

4. PROJECT DESIGN

Project design typically proceeds from a feasibility project through an outline project to a contract project. Project design by Deltamarin is based on the principle of total coordination: besides the general arrangement several other items are included and coordinated together.

These items include arrangements, structure, accurate weight, compartmentation and stability, machinery arrangement and all this fitted into a good hull form ensuring efficient performance. Efficient overall configuration with excellent performance for the specific shipping task.

We carry out about 40-80 projects every year. And many of them are built. That is an unbeatable track record. Check our references.

Outline Project

The idea of an outline project is to produce the first proposal for the potential owner.

The prepared project material is of preliminary nature and prepared for first price indication.

Good references and extensive statistics ensure quick, reliable and state of the art/ novel projects.

Contract Project

Contract project is prepared to guarantee the required capacities, capabilities, characteristics, quality, etc. of the final product, the ship. The material is adequate for the shipyard and the Owner to sign a newbuilding contract.

Documentation may include in addition to full specification and main drawings several specific and special items and studies included as enclosures, depending on each specific case.

Extensive experience and references ensure high quality end result and minimum pressure for changes and cost overruns.

Following design tools are used:

- CATIA 3-D CAD for product model designs and 3-D models
- Delmia simulation systems
- Autocad/Microstation 2-D CAD for drawings
- NAPA-Software for hull form and stability calculations
- DELTA-AVEC
- Extensive statistics

Typically several options are included in the project design work, such as interior and exterior 3-D models, safety and ship function simulations as well as different machinery configurations.

4.1 **Outline Project**

The final contents for each specific project are defined together with the client.

Typical scope for an Outline Project is the following:

1. **Definition of Main Dimensions**

Main dimensions will be defined taking into account the required capacities, service speed, weight and normal iterative design process.

2. **General Arrangement (GA)**

GA of the vessel will be prepared with all the major spaces, systems and equipment located and named. The GA will be in accordance with the latest rules and the Owner's requirements. A tonnage calculation will be prepared. Life saving and escape ways will be checked.

3. **Machinery Arrangement (MA)**

MA will be either a separate one or shown in the GA. All main components and spaces will be shown.

4. **Preliminary Midship Section (MS)**

Preliminary Midship Section will be prepared for reliable weight calculation purposes. The target is to achieve continuous structures and low structural weight.

5. **Lightweight Calculation**

Lightweight will be calculated utilising General Arrangement, Midship Section, specified equipment, references and extensive statistical data. Weight calculation will be verified using latest reference vessels and extensive statistics.

6. **Specification**

An outline specification will be prepared. The specification will include all the necessary chapters and items in approximately 80 pages. The client's or Deltamarin's standard can be applied.

7. **Hull Form**

Hull form will be prepared utilising good references and experience from model tests and full-scale measurements of similar reference vessels.

8. **Loading and Stability**

Watertight compartments and preliminary tank arrangement will be defined. Typical loading conditions will be defined and calculated. Intact stability will be calculated and a preliminary study of damage stability will be prepared.

9. Speed and Power

Speed-power prediction will be prepared based on the defined hull form and model tests of good reference vessels.
Electric and heat load will be estimated.

10. 3-D Exterior Model

3-D Exterior Model will be prepared for presentation purposes.

4.2 Contract Project

Contract Project is the most essential phase of a newbuilding project. Well-defined contract documentation ensures fluent process at the yard and an end product as intended.

Following items are typically included in the Contract Project:

- General Arrangement, Machinery Arrangement and other related drawings will be finalised in accordance with the owner's and the yard's requirements and discussions.
- Specification will be extended to ca. 250 - 350 pages and it will also include preliminary system diagrams for most important systems, 15-20 pieces.
- Midship section and weight calculations will be finalised and the longitudinal strength will be checked according to the final General Arrangement.
- Hull form will be updated based on the lightweight calculation and the dead-weight distribution. Lines plan, body plan and all necessary hydrostatic data will be included.
- Shaftline arrangement and appendage plan will be developed.
- Stability calculations will be updated, including all the required damage cases.
- Trial speed-power prediction will be updated, resistance characteristics will be calculated and optimum propeller diameter will be defined.
- Electric and heat balance will be calculated and one-line electrical diagram will be prepared.
- Escape way calculations and analyses will be prepared.
- Canal crossings (e.g. Panama) will be checked as needed.
- Manoeuvring capabilities will be calculated for defining rudder size and thruster power.
- 3-D Exterior Model will be updated or prepared for coordination, visualisation and presentation purposes. The model can be easily extended into superstructure and interior spaces.

Additional items, e.g. coordination of model tests, specific critical structural analysis and design, noise and vibration study, functional simulations, architect specification, material and price estimates, etc., can be included in the contract project.

Detail contents will be agreed upon with the client before the start-up of the work.