

The Impact of Contracts on Ship Design Preparation

The Society of Naval Architects and Marine Engineers published a paper by Dr. Kenneth Fisher, president of Fisher Maritime Consulting Group, having the title that appears above. It was published in the May 2012 *Journal of Ship Production and Design*. Below we present the Abstract, Introduction and Summary, with the major content being omitted for this publication. However, the entire paper can be viewed at www.fisher-maritime.com/design-contracts.html.

Abstract: The implementation of vessel designs is usually achieved through contracts for ship construction or conversion. Accordingly, the design process and the design organization's product have to anticipate and take into account the constraints and requirements of the contracts that control the use of the design, as well as the contract that initiates the design process. This paper addresses the most common contractual factors that have to be considered during preparation of ship designs.

[1] Introduction: When a design organization commences a project, they are usually doing so because there is a contract with the party that will be using that design to procure a vessel or complete some desired work on a vessel. That is, a contract of some form is the mechanism that is used to engage the services of a design organization; and later a different contract will be the mechanism that is used to obtain the product (ship or conversion) that is based on that design. Inasmuch as there has to be complete compatibility between the design and the two contracts, it is important that design organizations understand what objectives have to be achieved in order to be, not only technically appropriate, but contractually appropriate. This paper offers insights helpful to the achievement of compatibility between designs and contracts that design organizations should bear in mind when developing their product, i.e., the design.

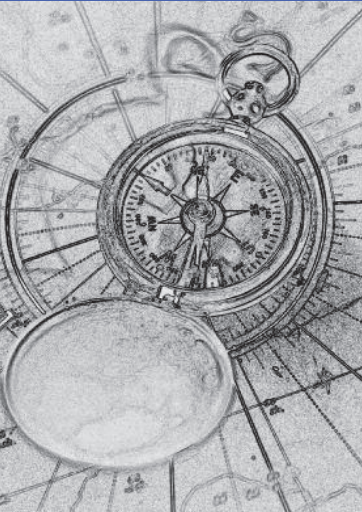
LESSON LEARNED #43: Subcontractor Capability Assumptions

A ship repair yard had been using a subcontractor to blast and paint both interior and exterior surfaces of vapor recovery piping when the yard took on an additional project involving comparable work. After removal of a large quantity of the 14" piping from the vessel, the shipyard brought it to the subcontractor's facility. However, the subcontractor did not have the capability to handle the large diameter piping, having worked only on piping of 10" diameter or less. At the last minute the shipyard had to find another source to accomplish the work.

Not finding a suitable subcontractor to have timely availability, the shipyard set-up its own facility to accomplish the work, with all those set-up and process costs being far greater than originally budgeted.

Fortunately the shipyard later recovered those set-up costs by using the same new capability for several other projects.

The lesson learned: For shipyards, before making a contractual commitment to a ship owner, it is necessary to confirm that any major or key subcontractor will not only be timely available, but have the capacity, techniques and workforce necessary for the workscope. If the prime contract is with a government agency, be sure the subcontractor can keep up with the required flow of paper work, too.



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The Impact of Contracts on Ship Design Preparation

Continued from Page 1

[2] - [18]: Omitted for this publication.

[19] Summary: Normally ship designers are keen to learn how to improve their technical design procedures, and to identify concepts and ideas that can be incorporated into future designs for improvement in the vessel's capabilities. This paper has focused, instead, on non-technical aspects of a vessel designer's role as part of the process of going from conceptual design to delivery of the vessel and modification of the vessel many years into its lifetime. The concepts addressed are summarized by the following.

- Multiple contracts are needed to achieve implementation of a vessel design.
- Specifications and plans have to be complete and suitable for use in contracts.
- The specifications and plans will be the basis for binding answers to many questions during execution of the shipbuilding contract.
- The specifications and plans have to be suitable for quantitative translations during the shipbuilder's estimating and bidding process.
- The designers have to ensure that the specifications and plans are wholly compatible and consistent with all the other elements of the shipbuilding contract.
- The ship designers will have responsibility, along with others on the ship owner's team, to timely provide information responses to all communications received from the shipbuilder.
- All information flow between the owner's team and the shipyard has to be planned by addressing content, form, format, timing and intended use of the information.
- Intellectual property rights have to be addressed before the transmittal of any design information.
- First class marine practice is not interpreted the same way by owner and shipyards.
- There has to be tight coordination between design organizations when several different ones are concurrently working to develop the detail design.
- The recommendation to incorporate a 'better' design feature must be based on a clearly defined criterion of what makes it better.
- A designer's responsibility has to include anticipated growth of the ship in future years.

As a vessel designer, it is vital that you consider your obligations in addition to technical preparation of the design. Remember that your design is being undertaken because there's a contract. Later, your design will be implemented

because of a different contract.

There may also be other intervening contracts. In some cases, due to the contractual arrangements, you may start to lose control of the design. The shipbuilder will be interpreting the ship designer's contribution to the contract—the plans and specifications—in accordance with the shipyard's definition of first class marine practice. Since that definition includes the use of least-cost solutions, the designer will have lost control of the design through the contracting process unless the specifications and plans give the shipyard little choice in those areas that are important to the ship owner. Contracts are the mechanism to control the implementation and use of your design, so it's important for you to understand how your design is going to be compatible with the contracts. Work to ensure that the contracts are compatible with your design, and vice-versa. Finally, don't neglect questions of intellectual property rights.▲



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LESSON LEARNED #44: Define achievement of design objectives

A construction contract for several RO-RO vessels required each ship to have a certain number of square meters of deck space for each of several overhead clearances. The general arrangement plans appeared to indicate that the required areas would be achieved. However, as construction was progressing, the owner's representatives pointed out to the shipyard that certain areas could not be included in the calculation due to the fact that fire detection and suppression equipment as well as several other items protruded downward into the specified vertical clearances. Debate ensued as to how to determine the amount of area that could not be included in the measurement because the small protrusions into the vertical clearance would preclude parking a vehicle under them.

The lesson learned: Although it may appear tedious at the outset, it may be necessary to develop a well-defined criterion that will be applied to determine whether design objectives have been achieved.

About Lessons Learned: Potentially costly and schedule-impacting events in shipyard projects can be avoided by consideration of these lessons that have been experienced by others in the world-wide shipbuilding and ship repair industry. The brief synopses of lessons learned included in this issue are adapted from analyses presented by participants in the regularly offered training course “Contract Management for Ship Construction, Repair and Design.” (Please see back page for list of remaining 2012 training programs.)

Lessons Learned numbers 1–33 are based on some of Fisher Maritime’s project management assignments, and can be found at: [http://www.fisher-maritime.com/Publications/PDF/Fisher ProjectInsights.pdf](http://www.fisher-maritime.com/Publications/PDF/Fisher%20ProjectInsights.pdf).

Other lessons learned (34-42) are found in prior editions (starting in 2010) of *Upright and Afloat* in the Publications section of our website: www.fisher-maritime.com.

LESSON LEARNED #45: Identify necessary decision-making participants

Upon discovering a small area of damage to hull plate and the deformation of the internal frame supporting that plating, the owner and shipyard agreed to have a section of the frame cropped out and replaced after straightening the plating. This occurred shortly before the vessel was to come off drydock. Due to the ship having been constructed to English unit dimensions and the available replacement section being a metric size, there was not an exact match between the new section and existing sections of the frame—a 2-3 mm difference.

However, when the class surveyor looked at the accomplished work, it was rejected due to the discontinuity. A subsequent minor modification was made to satisfy class—but it delayed the undocking of the vessel while the ‘fix’ was sorted out.

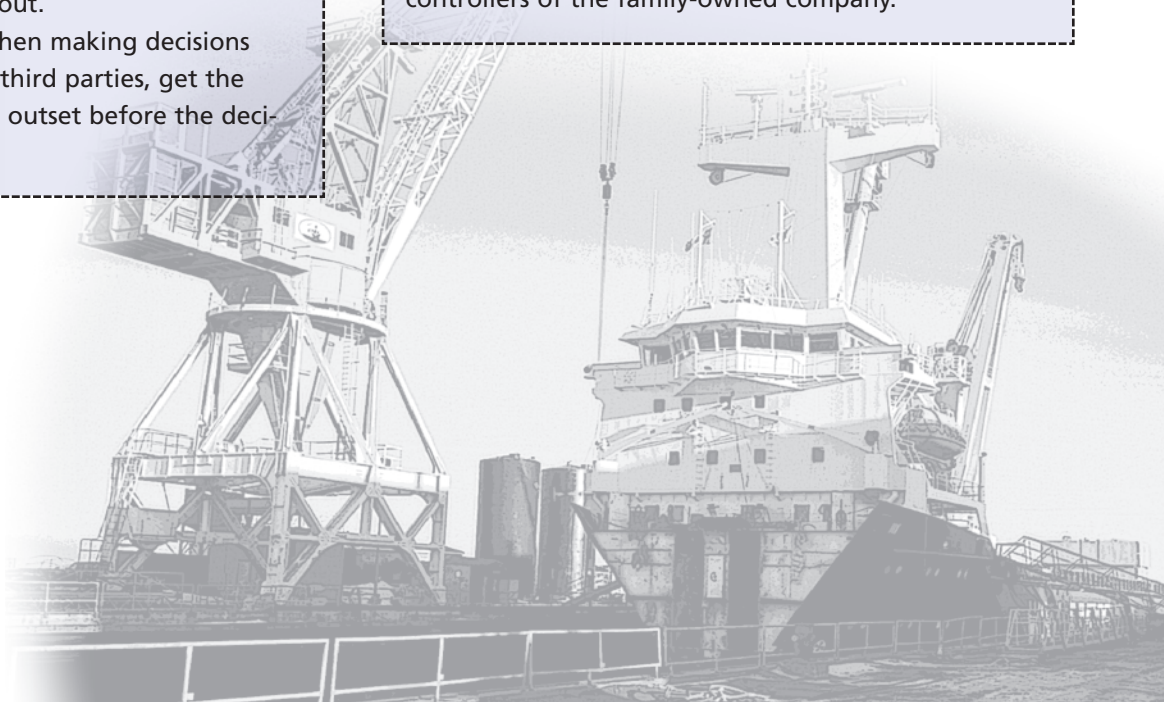
The lesson learned: When making decisions that have to be approved by third parties, get the third party involved from the outset before the decision is finalized.

LESSON LEARNED #46: Authority for changes and growth

A shipyard operated by a family-owned tug-operating company was assigned the construction of a new tugboat to be added to the company’s fleet. During construction, the future operational staff kept visiting the construction project, during which visits requests were made for modifications and additions to the tug. Inasmuch as one of the visiting operational team was a member of the family that owns the company, the builders assumed that the cost impacts of the additions and modifications would be accepted.

However, when the final cost to construct the tug escalated by over 30%, the project team was held responsible for the unauthorized cost escalation.

The lesson learned: It may be hazardous to one’s career to assume that any relative of the yard-owning family has the full authority of the financial controllers of the family-owned company.



Change Orders

Fisher Maritime routinely assists shipyard clients in preparing change orders and final invoices. In some instances it makes sense to bring us onboard for just one high-value change order, if not for multiple interacting ones. In all instances, Fisher Maritime has been able to assist by identifying all elements of the changes (direct and indirect), in determining the contractual basis for entitlement on these elements, and in calculating the quantum or cost of these changes and other items. Schedule impacts and the costs associated with owner-caused delays are routinely addressed as well. We often assist with drafting correspondence and participate in negotiations (sometimes in the background).

Fisher Maritime's considerable experience (over 30 years of such activities), including the development and/or rebuttal of claims, means that we are able to assess both direct and indirect costs that may otherwise have gone unaccounted, which omissions would otherwise come out of the client's bottom line. Contact Fisher Maritime at email@fisher-maritime.com.▲

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LESSON LEARNED #47: Re-Use Assumptions Create Risks

During a service life extension of a large ferry, the vessel's sewage treatment plant was to be replaced by a new one. However, as a cost-savings, the owner assumed in advance that the new plant could use the existing holding tanks and process tanks. The specifications indicated that the system's new components would be compatible with the existing tanks.

But once the project commenced, the contractor determined that many of the piping connections to those tanks had to be relocated and others had to be modified. This segment of the project experienced 76% growth. It would have been less expensive to have used all-new tanks.

The lesson learned: Optimistic assumptions as to the condition and suitability of existing components for re-use during major refits often creates a high-risk situation unless resources are applied to a thorough pre-contract survey and measurement of all the relevant features of those components.

Such assumptions essentially substitute a prayer in place of a reliable assessment of the existing conditions.

LESSON LEARNED #48: Location Change Leads to Cost Changes

A shipbuilder operating two construction facilities at widely-separated locations entered into a contract to construct a pair of sisterships. The pricing included the cost of many items of equipment delivered to the home-office facility and the services of vendors' technical representatives at that same location. When the purchaser requested that the two vessels be constructed concurrently instead of sequentially, the builder undertook parallel constructions, one at each of the two facilities, without changing the pricing.

Later, significant extra costs were incurred when equipment deliveries to the second, more-distant facility were more costly and took longer, as well as when the second yard had to pay for lengthy travel times and expenses for the vendors' technical representatives.

The lesson learned: A change in construction venue is almost certain to have a cost and/or schedule impact as would a change in design configuration. This 'good deed' of accelerating the delivery of the second vessel by constructing it concurrently at another facility without price increase is another example of the observation, "No good deed goes unpunished."

LESSON LEARNED #49: Allowing for Multiple Locations

In response to a request by a local shipyard, a classification organization committed to a certain fee schedule for class surveys during construction of two small vessels. However, while the design work was accomplished at the facility near the classification offices, actual construction was at another facility, several hours away. The classification travel costs ended up exceeding the survey costs, but the class organization could not alter its fee commitment or otherwise recover those costs.

The lesson learned: Inasmuch as vessel builders routinely have parts or all of vessel construction accomplished at multiple sites, service providers should not make assumptions as to where their services will have to be rendered. This lesson also applies to location of equipment deliveries.

Fisher Maritime's Professional Services

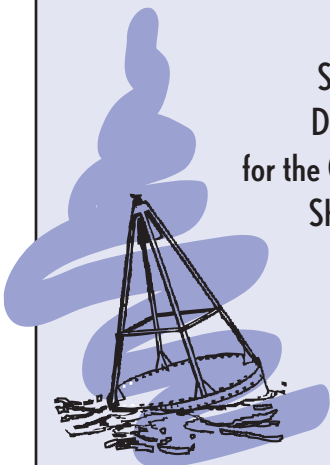
Contract Solutions and Project Management for the Construction and Conversion of Ships and Offshore Vessels

Pre-Contract Solutions and Services

- Contracting Strategies
- Bid Solicitation Strategies
- Identification of Resource Requirements
- Development of Bid Request Packages
- Solicitation of Competitive Bids
- Analysis of Bids and Bidder Qualifications
- Contract/ Agreement Drafting
- Integration of Specifications with Contract Agreement
- Negotiation Support for Contracting
- Quality Assurance Review of Specifications
- Preparation of Contract Management Controls and Check Lists/Spreadsheets

Contract Management and Close-Out

- Oversight of Contract Management and Administrative Communications
- Verification of Progress Invoices
- Negotiation of Changes, New Work, Emergent Work and Arisings
- Realistic Schedule Assessments
- Post-Delivery Negotiations
- Contract Close-Out
- Dispute Resolution Strategies
- Contract Mediation Services
- Contract Arbitration Services
- Development of Cost/Schedule Analyses for use in Settlements
- Development and Presentation of Claims or Rebuttals in Arbitration or Litigation



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On-Site Contract Management Training Course

Enhancing Professional Management Capabilities for Shipyard Projects

Dr. Kenneth Fisher's very well-attended training course, *Contract Management for Ship Construction, Repair and Design*, can be presented at your organization's facility for a low fixed fee. Already the program has been presented on-site over 180 times in 15 countries, in addition to another 160 open-registration presentations. Over 4,000 persons from 24 countries have benefitted from this course. A description of the course that is certain to enhance the professional management capabilities of persons associated with shipyard projects is available at www.fisher-maritime.com/projecttraining/contractmanagement.html.

If your organization has seven or more persons whose professional capabilities could benefit from such training, it is cost-effective to bring the program to you, instead of having those persons travel to a distant open-registration program. For details and information, send an inquiry to: register@fisher-maritime.com. (Can you identify these 15 countries in which the course has been presented? Hint: these are internet domain identifiers. AU, CA, DE, ES, GR, HK, HR, NO, NZ, PA, PT, SE, SG, UK, and US.)▲

2012 Training Programs

188 In-House Presentations & 161 Open Registration Programs Already Completed



FISHER MARITIME has been offering these popular training programs since 1988, both of which are scheduled for open-registration in 2012 on the dates and locations shown below. Outlines of the

programs can be viewed on our website, www.fishermaritime.com, or you may call to request a detailed brochure via fax or mail.

Each of the programs can be presented on-site at your organization's facility for seven or more persons at less cost than sending your staff to an open-registration presentation. Over 108 organizations in fourteen countries have had these programs presented on an in-house basis over the past 23 years. To receive details for arranging an on-site presentation of any of the programs listed below, contact us:

tel. 800-732-3476 or 973-660-1116, fax 973-660-1144, email: email@fishermaritime.com.

C&CM: Contract and Change Management for Ship Construction, Repair and Design. This 3-day course is designed for all members of the contract management team for ship owners, shipyards, design firms, vendors, subcontractors, regulatory agencies, whether commercial or government. Senior and middle management of all those types of organizations benefit from the "lessons learned" approach to managing all contractual commitments.

Ottawa, Canada	Tues.-Thurs.	July 17 – 19, 2012
Tampa, Florida	Tues.-Thurs.	Sept. 11 – 13, 2012
London, United Kingdom	Wed.-Fri.	Oct. 3 - 5, 2012

TPEC: The Port Engineer's and Owner's Representative's Course. This 3-day course is designed for shipowner's personnel who prepare specifications, who accompany the ship to the shipyard, and who arrange for new/growth/change work during contract performance. This course helps assure getting maximum value for money spent.

Portland, Oregon Tues.-Thurs. Nov. 13-15, 2012

SMCC: Shipyard Management of the Customer and Contract. This 2-day course for project managers, production supervisors, estimators and planners is the only training program specifically developed for mid-level managers of shipyards and subcontractors. Presented in-house only. Contact Fisher Maritime for details.

email@fishermaritime.com

Well-designed ships often become poorly executed shipbuilding projects due to lack of a comprehensive contracting strategy. The success of a project is just as dependent on good contracting strategy as it is on good ship design; one without the other inevitably leads to a compromised outcome. Ship owners are urged to contact Fisher Maritime to work out a comprehensive strategy, for both the design contract and building contract, that will meet the needs of the owner while minimizing risks of unwarranted design trade-offs, delays, extra costs, and disputes over interpretation of the intent of the design.

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