



Fundamentals of Shipbuilding Contracts

An instructive tutorial for all persons involved
in the development and/or management of
contracts for ship construction and conversion.

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SUMMARY

The ultimate outcome of the work product of vessel design engineers, shipbuilding contractors, equipment suppliers, vendors and subcontractors is controlled through the mechanisms defined by a shipbuilding contract. The contract defines the rights and responsibilities of the two parties that execute the contract, the Owner and the Contractor. The Owner's design engineers who continue on the project, as well as all the other organizations participating in the project, have to work within the boundaries of their contractually stipulated rights and responsibilities. If those rights and responsibilities have not been adequately defined during contract formation, each participating organization may not be able to make its contribution to the project in the manner it anticipated. Accordingly, it is in the interest of each organization, and the professionals within them, to not only understand the contract that controls their actions, but perhaps also to have a role in the formation of the contract. But in order to appreciate the interaction between the various elements of the contract, of which there are many, as well as to appreciate the role of each participant, it is necessary to have a fundamental understanding of the content and composition of shipbuilding contracts. This paper provides a description of the elements of such contracts, and the purpose of each such element of the contract, all in a manner that is suitable for persons who are not lawyers. The ultimate purpose of this paper, by providing insights based on actual shipbuilding contractual

experiences, is to assist readers in the avoidance of contract management difficulties as well as the more significant contractual disasters.

1. Introduction

A contract for the construction of one or more vessels is the logical outcome of a decision by a shipowner to acquire the new ship(s) to further the objectives of the organization. Possible objectives include: a favorable return on investment; a public service (ferries, search and rescue, etc.); a *captive* transportation link as a component in a larger logistics system; a military or security capability; environmental monitoring and preservation; scientific research; and recreation (cruise vessels and large yachts); among other objectives of ship owning organizations.

Once the decision to acquire the new ship is made, multiple follow on decisions are necessary. Many of those decisions are reflected in the technical specifications and plans, or drawings, which define the physical ship that will satisfy the requirements of the shipowner. The development of those technical requirements in the form of Contract Specifications and Contract Plans is discussed at length in Ref. [1] and Ref. [2].

All of those technical matters, however, come into effect only through the actions required by a contract. The contract consists of several components, as described below; but the one component which ties them all together is the *Agreement*. This paper describes the intent of the various parts of typical Agreements for shipbuilding contracts.

2. Organizational Experience

A new ship for most ship owning organizations is just one more in a series of vessels in its possession, but sometimes an

acquisition of a new ship is a *first* for an organization that is just getting into ship owning. Initially, it would appear that shipowning organizations that previously have acquired ships possess the experience to undertake the acquisition process without difficulty due to that previous experience. Conversely, it would appear that first time ship owning organizations likely would encounter greater difficulties due to the lack of relevant experience. However, neither of those statements is necessarily true.

The only experience a ship owning organization can bring into a ship acquisition process is that of the individuals involved on behalf of that organization. Thus, a first time shipowner can, in fact, have the benefit of prior ship acquisition experience by using, as employees or consultants, persons having directly relevant experience. It is important to stress the word *relevant*, since non-relevant experience is often the basis of false confidence or misunderstandings, leading to difficulties in the ship acquisition process. Some ship owning organizations have occasionally used persons from other industries to oversee a ship acquisition process, sometimes leading to difficulties arising from the significant disparities between procedures and expectations of the different industries.

The same perspective is also valid for shipyards; the persons involved in the development and negotiation of shipbuilding contracts on behalf of the shipyard can unwittingly create situations, which are more likely to lead to contractual difficulties if the experience of past contracts is not adequately translated into the new contract development process.

3. Perspectives, Not Standards

It is recognized that some persons reading this paper may interpret it as estab-

lishing a *standard* for appropriate shipbuilding Agreements. It is not intended that this paper establish such standards. This paper is for instructional purposes only, intended for those persons who do not yet possess experience sufficient to make the decisions that are needed in contract formation.

The fact that in actual practice an organization may not adhere to the ideas and perspectives set forth below is not necessarily an indication of inadequate contracting. Rather, the ideas and perspectives presented in this paper are intended to bring to light various possibilities and lessons learned in contract development. The relevant experience and qualifications of each party, coupled with the specific nature of the project, and influenced by market, financial, regulatory and classification factors, may singularly or collectively be superior factors, relative to this paper's recommendations, for the establishment of an appropriate contract.

4. Contract Components

There are three aspects of shipbuilding contracts and specifications that are central to the interests of technically oriented persons who are likely readers of this paper: (a) formation of the contract; (b) formation of the specifications and plans the central technical components; and (c) management of the contract during ship construction. In order to put those three contract support services into context, eight major components of a contract are illustrated in Figure 1.

This paper addresses the formation of the first of those components, the contract's Agreement. The formation of specifications and plans is addressed in Ref. [1] and Ref. [2], among other publications. The methods of shipbuilding contract management are addressed in Ref. [3]; and the drawing review

process is examined in Ref. [4], also among other publications.

Reference [5] is a treatise on shipbuilding contracts that addresses legal issues. Per the Foreword of it, the purpose is to “*present the law relating to shipbuilding contracts in as wide a perspective as possible.*” It was initially compiled by a subcommittee of the Assembly of the Comité Maritime International, and subsequently edited into a uniform format by Malcolm A. Clarke, Ph.D., Fellow of St. John’s College, Cambridge. The book addresses matters of financial security, title, risks and insurance, default and termination, among other non-technical subjects. Some of those subjects are briefly mentioned below, but are not thoroughly addressed as they do not normally come within the purview of technical persons who are the likely readers of this paper.

Those eight components illustrated in Figure 1, and possibly some others, constitute the contract. If any component of the contract refers to other standards or other regulations, then those other standards and/or regulations are also part of the contract.

Figure 1 – Major Components of Commercial Shipbuilding Contracts

- Agreement
 - Terms and Conditions
 - Contract Specifications
 - Contract Plans
 - International Regulations
 - Domestic Regulations
 - Classification Rules
 - Referenced Standards

The fact that a requirement may be included in a contract by indirect reference

does not give it any less validity than a requirement, which is directly identified within, say, the Contract Specifications. For example, suppose a contract requires that the design of a ship achieve compliance with a particular classification organization's *rules*. Suppose, further, that those *rules* refer to the ASTM standards for ship construction, which ASTM standards include minimum dimensions of handrails for inclined ladders. The ship, then, must comply with those minimum handrail dimensions, even though none of the first-level contract documents expressly identify that particular requirement. In other words, all of the standards and regulations are equally binding upon the parties whether directly or indirectly referenced.

While this paper focuses on new ship construction Agreements, nearly all the elements of it are also applicable to major ship conversion projects, and many of its elements are also pertinent to ship repair. Agreements for both ship conversion and ship repair will need to be supplemented by other elements not described in this paper, and some of the elements described herein would have to be deleted.

In all such matters, the contract is the mechanism that conveys the technical, as well as non-technical, understandings, obligations, rights and responsibilities between the Shipowner and the constructing shipyard, i.e., the Contractor. The contract is the instrument that allows the intangible product of the designing naval architects and marine engineers to become a reality; without a contract, the design would never be translated into a tangible object.

5. Purpose of Shipbuilding Contracts

A shipyard and a shipowner enter into a contract for mutually beneficial reasons; namely, the Shipowner wishes to acquire a ship which is suitable for the shipowner's needs, and the Contractor wishes to construct, for payment, a ship within its shipbuilding capabilities in order to earn a return on its investment in shipbuilding facilities. The shipbuilding contract is the manifestation of those mutual intentions; that is, the purpose of a shipbuilding contract is to achieve the development and delivery of a ship from the shipyard to the shipowner. From the time the parties agree to that technical objective until it is achieved, the parties establish a temporary business relationship, shaped in part by legal obligations and constraints that are intended to produce a satisfactory technical outcome.

More formally, the purpose of a shipbuilding contract is to define the entirety of the temporary relationship between the Contractor and the Shipowner. Essentially, the contract in its entirety establishes the rights, responsibilities, rules of conduct and assignment of risks between the two parties pertaining to all foreseeable technical, cost and schedule matters, as well as questions or disputes that may arise between the parties.

The assignment of risks does not end, however, upon contract execution; each Change Order that may be executed later as an amendment to the contract also may carry with it risks which must also be assigned. For the Contractor, usually there are the risks of cost and/or schedule overruns for fixed price contracts or fixed price Change Orders; for the Shipowner usually there are the risks of performance of the basic or altered elements of the Contract Work Scope. The assignment of those risks, however, can be different for each of the design and performance parameters and

for each subsequent Change Order, as the parties may agree.

The form of a contract determines which party is accepting, to some degree or other, the risk of cost overruns. In the fixed price form of contract, the contractor is obliged to complete the ship and the other deliverables all for the contractually-defined fixed price, as may have been supplemented by agreed-upon changes. However, when a new ship type is being created, or when new technologies are being implemented, it may be impracticable for a shipyard to offer a competitive fixed price since there are too many unknowns. In such instances, potential contractors may not be willing to accept the risks of offering a fixed price contract within a range acceptable to the shipowner.

In order to obtain the vessel, the shipowner may offer to use a cost-plus contract, in which the shipowner will pay all costs incurred by the shipyard, and in which the 'plus' payable to the shipyard is determined according to either a formula or a fixed amount per the contract language. It is also possible for the parties to use a contract form which leads to the sharing of cost overruns. Other variants on contract form are also possible, but infrequently used. The important point is that the form of contract determines how the parties allocate the risks of cost overruns.

6. Defining Contractual Relationships

Typically, contracts are written documents, which address all, or nearly all, of the potential elements of the contractual relationship. Sometimes, however, the shipbuilding contracts are oral to some extent, with certain elements of the contractual relationship having been established orally, while other components of the same contract may be in writing. It is not uncommon for written con-

tracts to be incomplete; that is, some of the components of the contractual relationship remain undefined at the time the contract is initiated.

If the two contracting parties have mutually decided to not reduce all of the potential components of their contractual relationship to writing, it indicates that they are each taking a risk if an unaddressed aspect of the contractual relationship becomes important at a later time. For example, if a contract requires that the Contractor ensures that the new ship achieve a speed of, say, 28.0 knots, but in fact the vessel can achieve only 26.2 knots, the parties will have to look to the contract to understand what remedies are available to the Shipowner and what rights remain for the Contractor. The Shipowner's remedies may be financial damages or the right to reject the ship; but if the contract did not address what remedies would be available to the Shipowner, neither party can be certain of what will be the outcome of the almost inevitable litigation. This is addressed further in the later section on *Liquidated Damages (Performance, Design)*.

As another example, suppose the Shipowner is not timely forthcoming with several progress payments. If the matter is sufficiently severe and creates a critical cash flow problem for the Contractor, the Contractor may wish to take some action to minimize the consequences of the lack of contractually defined progress payments. To the extent that the contract addresses the rights of the Contractor under such circumstances, the Contractor has a clear understanding of what can be done to deal with that lack of progress payments. If, however, the contract does not address that potential aspect of the relationship, then there is no predictable outcome to the consequential dispute.

These limited examples are presented to illustrate that many potential aspects of a contract may never have to be defined; but by failing to define those components of the contractual relationship in advance, the parties may have implicitly accepted risks. Thus, it can be appreciated that it is preferable to have a contract anticipate and address reasonably potential sources of dispute so that the parties have, in advance, a clear understanding of how they must act in the event a potential dispute arises, and to understand their contractually defined choices in courses of action.

7. Agreement

The Agreement is often mislabeled as the contract, but as illustrated in Figure 1, the Agreement is only one of the major components of a contract, though it is unique to each particular contract. The Agreement should clearly identify each of the other major components of the contract in a non-ambiguous manner, by using author, date of publication, a revision number or other unique identifying number, if applicable.

The Agreement is also the primary document in the hierarchical list of the of components of the contract, with the hierarchy being stated within the Agreement to set an order of precedence in the event of inconsistencies between the various components of the contract. An example table of contents of a commercial shipbuilding Agreement is illustrated in Figure 2.

Several organizations have standard forms of agreements, but they may refer to them as contracts. Those forms are the starting points of negotiations and development of the final form of the Agreement. The Association of West European Shipbuilders (AWES), the Shipowners Association of Japan (SAJ), and the Norwegian Shipowners

Association (NSA) are among those organizations that have such standard form agreements. In the United States, due to significant government involvement in many shipbuilding contracts, the U.S. Maritime Administration has had standard form agreements, too. Of course, major government agencies also have their own forms for acquisition of their own ships.

Figure 2 – Commercial Shipbuilding Agreement Typical Section Headings

- Introduction
- Entire Agreement
- Coordination of Contract Documents
- Definitions, Abbreviations, Interpretations
- Delivery of Vessels
- Options of Additional Vessels
- Project Schedule
- Scope of Work and Representations
- Intellectual Property Rights
- Materials and Workmanship
- Regulatory and Classification
- Industry Standards
- Contract price
- Unit Prices
- Delivery of Vessel(s) to Shipowner
- Liquidated and Actual Damages (Delivery)
- Liquidated Damages (Performance, Design)
- Representatives of the Parties
- Examination of Plans
- Inspection of Workmanship and Materials
- Changes in Specifications, Plans, Schedule
- Adjustment of Contract Price and Schedule for Change Orders
- Extension of Time
- Final As-built Drawings and Calculations
- Operating and Technical Manuals
- Tests and Trials
- Warranty Deficiencies and Remedies
- Progress Payments
- Contract Retainage
- Special Retainages

8. Terms and Conditions

The Terms and Conditions of a contract, none of which are unique to a particular shipbuilding contract, are often standardized

by Shipowners, especially if the Shipowner is a governmental agency or commercial entity which frequently acquires ships. If a term or condition has to be unique to a particular contract, it would probably be best to include it in the Agreement, not in the Terms and Conditions. However, some governmental agencies must select specific provisions from a list of potentially applicable ones.

In some contracts, the Terms and Conditions are integrated into the Agreement. In any event, prior to finalizing the form of the contract in its entirety, the Terms and Conditions have to be reviewed to ensure their relevance and applicability to the project. An example table of contents of a commercial shipbuilding contract's Terms and Conditions is illustrated in Figure 3.

Figure 3 – Commercial Shipbuilding Contract Terms and Conditions

- Care of Vessel(s)
- Access to Vessel(s)
- Responsibility for Shipyard Work and Risk of Loss
- Insurance requirements
- Responsibilities and Indemnities
- Contract Security (Performance & Payment Bonds)
- Termination of Work (Contractor Default)
- Termination of Work (Purchaser Default)
- Disputes and Claims
- Consequential Damages
- Assignment
- Successors in Interest
- Liens
- Notices
- Title
- Permits, Licenses and Taxes
- Applicability of Law
- No Waiver of Legal Rights
- Computation of Time

If the Terms and Conditions are integrated into the Agreement, the consolidated table of contents of the Agreement would include all of the components of Figures 2 and 3. When contract packages are being assem-

bled, a review of recent, prior contracts may indicate that certain Terms and Conditions could be adjusted to achieve more meaningful compliance or easier to understand requirements.

9. Contractor's Technical Proposal

Some shipowners seek technical proposals from bidding shipyards, which proposals show the shipowner how the bidding shipyard's offered ship will satisfy operational and/or performance requirements set forth in the shipowner's request for proposals. If such a procedure has been employed by a shipowner in the process of contract development, the successful bidder's technical proposal is usually included as a specifically identified component of the contract. It is also listed in the hierarchy of contract documents, but below the other components.

The purpose of including the Contractor's technical proposal as a component of the contract is to legally bind the Contractor to fulfilling its proposal, but in such a manner as to ensure that the shipowner-developed Specifications and Plans are superior to the technical proposal in the event of an inconsistency between them.

10. Decision-Making Authority

The contract documents, especially the Contract Specifications and Contract Plans, used in conjunction with the other components of the contract, define certain technical aspects of the ship that will be developed and delivered to the Shipowner by the Contractor. Numerous details, which are not initially defined in the Contract Specifications and Contract Plans, may have to be developed after the contract is executed. The contractual identification of applicable regulations, classification rules and other applicable standards

will largely shape many of the developmental micro-design decisions that need to be made to achieve the completed ship. However, there will also be numerous developmental micro-design decisions that are not controlled by the contractually identified regulations, classification rules and standards.

When the parties executed the shipbuilding contract, the authority to make those decisions was passed from the Shipowner to the Contractor, unless the contract gives the Shipowner some residual decision-making authority. This is unlikely, however; most contracts give that authority exclusively to the Contractor, modified only by the necessity of allowing the Shipowner to review detailed plans before actual ship construction, per Ref. [4]. This matter can become a source of disputes; and the avoidance of them is discussed in Ref. [1].

11. Government Contracts

The form of contracts issued by government agencies is often different from commercial contracts, but the general nature of the components of them is the same as the commercial contracts discussed herein. There are more forms of government contracts than there are government agencies; many agencies utilize multiple forms of contracts for various reasons.

The form and content of contracts from government agencies must comply with the procurement regulations applicable to each particular government agency. Thus, it is expectable to see differences between federal contracts, on one hand, and state or provincial contracts on the other. Some quasigovernmental agencies are also shipowners, such as port and canal authorities; and they may have forms of contracts that are different again.

Even within a federal or national government, different agencies have different procurement regulations applicable to them, and have evolved their own particular forms of contracts to suit those regulations. Within the U.S., for example, contracts for the Army's supply/logistic support ships are different from the contracts issued by the Army's Corps of Engineers, who maintain dredged waterways. The Navy's contracts for combat ships are a different form than those used for auxiliary ships. The National Oceanographic and Atmospheric Administration's contracts for its ships are different from other federal agencies. Coast Guard contracts for its front line cutters are different than for its support ships, such as small search-and-rescue craft.

Non-maritime regulations may affect the forms of contracts from government agencies, such as requirements for minority-owned or women-owned contractors, contracts set aside for small businesses, the need to comply with equal employment opportunity laws, or contracts set aside for economically depressed areas, among other possible constraints.

Most government contracts are awarded based on either lowest bid or best value bid that fully conforms to the requirements of the contract. The criteria to establish best value vary among the agencies. In contrast, a commercial shipowner has the flexibility to award the contract on any basis it wishes, not necessarily lowest bid or best value.

Despite some differences between commercial contracts and government contracts, the fundamentals are the same. Whether given different titles or other nomenclature, the components of a government contract are the same as illustrated in Figure 1. The purpose of a shipbuilding contract involv-

ing a government agency remains the same as described above for commercial contracts: defining the technical aspects of the products to be delivered and establishing the rights, responsibilities, rules of conduct, and assignment of risks between the two parties pertaining to all foreseeable technical, cost and schedule matters, questions or disputes that may arise between the parties, all for the intended delivery of a ship and the associated documentation.

12. Government Role in Commercial Contracts

There are several reasons why there may be direct or indirect participation by a government agency in a contract involving a commercial shipowner and a commercial shipyard. Nevertheless, it should be appreciated that any form of governmental financial assistance, direct or indirect, or other government role in a commercial contract may affect some of the clauses of the Agreement and some of the Terms and Conditions of the contract, and may impact the administration and management of the contract as well. Shipyards must be willing to accept those additional burdens, however, if they wish to be eligible to secure the shipbuilding contract.

13. Formation of the Agreement

Major components of a shipbuilding contract have been illustrated in Figure 1 and discussed above. It was pointed out that there might be additional components of a contract, such as the Contractor's technical proposal. In the following sections of this paper, the elements of the Agreement as listed in Figure 1 are discussed, including their purpose and, if appropriate, special considerations that should be given to them during formation of the Agreement.

The order or sequence of the components of the Agreement are not important, as long as they tie into each other, do not create variances with one another, and are supported by the other components of the contract without inconsistencies or ambiguities. This presentation assumes that the Terms and Conditions as listed in Figure 3, mostly legal issues, are a separate component of the contract, although they need not be. Some drafters of contracts, especially commercial shipbuilding contracts, include the terms and conditions in the Agreement.

14. Contract Deliverables and Communications

During formation of the Agreement and other components of the contract, a fundamental principle of contract management should be borne in mind:

"Contract management should commence the moment a contract is contemplated, not after it is signed." Ref. [6]

The significance of that principle during Agreement formation is that it reminds the parties that any contract rights, obligations, communications or inspections, among other considerations, that either party may wish to be able to exercise during contract performance, have to be built into the contract documents from the outset. After the contract is signed, it is too late to ask the other party to give you contract rights that are not already spelled out in the Agreement or other components of the contract.

Every contract has a set of contract deliverables, in addition to the ship itself. Some of these deliverables may include drawings, correspondence, comments, inspection reports, calculations, test results, and similar documentation. Other deliverables may be spare parts, manuals, or other hardware-

related items, in addition to training of vessel operating personnel on the use of ship-specific equipment. It is essential that the parties anticipate what the entire set of contract deliverables is to be prior to contract execution. The creation of each contract deliverable has a cost associated with it; and it is impractical, if not unreasonable, to expect one of the parties to agree to produce a deliverable that was not already included in the contract's workscope. Thus, every form of contract communication and deliverable that will be developed under each party's contract management staff has to be identified in advance of contract execution.

15. Introduction of Agreement

This component of the Agreement first identifies the parties, their corporate names, the legal form of the organization (corporation, partnership, privately held, nonprofit, state or federal agency, etc.), the jurisdiction of their existence, for example, incorporated in the State of, and the nature of their business as it pertains to this particular contract.

This section of the Agreement goes on to describe the nature of the project which is guided and controlled by this Agreement (new ship construction, ship conversion, etc.), and then describes the general role of each party. The principle location of the work is also included, but this does not necessarily bind the Contractor to performing all work at that location.

The role of the Shipowner is, of course, primarily financial, in addition to having certain rights of inspection, drawing review, etc., which rights are spelled out in other parts of the contract documents. The Contractor, of course, will be described as capable of constructing, testing and delivering the vessel.

One essential element of this description is that the shipyard is obligated to complete the design of the vessel from the status of the design as represented by the other contract documents. Ordinarily, a shipyard will understand that it must produce the detail plans and working drawings that are necessary to achieve construction of the ship. But often some design development efforts are needed between the Contract Plans and Contract Specifications, on one hand, and the detail plans and working drawings, on the other. This part of the Agreement should mention that the Contractor has responsibility to complete the design, as necessary, thus implying that its engineering and drafting responsibility is not limited only to producing detail plans and working drawings, but begins where the Contract Specifications and Contract Plans leave off.

16. Entire Agreement

This section of the Agreement reminds the parties that only this Agreement and the other documents to which it refers constitute the binding contract; and that any pre-contract agreements or understandings, whether written or oral, have no standing with regard to this contract. However, it is not quite that simple and straightforward.

First, underlying all contract law are legal requirements that the parties cooperate with each other, and that the parties always take actions to mitigate damages in the face of untoward events, regardless of which party will incur those damages. These underlying legal requirements, among others in different jurisdictions, are binding, though unstated in any commercial contract.

Second, it has to be appreciated that pre-contractual agreements or understandings may, in fact, serve to interpret, but not add to,

the current contract, as long as those other agreements and understandings are not in conflict with the current contract. Pre-bid correspondence between bidders and the Shipowner, as well as communications from pre-bid meetings, may form the basis for development of a common interpretation of an otherwise-ambiguous specification requirement. If the contract documents contain an ambiguity that is not resolvable by reference to a component of the contract listed in the hierarchy clause, it may already have been resolved in advance of contract execution, in the form of an interpretation or an expression of the intent of the parties.

Clearly, however, if any pre-contract agreement or understanding, whether written or oral, is in distinct contrast to a contractual requirement, that pre-contract agreement or understanding is of no consequence and has no value in contract interpretation.

17. Coordination of Contract Documents

This section of the Agreement primarily identifies all of the other components of the contract with the greatest specificity available. Do not state, for example, that the Contract Specifications are the most recently revised edition; rather, identify the authors and give the exact date of that revision because there may be later revisions that are not widely disseminated.

Persons who prepare this section of the Agreement must ensure that all of the identified components of the contract are applicable, current, up-to-date, and easily available to the other party.

Another facet of this section of the Agreement is the hierarchy clause, which states in essence that in the event of an error or inconsistency between different compo-

nents of the contract, certain identified components shall be superior to the others. The Agreement has to address the possibility that the Contract Specifications may require less than is required by the identified regulations or classification rules. To cover such situations, it is best to state that it does not constitute an inconsistency, but that the Contractor must comply with both of them; the ship shall include the greater of the two sets of requirements.

This section of the Agreement should also state that the inclusion of information in one component of the contract and its absence in another component does not, in fact, constitute an inconsistency or error; rather, the information shall be interpreted to be equally present in all components of the contract.

18. Definitions, Abbreviations, Interpretation of Terms

In order to ensure that there are no misunderstandings of how certain terms or words are intended to be used, it is common to have a section of the Agreement which provides the interpretations and definitions that are contractually binding. Typical definitions, interpretations and abbreviations are listed in Figure 4. Some of the technical definitions may appear in the Contract Specifications instead of the Agreement, which does not present a problem as long as there are no inconsistencies between the two lists of definitions.

Other interpretations, definitions and abbreviations should be considered to ensure that there is no opportunity for misunderstandings between the contracting parties.

Figure 4 – Typical Subjects For Definitions, Interpretations And Abbreviations

According to	FCC
ANSI	Furnish
Approval	Good Commercial
ASHRAE	Shipbuilding Practice
ASME	Guidance Plans
ASTM	IEEE
AWS	Install, Installation
Builder	Or equal
Buyer	Owner
CFR	Owner-furnished
Classification Organization,	Equipment (OFE)
Agency or Society	Owner-furnished
Compliance with	Information (OFI)
Contract	Progress Payments
Contract Change, Change	Provide
Contract Documents	Regulation(s)
Contract Drawings,	Regulatory Body
Contract Plans	Requirements
Contract Price	Regulatory Bodies
Contract Retainage	SOLAS
Contract Specifications	Special Retainage
Contract Time, or	SSPC
Contract Period	Surety
Contract Work,	The Vessel Design
Delivery Date	UL
Day(s)	USCG
Documentation	USPHS
Excessive Vibration, Noise	Warranty Deficiencies
Excessive temperature	Working Plans,
levels	Working Drawings

19. Delivery of Vessels, Options for Additional Vessels

This section of the Agreement establishes the Delivery Date of the Vessel and the place of delivery. Sometimes the place of delivery is other than at the shipyard in order to address taxes, operational limitations, costs of delivery to the region of intended use, or other factors. In the event a single contract covers the construction and delivery of more than one vessel, it must be clearly addressed within the Agreement. If the number of ves-

sels is fixed but more than one, the construction starting date and the Delivery Date for each will have to be defined. (The price for each additional vessel must also be defined in the section on Contract Price.)

Whether or not the Contractor has to submit separate drawings for the Shipowner's approval for each vessel must be considered and addressed. Sometimes details for sister ships are not the same (they are not identical twins, only sister ships). The parties must agree as to how much variance can exist without calling such variance to the particular attention of the Shipowner, and if there are some areas for which no variance is acceptable.

If there is a minimum number of vessels, with options for additional vessels, the appropriate dates for those option vessels also need to be defined. These other dates would include the dates by which successive options must be exercised by the Shipowner, the official start of construction for each option vessel (as it affects progress payments), the number of days allowed for construction of each option vessel, and the Delivery Date for each option vessel.

20. Scope of Work and Representations

Usually there are two major aspects to the statement of the Scope of Work, and several lesser ones. The first major segment focuses on the creation of the "hardware" aspects of the ship construction project. It assigns certain responsibilities solely to the Contractor, with Shipowner having no concurrent responsibilities. These include the provision of all engineering, labor, equipment, materials, fuel, lubricants, electricity, energy, machinery, facilities, services and supervision necessary for the completion of the design, the construction, outfitting, completion, testing, delivery and documentation of the Vessel in

accordance with the requirements of the Contract Documents. It should be clearly stated that Shipowner has no responsibility to provide any engineering, labor, equipment, materials, electricity, energy, machinery, facilities, services or supervision, unless there is some well-defined shipowner-furnished information and/or equipment. Further, it can be stated that Contractor shall be responsible for fuel and lubricants needed for tests, trials and filling of all operating systems and piping upon Delivery, but not for filling of reserve and supply tanks. This section also clearly refers to the Work being done in strict accordance with the Contract Specifications, Contract Plans and Guidance Plans (if any).

The second major segment of the Scope of Work addresses the non-hardware, or documentation, aspects, which are a vital part of the completed ship. This part addresses the necessary and/or requested certifications, documents, booklets, letters, drawings, calculations and other contract data deliverables that are to be provided both during construction and upon Delivery of the Vessel by the Contractor, again at no additional cost to the Shipowner. It is important for shipyards to appreciate that the development and acquisition of this documentation must be carefully budgeted, because it can account for a measurable portion of the total contract price. A list of typical Contractor-provided certifications to be provided with the Vessel is shown in Figure 5. Other contract data deliverables are not included in that list, but are listed in the Contract Specifications. See Ref. [1] for a suggested list of such additional documentation.

The secondary aspects of this section of the Agreement can include supplementary requirements for fulfillment of the work scope, such as that all engineering, labor,

equipment, materials, fuel, lubricants, electricity, energy, machinery, facilities, services and

Figure 5 – Typical Certifications Provided By Contractor

- International Load Line Certificate
- USCG certification and documentation
- ABS Certificate of Classification, Maltese Cross, Full Ocean Service
- Safety of Life at Sea Convention Certificate (SOLAS)
- USCG Stability Letter
- ABS Stability Booklet and Loading Manual
- USCG Approval of ABS Stability Booklet
- ABS Certification of all pressurized tanks
- USCG Safety Equipment Certificate
- FCC Certificate of Radiotelephone
- USPHS Certificate of Deratization
- USPHS Certificate of Sanitary Construction
- ABS Certificate of US Regulatory Tonnage
- ABS Certificate of International Tonnage
- ABS Certificate of Suez Canal Tonnage
- ABS Certificate of Panama Canal Tonnage
- Builder's Certificate in customary form
- Safety Construction Certificate (SOLAS)
- Safety Equipment Certificate (SOLAS)
- MARPOL Annex 1 (SOLAS)
- Stability Certificate (IMO)
- Equipment Certificates (engine, gensets, pressure tanks and the like as required by Regulatory Bodies)

supervision that may be reasonably inferred from the Contract Documents by professional ship builders/repairers as being required to produce the intended result as contemplated by the Contract Documents shall be supplied by the Contractor, whether or not specifically called for in the Contract Documents, and Shipowner shall not be liable for any increase in Contract Price or Contract Time as a result therefrom. Further, this section of the Agreement can state that any items of design, engineering, purchasing, manufacturing, installing and testing that are necessary to satisfy the Regulatory Body requirements, the Classification requirements, and/or the performance and design criteria shall be incorporated into the

Contract Work at no additional cost to Shipowner whether or not they are otherwise indicated in the Contract Specifications and/or Contract Plans.

21. Intellectual Property Rights

An important aspect of contracting is the matter of ownership of the vessel's design or selected aspects of the vessel's design that are not already controlled by copyright laws and/or patents. Some aspects may be as general as the basic ship design or the hull form, or may be as specific as the design of the computer hardware and software for either the propulsion control system or the dynamic positioning system. Many other aspects of the ship's design may also have been initially developed for this particular vessel, but could be used for other vessels as well.

The Shipowner may expect that it has sole ownership of those intellectual property rights because the Shipowner paid for their development through the contract price. On the other hand, the Contractor may expect that it has sole ownership because it has invested more than the design portion of the contract price into the development of those features. The parties should ensure that these matters are addressed in the Agreement.

Some commercial agreements have stated that the Shipowner owns the title to the Vessel Design, but Contractor can use it for other purchasers provided a royalty fee is paid to the Shipowner for each additional vessel constructed for other purchasers, thus recovering, in part, the portion of the Contract Price for the initial design costs. If a shipyard's subcontractor is involved, this matter may be more complex and difficult to resolve, but it is best addressed in the Agreement, rather than allowing it to become the subject of litigation.

22. Materials and Workmanship

This section of the Agreement typically sets forth the requirement that all materials, machinery and equipment furnished by the Contractor and incorporated into the vessel shall be new, of current production and currently supported by spare parts available in a designated geographic region. Additionally, the Contractor warrants that all design engineers, workmen, subcontractors and others, engaged by the Contractor in the performance of the Contract Work possess suitable professional skills and are appropriately certificated.

This section usually addresses several other aspects of the materials and workmanship, including, among others, the Shipowner's right to reject, and the Contractor's obligation to correct, at no additional cost, any materials or workmanship whenever found to be defective, or otherwise not in accordance with the requirements of the Contract Documents. If no specific aspects of the Contract Documents provide such a basis for rejection, published industry standards sometimes may be used as a basis for rejection. Note, however, that if Shipowner cannot point to a documented requirement as the basis for such rejection, the materials or workmanship cannot be summarily rejected.

Broad requirements pertaining to the materials and equipment can also be addressed in this section of the Agreement, with additional details in the Specifications. Some of these may be:

- the flushing of all piping,
- the provision of all working fluids in systems,
- the provision of all fuel for testing,
- the installation of safety guards around rotating and sliding equipment,

- the use of only materials and equipment approved by the designated regulatory or classification organization, and
- the use only of certified welders; among other possibilities.

This section of the Agreement could also state that the failure of the Shipowner to discover any nonconforming materials or workmanship does not constitute a waiver of any contractual rights or requirements.

23. Regulatory and Classification

The Agreement should state with which particular sets of regulations the design and construction of the ship must comply. These regulations will usually include both domestic and international requirements; domestic because the ship will fly the flag of a particular nation, and international because the ship will be trading with other countries, for which port entry is keyed to compliance with certain international regulations. The Agreement generally does not address, however, matters of financial responsibility for potential environmental damage, training of watch standing crew, or other similar matters which are solely the domain of the ship operator, charterer or shipowner.

The Agreement also should clearly identify under which classification organization the ship is to be classified; and if that classification organization has more than one set of rules, identify the particular rules with which compliance is to be achieved by the Contractor.

These two segments often are then supplemented by the requirement, if it is not an unusual contract, that all engineering, all arrangements for plan approval, all arrangements for inspections and any other requirements of the regulatory agencies and the classification organization are to be carried

out by the Contractor, again, at no additional cost to the Shipowner.

If the ship is a newly developed form or will contain innovative technology that has not been previously approved by either or both regulatory agencies and classification organizations, the Shipowner's designers may have to remain involved in the plan approval stage. This serves to complicate matters of schedule, payment of fees, and perhaps even warranties.

Some regulatory agencies have agreements with one or two classification organizations to the effect that the classification organization can perform some of the regulatory approvals. The intent is to streamline the regulatory approval process as well as reduce the workload of the regulatory agency. Shipowners should be aware that sometimes the relevant regulatory agency may not have a regular, working relationship with the nominated classification organization; this may create delays in approvals, likely require additional submittals, at extra cost, and may result in unexpected adjustments to the Contract Plans or Contract Specifications. The Shipowner should investigate and, if necessary, resolve these matters prior to contracting.

As regulatory and classification requirements are often incorporated by reference, the Agreement should address the potential for conflict between the express language of the contract documents, on one hand, and the referenced requirements, on the other. For bidding purposes, the Contractor is allowed to rely on the express language of the contract documents as being consistent with the nominated regulations and classification rules. If, however, the Contractor finds that it has to incorporate a greater content in order to comply with the regulations or classification rules, those extra costs are usually for the

Shipowner's account. However, if the express language of the contract documents is silent about certain matters, and the Contractor makes an erroneous assumption for bidding purposes, the Contractor will have to absorb the cost consequences of that erroneous assumption.

24. Industry Standards

Any standards with which compliance is to be achieved in the design and construction of the ship, other than those included within the regulatory requirements and classification rules, should be clearly identified in the Agreement or in the General Section of the Contract Specifications. It is not too important as to whether they are listed in the Agreement or the Contract Specifications, but it is important that they appear only once, since listing them twice will likely result in some inconsistencies; and then misunderstandings will arise.

Note, however, that if the standard as published is only a recommendation, unless otherwise mentioned in the contract documents, it may be construed as non-binding. If it is to be binding on the Contractor, the Agreement should state that the identified standards, although otherwise only recommendations, should be treated as obligatory for the purposes of this contract.

The selection of which standards shall apply for detail design, material selection and workmanship should be made from this perspective: if an aspect of the Contractor's detail design, the quality of Contractor-selected materials or the workmanship of installation is going to be challenged by a Shipowner's inspector, it is best if there is a contractually identified standard which supports the challenge. There can be no dispute as to whether a standard applies if it is specifically named in the Agreement.

25. Contract Price

Under fixed price contracts, the price for the Vessel has to be established, and the currency in which it is payable has to be stated as well. Working under a fixed price contract, the Contractor has accepted considerable risk; but as discussed below, there are other alternatives. Some contracts will include additional protection for one party or the other in the event of large currency fluctuations; that is, there may be some mechanism to share the risks of currency fluctuations if the Contract Price is payable in a currency not normally used by one of the parties. The payment of the Contract Price is separately covered by the Agreement's section on progress payments, as discussed below.

If the form of the contract is other than fixed-price, such as cost-plus-fixed-fee, the exact mechanisms or procedures to determine the total of all payments must be described with specificity to avoid later disputes. Whether or not the Shipowner has the right to audit the Contractor's books to confirm such final pricing should be stated as well. The use of a form of contract other than fixed-price essentially alters the assignment of risks to suit the needs and acceptances of the parties. When the ship incorporates experimental or new technology about which the Shipowner has knowledge superior to that of the Contractor, it may be reasonable for the Contractor to avoid specific risks associated with implementing that technology; but in such cases, the Shipowner may also wish to exercise greater oversight in the implementation of that technology.

It is not uncommon for the Contract Price to be subject to automatic adjustment, without negotiated change orders. There is no risk associated with this provided the mechanism for the automatic adjustment is clearly

stated. For example, if the quantity of a special material is not known with precision at the time of contracting, because the detail drawings have not been completed, the Contract Price may be automatically adjusted upon a material takeoff after completion of the detail design.

The Contract Price includes allowance for the acquisition and installation into the Vessel of [W] thousand pounds of [material name], and shall be adjusted at the rate of [X] dollars and [Y] cents per pound in excess of that estimated weight, or eighty-percent of that rate of adjustment per pound if less than that estimated weight, upon completion by Contractor of detailed, as-installed, material takeoff, subject to approval by Shipowner, which adjustment includes both material and labor costs.

The provision of spare parts may also lead to automatic adjustment of the Contract Price, if the quantity of spare parts which Shipowner wants is not known at the time of contract execution. Often, a Contractor will provide a list of recommended spares, and Shipowner will then determine which ones and how many are to be acquired. Because the Contractor did not know that quantity in advance, the price of the spare parts is added to the Contract Price, but the cost of acquisition and loading them aboard the ship are already included in the basic Contract Price.

Some Shipowners may wish to have the Contract Price stated in several components, but for new ship construction that is best addressed in the progress payments section of the Agreement, as discussed below. For ship conversion or repair, line item pricing is often used, so that if the entire item is canceled, the adjustment of the Contract Price is known if cancellations are limited.

If the number of vessels is fixed but more than one, the Contract Price for each additional vessel must also be defined in this section. When the construction of a series of vessels being purchased under a single contract will extend for several years, the parties may agree to an escalation clause. Typically, after agreeing to the portion of the total price that is labor-based, material-based and sub-contract-based, the cost of labor can escalate over time in accordance with an appropriate index, and the cost of materials and subcontracts can similarly escalate in accordance with perhaps a separate index. Usually the indices on which the escalation clauses are based are government-determined and widely published.

The Contract Price will also be subject to adjustment as the result of Change Orders, as discussed below.

26. Unit Prices

In anticipation of possible growth of the Contract Workslope, negotiated through Change Orders, the Shipowner will have to utilize additional materials, subcontractor efforts, engineering and production labor. Further, extensions of the project schedule may necessitate the provision by the Contractor of additional days of shipyard services.

The cost impact of a Change Order may require negotiation of at least nine elements. Indirect effects of Change Orders, expressed as additional labor hours or other cost allowances may also have to be negotiated.

- (1) material costs;
- (2) subcontractor costs;
- (3) additional engineering hours;
- (4) production labor hours;
- (5) markup of material costs;
- (6) markup of subcontractor costs;

- (7) hourly rate for engineering;
- (8) hourly rate for production labor at straight time and overtime, and
- (9) daily cost of shipyard services.

The first four items will depend on the details of the Change Order itself. However, items (5) through 9) should be uniform for all agreed-upon Change Orders. Since those five items will have to be either competitively bid or negotiated, it is best to include their specific values in the Agreement. This avoids the necessity of negotiating them repeatedly or of negotiating them when other variables have to be negotiated as well.

In ship conversion and repair contracts, there may be a greater array of unit prices, such as for steel work, for piping, for blasting and coating, due to the increased likelihood that such changes will arise in those types of contracts.

27. Delivery of the Vessel(s) to Shipowner

The place and condition of delivery of the completed ship should be identified in the Agreement. Usually, the place of delivery is alongside the shipyard's dock; but sometimes for tax or financial reasons, the place of delivery may be at another location. If the vessel is not designed for open ocean service, it may require some temporary, contractor-installed modifications to sail to the place of delivery. Also, some government agencies, in seeking competitive bids from geographically diverse shipyards, will require delivery from the successful bidder, wherever located, to be at the agency's service dock.

The condition of delivery is usually that of a *warm* ship; that is, one that is not *cold* with none of the auxiliaries running and no heat or other services already in operation on the ship. For smaller vessels, such as tugs

or other service craft, this differentiation is minor; but for larger ships, especially if steam powered, it may be more significant.

28. Project Schedule

The purpose of a shipbuilding project schedule is to give the shipyard a project monitoring and control mechanism. If properly developed and maintained (updated), it will enable the shipyard to see where it needs to re-deploy its resources in order to keep the time-critical activities on schedule, and not inadvertently give priority of resources to non-critical activities.

The Agreement usually requires that the Contractor develop a detailed project schedule within a certain period of time after contract award, and that the Contractor provide copies of it to the Shipowner. Thereafter, the Contractor is usually obligated to update the schedule both periodically and if there are significant impacts due to Change Orders, and to timely provide copies of the updated schedules to the Shipowner. This requirement in the Agreement is sometimes supplemented by some technical details in the Contract Specifications. The maintenance of a project schedule can become quite important if the Shipowner is going to allege Contractor default as evidenced by comparing the actual status to a planned schedule.

Whether or not this clause is within the Agreement, the Contractor always has a duty to complete the ship by the Delivery Date stated in the Agreement. There are several reasons, however, to include this requirement within the Agreement.

First, by putting into the Agreement some minimum scheduling and updating requirements, the Shipowner is assured that the Contractor has allocated within its budget the resources for those actions.

Second, this assures the Shipowner that it will be entitled to see copies of the schedule and all updates.

Third, this enables the Shipowner to identify the Contractor's interpretation of latest requested dates for the arrival of shipowner-furnished equipment or materials or for other shipowner-responsible actions.

Fourth, this allows the Shipowner to plan any necessary variations in the staffing of its inspection staff and, ultimately, the ship's crew.

Some agreements call for a *Key Event Schedule*. Key events could be the start of engineering, start of fabrication, start of hull erection, launching, sea trials and delivery

29. Liquidated and Actual Damages (Delivery)

The purpose of this section of the Agreement is to set forth an acknowledgment by the Contractor that if the ship is delivered later than either the original Delivery Date or any agreed upon contract extensions, the Shipowner will incur financial damages; and the parties agree in advance that the damages are approximated by a certain sum per day of delay, payable by the Contractor. For legal reasons, this is not necessarily a penalty clause, although it may give the Contractor similar incentive to achieve timely delivery. If, however, it is phrased as a penalty clause for late delivery, then there should be a bonus clause for early delivery. If it is phrased as a liquidated damages clause, a bonus clause is unnecessary. Some contracts may include a clear statement that the Contractor is not entitled to any bonus for early delivery.

Another way of looking at this same clause is that it protects the shipyard in two ways. First, the shipyard knows in advance

that its liabilities for delay in delivery are limited to the liquidated damages; and that the Shipowner cannot suddenly claim significantly-greater damages if the delivery is late, provided it is within the “cap” on liquidated damages, as discussed below. Second, the shipyard can view the daily amount of liquidated damages as the cost of “buying” a day of contract extension when it is not otherwise entitled to a contract extension. In some instances, that daily cost is less than the cost of accelerating the work to complete the ship on time.

The liquidated damages may accrue for a stated maximum number of days, thus placing a “cap” on the liquidated damages. The existence of a cap on liquidated damages does not, by itself, limit the damages that a Shipowner may claim from the Contractor if the delay extends beyond the number of days used to achieve the cap.

Unless further provisions are stated, the cap means that the Contractor is exposed to additional, *provable* damages that the Shipowner incurs after the cap is reached. The contracting parties may wish to negotiate on this matter, possibly eliminating such *consequential* damages for the Shipowner if the Contractor is similarly prohibited from seeking consequential damages due to the actions of the Shipowner.

Occasionally, shipbuilding contracts will allow the Shipowner to not take delivery of the ship if the delivery date is unilaterally extended by the Contractor, without Shipowner’s agreement, beyond a stated number of days; in which case the Contractor refunds to Shipowner all progress payments.

30. Liquidated Damages (Performance, Design)

The Contract Specifications and Contract Plans may provide target quantities, amounts, or dimensions for various aspects of the ship. Many of them will undoubtedly be achieved because of the design process. Some of them, however, may not be exactly achieved, such as maximum trial speed, minimum continuous operating speed, fuel consumption rate at design speed and draft, maximum deadweight, draft at maximum deadweight, or liquid capacity in certain tanks, among other possibilities. These possibilities are more likely to arise if the ship incorporates a new hull form, new technology or significantly greater powering than routinely installed in a similar ship, or if the shipyard has not previously constructed a similar vessel.

The essential point is that while the process of ship design and construction continues to advance, in some technical areas there are still no absolute assurances as to the net result or outcome that is built upon numerous engineering and design decisions. This matter is discussed more thoroughly in Ref. [4].

When the completed vessel does not achieve all of its intended design or performance parameters for which the Contractor was responsible, the Contractor and Shipowner have to negotiate a resolution to the discrepancies because the requirements of the contract strictly have not been fulfilled and the Shipowner is not getting all that was bargained for. Absent a harmonious negotiation, litigation is a distinct likelihood.

To avoid litigation, the Agreement can identify liquidated damages that would be payable by Contractor to Shipowner if the specific design or performance parameters are not achieved. For example, a certain sum of

damages could be payable for each one-tenth knot less than the intended trial speed for up to a half knot deficiency. Then twice that amount per tenth of a knot for a speed deficiency between a half-knot and a full knot. Similar progressive liquidated damages could be stated for greater deficiency.

The Shipowner may insist, however, that if the trial speed deficiency exceeds a stated amount, the Shipowner has the right to not take delivery of the ship and to be repaid all progress payments. The Contractor can be offered a bonus for achieving a higher speed, but the bonus may be limited to a modest amount, regardless of the extra speed achieved, because the operator cannot use that speed or cannot afford the fuel to achieve it.

31. Representatives of the Parties

The matter of identifying in the Agreement the person who constitutes the official representation of each party for contract purposes appears to be a fairly straightforward matter. However, during the completion of the design by the Contractor and during construction of the ship, numerous communications between the parties will be necessary.

Each of the parties may wish to designate a single person to be the recipient of legal notices and other higher level communications; but may also wish to designate other persons to be the recipient or authority for technical matters. For example, one person may have the decision-making authority pertaining to engineering and design developments; another may have authority to accept or reject the Contractor's material and equipment selections and its workmanship; and another may have authority to approve or negotiate progress payment invoices. There are additional functions, which can be as-

signed to other decision-making authorities for each party.

Perhaps the most important authority to designate is the one who can negotiate and accept amendments to the contract in the form of Change Orders. Each Change Order may modify the contractual statement of work, the Contract Price and the Delivery Date. Of comparable importance, the Agreement can also state that no persons other than the indicated representatives have any authority to modify the work scope, price or schedule, or accept design decisions or the workmanship of the Contractor.

32. Examination of Plans

It is customary to arrange for the Contractor to give to the Shipowner copies of its detail plans and working drawings in advance of their need for production. This allows the Shipowner to examine the drawings and inform the Contractor of any comments or suggestions that may be appropriate, prior to the use of those drawings by the production department. As simple as that may sound, there are a significant number of issues that will have to be addressed, preferably within the Agreement, although some contracts address such matters in the general section of the Contract Specifications. This process is thoroughly discussed in Ref. [4].

33. Inspection of Workmanship and Materials

When the Contractor is selecting major items of equipment to satisfy the Contract Specifications, the Shipowner may wish to include in the Agreement the creation of a review process that occurs before the purchase is executed by the Contractor. In that case, the Shipowner would have an opportunity to examine in advance the technical aspects of

the Contractor's purchase order, but not the pricing. The Shipowner should have to return any appropriate comments within a specified time so the Contractor's purchasing of the equipment will not be delayed.

The right of the Shipowner to inspect work in progress, not just completed work should be clearly stated in the Agreement. In further support of that concept, either the Agreement or the General Section of the Specifications can establish a mechanism for inspection, or quality, deficiency reports being issued by Shipowner to Contractor. The Agreement or Specification may require that once such a report is issued by the Shipowner, the Contractor must respond within a defined period of time as to how and when the Contractor will correct that deficiency. Related to this is the matter of Special Retainages, discussed in a later part of this section.

34. Changes in Specifications, Plans and Schedule

A Change Order is a formal amendment to the contract, which may incorporate changes in any of the Contract Work Scope, the Contract Price, the Delivery Date, the Terms and Conditions, or procedures set forth in the any of the contract documents. The area of greatest concern is that of changes to the Contract Work Scope, along with the associated cost and/or schedule impact.

When dealing with a government contract, it is more difficult to amend or change anything but the work scope, price and schedule, since many of the other facets of the contractually defined relationship are controlled by procurement regulations with which the government agency must comply in its contracting procedures.

This section of the Agreement is intended to define the procedures and mecha-

nisms by which the parties can implement a change to any of the Contract Specifications, Contract Plans and/or Delivery Date. The three parts of the process are the request by the Shipowner, the proposal by the Contractor, and the bilateral Change Order, which either accepts the proposal or results from negotiations over that proposal.

Sometimes, but rarely, work scope changes come about due to requests by the Contractor, usually on the basis of being able to reduce costs if the shipyard is allowed to alter some aspect of the Contract Specifications and/or Contract Plans.

The Agreement establishes the mechanisms needed to formally achieve the Change Orders. First it has to address the matter of the request by the Shipowner for a change proposal from the Contractor. The Agreement must consider whether or not the Contractor has a duty to make a change proposal in response to a change request from the Shipowner, or if it can decline to make a change proposal. The Agreement must then indicate the normal period of time allowed for the Contractor to prepare the change proposal after receipt of the change request.

The period of time during which the Shipowner has to accept, cancel or negotiate the proposal after the change proposal is given to the Shipowner should be defined by the Agreement. If this is not a defined period of time, a risk develops that the Shipowner may accept the proposal much later than the Contractor anticipated when developing the price and schedule impact of the proposed change.

The Agreement should also provide that the Contractor may also make an unsolicited change proposal. Thereafter, the same procedures and mechanisms would be utilized to convert that change proposal into a Change Order.

Agreements almost always require that the Contractor not proceed with the changed work until there is a bilaterally signed Change Order authorizing the change to the work scope. Thus, both parties will have had to consent, in writing, to the revised Work Scope, the impact, if any, on Contract Price, and the impact, if any, on Delivery Date. This section of the Agreement defines the process of achieving mutually agreed Change Orders. This section of the Agreement may also define that if the Contractor proceeds without such agreement, it is at the Contractor's risk.

Some government contracts define the government's right, as Shipowner, to *direct* the Contractor to proceed with change work even when there is no agreement as to price and schedule impacts. The idea behind this is to ensure that the government will not be abused by a Contractor that may be perceived as trying to take advantage of the necessity of the change work. The intent, as may be defined by the Agreement, is that at some later time the parties will negotiate the price and schedule impacts; and if that negotiation is not successful, the Contractor can resort to other mechanisms to seek compensation for the work. Other mechanisms may be a Request for Equitable Adjustment or the use of the Disputes Clause within the Terms and Conditions.

Some commercial contracts, especially in time-sensitive projects, include a similar right of the Shipowner's representative to *direct* the Contractor to achieve some previously undefined work before agreeing on price and schedule impact.

Changes, which come about due to regulatory, or classification requirements that must be achieved but which became enacted after the contract was first executed are considered a basis for a price and/or schedule

adjustment. This section of the Agreement defines the conditions under which such adjustments may come about.

35. Extension of Time

This section of the Agreement addresses extensions to the Contract Delivery Date due to events beyond the control of the Contractor. These are sometimes known as *force majeure* events, such as unusually severe weather, acts of the government, riot, strikes and labor disputes, among other possibilities. Some Agreements do not allow supplier failures or subcontractor defaults to be the basis of such excused delays, while others may allow such a basis for excused delays if the Contractor can demonstrate a direct impact on vessel completion schedule. This section of the Agreement also identifies the communications, which must be accomplished by the Contractor if a *force majeure* delay is appropriate.

36. As-Built Drawings and Calculations

The as-built, or as-fitted, drawings and the final calculations and test data form an engineering database for the ship. Most Shipowners' require, through this section of the Agreement, that the Contractor is to provide such information as to form that engineering database.

These *deliverables* from Contractor to Shipowner have to be defined to ensure that the Contractor allows for their development in the project's budget and schedule. These may be defined as a combination of:

- various certificates to be issued by regulatory or classification organizations,
- standard calculations in formats defined by professional societies such as SNAME, and

- documentation that is unique in format or content to the particular contract or ship.

The Agreement should also define whether each element of the documentation is to be transmitted only in hard copy (on paper) or if it also is to be transmitted electronically in computer-readable format. The Agreement may refer to a particular section of the Contract Specifications for the detailed format of those calculations and drawings.

The timeliness of delivery of those documents from Contractor to Shipowner should be defined within the Agreement; otherwise the Contractor has little motivation to accomplish them promptly if its engineering resources are temporarily needed for other projects.

Some Agreements provide a schedule for delivery of the documentation in draft form to the Shipowner, and then delivery in final form after the Contractor's correction of the documentation in accordance with comments from the Shipowner.

37. Operating and Technical Manuals

At the time of bidding the job, the contractor must know the extent of operating and technical manuals that are to be provided with the ship. Some shipowner's are content to accept the manuals that are provided by the equipment manufacturers only. Other shipowner's, however, require the delivery of system manuals; that is, manuals for the concurrent and interdependent operation of groups of components that form a system. Whatever the preference of the shipowner, it must be defined in either the Agreement or, by reference, in an appropriate section of the Contract Specifications.

Absent such a requirement in the Contract, the Contractor may perceive that it is not required to provide such technical documentation. If system manuals are required, they usually have to be developed by the Contractor or a specialist subcontractor, either of which may represent a significant cost to the Contractor.

Government contracts, especially for Navy and Coast Guard vessels, may require even greater *logistic support* technical documentation for which the cost of development may be a measurable percentage of the cost of the physical vessel. If these requirements are not defined within the Agreement or, by reference, within the Contract Specifications, it may become impracticable for the Shipowner to obtain them at a later date.

38. Tests and Trials

There are a significant number of tests and trials to which the vessel must be subjected in order to prove the workmanship and the operational capability of each component, and then each system, and then finally the entirety of the vessel. Many of these tests and trials are needed to obtain regulatory and classification approvals, but others are needed to give the Shipowner assurance as to the satisfactory completion of the work by the Contractor.

Each test and trial has cost and possibly schedule impacts. In order to include each of them in the Contractor's price and schedule, they have to be defined in the Agreement or, by reference, in the Contract Specifications. If special instrumentation or equipment is needed to accomplish the tests, it should be stated that Contractor is to provide those items, such as water bags or test weights for crane load tests and load banks for generator electrical load tests.

For some of the more complex trials, a definitive, draft trial agenda should be developed by the Contractor in advance, provided to the Shipowner for review and comments, and then finalized prior to those trials. The Agreement should establish the schedule and mechanisms for such developments. Several organizations, including SNAME and ASTM as well as the Navy and Coast Guard, have standard test and trial agendas which may be the basis of the specific agendas developed for the new ship's trials.

The details of any tests and trials, as well as the standards to be used for test and trial agendas, should be in the Contract Specifications, but the necessity of them, especially those in excess of regulatory and classification requirements should be identified in the Agreement.

39. Warranty Deficiencies and Remedies

The warranty clause of the Agreement must address several specific issues, but the order in which the issues are addressed is not significant. It should be understood, however, that a warranty claim can apply only to an item which was working or completed at the time of Vessel Delivery, and subsequently broke or ceased to work sometime during the Warranty Period. An item which was not working or not completed at the time of Vessel Delivery may be corrected or completed during the Warranty Period, but it is financially treated in a different manner, as described below in the section on Special Retainages.

The duration of the warranty period should be defined. Related to that, the warranty clause should address how, if at all, the warranty period pertaining to some equipment, or perhaps the entire ship, is extended if

that item or the entire ship is out of service due to a warranty defect.

The warranty clause must also define what is subject to the warranty: the Contractor's workmanship, the materials and equipment supplied by the Contractor, or both. Further, the warranty clause must define which entity is giving the warranty on each particular aspect of the ship. The clause may allow the Contractor to *pass through* any manufacturing warranties from vendors, such as pump manufacturers or coating suppliers, and provide that the Contractor does not otherwise warrant that item; however, the Contractor always warrants the workmanship of installing or applying those items. This may present some risk to the Shipowner if the manufacturer's warranty expires before the balance of the contractual warranty is to expire.

The matter of which party is to expend resources to correct a warranty item must also be defined. This can be complex since it must allow for:

- emergency repairs,
- possible remote location of the ship relative to the shipyard,
- timing of notification by the Shipowner to the Contractor of the existence of a warranty defect, and
- location at which it is possible to effect the warranty correction.

40. Progress Payments

A shipyard needs progress payments to cover the significant cash flow requirements that are incurred by the shipyard during ship construction project. The cash flow relates to the regular payroll for all those working on the vessel's construction, the subcontractors, the vendors and suppliers, as well as for a portion

of the overhead costs for the facility and organization. The shipyard's need for progress payments is not eliminated if the Shipowner decides to finance the construction by a mechanism that is separate from the final vessel mortgage financing. Either the Shipowner or the institution providing the construction financing will allow the Contractor to draw down against the arranged funds on a progress basis, which is pre-established in the Agreement.

It is in the best interest of the Shipowner to ensure that progress payments are made only for work already completed or materials and equipment already received by the Contractor. In some instances, all progress payments have been linked to purely physical construction, but that is not recommended due to the risks it creates. The engineering, the component tests, the system tests, the dock trials, the sea trials, and the certificates and documentation to be provided with the ship all require expenditures by the Contractor. If progress payments are made on the basis of physical progress only, the Contractor has reduced incentive to fully and timely complete all of those tasks that are not direct production work. Thus, an appropriate part of progress payments can be linked to those aspects of the Work Scope that are not physical production of the ship.

Progress payments can be used as a mechanism to discourage premature physical construction, which might otherwise be undertaken prior to completion of activities that are best completed prior to the start of physical construction. For example, the Agreement can state that no progress payments associated with physical construction will be made until the delivery to the Shipowner of a satisfactory, detailed-but-preliminary trim, weight and stability booklet. On some vessels, damage stability may be more relevant. Similarly,

progress payments against any electrical production work can be subject to completion of satisfactory electrical load and fault-current analyses. Other linkages between non-production work and progress payments may be appropriate, depending on the specifics of the project.

Non-production work items that do not have to precede production work, such as completion of as-built drawings, tests and trials, among other functions, can have their own progress payments associated with them. Simply, if the Contractor has received all the progress payments prior to delivery of the as-built drawings, for example, the Contractor has reduced incentive to apply its resources to proper updating and completion of those drawings once the ship has departed the shipyard.

The amount of the progress payments is based on contractually defined mechanisms. Some contracts breakdown the total work into small percentages for each structural module, major components, mechanical or electrical system, and for each major part of the distributive systems. The parties then periodically agree as to the percentage that each of those systems has been completed, and a progress payment against that percentage completion is paid.

Other contracts use well-defined milestones as the basis for progress payments. Depending on the nature of the ship construction project, a total of thirty to one hundred separate milestones may be defined, each having a particular percentage of the total Contract Price associated with its completion. At the end of every month, each of those milestones, which are 100% completed within that month become eligible for the associated progress payment. The non-production activities have their own set of progress payment milestones associated with them, too.

The developers of the Agreement must have a clear understanding of the ship construction process, both production and non-production work, in order to develop an appropriate set of progress payment criteria.

41. Contract Retainage

Many Agreements provide for the Shipowner to retain a defined percentage of each progress payment. Thus, at the time of vessel delivery to the Shipowner, assuming all the deliverables as well as the ship have also been completed, the situation is this: the Shipowner receives the ship and 100% of the other deliverables, but the Contractor has received a lesser percentage of the total contract price.

The purpose of the contract retainage is to provide for the circumstance in which the Shipowner may have to pay for a warranty correction when the Contractor is not able to timely accomplish it or when the Contractor allows the Shipowner to effect that correction. Another purpose of the contract retainage may be to protect the Shipowner in the event of a lien or claim by a supplier, vendor, subcontractor or other party which has contributed to the construction of the ship but has not been fully paid by the Contractor. To minimize the likelihood of such liens or claims, the Terms and Conditions usually require that the Contractor certify that the Vessel is being delivered free and clear of all liens, claims and encumbrances, and certify that all suppliers, vendors, and subcontractors have been fully paid.

For commercial contracts, the amount of the retainage, as a percent of the Contract Price, is negotiated during contract formation. The absence of any contract retainage creates a risk, however minor it may be, that the Shipowner will have to disburse money for

warranty corrections that properly should have been expended by the Contractor, with no cost-effective recourse to recovering that outlay.

For government contracts, the amount of the retainage is established in the request for proposals, or solicitations. Some government agencies require more significant retainages, which, in practice, may only serve to cause bidders to seek higher prices in order to deal with the impact on cash flow that such large retainages may have. From a government agency's perspective, a larger contract retainage allows longer payout for the ship; but in fact it may only serve to increase the cost of the ship.

The Agreement defines when the Contractor will receive the balance of the Contract Price, provided the Shipowner has not spent part of it in a manner allowed by the Agreement. The Contract defines a *temporary* business and legal relationship. From the outset, it is intended that the relationship will terminate upon the end of the warranty or guaranty period. Thus, all contract retainage should be finally paid to the Contractor no later than the end of the warranty period.

Some contracts provide that half or some other portion of the contract retainage be paid prior to the end of the warranty period, and the balance paid at the end of the warranty period.

42. Special Retainages

It is not uncommon that some items on the ship are incomplete or not fully functional at the time the ship is otherwise ready for Vessel Delivery. If those items do not affect ship safety, the ability of the ship to achieve its mission or perform its service, and if the correction or completion does not require the presence of the ship at a full-service shipyard,

the parties may agree that the delivery of the Vessel will not be delayed by those deficiencies.

However, this creates a situation that is inconsistent with the intent of the contract, which intent was stated above, namely, at the time of Vessel Delivery the Shipowner receives the ship and 100% of the other deliverables, but the Contractor will have received a lesser percentage of the total contract price per the contract retainage. In other words, the Contractor is implicitly seeking a waiver of the requirement to deliver the ship in a complete and fully functional condition. In that case, the Contractor should not receive all the funds that otherwise would have been paid at the time of Vessel Delivery.

The Shipowner may grant that implicitly requested waiver if the contract retainage is ample to cover all of:

- the correction of those deficiencies,
- all warranty corrections, and
- any possible liens or claims by subcontractors and vendors.

However, such granting of a waiver creates risks if the Contractor does not correct the outstanding deficiencies. Under other clauses, the Shipowner may not have the right to use the contract retainage to rectify items which clearly were not warranty items, because they didn't break *during* the warranty period.

It is recommended that the Agreement allow the Shipowner to create a special retainage for each such uncorrected pre-delivery deficiency in order to give the Contractor incentive to have that deficiency corrected during the first half of the warranty period. At the end of the first half of the warranty period, any such special retainages are paid to the Contractor if the corresponding deficiency has

been corrected. If it is not corrected by that time, the Shipowner can use those funds to have it corrected during the second half of the warranty period. The reason for that time limit on the expenditure by the Shipowner is, again, that the temporary business and legal relationship is expected to conclude at that time.

43. Technical Project as Basis of Agreement

The previous sections have discussed the purpose and concerns of a number of the clauses of a typical commercial shipbuilding agreement. Other clauses may also be appropriate if they are not already included in the Terms and Conditions of the contract documents. Government contract forms will vary considerably among the many possible government agencies (federal, state, local, educational institutions, quasigovernmental agencies, etc.), but will all contain the equivalent of the clauses discussed above, as well as possibly others that are required by the agency's procurement regulations.

When a set of contract documents is being developed, the Agreement and Terms and Conditions are usually built up from a previous set of similar documents. If, however, the nature of the vessel acquisition is going to be significantly different, then the use of the prior documents as a starting point has to be addressed more carefully. For example, if the prior acquisition was for a ship of the Contractor's standard design, and the new acquisition is for a unique design, there are many aspects of the Agreement that will have to be modified. If the contractor has never constructed a ship of the type being acquired, a more-rigorous set of checkpoints may have to be incorporated into the Agreement and the supporting Specifications.

Essentially, besides establishing a temporary business and legal relationship between the Contractor and Shipowner, the Agreement and the supporting documents should identify potential risks (technical, financial and schedule), assign responsibility for avoiding those risks, and address the consequences if those risks are not satisfactorily avoided. Thus, the nature of the technical project and the risks associated with its achievement are the most important factors in the creation of the contract documents. The entire set of contract documents must be integrated and consistent with each other, but primarily must be appropriate to the technical aspects of the project.

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