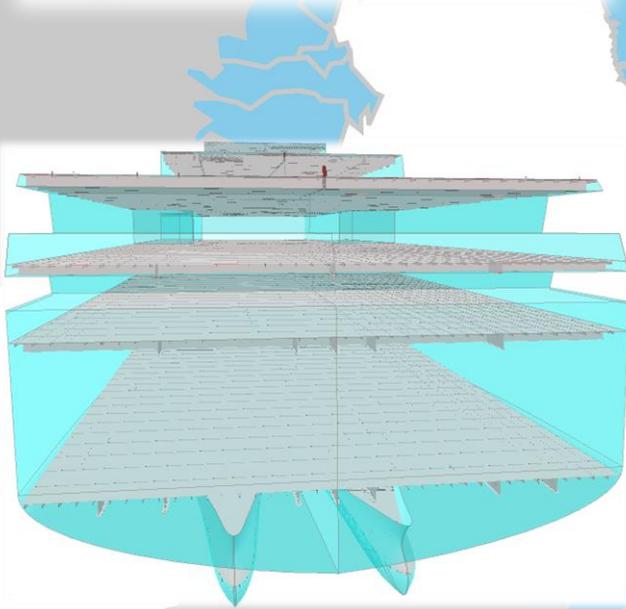
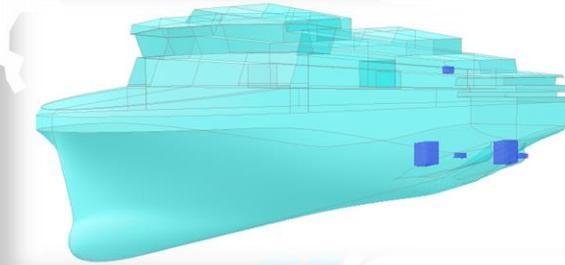
This year's symposium coincided with a period of change for the entire shipbuilding community in



University of Trieste is creating the virtual prototypes of the two ships studied in Metro project

Within the activities foreseen in the Work package 3 of METRO project, UNITS (University of Trieste) is creating the virtual prototypes of the two ships studied in Metro. In particular, starting from the design documentation elaborated by the partners, UNITS using leading edge design technologies is developing the parametric technical models of both the double-ended ferry and the ro-ro pax.

At present most of the structures have been modeled. Thanks to this work, in the next future it will be possible to virtually navigate inside METRO ships and check the data about the main machinery of the ships. In the figures it is possible to see the actual state of advancement of the 3D modeling activity.





Passenger ferry with diesel – electric battery hybrid propulsion, designed to carry 600 passengers and 170 cars

Tehnomont shipyard in cooperation with other partners and with company *Flow Ship Design* has published a new rendering of a ropax ferry which has been designed within METRO project.



Characteristics of the hybrid ropax:
Short international routes in Adriatic Sea (Italy-Croatia/Ancona-Split):

- Passengers: 1,340
- Crew: 75
- Cruising speed: 15.5 knots.
- Fully enclosed Main hold capacity of 630 lane meter or 2020 m²,
- In addition hoistable car deck with parking area of 1865 m²,
- Stern and bow ramps
- Twin screw, twin rudder, twin dual fuel engines driven with abt.
- 400 m³ LNG storage tanks,
- Two shaft generators (PTO/PTI) coupled with battery system with abt. 5 MWh capacity to cover entire range of electric power demand.





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