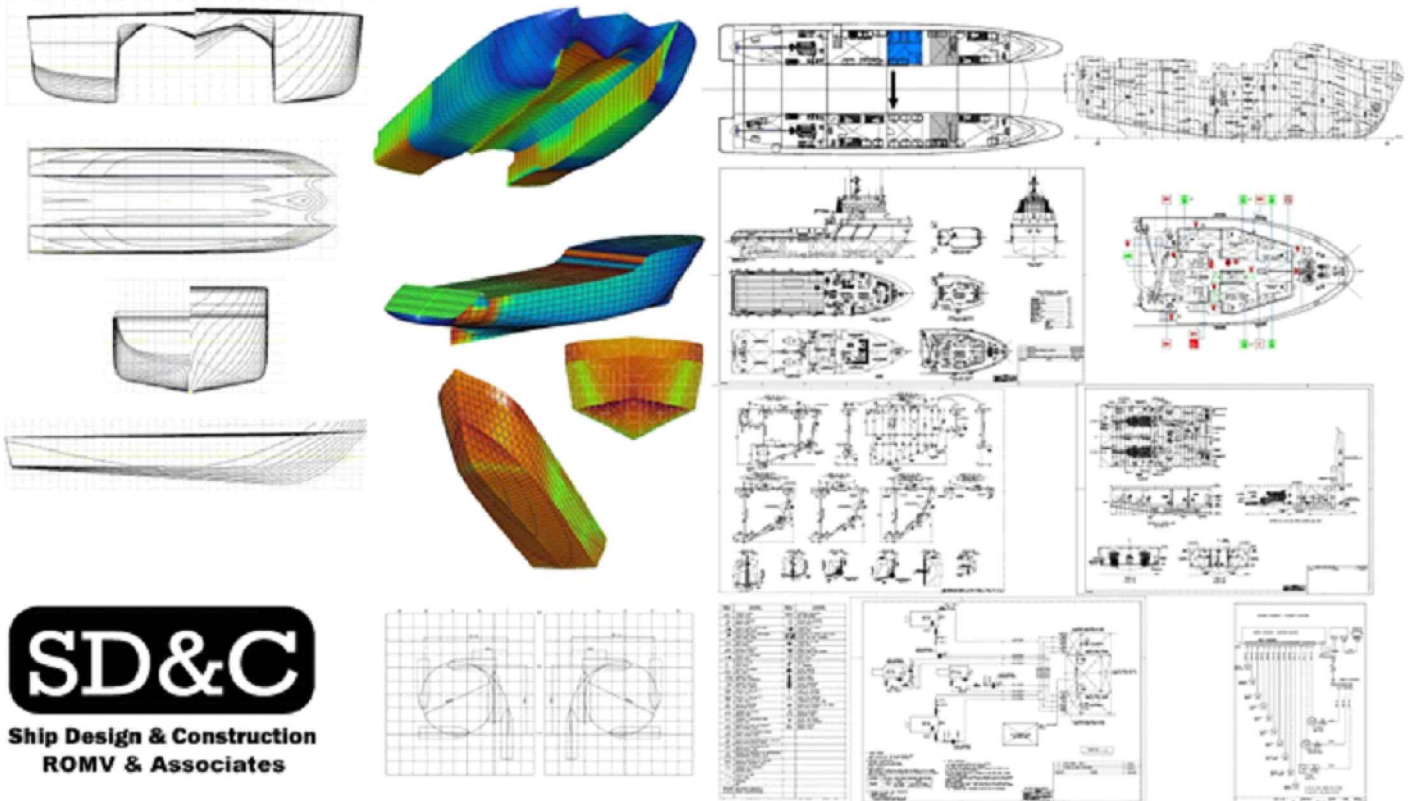


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Ship Design & Consulting
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Ship Design & Consulting Competencies



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About the Group

ROMV & Associates begins with the mission of assessing the naval industry by the applications of modern techniques and the rational decision analysis using synthesis models from the concepts to detailed engineered solutions.

Our team is compromised to deliver better engineering products and we are aware of the serious responsibility that the clients request to attend their requirements, therefore our process are extremely reviewed to reach the entire clients approvals by a whole professional attitude.

Our customers can rely on our professional and fully integrated design process that range from consulting, research, design and even the same yacht or ship building guide, including after-sales service, technical and knowledge transfer.

Group Overview

ROMV & Associates specialties are naval architecture and marine engineering subjects, it is internationally recognized for its participation in the ship design and ship building yards and for participating in outreach events contributing to naval engineering.

ROMV Ship Design & Consulting is a registered trademark accordingly to Ecuadorian Laws and is one of the three ship design & construction trademarks of the group providing design and construction of ships since 2003.

The main specialized services are related to modern boat/ship building and development of synthesis models from concepts exploration to final products. The scope of work is focused on fishing, commercial and military vessels and pleasure luxury yachts, the group also develops research to contribute to the maritime industry.

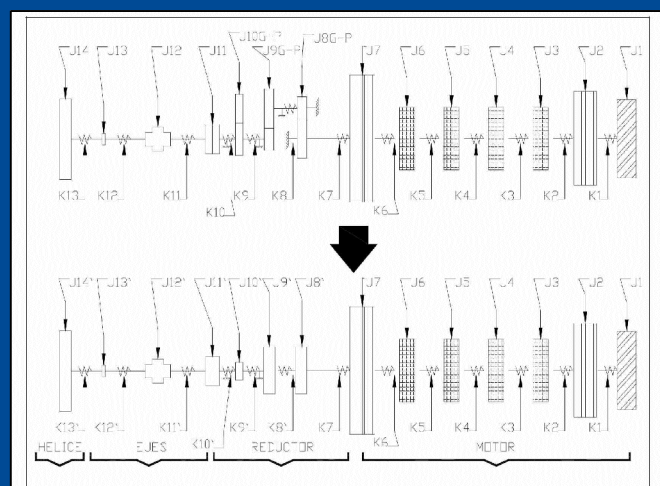
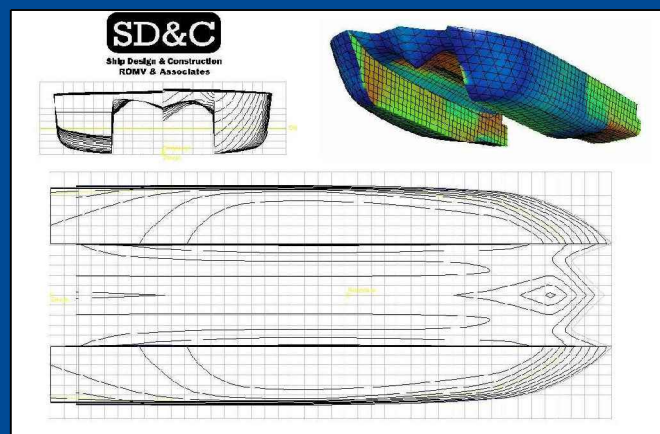
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Design Services

Our success in generating activities related to drawings, 3D models, ship specifications and other information necessary to build ships with iterative multistage design spaces and feasibility cost-effectiveness & risk models. A customer support in all aspects and all stages of a project, from the general arrangement plan of development at conceptual, preliminary, contractual, functional, transitional and detailed design stage. All under a design philosophy based on attributes desired by the customer.

Ship Design & Consulting competencies by ROMV & Associates not only are complete process methodology to fulfil owner's requirements in all design stages also product engineering oriented and trials agenda. The stages cover the whole information to be submitted for approvals and building permissions by the current authority, whole package for cost estimating, production control activities and the construction itself to finally validate the project regarding the performance & cost, all activities using softwares of design & analysis.



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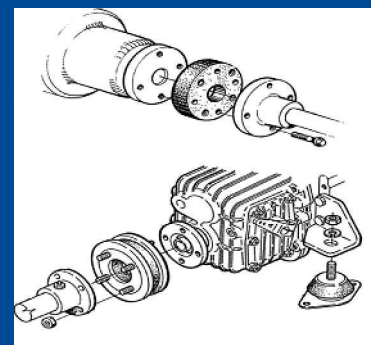
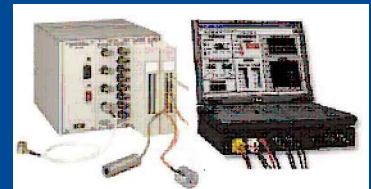
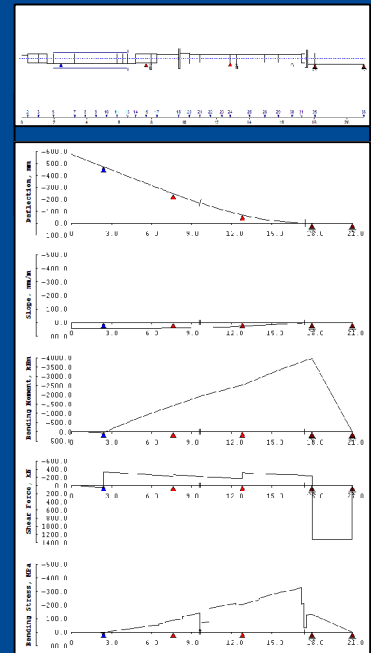
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Shaft Consulting Services

Shaft Calculations is offered by the group and assesses the clients in the appropriate techniques used to reach the goals and purposes commonly pursued while aligning shafts in vertical and horizontal plane at ships under construction or in course of repair. The services produce data to control alignment parameters for every stage of the alignment procedure as existing technical standards require.

Specific parameters that ROMV Ship Design & Consulting calculates:

- initial bearing offsets relative to the reference line;
- bearing loads in operation;
- stress at the reference points;
- thrust shaft flange loads in operation;
- influence numbers matrices;
- boring parameters;
- bearing loads and tolerances during the alignment stages;
- Sag and Gap at open shaft flange connections;
- jack correction factors and jack loads for all alignment stages;
- Sag and Gap at the thrust shaft flange, when the assembled shaft is decoupled from the engine;
- diagram of allowable values of Sag and Gap;
- shaft bending parameters for all alignment stages;
- bearing bush pressure parameters;
- shaft alignment parameters for geometric alignment;
- shaft alignment parameters based on measured Sag and Gap values;
- shaft alignment parameters based on measured stress values;
- shaft alignment parameters based on measured loads values;
- bearing adjustments in course of the strain gauges alignment procedure.
- Shaft Vibration Analysis & Monitoring (Torsional, Lateral & Longitudinal)
- Engine Vibration Analysis Monitoring (Torsional, Lateral & Longitudinal)



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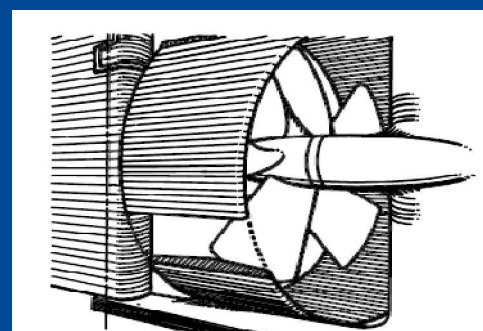
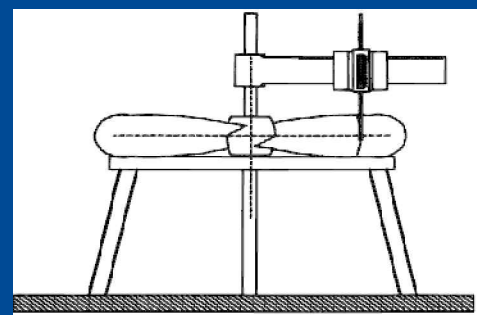
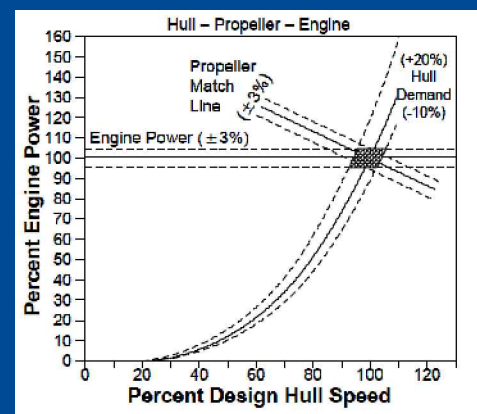
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Engine Performance Analysis Services

The performance of the boat is the result of a complex interaction of all three aspects of the installation; the engine, the hull, and the propeller. Proper component sizing is very important to the life and performance of the entire propulsion system. There are tolerances in several aspects of the propulsion system, and in worst-case conditions the result can be short life and/or unsatisfactory performance because for instance the engine power may be expected to vary due to manufacturing tolerance by as much as 3% when it is new on either side of its rated or 100% power, or up to 40% when it is reconstructed on lower side of its rated. In the propeller case, the power absorption may be as much as 5% higher, or lower than originally expected when it is new or worst when it has already many operation hours. All these situations may point many operators to choose to operate at reduced throttle settings while cruising to reach its rated speed (rpm) when the boat is ready for sea but the engine life and economy have not the best results.

The Engine Performance Analysis Service includes the evaluation of the fuel rate performance of a Marine Propulsion Engine, to the original factory performance specifications for that specific engine. This comparison is made for the entire operating range of the engine, and if the fuel rate data from the analysis test is within the acceptable range for load and performance specifications, it is an indication that the engine is operating correctly, and the propulsion system was sized satisfactorily. If, however, the actual fuel rate curve falls outside the acceptable range for load and performance specifications, adjustments and/or repairs for the fuel system may be necessary, or a further check may be needed for the hull, rudder, propeller, etc. in order to:

- Eliminating Engine Overloading on Overhauled Vessels
- Incorrect transmission or propeller
- Engine fuel setting adjustment with sentry totalizer systems
- High idle adjustment
- Properly sized propeller and/or reduction ratio
- Avoiding driveline component changes



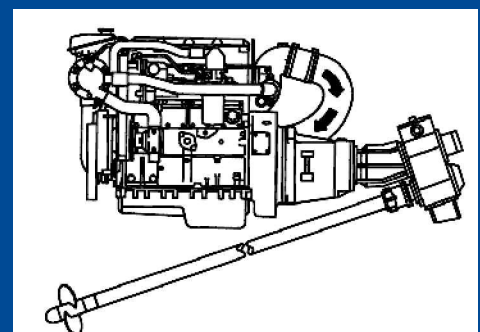
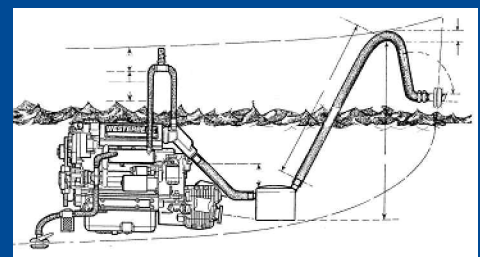
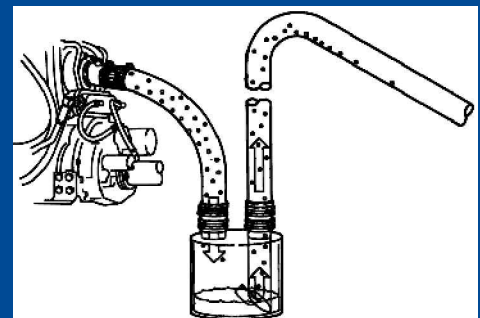
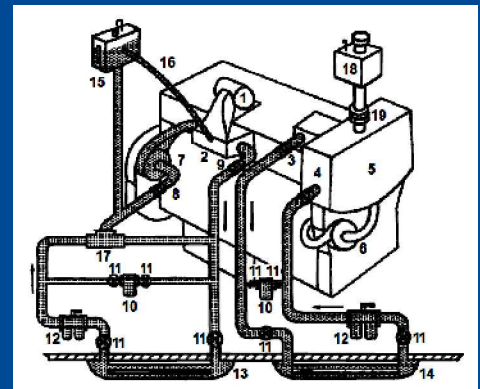
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Marine Engineering Consulting Services

The various duties of the Marine Engineering Services relate to the operation of the ship in a safe, reliable, efficient and economic manner. The main propulsion machinery installed will influence the machinery layout and determine the equipment and auxiliaries installed. This will further determine the operational and maintenance requirements for the ship and thus the knowledge required and the duties to be performed by the crew and by the marine engineer also. As ships are larger and complex vehicles which must be self-sustaining in their environment for long periods with a high degree of reliability, this service cover the various systems which propel and operate the ship assessing all decisions in configuration layout, equipment calculation & selection, training & trials, maintenance and so on. More specifically, this means the machinery required for propulsion, steering, anchoring and ship securing, cargo handling, air conditioning, power generation and its distribution. The Marine Engineering Services include the following areas:

- Engine room Arrangement
- Diesel engines, Steam turbines & gearing & Boilers
- Feed Systems
- Pumps & Pumping Systems
- Auxiliaries Equipment
- Fuel Oils, Lubricating oils & their treatment
- Refrigeration, air conditioning and ventilation
- Deck machinery & hull equipment
- Shafting & Propellers
- Steering Gear
- Firefighting & Safety
- Electrical equipment
- Engineering materials
- Watchkeeping & equipment operation



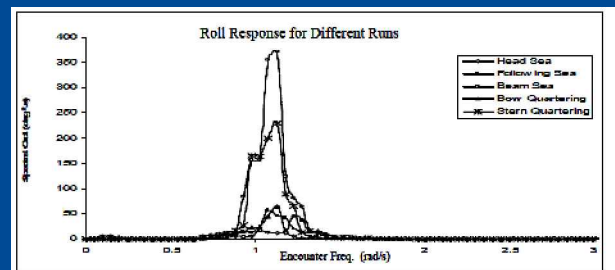
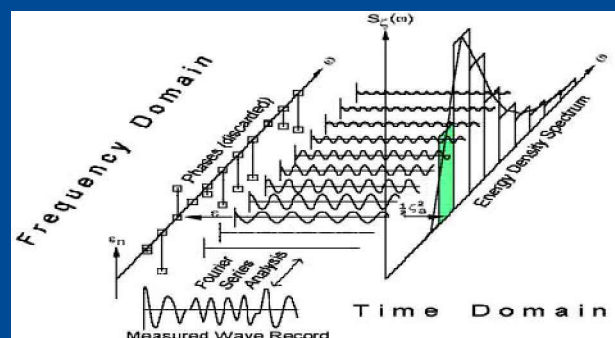
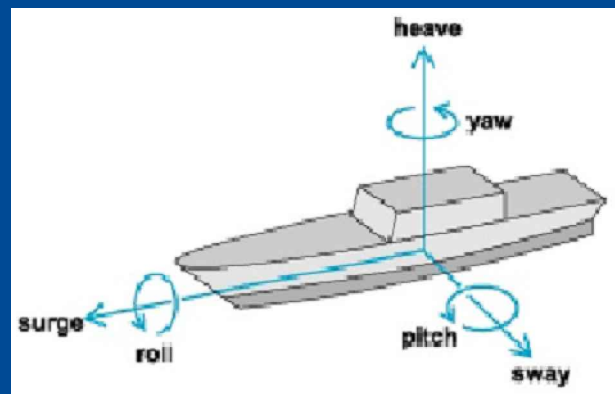
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Seakeeping Analysis Consulting Services

Seakeeping analysis is important in assessing the performance of floating structure in waves. To perform Seakeeping calculations, the wave characteristics as well as the response of the vessel are needed. The analysis normally requires reliable computer programs to calculate response amplitude operator (RAO) and accurate seaway representation. For seaway representation, theoretical spectra can be used but it is more preferable to use the measured spectra which can be obtained through full scale measurement. On the other hand theoretical spectra can be used for comparison. This consulting service offers a full-scale measurement of wave and vessel motions using data acquisition technology with boat motion monitoring system. This system is basically composed of a set of accelerometers, gyroscopes and wind sensors to be processed and analyzed using seakeeping formulations. Finally, the main analysis of the results obtained is in the form of spectral analysis of wave and vessel motions, from them the RAO can be obtained, which is the key to all Seakeeping analysis as:

- Motion in an Irregular Seaway
- Dynamic Stability
- Added Powering in a Seaway
- Adverse Dynamic Effects as:
 - Excessive Bow Motions
 - Deck Wetness & Slamming
 - Vertical & Rolling Effects
 - Seasickness
 - Propeller emergence
- Sudden Inclining Moment and Capsizing of a Vessel
- Crew & Passengers Vibration Exposure Criteria to maintain proficiency
- Structure & Equipment performance degradations

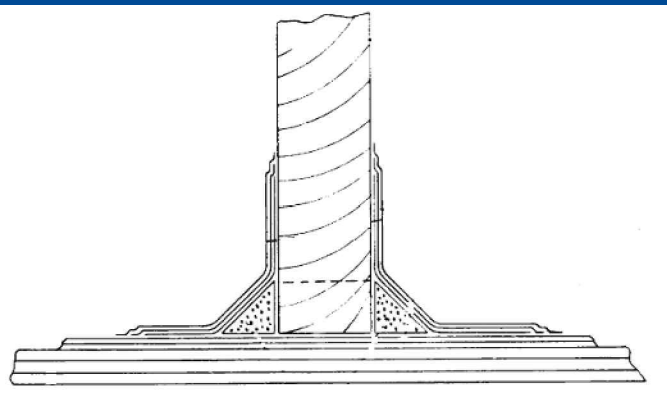
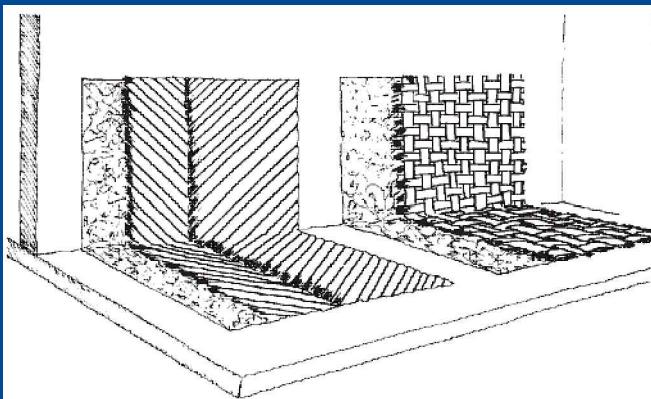
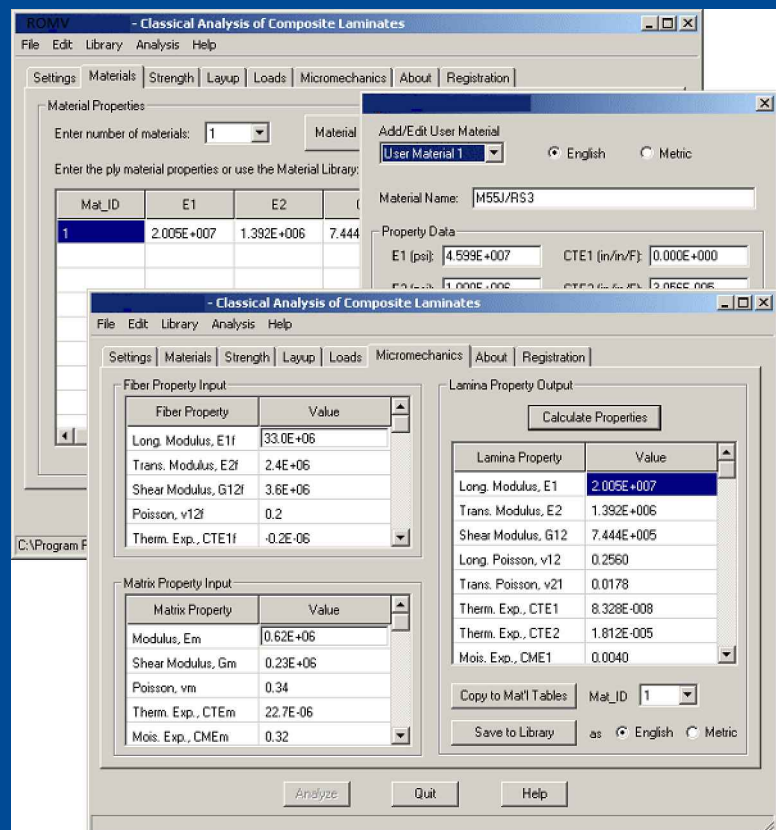


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Composites Consulting Services

Laminated Composites Analysis is offered by the group and assesses the clients according to classical laminated plate theory. Input consists of ply material properties, material strengths, ply fiber orientation and stacking sequence, mechanical loads and/or strains, and temperature and moisture loads. Output consists of apparent laminate material properties, ply stiffness and compliance matrices, laminate "ABD" matrices, laminate loads and mid-plane strains, ply stresses and strains in global and material axes, and load factors for ply failure based on Maximum Stress, Maximum Strain, Tsai-Hill, Hoffman, and Tsai-Wu failure theories. A micromechanics report calculation is also included for estimating lamina properties for given fiber and matrix properties.



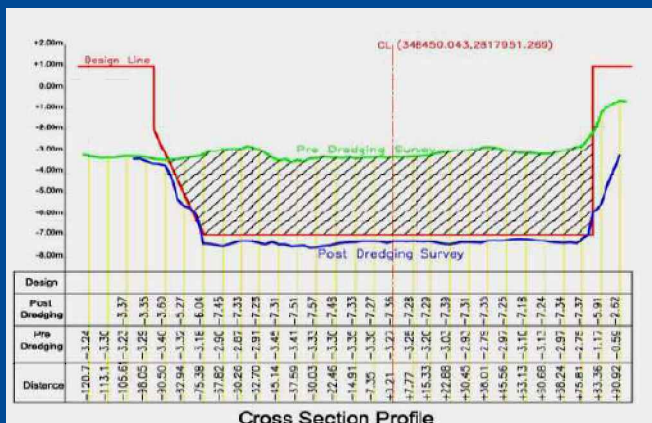
Dredging Consulting Services

From the very beginnings of civilization, people, equipment materials and commodities have been transported by water. Ongoing technological developments and the need to improve cost effectiveness have resulted in larger, more efficient ships. This, in turn, has resulted in the need to enlarge or deepen many of our rivers and canals, our “aquatic highways”, in order to provide adequate access:

- Dredging for Navigation to ports and harbours
- Dredging for construction, reclamation & mining
- Dredging for the environment
- Dredging for material management alternatives
- Dredging for sustainable crowding relocation

The ROMV Dredging Consulting Services in order to cover all these requirements offer the whole package to fulfill a cost/effectiveness/reliability solution including the following areas:

- Dredging Feasibility Studies
- Dredging Environmental Impact Assessment
- Dredge Design & Construction
- Dredge Engine/Pump Output Curve Calculation
- Dredge Test/Trials Agenda
- Dredge Maintenance & Repair
- Dredging Plans



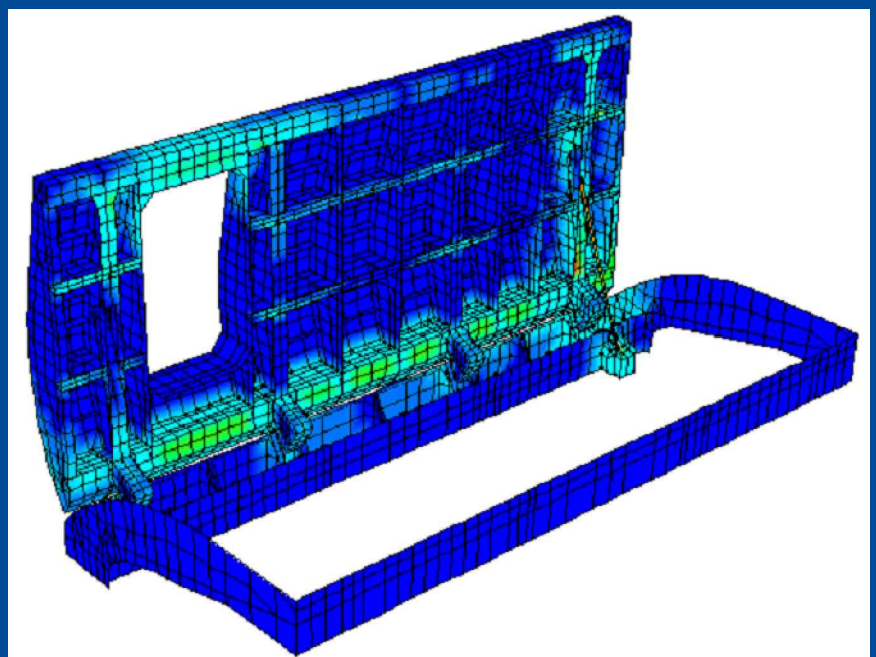
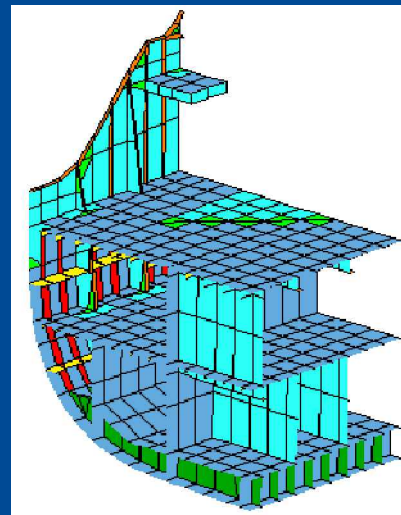
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Structural Analysis Consulting Services

The Complete Ship Structural Design Process is offered by the group using FEA softwares, assesing the clients in projects where various materials are present either in new or existing structures and despite of the nature of loads. The main capabilities analysis are:

- Structural Modelling
- Ship-based Loading
- Finite Element Analysis
- Structural Evaluation
- Optimizations
- Fine mesh Analysis
- Structure Natural Frequency



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Other Consulting Services

An open group of engineers & masters of sciences working continuously on concept explorations, synthesis models, design of experiments, CFD testing and varied calculations covering the whole ship work breakdown structure. In some cases the group carry out own models and computational tools, in other cases adopt the software requested by the clients, but always to fulfil the requirements and deliver the final product in a better way.

Also, a complete risk and decision analysis service is offered by the group to help clients answer questions as know the chances of making a project success in their next venture, Or which of many decision options is most likely to yield the best payoff? How about the best sequential drilling strategy? Or how much to invest in various projects in order to maximize the return on your project portfolio. Armed with that kind of information, you could take a lot of guesswork out of big decisions and plan strategies with confidence.

As consulting services the group also has structured ship/yacht production process and maintenance process based on various activities as superintendent/ship/tenders planning system to easily browse through the jobs within the conversion/new construction/existing projects. This service needs the participation of ROMV professionals as consulting men to reach high productivity goals.

Finally, the group has appropriated process specifically designed to assist operators safety departments with the requirements under ISM for health & Safety, providing total management of your ISM system when it is requested via LAN/WAN networks between office/shore and the vessel. This will greatly reduce the administrative headache with keeping your fleets ISM documentation up to date. A single export from an office system can be imported by your entire fleet. The service covers the following areas:

- Risk Assesment
- COSHH Assesment
- Machinery Assesment
- Manual Handling Assessment
- Policy Documents
- Responsibilities
- Safe System of Work
- Permits to work
- Inciden/Accident Reporting
- Health Monitoring
- ISPS forms & Restricted Access Documents
- Non Conformance & Observation Reports

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