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Ro-Pax Ship for Service between Marseille and Corsica

Professional paper

The paper presents a design of the ro-pax ship for service between Marseille and Bastia on Corsica. The ship will be built by *Brodosplit Shipyard* for the French company *CMN*, and the ship delivery is scheduled for 2011. With 2484 lane metres on three trailer decks and a deck for 200 passenger cars, the vessel will have a higher cargo capacity than the existing ro-pax ships on the same route. The superstructure for the accommodation of 750 passengers will have the comfort level increased to the cruise-ferry style. The vessel will have a high operational speed and will be in compliance with the latest safety standards.

Keywords: *Marseille-Corsica, ro-pax, ship design.*

Ro-Pax brod za plovību između Marseillea i Korzike

Stručni rad

Članak donosi prikaz projekta ro-pax broda za plovību između luka Marseille i Bastia na Korzici. Brod se gradi u brodogradilištu *Brodosplit*, a isporuka je predviđena u 2011. godini. Sa 2484 metara duljine voznih traka na tri palube za kamione i palubom za 200 osobnih automobila, brod će imati veći teretni kapacitet od svih postojećih ro-pax brodova na istoj liniji plovību. Nadgrađe za 750 putnika imat će razinu komfora sličnu brodovima za kružna putovanja. Brod će postizati veliku putnu brzinu i ispunjavati najnovije sigurnosne standarde.

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1 Introduction

Brodosplit Shipyard signed in 2008 the contract with the French company *CMN (Compagnie Meridionale de Navigation)* for building one ro-pax ship with the delivery expected in the year 2011.

The vessel is a ro-ro passenger vessel intended to operate on short international voyages as a passenger ship and on extended international voyages as a cargo ship.

Her basic trade will be the regular service between Marseille and Bastia harbours. She is assigned to carry passengers, passenger cars, freight cars, lorries, semi trailers, refrigerated trailers, Mafi-trailers, and trailers with dangerous cargoes on the open deck.

The vessel is purpose-built for the particular route and reflects specific *CMN* requirements regarding speed, power, manoeuvra-

bility, access, etc. The aim of the design is to reach a larger cargo capacity comparing to the existing ships on the same service area, high speed, and increased passenger comfort. The artistic impression of the ship is given in Figure 1.

2 Main characteristics of the vessel

The main particulars of the vessel are as follows:

Yard number	468
Delivery	2011
Length over all	180.00 m
Length between perpendiculars	167.50 m
Beam moulded	30.50 m
Height to main deck	9.80 m
Height to upper deck	15.80 m
Draught, design/scantling	6.70 / 7.50 m
Deadweight, design/scantling	7600 / 11300 t
Speed, trial	23.90 knots
Gross tonnage	41300
Output of main engines	38 400 kW
Passengers	750
Passenger cabins	200
Passenger beds	700
Trailer lane metres	2484
Cars lane metres	1150

The ship will be classed by *Bureau Veritas* with the following class notations:

Figure 1 **Artistic impression of the ship**
 Slika 1 **Umjetnički dojam broda**



I +Hull, +MACH, Ro-Ro Passenger Ship, Unrestricted navigation,

+AUT-UMS, +AUT-PORT, AVM-DPS, SYS-NEQ-1, MON-SHAFT, COMF, COMF-NOISE-1, COMF-VIB-1, +REF-STORE, CLEANSHIP, +ALP, INWATERSURVEY, SDS

The ship will fly the French flag.

3 Design requirements

3.1 Requirements of the Marseille-Bastia route

The main characteristic of the service between the French mainland and Corsica is the requirement for a safe and fast transportation of cargo all over the year, with the peak in the summer season. There is no container service in Corsican ports and the cargo is exclusively carried by ro-pax ships.

The passenger service to the island is suffering from seasonal oscillations, i.e. the majority of passengers and car traffic is carried out during the summer period. Cargo mainly travels during the week, and passengers and their cars during the weekend. The majority of the cargo is carried to Corsica, with the trucks returning back empty.



Figure 2 Marseille-Bastia route
Slika 2 Ruta Marseille-Bastia

This vessel is assigned for the service between Marseille and Bastia. This route is presented in Figure 2. The main feature of the vessel is a large cargo capacity. With three freight decks totalling about 2484 lane metres, she will be the largest freight carrier to link France with Corsica. This is combined with a relatively high passenger capacity, having a higher comfort than is usual for this route.

3.2 Harbour restrictions

The overall length of the vessel of 180 m utilizes the maximum limits of both ports. The turning area in the port of Marseille is maximum 180 m in diameter for the most frequently used dock. In Bastia the harbour facilities allow a maximum length of 180 m in all seasons. The design draught of the vessel is adjusted to the limitation of Bastia harbour. Another limitation in Bastia is

the inability of turning the vehicles on the shore. For this reason a space for turning is ensured on the main deck of the ship.

3.3 Hull form and speed

The distance between the ports of Marseille and Bastia is 213 nautical miles. During low season the typical overnight crossing lasts 12 hours and this can be achieved with the service speed of 19 knots.

For this vessel the Owner required maximum speed of 24 knots, with the requirement of the hull optimization for the economic service speed of 21 knots. The service speed of 21 knots allows a later departure time with the arrival at the same time in the morning. A later departure from Marseille is often caused by late arriving cargo. The early morning arrival is required by passengers and cargo transportation companies, intending to bring their vehicle returning back on the same vessel for the best possible vehicle utilization.

In the full tourist season, due to a huge increase in the number of vehicles and passengers, a daily service to and from the island may be required, and in that period the service speed of the ferries is of major importance. With a speed of 23 knots, this ship can increase the number of round trips during the peak period. For his reason, it is required that the vessel satisfies the passenger comfort requirement related to noise and vibration at a service speed of 23 knots.

With a four-engine power plant a large flexibility is achieved, allowing the attaining of the service speed of 19 knots by using two engines only. The trial speed of the vessel is 23.9 knots on the design draught with 85% MCR power of the main engines and shaft generators delivering hotel load at sea.

The mayor limitation in the hull form design:

- Length/breadth ratio. The length restriction is imposed by harbour limitations and the moulded breadth of 30.5 m is necessary to accommodate eight freight lanes with two side casings fitted.
- Breadth/draught ratio is result of the draught limitation in Bastia.
- Block coefficient is result of relatively high required deadweight.

The CFD optimization of the hull form, see Figure 3, was done for the service speed of 21 knots [1]. In addition, some improvements for the maximum speed of 24 knots were done, taking care not to reduce the performances obtained by initial optimization.

A very important task in the hull form optimization and propeller design was to minimize the vibration excitation force and to satisfy the requirements of the comfort class. A relatively high propulsion power will be transmitted by means of two 5.2 m diameter 4-bladed CP propellers.

The buttock flow aftbody form includes a centreline skeg and a very slight tunnel over the propellers. A trim wedge very effectively dampens the aft wave.

The shaftlines, shaft supports, engine and gearbox foundations are restricting the hull form optimization. A comparatively fine hull form requires a long shaft line, supported by one V and one I shaft bracket, see Figure 4. The struts are aligned according to the water flow and are fully streamlined to minimize the resistance.

The water on deck was calculated in accordance with the Stockholm agreement for the North Sea environment (significant wave height of 4 metres). In conjunction with that, special arrangements are necessary on the main deck (flood preventing doors or similar).

3.7 Separation of passengers from cargo

One of the difficult tasks of the ro-pax design is the integration of the passenger transport with the freight. This is a matter of passenger and drivers comfort, safety and loading/unloading sequences. Expectations are higher today and there is a trend towards a complete separation of cars from freight. The solution adopted on this vessel is a separate car deck accessed via a fixed ramp.

3.8 Environmental requirements

The ship is designed with the aim to obtain a high environmental quality, enabling an easy handling of any type of garbage generated onboard. The main engines are designed to fulfil the requirements of the Tier 2 of MARPOL Annex VI concerning exhaust gas emissions. The consequence is that MCR power is reduced for 400 kW per engine.

3.9 Passenger comfort

The vessel has the highest BV comfort class for vibration and noise, COMF-VIB1 and COMF-NOISE1. The vessel has to satisfy Class requirements for service speed of 23 knots.

To fulfil the strict requirements, vibration analysis with a detailed FE model of the complete hull was done [2], see Figures 5 and 6, resulting in an extensive strengthening of the hull structure in some areas.

An important task was to avoid/minimize the use of pillars on the passenger car garage deck below the accommodation, as per Owner's strict requirement. Finally, the majority of the pillars were removed except for the three pairs on the aft end of the garage.

Figure 5 **The two-noded vertical hull girder mode**
Slika 5 **Drugi oblik vertikalnih vibracija trupa**

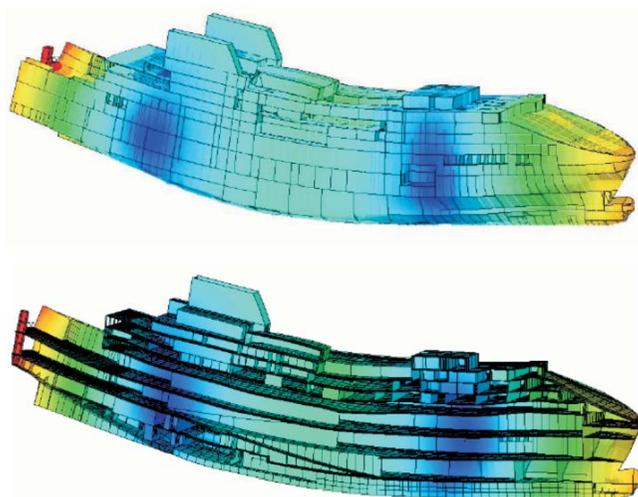


Figure 6 **Vibration response plot**
Slika 6 **Prikaz vibracijskog odziva**

4 Description of the vessel

4.1 General arrangement

The general arrangement of the ship (see Figure 7) is designed with the following distribution of decks:

- Main deck, Deck 3.
- Lower trailer deck, Deck 2.
- Upper trailer deck with open area for dangerous cargo, Deck 5.
- Passenger car deck, Deck 7.
- Passenger cabin deck, Deck 8.
- Passenger public area deck, with night seats and some cabins located at this level, Deck 9.
- Crew accommodation deck, the wheelhouse located at this deck, Deck 10.
- Helicopter landing area, Deck 11.

4.2 Cargo decks

Cargo may be carried on three decks: the main deck, a lower hold and an upper trailer deck, as described below.

Main deck

Both loading and unloading is accomplished over the stern into the main deck, via two hydraulically opened ramps with flaps. Each ramp has clear driving width of 10.8 m allowing two-way traffic. The ramps are 18.0 m long plus 2.5 m flaps. The length

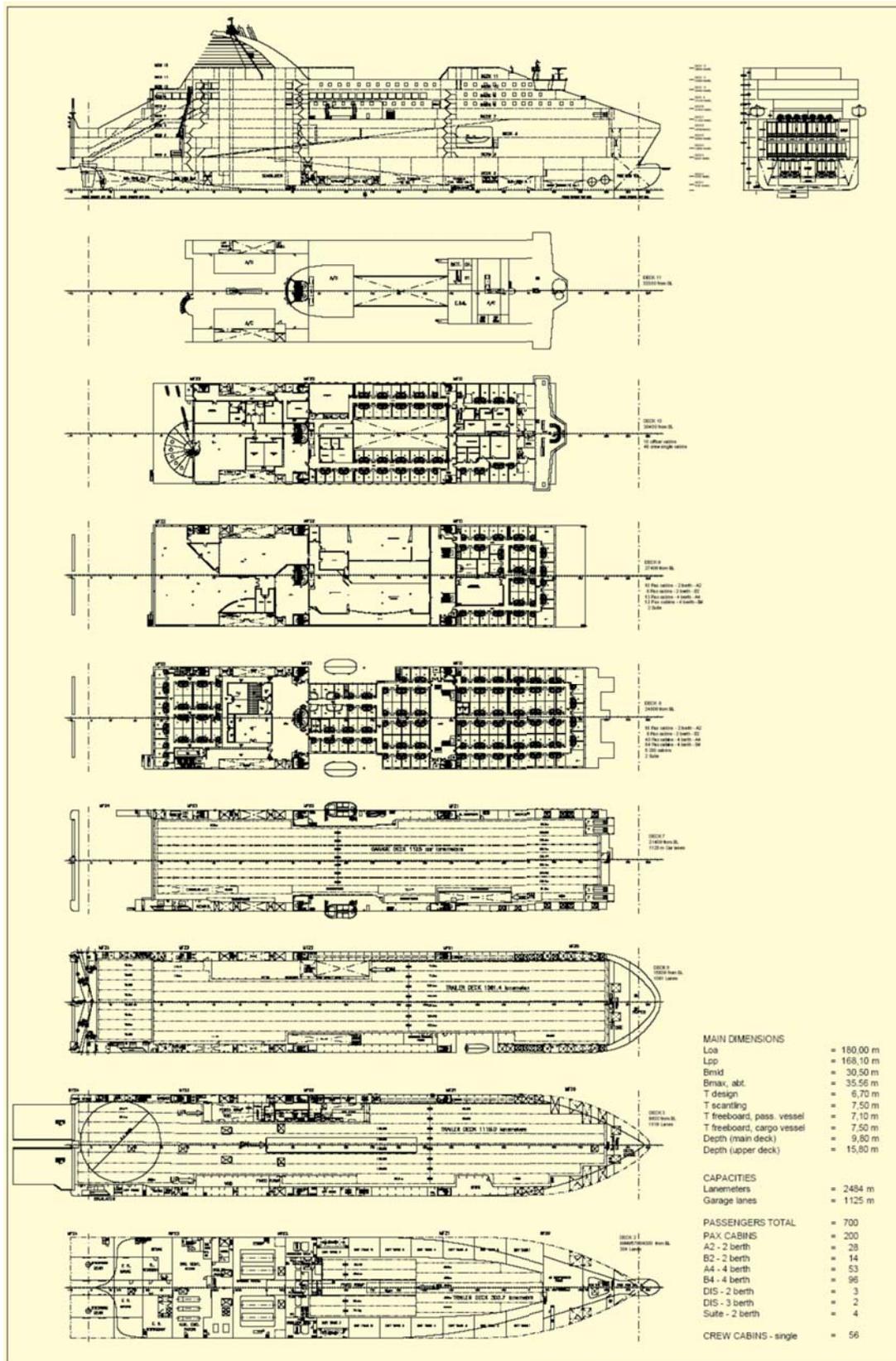


Figure 7 General arrangement of the Hull No. 468
 Slika 7 Opći plan Novogradnje 468

of the ramps is adjusted to allow a slope of maximum 7 degrees, in extreme conditions with a quay height in the range of 1.10 – 2.20 m. The ballasting capacity should be adjusted to achieve the ramp operating condition in 30 minutes.

The main deck is assigned for trailers and offers eight 3-metre wide freight lanes between the side casings. The free height of the deck is 5.0 m. The total capacity of the deck is 1119 lane metres.

The location and design of the internal ramps should leave sufficient space to allow the trailers to make in the aft part of the main deck a U-turn with a diameter of 23.4 m (the Bastia harbour has very limited available area on the quay).

On the aft part of Deck 3 the space is required to make the mentioned U-turn with the turning diameter of 23.4 m. The ramps are moved forward, creating a turning area aft and still leaving enough space forward on the upper decks.

The side casings incorporate the access to the superstructure via stairs and elevators. The primary service traffic (provision, linen etc.) is accomplished via the portside casing. The safe delivery area (for stores, provision, linen etc.) is provided below the main ramp on the port side. The trucks drive the provision onboard, being unloaded close to the lifts. The access to the service area is closed by a door when not in use. The service lift is used to bring provisions up, with a capacity for two pallets with the fork lift and one person.

Special waste treatment service modules connected by chutes from the galley on Deck 10 are arranged for food waste, consisting of a compacted rubbish container and individual waste bins for glass and tins.

The lower hold

Featuring five 3 m wide cargo lanes, with a capacity of only 304 of total 2484 lane metres, the lower hold is important to utilize the volume below the main ro-ro deck outside the engine rooms. The hold is located on Deck 2, the extension of the hold is about 43% Lpp in length and width is limited by the longitudinal bulkheads positioned at B/5 line. The clear deck height is 4.5 m.

The access to the hold is provided from the main deck level via a 4.3 m wide fixed ramp. The ramp is centrally located and covered with a flush watertight cover of crocodile type, constructed of one panel that is 45.7 m long and 4.5 m wide.

The narrow spaces of the garage are effectively loaded/unloaded by experienced drivers only and mainly assigned for unaccompanied cargo such as trailers and freight cars. The escapes from each end of the garage are equipped with watertight doors.

The location of the compartment within limits of B/5 longitudinal bulkheads imposes problems of stability requirements, having a mayor impact on the ventilation, escape and access.

Upper trailer deck

The upper trailer deck (Deck 5) is accessed through a 4.7 m wide fixed ramp on the portside, linking two main cargo decks. A ramp is closed by means of top hinged rampway doors.

The deck is intended for trailers. Eight 3 m wide freight lanes are provided out of the ramp area, with a clear height of 4.8 m and a capacity of 1061 lane metres.

The trailers containing IMO class cargoes will be stored in their designated open area on the weatherdeck (aft part of Deck

5). The area aft is separated from the enclosed part with a gastight garage door of guillotine type, size 24.8 m x 4.8 m.

The passenger car garage

The full length car deck (Deck 7) is situated directly below the accommodation. The CMN considers that it is most convenient to locate the passenger cars parking area as close to the cabins as possible. Immediately above the car deck there is the reception area on Deck 8.

To allow a full separation from the cargo and maximize the flow of the vehicles, a valuable space on two trailer decks is taken away in order to accommodate a 3.0 m wide fixed ramp on the starboard side that leads from the stern entrance to the car deck.

The minimum capacity of the deck is 200 passenger cars. The lanes are 2.4 m wide with a minimum free height of 2.4 m. The size of the slots is 5.0 x 2.4 m. The maximum weight of the cars is 2.5 tons in general and 3.0 tons on the area forward of the ramp. The requirements are adjusted to the characteristics of larger vehicles like campers, caravans and large SUVs, in accordance with the nature of the vessel and the route.

There is an area provided for 30 motorcycles, with an easy and removable lashing system. A top hinged gastight door is fitted inside the ramp on the level of Deck 5 to separate two upper garage decks from the lower horizontal fire zone.

Lashings of cargo

The cargo securing is important for the security of the ship. The lashing pots are welded flush with the decks at regular intervals in-between the lanes.

Ventilation of the holds

A battery of vent fans is located at the forward end of the garage decks providing the air circulation.

4.3 Passenger access

The pedestrian passenger access is made through an assigned part of the starboard aft ramp, protected from the cargo and the cars flow by removable handrails.

One escalator located in the side casing on the starboard side serves as the access to access lounge level from both the main cargo deck and the passenger cars deck. A corridor connecting the upper part of the escalator to the access lounge is suitable for a security check.

The ship is designed in a way that the flow of the embarking passengers (pedestrians, passenger car drivers, truck drivers) is directed, without any possibility of escape or by-pass, to a security check point.

A single system controls the access of the passengers and crew to different areas of the ship, including cabins and restricted areas.

The access of disabled persons, as well their circulation within the passenger spaces including the open deck, is made safe and easy in accordance with the requirements in [3].

4.4 Accommodation

The accommodation arrangement of the vessel is different compared with a typical ro-pax arrangement (usually with the

accommodation on the forward part of the vessel) and extends to the full length of the vessel.

Generally, there are three accommodation decks: Deck 8, Deck 9 and Deck 10. The access lounge is located on Deck 8, close to the mid-ship in order to be centrally positioned and to provide an easy access to the cabin areas and public areas as well.

Special attention is paid to very demanding French Rules related to the communication of persons with special needs (Division 190 – Accessibilité).

Cabins

The passenger cabins are arranged on Deck 8 and on the fore part of Deck 9. There are totally 200 cabins: 149 four-passenger cabins (2 lower berths + 2 foldable), 42 two-passenger cabins (double berth), 5 disabled person's cabins and 4 VIP cabins. In addition, 50 reclining seats are arranged on Deck 8.

The crew cabins are accommodated on Deck 10. There are 46 single-berth crew cabins, 5 officer's cabins, 3 senior officer's cabins, and 2 Captain's class cabins. All cabins are provided with a window (day light): 36 crew and 10 officer's cabins are "outer" cabins and 10 crew cabins are "inner" cabins oriented to the inner courtyard/garden.

Public areas

Generally, public areas are arranged on Deck 9 and Deck 10. On Deck 9 there are Halls, Arcades, Bar (250 seats), A La Carte Restaurant (150 seats), Self-Service Restaurant (120 + 120 seats), Children's Playroom, and Conference Hall/Cinema (100/50 seats). On Deck 10 there are Halls, Bar (150 seats), Meeting Rooms (18 + 20 seats) and Sun-deck.

The bars on Deck 9 and Deck 10 are located aft and connected by decorative spiral stairways, allowing a reduction of capacity in low season by subdividing it in two areas in case of specific events onboard. A similar approach is applied in the restaurants where the mid part can be added either to the A La Carte or to the Self-Service area, depending of actual needs.

The kennel with 6 large and 12 small boxes (cages) is provided on Deck 7.

The interior design will be done in close cooperation with AIA (*Architects Ingénieurs Associés*), one of the leading naval interior designers in France. The reference vessel for the standard of the interior design will be *Brittany Ferries' Mont St Michel*, also designed by AIA. The specification of the equipment and the arrangement of the catering areas will be done in cooperation with the French company *DL Services*.

5 Machinery and equipment

5.1 Power generation

The power source are four *Wärtsilä* medium speed engines of 9L46 type, having a total output of 38 400 kW at 600 rpm. The main engines are designed to satisfy the requirements of MARPOL Annex VI - Tier II. To minimize vibration and noise that might be transferred to the ship structure, the main engines are resiliently mounted.

The engines are coupled to a pair of propellers via gearboxes. Each gearbox features a PTO coupled to a 1900 kW shaft generator. Four bladed CP propellers are running at a constant speed

of 140 rpm. Diameter is 5.2 m. Direction of turning is inward over the top.

Two oil fired boilers, each with a 2000 kg/hr capacity match the four exhaust gas boilers located in the side casings.

Aft of the engine room the boiler room compartment is located. It is fitted with two 1250 kW thermal oil boilers. Further aft at Deck 2 level on the starboard side, the diesel generator room houses three *Wärtsilä* 6L20 gensets, each having an output of 1600 kW at 1000 rpm. On the portside there is ECR, having direct communication with the crew deck via the stair trunk and the service elevator. The communication with the main deck level is also ensured, because of its frequent use by the crew during vessel's 12 hours stay in the harbour.

Between the main engine room and the lower hold, the separators room/pump room is located, the fuel oil treatment room contains two buster units as well as the HFO and LO purifiers.

To maximize the use of the space, the compartments forward of the lower hold are also used for machinery. The first is the sewage treatment plant with the air conditioning compressors housed in the compartment above, and the next is the bow thrusters room.

5.2 Ballast, bilge and fire fighting systems

The ballast system comprises two ballast pumps (2 x 300 m³/h) and three ballast tanks with the total capacity of about 1700 m³. The system is designed bearing in mind the specific route of the vessel and the time of the voyage. The ballast valves are remotely controlled via an electro-hydraulic actuator. The material of the ballast piping is GRP. The automatic transfer of the ballast via pumps is provided between the tanks.

The bilge system is provided with two separate piping systems, the primary system requested by the class requirement, and the secondary system being the oily bilge piping. Four bilge pumps are provided. The automatic mode of the oily bilge pump is provided via the level indication for the bilge wells. The bilge valves are remotely controlled via an electro-hydraulic actuator.

The fire-fighting system comprises the water mist system for the machinery room and accommodation, and the drencher system for the cargo spaces. Also, a fire hydrants system is provided.

5.3 Electric network configuration

The electric plant consists of three diesel generators 3x1520 kW; two shaft generators, secondary type, 2x2200 kW and one emergency diesel generator 500 kW.

The electric network, radial type, voltage level 3x400 V, 50 Hz, is arranged to work as one common network or two separated distribution nets. Each half-network supplies about half of the electric consumers.

The main busbars are divided in two sections disconnectable with the busbar circuit breaker.

For the electric plant and network configuration three basic ship operation conditions are important:

1. Port loading and unloading,
2. Manoeuvring with bow thrusters and
3. Sea going.

- The necessary power for the port loading and unloading condition is produced by two diesel-generators. One generator is stand-by. The electric network runs as a common ship network.

- For the manoeuvring condition with bow thrusters, the electric plant works with two diesel-generators and two shaft generators. Each shaft generator supplies one bow thruster on the separated busbars. The electric network runs as a common ship network.

- In the sea going condition the ship systems are supplied from two shaft generators. The diesel generators are not in operation. In this case the electric network is divided in two independent ship networks, each independent part supplied from one shaft generator.

5.4 Manoeuvring equipment

The vessel is equipped with two 1900 kW electrical transverse thrusters having a 2.45 m diameter, located forward. The thrusters' capacity together with the active rudders satisfies the manoeuvrability requirements in windy conditions. It enables the vessel to get on or off the berth without tug assistance.

The ship is equipped with a pair of *Becker* TLFKSR high lift flap rudders, offering several technical advantages for large fast vessels. A 'twisted' leading edge is incorporated, having the top and bottom asymmetrically oriented to the direction of rotation of the propeller. The effect of the asymmetric leading edge profile accomplishes improved propulsion efficiency and the avoidance or significant reduction of the cavitation erosion. Other positive effects are the reduced flow resistance of the rudders and a higher degree of vessel manoeuvrability. King support (KSR) design with the integrated trunk reduces vibration and permits a minimum height of the steering gear deck.

The rudders may be operated independently over a range of $\pm 45^\circ$. The steering gears are of electro-hydraulic rotary vane type.

5.5 Roll stabilization

The vessel's large beam is expected to result in stiff motions at sea; the GM is typically about 3.5 m when fully loaded. To reduce the motions at sea, a pair of retractable fin stabilizers is fitted. The stabilizers have fins of special high lift profile not requiring the flaps.

To control the heel in the port during loading and unloading, an automatic anti-heeling system is provided. A single 800 m³/h pump can pump the fresh water between two heeling tanks with a total capacity of 550 m³.

5.6 Mooring equipment

The mooring equipment comprises 2 combined windlass/mooring winches, and 2 mooring winches forward and 4 mooring winches aft.

Because of a high windage area, the vessel needs an additional mooring safety. The mooring ropes and other related elements are dimensioned in accordance with the class requirements.

5.7 Lifesaving equipment

The lifesaving equipment is based on 856 persons (750 passengers, 56 crew members and 50 firemen).

The vessel is equipped with two 150- person lifeboats with gravity davits on the level of Deck 7 and with four vertical chutes. FRB is positioned on the starboard side on the level of Deck 4 and RB is positioned on the portside.

The helicopter landing area is located aft of the bridge on top of the AC deckhouse (Deck 11).

5.8 Bridge design and internal communication system

The bridge arrangement and navigation outfit satisfy the SYS-NEQ-1 class notation.

The following integrated internal communication systems are provided:

- data/internet/PC wireless network,
- passenger information system,
- integrated aut. telephones / public address system / talk back system,
- DECT telephones,
- clock system,
- CCTV system.

6 Fire subdivision and integrity

As required by SOLAS, the vessel is subdivided into five main vertical fire zones with a maximum length up to 40 m or 48 m, respectively. For vehicle decks, horizontal fire zoning is applied according to SOLAS, with zones not exceeding 10 m in height. With four garage decks, two horizontal fire zones are required, separated in the ramps by top hinged gastight fire doors on the level of Deck 5.

The stairways will provide a continuous fire shelter from each level to the embarkation deck.

All deckhouse supply systems (ventilation, air conditioning, electrical) will be separated.

7 Antifouling paint system

The underwater part of the ship hull will be protected with a silicon-based fouling release paint system (silicon antifouling), instead of the classical TBT-free self polishing antifouling. The ship buyer has insisted on this system because of excellent experience with its use on his fleet (smaller fuel consumption and a significantly effective life time).

The main characteristics:

- Fouling release coatings are an environmentally friendly way of controlling fouling on maritime surfaces;
- Biocide free and Copper free, low VOC (volatile organic compound);
- 'Non stick' coating – characterized by a flexible, smooth surface where fouling organisms can hardly adhere;
- 2-4 % fuel and emission savings (according to different paint producer's systems booklets) due to the decrease of the hull roughness;
- Some fouling may settle under static conditions, but 'silicon antifouling' has easy cleaning characteristics;
- High speed and medium activity or medium speed and high activity is necessary for self cleaning (new systems for low speed vessels are in development);
- Dry docking interval 5- 10 years;
- Ideal for aluminium vessels – no galvanic corrosion;
- Not subject to present or future biocide legislation;
- Masking is necessary to prevent the contamination of the surrounding paint areas (the topside - for painting in the dry

dock or the ballast tanks and structure for painting in the block stage).

Most of the silicon-based fouling release paint systems have to be applied and cured on temperatures above 10 °C. Relative humidity of the air should be between 30 – 85 %.

8 Conclusion

This vessel is one step forward in the ro-pax concept for the traffic between Marseille and Corsica. With 2484 lane metres of space for trailers and 1150 lane metres of space for passenger cars it has a cargo capacity larger than the other ships on the same route. The separation of freight and pas-

sengers is successfully done. Increased passenger comfort includes the highest BV comfort class for vibration and noise. The maximum speed of the vessel fully satisfies all service requirements.

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KRALJEVICA SHIPYARD

SHIPBUILDING SINCE 1729

The **KRALJEVICA** Shipyard, shipbuilding and shiprepairing company, is the oldest shipyard on the eastern coast of the Adriatic Sea.

The continuity of shipbuilding in **KRALJEVICA** has been lasting uninterrupted since 1729, when the Shipyard has been established by the Austrian Emperor Karl VI.



The **KRALJEVICA** Shipyard ranks, in view of its capacities, among medium-sized shipyards (500 employees, area of 110,000 m²).

The **KRALJEVICA** Shipyard's activities are divided in three main groups: newbuildings (asphalt tankers, multipurpose vessels, container vessels, dry cargo vessels, paper carriers, RO-RO vessels, car ferries, offshore supply vessels, tugs, yachts, fishing vessels, small aluminum crafts, etc.), navy vessels (patrol vessels, corvettes, coast guard vessels, etc.), shiprepairing/retrofitting (merchant and navy vessels).

As from the end of Second World War, the Shipyard built more than 180 vessels of which 80 navy vessels and more than 100 merchant vessels on two open slipways of up to 10,000 tdw (125 x 21 m) and one sheltered slipway in hall (for vessels up to 60 x 11 m).

Shiprepairing and marine service-conversions for vessels up to 25,000 tdw in two floating docks of 450 tons and 6,500 tons lifting capacity (for vessels of maximum 155 x 21 m), and on shiprepairing quay of 575 meters in length.

The Shipyard have awarded for his quality two prestigious prizes:

- in Year 1989 for RO-RO/Container/paper carrier of 3,400 tdw as one of **the Most Outstanding Ship of the Year** (by US magazine "Maritime Reporter & Engineering News")
- in Year 2005 for Asphalt carrier of 9,200 tdw as one of **the Significant Ship of the Year** (by UK magazine "The Naval Architect")



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CROATIAN CHAMBER OF ECONOMY



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joint approach to government institutions in order to ensure the most favourable business conditions;

joint promotion among both the domestic and foreign shipbuilding companies - publication of promotional materials and organizing the display of products at international fairs in cooperation with the Croatian Shipbuilding Corporation (Hrvatska brodogradnja - Jadranbrod d.d.);

establishment of links with foreign partners, with a focus on exports and cooperation;

coordination of the development of manufacturing programmes in cooperation

with the Croatian Shipbuilding Corporation, i.e. with Croatian shipyards.

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