

Hull modeling and design

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Scope of the work

The scope of this document is to collect all the studies, results, and other materials that concern the WP3 – Act. 3.2 “Hull modeling and design” task.

Attachments

Double ended ferry

METRO-Double ended Ferry-Outline specification_REV2

The outline specification document provides the technical description of the double ended ferry. It includes general ship information, description of the hull, equipment for cargo, ship equipment, equipment for the crew and passengers, Machinery main components and related systems as well as other ship systems.

METRO-DoubleEndedFerry-1101302-REV2-GAP

The general arrangement plan graphically represents the overall composition of the double ended ferry, including relevant sections, plans and projections. Principally, it represents volumes, spaces, compartments, bulkheads, hull forms, decks and main equipment as well as the allocation of volumes for all the crucial functions/operations, correctly synchronized for position and access. The well-organized operation of a ship depends upon the proper arrangement of each individual volume/space and the most efficient interrelationships among all compartments.

METRO-DoubleEndedFerry-ER GA-REV1

The engine room general arrangement plan graphically represents the overall composition of the engine room and spaces for double ended ferry’s equipment, including relevant sections, plans and projections. Principally, it represents volumes, spaces, compartments, decks, platforms and main equipment as well as the allocation of volumes for all the crucial machinery main components and systems.

METRO-DoubleEndedFerry-1101307-REV1-Capacity plan-concept

The capacity plan graphically represents the overall composition of the double ended ferry's structural tanks including relevant information (Volume, center of gravity), as well as ro-ro cargo typical layout.

METRO-Double ended Ferry-Power-speed estimation_REV1

The Power speed estimation document provides the results of the double ended ferry power requirement calculation for the design speed. The results are used to select the ships main machinery components such as thruster(s), main engine(s), genset(s), battery pack and other propulsion equipment.

METRO-Double ended Ferry-Weight estimation_REV2

The weight estimation document provides the results of the double ended ferry's items weight and center of gravity calculation. The results are used to for the hull body lines design and optimization as well as ships stability calculations. The first weight and center of gravity estimation is done early in the design stage and is updated as the design evolves.

METRO-DoubleEndedFerry-1101301-REV2-Body Lines

The body lines drawing is representing the hull shape, as a result of several loops in the design process, considering ship light weight, deadweight, power-speed calculation results, general arrangement, etc.

METRO-double ended ferry-1200301-REV1-Midship section preliminary

The Midship section drawing is representing double ended ferry's structure arrangement and scantlings. It is used as a base for the design of the ship structure. Further, it is used as input for the ships weight and centre of gravity estimation.

METRO-Double ended Ferry-Energy Requirements Analysis_REV1

The purpose of this document is to present the energy requirements for the double ended ferry. The vessel's energy requirements calculation is based on the electrical load balance calculation, power-speed estimation, and operating profile (speed profile) of similar vessels on the planned route.

The calculations of required energy, battery sizing and shore connection electrical power is based on the machinery layout, design speed, operational profile (maneuvering, mooring, port operations, sailing)

METRO-Double ended Ferry-Cargo hold ventilation calculation - REV1

The purpose of this document is to deliver preliminary requirements for the Cargo hold ventilation system where cargo space arrangement, ventilation system layouts (structural air ducts, equipment, etc.) are considered.

METRO-Double ended Ferry-TRIM & STABILITY BOOK_REV1

A trim and stability booklet is a stability manual which contains information to enable the Master to operate the ship in compliance with the applicable requirements contained in the Rules. Generally, it contains hydrostatic data, stability and trim characteristics, and information on longitudinal strength for various conditions of loading.

METRO-Double ended Ferry-SUBDIVISION AND DAMAGE STABILITY_REV1

The Subdivision and damage stability document represents the results of the damage stability calculation according to prescriptive rules and regulations. Further, it includes the description of the input data such as arrangement and permeabilities, compartments limits and connections data, subdivision data, buoyant hull, relevant openings and initial conditions.

METRO-Double ended Ferry-flyer

The flyer presents the main characteristics of the double ended ferry, including 3D visualization. It is delivered in a standard form of paper (A4) intended for project dissemination activities and wide distribution.

Deliverable_3.2_Database_DE_Ferry_final

This document represents an analysis of the basic parameters of double ended ferries. Extensive database was created encompassing a large number of ferries that operate in Europe. The established database serves as guidelines for the design of a new double ended ferry.

Deliverable_3.2_Double ended ferry structural model_final

This document shows the preparation of the 3D geometric model of the entire double-ended ferry, including the complete superstructure. The 3D model is intended for the analyses of the double-ended ferry hull structure. In this first phase, a special attention was paid to details that should facilitate or simplify, as much as possible, the next phase, which is the creation of a mesh of finite elements in the process of discretization of the structure of the ferry.

SLD Ferry

The document shows the single line diagram of the Ferry, representing the vessel's main switchboards and machinery.

RoPax

ROPAX-METRO-Outline-REV2

The outline specification document provides the technical description of the RoPax. It includes general ship information, description of the hull, equipment for cargo, ship equipment, equipment for the crew and passengers, Machinery main components and related systems as well as other ship systems.

ROPAX-METRO-GAP-REV2

The general arrangement plan graphically represents the overall composition of the RoPax, including relevant sections, plans and projections. Principally, it represents volumes, spaces, compartments, bulkheads, hull forms, decks and main equipment as well as the allocation of volumes for all the crucial functions/operations, correctly synchronized for position and access. The well-organized operation of a ship depends upon the proper arrangement of each individual volume/space and the most efficient interrelationships among all compartments.

ROPAX-METRO-ER-REV2

The engine room general arrangement plan graphically represents the overall composition of the engine room and spaces for ships equipment, including relevant sections, plans and projections. Principally, it represents volumes, spaces, compartments, decks, platforms and main equipment as well as the allocation of volumes for all the crucial machinery main components and systems.

METRO-Ropax-CAP-concept-REV1

The capacity plan graphically represents the overall composition of the RoPax's structural tanks including relevant information (Volume, center of gravity), as well as ro-ro cargo typical layout.

METRO-RO-Pax-Power-speed estimation_REV1

The Power speed estimation document provides the results of the RoPax power requirement calculation for the design speed. The results are used to select the ships main machinery components such as thruster(s), main engine(s), genset(s), battery pack and other propulsion equipment.

METRO-Ropax-Weight estimation_REV2

The weight estimation document provides the results of the ships items weight and center of gravity calculation. The results are used to for the hull body lines design and optimization as well as ships stability calculations. The first weight and center of gravity estimation is done early in the design stage and is updated as the design evolves.

METRO-RO-PAX-1101301-REV2-Body Lines

The body lines drawing is representing the hull shape, as a result of several loops in the design process, considering ship light weight, deadweight, power-speed calculation results, general arrangement, etc.

METRO-RO-PAX-1200301-REV2-Midship section preliminary

The Midship section drawing is representing RoPax's structure arrangement and scantlings. It is used as a base for the design of the ship structure. Further, it is used as input for the ships weight and centre of gravity estimation.

METRO-Ropax-Range_REV1

The purpose of this document is to present the sailing range and fuel capacity estimation for RoPax passenger vessel. The document is divided in two main parts, the estimation of sailing range using the LNG and MDO/MGO as primary fuel, respectively. The consumption of pilot fuel is also considered, during gas mode in dual fuel engines.

METRO-ROPax-Electric Load Balance_REV1

The purpose of this document is to present the electrical load requirements for the RoPax in different operating modes for all the main consumers on board the vessel.

METRO-RO-PAX-Cargo hold ventilation calculation - REV1

The purpose of this document is to deliver preliminary requirements for the Cargo hold ventilation system where cargo space arrangement, ventilation system layouts (structural air ducts, equipment, etc.) are considered.

METRO-Ropax-TRIM & STABILITY BOOK_REV1

A trim and stability booklet is a stability manual which contains information to enable the Master to operate the ship in compliance with the applicable requirements contained in the Rules. Generally, It contains hydrostatic data, stability and trim characteristics, and information on longitudinal strength for various conditions of loading.

METRO-RoPax-SUBDIVISION AND DAMAGE STABILITY_REV1

The Subdivision and damage stability document represents the results of the damage stability calculation according to prescriptive rules and regulations. Further, it includes the description of the input data such as arrangement and permeabilities, compartments limits and connections data, subdivision data, buoyant hull, relevant openings and initial conditions.

METRO-Ropax-flyer

The flyer presents the main characteristics of the RoPax, including 3D visualization. It is delivered in a standard form of paper (A4) intended for project dissemination activities and wide distribution.

Deliverable_3.2_Database_Ro_Pax_final

This document represents an analysis of the basic parameters of Ro-Pax ferries. Extensive database was created encompassing a large number of ferries that operate in Europe. The established database serves as guidelines for the design of a new Ro-Pax ferry.

Deliverable_3.2_Ro-Pax ferry structural model_final

This document shows the preparation of the 3D geometric model of the entire Ro-Pax ferry, including the complete superstructure. The 3D model is intended for the analyses of the Ro-Pax ferry hull structure. In this first phase, a special attention was paid to details that should facilitate or simplify, as much as possible, the next phase, which is the creation of a mesh of finite elements in the process of discretization of the structure of the ferry.

SLD RoPax

The document shows the single line diagram of the RoPax, representing the vessel's main switchboards and machinery.