4 OCEAN DESIGN PROJECT REFERENCES

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Abstract

This document presents 4 Ocean Design's extensive experience and successful track record in the design and engineering of vessels, yachts and offshore constructions.

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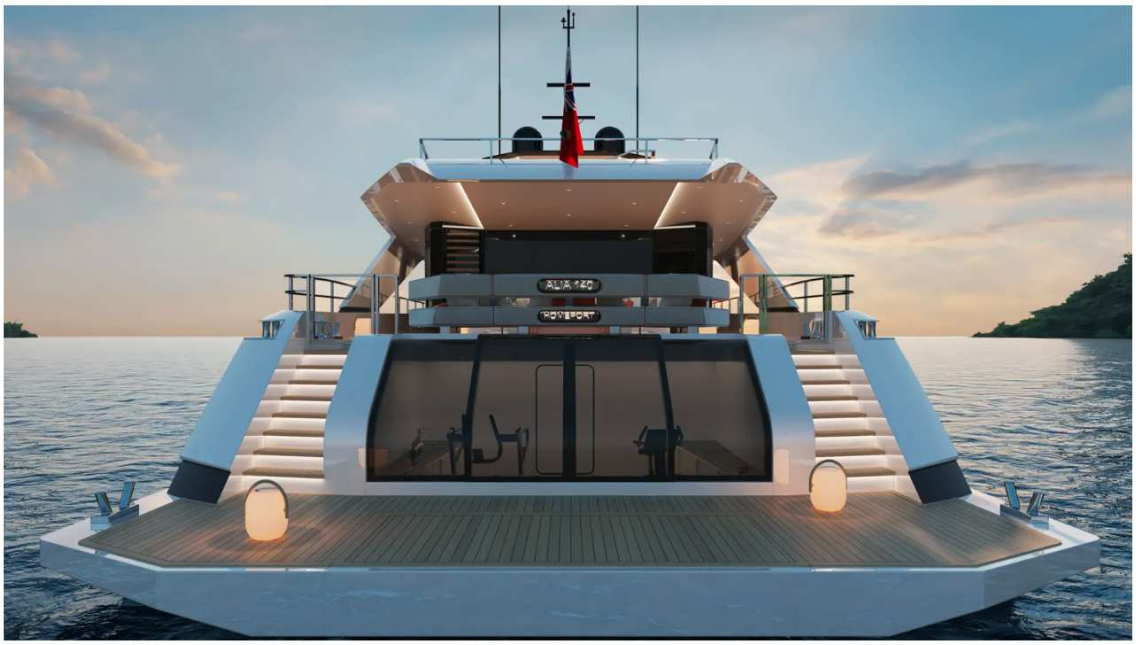
1. XIMENA

PROJECT XIMENA is a 43.0 m Motor Yacht, currently being built in Turkey by Alia Yachts and to be delivered in 2025.

https://www.boatinternational.com/yachts/news/alia-yachts-sells-in-build-pilothouse-motor-yacht

We have prepared the complete classification and flag state documentation along with all necessary calculations.



Key Stages of the Project:

1. **Hull and Superstructure construction plans**
    - Construction plans for steel hull together with scantling calculations.
    - Construction plans for aluminium superstructure together with scantling calculations.
    - Evaluation and checking of workshop documentation performed by yard.
2. **Outfitting:**
    - Anchor and mooring arrangements, and integration of all deck equipment.
    - Window plan with glass thickness calculations.
    - Main Engine foundation drawings.
    - Shaft line and A- brackets construction.
    - Rudder and steering gear calculations and foundation drawings.
    - Side doors construction drawings.
    - Stabilizers foundation drawings and calculations.
    - Passarella construction and integration.
    - Aft deck transformer integration.
    - Hull appendage layouts.
    - Manhole plan.
    - Bow thruster foundation.
3. **Flag Drawing**
    - Crew and accommodation plans.
    - Fire and safety plans.
    - Evacuation plans.
    - Visibility plan.
    - Main ad class dimensions.
    - Life raft & MOB Launching plans.

2. Sirena 35, 42 and 50

Projects Sirena 35, 42, and 50 was the series of steel hull and aluminium superstructure motor yachts for Sirena Shipyard.

https://www.superyachttimes.com/yacht-news/details-of-sirena-yachts-35-50-metre-line

We have prepared the complete classification and flag state documentation along with all necessary calculations.

Key Stages of the Project:

1. **Hull and Superstructure construction plans**
    - Construction plans for steel hull together with scantling calculations.
    - Construction plans for aluminium superstructure together with scantling calculations.
    - Weight caculations.
2. **Outfitting:**
    - Anchor and mooring arrangements, and integration of all deck equipment.
    - Window plan with glass thickness calculations.
    - Main Engine foundation drawings.
    - Shaft line and A- brackets construction.
    - Rudder and steering gear calculations and foundation drawings.
    - Side doors construction drawings.
    - Stabilizers foundation drawings and calculations.
    - Passarella construction and integration.
    - Aft deck transformer integration.
3. **Flag Drawings**
    - Crew and accommodation plans.
    - Fire and safety plans.
    - Evacuation plans.
    - Visibility plan.
    - Load line plan and calculations.

3. Virtus XP

VIRTUS XP is a 52.6 m Motor Yacht, currently being built in Turkey by Mengi-Yay and to be delivered in 2025. She is one of 2 Virtus XP models.

https://www.boatinternational.com/yachts/the-superyacht-directory/virtus-xp--15088

Key Stages of the Project:

4. **Hull and Superstructure construction plans**

    - Construction plans for steel hull together with scantling calculations.
    - Construction plans for aluminium superstructure together with scantling calculations.

4. Majesty 160

The 49-metre composite yacht currently being built in UAE.

https://www.boatinternational.com/yachts/news/gulf-craft-160-yacht

Key Stages of the Project:

1. **Flag Drawings**
    - Crew and accommodation plans.
    - Fire and safety plans.
    - Evacuation plans.
    - Visibility plan.
    - Load line plan and calculations.

5. Dunya DY012

DUNYA DY012, a 92.0 m Motor Yacht currently being built in Turkey and to be delivered in 2026, is going to be the flagship of

Dunya Yachts.https://www.dunyayachts.com/latest-news-blog/dy012/#about-dy010

Key Stages of the Project:

4. **Hull and Superstructure construction plans**
    - Construction plans for steel hull together with scantling calculations.
    - Construction plans for aluminium superstructure together with scantling calculations.
    - FEA calculation for construction and outfitting.
5. **Outfitting:**
    - Anchor and mooring arrangements, and integration of all deck equipment.
    - Window plan with glass thickness calculations.
    - Main Engine foundation drawings.
    - Shaft line and A- brackets construction.
    - Rudder and steering gear calculations and foundation drawings.
    - Side doors construction drawings.
    - Stabilizers foundation drawings and calculations.
    - Passarella construction and integration.
    - Aft deck transformer integration.
    - Hull appendage layouts.
    - Manhole plan.
    - Bow thruster foundation.
6. **Flag Drawing**
    - Crew and accommodation plans.
    - Fire and safety plans.
    - Evacuation plans.
    - Visibility plan.
    - Main ad class dimensions.
    - Life raft & MOB Launching plans.

6. Wallaby - Crew Transfer Vessel

The groundbreaking innovation is the world's first ship with a suspension system for commercial use. This suspension system, developed by Australian inventor Nauti-Craft, enables the two hulls of the catamaran to independently balance and compensate for wave forces and the resulting movements. As a result, the deck of the ship, the so-called chassis, can be kept relatively calm in the passive mode of the system and can dampen a considerable part of the accelerations during transit. In active mode, it even remains absolutely balanced. This makes the transit voyage much more comfortable, even with smaller ships, which significantly reduces the risk of seasickness and, above all, makes the transfer from technicians to offshore structures or from pilots to large ships much safer.

Key Stages of the Project:

1. **Basic and Technical Documentation**:
    - Developed comprehensive basic and technical documentation,
    - Included detailed plans for the CTV's structure and systems, facilitating the construction and assembly processes.
2. **Workshop and Delivery Documentation**:
    - Prepared detailed workshop documentation to guide the construction phase, including assembly instructions and material specifications.
    - Developed delivery documentation to ensure the finished vessel met all required standards and specifications for operational readiness.

The project highlights our ability to bring disruptive innovation to the maritime industry, meeting all customer requirements and maintaining the highest safety and performance standards.

7. Songa Hawk (Seaway Hawk)

The project for the Songa Hawk sponsons aimed to increase the vessel's displacement and expand its cargo deck area. We conducted a comprehensive shape analysis, classification calculations, and developed the technical documentation, which was subsequently approved by the Classification Society.

Key Stages of the Project:

7. **Shape Analysis of the Sponsons:**
    - Detailed hydrodynamic and structural analyses were carried out to ensure the new sponsons would enhance the ship's stability and displacement.
    - Shape optimization focused on minimizing hydrodynamic resistance while maximizing cargo deck space.

8. **Classification Calculations:**

- Comprehensive calculations were performed in accordance with the Classification Society's requirements, including assessments of stability, displacement, and structural strength following the modifications.
- Verification that all new structural elements met safety and durability standards.

9. Technical Documentation:

- Detailed technical documentation was prepared, including technical drawings, material specifications, assembly instructions, and reports of the conducted analyses and calculations.
- The documentation was submitted to and approved by the Classification Society, confirming compliance with the relevant norms and safety standards.
- This project showcases our capability to deliver complex maritime engineering solutions, ensuring both compliance and performance enhancements for our clients.

8. Costa Concordia wreck removal

We participated in the wreck removal project of the Costa Concordia passenger ship. Our tasks included:

1. Performing strength analyses and preparing documentation for the sponsons that were attached to the submerged wreck to facilitate its refloating.
2. Building computational models of the existing structure to verify scenarios and assumptions for the wreck removal to ensure they were feasible and would not cause damage to the existing structure, which could hinder further removal stages.
3. Acting as supervisory inspectors during the execution of the work.

Key Stages of the Project:

1. **Strength Analysis and Sponson Documentation:**
    - Conducted detailed strength analyses and prepared the necessary documentation for the sponsons, which were crucial in refloating the sunken wreck.
    - Ensured that the design and application of the sponsons were feasible and effective for the safe refloating of the ship.
2. **Computational Modeling:**
    - Developed computational models of the existing ship structure to assess various wreck removal scenarios.
    - Verified that the assumptions and methods for wreck removal would not damage the existing structure, ensuring the feasibility of subsequent removal stages.
3. **Supervisory Inspection:**
    - Participated as supervisory inspectors to oversee the execution of the wreck removal operations.
    - Ensured all work adhered to safety and structural integrity standards, facilitating a smooth and effective removal process.
    - This project underscores our expertise in complex maritime engineering operations, highlighting our ability to manage and execute challenging tasks to ensure successful outcomes for our clients.

9. Albatross - Conversion of a Tanker into a Semi-Submersible Heavy Lift Vessel

The project of converting a tanker into a semi-submersible heavy lift vessel was a significant challenge. It involved selecting an appropriate ship based on its main dimensions and crucial hull geometry after cutting out a large portion of the cargo area. The project spanned almost three years. The client had a range of requirements for the new vessel, and fortunately, we were able to integrate all these elements into a successful project.

Key Stages of the Project:

2. **Ship Selection and Initial Design:**
    - Selected the appropriate tanker based on its main dimensions and essential hull geometry after removing a substantial portion of the cargo area.
    - Ensured the selected ship met the client's specifications and requirements for the new heavy lift vessel.
3. **Stability and Longitudinal Strength Conditions:**
    - Conducted comprehensive analyses to ensure the vessel's stability and longitudinal strength under various operational conditions.
    - These analyses formed the basis for developing the hull's technical documentation.
4. **Technical Documentation:**
    - Prepared detailed technical documentation for the hull, including structural modifications, deck equipment, changes to the engine room, and piping systems.
    - Developed extensive electrical documentation to accommodate the vessel's new design and operational requirements.
5. **Major Modifications:**
    - Significantly altered control and accommodation areas to meet new operational needs.
    - Added new crew quarters and an additional wheelhouse on the main deck alongside large new ballast tanks.
    - Equipped the vessel with advanced mooring equipment in the cargo handling area.

This project highlights our ability to manage complex maritime conversions, ensuring all client requirements are met while maintaining high standards of safety and performance.

10. BoDo Constructor - Cable-Laying Barge

The project involved creating the basic, technical, workshop, and delivery documentation for a cable-laying barge. We also provided author supervision throughout the project. The barge, in addition to being equipped with typical cable-laying apparatus, needed to safely settle on the seabed during low tides. It also had a significant crew for operations, requiring the provision of comfortable and safe working conditions. Besides an anchoring system, the barge was positioned using spud cans. The working deck had to accommodate various equipment configurations.

Key Stages of the Project:

2. **Basic and Technical Documentation**:
    - Developed comprehensive basic and technical documentation for the barge, ensuring all design aspects met operational requirements.
    - Included detailed plans for the barge's structure and systems, facilitating the construction and assembly processes.
3. **Workshop and Delivery Documentation**:
    - Prepared detailed workshop documentation to guide the construction phase, including assembly instructions and material specifications.
    - Developed delivery documentation to ensure the finished barge met all required standards and specifications for operational readiness.
4. **Author Supervision**:
    - Provided ongoing author supervision during the construction and assembly phases to ensure adherence to the design specifications and address any arising issues promptly.
    - Ensured the project remained on schedule and met all quality standards.
5. **Special Requirements and Modifications**:
    - Ensured the barge could safely settle on the seabed during low tides, incorporating robust structural and stability features.
    - Designed the barge to accommodate a significant crew, providing comfortable and safe living and working conditions.
    - Integrated a positioning system using spud cans for precise location control.
    - Designed the working deck to be versatile, allowing for various equipment installations in multiple configurations.

This project demonstrates our expertise in designing specialized maritime vessels, ensuring they meet complex operational and safety requirements while providing a functional and comfortable environment for the crew.

11. Sylur - Installation of a Drilling Rig on a Platform Supply Vessel (PSV)

The project involved creating comprehensive documentation for the installation of a drilling rig with all its associated equipment on a Platform Supply Vessel (PSV). Solid foundations were constructed, and numerous new containers were installed. Additionally, a communication system using gangways and platforms was developed to ensure safe operations. As per the client's request, all installations were designed to be removable, allowing the vessel to perform multiple functions.

Key Stages of the Project:

1. **Comprehensive Documentation**:
    - Developed detailed documentation for the installation of the drilling rig and its associated equipment on the PSV.
    - Included plans for the structural modifications necessary to accommodate the new equipment.
2. **Foundation Construction**:
    - Constructed robust foundations to support the drilling rig, ensuring stability and safety during operations.
    - Conducted structural analyses to verify the integrity of the foundations under operational loads.
3. **Container Installation**:
    - Installed numerous new containers to house equipment and provide additional operational space.
    - Ensured containers were securely integrated into the vessel's structure.
4. **Communication System**:
    - Designed and implemented a system of gangways and platforms to facilitate safe and efficient movement between different parts of the vessel.
    - Ensured the system allowed for safe operations and compliance with safety standards.
5. **Removable Installations**:
    - Ensured that all installations, including the drilling rig, containers, and communication system, were designed to be easily removable.
    - Enabled the vessel to switch between different functions as required by the client.

This project highlights our ability to deliver versatile and complex maritime engineering solutions, meeting the client's needs for multi-functionality while ensuring safety and operational efficiency.

12. Ulam – Concept design of WTIV Jack up

The project involved creating a concept design for a Wind Turbine Installation Vessel (WTIV) equipped with the largest leg-encircling crane manufactured by Huisman and a top jacking system provided by NOV. The design aimed to optimize the vessel's capabilities for efficient and safe wind turbine installations. The project successfully obtained Approval in Principle (AIP) issued by the American Bureau of Shipping (ABS), validating the feasibility and compliance of our design with industry standards.

Key Stages of the Project:

1. **Extended scope of Concept design including**:
    - General arrangement plan
    - Technical specification
    - Hull shape with CFD optimization
    - Preliminary stability information with different type of deck loading layouts including setup with six 2500 t monopiles in vertical positions, and typical set ups for jackets and wind turbines.
    - Strength and fatigue analysis of hull structure and lattice leg construction
    - Weight and COG assessment
    - Full Hull construction with the 3d model of hull structure.
    - Engine room arrangement
    - Basic biggest piping installation schematic including ballast, and jacking system purging system
    - Crane arrangements
    - Load balance and single line diagram.