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Technical Management of Guarantee as Part of Quality Control in Construction of a Ship

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ABSTRACT

Nowadays, the buying and selling of manufactured goods and associated services are sufficiently regulated so that the buyer (a private, commercial or industrial customer) is protected from the quality and performance of the goods or services purchased or hired. This coverage, generally called "Guarantee", is fixed by national laws and regulations of international application.

In the naval industrial sector, the implementation of the "Technical Guarantees" are those that the builder gives about the features, benefits and condition of the ship and all the equipment, responding to manufacturing defects and compromising the replacement of parts and equipment damaged during a period of time. These guarantees should be clearly stipulated in the contract.

Just keep in mind that the great majority of products and equipment are manufactured and massively distributed to the market. However, for Shipbuilding Industry, many of the materials supply and service are unique and are tailor-made. The construction and delivery of a ship is a special case and complex of industrial supply. Therefore, the management of the technical guarantees after the construction and delivery of a ship owner provides clear advantages that have to be object of special study.

1. Introduction

Management of Technical Warranty inside the naval industry is done on equipment, parts and services related to those goods. Manufacturers and sellers of goods and services are responsible for translating legal guidelines to safeguard quality (assurance) in its general conditions of sale and service, but add other particular conditions agreed between seller and buyer, reflected in four main sections.

— The agreement for the construction of a ship is formalized through the Construction Contract. It is a commercial document which specifies the terms and conditions of the purchase and sale of the ship, between the ship-owner and the shipyard.

— The second part to consider is the Quality Approach in the Project, where the owner, in defense of their interests, should do a quality approach adapted to the project.

— In the third paragraph, must take into consideration the General Aspects of the Warranty. In any contract for construction of a vessel a section on techniques is associated guarantees the fulfillment of customer expectations has to appear.

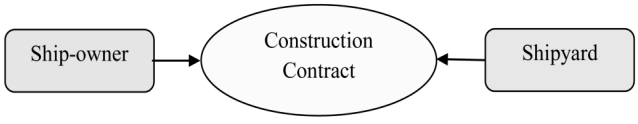
Finally, it is required to have a formal procedure and document database to collect the entire procedure Management of the Technical Guarantees.

2. Development

2.1. Construction contract

As mentioned above, the construction of a ship is formalized through the construction contract, which specifies the terms and conditions of the transaction for the sale of an asset, in this case of a ship between the ship-owner and the shipyard that builds.

Figure 1: Construction Contract



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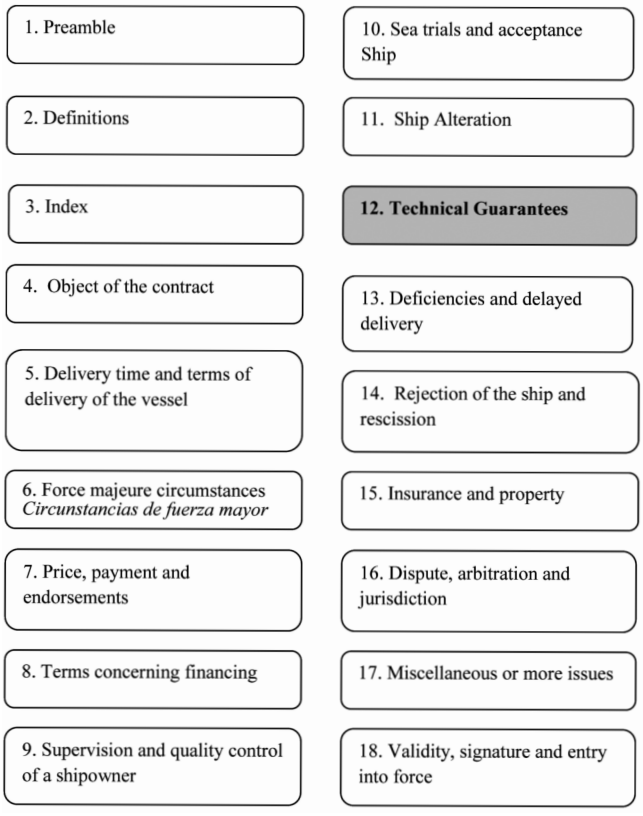
It is obvious that the construction of a ship starts with the signing of the contract. However, before the firm has taken a more or less long technical definition, preliminary and pre-negotiation process, which typically involved the owner, shipyard, engineering, suppliers, consultants, management flag, classification society, etc. The contractual relationship is terminated when all the issues related to it are resolved and well accepted by both parties.

The contract can be public or private, although the first mode given the high turnover figures and advised risks involved.

A standard shipbuilding contract usually consists on the following sections:

Figure 2: Sections of a Construction Contract



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We can shortly describe each of the sections of the Construction Contract the following way:

1. **Preamble:** Confirm the identity of the parties and the attorneys appointed to execute the document is signed.
2. **Definition**: Set of key words and terms that appears in the text.
3. **Index**: List of contents of the contract document.
4. ***Object of the contract:*** The scope of supply is defined corresponding to the price paid. Basically, the ship building, main technical features and benefits are defined. Mention is also made to the *"Detailed Technical Specification"* included in an annex that part of the contract.
5. ***Delivery time and terms of delivery of the ship:*** Includes the timing of production milestones (entry into force of the contract, the first steel cutting, keel laying, launching and delivery), the supply conditions of the ship and the port of delivery ship-owner.
6. ***Circumstances of force majeure:*** Circumstances are mentioned, under which the seller can extend the delivery within agreed upon notice and justification of such circumstances and with a ceiling agreed by both parties.
7. ***Price, payments and guarantees:*** First, the contract price is set, if fixed or variable (usually motivated by unfavorable commodity market, equipment or wages) and default interest. Moreover, the plan rhythmic partial payment to production milestones mentioned above is detailed. Finally, it specifies how they are to be generated and exchange guarantees mutual guarantee both parties, in anticipation of the damages that may be caused to a party for breach of the other.
8. ***Funding conditions:*** If it were the case that the shipyard act as an intermediary or facilitator credit from external financial institutions should reflect the terms agreed in the contract.
9. ***Supervision and control their own quality of owner:*** In this section the right of the owner to locate formalized at the shipyard throughout the construction and a team of technicians who will exercise control and approval of the construction as it progresses. Moreover, the law also provides for moving the shipyard before the vessel is a crew or any part thereof for the purpose of familiarization.
10. ***Sea trials and acceptance Boat:*** Sea trials are fixed once the ship has adequate seaworthy. These tests must attend shipyard representatives, shipowners, classification society and independent experts involved in the project. The media and risk tests run by the shipyard. If the tests are successful, a protocol signed by authorized parties and forcing the acceptance of the shipowner shall be developed. If during testing a compromising fault occurs, the test shall be suspended and shall be repeated once repaired the malfunction or mishap.
11. ***Ship Alterations:*** Modifications of the project under contract proposed by the builder or owner, and agreed to be agreed conditions and impact on contract commitments before being made. Basically delivery, characteristics and finals technical performance.
12. ***Technical guarantees:*** Those giving the builder about the features, performance and condition of the ship and all its equipment, responding to manufacturing defects and compromising replacement parts and faulty equipment for a period of time.
13. ***Deficiencies and delays in delivery:*** The delivery delay and the appearance of certain deficiencies linked to production and design, tends to go hand penalties, awards, rejection or renegotiation of the ship. Some typical aspects penalize-reward, are the delivery, the vessel's speed, the specific fuel consumption and capacity.
14. ***Rejection ship contractual termination:*** In this section is mentioned the lives of both parties (rights and

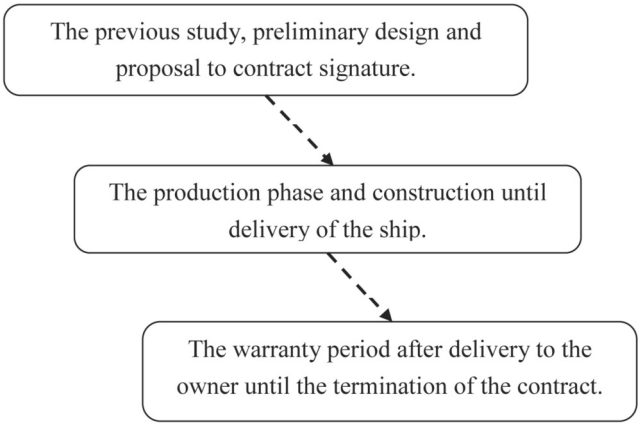
obligations) in the event that the owner rejected the supply boat under the application of any contractual clause.

15. ***Insurance and property:*** It will document that the ship will be property of the ship yard until the delivery date, in which the buyer will become the owner. Until then, all the responsibility on the ship it will be of the shipyard. In this section, must be realized actions to take by both parties in case of partial or total loss of the vessel prior to delivery.
16. ***Dispute, arbitration and jurisdiction:*** It is contemplated in this section how to be resolved disputes among the parties, as a result of the different interpretations of the contract.
17. ***Miscellaneous or more issues.*** In this section it will be included those minor issues, scattered, previously untreated, but which affect the contract will be included. For example, the endorsement of the contract to another shipyard, patents and intellectual property rights.
18. ***Validity, signature and entry into force:*** This is the page that shows the agreement, goodwill and date of entry into force of the contract, by the signatures of the parents.
19. ***List of contents of annexes which form part of contract:*** Detail Specification of the ship. It is the block, most voluminous of the contract, includes lists of suppliers agreed and documents delivery; acceptance certificate for the owner, list of supplies that directly provides the owner, etc.

2.2. Quality approach in the project

The shipowner, in defense of their interests, should do a quality approach adapted to the project. This scheme must consider three stages:

Figure 3: Quality approach in the project



Source: Authors

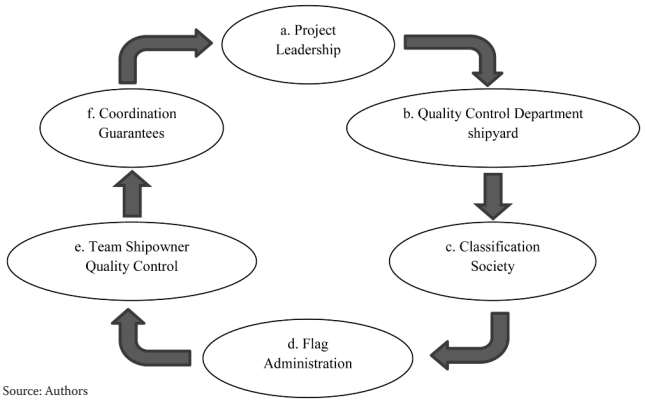
The initial stage of **study and preliminary,** usually a period fraught with many technical and commercial discussions, not without formalism and rigorous technical protocol, with a view to achieving a final project proposal.

The phase of, manufacturing and delivery is it consumes more time and resources, while requiring multiple and rigorous monitoring tools to try to ensure project quality.

It should be remembered that the contract usually not resolved with the delivery of the vessel to the shipowner. After this milestone, must be dealt the final stage of "guarantee" for which the means is advisable also arbitrate.

To carry out these three stages, the approach of quality should have different control mechanisms based on the following elements:

Figure 4: Control Mechanisms.



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These control mechanisms must begin with th*e leadership of the project from the ori*gin of the idea and throughout the preliminary stage. It must have a project leader able to combine proposals to meet the expectations of the shipowner.

The Quality Control Department shipyard, acts as entity's internal control over activity by the production department and ensure technical purity in the implementation of the project with the technical specification.

The Classification Society is chosen by the shipowner and its main role is focuses on advising, control, monitor and implement appropriate corrective actions for the project to comply with the rules of its own classification in order to get rated and certified class.

Administration flag, depending on the legal powers conferred and under the international commitments made by the state that it represents, must monitor compliance with national and international standards as far as safety and navigability concerns.

When a ship is built in a foreign country, the flag Administration itself usually refers to a recognized organization (Classification Society) as an entity authorized to act on behalf of the same and issue provisional statutory certificates.

Team quality control shipowner is formed by a group of technical specialists (Team Leader and supervisors hull and structure, mechanical assemblies, electrical assemblies and supervisor of paintings) moved permanently to the yard during the time of manufacture, exercise direct control of compliance of the project, on the fly, defending the general interests of the owner and, in particular, the standard of care is respected project.

Finally, there must be Coordination of Guarantees which will manage the final contractual phase. To do this, you must involve office staff of the shipping and the crew itself.

2.3. General aspects of the guarantee

In any contract for construction of a vessel a section devoted to the technical guarantees appears. In drafting the whole contract the text and in particular with regard to the guarantee should participate Management, Risk departments and Technicians plus an external consultant to review contrast.

By the supplier or manufacturer, technical guarantee is associated with the fulfillment of customer expectations. In this sense, the guarantee is offered to purchasers of equipment and property as an added value to their products.

If that occurs the delivery (the good, ie the ship) with outstanding deficiencies, their resolution will not be against the amount allocated to guarantees, unless timely agreement.

It is common practice to set a total economic amount, which constructor takes a maximum guarantee value. That amount can be given direct monetary value or percentage of contract value.

The warranty period starts from the date of delivery and acceptance of the vessel.

The seller must ensure that the ship and all its systems and equipment will operate without failure for a specified time that is generally 12 months from the date of delivery and acceptance. During that time is required to repair faults and correct defects not known by the shipowner at the time of delivery, as are design defects, incomplete work or improperly made, poor quality, faulty materials, etc. Generally not liable for failures resulting from misuse, negligence, accident or lack of maintenance. The responsibility is usually limited to repairing or replacing parts or pieces of the hull structure, machinery and equipment of the ship.

For guarantee repair work performed by the shipyard or authorized agent is used to give an additional guarantee of 6 months, but with a maximum of 18 months from the delivery and acceptance of the vessel.

If to consider a warranty repair that requires input in shipyard causes great inconvenience to the buyer (eg by remoteness), by agreement or judgment of the owner, a shipyard will be selected in the normal work area to make the ship repair. After repair, the original invoice by warranty refers.

Any guarantee claims must be communicated to the shipyard and delivered a copy to the engineer onboard warranty, if any. Usually prescribed that since the problem is detected until it is communicated to the yard, must not spend more than 14 days.

After a warranty claim, as required, by agreement, may be resorted to the services of an independent surveyor in order to check the problem. Based on its report, the shipyard may accept or reject the claim. If yes, proceed to the repair.

To a fault arising under warranty, usually stated in the contract that the seller is not responsible for lost profits, detention of the ship, crew costs or other consequential damages.

At the request of the buyer, the shipyard reports the warranty conditions given by the various subcontractors. Moreover, these conditions usually endorse the shipowner but always under the minimum requirement of 12 months from the delivery of the boat.

It is normal for the buyer and subcontractors can resolve the guarantees arising directly, always informing the shipyard and understanding that this does not relieve the seller of its ultimate responsibility for technical guarantee. This possibility of resolution is an advantage for the owner as all claims resolved directly by the manufacturer of the equipment does not reduce the amount of collateral agreed with the shipyard. If a manufacturer rejects a claim despite the opinion of the owner, finally, could claim the shipyard.

If the ship was paralyzed on his holding to repair a under warranty problem, the shutdown period would not count for the purposes of the same for all the equipment and be added to the initial guarantee period.

The shipyard may designate and maintain on board an engineer qualified warranty for some time, but now is not a common practice and often contemplate how discretionary but not mandatory shipyard for cases of ships with special features or complex projects.

Typically require that parts or components defective, which would have been replaced under warranty, must be kept on board during the warranty period in order to subject them to study if necessary to resolve the claim.

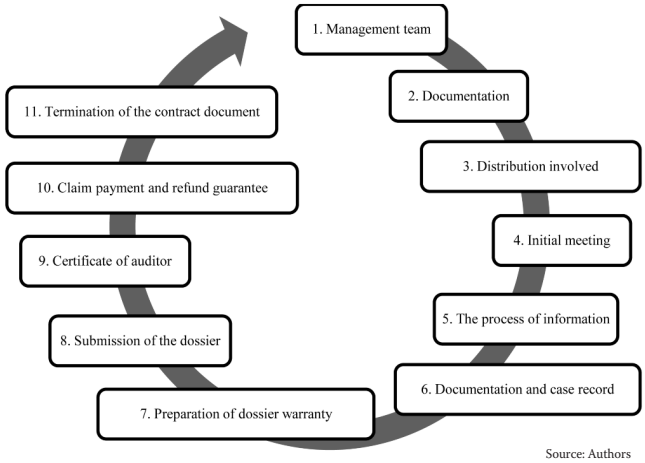
All costs of providing warranty parts (transport, forwarding, taxes...) borne by the shipyard, manufacturer or subcontractor.

After all the warranty period (standard is 12 months), you must specify the documents needed to settle the set of all warranties (guarantee by the dossier) time limit to complete the dossier, if intervention is necessary an independent auditor to evaluate and settle the acceptance or rejection (service paid by the yard).

2.4. Management procedure technical guarantees

A successful "management of guarantees" bring benefits to the ship and the company. To achieve this purpose, required to have a formal procedure and document database. This proce-

Figure 5. Method of managing technical guarantees.



Source: Authors

dure assumes all contractual provisions devoted to technical guarantee.

Additionally, the guidelines that staff must follow the shipping for the proper management of the guarantees will be incorporated.

We then propose the main components and basic lines of this management model:

1. ***Management team.*** It is usually formed by a coordinator based in the office of the shipping and communications manager with the shipyard, and Captain, responsible for the ship
2. ***Documentation match.*** Must have at least an updated construction contract, the Act of delivery and acceptance of the ship and the list of deficiencies, if any.
3. ***Writing and distributing the text of the written procedure.*** This procedure should be developed at the time the construction contract. It should be a permanent and improved standard within the company.
4. ***Initial meeting*** between the coordinator and commanders ship after delivery of the vessel, to instruct the crew answer questions of procedure and set management objectives, which are:
   – Resolution of all problems classified as claimable under warranty.
   – Document all actions to develop the dossier warranty.
   – Resolution of the list of outstanding deficiencies, if any.
5. ***The process of information.*** In the process, they have vital information flows. In this regard, we distinguish the following:
   – Communication of the ship. Essentials ship building number, delivery date, description, date of detection of the problem, date of submission, etc: before a warranty issue, a format designed to incorporate be completed.
   – Communication to the yard and / or subcontractor. It will confirm whether the present case is appealable to the warranty or not.
   – Response shipyard-subcontractor: Additional information, further clarification, support, spare parts.
   – Performance and problem resolution. Archive of all related records: working parts, supply slips, photos, reports, etc.
6. ***Documentation and record of the case.*** While each claim is closed, all related documents are saved as part of the final record of warranty claim.
7. ***Preparation of record of warranty.*** The final and complete record of the shipyard guarantee claims must contain at least the following: cover letter, complaint and request for acceptance led to the independent auditor. A summary of all cases that claim table. Copies of the Act or Protocol delivery and acceptance of the ship, the endorsement of guarantee provided by the shipyard, construction contract, the signature and entry into force of the contract, the contract section on technical guarantees, and for each case, communication complaint to the yard and all documents that support it, including original invoices generated.
8. ***Transfer of the case to an auditor at the end of the warranty period.*** After all the warranty period, should be designated an independent auditing company by mutual agreement by both parties, to rule on cases claimed warranty.
9. ***Auditor's certificate.*** The auditing company (chosen with mutual acceptance of shipowner and shipyard) must evaluate the dossier, request clarification or additional documents and finally issue a certificate related cases and those not accepted..
10. ***Claim for payment to the shipyard and refund guarantee.*** From here, the shipyard must pay the owner the amount claimed warranties accepted..
11. ***Termination of the contract document.*** Once the owner has received payment, was the last formal act referred to in the contract: the return of a guarantee to the shipyard and the signing of the termination of the contract document.

3. Case study

Actual experience indicates that the adoption of a formal, systematic, documented process for managing the technical guarantee after the construction and delivery of a ship owner provides numerous advantages. Without going into a detailed analysis of different cases and different factors, we can say that the inclusion of warranty management within the approaches of project quality and, moreover, the accommodation of this management to a rigorous procedure, make a difference between a system of quality management and casual. As an example, below a case control deficiencies and resolved guarantees:

Table 1: Case Study.

CONTROL DEFICIENCIES RECEIVED and GUARANTEE SOLVED Ship 1 and 2 Guarantee management procedure implemented Ship X without guarantee management process implemented				
DEFICIENCIAS	**Equipment**	Ship 1	Ship 2	Ship X
	Hull	20	2	1
	Machinery	15	0	1
	Electrical	16	0	1
	Painting	1	1	0
	Total	**52**	**3**	**3**
	Resolved by:			
	Subcontractor	46	0	3
	Shipyard	6	3	0
	Total	**52**	**3**	**3**
GARANTIAS	**Equipment**	Buque 1	Buque 2	Buque X
	Hull	15	8	3
	Machinery	63	64	15
	Electrical	54	53	11
	Painting	2	0	0
	Total	**134**	**125**	**29**
	Resolved by:			
	Subcontractor	93	85	3
	Shipyard	41	40	0
	Total	**134**	**125**	**3**

Source: Authors

4. Conclusions

— The owner is always in control of the management of guarantees against the shipyard or subcontractors.
— Reset faults are rectified and the condition of the ship according to the initial expectations of the owner.
— Replacement costs are recovered optimally, without formal fissures and making the most of the item or contractual warranty clauses.
— It helps to correct faults in other sister ships in quasi - simultaneous construction and before delivery to the owner.
— You can help improve the text of the contract for future projects.
— The crew awareness in detecting and reporting failures and shortcomings.
— During the warranty period , in principle , every problem is treated as claimable , however insignificant.
— Knowledge about the process is sped up the ship by the crew.
— The ship is refined and, in turn, reveals weaknesses to consider in the future exploitation.
— Assumes a plus for insurers and P&I Club.
— Starts and establishes contact with equipment manufacturers , facilitating future relationship.
— Help to make an initial assessment of equipment manufacturers as usual suppliers.

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