

SSC Project Recommendation for FY 2019

Importance of Fabrication and Detailing

1.0 OBJECTIVE.

- 1.1 The objective of this project is to develop a guidebook on the importance and the identification of fabrication and detailing practice that will improve quality / reduce vessel life cycle costs.

2.0 BACKGROUND.

- 2.1 While design Engineers and Naval Architects are trained or have reference materials that support their efforts to preclude premature ship structural or mechanical degradation (e.g. fatigue, fracture, corrosion), this information may not be as readily available to shipyard workers, supervisors or inspectors. Where information is available, it tends to be presented in terms of workmanship rules which do not provide the user with an understanding of the underlying reason for the requirement and thus in some instances may be difficult to interpret or apply.
- 2.2 It is important for shipyard workers, supervisors or inspectors to understand the effects of fabrication and detailing practice since a significant proportion of structural or mechanical component failures may be directly attributed to these issues. By better impressing the reasoning for and importance of fabrication and detailing on non-design personnel may result in better ship fabrication and maintenance quality by having another level of quality assurance in the ship design / production process.
- 2.3 With increases in demand for and turnover in shipyard workers, supervisors or inspectors and increasing turnover, the proposed fabrication and detailing guide may be useful as an element of a training program to help develop qualified personnel for these jobs. This training could be developed by individual employers or could be presented as an SSC sponsored event such as the short course on Fatigue and Fracture in Ship Structures [ref 1].

3.0 REQUIREMENTS.

3.1 Scope.

- 3.1.1 The Contractor shall ensure that the guide to fabrication and detailing quality relates workmanship / inspection criteria to the structural strength or degradation mechanisms they address and provides a technically sound description of these relationships that would be understood by laymen.
- 3.1.2 The Contractor shall ensure that the guide to fabrication and detailing quality is complete in its coverage of ship production issues.
- 3.1.3 The Contractor shall ensure that the guide is supported by a literature bibliography of related work.

3.2 Tasks.

- 3.2.1 It is proposed that the project could be completed with the following tasks:

- 3.2.1.1 Define ship production tasks and degradation mechanisms or strength deterioration modes (failure modes or limit states) of interest. - The intent of this task is to define the scope of the guide and should be the focus of the project kickoff meeting. It is suggested that the guidance document include the

following, however this will be open to discussion with the Technical Committee:

3.2.1.1.1 Ship Production Tasks

- 3.2.1.1.1.1 Material Quality
- 3.2.1.1.1.2 Fitup and Surface Prep
- 3.2.1.1.1.3 Structural Details
- 3.2.1.1.1.4 Joining
- 3.2.1.1.1.5 Coating Application

3.2.1.1.2 Degradation Mechanisms and Failure Modes

- 3.2.1.1.2.1 Fatigue and Fracture
- 3.2.1.1.2.2 Corrosion
- 3.2.1.1.2.3 Structural Yielding
- 3.2.1.1.2.4 Buckling
- 3.2.1.1.2.5 Excessive Deflection, etc.

3.2.1.2 Review class and military workmanship rules - This review will produce a listing of general inspection requirements and these items will be grouped in terms of their rationale and the production tasks they impact. For example:
- Work surface cleanliness can be related to weld faults (Joining task) and or lack of paint adhesion (Coating Application task)
- Limits on distortion (Material Quality or Joining tasks) can be related to residual stress, fatigue, buckling or other structural issues.

3.2.1.3 Develop inspection and guidance notes for each ship production task – The goal of this task is to develop pictorial, qualitative or semi-quantitative descriptions of the issues of concern for each ship production task covering issues such as:

3.2.1.3.1 Material Quality (Receiving Inspection / Handling and Storage)

- 3.2.1.3.1.1 Base Materials
- 3.2.1.3.1.2 Joining Consumables
- 3.2.1.3.1.3 Coating Products

3.2.1.3.2 Fit-Up and Preparation

- 3.2.1.3.2.1 Alignment
- 3.2.1.3.2.2 Surface Preparation

3.2.1.3.3 Structural Detailing

- 3.2.1.3.3.1 Structural Continuity
- 3.2.1.3.3.2 Connection Types
- 3.2.1.3.3.3 Drainage
- 3.2.1.3.3.4 Material Combinations

3.2.1.3.4 Joining

- 3.2.1.3.4.1 Weld Faults
- 3.2.1.3.4.2 Structural Faults
- 3.2.1.3.4.3 Joining Sequence

3.2.1.3.5 Priming and Paint Application

- 3.2.1.3.5.1 Coating Types
- 3.2.1.3.5.2 Application Practice

3.2.1.3.6 It is expected that this task will involved shipyard and class society consultation to support the development of the desired information.

- 3.2.1.4 Develop guide to fabrication and detailing quality – In this task the t notes and data collected for each task in the guide will be assembled into a consistent and cohesive guide suitable for training.
 - 3.2.1.5 This task will be used to develop a brief overview of a training course that could be offered using the guide as its basis.
 - 3.2.2 The Contractor shall keep the project technical committee and contracting authority informed of the progress of the project at least on a quarterly basis.
- 3.3 Project Timeline.
 - 3.3.1 Task 1: Define ship production tasks and faults: NTP – NTP+7 weeks
 - 3.3.2 Task 2: Review rules and develop rationale: NTP – NTP+13 weeks
 - 3.3.3 Task 3: Collect and summarize ship production tasks: NTP+7 weeks – NTP+32 weeks
 - 3.3.4 Task 4: Assemble fabrication and detailing guide: NTP+26 weeks – NTP+52 weeks (end)
 - 3.3.5 Task 5: Develop course syllabus: NTP+39 weeks – NTP+52 weeks (end)

4.0 GOVERNMENT FURNISHED INFORMATION.

- 4.1 Standards for the Preparation and Publication of SSC Technical Reports
- 4.2 Most of the technical data required for this program is available in the public domain or can be readily obtained from Class. Therefore, no specific government furnished information is required.

5.0 DELIVERY REQUIREMENTS.

- 5.1 The Contractor shall provide quarterly progress reports to the Project Technical Committee, the Ship Structure Committee Executive Director, and the Contract Specialist.
- 5.2 The Contractor shall provide a brief training course syllabus, outlining the content of a training course that could be offered based upon the work compiled in this report will be submitted.
- 5.3 The Contractor shall provide interim progress reports and hold a kick off meeting, interim progress meeting and a final project presentation
- 5.4 The Contractor shall provide a print ready master final report and an electronic copy, including the above deliverables, formatted as per the SSC Report Style Manual.

6.0 PERIOD OF PERFORMANCE.

- 6.1 Project Initiation Date: June 2019.
- 6.2 Project Completion Date: 12 months from the date of award.

7.0 GOVERNMENT ESTIMATE. These contractor direct costs are based on previous project participation expenses.

- 7.1 Project Duration: 12 months.
- 7.2 Total Estimate: approximately \$90,000
- 7.3 The Independent Government Cost Estimate: To be provided with full proposal.

8.0 REFERENCES.

- 8.1 BMT Fleet Technology Limited, "Short Course on Fatigue and Fracture in Ship Structures", Prepared and presented on behalf of the US Ship Structure Committee.

9.0 SUGGESTED CONTRACTING STRATEGY

- 9.1 BMT maintains an active GSA Schedule contract under the new Professional Services Schedule (PSS). Using the streamlined procurement procedures in FAR Subpart 8.4 Federal Supply Schedules, PSS offers federal agencies access to commercial professional services at "Most Favored Customer" pricing. SSC may use the simplified acquisition procedures to issue a Request for Quotation (RFQ) using GSA's eBuy solicitation system, or directly to contractors according to governing agency procedures. Special Item Number (SIN) 871-1 (Strategic Planning for Technology Programs/Activities) or SIN 871-2 (Concept Development and Requirements Analysis) would be appropriate classifications for the proposed project.