

Cost management in shipbuilding

The major part of the ship's cost is fixed by initial design and engineering. At the same time precise cost information is usually unavailable in these early shipbuilding phases. Therefore, the shipbuilding process requires special procedures for the cost management. Report by Dr. Jan O. Fischer, of GKP*, and Professor Dr.-Ing. Gerd Holbach, of TU Berlin**.

Gesellschaft für kostenorientierte Produktentwicklung (GKP), which specialises in cost effective design, and the department of design and operation of maritime systems of the Technische Universität Berlin have created the software application 'CC-S', designed to support the planning, analysing and controlling of the product's cost in all shipbuilding phases. Its reach extends from the beginning from the early phases of design and engineering, to the calculation accompanying the production and finally to the analysis of already concluded projects.

Design and engineering

Up to 90% of the total costs are fixed at the start of production (Figure 1). Thus, it appears that approaches to optimise the cost have to be considered in design and engineering. Consequently, it is necessary to gather information on the estimated cost of the ship and its assemblies or systems at the very earliest stage.

Alongside its importance for controlling costs, meaningful cost information is important for quotation costing, which requires both quick and precise cost estimation. Another considerable reason for cost forecasting is the evaluation of different designs or technical options: in case of several design alternatives, which are equal in reference to the technical demands, it is obvious that the alternative causing the lowest costs should be chosen. Finally, costs have to be estimated to enable a comparison of planned and actual cost. Those comparisons are necessary to

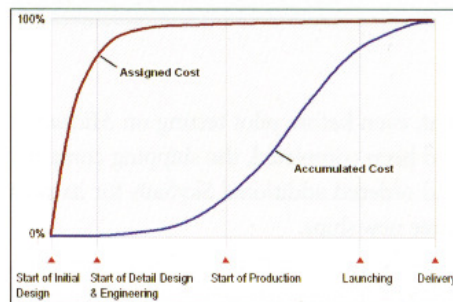


Figure 1. Approximately 85% of the total costs are fixed after the initial design.

identify the need of controlling actions within the running project and to improve the quality of estimations in the future.

Current cost management

Worldwide competition and increasing of materials costs place a massive pressure on shipyards to realise a cost aware design. Simultaneously, the cost calculation in unit production is complicated by the fact that there is only insufficient cost information in the phases of design and engineering and the quality of this information is often quite low in these early phases. Furthermore, the information is usually distributed on different enterprise resource planning and CAM systems which are complicated to handle and lack sufficient interfaces. Sometimes the required cost information exists only in hard copy, or even as the knowledge of single experts only. The cost planning of new projects is usually practiced using tabular calculation programs of office software, which have no direct link to the other tools of the yard.

These circumstances cause different disadvantages:

- Estimating and planning the ship's cost takes a lot of time for manual system queries and following cost aggregations. The pressure of time limits makes the determining of exact and robust cost

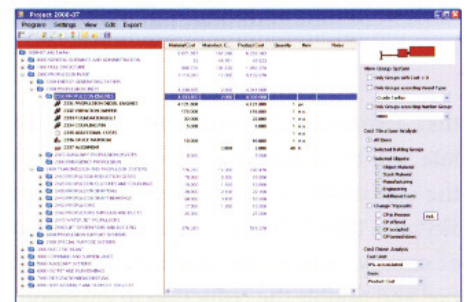


Figure 2. Cost planning and cost recording, referring to the vessel's structure.

information difficult.

- The possibility of cost estimating belongs to single experts. Besides this fact, the quality of estimations, based on the knowledge of experts, differs widely (variation on average $\pm 35\%$).
- The expense of determining and updating dependences of technical and economical parameters, which can be used for cost estimations in new projects, reduces the value of those indexes extremely.
- The existing data base, generated in past projects, is far from being complete, caused by the lack of an integrated system for managing and providing the cost information.

In summary it can be remarked, that there is a big gap between the existing and the used possibilities of cost optimising and controlling the achievement of the allowable cost. These circumstances concern not only the need of reducing cost but, also the aim of gaining time to create and compare different design alternatives.

Software Solution 'costfact-s'

To solve the above problems, a software solution was designed by GKP, of Cologne, and the university of Berlin (department of

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