SPAR Scuttlebutt

June 2019

SPAR a Team Member of a Successful NAVSEA Award

Recently, the technology team primed by MCR Federal and including SPAR, has been awarded a contract to offer services to NAVSEA for a wide range of areas related to improving effectiveness, efficiency, and affordability in ship design, manufacturing, and support.

The winning MCR Federal team offers a unique combination of in-depth marine industry design, best-practices manufacturing and cost and schedule savings experience and capabilities especially well-suited to address the Navy's stated needs.

SPAR along with our companion industry experts have teamed together under this contract to showcase our technical expertise to support the US Navy's shipbuilding programs. As part of this specialized MCR team, SPAR provides all aspects of Cost Analysis from early stage design through Life Cycle Cost and Acquisition Strategies. Read about our team here.

Royal Canadian Navy & Canadian Coast Guard

SPAR continues to support the Canadian Government by providing a third-party review for the earned value management ("EVM") reporting of the non-combatant ships currently being built under the Canadian National Shipbuilding Procurement Strategy ("NSPS").

As SPAR continues to be an active participant in the EVM Integrated Product Team at the shipyard, reviewing shipyard EVM reports and data each week for the OFSV and JSS programs, providing independent EVM reports and forecasts each month using SPAR's shipbuilding PERCEPTION® ERP/EVM system. SPAR continues to provide briefings and attending meetings as required by the Canadian Government.

In addition to providing EVM services, SPAR has provided Cost Validation Studies for the CCG OOSV, the DND AOPS being built at Halifax, and the DND JSS. These studies included benchmarking the shipyards estimated build cost by providing an Independent Cot Estimate based on our libraries of standard Cost Estimating Relationships (CERs) and productivity factors.

Looking For Cost Drivers

Designing and building a modern ship is a complicated business involving procurement of many different materials and subcontractors synchronized with various production fabrication, assembly and testing processes. Each of these elements need to be carefully planned and coordinated, and each adds to the cost of the final product: the ship.

Government agencies planning new shipbuilding programs are anxiously looking for how to satisfy their ship mission requirements within the limited funding levels available.

Commercial ship owners have financial objectives to meet the challenges of their business markets and maximize a return on investment.

Ship designers need to satisfy the ship owners ship performance requirements, and generate an engineered design that is more producible, easier and less costly to build. The management of the design and engineering processes further need to plan its efforts to directly support the shipbuilder and its ability to more efficiently execute the fabrication and assembly processes.

Shipbuilders need to offer ship products that can favorably compete against other shipbuilders on the open markets and satisfy the general financial and construction requirements imposed by the customer. The shipbuilder further needs to review carefully steps to minimize cost and schedule risk: specifically, cost risks from potential problems with engineering and production performance.

All of these special interests place a very heavy focus on one single element that affects them all: cost

Within what typically is a limited time frame for cost evaluations, the prudent shipbuilder needs to at least review the costlier elements of its program proposal. These large cost items are called cost drivers, and their review can open up new opportunities to mitigate their costs, even open up innovation for applying new technologies and build strategies that can improve the program's overall price and/or improve the performance of the ship design in the water and reduce costs over the life of the vessel.

SPAR, a long-standing company specializes its products and services on helping ship designers and shipbuilders better manage their costs. SPAR has authored a paper named "Looking for Cost Drivers,". The discussion illustrates a many faceted approach to reviewing a program cost estimate and identifying what cost drivers are most significant. The discussion describes typical" hard cost drivers" such as expensive machinery and equipment to "soft cost drivers" such as the producibility of the ship design and outfit density. Likewise, shipbuilder's productivity and the cost/schedule performance of the engineering effort can be critical drivers of cost too.

Estimating Cost Models

SPAR offers a variety of cost models that focus on specific ship types (naval, commercial, mono-hull, catamaran, trimaran, and SWATH/SLICE hull forms). The cost models produce estimates for design and construction with options for estimating life cycle costs.

The cost models are extensive Excel workbooks that provide a very wide range of equipment and ship system selections and options as well as a variety of structural materials including high strength steels, aluminum and composites. All material costs are linked to commodity-based escalation tables to provide consistent material costs relevant to the anticipated year for contract award.
The cost models have been designed to provide quick cost estimates for various concept and preliminary design trade-off studies.

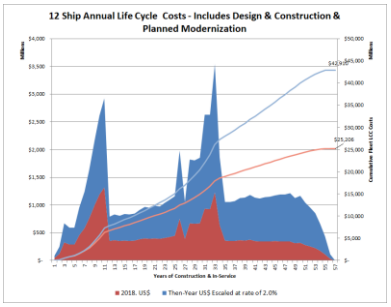
The models provide easy-to-use cost adjustments to accommodate the impact of design complexity, special operating requirements, and anticipated build strategy.

The cost models generate estimates of cost risk based on expected risk levels of engineering, shipbuilding and schedule performance assessment criteria.

A presentation of the cost model features can be viewed from SPAR's web site.

Estimating Life Cycle Costs

There are options for estimating life cycle costs ("LCC"). These extended features generate LCC estimates, including annual funding projections, not only for a lead ship, but also for a fleet or class of such vessels planned for an acquisition program. With the LCC estimating features linked directly to the design and construction cost model, changes in the design and production build strategy automatically flow into their impact upon LCC.



The LCC Cost Model can be used to identify differences in LCC with alternative ship systems, materials, construction build strategies as well as operations and maintenance scenarios.

Selecting better design choices can produce ships that are less expensive to operate and maintain and can increase the in-service time, and even lengthen its useful life expectancy in meeting the ship's mission requirements.

A presentation of the LCC features can be viewed from SPAR's web site.

Estimating Non-Recurring Design & Engineering Costs

SPAR has expanded its "should Cost" modeling for estimating non-recurring design and engineering ("NRE") costs. The model develops NRE labor hours as a percentage of total lead ship

production labor hours which can vary significantly depending on the size and type of vessel, the complexity of the design and the expertise and competence of the technical group performing the NRE scope of work.

These percentages, based on estimated "should cost" averages for U.S. shipbuilders will change depending on the specific vessel being estimated i.e. Ship type, LOA, displacement, and outfit density factor. NRE labor hour formulas are built into each of the SPAR Cost models and provided as guidelines for the user. These estimated percentages can be modified by the estimator depending on individual circumstances

Cost Estimating Contracts

SPAR has been actively engaged in providing independent cost estimates across a very wide range of ship types: Fisheries and hydrographic science vessels; large and medium polar icebreakers, fast ferry overhaul & refurbishment; several training ship designs, conversions of tanker and offshore support vessel to training ship requirements; navy replenishment oilers; naval amphibious ship; multiple naval destroyer designs; multiple naval LCS and frigate designs; naval ice-capable patrol vessel; and multiple security patrol vessels.

A number of these estimates were tailored toward comparing costs for similar designs; built in different countries each with domestic labor and material costs, shipbuilding productivity and consideration for delivery from on-going production programs; partnership arrangements with world-class foreign design engineering, even material kitting options.

These estimates all include estimates of cost risk measured by assessments of design complexity; quality and management of anticipated engineering performance; productivity and management of shipbuilding performance; and other pertinent considerations.

On-Line Software Demos & Training

SPAR has provided a series of on-line software demos and training exercises to shipyards in Asia, India, the Middle East and within the U.S. using the WebEx system over the Internet. WebEx provides a very clear and responsive transmission of on-line demonstration and training details, video and audio features between SPAR staff and shipyard personnel.

Estimating Higher Cost of High Outfit Density Ships

SPAR has been involved in a number of industry projects for developing new methods for planning and estimating ship design and construction.

SPAR has developed cost models that estimate the impact of ship outfit density on production costs. Ships packed with significant outfitting within very confined spaces tend to require many more labor hours to install, whether on board or even earlier on block. In addition, such heavily confined spaces often are more difficult for conducting operations and maintenance activities. They further severely limit the amount of space and weight margins available for future upgrades. New ship volume density functions related to production labor cost have been fully implemented as options within SPAR estimating cost models.

Modern European shipbuilders have been successfully working on solving these problems and are more often now producing designs with larger hulls and outfit spaces. The larger ship volumes are reducing outfit labor hours, and better accommodate maintenance activities and future upgrades.

The added cost for larger ship structures is often much smaller than the resulting cost savings in construction and life cycle.

SPAR has co-authored a Journal of Ship Production and Design paper titled "Reducing Detail Design and Construction Work Content by Cost-Effective Decisions in Early-Stage Naval Ship Design," that develops an approach for estimating the cost penalties for high outfit dense ship designs.

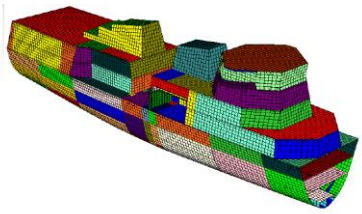
SPAR Participates in NSRP Project

The team of Fincantieri Marinette Marine, Leonardo DRS Technologies, Maestro Marine, U.S. Navy NSWC-CD Code 65, consultants Peter Jaquith and Robert Keane and SPAR have successfully concluded a research and development

contract by Naval Ship Research Program (NSRP).

The title of the project is "Ship Structural Design Optimization for Improved Producibility and Enhanced Life-Cycle Performance. The focus of the project is to exploit the optimizing features of the "MAESTRO" ship structures design capabilities and extend these features to better address the shipbuilder's production faciliti4es and efficiencies.

The project demonstrated significant production cost benefits available from the Maestro structural design optimizing capabilities.



SPAR Associates, Inc.

SPAR has been providing shipyard production planning and management control software since 1972. In addition to its software products, SPAR offers a variety of support services, including custom software design and development; training and software maintenance services; independent cost estimating; supplemental shipyard planning and scheduling services; earned value management analysis, evaluation and reporting to various interests in the marine industries.

We are always available to address whatever questions that you might have. Your success is ours.

If you have corrections to your address or would like to add a name to our mailing list, please complete the following form and ***Send To:*** SPAR Associates, Inc.- 927 West Street- Annapolis, MD 21401,USA
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