



Total quality management in ship repair

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Introduction

The ancient wisdom books of the tradition state that a man should take joy from his work. It is recommendation for survival. Without a deep sense of satisfaction and pleasure in your role and its responsibilities, your commitments to the job and to the future will be limited. With limited commitments your hope of improvement will also be limited. With limited hope you will lack vision in shiprepair industry. We can no longer leave with the commonly accepted levels of delays, mistakes, defective materials and defective material workmanship. In the shiprepair business, customers matter most. Without customers we have no earnings, no market share, no return on investment, and of course, no profit. If TQM is aimed at anything, it is aimed at winning and keeping customers-keeping them delighted. This is certainly a cost issue as well as a revenue issue. Total quality management teaches us to "know the customers" - to know what their needs are, to know how we are doing at meeting those needs, and to know what we must do to improve. Specifically, TQM can help us achieve great advances in delighting the customers we have and keeping them.

On the other hand, it should be emphasized that in any repair work on a ship the best results will be obtained when there is close co-operation between the parties involved, i.e. the yard, the shipping company and the ship.



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From the yard's point of view, it is considered very useful that the owner be well informed not only about his requirements of the yard but also his duties towards the yard, however, all dry-docking and repair work follows a common pattern, which may conveniently be divided into phases which overlap and affect each other. So, it might seem to be quite difficult to achieve such harmony to reach the bottom line of such problem. However, the main objective of this paper is to deal with these phases in order to reach an integrated frame work in the shiprepair industry, and to touch the real benefits of implementing TQM in shiprepair.

Registration of jobs

Registration of jobs should primarily be carried out on board by the ship crew. Most of the faults occurring on board will normally be repaired by the crew. It is therefore very important to record what is repaired, when, and what kind of spare parts are used.

Specification

When the work to be carried out at the yard has been carefully selected, the time has come to send a written specification to the yard asking for a tender. It is believed that the specification is the basis for the repair contract between the owner and the repair yard as regards of both time and price. However, a poor specification may often cause delay and increase the cost. For the owner this may entail higher costs than estimated and a longer stay at the yard. For the yard it can mean cancellation of other commissioned work, postponement of new building schedules and the transfer of certain jobs to sub-contractors, who often cost more than their own laborers. Indeed, both parties stand to lose money if the specification is poor. Hence the specification should be in away to reflect a clear picture of the work to be done. It shall be the yard's tool for quoting the most accurate price and for planning the work, resources and schedules. So, specification could be divided into the following main sections:

- General particulars and information about the ship (length, beam, draft, main engine, auxiliary engines, pumps,etc.).
- General conditions (performance, cleaning, testing,etc.).
- Standard prices (standard or unit prices should be taken into the specifications for jobs which can be measured in units).



- General services (dock rates, fresh water rates, electric power rates, crane hire rates).
- Work specifications (should include photos and sketches and should be as complete as possible for each job).

Invitation to tender

As stressed earlier, the specification is the main element in the repair contract between the owner and the yard. The specification is sent to various yards requesting quotations for price and duration, or alternatively for duration and hourly rates if the work is to be paid by running account. The quotation for duration of work should be presented in the form of a progress plan.

Planning and preparation of repair work

Increasing demands are made for improved planning and control as a result of increased completion as regards both the duration and cost of ship repair. However, the need for preparation and planning will vary somewhat depending on the type and extent of work and the time available. Furthermore, factors such as the yard's familiarity with the ship and the quality of the specification strongly influence the amount of preparatory work that may be done. In this respect, the yard must undertake certain preparations irrespective of the yard and magnitude of the project. These include the following:

- Owner's specification is studied by the repair, operation, planning, design and purchasing departments, job distribution may depend on work organization.
- Materials and equipment are ordered as early as possible. In such process a harmonic teamwork and interunit co-operation is needed.
- Owner's specification must be re-edited and adapted to the yards' account plan. The yard's specification is sent to the various departments, preferably with a detailed work description.
- Repair manager (project manager) is appointed.
- If possible and desirable representatives from the yard visit the ship, preferably together with an owner's representative.
- Job and material requisitions are issued and distributed to the respective foremen. Some yards also include estimates of manhours.



- Progress and manning plans are made, including job method plans if required.
- Design work is carried out.
- Possible prefabrication are completed.
- Preparatory meetings are held between repair engineers, foremen and other persons involved to review general information about the project, progress plans, specifications and special work arrangements, etc.
- Material and equipment are collected and checked.
- Owner's deliveries are received and stored.
- Necessary contacts are made with the classification society and authorities in consultation with the owner.
- The dry-dock is reserved and prepared and the owner is informed about dry-dock particulars and the desired trim and loading of the vessel. Yet, it should be noted that a progress plan should be provided. The advantages of having a progress plan are many. It may be presented in different ways, the most usual being as a network plan or schematically in a gant diagram, where the jobs are distributed within the available time period. This gives a review of each individual job and the total contract, and makes it easier to evaluate the work force required. Some of the jobs will prove to be critical, i.e. jobs that will be decisive for meeting the delivery deadline. These critical jobs must be further analyzed in order to bring forward delivery; overtime or shift work should be considered in this regard.

Evaluation of bids/tenders

When choosing a yard, its location relative to the trade of the ship must be considered, together with the quality of the bid, earlier experiences with the yard, language, weather, conditions of payment, spare parts available, customs regulations, etc. Most of these aspects should have been considered before writing the yard to tender. So, when bids are received and evaluated a number of points will usually be unclear and have to be settled through further contact with the yard. When this phase has been completed, the owner may be let with several bids which must be evaluated in relation to one another. Points to be considered are then:

- Price, duration and quality of bid.
- Duration.



- Quality of bid.
- Conditions of payment, and how much of the specification is covered by the bid.
- Any reservations made by the yard and the effect they may have on costs.
- What impact the reservations may have on duration of the work.
- Whether cost and time quotations are realistic in relation to the workload and yard capacity.

When a yard has quoted price after survey or running account instead of pricing an item, it is advisable to use the highest quotation from other yards as a basis for evaluation.

Preparation

Planning and preparation for repair work are interlinked. The preparations to be made by the shipping company and on board ship by a way that increases the employee involvement and improve management - employee relations. It should include the following:

- The final written specification and repair program from the yard to be sent to the ship in such way to achieve interunit co-operation.
- The superintendent to visit the ship prior to docking.
- Transportation of spare parts, equipment, paint, etc., to the yard.
- Hiring of the necessary specialists, classification officials, special service staff, etc.
- Instructions to the personnel department that no senior officers or other key personnel are to be relieved during the dry-docking period.
- The superintendent to arrive at the yard one or two days prior to the ship's arrival to clarify with the repair engineers all details with regard to work progress, daily meetings and participants, responsibility for follow-up, water and ballast water.
- Give dimensions of shore connections.

However preparations on the ship should take another different dimension. It should include the following:

- Distribution of jobs to be carried out.



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- Planning of the ship's own activities during dry-docking, including necessary watchkeeping.
- Preparation of a relief plan for personnel on board, taking care not to change responsible officers.
- Preparation of a list of certificates to be renewed.
- Give notice about jobs to be canceled.
- Special tools and equipment must be looked after and tested.
- Spare parts must be available or ordered.
- Drawings and work instructions must be available.
- Marking of every component and area where work is to be carried out.
- Cleaning, gas-freeing and dismantling where possible.
- Lock up tools and valuables.
- Preparation of a tank plan giving the amount of fuel oil, diesel oil, fresh water, etc., carried on board.

Execution, organization and administration

Once the ship arrive at the yard and the work is in progress, many details require attention:

- Presentation of the persons in charge on both sides. i.e., superintendent and responsible officers from the ship and repair manager and foremen from the shipyard.
- Make sure that all critical jobs are started according to the repair program.
- The use of communications equipment such as walkie-talkies or the like saves a lot of time in locating people. A telephone should be installed on board the ship.
- Drawings and work instructions should be in hand.
- The yard should take care that officials from the classification society and the authorities are at hand when needed for the inspection of work or components.
- The yard should also order necessary contractor and service staff.
- The yard should give information about their fire routines, so that the ship's routine dose not interfere with the yard's in the event of fire.
- There must be no doubt about the routines regarding ship's CO₂ plant.



- There should be a daily meeting on board the ship, even if the work in progress is under full control.

CONCLUSIONS:

Improvements in shiprepair is more difficult to trace to the bottom line. However, some benefits could be derived from TQM implementation in shiprepair.

- a. Improved teamwork and interunit co-operation as a quality team oriented modus operandi takes hold. This also greatly facilitates the strong and effective integration of different work groups.
- b. Improved communication through a common language and a strong customer focus. Since total quality management builds a common language and a set of compatible attitudes that greatly improve the effectiveness of a corporation.
- c. Increased employee involvement. Since those actually performing the work are in the best position to know what can be done better and how to achieve the improvements. So, total quality management provides the setting and tools to more effectively tap this underutilized resource.
- d. Improve management-employee relations. Total quality management provides a corporate focus that both managers and nonmanagers pursue in similar ways while speaking the same language. This builds a more effective total corporate team.