

MAZAGON DOCK SHIPBUILDERS LIMITED

माझगांव डॉक शिपबिल्डर्स लिमिटेड

"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/MBS/MRLC-2/ Hiring of services for Hull activities for Project-MRLC 2



माझगांव डॉक शिपबिल्डर्स लिमिटेड

MAZAGON DOCK SHIPBUILDERS LIMITED

Mumbai-10

रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

NOTICE INVITING EXPRESSION OF INTEREST (EOI)

FROM REPUTED VENDORS FOR

HIRING OF SERVICES FOR HULL ACTIVITIES FOR PROJECT-MRLC 2

1. EOI Ref. No. : EY/CD/MBS/MRLC-2/2022
2. Description : Hiring of services for Hull activities
for Project-MRLC 2
3. Date of Issue of EOI : 13-06-2022
4. Last date for Submission of EOI : 21-06-2022



CERTIFIED

ISO 9001: 2008

for Submarine Division

माझगांव डॉक शिपबिल्डर्स लिमिटेड

MAZAGON DOCK SHIPBUILDERS LIMITED

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रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

"EXPRESSION OF INTEREST" (EOI)

EOI No: - EY/CD/MBS/MRLC-2/ Hiring of services for Hull activities for Project-MRLC-2

EOI date : 13-06-2022

CLOSING DATE : 21-06-2022

OPENING DATE : 21-06-2022

SUB: INVITATION OF "EXPRESSION OF INTEREST" (EOI) from Reputed Vendors with expertise in the field of Hiring of services for Hull activities for Project-MRLC-2

Mazagon Dock Shipbuilders Limited is the India's premier shipyard under the Ministry of Defence Production constructing warships, Submarines. The company invites Expression of Interest from reputed ISO certified indigenous firm's engaged in shipbuilding activities/ marine structures for long term participation in its production programme for Hull activities for Project-MRLC 2.

SUB: Hiring of services for Hull activities for Project-MRLC-2.

MAZAGON DOCK SHIPBUILDERS LIMITED INVITES expression of interest (EOI) IN TRIPLICATE from reputed ISO certified Indigenous Contractors/ship builders with expertise in the field of ship building/marine structures for the following Work.

1. **Scope of work:** Attached with this EOI.

2. **Qualification Criteria:**

Bidders should have mandatory experience of HULL FABRICATION & OUTFITTING on Submarines in the past 15 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas: -

- a) Fore body & Aft body fabrication, Pressure testing of tanks, fabrication and installation and Installation of Bridge fin and Casing
 - i. Firm should have experience of fabrication and installation of submarine structures up to 30 MT weight. This 30MT needs to be in not more than 2 contracts with each job not weighing less than 2 MT.
- b) Fabrication & Installation of Sonar Dome, Stern tube and Fabrication & Machining of Rudder & Hydroplane Blades.
 - i. Firm should have experience of sheet metal forming work on a submarine up to a thickness of 2mm (stainless steel).

- ii. Firm should have experience of fabrication and machining of rudder & hydroplanes blades of submarine.

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3. Financial Qualification Criteria:

Bidders must submit the following documents along with their offer:

- i) Details of company Profile and valid Shop & Establishment registration certificate.
- ii) Audited / Certified Balance sheet, Profit / Loss account for past 3 years and valid solvency certificate / Banker's opinion issued by Nationalized / Reputed international / scheduled bank.
- iii) Bidder's average Audited Annual financial turnover certificate.
- iv) Valid ISO certificate.
- v) The bidders experience and past performance on similar services (HULL FABRICATION & OUTFITTING on Submarines) in the last 15 years (Order copies & work completion certificates to be appended).
- vi) List of employees on their pay roll & their work experience/qualification related to SOW.

4. Terms & Conditions Of EOI: Participating firms shall indicate acceptance of terms & conditions of EOI as given below:

4.1 Confidentiality: All the information provided to the vendors shall be treated as confidential and should not be disclosed in any manner to any unauthorized person under any circumstances.

4.2 Statutory Requirement, Official Secret Act, Safety and Security Rules

In the event of placement of Order, contractor shall also abide to all statutory requirements, Official Secrets Act 1923, Security and Safety Rules. The documents are available on MDL website. ~~Bidders are required to submit a non disclosure agreement on Rs.500 stamp paper in the format as per Enclosure-I~~

4.3 Submission of EOI:

EOI complete in all respect with all supporting documents in a Envelope securely closed (Sealed) super scribed with EOI No, due date, Time and firm's name addressed to:-

HOD,
Commercial Department–East Yard,
Mazagon Dock Shipbuilder Limited
Mumbai-10

EOI should be deposited on or before the EOI closing date and time.

TENDER BOX for East yard, Commercial, situated at MDL Reception Centre MAZAGON DOCK SHIPBUILDERS LIMITED, Dockyard Road, Mumbai-10

Also MDL reserves right to demand/ask for soft copy through non Rewritable CD.

4.5 Bid rejection Criteria

- i. Bids received after due date.
- ii. Bidder's failure to furnish sufficient or complete details for evaluation of the bids within the given period.
- iii. Incomplete / misleading / false / ambiguous in the proof of eligibility requirements.
- iv. Failed to produce timely clarifications related thereto, when sought.
- v. Bids not meeting qualification criteria

- vi. Submitted more than one proposal for single specialization area.
- vii. Declared ineligible by the Government of India / State govt. / Public sector undertaking.
- viii. Information relating to the evaluation, clarification and recommendation for pre-qualification shall not be disclosed to bidders or any other persons not officially concerned with such process until the pre-qualification process is completed. Any effort by the bidder to influence MDL prequalification process may result in rejection of his EOI.
- ix. Bidders who are debarred under PPP MII order 2017, GeM, CPPP including Tender holiday issued by MDL
- x. Non-submission of Compliance Certificate w.r.t Land Border Clause as per the enclosed format. (Restrictions under Rule 144 (xi) of the General Financial

4.6 Opening of EOI:

The EOI received will be opened on the due date at the declared time or next working day if closing date happens to be holiday declared by MDL. Participated firms, who wish to remain present during the EOI opening, should nominate on their company's letterhead the name and designation of one person authorized to remain present at the time of opening the EOI and send this letter so as to reach the undersigned at least one working day prior to closing date of the tender.

5. Purpose:

For identifying the firms who are interested to execute the work as per the standards and process as desirable for the scope of work.

All the EOI received by MDL, on or before the due date & time would be scrutinized w.r.t the scope of work. Upon completion of meetings and scrutiny, MDL will finalize tender. The firms may please note that mere meeting of the requirement mentioned in the EOI does not entitle any firm the right for awarding the tender or contract.

6. Expression of Interest & Selection of Bidders:

Technical offers submitted against expression of interest shall be evaluated by MDL user in line with present requirements as stated in the technical documents/EOI. MDL team may further visit to bidder's premises to ascertain the capability and capacity required to undertake the task. MDL team thereafter shall shortlist the suitable bidders based on the technical offers and visit report of MDL team to progress further. Decision of MDL team/User with regards to short listing of bidders shall be final. MDL has right to accept and reject expression of interest at any stage of the process.

7. Contact Person:

(i) For any further technical details/queries, firms may contact Mr D C Sonawane CM(PLG-EY), Tel no. 022-2376-3599 & mail- dcsonawane@mazdock.com and Mr. Sudarsan Behera ,CM(HULL), Tel no. 022-2376-3599 & mail- sbehera@mazdock.com.

(ii) For any commercial details/queries, firm may contact Manish Sorte, DM (C-EY), Tel No. +91 22 23782610 or Mr. Pravin Nikhare, CM(C-EY), Tel No. +91 22 23762614, Fax no. +91 22 23741386, E-mail Id : mbsorte@mazdock.com, psnikhare@mazdock.com

8. Public Grievance Cell:

A Public Grievance Cell headed by Shri. R R Kumar, General Manager has been set up in the Company. Members of public having complaints or grievances are advised to contact him on Wednesday between 10.00 hours and 12.30 hours in his office on Third Floor, D-1 Building, East Yard , or send their complaints / grievances to him in writing for redressal. Contact Telephone No is 23782338. Interested firms are requested to submit their Expression of Interest (EOI) on or before the due date & time.

MAZAGON DOCK SHIPBUILDERS LIMITED

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"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/MBS/MRLC-2/ Hiring of services for Hull activities for Project-MRLC 2

Thanking you,
For MAZAGON DOCK
SHIPBUILDERSLIMITED,

Enclosure:-

a) Official Secrets Act 1923 (Available on MDL Website)

Note: The documents mentioned under reference and formats shall be downloaded from MDL's
Website: www.mazdock.com > [Tender/EOI](#)

EOI FOR HIRING OF SERVICES FOR HULL ACTIVITIES
FOR MRLC-2 (SHANKUSH)

BROAD SCOPE FOR EOI OF HULL WORKS:

BROAD SCOPE OF WORKS FOR EOI IS AS FOLLOWS:

THE JOBS TO BE CARRIED OUT INSIDE MDL PREMISES. HOWEVER, SUBCONTRACTOR MAY TAKE OUT MATERIALS OUTSIDE MDL PREMISES FOR ANY SPECIFIC JOB WHICH CANNOT BE CARRIED OUT INSIDE.

GROUP-1 (ONE FIRM)

- A) DEGUTTING AND REMOVAL, FABRICATION AND INSTALLATION OF SONAR DOME
- B) FABRICATION AND MACHINING OF UPPER & LOWER RUDDERS AT MDL PREMISES
- C) FABRICATION AND MACHINING OF AFT HYDROPLANE PORT AND STBD
- D) SURVEY, REPAIR OR FABRICATION AND MACHINING OF FORWARD HYDROPLANE PORT AND STBD.
- E) DEGUTTING, FABRICATION AND INSTALLATION OF STERN TUBE
- F) FABRICATION AND INSTALLATION OF NON-HY80 SEATING AT MDL PREMISES.
- G) CRADLE SHIFTING FOR SURVEY OF EXTERNAL PRESSURE HULL

GROUP-2 (TWO PARALLEL FIRMS)

- H) DEGUTTING, FABRICATION & INSTALLATION OF BRIDGE FIN & CASING.
- I) DEGUTTING, SURVEY, REPAIR, RENEWAL OF FORE AND AFT BODY NON PRESSURE HULL STRUCTURES INCLUDING ALL EXTERNAL TANKS MBT NO1,2&3 ,4,5, RBFT. PRESSURE TESTING AND FINAL BOXING UP OF ALL EXTERNAL TANKS AND MBT'S
- J) REPAIR OF RESCUE SEAT BY MANUFACTURING, WELDING AND MACHINING
- K) OPENING, DEGUTTING, RENEWAL OF ALL INTERNAL TANK AND STRUCTURES INSIDE PRESSURE HULL. PRESSURE TESTING AND BOXING UP OF ALL INTERNAL TANKS.

GROUP-3 (ONE FIRM)

- L) DEGUTTING, OUTFITTING AND TESTING OF PROVISIONAL COLD STORE.
- M) DEGUTTING, SURVEY, REPAIR, RENEWAL AND REFIT OF DECK PLATFORMS, PLATES, FRAMES AND SUPPORTS
- N) DEGUTTING AND RENEWAL OF COMPLETE METALLIC PANELING AND TRAYS INSIDE GALLEY LOCKERS.
- O) INSIDE PRESSURE HULL AND ACCOMODATION OUTFITTING.
- P) DEGUTTING, SURVEY, REPAIR, RENEWAL, INSTALLATION, PRESSURE TESTING AND TRIALS OF VENTILATION SYSTEM (P- SYSTEM)
- Q) REMOVAL AND FIXING INSULATION ON PRESSURE HULL, BULKHEADS & COMPARTMENTS OF SUBMARINE

1. PRE-QUALIFICATION CRITERIA:

Bidders should have mandatory experience of HULL FABRICATION & OUTFITTING on Submarines in the past 15 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas: -

2. Fore body & Aft body fabrication, Pressure testing of tanks, fabrication and installation and Installation of Bridge fin and Casing
- 2.1 Firm should have experience of fabrication and installation of submarine structures up to 30 MT weight. This 30MT needs to be in not more than 2 contracts with each job not weighing less than 2 MT.
3. Fabrication & Installation of Sonar Dome, Stern tube and Fabrication & Machining of Rudder & Hydroplane Blades.
- 3.1 Firm should have experience of sheet metal forming work on a submarine up to a thickness of 2mm (stainless steel).
- 3.2 Firm should have experience of fabrication and machining of rudder & hydroplanes blades of submarine.

2. Right to accept or reject any or all offers:

- a) Notwithstanding anything contained in this EOI, MDL reserves the right to accept or reject any application and to annul the EOI process and reject all applications, of this EOI any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof. In the event that MDL rejects or annuls all the applications, it may at its discretion, invite all eligible participating firms to submit fresh applications.
- b) MDL reserves the right to disqualify any applicant during or after completion of EOI process, if it is found there was a material misrepresentation by any such applicant or the applicant fails to provide within the specified time, supplemental information sought by MDL.
- c) MDL reserves the right to verify all statements, information and documents submitted by the applicant in response to the EOI. Any such verification or lack of such verification by MDL shall not relieve the applicant of his obligations or liabilities hereunder nor will it affect any rights of MDL.

3. MDL SCOPE:

- a. MDL will provide only space, Water and source compressed air (service air) supply of 4 -7 bars pressure & electricity and electrical connections.
- b. Crane facilities for lifting heavy materials (>50 kg) will be provided by MDL, as per requirement, taking safety and weight factors into consideration. contractor has to give 24-hour prior intimation

- c. Power supply - 440 Volts, 220 Volts & 110 Volts for tools and equipment/ instruments, 110 Volts for electrical grinding/ drilling machines/ lighting arrangement and 24 Volts for temporary hand-held lighting arrangement.
- d. Suitable space/work site within MDL, if available, for the subcontractor's office and space for keeping lockable storage, cabinets for instruments and storing material.
- e. MDL EY-Design will provide latest version of drawings, specifications, formats and other documents. Contractor needs to take into consideration the changes from earlier version and immediately inform MDL about any problems noted.
- f. Staging material will be provided by MDL.
- g. Any welding with HY-80 material will be in MDL scope.
- h. Blasting and painting of external surfaces as per paint Specification to be done by the MDL.
- i. Assistance in arrangement of gate passes.
- j. Firm's performance will be reviewed by MDL after every months of placement of order and if found unsatisfactory, MDL reserves the right to short close the order and divert the jobs to other performing contractor.

4. SUBCONTRACTOR'S SCOPE

- 4.1 Sub-contractor has to carryout entire work at MDL premises as per rule and regulation applicable at MDL.
- 4.2 All material /cut parts will be in subcontractor's scope along with test certificate as per specification and drawings.
- 4.3 The welding instructions/procedure/sequence of operation and inspection details as laid down in the Drawing /QA requirement should be strictly adhered to WPS and PQR for welding in subcontractor's scope.
- 4.4 Preheating and welding of SBST/LN44 material wherever required is to be arranged by subcontractor.
- 4.5 Preservative (primer) for preservation of all weld joints after NDT (if required) are in subcontractor's scope.
- 4.6 **Material:** Welding Electrodes (as per attached list below), consumables, fasteners, hardwares, anodes as per listed drawings and part list are in subcontractor's scope. Subcontractor should submit test certificates, relevant documents of all material as per specification given in drawing. Subcontractor should offer material for inspection as per QAP to EY-QA and SRMT.

SR NO	ELECRUDE DESCRIPTION	ELECTRODE SIZE
1	Supratherme (Spl)	2.5 mm
2	Supratherme (Spl)	3.15 mm
3	Supratherme (Spl)	4 mm
4	Grinox 514	2.5 mm
5	Grinox 514	3.2 mm
6	Thermanit X	2.5 mm
7	Fox AM 400	3.2 mm
8	FOX AM 400	4 mm
9	Thermanit 19/15	3.2 mm
10	Arrosta 4462	2.5 mm
11	Arrosta 4462	3.2 mm
12	Filler Wire Grinox TR4E	2 mm
13	Filler Wire Themanit 20/16	2 mm
14	Filler Wire Arrosta	3.2 mm
15	FOX CN 13/4 Supra	3.2 mm
16	Super Stainless	3.2 mm

- 4.7 Material Acceptance: Prior to commencement of work subcontractor to submit material test certificate from NABL authorized Lab & OEM certification if any with CC. MDL clearance /approval to be obtained for confirmation of the material specification.
- 4.8 All material and consumables required for fabrication of tools, Skids, Jigs & Fixtures, Template / wooden templates/ mock ups etc are in subcontractor's scope. Material for the skids, Jigs & Fixtures is to be of IS 2062.
- 4.9 Scaffolding and temporary supports inside and outside submarine wherever required will be in subcontractor's scope.
- 4.10 **Machines and equipment** : Duly calibrated inverter based welding machines with rectifiers, Baking ovens, Portable ovens required for handling the electrodes (usage of ovens with asbestos cloth inside is not permitted), Edge bevelling and machining facility/ machine, Drilling & tapping machines, Portable Grinding machines (Pneumatic/ Electric), cutting machines, digital weighing machine, Theodolite/Leica machines with accessories, Special lifting Tackles (for normal handling), Slings (duly certified by competent authority) and shackles required for lifting & shifting, lifting clamps (Magnetic clamps are not permitted) for normal handling, CI block/ base plate required for fabrication work is in subcontractor's scope.
- 4.11 **Measuring Tools**. Calibrated / tested measuring instruments like measuring tapes, dial gauges, feeler gauge, Vernier, micrometres, spirit levels, steel scales, try squares, plum bobs etc. are in subcontractor's scope. The tools/ instruments

are to be calibrated/ tested regularly and certified through NABL approved lab/ traceable to national standards

- 4.12 All necessary lifting and shifting tools, blocks, slings, tackles and shackles, duly tested and certified. Ropes and chains are not to be used for handling of material.
- 4.13 Sub-contractor has to make arrangement of his shed in open space inside MDL for fabrication work.
- 4.14 Contractor has to bring their own porta cabin and lockable space lock and key. Electrical connections will be provided by MDL.
- 4.15 Forklifts, hand trolley for material handling are to be arranged by the contractor.
- 4.16 Subcontractor has to take connection from the power supply points shown by MDL. However, lead wires and bulbs to be arranged by the contractor. Additional Lighting arrangement at the site (apart from general lighting at W/s) is to be provided by the subcontractor as per requirement).
- 4.17 The subcontractor shall execute the work in accordance with relevant documents, drawings, protocols, specific directives or instructions as per requirements.
- 4.18 The subcontractor is required to study the Work Instruction and inspection protocol sheets given by MDL. The works are to be carried out as per details in WI. These documents are to be preserved by the subcontractor for reference and to be returned progressively for respective jobs.
- 4.19 All relevant data for fabrication, installation, degutting, regutting, overhauling testing activity to be maintained / Updated in the soft format day to day and this data should be made available when ever required on MDL Instruction.
- 4.20 **PPE (Personal Protective Equipment):** Standard PPE like safety shoes, helmet, gloves, respiratory masks (FFP3 type), Wide vision (panoramic) safety goggles to be used and is solely subcontractor's responsibility.
- 4.21 **NDT:** Subcontractor should have In-house/ outsourced facility for various NDT's such as RT, DP, MPI, UT etc. The firm should have NDT level II Engineers.
- 4.22 Theodolite/Leica Marking /inspection is to be arranged by sub-contractor.
- 4.23 **Quality Management Systems.** Dedicated QA Engineer with staff assistance. Proper documentation of every stage of work like material identification, material collection, marking, template inspection, edge preparation, Fit-up inspection, Weld visuals, NDT, final dimensional checking, inspections etc in the prescribed format of earlier/ existing work undertaken.
- 4.24 An adequate computer for viewing of relevant documents/ drawings pertaining to work. The computers should have minimum following software like Microsoft Office, Auto-CAD etc

- 4.25 **Mobilization** Contractor shall complete mobilization of his workforce, tools, moulds and equipment within ONE weeks from date of award of order or intimation by site manager. In mobilization period contractor should arrange entry passes for his employees & no excuse for delay in commencing work on this account will be entertained. Firm is to mobilize manpower within 7 days of order placement for welder qualification and fabrication work. Failing with which is liable for LD.
- 4.26 **Working Schedule** The contractor has to prepare a micro-level plan of activities for each month. If contractor is required to work in all shifts, including Saturday, Sunday, holidays or as and when necessity arises, the contractor is to make necessary arrangements. MDL will provide necessary assistance to the contractor.
- 4.27 The subcontractor will be required to follow all safety norms and procedures to ensure safety of men and materials (with respect to theft, fire, accidents or any other incidence). The operatives shall wear safety shoes, helmets, boiler suits, grinding shields, goggles, safety belts, and hand gloves etc. as part of safety rules. The subcontractor shall install fully equipped First Aid box near the site.
- 4.28 The subcontractor has to maintain high standard of hygiene and house-keeping on cradles and surrounding areas.
- 4.29 Delicate equipment and panels would require to be adequately protected with plywood boxes/ canvas/soft covers during movement/ installation of other equipment, devices, pipes etc. in close proximity. Accordingly, carpenters may be deployed as required.
- 4.30 With regard to preservation of coated surfaces, the subcontractor has to ensure decks, platforms, foundations and structures which are coated finally are properly protected by covering with adequate covering material prior to commencement of any outfitting work in the vicinity. Utmost care is to be taken not to damage any coated surface during Installation work. Damages, if any, are to be repaired by the subcontractor at own cost in consultation with MDL officers as per specifications in the relevant documents and drawings.
- 4.31 **Manpower**
- I. Sufficient number of ITI qualified Skilled & Semi-skilled fitters, riggers, welders, Brazers, grinders, painters, carpenters, electricians, store-keepers, material handlers, helpers etc. are to be deployed for carrying out the activities as per schedule and time. The high technology and high accuracy

- jobs are required to be undertaken on MRSSK submarines and require adequately trained highly qualified personnel to be deployed for these jobs.
- II. The qualifications will be authenticated by MDL officers. Those deployed shall be Conversant in reading of engineering drawings and documents.
 - III. Qualified Engineers & supervisors: At least two engineers & six supervisors are to be engaged for execution of this subcontract.
 - IV. Degree/Diploma Engineers in the disciplines of mechanical Engineering and Supervisory Staff with technical background having min. 2 years of experience in similar work preferably in Shipbuilding shall be deployed and are entirely responsible for execution of the tasks as per specifications in the relevant documents and drawings.
 - V. A dedicated QA engineer(s) with staff assistance.

4.32 **Organization Management:**

- a. Subcontractor must take into consideration the nature of tasks to be carried out and the level of responsibilities associated while putting the organization in place. The subcontractor shall nominate suitable contact persons for the smooth execution of the contract.
 - b. During the activities, the subcontractor should provide name, function and phone number of all persons working in MDL's site in order to communicate easily. The subcontractor should also take into consideration that during the activities, the inspections and break points will be imposed by MDL.
 - c. The subcontractor is required to depute a nodal person who will be interacting with the MDL representative who will be nominated on placement of order. The detailed work-site organization will be put in place in consultation with the subcontractor after placement of order.
 - d. Subcontractor is required to keep daily log book of persons working in the yard, work carried out, material taken over, material installed and obtain signature of site in charge. The format of such records is to be mutually decided between MDL and contractor.
- 4.33 Subcontractor shall keep the MDL informed regarding the progress of the work throughout the entire contract period. Contractor shall submit weekly progress report.
- 4.34 The subcontractor will render a monthly progress report also of all activities being carried out on 1st of every calendar month. This shall be jointly reviewed to resolve issues. Format of such report will be given after award of contract.

- 4.35 Extensive documentation is required during the execution of the work to ensure traceability, which is important for Quality Assurance. The contractor has to create the documents promptly during each stage of work
- 4.36 **Material handling within and outside the yard:** The subcontractor has to arrange suitable vehicles / forklifts / hand trolleys for transportation of material within and outside the yard.
- 4.37 Any material, equipment, infrastructure facility, required directly or indirectly for completing the subject work, as per the scope of work & drawing given, if not mentioned in MDL's scope, has to be arranged by the subcontractor without any extra cost to MDL.

5 **WELDER QUALIFICATION**

- 5.1 Welding machines for qualification of welders at MDL premises
- 5.2 Welding test coupons of required thickness and the consumables (electrodes) required for welders' qualification tests are in subcontractor's scope. WPS/PQR/welding qualification is in subcontractor's scope.
- 5.3 NDT test is required for welder's qualification.
- 5.4 On receipt of the Order, welder qualification must commence within 7 days of time to enable early start of fabrication work.
- 5.5 Welding qualification as per MIL 248D specifications is to be done and may take weeks' time or more depending on the quality of welder sent by subcontractor for qualification.
- 5.6 The plan for welder's qualification has to be worked out by the subcontractor with OIC (QA-EY) and OIC (W-EY) soon after the placement of order.
- 5.7 The subcontractor has to qualify sufficient number of welders (at least 3 Nos.) for non-HY80 and LN 44 materials in all MAG welding for fillet and butt weld for plates thickness 3 mm and above (as per job requirement) as per welder's qualification procedures. QA-EY/RMT will qualify the welders at MDL.
- 5.8 In view of this, the subcontractor shall deploy minimum 3 qualified welders by any approved third party, so that their training & qualification could be started immediately on placement of Order and to meet the delivery schedule of structures.
- 5.9 The welding qualification plan is to be understood for the welder qualification. It may be noted that the "Welder Qualification" has various stages, which have to be qualified step by step by the welder. In order to qualify finally, so that the welder can be deployed / allowed to work on the plates and sections.

- 5.10 It is absolutely essential that the welders who are required to be trained for deploying on these jobs must be on the permanent rolls of the subcontractor's firm.
- 5.11 Once the welders nominated by Firm are qualified by MDL for the subject work, they will be deployed continuously on this job.
- 5.12 The original certificate of qualification of these welders will be kept with QA-EY Department for MDL record. In case of quitting of the trained & qualified welders, the qualification of additional welders at MDL will be on chargeable basis to the subcontractor.

6 Inspection and test:

The stage inspection & final inspections will be carried out by MDL (QA-EY) and Naval Inspection Authorities ie SRMT. The defects rectification / rework applicable after any stage of inspection shall be carried out by subcontractor at no extra cost. All the work carried out by subcontractor will be accepted only after the final clearance from MDL (QA-EY) and Naval Inspection Authorities ie.SOT(MB). The decision of the Inspection Authority on any question of intent, meaning and scope of the work / documents/ specifications / standards shall be final and conclusive and binding on subcontractor.

- A) Inspection will be undertaken by QA-EY, RMT as per approved QAP.
 - B) Destructive tests required for fabrication of structures are to be arranged by the subcontractor at their own cost at Govt. approved lab.
 - C) The subcontractor(s) have to arrange all the required Non-destructive testing as per drawing & COS. (to be conducted in laboratory) such as RT, DP, MPI, UT, etc. to be taken at various stages as indicated by the inspection agency at their cost. Class II film to be used for RT report.
 - d) The defects rectification / rework applicable after any stage of inspection shall be carried out by subcontractor at no extra cost to MDL. All the work carried out by subcontractor will be accepted only after the final clearance from MDL (QA-EY) and Naval Inspection Authorities i.e. RMT (MB).
 - e) The decision of the Inspection Authority on any question of intent, meaning and scope of the work / documents/ specifications / standards shall be final and conclusive and binding on subcontractor.
 - f) Radiography of welded joints. (Contractor has to utilize MDL approved contractor on payment basis.)
- 7 **QAP.** Draft QAP is enclosed as per Annexure-1. The subcontractor is to prepare and submit the final QAP to MDL for approval within 05 days of placement of order.

8 Quality of Product.

- a) The subcontractor must ensure dimensional accuracy and control welding distortions. It is, therefore, absolutely essential to follow the procedures as mentioned in the documents provided.
- b) The tolerance requirements given in the drawings and documents are very stringent. It is therefore necessary that contractor keeps quality requirement in mind and ensure that work is done to best of accuracy.
- c) The subcontractor shall take all necessary precautions to minimize wastage/rework/damage during fabrication. Any such damages / nonconformities may be repaired with prior approval of the Production Officer in-charge and QA-EY of MDL and relevant documents are to be prepared.

9 QA REQUIREMENTS:

- a. Welding procedure specification WPS/ procedure qualification record (PQR) to be submitted for quality assurance- east yard approval.
- b. Quality assurance plan is to be prepared by sub-contractor and for the same the part is required to consult quality Assurance-East yard officials for approval prior to submission.
- c. All inspection stages will be carried out as per QA plan

10 Work completion certificate(WCC):

Work Completion Certificate (WCC) shall be issued on satisfactory completion of respective work with inspection and acceptance reports. The agency responsible to issue WCC shall be MRLC

11 FIM BG/INDEMITNITY BOND /INSURANCE:

Any material is required to be taken outside MDL by subcontractor, same will be allowed only on submission of FIM-BG. The cost of FIM-BG will be provided on case to case basis & on as and when required basis.

- 12 **Guarantee /warranty:** supplied items shall be warranted for 12 months from date of installation and commissioning. Valid warranty certificate must be submitted. During this period, all defect arising out of defective material and faulty workmanship will be rectified by repairing or replacing part or whole material as necessary free of charge on delivery basis. Any consequential damage/defect or loss of item due to poor workmanship/poor material quality/ negligence etc. attribute to the bidder to be rectified / replaced by the bidder free of cost.
- 13 **Rework.** Any rework arising due to MDL will be paid extra as per the man-days rates indicated in the rate sheet.

Note

1. Any material, equipment, infrastructure facility, required directly or indirectly for completing the subject work, as per the scope of work & drawing given, if not

mentioned in MDL's scope, has to be arranged by the subcontractor without any extra cost to MDL.

2. In case of the performance of the contractor is not satisfactory MDL reserves the right to cancel the order and lift the material from contractor.
- 14 Passes: Obtaining police verification/clearance for each personnel being deputed to MDL is a pre-requisite for issue of MDL Security pass for entry into East Yard. The firm should arrange/furnish all requisite documents to Security department immediately on receipt of Order. Subcontractor may contact Security department for guidance.
- 15 **TRANSPORTATION:**
- a. Safe transportation of MDL material required even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.
 - b. No payment will be made for any transportation trips

SCOPE OF WORK IS AS FOLLOWS:

A) SCOPE OF WORK FOR DEGUTTING, REMOVAL, FABRICATION AND INSTALLATION OF SONAR DOME

This Scope includes degutting and removal, fabrication and installation of sonar dome as per drg no. **72135/1289-50-07-00** is as follows,

A -SCOPE OF WORK FOR DEGUTTING AND FABRICATION OF SONARDOME

1. Degutting, dismantling and removal of old sonar dome onboard submarine to shop floor and handover to MRLC-HULL.
2. MDL will provide jig for sonar dome. Subcontractor has to check, do minor repairs if any and offer to EY-QA and SRMT for inspection before using the jig for fabrication of sonar dome.
3. All materials as per the given drawing and part list are in subcontractor's scope.
4. All electrodes and consumables are in subcontractor's scope.
5. The crane facility available in workshop will be provided by MDL for which contractor has to give 24-hour prior intimation.

6. Air supply for grinding operation will be provided by MDL but grinding machines, hose and fittings for pneumatic supply at site will be in subcontractor's scope.
7. Electrical supply (110V , 230V,440V) will be in MDL scope.
8. It is to be noted that nesting and cutting is under subcontractor's scope.
9. Fabrication of sonar dome to be completed within 4 months from the date of placement of order.
10. Sub-contractor scope of work includes material and consumable procurement, cutting/ forming plates / bars, machining of items and fabrication of sonar dome as per Drg. No. 72135/1289-50-07-00((Fabrication of total new sonar dome with plating).
11. Fabrication and installation of CIA foundation as per drawing 72135/1283-42-08-00 will be in subcontractor's scope.
12. Machining of formstuek, round bars, part no. S 2,3,4,5,6,7,8,9,14,16 etc. Are to be carried out by the sub-contractor.
13. The sub-contractor to qualify for welding procedure and welders.
14. The sub-contractor comply strictly all quality control agency requirements as Indicated in respective drawings. The QA plan is to be prepared and get it Certified from EY- QA department.
15. All stage and final inspection will be carried out by QA -EY and SRMT as per the QAP. The Rectification after inspection will be carried out by sub-contractor free of cost.
16. The sub-contractor to forward the schedule for various activities of sonar fabrication within two weeks' time after the receipt of order to HULL- MRLC.
17. For any technical clarification the sub-contractor is advised to contact Design-EY.
18. The sequence of fabrication as per annexure- A is enclosed here with which can be used for reference purpose. However, the subcontractor has to ensure that the work is completed as per drawing meeting all quality requirements. Position of butt joints to be finalized before the start of Job.
19. Status of sonar dome at the time of installation will be as follows.
Item 58, 59, 60, 61 &62 to be kept on tack with green material for adjustment at site.
 - a) 1.5 mm cover sheet in the aft zone of sonar dome in the vicinity of item specified at serial will be left uncovered for adjustment.
 - b) All top brackets (peripheral) of sonar dome to be supplied loose.

c) Item no 18 to 35(vertical supports with pipe and bracket) to be supplied loose.

d) Rope guard assembly to be supplied loose.

20. Fabrication of sonar dome to be carried out in MDL Premises. However, subcontractor may take out materials outside MDL premises on returnable MDN for any specific job which cannot be carried out inside.

SCOPE OF WORK FOR SONAR DOME INSTALLATION

1. Modify rope guard area as per drawing no 72135/1289-50-07-00, if required.
2. Install new sonar dome which is already manufactured. The following are the guidelines to be followed to install the sonar dome.
 - a) Align sonar dome and tack weld associated parts to match with dome structure meeting requirements of relevant reference drawings.
 - b) Main reference drawings are as follows

SL NO	REFERENCE DRAWINGS	DESCRIPTION
1	72135/1289-50-07-00	Main drawing
2	188/1289-50-06-00	Casing aft of frame 52600
3	188/1282-42-01-00	Shell plate of fore body
4	186/1285-42-01-00	Deck aft of for 600010
5	186/1285-42-04-00	deck forward of frame 600010
6	72135/1283-42-08-00	FDN for CIA
7	186/M1/5525-08-00-00	Installation of CIA FDN
8	186/1283-42-03-00	Fore body of cylindrical base

- a. Entire formstuek and rope guard assembly. Along periphery of sonar dome and CHA is expected to be corroded/damaged and requires replacement.
- b. Install all peripheral bracket and vertical support brackets of sonar dome with brackets on deck structure by bolting. Cut green material if any, left on the aft part of sonar dome and tack weld loose parts.

- c. Full welds accessible part and drill holes'/ pilot holes for blind nuts fitment for installation as per drawings.
- d. Complete balance welding, carryout dry survey, fit blind nuts and complete all other work prior to installation of sonar dome,
- e. Fore body area under sonar dome should be painted before final installation of sonar dome. All blasting and painting activities are in MDL scope.
- f. Install sonar dome with all its fittings as per drawings.
- g. Fabrication and installation of CIA foundation as per drawing 72135/1283-42-08-00 will be in subcontractor's scope.
- h. EY-QA and SRMT will carry out the inspection at appropriate stage as per approved QA plan.
- i. Blasting/painting of sonar dome including antiskid will be in MDL scope.
- j. Subcontractor to arrange for transportation of the material.
- k. Any welding with HY-80 material will be in MDL.
- l. The crane facility available in workshop will be provided by MDL for which contractor has to give 24-hour prior intimation.
- m. Air supply for grinding operation will be provided by MDL but grinding machines and hose for pneumatic supply at site will be in subcontractor's scope.
- n. Contractor should remove the sharp edges and burr if any, prior to blasting and priming of assembly. Therefore, plate preparation to the required standards is to be undertaken prior dispatch for blasting priming. In case of POROSITY observed after blasting, same is to be repaired by the Sub-contractor.
- o. PPE (Personal Protective Equipment): Standard PPE likes safety shoes, helmet, gloves, Respiratory masks (FFP3 type), Wide vision (panoramic) safety goggles to be used and all Safety norms to be followed by subcontractor.

3. OTHER REQUIREMENTS

- 1. Sub-contractor has to carryout entire work at MDL premises as per rule and regulation applicable at MDL.
- 2. Following information is for guidance of subcontractor. The subcontractor must survey the job for detailed information and make his own estimation. All queries to be put up in writing, if any
 - a) Entire formstuek along periphery of sonar dome and CHA is corroded and will need replacement.

- b) Where formstuek does not require replacement the old holes are required to be built up by welding and new holes to be drilled to suit new sonar dome.
 - c) Sensitive equipments and cables fitted in sonar dome area need to be protected against damaged with the utmost care.
 - d) Gap between screwed parts and supporting structure are required to be maintained as per drawing
 - e) At the time of fitments of sonar dome certain associated fitments are to be taken care of and if needed to be rectified and proper fitment is required to be ensured with respect to the following
 - I. Flap Drg. 186/1611-32-00-00 one in No
 - II. Flap Drg, 186/1611-35-00-00 one in No
 - III. Fitment of stanchion shoe fitment on portable plate part no151 and 152 of sonar dome to be retrieved and fitted back on completion of sonar dome work as per drg.186/1642-01-00-00.
3. Procedure and welder qualification for following material needs to be carried out by sub-contractor prior to commencement of work.
- a) stainless steel to stainless steel
 - b) AH 36 to AH 36
 - c) AH36 to stainless steel details regarding qualification are available with MDL (QA-EY)
4. Sub-contractor has to arrange all tools, tackles and facilities require for carrying out work at naval dock except electric power supply. Some of the important facilities to be arranged by subcontractor are listed as below.
- a) Welding machines.
 - b) Portable drilling/grinding machines
 - c) Electrode baking and storage facility.
 - d) Container for storage of material.
 - e) SS /carbon steel cutting equipment/gases.
 - f) Grinding wheel/cutters
5. The firm should confirm the detail of man power mobilization including the site in charge, quality control officer in charge and qualified production in charge.

6. The above details given onwards are guidelines only, however the sub- contractor to workout separately the activities to complete the installation job to the satisfaction of inspection agencies i.e. MDL-QA/SRMT/IN.
7. Accordingly, a schedule to be submitted along with QA plan in the technical bid which will be examined by EY-QA and Hull-MRLC.

Annexure A

D-SEQUENCE OF FABRICATION OF SONAR DOME DRG NO. 72135/1289-50-07-00

Sr No.	Description	Qty.in Nos.
1.0	Mark and cut all plates and sections as per drawing(cutting plan/tracing)	
2.0	Manufacture part no 55 channel Press the plate to form channel as per sht.2	
3.0	Check the channel as per drawing.	
4.0	Manufacture the rope guard and pipe supports as per drg. Fabricate the pipe support part no 17 with bracket part no 136	
4.1	Fabricate the pipe support part no 17 with bracket part no 137	17
4.2	Fabricate the pipe support part no 17 with bracket part no 183	02
4.3	Tack weld the brackets 134 to 137 and drill the holes as shown	01
4.4	Fabricate the bar with part no 35 pipe with 95 and 100	
4.5	Fabricate the tie bar with part no 33 and 34(P&S)	02
4.6	Fabricate the pipe with bracket 93 ,94 and 97	02
4.7	Cut part no550 pipe to the size, mark and slit the pipe as shown in detail RR	01
4.8	Set ,align, tack weld and weld part no 50 with part no 48 round bar	02
4.9	Set ,align, tack weld and weld part no84, 83,92102 and109 with pipe part no 50	10
4.10	Set, align, tack weld and weld part no52 brackets and 164, 60x40x7mm.angle with pipe and bracket. with pipe part no 50	01
4.11	Part no 165 with brackets	01
4.12	Part no 53 with bracket and pipe, part no 50	01

4.13	Mark and cut the pipe no 51 to the size and mark the position of the brackets	01
4.14	Set ,align, tack weld and weld part no49 &171,10 mm dia. round bar with part no 51	02
4.15	Mark Set ,align and tack weld bracket, part no125 with pipe	01
4.16	Face the top portion of the round bar as shown in the drg. For lattice	
4.17	Use clamps for securing the lattice round bar .	
4.18	Set the templates frames at 1to XIV,N-N,O-O,Q-Q,F-F,G-G,A-A,B-B,S-S&T-T in position of the slot in the jig and secure in position.	
4.19	Set , part no 3/4,5/6,7/8 in position and along with the templates on the jig and secure in position.	
4.20	Mark the position of the longitudinal round bar for lattice (longer parts) part no 44 on the jig.	
4.21	Lay the 12mm round bar diagonally as per the marking and secure the round bar with clamps. All clamps and necessary arrangement for the fabrication of sonar dome has to be arranged by subcontractor.	
4.22	Mark, cut &prepare the cross diagonal 12mm round bar to the size and edge prepare.	
4.22	Set ,clamp and secure the shorter 12 mm round bar in the jig and tack weld and weld the joints	
4.23	Tack weld and weld the round bar to part no 3,4,5,6,7 and 8 as shown in the drg.	
4.24	Mark the meeting point of the lattice with the templates provided on the slot on the sonar dome jig for longitudinal and cross sectional frames	
4.25	Remove the lattice from jig and full weld the lattice from other side	50
4.26	Remove the longitudinal and transverse frame templates from the jig	50
4.27	Bend part no 442mm ss bar to zig -zag shape for frame 1 to XIV and section N-N,Q-Q,P-P,F-F,G-G,A-A,B-B,S-S&T-T to the size as per marking in the respective templates.	50
4.28	Set, align, tack weld and weld the zigzag shaped partno. 44 with part no 43 for the transverse and long frames as per the templates.	
5	Check the assembled lattice assembly and fabricated rope guard and support as per drawing	

6	Sub-assemble the sonar dome parts as per following drawing Reference dgs. 188/1282-42-01-00 186/1284-42-01-00 186/1289-50-06-00 Sub assemble the parts as follows part no 141 to 166	
6.1	Part 181 with 182	01
6.2	Part 138 with 139	01
6.3	Sub assemble the window frames between fr.53255 & 57130	02
6.4	With part no 158 to 163 &185 on the sonar dome jig as(P& S) as per drg	02
6.5	Rolling and welding of any parts are in subcontractors scope.	
6.6	Fabricate the frame with part no 79 to 81 on the sonar dome jig as per details Z of drg no 72135/1289-50-07-00 and 188/1282-42-01-00 set, align part no 63 in the jig and tack weld the joints.	01
6.7	Set, align, tack weld part no 58, 59, 60, 61& 62 with the jig, align with part no 63&64 and tack weld the joints.	01
6.8	Remove the frame from jig and full weld the joints	01
6.9	Set ,align tack weld &weld part no55 with part no 155	01
6.10	Set align, tack weld and weld the brackets part no 91 with sub assembled part no 55/165	05
6. 11	part no 147 with 146	02
6.12	Part no 177 with 144	01
6.13	Part no 178 with 144	01
6.14	Set, align tack weld and weld part no 179 with part no 143	01
6.15	Set , align, part no 180,145 and 178 on the jig, tack weld and weld the joints as per drawing.	
6.16	Set align, tack weld and weld part no 143	
6.17	Bend part no 154,70x15 bulb plate to the size and set in position	
6.18	Bend part no 155,70x15 bulb plate to the size and set in jig	
6.19	Set, align part no 154 with part no 140 and part no 148	
6.20	Set, align part no 155 with part no 141	
6.21	Assemble the part no 3& 4 with part no1x9 screws	29
6.22	Part no 5 and 6 with part no9 ,screw	06
6.23	Part no 7 and 8 with part no10 screw	45
6.24	Part no 1 with part no 151 and 152	02
7.0	Check the sub assembled parts as per drg.	

8.0	Assemble the sonar dome as per drg. and wi assembly of the sonar dome may be carried out in close co-ordination with pipe shop	01
8.1	Set the fabricated window frame part no 158/187 in the position on the jig and secure (P&S)	01
8.2	Set, align and tack weld sub-assembled rope guard part 164/165 on the jig	01
8.3	Set , align and secure frame 58/63 on the jig as per drg.	01
8.4	Set, align and tack weld sub-assembled rope guard part 73/76on the jig	01
8.5	Align the sub -assembled part no 55/165 part on the jig	01
8.6	Set align and tack weld sub-assembled 79/81 on the jig	01
8.7	Set align part no77 with part no73&81 and secure on the jig	01
8.8	Set align part no 75 with part no 79 &secure on the jig	01
8.9	Set align tack weld part no 56 with part no 58 & frame (Stbd.)	04
8.10	Set, align, tack weld part no57 with part no59 &162	01
8.11	Set, align and tack weld part no 66,67,68 &69 on the jig as per drg	
8.12	Set align part no 54 with part no 156(part)	
8.13	Set, align and secure sub-assembled parts 154,145and 155 in position	
8.14	Set the assembled lattice on the jig and align with the transverse long frames, brackets etc. And cut the excess material, if any.	
8.15	Tack weld and weld the joints as shown in the drg.	
8.16	Mark and cut 1.5 mm thk. Stainless steel sheet to the required size as per drg.	
8.17	Form the sheet for the dome as per rolling. Set/mock-up	
8.18	Set the formed stainless sheet on the lattice out the opening as shown and weld in position.	
8.19	Set plate no 150,151,152 &153 in position and secure	
8.20	Mark and cut the opening for part no 151 and fit on the part on the plate as shown in section C-C	
8.21	Tack weld and weld part no 43 between Fr.60010 and 61510	04
8.22	Tack weld the loose parts part no. 104 to 107,115,117,119,121 to 123,125,173,168,175 etc.in position.	
8.23	Provide temp stiffeners as required.	
9.0	Check the assembled sonar dome as per drg.	
10.0	Radiography of welded joints (Contractor has to utilize MDL approved contractor on payment basis.)	

FIM BG/Indemnity Bond/Insurance:


Since job is Inside MDL/Subcontractor's premises FIM BG/Indemnity Bond/Insurance is applicable as Per commercial procedure.

1. **Work completion certificate (WCC):** Work Completion Certificate (WCC) shall be issued on satisfactory completion of respective work with inspection and acceptance reports by user department based on COC issued by QA-EY. Subcontractor to prepare the file for COC and submit to QA-EY for approval and issue of COC.
2. Contractor is responsible for the safe transportation even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.
3. Contract period is tentatively One year from date of placement of order and extendable up to one year from contractual delivery/completion date.

QA REQUIREMENTS AS FOLLOWS:

1. Welding procedure specification WPS/ procedure qualification record (PQR) to be submitted for quality assurance- east yard approval.
2. Quality assurance plan is to be prepared by sub-contractor and for the same the part is required to consult quality Assurance-East yard officials for approval prior to submission.
3. All inspection stages will be carried out as per QA plan.
4. The stage inspection & final inspections will be carried out by MDL (QA-EY) and SRMT. The defects rectification / rework applicable after any stage of inspection shall be carried out by you at no extra cost. All the work carried out by you will be accepted only after the final clearance from MDL (QA-EY) and Naval Inspection Authorities i.e. SOT(MB). The decision of the Inspection Authority on any question of intent, meaning and scope of the work / documents/ specifications / standards shall be final and conclusive and binding on you.

Sample Quality plan for Fabrication & Installation of sonar dome

MAZAGON DOCK SHIPBUILDERS LTD.	PROJECT - INS SHANKUSH	DOCUMENT NO.		
	SAMPLE QUALITY PLAN	EY/QAP/ INS SHANKUSH/	REV No.	
	SECTION -	Page 1 of 1	DATE:	
EAST YARD	HULL	CHECKED BY:		
Title: <u>Fabrication & Installation of Sonar dome of SSK Submarine</u>				

SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY- QA	SRMT

W: Witness R: Review RW: Random Witness

Note: - The plan given above is indicative only. Detailed QA Plan for individual items should be prepared in the same format and submitted to QA-EY for approval prior to commencement of job.

Responsibility Matrix for Fabrication and installation of sonar Dome

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Mobilization work		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out fabrication	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & cut parts)		✓
5	Issue of drawings, Work Instructions, protocols	✓	
6	Procurement of material		
7	Preparation of nesting plan/lofting plan of material and cutting		✓
8	Collection of Material from MDL		✓
9	Arrangement of transportation trips between MDL and sub-contractors premises		✓
10	Preparation of QAP & get it approval from MDL		✓
11	Call for inspections		✓
12	Arranging Inspection	✓	
13	Arranging NDT (Except qualification of welders)		✓
14	Blasting and painting	✓	
15	Preparation of Reconciliation statement & submission to MDL		✓
16	Delivery of finished material (with packing)to MDL including balance left over material		✓
17	Issue of WCC	✓	
18	Submission of invoices for payment		✓
19	Payment for work carried out	✓	
20	Suitable working platform for fabrication of Assly.		✓
21	Tools and man power for fabrication		✓

B) SCOPE OF WORK FOR FABRICATION AND MACHINING OF UPPER & LOWER RUDDERS FOR SUBMARINE INS SHANKUSH AT MDL PREMISES

Sl No.	Item Description	Qty	
		For Shankush	
1.	Fabrication and machining of upper a rudder as per drawing no. 4123-01-00-00	01 set consisting of one upper rudder & one lower rudder	01 set
2.	Fabrication and Machining of lower rudder as per drawing no. 4123-02-00-00	01 set consisting of one upper rudder & one lower rudder	01 set

Note

Instructions to bidders

- i) Contractor to undertake activity of approval of QAP (to be app. By QA-EY & SRMT & Delivery Schedule in Bar Chart (to be approved by HULL MRLC) on priority on receipt of order.

Detail Scope of Work:

Fabrication and Machining of Upper and lower rudders to be completed as per Drawing No.186/4123-01-00-00 and 186/4123-02-00-00 including blue machining of taper bore of rudders with existing rudder shaft maintaining dimensions, key fitting and proving of co-planetary of upper and lower rudders by assembly with rudder shafts duly painted with primer internally and externally.

MDL SCOPE:

1. The welding instructions/procedure/sequence of operation and inspection details as laid down in the Drawing /QA requirement should be strictly adhered to WPS and PQR for welding will be given by MDL.
2. MDL will provide the existing rudder shaft to the subcontractor.

Sub-contractor scope of work

1. Sub-contractor to collect existing rudder shafts from MDL.
2. The Subcontractor will deliver the finished rudders duly inspected and cleared by EY-QA/SRMT together with existing shafts, Drawings, Documents to HULL MRLC. The subcontractor to take due care to avoid any damage to the rudder shafts during fitment, transport etc.
3. Top plate on upper rudder to be fabricated and installed as per drawing no. 1554-01-00-00.
4. Blasting and painting of internal and external surface of rudders as per paint Specification to be done by the Subcontractor.
5. Welders qualification to be carried out by the Subcontractor duly approved by EY-QA/ SRMT. Sub-Contractor should carry out welders Qualification as per approve WPS/PQR prepared & approved by MDL.
6. Subcontractor to forward detailed QA Plan with proper fabrication sequence to EY-QA for approval before starting work.
7. The Contractor will have to offer the different stage of work as per approved QA Plan to QA-EY/ SRMT, stating of inspection/job status/observations at least 2 days before the date of inspection.
8. The work completion schedule being the essence of the contractor the Contractor should ensure to start the work within a week's time from the placement of order/LOI and complete the same as per fixed scheduled date.
9. The contractor should submit detailed production plan/schedule of various activities pertaining to fabrication of rudders till delivery of the rudder to MDL in bar chart form indicating duration, start and finish date for each activity along with offer. The entire job to be completed within Ten months.
10. The contractor should indicate fabrication set-up machining facility along with offer and ensure timely availability of machine to finish the work by schedule date.
11. The contractor should provide the necessary measuring instruments / arrangements for inspection.
12. Immediately on placement of order, the contractor has to prepare the final QAP & get it approved from QA-EY /SRMT prior to commencement of work within 07 days. (Tentative QAP is at Annexure-1).
13. Contractor has to arrange special lifting / holding tools for lifting /shifting activities. the firm should use nylon slings for normal handling.
14. The contractor should follow general rules for welding as per drawings/documents.

15. It may be noted that the fabrication of Assembly with close, stringent tolerance need a close supervision and therefore this work has to be carried out by the supervisor who has thorough knowledge with minimum qualification in technical field of fabrication not less than Diploma in engineering with experience of at least 3 years in fabrication.
16. Contractor is responsible for the safe transportation even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.
17. The contractor has to keep the record of materials and to return all balance materials at MDL premises.
18. Contract period is tentatively One year from date of placement of order and extendable up to one year from contractual delivery/completion date.

Technical Terms and Conditions:

1. The latest issues of drawings are to be referred together with associated Drawings/documents referred therein;
 - i) 4123-01-00-00 - Upper Steering Rudder
 - ii) 4123-02-00-00 - Lower Steering Rudder
2. The weld in Sleeves are required to be pre-machined as per respective drawings prior to fabrication, keeping final machining allowance to finish the taper bore and facing, maintaining surface finish after complete fabrication as laid down in the drg. The hardness of the weld in Sleeve will be approx. 220 HB 30. The taper bore to be blue matched with shaft taper.
3. Individual upper and lower dimensional checks (centre line & offset) will be Carried out with the help of theodolite/Leica at the following stages:-
 - (a) On tack and before closing plates.
 - (b) After welding and before closing plates.
 - (c) After welding of closing plate.

QA REQUIREMENTS FOR FABRICATION & MACHINING OF UPPER AND LOWER RUDDER

1. Detailed Q.A. Plan should be followed as prepared by MDL
2. Calibrated measuring instruments/tools required for inspection purpose.
Subcontractor should produce the certificate of calibration on demand during inspection
3. Job to be offered for inspection at following stages:-

- (a) Identification & Dimensional inspection of part materials.
- (b) Welder's Qualification.
- (c) Rough Machining of Sleeve.
- (d) Ribs on tacks (without closing Plates)
- (e) After Welding of Ribs.
- (f) One side closing plate and sleeve on tacks.
- (g) After welding of one side closing plate & sleeve.
- (h) MPT/RT of joints as required
- (i) Sand blasting & Priming before Other closing plate on tacks
- (j) Final weld inspection.
- (k) MPT/RT of joints as required.
- (l) Final machining of sleeve.
- (m) Blue matching of Shaft and sleeve.
- (n) Alignment of Upper & Lower Rudders.
- (o) Blasting & Painting of outer surface.

Responsibility Matrix

FABRICATION AND MACHINING OF UPPER & LOWER RUDDERS for Submarine INS SHANKUSH

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Mobilization work		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out fabrication	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & cut parts)		✓
5	Issue of drawings, Work Instructions, protocols	✓	
6	Procurement of material	NA	Y
7	Collection of Material from MDL		✓
8	Arrangement of transportation trips between MDL and sub-contractors premises		✓
9	Preparation of QAP & get it approval from SOT		✓
10	Call for inspections		✓
11	Arranging Inspection	✓	

12	Arranging NDT (Except qualification of welders)		✓
13	Blasting and priming		Contractor scope
14	Preparation of Reconciliation statement & submission to MDL		✓
15	Delivery of finished material (with packing)to MDL including balance left over material		✓
16	Issue of WCC	✓	
17	Submission of invoices for payment		✓
18	Payment for work carried out	✓	
19	Suitable working platform for fabrication of Assly.		✓
20	Tools and man power for fabrication		✓

**C) SCOPE OF WORK FABRICATION AND MACHINING OF AFT
HYDROPLANE PORT AND STBD**

Fabrication and machining of AFT Hydroplane PORT and STBD for INS SHANKUSH including blue machining of taper bore of Hydroplanes with existing hydroplane shaft maintaining dimensions, key fitting and proving of co-planetary of Forward Hydroplane STBD and PORT by assembly with Hydroplane shafts duly painted with primer internally and externally within MDL premises. Machining will be done by subcontractor. The work broadly involves bending, forming, machining, fit-up, welding, NDT followed by inspection on as per the drawings and documents provided by MDL.

Following is required for fabrication and machining of Hydroplane forward STBD and PORT (for full job)-

- a. **Manpower.** At least 4 qualified welders.

MDL'S SCOPE

1. Drawings and documents.

- b. All drawings required for fabrication and machining of Hydroplanes. The details of the same is as tabulated below-

Sr. no.	Drawing No.	Description
1	4121-01-00-00	AFT Hydroplane PORT and STBD

- c. Any other drawings required for fabrication other than mentioned above is to be provided by MDL.
- d. The welding instructions/procedure/sequence of operation and inspection details as laid down in the Drawing /QA requirement should be strictly adhered to WPS and PQR for welding will be given by MDL.
- e. Preheating and welding of SBST/LN44 material wherever required.
- f. Preservative (primer) for preservation of all weld joints after NDT (if required).
- g. Blasting and painting of external surfaces of Hydroplanes as per paint Specification to be done by the MDL.
- h. Old shaft for machining and blue matching of Bush (LN 44) of hydroplanes will be provided by MDL. Machining and blue matching will be done by subcontractor. Blue matching should be 80% of the total machined surface area.

2. **Facility.** Following facility with in MDL premises-

- a. Blasting / Priming of external surfaces.
- b. Technical guidance to complete the job to the satisfaction of MDL-QA and Refit Monitoring Team (SRMT) during fabrication of Hydroplane forward STBD and PORT. However, this shall not absolve the contractor of his responsibility related to quality, warranty, and schedule / time completion etc.

3. **Job Description.**

- a. The subcontractor has to fabricate and machine the AFT Hydroplane STBD and PORT as per drawings, documents, procedures provided by MDL.
- b. Cutting of stiffeners and profile with maximum wastage of 5%.
- c. Forming and Machining of plates will be done by the subcontractor. it has to be done at sub-contractor's premises.
- d. Edge preparation as per drawing/requirement for fabrication.
- e. Drilling/tapping wherever required.
- f. The plate edge preparation is required to have the requisite surface finish on the edges and the weld areas etc. to undertake effective blasting, priming and painting. Blasting, priming and painting of internal surfaces will be done by subcontractor.
- g. Rectification of plate wherever required.

- h. If required, the subcontractor is required to fabricate specific tools and jigs required for the fabrication.
 - i. All subassemblies/assembly pre-fit up inspection and fit up inspections like setting, positioning, alignment, tacking etc.
 - j. Applying the MDL specified primer for preservation of all weld joints after NDT.
 - k. The entire work is to be carried out as per time lines and schedules are asked by production department i.e. MRLC.
 - l. All the leftover/scrap material to be placed in separate identifiable space/bins at sub-contractor's place.
 - m. Wooden template required for the fabrication and machining of Hydroplane Forward STBD and PORT will be subcontractor's scope.
 - n. The weld in Sleeves are required to be pre-machined as per respective drawings prior to fabrication, keeping final machining allowance to finish the taper bore and facing, maintaining surface finish after complete fabrication as laid down in the drg. The hardness of the weld in Sleeve will be approx. 220 HB 30. The taper bore to be blue matched with shaft taper.
 - o. Individual PORT and STBD hydroplane dimensional checks (center line & offset) will be Carried out with the help of theodolite/Leica at the following stages: -
 - On tack and before closing plates.
 - After welding and before closing plates.
 - After welding of closing plate.
4. **Welders.** 04 Nos. (Min). qualified welder
5. **Transportation.**
- a. Safe transportation of MDL material required for fabrication of Hydroplane Forward STBD and PORT even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.
 - b. No payment will be made for any transportation trips.
6. **Material Reconciliation.** Post completion of work, shaft to be handed over to production department i.e. MRLC.

GENERAL TERMS AND CONDITIONS

7. **Work Duration.** The work period will be ten weeks for the fabrication and machining from the placement of order. Contract validity- 12 months.

8. **Responsibility Matrix:** As per Annexure-2.
9. **Performance Bank Guarantee:** Applicable.
10. **Parallel Contract.** No.
11. **Rework.** Any rework arising due to MDL will be paid extra as per the man-days rates indicated in the rate sheet.

Note

Any material, equipment, infrastructure facility, required directly or indirectly for completing the subject work, as per the scope of work & drawing given, if not mentioned in MDL's scope, has to be arranged by the subcontractor without any extra cost to MDL.

3. In case of the performance of the contractor is not satisfactory MDL reserves the right to cancel the order and lift the material from contractor.

Annexure-2

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Collection of material from MDL		<input type="checkbox"/>
5	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
6	Special tool (if required).		<input type="checkbox"/>
7	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
8	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
9	Fabrication Hydroplanes forward STBD and PORT		<input type="checkbox"/>
10	Forming/ bending of plates wherever required		<input type="checkbox"/>
11	Transportation of any kind required for work		<input type="checkbox"/>
12	Crane facility in MDL	<input type="checkbox"/>	

13	Preparation of QAP & approval from RMT		<input type="checkbox"/>
14	Call for inspections		<input type="checkbox"/>
15	Arranging Inspection	<input type="checkbox"/>	
16	Blasting and priming	<input type="checkbox"/>	
17	Arranging NDT		<input type="checkbox"/>
18	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
19	Issue of WCC	<input type="checkbox"/>	
20	Submission of invoices for payment		<input type="checkbox"/>
21	Payment for work carried out	<input type="checkbox"/>	

D) SCOPE OF WORK FOR SURVEY, REPAIR OR FABRICATION AND MACHINING OF HYDROPLANE FORWARD STBD AND PORT (New fabrication and machining only after survey and approval from SRMT)

Survey and repair or fabrication and machining of Hydroplane forward STBD and PORT for INS SHANKUSH including blue machining of taper bore of Hydroplanes with existing hydroplane shaft maintaining dimensions, key fitting and proving of co-planetary of Hydroplane Forward STBD and PORT by assembly with Hydroplane shafts duly painted with primer internally and externally in MDL premises. Machining will be done by subcontractor. The work broadly involves bending, forming, machining, fit-up, welding, NDT followed by inspection on as per the drawings and documents provided by MDL.

New fabrication only after survey and approval from SRMT. Survey is in subcontractor's scope.

Following is required for fabrication and machining of Hydroplane forward STBD and PORT (for full job)-

- a. **Manpower**. At least 4 qualified welders.

MDL'S SCOPE

1. **Drawings and documents.**

- b. All drawings required for fabrication and machining of Hydroplanes. The details of the same is as tabulated below-

Sr. No.	Drawing No.	Description
1	4122-02-00-00	Hydroplane forward STBD
2	4122-01-00-00	Hydroplane forward PORT

- c. Any other drawings required for fabrication other than mentioned above is to be provided by MDL.
2. Blasting and painting of external surfaces of Hydroplanes as per paint Specification to be done by the MDL.
 3. Shaft for machining and blue matching of Bush (LN 44) of hydroplanes will be provided by MDL. Machining and blue matching will be done by subcontractor. Blue matching should be 80% of the total machined surface area.
4. **Facility.** Following facility with in MDL premises-
- Blasting / Priming of external surfaces.
 - Technical guidance to complete the job to the satisfaction of MDL-QA and Refit Monitoring Team (SRMT) during fabrication of Hydroplane forward STBD and PORT. However, this shall not absolve the contractor of his responsibility related to quality, warranty, and schedule / time completion etc.

5. Job Description.

- a. Remove plates (1m²) on hydroplane port and STBD for survey.
- b. Survey of old Hydroplane port and STBD to be carried out after blasting and painting.
- c. After grinding of all pitting points, thickness gauging and NDT to be carried out. Old hydroplane port and STBD to be offered for survey to EY-QA and SRMT after NDT.
- d. Survey report to be submitted to HULL MRLC. As per survey report renew the removed plates and repair by weld build ups or go for new fabrication of Hydroplanes.
- e. The subcontractor has to fabricate and machine the Hydroplane forward STBD and PORT as per drawings, documents, COS & procedures provided by MDL.
- f. Collection of existing shaft for blue matching.
- g. Cutting of stiffeners and profile with maximum wastage of 5%.
- h. Forming and Machining of plates will be done by the subcontractor. it has to be done at sub-contractor's premises.

- i. Edge preparation as per drawing/requirement for fabrication.
- j. Drilling/tapping wherever required.
- k. The plate edge preparation is required to have the requisite surface finish on the edges and the weld areas etc. to undertake effective blasting, priming and painting. Blasting, priming and painting of internal surfaces will be done by subcontractor.
- l. Rectification of plate wherever required.
- m. If required, the subcontractor is required to fabricate specific tools and jigs required for the fabrication.
- n. All subassemblies/assembly pre-fit up inspection and fit up inspections like setting, positioning, alignment, tacking etc.
- o. Applying the MDL specified primer for preservation of all weld joints after NDT.
 - i. The entire work is to be carried out as per time lines and schedules are asked by production department i.e. MRLC.
- p. All the leftover/scrap material to be placed in separate identifiable space/bins at sub-contractor's place.
- q. Wooden template required for the fabrication and machining of Hydroplane Forward STBD and PORT will be subcontractor's scope.
- r. Theodolite/Leica Marking /inspection is to be arranged by sub-contractor.
- s. The weld in Sleeves are required to be pre-machined as per respective drawings prior to fabrication, keeping final machining allowance to finish the taper bore and facing, maintaining surface finish after complete fabrication as laid down in the drg. The hardness of the weld in Sleeve will be approx. 220 HB 30. The taper bore to be blue matched with shaft taper.
- t. Individual PORT and STBD hydroplane dimensional checks (center line & offset) will be Carried out with the help of theodolite/Leica at the following stages: -
 - On tack and before closing plates.
 - After welding and before closing plates.
 - After welding of closing plate.

6. **Welders.** 04 Nos. (Min). qualified welder

7. Transportation.

a. Safe transportation of MDL material required for fabrication of Hydroplane Forward STBD and PORT even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.

b. No payment will be made for any transportation trips.

8. Material Reconciliation. Post completion of work, shaft to be handed over to production department i.e. MRLC.

GENERAL TERMS AND CONDITIONS

9. **Work Duration.** The work period will be ten weeks for the fabrication and machining from the placement of order. Contract validity- 12 months.

10. **Responsibility Matrix:** As per Annexure-2.

11. **Performance Bank Guarantee:** Applicable.

12. **Parallel Contract.** No.

Annexure-2

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>
6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Fabrication Hydroplane forward STBD and PORT		<input type="checkbox"/>
9	Forming/ bending of plates wherever required		<input type="checkbox"/>

10	Transportation of any kind required for work		<input type="checkbox"/>
11	Crane facility in MDL	<input type="checkbox"/>	
12	Preparation of QAP & approval from RMT		<input type="checkbox"/>
13	Call for inspections		<input type="checkbox"/>
14	Arranging Inspection	<input type="checkbox"/>	
15	Blasting and priming	<input type="checkbox"/>	
16	Arranging NDT		<input type="checkbox"/>
17	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
18	Issue of WCC	<input type="checkbox"/>	
19	Submission of invoices for payment		<input type="checkbox"/>
20	Payment for work carried out	<input type="checkbox"/>	

E) SCOPE OF WORK FOR DEGUTTING, MANUFACTURE AND INSTALLING OF STERN TUBE

1. Degutting and removal, manufacture and installation of Stern Tube for INS Shankush (MRLC) as per following drawings and documents.
2. Degutting, dismantling and removal of stern tube to shop floor and hand over to MRLC HULL.
3. After fabrication pressure test stern tube on shop floor at 4.5 kg/cm²
4. Install stern tube on board and carry out final inspection as per QAP.
5. After installation stern tube to be pressure tested onboard as per drawing no 1281-10-03-00. Blanking for pressure testing to be done at A.P flange (outside MBT 5) and Fr 6000 inside PH.
- 6.

SR, NO.	ITEM DESCRIPTION	DRAWING NO.	QTY
1	Stern Tube	1281-10-03-00 DWG 1281-10-03-00 Part List 1281-10-03-03 DWG 1281-10-03-04 DWG	1 Set

Delivery Schedule: To be delivered within 04 Months from date of placement of order.

7. Material specifications: - As per Drawings.
8. All material, consumables & hardware required for Manufacturing and supply of Stern Tube are to be arranged by supplier. Material to be used is as per Drawing & Part List.
9. Any item not mentioned in the part list/drawing but required is to be arranged by the supplier without any additional cost.
10. Govt. approved Lab. Test/Mill test certificate for all Steel material & Fasteners (if procured from local vendors or made in house) used for manufacturing to be submitted to QA-EY.
11. Welding procedures & welders are to be qualified.
12. Fabrication to be carried out in MDL premises. If any activity such as machining, galvanizing to be done at outside facility, subcontractor may take out material outside on MDN.
 - a. Carry out machining & drilling of flanges as per drawing.
 - b. Cut the pipes (with machining allowance) & offer to QA for on tack inspection
 - c. Carry out welding & machine the welded pipes to maintain the final dimension & parallelism of end flanges.
 - d. Carry out NDT, RT, FDI & offer to QA as per QAP
 - e. Carry out cutting & welding of parts as per section A-A in the drawing.
 - f. Carry out strength pressure test at 4.5 KG/CM² & offer to QA as per QAP
 - g. Carry out galvanizing of the welded pipes & flanges, offer to QA for galvanizing and final inspection as per QAP
 - h. For RT & Galvanizing, The Bidder has to utilize MDL approved contractor on payment basis
13. Every Fabricated part needs to be free from burrs, corners, sharp edges & smooth grinded prior to offer for final inspection.
14. The supplier has to submit QA plan for approval by MDL QA-EY. /EY design prior to starting work and all stage inspection shall be carried out as per approved Quality Plan. Sample QAP is attached at Annexure -1
15. MDL(QA-EY) will inspect the Stern Tube & its sub components during & after completion of fabrication as per approved QAP.
16. All parts are to be marked(engraved) for easy identification.

17. New stern tube inside diameter to be checked with dummy size shaft (disc type).
Dummy size shaft will be provided by MDL. Disc to be manufactured by subcontractor.
18. Delivery of duly inspected and cleared Stern Tube to MDL is in supplier scope.
19. During & after manufacturing final product, firm have to offer to MDL (EY-QA) for final inspection as per approved QAP.
20. Final Work completion certificate (WCC) will be issued by MDL User/Ship manager.
21. Prequalification criteria: Past experience of similar supply (firm has to submit order copy and work completion certificate of similar order executed during the previous two years)
22. Validity of the contract period is 1 Year from date of order placement.
23. Suppliers will also be liable to pay Liquidated Damages for late delivery /commencement Period including Manufacturing and Supply of Stern Tube as per Purchase Order value, a sum representing 0.5% (Half per cent) per week or part thereof, subject to maximum 5% total annualized contract value.

Responsibility matrix

<i>Sr. No</i>	<i>Activity Description</i>	<i>MDL' Scope</i>	<i>Bidders Scope</i>
01	Organization of initial meeting with bidders	MDL	
02	Issue of drawings and related documents required for execution of work	MDL	
03	Gate Pass arrangement for entry to MDL		Bidder
04	Fabrication of necessary jig/ fixtures along with material and consumable		Bidder
05	Fabrication of Stern Tube 1 set		Bidder
06	Transportation of Stern tube set from Bidders place to MDL		Bidder
07	Preparation of QAP & approval from RMT		Bidder
08	Call for inspections		Bidder
09	Arranging Inspection	MDL	
10	Arranging NDT ,RT, Pressure testing, Galvanizing		Bidder
11	Submission of invoices for payment		Bidder
12	Payment for work carried out	MDL	
13	Release of work completion certificate.	MDL	
14	Suitable tools along with calibrated Machineries & accessories for operation on call.		Bidder
15	Mobilization of resources (Machine and manpower with relevant insurance) within 7 days if required		Bidder
16	Personal protective equipment's (Helmet, Ear Plugs, Safety goggles, safety belts, safety shoes) if required		Bidder
17	Follow up schedule for execution of the task.		Bidder

18	Collection of authorized reports and Work Completion certificate.		Bidder
19	Gas and other consumables arrangement/electrode and welding machine drill machine. if required.		Bidder

F) Scope of Work for fabrication and installation of Non-HY80 seating at MDL premises

Scope consists of part I AND II

Part I –Fabrication of Non-HY80 seating at MDL premises

This scope of work pertains to fabrication of 1000 appx. Nos. of Non HY80 seats for INS SHANKUSH in MDL premises in the weight range 0-2 Kg ,2-10,10-100 Kg .

Assuming commencement of work by October 2022, 100 seats to be fabricated /month by each sub-contractor. However target may change as per requirement at site.

A. MDL’s scope:

1. All drawings and relevant documents, for construction / fabrication purpose. Contractor is required to execute a **Non-Disclosure Agreement** accordingly.

B. Sub-Contractor’s scope:

1. Gases for welding to be arranged by the subcontractor from MDL approved source only.
2. Contractor has to arrange suitable size platform / Cast Iron block (if required) for fabrication of seats within the allocated space for meeting the indicated delivery schedule.
3. **Manpower :**
 - ✓ Contractor should have minimum 6 Nos. of qualified (IRS qualified /any third party) welders on firm’s rolls for present requirement.
 - ✓ Sufficient no. of skilled fabricators (minimum 04 no’s).
 - ✓ Fabrication of seating with close, stringent tolerance need a close supervision and therefore this work has to be carried out by the

supervisor who has thorough knowledge with minimum qualification in technical field of fabrication not less than Diploma in engineering with experience of at least 3 years in fabrication.

- ✓ Dedicated QA Engineer (Minimum qualification NDT, ISNT/ASNT level II) with staff assistance.
 - ✓ The contractor should be in position to mobilize above manpower when required
4. NDT Facility- The firm should have In-house / outsourced facility for various NDT's such as, DP, MPI, RT etc. The firm should have qualified NDT, ISNT/ASNT level II personnel.
 5. Tools & Equipments–
 - a) Inverter based welding machines & TIG machines (bidders may approach DGM (Welding-EY) for details/specifications of these).
 - b) Welding machine accessories, viz., Cables, holders, gouging torches, gas cutting torches
 - c) Suitable size platform / Cast Iron block (if required) for fabrication of seats within the allocated space for meeting the indicated delivery schedule
 - d) Portable grinding machines.
 - e) Machining In-house / outsourced facility (viz., Milling, Shaping, drilling / threading, Turning, Boring, Press for Critical 3D Forming of Parts).
 - f) Special lifting / holding tools for job, Nylon slings for normal handling
 6. Transportation of raw materials from MDL to allocated working premises, finished goods & leftover/balance material to MDL (nominated locations).
 7. Loading/unloading facilities for raw material/finished goods respectively at MDL premises only shall be provided by MDL. However, contractor's manpower shall have to be deployed for the same.
 8. Radiography of welded joints (Contractor has to utilize MDL approved contractor on payment basis.) MDL will provide generally full length stiffeners to the contractor. Contractor has to keep the record for the supplied and consumed length of stiffeners. Contractor has to cut the required length from full size of stiffeners considering the minimum wastage.

Plate preparation/edge preparation for Blasting and Priming:

1. Blasting and priming activities are to be carried out for the fabricated seats
2. Contractor should remove the sharp edges and burr if any, prior to blasting and priming of seats. Therefore, plate preparation to the required standards is to be undertaken prior dispatch for blasting priming.
3. In case of POROSITY observed after blasting, same is to be repaired by the Sub contractor.

Dispatch

Supplier has to dispatch seats in wooden boxes, Seating No., LOT No., LOT Sr. No. etc. are to be clearly marked and painted on each Seating and same should be reflected in the Challan. Any discrepancy is to be corrected by the Contractor. Contractor has to submit progress report to EY- Plg. fortnightly.

9. Contractor has to fabricate the seats as per following schedule according to priority list given by MDL:

Note 1- Provision in the contract to be made for extension by at least one year.

Note 2: THREE week is for mobilisation period.

18. If contractor fails to deliver monthly seats requirement mentioned in the above table then MDL reserves the right to amend/short close the existing order placed and procure from alternate vendor at risk and cost.
19. The contractor should thoroughly go through technical documents and understand the scope prior to submission of BID.

C. General/Technical Scope of work:

1. Immediately on placement of order, the contractor has to prepare the final QAP & get it approved from QA-EY dept./SRMT prior to commencement of work within 07 days. **(Tentative QAP is at Annexure-1).**
2. Contractor has to arrange special lifting / holding tools for lifting /shifting activities. The firm should use nylon slings for normal handling.

3. The contractor should follow general rules for welding as per drawings/documents.
4. It may be noted that the fabrication of seating with close, stringent tolerance need a close supervision and therefore this work has to be carried out **by the supervisor who has thorough knowledge with minimum qualification in technical field of fabrication not less than Diploma in engineering with experience of at least 3 years in fabrication.**
5. **Welders qualification**
 - a. The contractor has to qualify the sufficient number of welders for non-HY80 materials in all SMAW positions for fillet and butt weld for plates thickness 5 mm and above (as per job requirement) as per welders qualification procedures. QA-EY/SRMT will qualify the welders. In view of this the contractor should have minimum 3 Nos. of qualified (IRS qualified /any third party) welders on his firm's permanent rolls, so that their training & qualification can be started immediately on receipt of Order. Subsequently more welders may have to be qualified based on their requirement and rate of production. The qualification & training of TIG welders & non- HY80 welders shall be carried out in MDL premises in presence of QA-EY & SRMT.
 - b. It may be noted that the welder qualification has got various stages which have to be qualified step by step by the welder. In order to qualify finally so that the welder can be deployed / allowed to work on 5 mm and above thick non- HY80 plates and sections, it takes approximately 20 days. It is therefore absolutely essential that the welders, minimum of 3 nos., who are required to be trained for deploying on these jobs must be on permanent rolls of the contractor's firm from the last one year.
 - c. The contractor has to position adequate number of qualified welders and other operatives for working in three shifts keeping in view the requirement of meeting the monthly target as per schedule given by AGM (Wks-EY).
 - d. The contractor is required to give an undertaking that once these welders are trained & qualified on TIG & HY80 welding, they will be

deployed continuously on this job only. In case of not deploying these welders on MDL jobs, the cost of training as well as the cost of electrodes & the raw materials consumed for training on such welder will be recovered from the contractor. The original certificate of qualification of these welders will be kept with MDL QA-EY department for MDL record. In such case the qualification of additional welders at MDL will be on chargeable basis. The contractor is to bear the cost of training/qualification of additional welders. **(Note: Cost of training of all 3 types of welder qualification (including cost of material & cost of trainer) will be calculated by EY-Design department).**

- e. The original certificate of qualification of these welders will be kept with MDL QA-EY department for MDL record. In case of any drawing changes the work is to be undertaken by sub-contractor & same will be considered as extra work.
6. The contractor has to fabricate complete seating as per drawings, documents & procedures provided by MDL. He has to make all machining & forming work as mentioned in the drawing.
7. The contractor shall have to fabricate specific tools and jigs, if required, for the fabrication. Materials including the consumables required for manufacturing of Skids, Jigs & fixtures, Template / wooden templates etc. are to be arranged by the contractor. Material for Jig is IS2062.

8. Dispatch:

Supplier has to dispatch seat wise in wooden boxes ., Seating No., LOT No., LOT Sr. No. etc. are to be clearly marked and painted on each Seating and same should be reflected in the Challan. Any discrepancy is to be corrected by the Contractor. Contractor has to depute their personnel to MDL for identification of Seats. if required

Progress Report: Contractor has to submit progress report to EY- Plg fortnightly.

9. **Sample work instructions & drawings along with inspection reports for each group will be provided by MDL. However, firm has to fill up the inspection reports for each seating based on sample work instructions. In case of any query, firm can contact EY-Planning dept.**

Reconciliation:

10. MDL may arrange technical guidance to carry out the job to the satisfaction of QA-EY and SRMT at every stage of fabrication for the initial period of fabrication. This, however, shall not absolve the contractor of his responsibility related to quality, warranty, schedule/time completion etc. under the contract.
11. All stage inspection, overall dimension, NDT and final acceptance documents should be prepared by the contractor. They have to also carry out the required documentation as per procedures given in Drawing and various annexure attached to the tender document. It is necessary that for this work the contractor deploy a separate qualified & experienced person, who keeps a proper quality record as well as carryout quality checks. The firm may contact QA-EY department and studies the procedure/steps of preparation of different documents at different stages of fabrication as well as preparation of NCRs, etc.
12. The contractor shall take all necessary precautions to minimize wastage/rework/damage during fabrication. Any such damages/nonconformities may be repaired only prior approval of the production in-charge and QA-EY department and on approval of relevant documents. The repair orders are to be approved by the concerned authorities.
13. **Work completion certificate (WCC):** Work Completion Certificate (WCC) shall be issued on satisfactory completion of respective work with inspection and acceptance reports by user department based on COC issued by QA-EY. Subcontractor to prepare the file for COC and submit to QA-EY for approval and issue of COC.

14. The contractor has to keep the record of weld consumables and submit the same to OIC (Welding-EY) twice a month. The portable ovens if any required for handling the electrodes are to be arranged by the contractor. The usage of ovens with asbestos clothes inside is not permitted.
15. Contractor is responsible for the safe transportation even inside MDL premises. If any damage occurs during transportation, the contractor has to rectify the same at MDL premises as per MDL procedure at their own cost. The final acceptance will be in MDL premises.
16. The contractor has to keep the record of materials and to return all balance materials at MDL premises.
17. Contract period – (Extendable up to one year from contractual delivery/completion date.)
18. Performance Bank Guarantee: Not Applicable.
- 19. FREE ISSUE MATERIAL (FIM):**
 1. As job is in-house no FIM is required, However, sub-contractor has to submit FIM BG, if cut parts are taken out side MDL for forming /machining etc .(This point to be discussed and finalised during PNC,TNC etc

Annexure-1

Tentative Quality Assurance Plan (QAP)

QAP-1. For Manufacturing of seatings

S. No.	Description	Type of Inspection	Reference Document	Inspected by	
				QA-EY	SRMT (Mb)
1	Material Identification	Sampling	As per relevant drgs.	W	W
2	Fit-up on tack	Dimensional	--do--	W	R
3	Welding/NDT	As per specification	----	W	W
4	Final inspection after welding	Dimensional	--do--	W	W

QAP-2. For Manufacturing of major seatings

S. No.	Description	Type of Inspection	Reference Document	Inspected by	
				QA-EY	SRMT(Mb)
1	Material Identification	Sampling	As per relevant drgs.	W	W

2	Shaping of pieces	Dimensional & forming	As per relevant drgs.	R	R
3	Sub-assembly of pieces on Tack	Dimensional & Fit-up	As per relevant drgs.	W	W
4	Welding	As per specification	----	W	W
5	Final inspection after welding/NDT	Dimensional	As per relevant drgs	W	W

Legend: W-Witness H-Hold R-Review

ANNEXURE-2

Responsibility Matrix for Seating manufacturing

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Mobilization work		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out fabrication	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & cut parts)		✓
5	Issue of drawings,	✓	
6	Material (stiffeners+cut parts)		✓
8	Arrangement of transportation trips between MDL and sub-contractors premises		✓
9	Preparation of QAP & get it approval from SRMT		✓
10	Call for inspections		✓
12	Blasting and priming	✓	
13	Arranging NDT (Except qualification of welders)		✓
14	Preparation of Reconciliation statement & submission to MDL		✓

15	Delivery of finished material (with packing)to MDL including balance left over material		✓
16	Issue of WCC	✓	
17	Submission of invoices for payment		✓
18	Payment for work carried out	✓	
19	Suitable working platform for fabrication of assly.		✓
20	Tools and man power for fabrication		✓

Part II -Scope of Work for installation of Non HY80 seating at MDL premises for INS SHANKUSH

Job Description:

Work consists of installation of Non HY80 seating's on structures of Non HY80 and HY80for INS SHANKUSH MDL premises. Contractor has to install seating **structure wise**, as per work allotted by MDL.

Criteria for installation of Non- HY80 seats on Non- HY80 structures:

1. Firm should have minimum manpower of various categories on their roles as listed below:
 - i. 4G qualified welders : 04nos.
 - ii. Structural Fitters : 04 nos.
 - iii. Grinders : 04 nos.
 - iv. QA Inspector : 01Nos.

QA Inspector should have minimum one year experience in Inspection and Documentation

2. Firm should have minimum following equipments:
 - (a) Inverter based welding machines : 5 nos.
 - (b) Inverter MIG welding machine : 2 nos.
 - (c) Grinding machine : 5 nos.
3. Firm who fulfil above criteria have to install 05 Nos. of sample seats on structure (tack welding only) at different locations within one week time from date of issue of seats and relevant drawings. If any deviation

is observed from drawing, rectification has to be done by sub contractor at his own cost.

4. Qualification of Manpower will be done by subcontractor at his own cost, preferable in presence of MDL executive from User Department. However, MDL will provide welding machine& electrodes/filler wire, only for installation of above mentioned sample seats (i.e. 05 nos.)
5. Firms who successfully complete installation of above samples in a given specified time will only be considered as technically qualified

MDL's Scope:

Drawings/Work Instruction:

1. All drawings, relevant documents, Sample Work instructions and Protocols for installation purpose only for reference by Planning Dept – East Yard on execution of Non-Disclosure Agreement by bidder. **(Work Instruction & all the protocol/inspection report in the scope of contractor will be supplied by MDL.)**

Material/Equipments:

1. Non-HY80 fabricated seating's. Allotment of work will be as per user requirement
2. For installation of Non-HY80 seats on HY80 structures, tacking and welding will be done by MDL. And NDT and all related work is in contractor scope.

For Welder qualification:

1. Welding machines only for qualification of welders at MDL premises for Non – HY80 material
2. Welding test coupons of required thickness and consumables (electrodes) required for welders' qualification tests.
3. Maximum number of attempts for qualification of each welder is 3 times

Contractor's Scope:

1. Contractor has to install seatings by structure wise as per work allotted by MDL. (if required, MDL will guide contractor in initial stage of installation)
2. Removal of given material on seating by oxycutting/grinding as applicable.
3. Welders shall be qualified within one month after placement of order.
4. Installation of Non HY80 seats on NonHY80 structure and on HY80 structure will be in sub-contractor scope.
5. Some of supplied parts may not as per the actual dimensions/shape; contractor has to do corrective action by grinding.

1. Q.A.Plan and Inspection:

Immediately on placement of order, the contractor has to prepare the final QAP & get it approved from QA-EY dept./SRMT prior to commencement of work within 07 days. **(Tentative QAP is at Annexure-1).**

1. Contractor has to follow QA & SRMT approved QA Plan (QAP) throughout during installation work period along with required stage inspection. Sample QAP attached for ready reference
2. Inspection will be undertaken by QA-EY and SRMT after same is offered to QA.
3. Documentation part is very important and critical which requires special attention. Every stage of work like material identification, Template inspection, edge preparation, Fit-up inspection, Weld visuals, final dimensional checking are to be offered to QA-EY / SRMT(MB) and after obtaining clearance to be documented by the subcontractor as per the prescribed format/ protocol. **(All the protocols duly filled in and signed by QA & SRMT for each seating are to be submitted to QA-EY)**
4. NDT such as UT,DPT and RT etc at various stages will be in Subcontractor's Scope. Any discrepancies found during NDT will be rectified by vendor at its own cost

D. General/Technical Scope of work:

1. Contractor has to arrange special lifting / holding tools for lifting /shifting activities. The firm should use nylon slings for normal handling.
2. The contractor should follow general rules for welding as per drawings/documents.
3. It may be noted that the installation of seating with close, stringent tolerance need a close supervision and therefore this work has to be carried out by the supervisor who has thorough knowledge with minimum qualification in technical field of fabrication not less than Diploma in engineering with experience of at least 3 years in fabrication.

Contractor's General Scope of Work:

Mobilization of Manpower/Equipments

- 1) On receipt of order, contractor has to arrange/mobilize required manpower/ skilled workmen, welding equipments & accessories, fabrication tools, inspection/measuring instruments (calibrated) to perform the work (which includes all the activities like marking, fit-up, welding, weld visual) as per the drawing and schedule etc. in 2 (two) weeks time.
- 2) In addition to working operatives, subcontractor's Site Engineer, material handling persons, welders and certain key persons must apply for MDL pass in order to meet/discuss with officials of East Yard Production / Welding / Planning / Design / OTS etc.
- 3) Contractor shall deploy person to collect materials (seatings, electrodes etc.) from MDL stores (Anik Chembur store, Sewree store, SY stores, and East Yard (EY) stores). Contractor has to arrange manpower for loading and unloading of material / seating at MDL.

Note: Obtaining East Yard pass involves police verification and it is time consuming process, firm should get such details from planning department, immediately act upon same on day one onwards, on receipt of order.

Welder's Qualification:

Welders are to be qualified as per TKMS (collaborator) standards. Contractor has to qualify sufficient number of welders for Non-HY80 materials in all SMAW positions for fillet and butt weld for plates thickness 5 mm and above (as per job requirement) as per welders qualification procedures. In view of this, contractor should have minimum 5 Nos. of qualified (IRS qualified /any third party) welders on his firm's permanent rolls, so that their training & qualification can be started immediately. Subsequently more welders may have to be qualified based on their requirement and rate of production. Qualification & training of TIG welders & SMAW welders shall be carried out in MDL premises.

- 1) Contractor is required to give undertaking, that once these welders are qualified, they will be deployed continuously on this job. In case of not deploying these welders on MDL jobs, cost of training as well as the cost of electrodes & raw materials consumed for training on such welder will be recovered from contractor. Original certificate of qualification of these welders will be kept with MDL QA department for MDL record. In such case, qualification of additional welders at MDL will be on chargeable basis.
- 2) Welder's qualification has to commence within one week time, so that installation work to commence by firm from 4th week onwards (This includes 20 days (approx) of welders training period). Plan for welder qualification has to be worked out by contractor with OIC (QA-EY) and AGM (HULL-EY).

General:

- 1) Contractor shall be given space in MDL premises near installation work. Work of installation has to be done during normal MDL working days i.e. Monday to Friday between 0730 hrs to 2400 hrs (in two shifts) every day. In the event, contractor desires to work on Saturdays/Sundays/Holidays and beyond mid night; prior approval should be obtained from yard in-charge. Depending on urgency of

work, contractor to work in 3 shifts on need basis as per guidance/advice of GM/AGM (HULL-EY).

- 2) It may be noted that installation of seating with close stringent tolerance need a close supervision and therefore this work has to be carried out by supervisor who has thorough knowledge with minimum qualification in technical field of fabrication not less than Diploma in engineering with experience of at least 3 years in fabrication.
- 3) Contractor may approach for initial technical guidance to AGM (Hull-EY) and other nominated production officers. MDL shall provide technical guidance to carry out job to Satisfaction of QA and SRMT at **the initial stage of installation** of seatings, and then it has to be done by the contractor only. This shall not **absolve contractor of his responsibility related to quality, warranty,** schedule/time completion etc. under the contract.
- 4) Applying MDL supplied primer for preservation of all weld joints after NDT, if required is under contractor's scope of work.
- 5) All arrangements such as temporary light arrangement, connecting/disconnecting machines, welding rectifiers etc. are to be done by the contractor on their own.
- 6) Contractor has to keep record of weld consumables. Contractor is directed to use only approved welding consumables.

Reconciliation:

The agency responsible to approve Reconciliation statement is

Production – EY.

Quality of Product:

- 1) Any items / facilities not indicated in MDL's scope, but required for completing subject work, as per drawing is to be arranged by subcontractor at their own cost.
- 2) All actions/work is required to be done by subcontractor, in order to complete work quantum as mentioned in Annexure-II, till it is accepted by QA-EY & SRMT (MB)

- 1) Contractor shall take all necessary precautions during installation of seatings. Any damages/nonconformities may be repaired with prior approval of production in-charge and quality assurance department and relevant documents is prepared. Repair orders are to be approved by concerned authorities.
- 2) All equipment / machines used by contractor are required to be calibrated regularly and they have to maintain record.
- 3) Contractor has to ensure dimensional accuracy and has to control welding distortions. It is therefore, absolutely essential to follow procedures as mentioned in documents provided.
- 4) Tolerances given in the drawings and documents are to be achieved by the contractor while executing the job.

Note: Any rework due to non-conformity from quality requirement point of view has to be done by contractor at no extra cost to MDL.

Safety:

- 1) Contractor has to provide all safety gears and personal protective equipment to his employees and they have to follow safety rules and regulations.

ANNEXURE-2

Responsibility Matrix for Seating installation

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Mobilization work		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out installation	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & cut parts)		✓
5	Issue of drawings, Work Instructions, protocols	✓	
6	material		✓
8	Arrangement of transportation trips between MDL and sub-contractors premises		✓
9	Preparation of QAP & get it approval from SRMT		✓
10	Call for inspections		✓
12	Blasting and priming (If required)	✓	
13	Arranging NDT (Except qualification of welders)		✓
14	Preparation of Reconciliation statement & submission to MDL		✓
15	Delivery of finished material (with packing)to MDL including balance left over material		✓
16	Issue of WCC	✓	
17	Submission of invoices for payment		✓
18	Payment for work carried out	✓	
19	Tools and man power for installation		✓

Tentative foundation list

Weight of seats/ foundation:

DESCRIPTION	DRAWING NO.	LOCATION/SYSTEM	WEIGHT (KG)
Rudder Angle indicator	4174-06-00-00	Rudder angle indicator	18.401
Rudder switch	4174-11-00-00		4.619
Port side	5000-07-00-00	CIC room Foundation	
Stbt side	5000-08-00-00		
CONTROL PANEL	3311-09-00-00	CATHELCO SYSTEM	55.812
VLF buoyant	1178-32-25-00	VLF	225.36
SOUND POWERED TELEPHONE ENGINE ROOM	3697-03-00-00 (29) BL1	SOUND POWERED TELEPHONE EQPT.	48.569
SOUND POWERED TELEPHONE, SUBMARINE CONTROL CONSOLE	2720-03-00-00 (41)		9.521
SOUND POWERED TELEPHONE, WEAPON CONTROL SYSTEM	3697-03-00-00 (21) BL2		5
SOUND POWERED TELEPHONE, RADAR	3697-03-00-00 (22) BL3		
SOUND POWERED TELEPHONE ACCESS TRUNK/PLOT TABLE	3697-03-00-00 (23) BL4		
SOUND P.T. COMMANDING OFFICER'S STATEROOM	3697-03-00-00 (24) BL5		
SOUND POWERED TELEPHONE, OFFICERS' MESSROOM	3697-03-00-00 (25) BL5		
SOUND POWERED TELEPHONE TORPEDO ROOM	3697-01-00-00 (41)		60.845
SOCKET, PRESSURE WATERTIGHT	3495-01-00-00 (10)		23.127
DISTRIBUTION BOX, WATERTIGHT	3697-03-00-00 Sht.3 (26)		85.042
SOUND POWERED TELEPHONE, PORTABLE	3661-01-00-00 (4)	8.833	
MIC connection box with 7 pin socket.			2.288

HORN loudspeaker H-44			
HORN loudspeaker H-44			
HORN loudspeaker HPS6			
HORN loudspeaker HPS6			
TRANSMIT RECEIVE AND CONTRL UNIT SEB 5900			1.39
CONNECTION BOX	5000-08-05-00		
CONNECTION BOX	72172/5000-08-06-00		
CONNECTION BOX	72172/5000-08-06-00		
CONNECTION BOX			3.7
CONNECTION BOX	2720-04-00-00		5.932
PRESSURE SENSOR	72172/5553-04-00-00		1.2
SOUND VELOCITY / TEMPERATURE TRANSDUCER	72172/5340-01-00-00		
DIGITAL SLAVE DISPLAY (CIC)	72123/5000-08-08-00		93.797
DIGITAL SLAVE DISPLAY (CR)	5541-02-00-00		
HF TRANSDUCER 50 kHz (DIVING DEPTH)			
LF TRANSDUCER 1 MHz (DIVING DEPTH)			
HF TRANSDUCER 50 kHz (WATER DEPTH)	5541-02-00-00		
LF TRANSDUCER 1 MHz (WATER DEPTH)			46
DDU,INU,STD22M	Drawing will be provided later	Gyro	6.59 only for DDU
PROXIMITY SWITCH (SNORKEL RUNNED IN)	2170-01-00-00	HOISTABLE MASTS CONTROL	1
PROXIMITY SWITCH (SNORKEL INTERLOCKED)	2170-01-00-00		

PROXIMITY SWITCH (SNORKEL LIFTED)	2170-01-00-00		
POWER SUPPLY UNIT (24V DC CONVERTER)	72172/5000-08-05-00	Intercom system	1
VOICE TERMINAL ENGINE ROOM AFT	72172/3697-16-00-00		33.691
VOICE TERMINAL CONTROL UNIT	72172/2722-01-16-00		1.75
VOICE TERMINAL ENGINE ROOM FWD	2774-03-00-00		33.300
VOICE TERMINAL SUBMARINE CONTROL CONSOLE	2720-03-00-00		9.52
VOICE TERMINAL ISUS 90-84	72172/1178-31-55-00		14.71
VOICE TERMINAL RADIO ROOM	72172/3697-16-00-00		
VOICE TERMINAL CO'S CABIN	72172/3697-16-00-00		59.264
VOICE TERMINAL PERISCOPE	72172/5342-01-25-00		10
VOICE TERMINAL RADAR	72172/3697-16-00-00		59.246
VOICE TERMINAL CHART TABLE	72172/5000-08-00-00		958.405
VOICE TERMINAL WARD ROOM	72172/3697-21-00-00		2.439
VOICE TERMINAL TORPEDO ROOM	72172/3697-16-00-00		59.246
VOICE TERMINAL BRIDGE	72172/3697-16-00-00		59.246
BUS ACCESS CONCENTRATOR 2	72172/5000-08-05-00		1.1
BUS ACCESS CONCENTRATOR 1	72172/3697-25-00-00		1.5
THWINCOM UHF BASE STATION			
PTT-FOOT SWITCH	1637-22-00-00		420.657

PTT-FOOT SWITCH			
DISTRIBUTION BOX	72172/3697-16-00-00		59.246
CONNECTION BOX	1511-07-00-00		153.911
NETWORK MANAGEMENT LAPTOP			
VOICE TERMINAL PLOTTING TABLE	72172/3697-16-00-00		59.246
THWINCOM BATTERY CHARGER 1 (HQC120)	72172/1178-31-24-00		23.289
THWINCOM BATTERY CHARGER 2 (HQC120)	72172/1178-31-24-00		23.289
SOCKET, WATERTIGHT 115V AC 1PH 60Hz	72172/1178-31-24-00		23.289
SOCKET, WATERTIGHT 115V AC 1PH 60Hz	72172/1178-31-24-00		23.289
WEAPON CONTROL UNIT	1178-31-15-00	ISUS	48
DATA INPUT UNIT-1 (BOW)			
SPLICE BOX-BOW	1178-31-15-00		
TUBE DISTRIBUTION BOX 4			
TUBE DISTRIBUTION BOX 2	5000-02-00-00		3.6
TUBE DISTRIBUTION BOX 1			
TUBE DISTRIBUTION BOX 3			

Note: - Kindly arrange to return all CDs and relevant documents to concerned department and delete all soft copies from your system as and when, Job is completed.

G) SHIFTING OF 10 NOS SUBMARINE SUPPORT CRADLES FOR EXTERNAL HULL SURVEY

Subcontractors Scope

1. Shifting & repositioning of 10 Nos submarine support cradles of INS SHANKUSH under guidance of MDL.
2. 8 Nos. 100 T hydraulic jacks with synchronized power pack with men.
3. Transportation of jacks from Vendors premises to MDL and Vice versa.
4. **Procedure for Shifting of Cradle.** The procedure for shifting of cradles is divided in two phases and is as follows-

Phase-I

- (a) Refer drawing no. MRLC-2018-00-01 Rev B for Shifting of cradle nos. 4, 6 and 7.
- (b) Use 4 nos. jacks of 100MT below each Cradle
- (c) Place 4 nos. of 100MT jacks below cradles (Cradle no. 3 and 5.) as indicated in the Annexure-1 attached.
- (d) Put vertical wooden shore support (**supplied by MDL**) below the jack inside the pontoon to avoid deformation.
- (e) Put 20- 30 mm MS plate (**supplied by MDL**) on the pontoon below the jack for load distribution as indicated in the sketch
- (f) All 8 lifting jacks to be synchronized using one power pack.
- (g) Lift all the synchronized jacks under the cradle 3 and 5 by sufficient height in order to release the load on cradle nos. 4, 6 and 7. Also ensure the contact of other cradles with the hull.
- (h) Lifting of cradle nos. 4, 6 and 7 manually or by screw jack by 10mm.
- (i) Put approximately 1500 x 520x 3-4mm plate on each skid beam below cradle nos. 4, 6 and 7
- (j) Use steel rods for rolling between cradle and skid beam steel plate.
- (k) Pull the cradle 300-400mm manually or by using some other means towards aft or forward for new position of cradle. Final position will be indicated at the time of shifting.
- (l) Remove the plate and steel rods below these cradles after shifting.
- (m) Lowering of cradles nos. 3 & 5 by lowering the jacks to original position.
- (n) Remove of these jacks to put under new cradles.
- (o) Insert the jacks below cradle nos. 4 and 6 for shifting cradles no 3 and 5.
- (p) Follow the procedure indicated above from para 3 to 14.
- (q) Insert the jacks below cradle nos. 9 and 11 for shifting cradles no 8, 10 and 12.

- (r) Follow the procedure indicated above from para 3 to 12.
- (s) Insert the jacks below cradle nos. 10 and 12 for shifting cradles no 9 and 12.

Phase-II

- (t) Repeat the same procedure for shifting back all the cradles to original position after painting activity carried out by MDL.
5. The activity to be undertaken under utmost caution. The vendor is to be careful against the following-
- (a) Personnel Safety and all safety norms of MDL to be followed.
 - (b) Use of PPE. PPEs is to be supplied by subcontractor.
 - (c) Condition of soft wood on cradle. In the event of its crushing inform the central coordinator.
 - (d) Condition of balance cradle arms and boat hull. Any abnormalities to be informed immediately.

Note: All material required for execution of work is in subcontractor's scope other than vertical wooden shore & 20- 30 mm MS plate as mentioned at Sr. 4 (d) & (e) above.

MDLs Scope

- 6. Vertical wooden shore & 20- 30 mm MS plate as mentioned at Sr. 4 (d) & (e) above.
- 7. Procedure for shifting/ repositioning of cradles as mentioned above.
- 8. All necessary gate passes for entering MDL premises during entire period of contract.
- 9. **Work Completion Certificate.** Work Completion Certificate (WCC) shall be issued by user after successful completion of work.

General

- 10. **Work Duration.** Contract validity- 06 month. The duration of work for each phase is 07 days each.
- 11. **Mobilization period.** Phase wise mobilization period as follows-
 - (a) **Phase I-** Within 3 days of order placement.
 - (b) **Phase II-** Within 03 days of intimation by MDL. Tentative time between end of Phase-I & start of Phase-II is 3-4 months.
- 12. In case of the performance of the firm is not found to be satisfactory and any point of time, MDL reserves the right to cancel the order.

H) SCOPE OF WORK FOR DEGUTTING, FABRICATION & INSTALLATION OF BRIDGE FIN & CASING

Sr. No.	Description of Work/ Job
1	BRIDGE FIN FABRICATION & INSTALLATION AS PER THE DRAWINGS AND SCOPE OF WORK .
2	CASING FABRICATION & INSTALLATION AS PER THE DRAWINGS AND SCOPE OF WORK .
3	OUTFITTING OF FLAPS, GRPS, BOLLARD AND ANODES ALONG WITH EXHUST OUTLETS AND ALL FOUNDATION OF EXTERNAL STRUCTURES, PIPING, CABLING CLAMP AND SUPPORTS FROM aft TO FORWARD WILL BE IN SUBCONTRACTOR SCOPE (OUTER FOUNDATION STRUCTURES DRAWING MAY BE PROVIDED DURING FABRICATION AND INSTALLATION PHASE DUE TO MODIFICATION AT SITE) INCLUDING INTERNAL FOUNDATION WHICH ARE MENTIONED AS PER DRAWING.ANY MACHINING AND DRILLING WILL BE IN SUBCONTRACTOR SCOPE

old jig/ FIXURE (as used in INS SHISHUMAR) TO be used FOR FABRICATION of casing and bridge fin AND TEMP SUPPORTING TO MINIMISE DEFORMATION OF BRIDGE FIN as required to meet the scope of work mentioned BELOW. if any modification required in jig and fixture assembling of fixture according to frame is to be done by contractor at his own cost. Jig and fixture is MDL property. after completion of work same is to be handed over to MDL

The Bridge Fin and casing are to be fabricated, installed and outfitting work to be carried out as per the drawings listed below.

Activities involved in the above work are listed below:

- 1. Degutting of casing (excluding sonar dome) and bridge to be done using oxy acetylene gas cutting.*
- 2. Degutting or dismantling of Engineering, electrical equipment's, masts, cables and pipelines are in MDL scope.*
- 3. Degutting of all other hull fittings such as bollards, flag mast, latent mast, SS cable tray for snorkel mast, stanchions and life line, ladders, GRP plates, aft fairing GRP, bridge fin aft GRP (4nos), GRP covering for VLF loop ANTENNA, GRP flaps for torpedo loading, lining cover for battery hatch trunk, duxx window, Cover for distress buoy. All metallic flaps, life raft container lid are in subcontractor's scope.*
- 4. Casing joints to be cut 5mm above pressure hull. Remaining part on casing to be removed by Gouging and grinding. NDT to be carried out after grinding of casing*

supports on pressure hull. Gouger will be supplied by MDL, all other activities including grinding and NDT are in subcontractor's scope.

5. *Casing structure to be removed in parts so that it can be used as a model for new fabrication. After the fabrication work is over all the casing and bridge fin parts to be cut into small parts and disposed to the scrapyard of MDL.*
6. *All SS fitting and other useable fittings to per preserved.*
7. *Fabrication of Casing and Bridge Fin. The space will be provided in the workshop by MDL.*
8. *Sandblasting, priming of casing and bridge fin will be done by MDL after completion of fabrication before installation.*
9. *Installation of casing and bridge fin on board in MDL premises.*
10. *Hull outfitting work of the casing and bridge fin in MDL premises.*
11. *To complete the remaining work of casing and bridge fin which is to be done only after the installation on board.*
12. *Machining of S.S form stuck, as per the main drawing.*
13. *Casing installation includes installation of Total Nos GRP plates. This involves: -*
 - (i) Wooden template preparation and Wood material for making template will be in subcontractor's scope.*
 - (ii) Drilling of holes in form stuck frame of casing*
 - (iii) Fixing of blind nuts*
 - (iv) Drilling holes in GRP plates etc.*
 - (v) GRP Plates require final finishing at the edges. These works are to be carried out by carpenters.*
 - (vi)The support structure where the GRP Plates are to be fitted to be ground to achieve required gap and finish.*
14. *Installation of the casing and Bridge Fin flaps and doors. The work of these doors and flaps are to be done after the installation of casing and Bridge Fin.*
15. *All other outfitting work as per the drawings listed below.*
16. *Renewal and installation of Bridge Fin sonar.*
17. *Installation of GRP cockpit, SS hood & GRP flaps in bridge fin.*
18. *The contractor is requested to visit EAST YARD MDL to understand the job properly before quoting.*

The Bridge Fin and casing are to be fabricated, installed and outfitting work to be carried out as per the drawings listed below.

Activities involved in the above work are listed below:

19. *Fabrication of Casing and Bridge Fin. The space will be provided in the workshop by MDL.*
20. *Sandblasting, priming of casing and bridge fin will be done by MDL after completion of fabrication before installation.*
21. *Installation of casing and bridge fin on board in MDL premises.*
22. *Hull outfitting work of the casing and bridge fin in MDL premises.*
23. *To complete the remaining work of casing and bridge fin which is to be done only after the installation on board.*
24. *Machining of S.S form steuk, as per the main drawing.*
25. *Casing installation includes installation of all GRP plates. And flaps This involves:-*
 - I. *Wooden template preparation Wood material for making template will be subcontractor scope.*
 - II. *Drilling of holes in form stuck frame of casing.*
 - III. *Fixing of blind nuts.*
 - IV. *Drilling holes in GRP plates etc.*
 - V. *GRP Plates require final finishing at the edges. These works are to be carried out by subcontractor*
 - VI. *The support structure where the GRP Plates are to be fitted to be ground to achieve required gap and finish are to be carried out by subcontractor*
26. *Installation of the casing and Bridge Fin flaps and doors. The work of these doors and flaps are to be done after the installation of casing and Bridge Fin.*
27. *All other outfitting work as per the drawings listed below..*
 - a. *Renewal and installation of Bridge Fin .*
 - b. *Installation of GRP cockpit, SS hood & GRP flaps in bridge fin.*
28. *The contractor is requested to visit EAST YARD MDL to understand the job properly before quoting.*

MAIN DRAWINGS			
SR NO	DRAWING NO.	DESCRIPTION	DETAILS OF JOB INVOLVED
1	72172/1289-50-02-00	CASING FR 21216 TO 29580	COMPLETE JOB AS PER DRG.
2	188/1289-50-03-00	CASING FR 29580 TO 36189	COMPLETE JOB AS PER DRG.
3	72172/1289-50-04-00 72172/1289-50-04-11	CASING FR 36189 TO 38289	COMPLETE JOB AS PER DRG.
4	72172/1289-50-05-00	CASING FR 38289 TO 44329	COMPLETE JOB AS PER DRG.
5	188/1289-50-06-00 75805/1289-50-06-00	CASING FR 44329 TO 52600	COMPLETE JOB AS PER DRG.
6	1289-50-08-00	B. FIN AFT UPPER PART	COMPLETE JOB AS PER DRG.
7	1289-50-09-00	B. FIN MID UPPER PART	COMPLETE JOB AS PER DRG.
8	1289-50-10-00	B. FIN FWD UPPER PART	COMPLETE JOB AS PER DRG.

1. EXHAUST GAS DIFFUSER AND SNORKEL TRUNKS

SR NO	DRAWING NO	DESCRIPTION
1	2128-11-00-00	MANUFACTURING AND INSTALLATION OF EXHAUST GAS OUTLET ALONG WITH ALL FOUNDATION EXCEPT EXHAUST TRUNKING
2	72172-2178-03-00-00	DEGUTTING , MANUFACTURING(RENEWAL) AND PRESSURE TESTING(PRESSURE TESTING ALL HARDWARE AND BLANKS WILL BE ARRANGED BY SUBCONTRACTOR) AND REINSTALLATION OF SNORKEL TRUNKING ALONG WITH FOUNDATION WILL BE DONE BY SUB-CONTRACTOR

2. FABRICATION AND INSTALLATION OF BOLLARD

SR. NO.	DRAWING NO	DESCRIPTION
1	1691-01-00-00 1691-02-00-00 1691-03-00-00 1691-02-10-00 1691-02-11-00	Degutting ,Manufacturing and installation of bollard

3) Clamps and supports

a) All pipe clamps and supports to be installed as per drawing on bridge fin casing and external Mbts inside and outside pressure hull/Non pressure hull refer drawing 187/4397-05-00-00 total sheet 1-5 186/1619-19-00-00 and 186/4192-12-00-00. All pipe clamp to be kept on tack after clearance from piping section in charge same will be welded and Ndt to be completed

b) All cable clamps to be installed as per drawing 3497-07-00-00(sheet 1-3) and 3497-08-00-00(sheet 1-4) on bridge fin casing and external Mbts inside and outside pressure hull/Non pressure hull. All clamp to be kept on tack after clearance from electrical section in charge same will be welded and NDT to be completed. clamp to be welded on hy80 will be done by MDL welder, NDT and grinding to be done by subcontractor every places

4) Renew the following:

- Ship's brow,
- Ropes,
- Wire ropes,
- Rope reels,
- Clamping arrangements for pipes other minor structures:
- Covers
- Brackets
- Fittings inside casing.
- Bottles and other equipment.
- Renew guard rails and stanchions.
- Renewal SS cable tray of snort mast and installation of the same
- Towing slip arrangement,
- Bottles and other equipment. Renew guard rails and stanchions.

SR NO-4 material will be in subcontractor scope.

5.FLAPS

ALL FLAPS REMOVAL AND INSTALLATION IS IN SUB-CONTRACTORS SCOPE

SR NO.	DRAWING NO	DESCRIPTION
1	186-1611-01-00-00	Bridge fin Aft upper part
2	186-1611-02-00-00	Bridge fin Aft upper part
3	186-1611-03-00-00	Bridge fin Mid upper part
4	186-1611-04-00-00	Bridge fin Mid upper part
5	186-1611-05-00-00	Bridge fin Mid upper part
6	186-1611-06-00-00	Bridge fin Mid upper part
7	186-1611-07-00-00	Bridge fin Forward upper part
8	186-1611-08-00-00	Bridge fin Forward upper part
9	186-1611-09-00-00	Bridge fin Mid upper part
10	186-1611-10-00-00	Bridge fin Mid upper part
11	186-1611-11-00-00	Bridge fin Mid upper part
12	186-1611-12-00-00	Bridge fin Mid upper part
13	186-1611-15-00-00	Bridge fin Forward upper part
14	186-1611-16-00-00	Bridge fin Forward upper part
15	186-1611-20-00-00	Casing 01-05 Flap for retractable cleat aft
16	186-1611-21-00-00	Casing 01-05 Flap for stowage room aft
17	186-1611-22-00-00	Casing 01-05 Flap for stowage capstan aft
18	186-1611-23-00-00	Casing 01-05 Flap for maintenance exhaust gas Fittings
19	186-1611-24-00-00	Casing 01-05 Flap for emergency blowout
20	186-1611-25-00-00	Casing 01-05 Lid for inflatable life raft container fr-38120
21	186-1611-26-00-00	Casing 01-05 covering for sanitary extraction
22	186-1611-27-00-00	Casing 01-05 Flap for emergency towing rope
23	186-1611-28-00-00	Casing 01-05 Flaps for Torpedo loading platform
24	186-1611-29-00-00	Casing 01-05 Lid for inflatable life raft container FR-43692
25	186-1611-30-00-00	Casing 01-05 Lining cover for battery hatch trunk
26	186-1611-31-00-00	Casing 01-05 Flap for emergency blow out P H Aft
27	186-1611-32-00-00	Casing 01-05 Flap for emergency blow out P H + MBT Forward
28	186-1611-34-00-00	Casing 01-05 Flap for cylindrical basis
29	186-1611-35-00-00	Casing 01-05 Flap for retractable hawse forward
30	186-1611-55-00-00	Casing 01-05 Flap for compressed air charging
32	186-1611-56-00-00	Mine laying equipment
33	186-1611-50-00-00	flaps in floating body
34	186-1611-53-00-00	flap inside cock pit

6. GRP

ALL GRP REMOVAL AND INSTALLATION IS IN SUB-CONTRACTORS SCOPE EXCEPT DRG NO 1276-14-00-00 (FLOATING BODY)

SR.NO.	DRAWING NO	DETAILS AND SCOPE
1	72177/1280-03-00-00	GRP MAIN DRAWING(all grp components given in this drawing) in case renewal for GRP same is to be procured by subcontractor Except- 1276-14-00-00 (floating body) , 1289-50-01-00 (aft fairing) ALL other GRP is to be procured by subcontractor AFTER SURVEY IN CASE OF RENEWAL
2	1289-50-01-00	Casing of Sec-20(Aft Fairing) all work as per drawing including buoyancy block arrangement is in subcontractor scope survey in case of repairing of AFT FAIRING GRP same has to be repaired by sub-contractor (will be procured by mdl in case of renewal)

7. ANODES

SR NO	DRAWING NO.	DESCRIPTION
1	72177/1912-01-00-00 72177/1912-02-00-00-00 186/5761-05-00-00 186/4351-02-11-00	ANODE PLAN EXTERNAL AND INTERNAL STRUCTURE, REMOVAL AND REINSTALLATION Facing flange support

Anodes will be installed by subcontractor, if any structural modification or seat welding required for anode as per drawing to be done by sub-contractor. any forming and fabrication required that will be considered for anode installation, it will not be considered as fabrication anodes will be procured by sub-contractor

All anodes to be installed (after completion of painting) as per drawing on bridge fin casing and external Mbts inside and outside pressure hull/Non pressure hull. Anode welding machine and qualification will be subcontractor scope. All anode to be kept on tack after clearance from hull section in charge and QA/SRMT same will be welded and Ndt to be completed

8. VARIOUS FOUNDATIONS AND STRUCTURES

SL. NO.	DRAWING NO.	DESCRIPTION
1	186/1171-31-50-00	PH-PENETRATION SNORKEL
2	186/1613-05-13-00	FOUNDATION
3	186/1613-05-14-00	FOUNDATION
4	186/1178-42-02-00	FDT. VALVES VENTING MBT'S
5	186/1288-42-01-00	FDT. ANCHOR SLIP DEVICE AND HYDRAZINE DISTRIBUTOR
6	186/1288-42-05-00	FOUNDATION TOP FASTENING
7	188/1288-42-08-00	FOUNDATION FOR 6 AIR BOTTLES IN NO. 2 AND 3 MBT'S
8	188/1288-42-09-00	FOUNDATION FOR 6 AIR BOTTLES IN NO. 1 MBT.
9	188/9197-03-00-00	BALLAST SUPPORT FORE BOBY
10	186/9197-06-00-00	BALLAST SUPPORT FORE BODY (RESERVE)
11	186/3732-01-00-00	MOUNTING OF TYFON
12	0186/1178-42-09-00	FDT. ANCHOR CHAIN SLIP DEVICE
13	0186/4213-02-00-00	MOUNTING ANCHOR WINCH
14	0186/1654-02-00-00	STEP FOR FLAG STAFF FORWARD
15	0186/4261-02-00-00	LEAD FOR TOWING-HOOK TRIPPING – LINE
16	0186/1633-12-00-00	ACCESS LADDER INSIDE CASING
17	0186/1642-02-00-00	HANDRAIL ON BRIDGE FIN

18	0186/1691-06-00-00	RETRACTABLE HAWSER , FORWARD
19	0186/1691-07-00-00	RETRACTABLE HAWSER , AFT
20	0186/2173-01-00-00	CABLE RUN FOR SNORKEL
21	72172/2193-02-00-00	GUIDE FOR CABLE TRAY
22	186/9197-02-00-00	Ballast Support Casing
23	186/1178-42-06-00	Foundation for VENTINGS of main ballast tank 1,2,3
24	186/1178-42-04-00	Foundation Anchor winch Drive
25	186/3497-07-21-00	Welding Parts for Cable Duct
26	1178-10-12-00	Foundation for static frequency Converter 3,4,5 & 6
27	186-1283-42-03-00	CHA Foundation
28	0186/1552-50-01-00	Foundation for fastening for torpedo loading
29	0186/1178-42-03-00	Foundation for Chain Stopper
30	0186/1285-42-01-00	Foundation for anchor winch, cable tray, deck aft Fr. 60010
31	72173/2722-01-17-00	Installation of Single Phase Preventer
32	186/5525-04-10-00	Intermediate foundation
33	186/5525-04-00-00	Intermediate foundation
34	0186/1515-50-01-00	Foundation For CTA
35	2914-01-11-00	Intermediate Foundation
36	186/1692-02-00-00	INDICATOR FOR ANCHOR POSITION
37	1288-34-09-00	FDN FOR OPTRONIC MAST CABLE TRUNK
38	1511-01-00-00	DISSTRESS BUOY MOUNTING

39	1694-01-00-00	INSTALLATION OF SIDE LANTERNS
40	1694-03-00-00	LANTERN MAST WITH CABLE PROTECTING TUBE

41	1694-05-00-00	MAST FOR ANCHOR –OR NOT UNDER COMMAND SIGNALS
42	1654-01-00-00	FLAGS STAFF WITH SUPPORT ON CONTROL UNIT
43	1288-01-00-00	FOUNDATION FOR VLF ANTENA
44	1288-02-00-00	FOUNDATION WIRE DRUM RADIO BOUY
45	1288-03-00-00	FDT FOR ESM 1100 ABOVE DATUM LINE
46	1633-04-00-00	STEPS IN SUPER STRUCTURE
47	1633-11-00-00	HAND GRIPS IN CASING

MDL SCOPE OF SUPPLY

1. Crane in the shop will be made available for lifting heavy items.
2. Welders for full welding on HY 80 Material will be supplied by MDL.
3. HY80 electrode will be supply of MDL in case required. All other electrodes will be arranged by subcontractor.
4. The preheating equipment's will be given by MDL in case of preheating by transformer. In case of flame heating by gas, same will be in subcontractor's scope.
5. The full welding and tack welding to be done by MDL welders IN CASE OF HY80 welding. Balance all other welding and other consumables will be in subcontractor's scope.
6. Issue of main drawings / fly drawings along with part lists. It will be collected from EY-D.
7. MDL shall provide technical guidance to complete the job to the satisfaction of QA and SRMT during fabrication of Bridge Fin. However this shall not absolve the contractor of his responsibility related to quality, warranty, schedule/ time completion – etc under the contract.
8. All fabricated subassemblies will be subjected to various stages inspection by MDL QA / SRMT as per the drawing and specification applicable.
9. MDL will provide power supply during installation free of cost at one point. Sub-contractor will use his own grinding m/c for grinding purpose

SUBCONTRACTOR'S SCOPE

1. Supply of AH36 material cut as per the lofting document.
2. Supply of rolled form stocks of AH36 Material.
3. Supply of AH36 material welding electrodes including SS electrode.
4. Supply of hard ware such as CSK Screws, Hexagonal nut and bolts, Blind nuts, Nylon ropes, Pulleys, Pins, --- etc.
5. Supply of blind rivet, nut screw and machine for fitment of blind nuts.
6. Supply of GRP and flap material will be sub-contractor scope along with test certificate as per specification in drawing.
7. All welding machine and has to be arranged by subcontractor.
8. Consumables like grinding wheels gases etc. are in subcontractor's scope of supply.
9. All anodes are to be supplied by subcontractor along with certificate.
10. Subcontractor will do 100% visual and 30 % RT and MPI.
11. Casing and bridge fin are to be constructed in the workshops of MDL The other facilities required for the fabrication of Bridge Fin are in subcontractor's scope.
12. The plate forming for casing and bridge fin are to be done by subcontractor, taking the plates outside MDL as per procedure.
13. Supporting angles / I beams required to minimize the deformation & maintaining the level of Bridge Fin is in subcontractor's scope.
14. Full size plates / parts cut as per the lofting documents is to be collected from East Yard store.
15. Rider plate flat bars required for the fabrication of Bridge Fin, subcontractor have to cut from full size AH 36.
16. Pre fabrication activities like levelling of erection jig, beveling / edge preparation, grinding of plates / sections etc. Cutting of materials by gas cutting, machine flame cutting and grinding of edges as per the fabrication code and specification is in subcontractor's scope. Care is to be taken that the weld preparation is correctly profiled.
17. Subcontractor have to arrange the skilled labors, required instruments, equipment's machines, and tools to the fabrication of casing and bridge fin. The material handling is in your scope. However, MDL will provide the assistance in handling the large items.
18. All subassemblies/assembly pre-fit up inspection and fit up inspections like setting, positioning, alignment, tacking etc, is in your scope.
19. Subcontractor have to follow the time schedule given by Planning department from time to time and accordingly has to forward the work schedule in the form of bar chart for Bridge Fin activities.

20. After the placement of order, subcontractor have to prepare draft QA plan within two weeks' time and submit it to EY-QA for their approval. Fabrication of casing and bridge fin has to commence immediately after receipt of material from MDL.
21. Welders qualification to be carried out as per MIL 248D specification in the presence of EY QA / SRMT at contractor's own cost. Further details can be obtained from C.M. (W-EY). MDL will provide cut plates of required thickness and electrodes for welder's qualification tests. Subcontractor have to prepare test coupons as per welding specification.
22. Fabrication / installation / outfitting of casing and bridge fin require high quality workmanship and subcontractor have to depute qualified supervisors at site throughout the tenure of project for the following purpose.
 - a. To control the labours and responsible for execution of job with all safety measures for men, material, machines.
 - b. To coordinate and follow up and they shall be responsible for clearance from MDL QA / SRMT in order to expedite the work in time.
 - c. To be present at all times as long as workmen are at site.
 - d. To interact and coordinate with MDL officers from relevant departments such as production, planning, QA, Maintenance, design, Engineering, Electrical & Weapon etc. and be accountable for timely completion of Bridge Fin outfitting activities.
 - e. To brief and give the report to the nominated production officer regarding the resolved / unresolved issues on the daily basis.
23. The installation of Bridge Fin and its outfitting activities are to be carried out in MDL premises on board. For this subcontractor have to mobilize all manpower, welding equipment and accessories, fabrication tools etc in week time prior to the commencement of these activities. MDL will provide free electricity, compressed air, EOT cranes facilities –etc.
24. Any rework modification arising out of faulty workmanship, incorrect welding and erection sequence will be your responsibility.
25. The contractor shall take all necessary precautions to minimize wastage and damage during fabrication. Any such damages may be repaired only after prior approval from the officer in charge.
26. Subcontractor have to prepare the erection sequence of the casing and bridge fin and get it approved from the production officer before the commencement of erection work on the erection jig.

27. Due care is to be taken while erection and precise full welding of the casing and bridge fin to maintain the centre line at level 6000 and the centre line marked on the erection jig / decks at various levels in one plane. All these above aspects are to be considered during the fabrication and installation of Bridge Fin On board.
1. Very high accuracy is required for maintaining the level of Bridge Fin and centreline at various deck levels.
 2. Casing is to be made part wise as per drawing and to be installed and aligned on the pressure hull.
 3. Marking of reference lines such as center line, frame lines etc. on jig and subsequently, to be offered to EY-QA MDL for Inspection & clearance.
 4. Preparation of rolling sets and rolling of shell plates is in your scope.
 5. The number of openings have been provided on the decks at various levels for different masts. Subcontractor have to ensure that the centerline of these openings will be in one line. Similarly, the distance between two openings, between two decks will be maintained as per drawings. While installing the Bridge Fin on board the center line of openings should tally with the centerline of hull inserts of respective masts.
 6. Shell plates are to be formed as per wire gauges /wooden mock-ups/templates wherever necessary.
 7. The drawings may get modified for minor changes. Subcontractor have to consider it and subcontractor will be paid extra as per the man days indicated in the rate sheet, for any growth of work if arise out of any change in drawings / change in scope of work. All material and consumables will be supplied by MDL for such rework

INSPECTION:

The stage inspection & final inspections will be carried out by MDL (QA-EY) and Naval Inspection Authorities ie SRMT (MB). The defects rectification / rework applicable after any stage of inspection shall be carried out by subcontractor at no extra cost. All the work carried out by subcontractor will be accepted only after the final clearance from MDL (QA-EY) and Naval Inspection Authorities i.e. SRMT(MB). The decision of the Inspection Authority on any question of intent, meaning and scope of the work / documents/ specifications / standards shall be final and conclusive and binding on subcontractor.

Welding electrodes types: each type electrodes may be used for fabrication same to be arranged by sub-contractor. Approximate quantity may be order after discussion with MDL-EY -Design

I.

I) DEGUTTING, GRINDING, NDT, THICKNESS GAUGING, SURVEY, REPAIR, RENEWAL OF FORE AND AFT BODY NON PRESSURE HULL STRUCTURES INCLUDING ALL EXTERNAL TANKS MBT NO1,2&3 ,4,5, RBFT. PRESSURE TESTING AND FINAL BOXING UP OF ALL EXTERNAL TANKS AND MBT'S

Sr. No	Description of Work/Job
1.	Opening, degutting, Survey, (Grinding, NDT, Thickness Gauging) of structures of Fore and Aft body including MBT no1,2&3,4,5 and RBFT.
2	Repair by weld buildup , grinding and NDT and final inspection of structures of Fore and Aft body including MBT no1,2&3,4,5 and RBFT
3	Renewal of plates of structures of Fore and Aft body including MBT no1,2&3,4,5 and RBFT
4	Survey and renewal of penetrations of Fore and Aft body including MBT no1,2&3,4,5 and RBFT
5	Removal and installation of lead ballast weights including covering plates.
6	Survey ,renewal and fixing of synthetic foam blocks.
7	Degutting, survey ,repair and renewal and refit of structural elements of fore body and aft body.
8	Pressure testing and boxing up of all external tanks and MBT's.

This scope includes fore body and aft body non pressure hull structures including all external tanks and MBT no1,2&3,4,5, RBFT, all fallout area structures, chain locker, hull penetrations, aft hydroplane stabilizer, upper and lower rudder fixed parts. All outer shell plates and decks of fore body and aft body are included in this scope.

4. Opening and removal of manhole covers, hand hole covers, flooding burst flaps and all opening covers of all external tanks will be in contractor's scope.
5. High pressure water jetting and cleaning (only once) of fore body, aft body and all external tanks including MBT's just after docking on pontoon are in MDL scope. But general cleaning of tanks during all activities are in subcontractor's scope.
6. All manhole, hand hole, flooding burst flaps and other opening covers to be offered for survey to EY-QA and SRMT after chipping and blasting. Chipping and blasting are in MDL scope.

7. All manhole, hand hole, and all opening covers are to be renewed.
8. All studs of external tank manhole, cover plates of fore body and aft body including external tanks and MBT's are to be renewed. This is in subcontractor's scope.
9. Cleaning and Degassing of external tanks are in subcontractor's scope. Subcontractor should obtain the gas free certificate from EY-QA and SRMT and submit the same to HULL –MRLC.
10. Degutting and removal of all structural elements such as ballast cover plates, hydrazine trunks, plates inside chain locker, Top fastening foundation hydrazine foundation, anchor indicating pipe, Hawse pipe, anchor pipe, flood gratings are in subcontractor's scope. Degutting Pipe lines, cables, cable conduits, hydroplanes, rudders, HP air bottles are in MDL scope.
11. All the structural elements to be offered for survey after removal to EY-QA and SRMT after chipping and blasting. Chipping and blasting are in MDL scope.
12. After high pressure jetting, chipping, blasting and priming MDL will be handover fore body and aft body areas and tanks progressively to subcontractor for survey. High pressure jetting, Chipping, Blasting and priming will be in MDL scope.
13. Grinding, NDT, thickness gauging, survey, repair by weld buildups, repair by plate renewal of all non-pressure hull structures of fore body and aft body including all external tanks and MBT's are in subcontractor's scope.
14. Degutting and removal of all lead ballast weights and cover plates from all locations as per drawings attached are in subcontractor's scope.
15. Degutting, cutting and removal and renewal of all anode are in subcontractor's scope.
16. All hull penetration to be offered for survey to EY-QA and SRMT. All hull penetrations to be renewed as per survey report.
17. All fabrication activities of plate renewal such as marking, cutting and removal of old plate from onboard, templates for cut out area, marking and cutting of new plate outside required edge preparation for onboard cut out and new plate, weighing, fit-up of new plate, welding of joints, during welding and flush grinding, NDT and final inspection are in subcontractor's scope.
18. Inspection offers to be raised after Marking, fit-up, NDT and final inspection.
19. All activities of weld buildups such as spoon shape grinding, weld runs and layers, during welding and flush grinding, NDT and final inspection are in subcontractor's scope.
20. Any weld buildup /welding on HY80 material will be in MDL scope.
21. All welding electrodes, consumables, AH36/SBST plates are in subcontractor's scope. HY80 plate and electrodes and welding on HY80 structure are in MDL scope.
22. All welding machines, stud welding machines, tools, grinding machines, portable ovens are in subcontractor's scope.
23. All seg plates to be removed and to be offered for survey after blasting and painting to EY-QA and SRMT. Repairs to be done as per survey report and refit.

OPENING, CLEANING, DEGUTTING, SURVEY (GRINDING, NDT, THICKNESS GAUGING), STUDS RENEWAL, REPAIR BY GRINDING AND WELD BUILDUPS, PLATE RENEWAL OF FOREBODY AND AFT BODY STRUCTURES.

1. Degutting and removal of all structural elements such as ballast cover plates, hydrazine trunks, plates inside chain locker, Top fastening foundation hydrazine foundation, anchor indicating pipe, Hawse pipe, anchor pipe, flood gratings are in subcontractor's scope. Degutting Pipe lines, cables, cable conduits, hydroplanes, rudders, HP air bottles are in MDL scope.
2. All the structural elements to be offered for survey after removal to EY-QA and SRMT after chipping and blasting. Chipping and blasting are in MDL scope.
3. After high pressure jetting, chipping, blasting and priming HULL MRLC will be handover fore body and aft body areas and tanks progressively to subcontractor for survey. High pressure jetting, Chipping, Blasting and priming will be in MDL scope.
4. Subcontractor should flush grind and level all pitting points inside and outside tank boundaries and all bulkheads. All cracks and weld defects to be flush grinded as per M/s TkMS representative, SRMT, MFAB, EY-QA and internal QA personnel deputed by HULL -MRLC. All welded foundations and welded pipe clamps and brackets should be considered for survey.
5. After grinding NDT to be carried out for all the ground points. Thickness gauging to be done for all the points. Thickness readings to be marked on the plates with permanent marker.
6. After grinding, NDT and thickness gauging entire tank to be offered to QA-EY and SRMT, MFAB, HITU for survey.
7. After survey photography of the entire internal and external structure of tank to be carried out. Photography will be in MDL scope.
8. Survey remarks to be summarized as per survey report and submit to HULL-MRLC.
9. All fabrication activities of plate renewal such as marking, cutting and removal of old plate from onboard, templates for cut out area, marking and cutting of new plate outside, required edge preparation for onboard cut out and new plates, weighing, fit-up of new plate, welding of joints, flush grinding, NDT and final inspection are in subcontractor's scope.
10. Inspection offers to be raised after Marking, fit-up, NDT and final inspection.
11. Aft hydroplane stabilizer to be offered for survey to EY-QA and SRMT, after opening the cover plates below.
12. Synthetic foam blocks to be renewed as per survey report.

FOREBODY DRAWINGS

SL NO	DESCRIPTION	DRAWING

1.	1285-42-01-00	DECK AFT FR 60100
2.	1285-42-04-00	DECK FWD FR 60100
3.	1282-42-01-00	SHELL PLATING FOREBODY
4.	1285-42-02-00	SUPPORTING DECKS
5.	1284-42-05-00	HAWSE PIPE CHAIN LOCKER
6.	1285-42-03-00	RESERVE FUEL OIL TANK
7	1285-42-06-00	Guide tube for anchor
8	1284-42-01-00	OUTER STRUCTURE MAK1
9	1284-42-02-00	OUTER STRUCTURE MAK2
10	1284-42-03-00	OUTER STRUCTURE MAK3
11.	1284-42-04-00	CENTER LINE BHD FWD
12.	1284-42-11-00	PENETRATIONS FOREBODY
13	1551-01-00-00	TORPEDO GUIDE RAIL SECTIONS TORPEDO TUBE I AND II
14	1551-02-00-00	TORPEDO GUIDE RAIL SECTIONS TORPEDO TUBE III AND IV
15	1551-03-00-00	TORPEDO GUIDE RAIL SECTIONS TORPEDO TUBE V AND VI

16	1551-04-00-00	TORPEDO GUIDE RAIL SECTIONS TORPEDO TUBE VII AND VIII
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AFT BODY DRAWINGS

SL NO	DRAWING	DESCRIPTION
1.	1282-10-01-00	Shell plating aft body
2.	1283-10-01-00	Framing aft body
3.	1284-10-01-00	Bulkhead aft body
4.	1281-10-01-00	Rudder fin
5.	1281-10-02-00	Aft hydroplane fin (stabilizer)

* Outer shell and all tank boundaries and all welded structural elements are considered for survey.

- *Considering tentative weight for renewal of plates maximum 20Ton (weight can be less than 20 ton).*

SURVEY AND RENEWAL OF PENETRATIONS ON FORE BODY AND AFT BODY

SL NO	DRAWING	DESCRIPTION
1.	1284-42-11-00 72172-1284-42-11-00	Penetrations fore body
2.	1281-10-02-00	Aft hydroplane fin stabilizer

DEGUTTING AND REMOVAL AND INSTALLATION OF LEAD BALLAST WEIGHTS)

1. Degutting and removal of all lead ballast weights and cover plates from all locations as per drawings attached are in subcontractor's scope.
2. Degutting of all ballast weights from MBT 2&3, 1,5, fall out area, casing near battery hatch, access trunk, aft casing and ballast keel area. Opening of ballast wt covers and removal of ballast wts to be done in presence of HULL MRLC representative. Removal of ballast weights to be offered to EY-QA and SRMT for inspection. Counting and weighing of each lead ballast in each location to be done in presence of EY-QA and SRMT and protocols to be made.
3. After opening inspection lead ballast weights to be handed over to HULL MRLC immediately with summary of weights and inspection reports. Ballast weights removed from each location to be summarized in excel sheet as per opening inspection and handover to HULL MRLC.

4. All ballast weights to be offered for survey to EY-QA and SRMT after blasting. Blasting and painting will be in MDL scope. But shifting of Weights to blasting chamber and for inspection and painting will be in subcontractor's scope. All these activities to be done in presence of HULL MRLC representative.
5. Degutting and removal of all cover plates of ballast wt as per drawings attached. All cover plates removed to be offered for survey to EY-QA and SRMT. Welded plates brackets and stiffeners on pressure hull, fore body and aft body structures to offered for survey separately. All the above structures to be repaired and renewed as per survey report.
6. All lead ballast weights to be reinstalled as per drawing. Weighing of all ballast weights to be under taken before reinstallation. Weighing and reinstallation to be offered to EY-QA and SRMT. Final installation of weights to be summarized in excel sheet and submit to HULL MRLC with inspection reports.
7. Minor modification in shape of lead weights by hammering will be in subcontractor's scope. Renewal of weights if any will be in MDL scope.
8. Weighing machine with calibration certificate will be in subcontractor's scope.

SL NO	DRAWING	DESCRIPTION
1	1950-01-00-00	General arrangement ballast weights
2	9197-03-00-00	Ballast support fore body(MBT 2&3)
3	9197-04-00-00	Ballast support aft body(MBT 5)
4	9197-06-00-00	Ballast support fore body reserve
5	1286-20-01-00	Ballast keel sec20
6	1286-31-01-00	Ballast keel sec31
7	1286-32-01-00	Ballast keel sec32
8	1286-41-01-00	Ballast keel sec 41
9	1286-42-01-00	Ballast keel sec 42
10	9153-01-00-00	Lead ballast in ballast keel
11	9197-02-00-00	Ballast support casing

DEGUTTING, SURVEY, REPAIR BY WELD BUILD UP, RENEWAL, REFIT OF ALL STRUCTURAL ELEMENTS OF FOREBODY, AFT BODY AND EXTERNAL PRESSURE HULL

1. Degut all structures inside fore body and aft body and pressure hull to shop floor as per the drawings listed.

2. All the structural elements to be offered for survey after chipping, blasting and painting to QA-EY and SRMT. Chipping, blasting and priming are in MDL scope.
3. All the pitting to be level grinded and thickness gauging to be done during survey.
4. Survey report to be summarized and submit to HULL MRLC.
5. Repair by weld buildup or renewal as per survey report.

SL NO	DESCRIPTION	DRAWING
1	Hydrazine trunks (MBT 2&3) (4 nos)	1288-42-02-00 1288-42-06-00-00 1288-42-07-00-00 1288-42-10-00-00
2	Hydrazine trunks (MBT 4 & 5)	1288-10-01-00 1288-10-03-00 1288-10-04-00 1288-10-05-00
3	Flood gratings (MBT 4&5)	4357-01-00-00
4	Flood gratings (MBT 1, 2&3)	4357-02-00-00
5	Top fastening foundation Hydrazine generator MBT 2&3 (2nos)	1288-42-05-00
6	Bursting flaps MBT 2&3	1611-49-00-00
7	Bursting flaps MBT 1	1611-48-00-00
8	Bursting flaps MBT 4	1611-45-00-00
9	Bursting flaps MBT 5	1611-47-00-00
10	Skeg plates	1283-10-02-00
11	Covering Hood	2511-02-11-00
12	Garbage ejector structure	4552-02-00-00

**PRESSURE TESTING OF EXTERNAL TANKS AND MBT'S OF INS
SHANKUSH AT MDL**

There is a requirement of Pressure Testing of tanks of MRLC of INS SHISHUMAR as per the scope below.

Tanks listed in work quantum are subjected to high pressure hence strength test and leak test are required for these structures, the strength tests are carried out over the tanks in compliance with the relative pressure of each entity. Leak test must be carried out prior to the strength test

Pressure testing to be carried out twice for all the tanks, first time after survey and renewal, before painting and second time after outfitting and piping.

All the external tanks and MBT's to be boxed up with original manhole covers, gasket, fasteners and fittings before second time pressure testing.

For all tests, pressurization and decompression must be gradual to prevent any dynamic compression phenomenon and to enable material to adapt to the changes in stresses.

MDL's Scope:

1. MDL User department/contract operating agency shall organize & provide water, oil, electricity, site space, storage space for testing tools & tackles.
2. MDL user department shall complete all pre-requisite required for the Pressure Testing of tanks associated with the particular system and subsystem and that shall be confirmed by QA-EY.
3. In addition, MDL shall provide the drawings, relevant technical documentation (Standard) along with WI & Protocols and all related documents upon submission of Non-Disclosure Agreement (NDA).
4. Fluid (Air/Water/Lub oil) required for the tank pressure testing will be in MDL Scope.
5. Technical guidance shall be provided by MDL to initial phase of contract for execution of the job as per drawing and standards. However, this shall not absolve the contractor of his responsibility related to quality, warranty, schedule/completion time etc. as per contract terms.

Subcontractor's Scope:

1. Lock & key arrangement for storing material, blanking plates, gaskets and tools are in subcontractor's scope.
2. Subcontractor will have to collect the set of drawings, specifications, standards, WI and protocol from MDL against submission of non-disclosure agreement.
3. After collection of the confirmed order, drawing, specifications & standards, WI, Subcontractor will have to submit the QAP and get it approved from D-EY department within 5 days from the date of purchase order. Delay attributable to Subcontractor in submission of QAP shall be accounted in the period of completion. Further, Delay in approving the QAP attributable to MDL beyond 3 days shall be excluded from completion period.
4. Subcontractor to note that all required tools like, calibrated pressure gauge, dial gauge, hoses, connectors, pipe fittings, inlet and outlet fittings and small tools required for pressure testing will have to be arranged by subcontractor. In addition to this calibrated measuring instruments as required for inspection/testing at various stages of tank pressure testing will be in subcontractor scope. Bidder to produce certificate of calibration, on demand, during inspection.
5. Subcontractor will have to clean the tanks as per the requirement before start of the tank testing and after completion, draining if required.
6. Subcontractor will have to measure sizes of all coamings/openings and penetration for preparation of blanks and cutting of gasket for pressure testing. Material required for blanks and asbestos free gasket is in subcontractor's scope. Required fittings, dial gauges, hoses, pressure gauges and pressure testing tools are in subcontractor's scope. In case any other fittings, accessories required other than mentioned in scope of work shall be arranged by subcontractor. In addition to this, blind flanges for pipes, and temporary manhole covers will have to be arranged by subcontractor. Drawing is to be provided by MDL but subcontractor has to measure the sizes as per on site fitting/penetration.
7. During leak test, air leakage from all blanks and sleeves to be checked by using soapy water. Correction of repair if leakages observed in any blank will have to be carried out and test has to be repeated till satisfactory result is obtained. Pressure

testing (Strength test/ leak test) of tanks is to be carried out as per work quantum and relevant drawings/work instructions. All work involved in drawings and work instruction are in subcontractor's scope.

8. Additives required (if any) such as corrosion inhibitor, Benzotriazole, Sodium, Molybdate, Trisodium phosphate and Sodium borate will be arranged by subcontractor at the time of calibration.
9. Tank Pressure Testing procedure in the WI documents are in the scope of subcontractor. Filling of tank can be done through Guillemin union/manhole/valve/pipe or Hose as per document. Onboard hoses, couplings and fittings shall be handed over to subcontractor before commencement of job. In case any other fittings, accessories required shall be arrange by subcontractor. In addition to this blind flanges for the pipes, equipment and temporary manhole covers will have to arrange by subcontractor.
10. Subcontractor will have to raise the inspection calls at various stages of tank Pressure Testing as per QAP well in advance to ensure the on time inspection by MDL authority. Inspection and clearance of work executed is responsibility of the subcontractor.
11. Subcontractor to submit all the inspection reports (at all Stage) duly authorized by MDL (QA-EY) & reviewed by SRMT/Ship Staff after tank pressure testing. Thereafter, Work completion certificate (WCC) shall be certified within seven working days after completion by the executive of the rank not less than Chief Manager of the user.

Following are the stage of pressure testing

Leak Test (Self Inspection).

Pressure Test to be offered to EY-QA and SRMT for inspection.

12. Subcontractor to note that all required tools like, calibrated flow meter, multi-meter, hoses, connectors, pipe clips and small tools required for process will have to be arrange by subcontractor.
13. Before second time pressure testing of external tanks after painting and outfitting, boxing up of each tank to be undertaken. This boxing up to be Offered to EY-QA and SRMT. During inspection all painting and pipe system outfitting points to be intimated to HULL MRLC. Rectification of all such points are in MDL scope. After clearance from EY-QA and SRMT final boxing up of tanks to

be done with original gaskets, manhole covers and fasteners. A protocol to be made for final boxing up of each tank.

14. Final inspection report for blasting, painting, survey and repair renewal of structure, system piping inside each tank will be provided by MDL. These activities are in MDL scope.
15. Second time pressure testing of all external tanks with system pipelines to done after final boxing up.
16. In case, any defect the observed during stage inspection/final inspection attributable to Subcontractor, it will have to be rectified/repared at no extra cost. Re-inspection will have to be done before proceeding to next stage or final clearance to ensure the compliance to drawing, specification & standards.
17. Subcontractor will have to drain the tanks with intimation to user department after completion of pressure testing of tanks.
18. MDL reserves the right to ask the subcontractor to enhance the capacity including manpower deployed to achieve the target rate of tank pressure testing during contractual period.
19. Fabrication and drilling of blanks and any welding or tacking required will be on subcontractor's scope. Welding on pressure hull /HY80 structure will be in MDL scope.
20. Subcontractor will have to ensure the proper completion documentation as mentioned in the MDL order and WI after completion of tank gauging such as inspection clearance note by MDL, test certificates/protocols, any noncompliance to the documentation during completion may lead to delay in providing the WCC by MDL
21. Subcontractors are requested to include all the price of mobilization (man & machine), tooling, set up, operations, inspection & reporting & demobilization (man & machine) in above rates
22. Bidder to have minimum of 4 Nos. Fitters and one Supervisor with diploma in mechanical engineering having 3 years of experience.
23. Bidder to have well established Quality assurance set up.

24. **Work Quantum for Pressure Testing:**

Sr. No.	Description	Pressure Test (Bar)	Testing Fluid	Vol (m3)
1	Reserve Fuel Oil Tank	0.7	Water	15.17

2	No.01 Main Ballast Tank	0.6	Air	15.61
3	No.02 &3 Main Ballast Tank	0.6	Air	83.91
4	No.04 Main Ballast Tank	0.6	Air	32.11
5	No.05 Main Ballast Tank	0.6	Air	25.81

Notes:

1. In-case of pressure testing by air, range is to be confirmed afterword.
2. Water/Air medium will be decided after hull survey of external tanks.
3. Pressure testing as per tank testing plan Drg no 1074-01-00-00

25. General Instructions:

- a) **Mobilization**: Within 03 days of placement of order and work will be released to the Contractor periodically by means of written Schedule jointly prepared within overall contracted period between Contractor & User. Delay attributable to subcontractor over the defined completion period of one week per part there of shall attract LD as per MDL standard procedure. MDL's hindrance register system shall be implemented to account the responsibilities in case of delay.
- b) Sub-contractor has to maintain Hindrance Register.
- c) The contractor is to prepare a micro-level plan of tank gauging of all tanks. Detailed work schedule shall be prepared by the contractor and submitted for approval.
- d) The subcontractor will be required to follow all safety norms and procedures to ensure safety of men and materials (with respect to theft, fire, accidents or any other incidence). The operatives shall wear safety shoes, helmets, boiler suits, goggles, and hand gloves etc. as part of safety rules. The subcontractor shall install fully equipped First Aid box near the site.
- e) In case Subcontractor wants to understand the job to be executed, may visit MDL (P-EY) before submission of the offer for better clarity and understanding.
- f) The subcontractor is required to study the relevant drawings, Work Instruction and inspection protocol sheets given by MDL. The work is to be carried out as per Work Instructions.

- g) Inspection of tank gauging of all tanks would be carried out at various stages as per QAP. Detailed protocol will be required to be filled up at every stage as per WI. The contractor is to get the jobs inspected and cleared by QA-EY/ RMT/ any other inspecting authority as per QAP.
- h) The contractor is to ensure not to damage any fittings/ pipes/equipment which are already installed. In the event of damage to the above, the cost of the same will be recovered from the subcontractor's account.
- i) Cleanliness is vital for a submarine system, especially the hydraulic system. Hence the subcontractor has to take utmost care not to allow any dirt to enter inside any tank pipe. Extreme care is to be taken and adequate hygiene is to be maintained while tank testing of systems. Suitable blanks to be fitted after tank Pressure Testing and Gauging by sub-contractor.
- j) The subcontractor will have to render a weekly progress report of all activities being carried out.
- k) The subcontractor will provide a technical file which consists of the following: -
- i. List of inspections carried out as per WI.
 - ii. The list and a copy of each non-conformity (NCR).
 - iii. Each file (2 hard copies + 1 soft copy) to be given to MDL by the subcontractor not later than 2 weeks after the completion of works related to a subcontract order.
 - iv. It has to be noted that some partial COC may be asked by MDL during the pressure testing as part of inspection
- l) Subcontractor to have well established Quality assurance set up.

26. **List of tools:**

Sr. No.	Description of tool	Specification/Range of the tool.	Qty (Min)
1	Multimeters for measurement current in mA.	Range 0-50mA.	1
2	Volumetric counter (for measurement of water) OR Portable Flow meter of Mechanical Type.	0.5 inch dia, Range 0-100 m ³ and min resolution:0.01 m ³	1
3	Volumetric counter (for measurement of water) OR Portable Flow meter of mechanical type.	2 or 3 inch dia, range 0-100 m ³ , min resolution:0.01 m ³ and Type-Mechanical	1

4	Volumetric counter (for measurement of oil) OR Portable Flow meter of Mechanical Type.	0.5 inch dia, Range 0-100 m ³ and min resolution:0.01 m ³	1
5	Hose for water	Hose of 0.75 inch dia. OR suitable for 0.5 inch flow meter of length 100m.	1
6	Hose for water	Hose of 2 or 3 inch dia, OR suitable for 2 or 3 inch dia, flow meter of length 100m.	1
7	Hose for oil	0.75 inch dia. OR suitable for 0.5 inch flow meter (oil) of length 50m.	1
8	Submersible water pumps for draining water from tanks.	Capacity 1Hp OR 2 Hp.	1

27. **Contract period:** 18 Months.
28. **Validity period of contract:** As per work schedule.
29. **Parallel contract:** No.
30. **Responsibility Matrix:** As per Annexure-II.

Note: Blanks for Manhole covers and Penetrations (Subcontractor is allowed to use blanking material i.e. material grade and thickness as per drawing). for MBT all opening should be closed by subcontractor including MBT flap opening. All type of MBT openings to be closed by bend plates/ including welding to be done by subcontractor. All testing blanks to be returned by subcontractor to MDL after completion of pressure test.

NOTE: Testing procedure given by EY-Design Dept. to be followed for Sanitary Tank and PPCT (PORT & STBD). All blanks, jigs and fixtures has to be arranged by Subcontractor as per drawing.

For a water test (pressure greater than 1 bar), pressure is to be measured at lowest available point. Pressure is to be measures using pressure gauge/U-tube manometer. All pressure testing measuring tools to be calibrated from NABL approved lab.

ANNEXURE-I

Procedure for leak test and pressure test tank:

1. Install the test equipment on vent pipe
2. After Gauging activity, put necessary blanks and pressurize tank as per PTRH (Pressure testing and Rinsing Handbook) and PTP (Particular Test Protocol)
3. MDL QA representative shall be present during test.

4. Valve Position during & after Leak Test should be as per details mentioned in PTRH/Work Instruction
5. Check tank for any kind of leakages. Rectify, if any and re-do the test.
6. Ensure no leakages.
7. After test, remove testing equipment from vent pipes
8. Fill up inspection sheet in specified format.
9. Empty tank after completion of leak test
10. Inspection of tanks after drying will be as per QAP
11. Close the manhole and bend the lock washer

Annexure-II

Responsibility Matrix

Sr. No	Work Description	Responsibility	
		MDL	Contractor
1	Submission of QAP within 4 days.		Subcontractor
2	Approval of QAP from D-EY.		Subcontractor
3	Definition of work schedule and signoff with mutual agreement of subcontractor.	User dept.	Subcontractor
4	Handing over of drawings/specifications/standards/WI's/protocols etc relevant to the job to be executed.	User dept.	
5	Mobilizing work force and requisite tooling for the work.		Subcontractor
6	Security formalities for Gate pass (Including PVR) for fitters.		Subcontractor
7	Providing Site clearance for testing.	User dept./WI	
8	Procurement of material for blanking ,rubber gaskets, tools and equipment for pressure testing.		Subcontractor
9	Preparation for the tank testing as per defined schedule.		Subcontractor
10	Cleaning of tank before tank testing.		Subcontractor
11	Inspection calls at various stages as per QAP.		Subcontractor
12	Completion of the tank testing as per the WI and drawing.		Subcontractor

13	Draining of tank after completion of tank pressure testing .		Subcontractor
14	Inspection of tank as per calls/QAP at Various stages/ Issue of Inspection clearance	QA-EY	
15	Release of Work Completion Certificate (WCC) & Reconciliation certificate if applicable.	User Department	
16	Submission of Invoice Documents as per order		Subcontractor

J) SCOPE OF WORK FOR REPAIR OF RESCUE SEAT BY MANUFACTURING, WELDING AND MACHINING

WORK DEFINITION

1. This job involves modification of rescue seat by welding and machine to desired thickness as per the laid down procedures and drawings inside MDL premises on INS Shishumar (MRLC). Modification of lining cover of battery hatch so as to match it with rescue seat thickness after modification and machining. All activities prior to modification such as removal of fitting(4nos) on rescue seat, modification of holes(4nos) and all inspection are included in this scope.
2. Battery hatch coaming reading/observation to be submitted for approval to IN Before and after degutting/ Re-welding of rescue plate.
3. Onboard condition the Upper battery hatch ring has been installed with O-ring.
4. Refer drawing 186/1613-03-00-00 pos no 10,93. Ring to be removed before cutting of rescue plate and secure the coaming from welding distortion.
5. Refer to Drawing no 186/1272-41-01-00 (pos no 5) plate to be removed from Bracket using cutting. Total no of Brackets 32 nos (Inside and outside of rescue trunk)
6. Bevel Preparation of Bracket for mounting of new rescue plate.
7. Machining of new rescue plate outside and Inside keeping green material for final machining after Welding.
8. Welding of new plate on its position, welding to be carried out in controlled manner keeping stringent control over out of circularity (OOC) of rescue trunk.
9. After welding inspection (DPT/ visual) to be carried.
10. On-board setting of special machine for machining.

11. Carry out the machining as per requirement of drawing 186/1272-41-01-00, post machining inspection to be carried out.

MDL'S SCOPE

Material requirement:-

SR no	Description of Material	Remarks
1	HY80 plate (2m X 2m, thickness-30mm)	Provided by MDL
2	HY80 plate (2.5 m X 2.5m, thickness-17mm)	Provided by MDL
4	Welding Rod SHNI 3.2 mm electrode	Provided by MDL

1. **Drawings and documents.**

- a. All drawings required for modification and machining. The details of the same is as tabulated below-

Sr. No.	Drawing No.	Description
1	186/1272-41-01-00	Battery hatch trunk
2	186/1272-41-02-00	Trunk coaming
3	186/1613-03-00-00	Upper cover for battery hatch
4	186/1611-30-00-00	Lining cover for battery hatch trunk
5	186/1611-30-00-01	GRP plate

- b. Any other drawings or document required other than mentioned above is to be provided by MDL.

2. **Material.** Following material required for modification and machining.

- a. AH36/HY80 plates for supports, weld backing, locking plates and reference pads.

3. **Welding Activities**

- Qualified welders for modification and tacking.
- WPS required.
- Welding electrodes (SHINI 2K 90) for modification and tacking
- Pre heating transformer and arrangement.
- Main oven and portable oven.
- Welding machines, holder and cables.
- Installation of upper hatch cover (battery hatch).

4. **Facility.** Following facility with in MDL premises-

- a. Crane facility with crane operator.

- b. Blasting / Priming wherever required.
 - c. Electric power supply/ air supply points (only) for operation of subcontractors machines and equipment. Connecting cable and hoses are to be arranged by subcontractor.
 - d. Technical guidance to complete the job to the satisfaction of MDL-QA and Refit Monitoring Team (RMT). However, this shall not absolve the contractor of his responsibility related to quality, warranty, and schedule / time completion etc.
5. **Work completion certificate (WCC)**. Work Completion Certificate (WCC) shall be issued on satisfactory completion of respective work with inspection and acceptance reports. The agency responsible to issue WCC shall be MRLC.

SUB-CONTRACTOR'S SCOPE

6. **Job Description.**

- a. Collection of plates/ consumables etc. required for modification and machining from MDL East Yard store/Alcock yard intermediate store/South Yard P & A shop or any other designated place within MDL premises.
- b. Gas cutting, grinding and fit-up of reference pad plates and supports required for machining and to avoid distortion.
- c. Preheating for tack welds using oxygen acetylene torch.
- d. All preparations before welding such as removal of paint by grinding, fit-up of copper strips or weld backing. Copper strips should be arranged by subcontractor. Cutting of HY80 strips for metal backing is in subcontractor's scope.
- e. . Use Shini2k90 welding electrode for welding. Welding is in MDL scope, but during welding grinding and wire brushing is in subcontractor's scope. Carry out visual and radiography of the welded area.
- f. Reference pad plates 08 no's of 15mm thickness at 45 degrees to be welded.
- g. Rough machining on the reference pads to be done for maintaining the slope. Setting of machine and prior machining inspections to be done.
- h. Prior to machining on the basis of reference pad light machining cut has to be taken by machine to get required thickness on rescue seat.
- i. Carry out weld modification of rescue seat as per drawing. welding to be carried out in accordance with WPS 111/3-3/30/MRLC-WPS-1.

- j. Carryout visual and MPI on the top surface of seat (built up area) after 8 days. Remove copper strips. Smooth surface grinding to be carried out on the outer side of rescue seat.
 - k. Set up and align the machine with reference to machined pads and carry out machining on the welded area.
 - l. Measure thickness of rescue seat post machining.
 - m. Carry out visual and MPI of the machined surface.
 - n. Flatness to be achieved within 1mm and thickness of the top surface the seat to be 22mm, tol. + 0.5mm. Inspection protocols to be filled.
 - o. Rescue seat surface roughness average should be less than 6.35 μ m.
 - p. Remove all temporary supports and carryout DPT.
 - q. Carry out circularity measurements of the trunk as per INBR1558/18. (protocol to be fill up)
 - r. Carry out circularity measurements of the trunk as per INBR1558/18. (protocol to be fill up). Drilling of 4 holes and fit-up of eye fittings as per Drawing.
 - s. Carry out skirting around the mating sheet to ensure smooth transition of the shape of the casing.
 - t. Carry out modification and fit up of lining cover (Drg no 186/1611-30-00-00) of battery hatch trunk to match the obtained height
 - u. The entire work is to be carried out as per time lines and schedules are asked by production department i.e. MRLC.
 - v. Machine for carrying machining activity (Sub contractor scope).
 - w. All the leftover/scrap material to be placed in separate identifiable space/bins at sub-contractor's place and is to be returned back to MDL on completion of work.
 - x. Measuring flatness, thickness, circularity, roughness of the seat post machining is subcontractor scope.
7. **PPE (Personal Protective Equipment).** Standard PPE like safety shoes, helmet, gloves, respiratory masks (FFP3 type), Wide vision (panoramic) safety goggles to be used and is solely subcontractor's responsibility.
8. **QAP.** Draft QAP is enclosed as per Annexure-3. The subcontractor is to prepare and submit the final QAP to MDL for approval within 05 days of placement of order.
9. **Inspections and tests.**
- G) Inspection will be undertaken by QA-EY, RMT as per approved QAP.
 - H) The subcontractor(s) have to arrange all the required Nondestructive testing as per drawing & COS. (to be conducted in laboratory) such as RT,

DP, MPI, UT, etc. to be taken at various stages as indicated by the inspection agency at their cost. Class II film to be used for RT report.

D) The defects rectification / rework applicable after any stage of inspection shall be carried out by subcontractor at no extra cost to MDL. All the work carried out by subcontractor will be accepted only after the final clearance from MDL (QA-EY) and Naval Inspection Authorities i.e. SRMT (MB).

E) The decision of the Inspection Authority on any question of intent, meaning and scope of the work / documents/ specifications / standards shall be final and conclusive and binding on subcontractor.

10. **Safety.**

- a. The working supervisor will be responsible for safety of their men working in MDL premises.
- b. The subcontractor is to ensure that his personnel uses all safety gear as laid down in Industrial & Labour Regulations while working on jobs.
- c. The subcontractor shall observe all necessary safety precautions to safeguard their own Personnel and that of others, plant & machinery, equipment and completed work at site.
- d. Personnel are to comply with all the requirements of safety norms as per prevailing laws. He will remain solely liable for any claims or damage arising out of non-compliance of rules and regulations of any statutory or government bodies.

GENERAL TERMS AND CONDITIONS

11. **Work Duration.** The work period will be of 02 months from date of placement of order. Contract validity- 12 months.
12. **Mobilization.** Firm is to mobilize manpower within 7 days from the order placement, failing with which is liable for LD of Rs. 300/- per day.
13. **Responsibility Matrix:** As per Annexure-1.
14. **Shift timings.** Subcontractor to depute manpower and adhere to MDL working time if required on Saturday, Sunday and holiday. If required work is to be carried out in all 03 shifts to meet the timeline.
15. **Passes.** Obtaining police verification/clearance for each personnel being deputed to MDL is a pre-requisite for issue of MDL Security pass for entry into East Yard. The firm should arrange/furnish all requisite documents to Security department immediately on receipt of Order. Subcontractor may contact Security department for guidance.

16. Subcontractor will indemnify the MDL from any risks and costs arising out of any accidents, leading to total or partial loss to the persons or property during execution of work in his scope particularly arising out of non-compliance of rules and regulations of any statutory or government bodies.
17. Provisions of Labour laws to be taken into account by sub-contractor.
18. The contractor while executing work in on board ships/area of work should be governed by Official Secret Act and also shall observe all necessary security rules and will be subject to security checks as per rules and regulations in force from time to time.
19. In case of the performance of the firm is not found to be satisfactory and any point of time, MDL reserves the right to cancel the order.
20. **Performance Bank Guarantee:** Applicable.
21. **Free Issue Material:** As the work is required to be executed within MDL premises. However, if any material is required to be taken outside MDL by subcontractor, same will be allowed only on submission of FIM-BG. The cost of FIM-BG will be provided on case to case basis & on as and when required basis.
22. **Rate Contract.** No.
23. **Parallel Contract.** No
24. **Rework.** Any rework arising due to MDL will be paid extra as per the mandays rates indicated in the rate sheet. The certification of such mandays will be done by QA-EY & user i.e. MRLC.

Note

1. Any material, equipment, infrastructure facility, required directly or indirectly for completing the subject work, as per the scope of work & drawing given, if not mentioned in MDL's scope, has to be arranged by the subcontractor without any extra cost to MDL.
2. In case of the performance of the contractor is not satisfactory MDL reserves the right to cancel the order and lift the material from contractor

Annexure-1

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor

1	Mobilization of men for grinding ,NDT/UT/RT and machining		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out job	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & cut parts)		✓
5	Issue of drawings and related documents required for execution of work	✓	
6	Issue of material	✓	
7	Collection of material from MDL		✓
8	Suitable working platform for job		✓
9	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		✓
10	Special tool (if required).		✓
11	Necessary tools, tackles and men required for the job		✓
12	Machining and all other activities except welding		✓
13	Installation of upper hatch (battery hatch)	✓	
14	Transportation of any kind required for work		✓
15	Crane facility in MDL	✓	
16	Preparation of QAP & approval from RMT		✓
17	Call for inspections		✓
18	Arranging Inspection	✓	
19	Blasting and priming	✓	
20	Arranging NDT		✓
21	Issue of WCC	✓	
22	Submission of invoices for payment		✓
23	Payment for work carried out	✓	

K) OPENING, DEGUTTING, RENEWAL OF ALL INTERNAL TANK AND STRUCTURES INSIDE PRESSURE HULL. PRESSURE TESTING AND BOXING UP OF ALL INTERNAL TANKS

Sr. No	Description of Work/Job
1.	Opening, degutting, survey, repair and renewal of all manhole covers of all internal tanks.
2	Renewal of all studs of manhole covers of internal tanks
3	Onboard structural renewal of all internal tanks , inbuilt ducts ,bulkheads, ATU structures.

4	Degutting, dismantling, lifting ,shock mount renewal and refit of distillate tank.
5	Degutting, removal , survey, repair and refit of equipment foundations
6	Pressure testing and final boxing up of all internal tank.

1. Opening and removal of manhole covers, hand hole covers and all opening covers of all internal tanks and inbuilt trunks will be in contractor's scope.
 - b. All manhole, hand hole, other opening covers to be offered for survey to EY-QA and SRMT after chipping blasting and painting. Chipping, blasting and painting are in MDL scope.
 - c. All manhole, hand hole and all openings covers to be renewed or repaired by weld buildups.
 - d. All studs of internal tank manhole, hand hole covers and covers of inbuilt trunks to be renewed after survey.
 - e. Cleaning and Degassing of internal tanks are in subcontractor's scope. Subcontractor should obtain the gas free certificate from EY-QA and SRMT and submit the same to HULL –MRLC.
 - f. All Chipping, Blasting and priming will be in MDL scope.
 - g. Survey of all internal tanks, bilges and inbuilt ducts are in MDL scope. After survey renewal of plates will be in subcontractor's scope. Repair by weld build up will be in MDL scope.
 - h. All fabrication activities of plate renewal such as marking, cutting and removal of old plate from onboard, templates for cut out area, marking and cutting of new plate outside required edge preparation for onboard cut out and new plate, weighing, fit-up of new plate, welding of joints, flush grinding, NDT and final inspection are in subcontractor's scope.
 - i. Inspection offers to be raised after Marking, cutting, fit-up, NDT and final inspection.
 - j. Drip separator (baffle plates) to be removed with fixing plates, offered for inspection, renew and refit as per drawing no 4678-82-00-00.
 - k. I Beams inside Battery pit no1 &2 are to be removed, offered for inspection, repair and refit as per drawing no 1179-23-01-00 & 1179-34-01-00.
 - l. Cover with sounding pipe to be removed, offered for inspection, repair and refit as per drawing no 4528-43-00-00.
 - m. Cover of bilge well of aft battery pit inside CIC aft bilge to be removed, offered for inspection, repair and refit as per drawing no 4318-51-00-00.
 - n. Any weld buildup /welding in HY80 material will be in MDL scope.
 - o. Renewal of any HY80 structure is in MDL scope.
 - p. All welding electrodes, consumables, AH36/SBST plates are in subcontractor's scope. HY80 material and electrodes and welding on HY80 structure are in MDL scope.

- q. All welding machines, Stud welding machine, tools, grinding machines, portable ovens are in subcontractor's scope.

OPENING, DEGUTTING MANHOLE COVERS, CLEANING, DEGASING OF ALL INTERNAL TANKS

Sr. No	Description
1	Contaminated lubrication oil tank
2	Fuel oil collecting tank
3	Lubricating oil tank
4	No.01 Compensating Fuel Tank
5	No.02 Compensating Fuel Tank
6	No.01 Compensating Tank
7	No.02 Compensating Tank
8	No.01 trim tank
9	No.02 trim tank
10	No.03 trim tank
11	No.04 trim tank
12	No.01 Fuel Oil Tank
13	No.02 Fuel Oil Tank
14	No.03 Fuel Oil Tank
15	No.04 Fuel Oil Tank
16	No.05 Fuel Oil Tank
17	No.06 Fuel Oil Tank
18	STBD press proof compensating Tank
19	PORT press proof compensating Tank
20	No.01 Washing Water Tank
21	No.02 Washing Water Tank
22	No.01 Drinking water tank
23	No.02 Drinking water tank
24	Press proof sanitary tank
25	No.01 Torpedo Tank

26	No.02 Torpedo Tank
33	Distillate Tank
34	Fuel Oil Tank No.10
35	Battery Pit No1
36	Battery Pit No2
37	Snorkel tank

SURVEY (GRINDIND, NDT, THICKNESS GAUGING) OF ALL ONBOARD PENETRATIONS OF INTERNAL TANKS

Sr. No	Description	Drawing
1	Contaminated lubrication oil tank	
2	Fuel oil collecting tank	
3	Lubricating oil tank	1175-10-12-00
4	No.01 Compensating Fuel Tank	1175-31-12-00
5	No.02 Compensating Fuel Tank	1175-31-12-00
6	No.01 Compensating Tank	1175-31-12-00
7	No.02 Compensating Tank	1175-31-12-00
8	No.01 trim tank	1175-10-11-00
9	No.02 trim tank	1175-10-11-00
10	No.03 trim tank	1175-42-11-00
11	No.04 trim tank	1175-42-11-00
12	No.01 Fuel Oil Tank	1175-20-11-00
13	No.02 Fuel Oil Tank	
14	No.03 Fuel Oil Tank	
15	No.04 Fuel Oil Tank	
16	No.05 Fuel Oil Tank	
17	No.06 Fuel Oil Tank	
18	STBD press proof compensating Tank	1175-31-14-00
19	PORT press proof compensating Tank	1175-31-14-00

20	No.01 Washing Water Tank	1175-31-13-00
21	No.02 Washing Water Tank	1175-31-13-00
22	No.01 Drinking water tank	1175-31-13-00
23	No.02 Drinking water tank	1175-31-13-00
24	Press proof sanitary tank	1175-32-12-00
25	No.01 Torpedo Tank	1175-42-11-00
26	No.02 Torpedo Tank	1175-42-11-00
33	Distillate Tank	
34	Fuel Oil Tank No.10	1175-20-11-00
35	Battery Pit No1	1175-31-11-00
36	Battery Pit No2	1175-32-14-00
37	Snorkel tank	

**OPENING, REMOVEVAL, SURVEY AND REPAIR BY WELDING OF COVER PLATES, COMPLETE STUD
RENEWAL AND FINAL BOXING UP**

Sr. No	Drawing	Description
1	1177-32-02-00	Only Inbuilt Trunk of Battery Room No2 AFT (Fr 44759) to be considered from the drawing.
2	1175-42-01-00	Only Inbuilt Trunk Battery Room No2 FWD (Fr 52600) to be considered from the drawing.
3	1176-31-05-00	Ventilation Trunking (FR30437 to FR35272 SB)
4	1176-33-01-00	Air trunk SB
5	1177-32-04-00	Vent Trunk STB PT BHD
6	1176-31-02-00	Only Inbuilt Trunk from Inner Snorkel Valve to be considered from the drawing.
7	1176-31-04-00	Only Ventilation Trunk BHD 29580 (CIC) to be considered from the drawing.
8	1178-31-02-00	Ventilation Trunk Below MSB (Control Room Port Side)
9	1673-08-00-00	AIR DUCTS

10	4620-31-30-00	below CO's cabin
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FOR DEGUTTING, SURVEY, REPAIR AND REFIT OF THE FOLLOWING.

Sr. No	Drawing	Description
1	3497-61-00-00	I beam with foundation and shock mounts (to be renewed)(shock mounts will be supplied by MDL)
2	2764-01-00-00	Foundation of DMS panel
3	1178-12-02-00 3334-04-00-00	Foundation for automatic starter panel PORT and STBD
4	1178-20-09-00	Foundation for converter blocks port and STBD
5	2552-01-18-00	Intermediate foundation converter No1
6	2552-01-19-00	Intermediate foundation converter No2

FOR DEGUTTING THE FOLLOWING.

Sr. No	Drawing	Description
	1178-10-12-00	Foundation for converter blocks port and STBD
1	NA	Old Intermediate foundation converter No 3 & 4
2	NA	OLD Intermediate foundation converter No 5 & 6

SURVEY (GRINDING, NDT, THICKNESS GAUGING) AND REPAIR BY WELD BUILD UP

Sr. No	Drawing	Description
1	1176-32-04-00	WC bulkhead
2		Cold and cool room bulkhead

DEGUTTING, SURVEY (GRINDING, NDT, THICKNESS GAUGING), REPAIR BY WELD BUILDUP AND GRINDING

Sr. No	Drawing	Description
1	4671-06-00-00	Structural parts of ATU -3 including filter frame and filters
2	4671-01-00-00	Structural parts of ATU -1 including filter frame and filters
3	4671-17-00-00	Structural parts of ATU -5 including filter frame and filters
4	4671-20-00-00	Structural parts of ATU -4 including filter frame and charcoal filters
5	4671-04-00-00	Structural parts of ATU -2 including filter frame and filters

COMPLETE RENEWAL OF STRUTURAL PARTS OF ATU's

Sr. No	Drawing	Description
1	4671-06-00-00	Structural parts of ATU -3 including filter frame and filters
2	4671-01-00-00	Structural parts of ATU -1 including filter frame and filters
3	4671-17-00-00	Structural parts of ATU -5 including filter frame and filters
4	4671-20-00-00	Structural parts of ATU -4 including filter frame and charcoal filters
5	4671-04-00-00	Structural parts of ATU -4 including filter frame and filters

PRESSURE TESTING AND FINAL BOXING UP INTERNAL TANKS OF INS SHANKUSH AT MDL

There is a requirement of Pressure Testing of internal tanks of MRLC of INS SHISHUMAR as per the scope below.

Tanks listed in work quantum are subjected to high pressure hence strength test and leak test are required for these structures, the strength tests are carried out over the tanks in compliance with the relative pressure of each entity. Leak test must be carried out prior to the strength test

Pressure testing to be carried out twice for all the tanks, first time after survey and renewal, before painting and second time after outfitting and piping.

All the internal tanks to be boxed up with original manhole covers and fasteners and fittings before second time pressure testing.

For all tests, pressurization and decompression must be gradual to prevent any dynamic compression phenomenon and to enable material to adapt to the changes in stresses.

MDL's Scope:

2. MDL User department/contract operating agency shall organize & provide water, oil, electricity, site space, storage space for testing tools & tackles.
3. MDL user department shall complete all pre-requisite required for the Pressure Testing of tanks associated with the particular system and subsystem and that shall be confirmed by QA-EY.
4. In addition, MDL shall provide the drawings, relevant technical documentation (Standard) along with WI & Protocols and all related documents upon submission of Non-Disclosure Agreement (NDA).
5. Fluid (Air/Water/Lub oil) required for the tank pressure testing will be in MDL Scope.
6. Technical guidance shall be provided by MDL to initial phase of contract for execution of the job as per drawing and standards. However, this shall not absolve the contractor of his responsibility related to quality, warranty, schedule/completion time etc. as per contract terms.

Subcontractor's Scope:

7. Lock & key arrangement for storing material, blanking plates, gaskets and tools are in subcontractor's scope.
8. Subcontractor will have to collect the set of drawings, specifications, standards, WI and protocol from MDL against submission of non-disclosure agreement.
9. After collection of the confirmed order, drawing, specifications & standards, WI, Subcontractor will have to submit the QAP and get it approved from D-EY department within 5 days from the date of purchase order. Delay attributable to Subcontractor in submission of QAP shall be accounted in the period of completion. Further, Delay in approving the QAP attributable to MDL beyond 3 days shall be excluded from completion period.
10. Subcontractor to note that all required tools like, calibrated pressure gauge, dial gauge, hoses, connectors, pipe fittings, inlet and outlet fittings and small tools required for pressure testing will have to be arranged by subcontractor. In addition to this calibrated measuring instruments as required for inspection/testing at various stages of tank pressure testing will be in subcontractor scope. Bidder to produce certificate of calibration, on demand, during inspection.
11. Subcontractor will have to clean the tanks as per the requirement before start of the tank testing and after completion, draining if required.
12. Subcontractor will have to measure sizes of all coamings/openings and penetration for preparation of blanks and cutting of gasket for pressure testing. Material required for blanks and asbestos free gasket is in subcontractor's scope. Required fittings, dial gauges, hoses, pressure gauges and pressure testing tools are in subcontractor's scope. In case any other fittings, accessories required other than mentioned in scope of work shall be arranged by subcontractor. In addition to this, blind flanges for pipes, and temporary manhole covers will have to be arranged by subcontractor. Drawing is to be provided by MDL but subcontractor has to measure the sizes as per on site fitting/penetration.
13. During leak test, air leakage from all blanks and sleeves to be checked by using soapy water. Correction of repair if leakages observed in any blank will have to be carried out and test has to be repeated till satisfactory result is obtained. Pressure testing (Strength test/ leak test) of tanks is to be carried out as per work quantum and

relevant drawings/work instructions. All work involved in drawings and work instruction are in subcontractor's scope.

14. Additives required (if any) such as corrosion inhibitor, Benzotriazole, Sodium, Molybdate, Trisodium phosphate and Sodium borate will be arranged by subcontractor at the time of calibration.
15. Tank Pressure Testing procedure in the WI documents are in the scope of subcontractor. Filling of tank can be done through Guillemin union/manhole/valve/pipe or Hose as per document. Onboard hoses, couplings and fittings shall be handed over to subcontractor before commencement of job. In case any other fittings, accessories required shall be arranged by subcontractor. In addition to this blind flanges for the pipes, equipment and temporary manhole covers will have to be arranged by subcontractor.
16. Subcontractor will have to raise the inspection calls at various stages of tank Pressure Testing as per QAP well in advance to ensure the on time inspection by MDL authority. Inspection and clearance of work executed is responsibility of the subcontractor.
17. Subcontractor to submit all the inspection reports (at all Stage) duly authorized by MDL (QA-EY) & reviewed by SRMT/Ship Staff after tank pressure testing. Thereafter, Work completion certificate (WCC) shall be certified within seven working days after completion by the executive of the rank not less than Chief Manager of the user.

Following are the stage of pressure testing

Leak Test (Self Inspection).

Pressure Test to be offered to EY-QA and SRMT for inspection.

18. Subcontractor to note that all required tools like, calibrated flow meter, multi-meter, hoses, connectors, pipe clips and small tools required for process will have to be arranged by subcontractor.
19. Before second time pressure testing of internal tanks after painting and outfitting, boxing up of each tank to be undertaken. This boxing up to be Offered to EY-QA and SRMT. During inspection all painting and pipe system outfitting

points to be intimated to HULL MRLC. Rectification of all such points are in MDL scope. After clearance from EY-QA and SRMT final boxing up of tanks to be done with original gaskets, manhole covers and fasteners. A protocol to be made for final boxing up of each tank.

20. Final inspection report for blasting, painting, survey and repair renewal of structure, system piping inside each tank will be provided by MDL. These activities are in MDL scope.
21. Second time pressure testing of all internal tanks with system pipelines to be done after final boxing up.
22. In case, any defect is observed during stage inspection/final inspection attributable to Subcontractor, it will have to be rectified/repaired at no extra cost. Re-inspection will have to be done before proceeding to next stage or final clearance to ensure compliance with drawing, specification & standards.
23. Subcontractor will have to drain the tanks with intimation to user department after completion of pressure testing of tanks.
24. MDL reserves the right to ask the subcontractor to enhance the capacity including manpower deployed to achieve the target rate of tank pressure testing during contractual period.
25. Fabrication and drilling of blanks and any welding or tacking required will be on subcontractor's scope. Welding on pressure hull /HY80 structure will be in MDL scope.
26. Subcontractor will have to ensure the proper completion documentation as mentioned in the MDL order and WI after completion of tank gauging such as inspection clearance note by MDL, test certificates/protocols, any noncompliance to the documentation during completion may lead to delay in providing the WCC by MDL.
27. Subcontractors are requested to include all the price of mobilization (man & machine), tooling, set up, operations, inspection & reporting & demobilization (man & machine) in above rates.
28. Bidder to have minimum of 4 Nos. Fitters and one Supervisor with diploma in mechanical engineering having 3 years of experience.

Sr. No.	Description	Pressure Test (Bar)	Testing Fluid	Vol (m3)
1	Contaminated lubrication oil tank	0.7	Water	2.3
2	Fuel oil collecting tank	0.7	Water	2.29
3	Lubricating oil tank	0.7	Water	7.99
4	No.01 Compensating Fuel Tank	3.125	Water	9.99
5	No.02 Compensating Fuel Tank	3.125	Water	9.72
6	No.01 Compensating Tank	3.125	Water	15.04
7	No.02 Compensating Tank	3.125	Water	15.04
8	No.01 trim tank	3.125	Water	6.08
9	No.02 trim tank	3.125	Water	6.08
10	No.03 trim tank	3.125	Water	4.75
11	No.04 trim tank	3.125	Water	4.75
12	No.01 Fuel Oil Tank	3.125	Water	35.11
13	No.02 Fuel Oil Tank	3.125	Water	34.83
14	No.03 Fuel Oil Tank	3.125	Water	13.33
15	No.04 Fuel Oil Tank	3.125	Water	12.31
16	No.05 Fuel Oil Tank	3.125	Water	13.18
17	No.06 Fuel Oil Tank	3.125	Water	13.99
18	STBD press proof compensating Tank	65	Water	3.92
19	PORT press proof compensating Tank	65	Water	3.92
20	No.01 Washing Water Tank	0.7	Water	5.98
21	No.02 Washing Water Tank	0.7	Water	9.07
22	No.01 Drinking water tank	0.7	Water	6.76
23	No.02 Drinking water tank	0.7	Water	6.76
24	Press proof sanitary tank	37.5	Water	2.4
25	No.01 Torpedo Tank	3.125	Water	9.9

26	No.02 Torpedo Tank	3.125	Water	8.92
27	Distillate Tank	0.7	Water	1.7
28	Fuel Oil Tank No.10	3.125	Water	13.5

Notes:

4. In-case of pressure testing by air, range is to be confirmed afterword.
5. Water/Air medium will be decided after hull survey of internal tanks.

29. General Instructions:

1. **Mobilization:** Within 03 days of placement of order and work will be released to the Contractor periodically by means of written Schedule jointly prepared within overall contracted period between Contractor & User. Delay attributable to subcontractor over the defined completion period of one week per part there of shall attract LD as per MDL standard procedure. MDL's hindrance register system shall be implemented to account the responsibilities in case of delay.
2. Sub-contractor has to maintain Hindrance Register.
3. The contractor is to prepare a micro-level plan of tank gauging of all tanks. Detailed work schedule shall be prepared by the contractor and submitted for approval.
4. The subcontractor will be required to follow all safety norms and procedures to ensure safety of men and materials (with respect to theft, fire, accidents or any other incidence). The operatives shall wear safety shoes, helmets, boiler suits, goggles, and hand gloves etc. as part of safety rules. The subcontractor shall install fully equipped First Aid box near the site.
5. In case Subcontractor wants to understand the job to be executed, may visit MDL (P-EY) before submission of the offer for better clarity and understanding.
6. The subcontractor is required to study the relevant drawings, Work Instruction and inspection protocol sheets given by MDL. The work is to be carried out as per Work Instructions.
7. Inspection of tank gauging of all tanks would be carried out at various stages as per QAP. Detailed protocol will be required to be filled up at every stage as per WI. The contractor is to get the jobs inspected and cleared by QA-EY/ RMT/ any other inspecting authority as per QAP.
8. The contractor is to ensure not to damage any fittings/ pipes/equipment which are already installed. In the event of damage to the above, the cost of the same will be recovered from the subcontractor's account.

9. Cleanliness is vital for a submarine system, especially the hydraulic system. Hence the subcontractor has to take utmost care not to allow any dirt to enter inside any tank pipe. Extreme care is to be taken and adequate hygiene is to be maintained while tank testing of systems. Suitable blanks to be fitted after tank Pressure Testing and Gauging by sub-contractor.
10. The subcontractor will have to render a weekly progress report of all activities being carried out.
11. The subcontractor will provide a technical file which consists of the following: -
1. List of inspections carried out as per WI.
 2. The list and a copy of each non-conformity (NCR).
 3. Each file (2 hard copies + 1 soft copy) to be given to MDL by the subcontractor not later than 2 weeks after the completion of works related to a subcontract order.
 4. It has to be noted that some partial COC may be asked by MDL during the pressure testing as part of inspection
12. Subcontractor to have well established Quality assurance set up.

30. **List of tools:**

Sr. No.	Description of tool	Specification/Range of the tool.	Qty (Min)
1	Multimeters for measurement current in mA.	Range 0-50mA.	1
2	Volumetric counter (for measurement of water) OR Portable Flow meter of Mechanical Type.	0.5 inch dia, Range 0-100 m ³ and min resolution:0.01 m ³	1
3	Volumetric counter (for measurement of water) OR Portable Flow meter of mechanical type.	2 or 3 inch dia, range 0-100 m ³ , min resolution:0.01 m ³ and Type-Mechanical	1
4	Volumetric counter (for measurement of oil) OR Portable Flow meter of Mechanical Type.	0.5 inch dia, Range 0-100 m ³ and min resolution:0.01 m ³	1
5	Hose for water	Hose of 0.75 inch dia. OR suitable for 0.5 inch flow meter of length 100m.	1
6	Hose for water	Hose of 2 or 3 inch dia, OR suitable for 2 or 3 inch dia, flow meter of length 100m.	1

7	Hose for oil	0.75 inch dia. OR suitable for 0.5 inch flow meter (oil) of length 50m.	1
8	Submersible water pumps for draining water from tanks.	Capacity 1Hp OR 2 Hp.	1

31. **Contract period:** 18 Months.

32. **Validity period of contract:** As per work schedule.

33. **Parallel contract:** No.

34. **Responsibility Matrix:** As per Annexure-II.

Note: Blanks for Manhole covers and Penetrations (Subcontractor is allowed to use blanking material i.e. material grade and thickness as per drawing). for MBt all opening should be closed by subcontractor including MBT flap opening. All type of MBT openings to be closed by bend plates/ including welding to be done by subcontractor. All testing blanks to be returned by subcontractor to MDL after completion of pressure test.

NOTE: Testing procedure given by EY-Design Dept. to be followed for Sanitary Tank and PPCT (PORT & STBD). All blanks, jigs and fixtures has to be arranged by Subcontractor as per drawing.

For a water test (pressure greater than 1 bar), pressure is to be measured at lowest available point. Pressure is to be measures using pressure gauge/U-tube manometer. All pressure testing measuring tools to be calibrated from NABL approved lab.

ANNEXURE-I

Procedure for leak test and pressure test of tanks:

12. Install the test equipment on vent pipe
13. Put necessary blanks and pressurize tank as per PTRH (Pressure testing and Rinsing Handbook) and PTP (Particular Test Protocol)
14. MDL QA representative shall be present during test.
15. Valve Position during & after Leak Test should be as per details mentioned in PTRH/Work Instruction
16. Check tank for any kind of leakages. Rectify, if any and re-do the test.
17. Ensure no leakages.
18. After test, remove testing equipment from vent pipes
19. Fill up inspection sheet in specified format.
20. Empty tank after completion of leak test
21. Inspection of tanks after drying will be as per QAP
22. Close the manhole and bend the lock washer

Responsibility Matrix

Sr. No	Work Description	Responsibility	
		MDL	Contractor
1	Submission of QAP within 4 days.		Subcontractor
2	Approval of QAP from D-EY.		Subcontractor
3	Definition of work schedule and signoff with mutual agreement of subcontractor.	User dept.	Subcontractor
4	Handing over of drawings/specifications/standards/WI's/protocols etc relevant to the job to be executed.	User dept.	
5	Mobilizing work force and requisite tooling for the work.		Subcontractor
6	Security formalities for Gate pass (Including PVR) for fitters.		Subcontractor
7	Providing Site clearance for testing.	User dept./WI	
8	Procurement of material for blanking ,rubber gaskets, tools and equipment for pressure testing.		Subcontractor
9	Preparation for the tank testing as per defined schedule.		Subcontractor
10	Cleaning of tank before tank testing.		Subcontractor
11	Inspection calls at various stages as per QAP.		Subcontractor
12	Completion of the tank testing as per the WI and drawing.		Subcontractor
13	Draining of tank after completion of tank pressure testing .		Subcontractor
14	Inspection of tank as per calls/QAP at Various stages/ Issue of Inspection clearance	QA-EY	
15	Release of Work Completion Certificate (WCC) & Reconciliation certificate if applicable.	User Department	
16	Submission of Invoice Documents as per order		Subcontractor

L) DEGUTTING, OUTFITTING AND TESTING OF PROVISIONAL COLD STORE.

Sr. No	Description of Work/Job
1.	Degutting /dismantling/removal of insulation metallic panels, racks, doors, hatches and ladder of cold store. Renewal of insulation. Fabrication, renewal and refit of metallic panels. Repair and refit of racks. Leak test and heat input test of cold store .

This scope includes degutting, outfitting and testing of refrigerated room, deep freeze room and handling room. The following are the detailed activities to be carried out.

- r. Dismantling and removal of doors (3nos) and hatches (1nos), ladder and handles retaining wooden frames from cold store
- s. Dismantling and removal of racks inside cold store.
- t. Removal and refit of piping, cables connected engineering and electrical equipment are in MDL scope.
- u. Dismantling and removal of entire SS panels including drips trays of coolers and opening between rooms from cold store.
- v. Removal and cleaning of entire insulation inside cold store retaining wooden framing.
- w. Survey and repair of wooden framing for insulation and wooden frames of doors and hatches will be in subcontractor's scope. If there is a requirement for wholly or partial renewal of wooden frame this will be in contractor's scope.
- x. Survey, repair and renewal of supports for insulation wooden framing will be in subcontractor's scope.
- y. Subcontractor should undertake fixing of insulation after chipping, blasting, repair, renewal and painting of cold and cool room tank top and bulkheads. Blasting, survey, repair of structural plates and painting activities will be in MDL scope.
- z. Fabrication and fitting of complete SS metallic panels. Renewal of SS trays for coolers (2nos) will be in subcontractor's scope. Drilling tapping of holes for pipelines and equipment on SS panel or supports below if any is in subcontractor's scope. Refit of ladder and handles are in subcontractor's scope.
- aa. Installation of doors and hatches of cold room after repairs. Gaskets to be renewed. Due repairs to be under taken for hinges and locking arrangements of doors and hatches.
- bb. Carry out chalk and tightness test after installation of doors and hatches.

- cc. Carry out heat input test of refrigerated room and deep freeze room separately. Heating transformers and all equipment's for heat input test will be in subcontractor's scope.
- dd. Survey ,repair and refit of racks inside cold and cool room.
- ee. All materials including SS sheets and fasteners are in subcontractor's scope.
- ff. Blasting, survey, repair of structural plates and supports, painting activities if any will be in MDL scope.

MAIN DRAWINGS

SR. NO	DRG. NO.	DISCRIPTION	REMARKS
1.	186/1846-01-00-00	General arrangement	
2.	186/1846-02-00-00	Provisional cold store.	

2. **Work Duration**. The work period will be two months for degutting. Renewal of insulation, metallic paneling, installation doors, hatches, ladder will be completed within 1 years from the date of placement of order. Work period for Heat input test will be 15 months from date of placement of order. Repair and refit of racks will be 18 months from date of placement of order. Contract validity- 24 months.
3. **Responsibility Matrix**: As per Annexure-2.
4. **Rate Sheet**: As per Annexure-3.
1. **Parallel Contract**. No.

Annexure-2

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>

6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Degutting, renewal of insulation, metallic panels, fit-up of doors ,hatches, ladders, heat input test, repair and refit of racks.		<input type="checkbox"/>
9	Forming/ bending of plates wherever required		<input type="checkbox"/>
10	Transportation of any kind required for work		<input type="checkbox"/>
11	Crane facility in MDL	<input type="checkbox"/>	
12	Preparation of QAP & approval from RMT		<input type="checkbox"/>
13	Call for inspections		<input type="checkbox"/>
14	Arranging Inspection	<input type="checkbox"/>	
15	Blasting and priming	<input type="checkbox"/>	
16	Arranging NDT (Except qualification of welders)		<input type="checkbox"/>
17	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
18	Issue of WCC	<input type="checkbox"/>	
19	Submission of invoices for payment		<input type="checkbox"/>
20	Payment for work carried out	<input type="checkbox"/>	

Sr. No	Description of Work/Job
1	Degutting /dismantling/removal of insulation metallic panels, racks, doors, hatches and ladder of cold store. Renewal of insulation, metallic panels. Installation of doors and hatches .Tightness test and chalk test of doors and hatches.
2	Heat input test of cold store.
3	Repair and renewal of Racks

M) DEGUTTING, SURVEY, REPAIR, RENEWAL AND REFIT OF DECK PLATFORMS, PLATES, FRAMES AND SUPPORTS

Sr. No	Description of Work/Job
1.	Degutting ,survey, repair, renewal and refit of deck platform, plates ,frames ,supports and fittings

This scope includes degutting, survey, repair, renewal and refit of deck platform, plates, frames and supports as per the below mentioned drawings.

1. This scope includes all metallic plates, GRP plates, aluminum plates, frames angles and supports in torpedo area (sec42), Crews accommodation (sec41), officer's cabin port and STBD, WC, FWD bath, ward room, CO's cabin, Galley, Walk way in accommodation(sec31&32), CIC(sec31), Radio room, Control (sec31) room and Engine room (sec10 &20)
2. Dismantling and removal of all deck plates supports, frames and angles from onboard submarine to shop floor as per drawings listed below. Proper tallies indicating drawing number and part number should be tied with each parts before removal.
3. All AH36/SBST/ aluminum deck plates frames and supports to be handed over to MDL designated subcontractor for blasting before survey. Blasting and painting will be in MDL scope. But handing over and taking over of material for blasting and painting through proper MDN will be in contractor's scope.
4. All GRP plates to be offered for survey after removal of old linoleum sheets and SS strips.
5. Survey of all the above parts to be offered to EY-QA and SRMT. Result of survey to be tabulated in an excel sheet and submit both hard copy and soft copy to MRLC-Hull.
6. Repair of metallic deck plates and frames to be under taken as per survey report. consider weld buildups grinding in AH36/SBST plates frames and supports. Cracks on aluminum frames to be welded. Missing supports, frames, aluminum checkered plates and angles to be fabricated (consider 5%). Complete deck plates and frames of WC and forward bath to be renewed. All fittings such as hinges, ball gauge, handles to be renewed.
7. Linoleum sheets and SS strips to be renewed for all GRP deck plates which are cleared for reuse after survey. New GRP plates to be made for rejected pieces and linoleum sheets and SS strips to be fixed. Consider 50 nos of GRP deck plates for renewal.
8. Cutting or drilling of slots for pipelines and equipment on angles, frames or supports if any are in subcontractor's scope.
9. All materials including GRP plates, SBST/ AH 36 plates, aluminum checked plate, aluminum/SBST/AH36 angles, linoleum sheets and SS plates for corner strips and fasteners are in subcontractor's scope.

10. After repair and renewal refit the entire deck platform and offer to EY-QA and SRMT.

11. Painting and insulation activities if any will be in MDL scope.

MAIN DRAWINGS

SR. NO	DRG. NO.	DISCRIPTION
1.	186/1637-01-00-00	General arrangement floor plates
2.	186/1637-05-00-00	FLOOR PLATES IN THE CIC
3.	186/1637-18-00-00	FLOOR IN CONTROL ROOM S.B. - SIDE
4.	186/1637-22-00-00	FLOOR PLATES IN THE DIESEL MONITORING AREA AND THE SWITCHBOARDS AREA
5.	186/1637-28-00-00	PLATING FOR COOLING SET
6.	186/1637-30-00-00	COVERING IN ACCOMMODIATION AREA
7.	186/1637-27-00-00	PLATING FOR LIVING ROOMS FORWD. OF PT BULKHEAD
8.	186/1637-32-00-00	FLOOR IN TORPEDO TUBES AREA
9.	186/1612-02-00-00	DECK COVERRING IN THE LIVING QUATER
10.	186/1936-02-00-00	DECK COVERRING IN THE RADIO ROOM
11.	186/1637-26-00-00	COVERING IN CREWS ACCOMMODIATION AREA PORT AND STARB.
12.	186/1637-29-00-00	COVERING FOR BATH. WC AND AIR CONDITIONING EQUIPMENT ROOM
13.	186-1637-06-00-00	AFT Engine room
14.	186-1637-02-00-00	Floor plates and splash protection above coupling
15.	186-1637-09-00-00	Floor plates near propulsion motor PS-STBD
16.	186-1637-03-00-00	Floor plates on propulsion motor PS-STBD
17.	186-1637-07-00-00	Floor plate near diesel engine 3&4
18.	186-1637-08-00-00	Floor plate in-between diesel engine
19.	186-1637-15-00-00	Floor plate near K2 unit
20.	186-1637-21-00-00	Floor plate between diesel engine and hydraulic station

21.	186-1637-31-00-00	BEHIND MSB
22.	186/1612-05-00-00	HAND HOLE COVER IN ACCOMMODATION DECK
23	186/1637-16-00-00	FLOOR PLATE FOR TO TRANSP. SYSTEM RESERVE
24.	186/1637-35-00-00	COVERING IN LIVING ROOM SB
25.	186/1637-36-00-00	COVERING IN LIVING ROOM PORT SIDE

GENERAL TERMS AND CONDITIONS

- 1 **Work Duration.** The work period will be six months for degutting, survey, renewal, Repair of deck plates, platforms and support. Installation will be completed within 2 years from the date of placement of order. Contract validity- 24 months.
- 2 **Responsibility Matrix:** As per Annexure-2.
- 3 **Rate Sheet:** As per Annexure-3.
- 4 **Parallel Contract.** No.

Annexure-2

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>
6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Fabrication degutting, survey, repair, renewal and refit of deck platforms, supports and frames.		<input type="checkbox"/>
9	Forming/ bending of plates wherever required		<input type="checkbox"/>
10	Transportation of any kind required for work		<input type="checkbox"/>

11	Crane facility in MDL	<input type="checkbox"/>	
12	Preparation of QAP & approval from RMT		<input type="checkbox"/>
13	Call for inspections		<input type="checkbox"/>
14	Arranging Inspection	<input type="checkbox"/>	
15	Blasting and priming	<input type="checkbox"/>	
16	Arranging NDT (Except qualification of welders)		<input type="checkbox"/>
17	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
18	Issue of WCC	<input type="checkbox"/>	
19	Submission of invoices for payment		<input type="checkbox"/>
20	Payment for work carried out	<input type="checkbox"/>	

N) DEGUTTING AND RENEWAL OF COMPLETE METALLIC PANELING AND TRAYS INSIDE GALLEY LOCKERS

Sr. No	Description of Work/Job
1.	Degutting ,new fabrication and fitting of complete metallic paneling and trays of galley lockers

This scope includes degutting, new fabrication and fitting of complete paneling and trays of galley lockers as per the drawings mentioned below.

1. Dismantling and removing all metallic panels and trays inside galley.
2. Removal and refit Switch boards, transformers, electrical equipment will be in MDL scope. Connecting SS panels for such equipment are in sub-contractor's scope
3. Removal and renew and refit galley refrigerator, tilting boiler, cooking range, wash basin, are in subcontractor's scope. Procurement of tilting boiler, cooking range and galley in subcontractor's scope.
4. All pipe lines including taps are in MDL scope.
5. Drilling of holes for pipelines and equipment on metallic panels if any is in subcontractor's scope.
6. All materials including SS sheets and fasteners are in subcontractor's scope.
7. Painting and insulation activities if any will be in MDL scope.
8. Remove, renew and refit galley door with lock and handle.

9. All locks and handles of galley to be renewed as per drawings listed.

MAIN DRAWINGS

SR. NO	DRG. NO.	DISCRIPTION
1	1841-01-00-00	General arrangement of galley
2	1841-02-00-00	Attachment of galley equipment to pressure hull
3	1841-03-00-00	Attachment of galley equipment to transverse bulkhead.
4	1841-05-00-00	Installation drawings of galley metallic panels trays and lockers and equipment.
5	1841-06-00-00	Installation drawings of galley metallic panels ,trays , lockers and equipment.
6	1811-05-00-00	DOOR FOR GALLEY

GENERAL TERMS AND CONDITIONS

1. **Work Duration.** The work period will be one months for degutting. Renewal of metallic paneling and lockers will be completed within 1 years from the date of placement of order. Contract validity- 24 months.
2. **Mobilization.** Firm is to mobilize manpower within 7 days of order placement for welder qualification and fabrication work. Failing with which is liable for LD.
3. **Responsibility Matrix:** As per Annexure-2.
4. **Rate Sheet:** As per Annexure-3.
5. **Performance Bank Guarantee:** Applicable.
6. **Parallel Contract.** No.

Annexure-2**RESPONSIBILITY MATRIX**

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>
6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Degutting, fabrication and renewal of metallic panels and lockers.		<input type="checkbox"/>
9	Forming/ bending of plates wherever required		<input type="checkbox"/>
10	Transportation of any kind required for work		<input type="checkbox"/>
11	Crane facility in MDL	<input type="checkbox"/>	
12	Preparation of QAP & approval from RMT		<input type="checkbox"/>
13	Call for inspections		<input type="checkbox"/>
14	Arranging Inspection	<input type="checkbox"/>	
15	Blasting and priming	<input type="checkbox"/>	
16	Arranging NDT (Except qualification of welders)		<input type="checkbox"/>
17	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
18	Issue of WCC	<input type="checkbox"/>	
19	Submission of invoices for payment		<input type="checkbox"/>
20	Payment for work carried out	<input type="checkbox"/>	

**O) SCOPE OF WORK FOR INSIDE PRESSURE HULL AND ACCOMODATION
OUTFITTING.**

1. This work can be classified in 2 categories as below mentioned below.
 - a) In category I mark the job elements on board with permanent proper marking or tally as per latest reference drawings. Survey in presence of RMT and QC, remove the elements, store the items with proper traceability marks for easy retrieval, repair as per survey report. Carry out on board installation as per latest revised reference drawings and inspection by QA and RMT as per latest QAP.
 - b) In category II mark the job elements on board with permanent proper marking or tally as per latest reference drawings, remove the elements, handed over to store with proper marking. Renew the removed job elements for on board installation as per reference drawings and inspection by QA and RMT as per latest revised QAP.
2. According to DL SOW the following items to be covered.
 - a) Item1: Carry out complete survey, renew wooden panelling in cupboards as per wherever required. (Perforated sheets to be replaced covering 100% of the area).
 - b) Item2: Remove the old stowage boxes mentioned as per GA drg 186-9120-03-00-00 and manufacture as per drg 186-9199-04-00 and complete the installation of ten (10) stowage boxes on board as per customer requirement.
 - c) Item3: Remove, Manufacture and install ten (10) pieces dip trays on wash water/drinking water pumps. (SS to provide details).
 - d) Item4: Carry out removal of all bunks (40). Bunks to be renewed and install on board with respect to latest revised drawings.
 - e) Item5: Remove, renew mattress, covering and completion of onward installation as per latest revised drawings.
 - f) Item6: Replacement of partition covers and curtains. Fire Retardant cloth to be used.
 - g) Item7: Remove, repair and refit chart table. All locks to be renewed.
 - h) Item8: Replacement of table tops in accommodation areas.
 - i) Item9: Renew 10 Operators Chairs.
 - j) Item 10: Renew locks and handles in all compartments and galley.
 - k) Item 11: Six (6) pieces wooden grating for WC, wash space and Q1-Q2 space to be renewed.
 - l) Item 12: One (1) piece captain's chair in CIC and one (1) piece captain's chair for captain's office to be renewed.
 - m) Item 13: Manufacture wooden grating of bridge and bilge spaces as per specifications. Approximate area 4m². SS to provide drawings, templates, samples or specifications as required and liaise.
 - n) Item 14: Upgrade all furniture fittings as per IHQ Norms. Inspection Report to be submitted. Habitability Package Upgrade as per IHQ MoD (N) norms.
 - o) Item 15: Manufacture two (2) pieces additional trays under K1 and K2 filter.
 - p) Item 16: Remove One (1) piece small domestic refrigerator with foundation, renew and refit (commercial type).

Note on storage: Securing and safety of stowed items in the provided space be ensured by Sub contractor.

Following is required for carpentry related work.

- a. **Manpower.** In case of any welding activities for installation of stowage boxes, dip trays, metallic racks to be done, Man power also to be qualified for welding. gas cutting, grinding related activities.
- b. **Experience.** Firm needs to have similar experience of Carpentry and fabrication related work.

MDL'S SCOPE

q) Drawings and documents.

- a. All drawings required for fabrication and on board outfitting activities. The details of the same is as tabulated below-

WOODEN PANELING IN COMPARTMENTS (ANNEXURE 1)

Sl no	Description	Drawing number
1	WALL CUPBOARD IN COMMANDER ROOM AND OFFICER'S MESS ATTACHMENT TO PRESSURE HULL AND DECK	186/1721-04-00-00
2	WALL CUPBOARD IN CREW'S QUARTER PORT ATTACH. TO PRESS HULL A. DECK	186/1725-03-00-00
3	WALL CUPBOARD IN CREW'S ATTACHMENTS PRESSURE HULL AND DECK	186/1725-04-00-00
4	WALL CUPBOARD OFFICER'S SLEEPING ROOM 9B. AND STB. ATTACHMENTS TO PRESSURE HULL AND DECK	186/1725-05-00-00
5	WALL CUPBOARD IN COMMANDER'S CABIN	186/1721-03-00-00
6	WALL CUPBOARD FOR OFFICER'S WARDROOM	186/1721-02-00-00
	ARRANGEMENT IN COMMANDING OFF'S CABIN	186/1721-01-00-00

7	WALL CUPBOARD IN OFFICERS'S SLEEPING ROOM PORT AND STARBOARD	186/1722-01-00-00
8	WALL CUPBOARD IN CREW'S QUARTER STARBOARD	186/1725-02-00-00
9	WALL CUPBOARD IN CREW'S QUARTER PORT	186/1725-01-00-00

WOODEN PANELING IN COMPARTMENTS (ANNEXURE 2)

10	WOODEN LINING FOR CEILINGS	186/1671-04-11-00
11	LINING IN COMMONDER CABIN AND OFFICER MESS (WARD ROOM)	186/1712 -01-00-00
12	CROSS BULKHEAD LINING CREW QUARTERS	186/1712 -03-00-00
13	WARDROOM CEILING	186/1712 -06-00-00
14	COMMANDER CABIN CEILING	186/1712 -07-00-00
15	LINING OF OFFICER CABIN PORT AND STBD	186/1712 -08-00-00
16	LINING OF OFFICER CABIN PORT SIDE	186/1712 -09-00-00
17	LINING OF OFFICER CABIN STBD SIDE	186/1712 -10-00-00

BUNKS (ANNEXURE 3)

18	BUNK NUMBER PLATES	186/1667-03-00-00
19	ARRANGEMENT OF BUNKS DETAILS	186/1713-02-00-00
20	HOUSING FOR BUNK LAMP	186/1713-19-00-00
20	FOLDING BUNK PARTITIONS	186/1713-41-00-00
21	BUNK	186/1713-03-00-00
22	BUNK ATTACHEMENTS PIECES WITH ROLLER BEARING	186/1713-03-10-00
23	GUIDE RAILS FOR BUNKS	186/1713-04-00-00
24	SPARE BUNKS	186/1713-34-10-00

25	INSTALLATION-DRAWING FOR SPARE BUNKS	186/1713-34-00-00
26	MATTRESSES AND ACCESSORIES FOR SPARE BUNKS	186/9136-10-00-00
27	BUNK-CURTAINS	186/9136-04-00-00
28	PACKING ABOVE FOLDING BUNK-WALL	186/9136-14-00-00
29	MATTRESSES AND ACCESSORY	186/9136-03-00-00

MOVABLE WALLS (ANNEXURE 4)

30	MOVABLE LONGITUDINAL - WALLS , PORT	186/1711-01-00-00
31	SUPPORTS AT FRAME LINING FOR MOVABLE WALLS	186/1711-06-00-00
32	GUIDE RAILS FOR MOVABLE WALLS	186/1711-06-10-00
33	SLIDING BRACKETS FOR MOVABLE WALLS	186/1711-07-00-00
34	AIR DUCTS FOR MOVABLE LONGITUDINAL - WALLS , PORT AND STBD	186/1711-01-10-00
35	MOVABLE LONGITUDINAL - WALLS , STARBOARD	186/1711-02-00-00
36	DECK MARKINGS FOR MOVABLE WALLS	186/1711-05-00-00
37	OPERATING INSTRUCTIONS FOR MOVABLE LONGITUDINAL WALLS AT TORPEDO LOADING	186/1711-12-00-00
38	ARRANGEMENT OF LOCKING HOOK FOR MOVABLE LONGITUDINAL WALLS	186/1711-04-00-00
39	FOLDING WALL	186/1711-03-00-00

CURTAINS (ANNEXURE 5)

40	PARTITIONING CURTAINS	186/9136-02-00-00
41	CURTAINS AND ACCESSORIES FOR SPARE BUNKS	186/9136-08-00-00

42	CURTAINS IN ACCMMODATION	186/9136-01-00-00
43	CURTAINS BEHIND OPERATORS CHAIR CIC	To be provided by D-EY

WASH BASIN (ANNEXURE 6)

43	INSTALLATION WASHBASIN COMMANDER'S CABIN	186/1754-02-00-00
44	LAVATORIES FOR OFF AND CREW	186/1751-01-00-00
45	WASH BASIN FOR WC	Renew as per old wash basin and locker below.
46	WASH BASIN FOR FORWARD WASH ROOM	Renew As per IN requirement.

WRITING DESK (ANNEXURE 7)

	WRITING DESK FOR CONTROL ROOM	1837-01-00-00
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KEY LOCKER (ANNEXURE 8)

46	KEY LOCKER	1899-01-00-00
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DOORS (ANNEXUR 9)

47	DOORS FOR LIVING – ROOM (4nos)	1811-07-00-00
56	DOOR BETWEEN CONTROL ROOM AND C.I.C.	1811-04-00-00

COVERING ABOVE DOOR CREW'S WASHROOM

46	COVERING ABOVE DOOR CREW'S WASHROOM	1751-04-00-00
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PAPER BASKET (Annexure -10)

62	GENERAL ARRANGEMENT PAPER BASKET	9136-12-00-00
63	PAPER BASKET	186/9136-05-00-00

GRATING (Annex-11)

62	BRIDGE GRATING	186/1638-02-00-00
63	WOODEN GRATING FOR BATTERY ROOM HATCHWAYS	186/1938-01-00-00
64	WOODEN GRATING FOR WC	186-1938-02-00-00

TABLE (Annex-12)

65	Chart table	186/1832-01-00-00
66	TABLE FOR OFF. MESS	186/1713-11-00-00
67	TABLE FOR CREW'S MESS	186/1713-12-00-00

SOFA (Annex-13)

66	SOFA FOR OFFICER WARD ROOM	186/1713-16-00-00
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STOWAGE BOX(Annex-14)

67	Stowage Box	186/9199-04-00-00
68	Stowage Box	186-9120-03-00-00

DRIP TRAY (Annex-15)

71	drip tray	As per old tray / suit at site.
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PORTABLE METALIC RACKS (Annex-16)

72	Portable metallic racks	1751-01-10-00 sample drawing.
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		Make as per customer requirement.
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FIRE EXTINGUISHER (Annex-17)

82	ARRANGEMENT AND HOLDER FOR FIRE EXTINGUISHER	186-9117-02-00-00
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WORK BENCH(Annex-18)

83	WORK BENCH	186-9225-01-11-00
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RADIO ROOM PERFORATED SHEETS (Annex-19)

84	Perforated plates in radio room	1672-02-00-00(POS-6 to 15)
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LOCKS AND HANDLE (Annex-20)

	DOORS FOR LIVING - ROOM	1811-07-00-00
	MOVABLE LONGITUDINAL - WALLS , STARBOARD	1711-02-00-00
	WALL CUPBOARD FOR OFFICER'S WARDROOM	1721-02-00-00
	WALL CUPBOARD IN COMMANDER'S CABIN	1721-03-00-00
	ARRANGEMENT IN COMMANDING OFF'S CABIN	1721-01-00-00
	WALL CUPBOARD IN OFFICERS'S SLEEPING ROOM PORT AND STARBOARD	1722-01-00-00
	ARRANGEMENT OFF. - CABIN PORT	1722-03-00-00
	ARRANGEMENT OFFC. - SLEEPING ROOM STB.	1722-04-00-00
	WRITING DESK FOR CONTROL ROOM	1837-01-00-00
	KEY LOCKER	1899-01-00-00
	WORKBENCH	9225-01-11-00

	SOFA FOR OFFICERS WARDROOM	1713-16-00-00
	SEATS IN RADIO ROOM	1837-03-17-00
	INSTALATION DRAWING FOR GALLEY EQUIPMENT (HOLDER FOR TIN OPNER)	1841-06-00-00
	HOLDERS IN SMALL ARMS LOCKER	1892-01-00-00
	SECRET LOCKER IN COMMANDERS COMPARTMENT	1897-01-00-00
	MOVABLE LONGITUDINAL - WALLS , STARBOARD	1711-02-00-00
	DETACHED WARDROBE	1713-14-00-00

CHAIRS(Annex-21)

	ARRANGEMENT AND INSTALLATION DRAWING OF OPERATOR SEATS	186/1837-03-00-00
	CAPTAIN CHAIR	186-5000-03-00-00
	CONTROL ROOM SEAT	186/1837-03-13-00
	SEATS IN RADIO ROOM	186/1837-03-17-00
	FOLDING SEAT. (CONTROL ROOM)	801/1837-05-00-00

b. any other drawings, reference drawings or installation procedures required for fabrication and on board installation other than mentioned above is to be provided by MDL.

r) **Material.**

- a. Carpenter material like sun mica sheet, hardware materials, favicol etc. wherever required will be in decided by LST-Planning and Commercial scope.
- b. In case of welding job to be done on board for jobs stowage boxes, dip trays, metallic racks all consumable items for required job is in the scope of sub-contractor.

s) **Facility.**

- a. Technical guidance to complete the job to the satisfaction of MDL-QA and Refit Monitoring Team (SRMT) during fabrication of carpentry related work. However, this shall not absolve the contractor of his responsibility related to quality, warranty, and schedule / time completion etc.
- b. Assistance in arrangement of gate passes.

SUB-CONTRACTOR'S SCOPE

t) Job Description.

- a. Procurement of all materials as per drawing and part list are in subcontractor's scope.
- b. All materials, fittings like locks, handles, hinges, cut parts, fasteners as per the listed drawing and part list are in subcontractor's scope. Subcontractor should produce test certificate, relevant documents of all the materials as per specification given in drawing. Subcontractor should offer materials for inspection as per QAP to EY-QA and SRMT.
- c. The on board installation instructions/procedure/sequence of operation and inspection details as laid down in the Drawing /QA requirement should be strictly adhered to QAP and TM.

GENERAL TERMS AND CONDITIONS

- u) **Work Duration.** The work period will be ten weeks for the fabrication and machining from the placement of order. Contract validity- 12 months.
- v) **Mobilization.** Firm is to mobilize manpower within 7 days of order placement for welder qualification and fabrication work. Failing with which is liable for LD.
- w) **Responsibility Matrix:** As per Annexure-2.
- x) **Performance Bank Guarantee:** Applicable.
- y) **Free Issue Material:** Any material is required to be taken outside MDL by subcontractor, same will be allowed only on submission of FIM-BG. The cost of FIM-BG will be provided on case to case basis & on as and when required basis.
- z) **Parallel Contract.** No.

Annexure-1

SAMPLE QAP

NAME OF FIRM (Letter Head)								
Mazagon Dock Shipbuilders Ltd. Design-East Yard	Quality Assurance Plan for Project: _____	PO. No.:-			Document No. _____	Issue No.:- Date :-		
		Date :-						
<u>Function</u> :-								
Sr. No.	Description	Type of Inspection	Quan tum of check	Reference Document	Firm	MDL- QA	RMT (Mb)	Remark
1								
2								
3								
4								
Note:- All the measuring equipment must be dully calibrated/ tested with valid certificate and should be produced whenever asked.								
P= PERFORM V= VERIFY RW = RANDOM WITNESS R = REVIEW (Means physical check The system and verify)								
_____ Prepared by (Supplier Seal)			_____ Reviewed and Approved by MDL (Design-EY)			_____ Concurred By SRMT (Mb)		

Note: - The plan given above is indicative only. Detailed QA Plan for individual items should be prepared in the same format and submitted to QA-EY for approval prior to commencement of job.

Annexure-2**RESPONSIBILITY MATRIX**

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>
6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Fabrication of wall cupboards		<input type="checkbox"/>
9	Transportation of any kind required for work		<input type="checkbox"/>
10	Crane facility in MDL	<input type="checkbox"/>	
11	Preparation of QAP & approval from RMT		<input type="checkbox"/>
12	Call for inspections		<input type="checkbox"/>
13	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
14	Issue of WCC	<input type="checkbox"/>	
15	Submission of invoices for payment		<input type="checkbox"/>
16	Payment for work carried out	<input type="checkbox"/>	

Annexure-3

Sr. No.	Description of Work/Job
1	Removal, Survey, repair ,sunmica sheet renewal ,refit of wooden panelling as per Annex-1,2
2	Cutting of new Plywood, fixing of sun mica sheet and refit of wooden panelling as per drg annex-1,2 and survey report. (rate/m2)
3	Removal, fabrication of 40 bunks ,installation on board as per drg annexure -3
4	Removal, fabrication of 10 drip trays and two (2) pieces additional trays under K1 and K2 filter as per suit at site, as per annexure-20 as per suit at site on wash water /drinking water pumps ,installation on board and rate as per tray
5	Removal, renewal of 10 operators chairs as per drawing,2 captain chairs as per customer requirement in the CIC and CO room ,installation on board as per drg annexure-21 and customer requirement
6	Removal, renewal of table tops in accommodation areas as per drg annexure-12
7	Remove the old stowage boxes mentioned as per GA drg 186-9120-03-00-00 and manufacture as per drg 186-9199-04-00 and complete the installation of ten (10) stowage boxes on board as per customer requirement
8	Removal mattress, coverings, partition covers, fire retardant cloth as per drg. Annexure-5,3
9	Removal, renewal of 6 pieces of wooden gratings for WC,Wash space ,Q1-Q2 space ,Bridge and bilge spaces as per suit at site and drg annexure-11, rate as per square meters
10	Remove, Renewal of locks and handles in all compartments as per drg.annexure-20
11	Remove, renew paper box ,refit as per drg annexure-10

12	Remove, repair fire extinguisher stand ,refit as per drg annexure-17.
13	Remove, renew of perforated plates inside radio room as per drg annexure -19
14	Remove, repair the chart table and refit as per drg annexure-12.
15	Remove, repair the work bench and refit as per drg annexure-18.
16	Remove, repair the movable wall metallic frames and refit as per drg annexure-4
17	Remove, repair, refit the writing desk as per drg annexure-7
18	Remove, repair, refit the key locker as drg annexure-8
19	Remove,renew,refit the wash basins in WC area and Forward toilet room as suit at site and drg annexure-6
20	Remove with foundation,renew and refit One (1) piece small domestic refrigerator to be renewed (commercial type).

P) SCOPE OF WORK FOR DEGUTTING, SURVEY, REPAIR, RENEWAL, INSTALLATION, PRESSURE TESTING AND TRIALS OF VENTILATION SYSTEM (P- SYSTEM)

Sr. No	Description of Work/Job
1	Degutting and survey of all ducts , fittings and clamps of ventilation, air regeneration and air treatment system as per TM 407
2	Repair of ducts of ventilation system as per survey report.
3	Renewal of ducts of ventilation system as per survey report.
4	Removal and renewal of insulation.
5	Removal and installation of valves and flaps as detailed below.
6	Installation of all ducts as per assembly drawings.
7	Pressure testing of ventilation air regeneration and air treatment system as per TM 407
8	Test and trials of ventilation air regeneration and air treatment system as per TM 407

This scope includes degutting, survey, repair, renewal, pressure testing, test and trials of ventilation, air regeneration and air treatment system as per TM 407, Schematic drawing, assembly drawing and fabrication drawing attached. The following activities are involved in this scope.

- a. Dismantling and removing all ventilation ducts (192 nos) along with fittings and clamps from on-board submarine to shop floor for survey.
- b. Proper tallies to be made for each material before renewal. List of removed material as per drawing to be made on a day to day basis and get it verified from Hull MRLC. After complete degutting total list of items removed and summary to be submitted to Hull MRLC.
- c. Remove insulation on ducts, clean to bare metal and offer for survey to QA-EY and SRMT.
- d. Prepare and submit a summary of survey based on survey reports in excel sheet along with soft copy to user HULL MRLC.
- e. Repair of ducts to be done by weld build-ups or patch works as per survey report. Consider 142 no's ducts approximately.
- f. Renewal of duct to be undertaken as per survey report and fabrication drawings. Approximately 50 ducts to be considered for renewal and others to be repaired.

- g. Fabrication and repair of ducts to be done at MDL premises. However, if any special facilities such as forming, bending required subcontractor may take material outside on MDN.
- h. Procurement of all materials and fasteners including SBST plates (1.5mm) as per drawing are in subcontractor's scope.
- i. Procurement of all consumables and welding electrodes except paint is in subcontractor's scope.
- j. After repair and renewal, all the ducts are to be pressure tested with 0.1 bar air at shop floor before installation. This pressure testing to be offered to QA-EY.
- k. After repair and renewal of ducts to be offered for inspection to QA-EY and SRMT.
- l. All ducts, fittings, rubber connectors and clamps to be installed on board as per assembly drawings. All rubber gaskets to be renewed.
- m. Installation inspection of each duct and fitting to be offered to QA-EY and SRMT.
- n. After installation inspection entire system to be pressure tested as per TM 407.
- o. Test and trials of ventilation air regeneration and air treatment system as per TM 407.
- p. Remove, renew & installation of pneumatically operated flaps P1, P2, P3, P5, P6, P7, P8, P9, P15 & P17 will be in subcontractor's scope. New flaps will be provided by MDL.
- q. Remove, new installation of hydraulically & pneumatically operated valves P-33, P34 and P35 is in subcontractor's scope. New P33, P34, P35 valves will be provided by MDL. Manual operation linkage of P33, P34, P35 valve to be removed, overhauled and refit.
- r. Remove, overhaul & installation of manually operated ventilation flaps P4, P11, P12, P13, P14, P16, P18 & P19 are in subcontractor's scope. All flexible linkages to be renewed.
- s. Remove, overhaul & installation of throttle flaps - P28, P29, P30 & P31 are in subcontractor's scope.
- t. Battery venting flaps inside battery pits to be completely renewed.
- u. All compensators to be renewed. New compensators will be supplied by MDL
- v. Survey all rubber connector and renew / repair as necessary, and refit.
- w. Remove and renew ninety- three (93) pieces Punkhalouvers and refit. New punkhalovers will be provided by MDL.

- x. Remove, overhaul and refit air regeneration plant clamping devices.
- y. Overhauling of testing cock and selector cock of air regeneration plant are in subcontractor scope.
- z. Fit up of testing cock, selector cock, flow meter with tubes of air regeneration plant are in sub-contractor's scope.
- aa. Fit up of dust filter (P116) and is in subcontractor's scope.
- bb. Blasting and Painting of ducts are in MDL scope.
- cc. Insulation of all ducts (Meselson sheet, fibre glass cloth and glue) are in subcontractor's scope. Procurement of insulation in subcontractor's scope.
- dd. Removal, overhauling and installation of ATU's K1, K2, K3, K4 and K5 are in MDL scope.
- ee. Inspection covers of all inbuilt ducts to be opened and the entire duct with opening covers to be offered for survey.
- ff. Chipping of old paint and blasting if required will be in MDL scope.
- gg. Removal of antiphon insulation inside air ducts will be in MDL scope.
- hh. Repair and renewal of plates of in build ducts to undertaken as per survey report.
- ii. All studs of inbuilt duct openings to be renewed as per survey report.
- jj. Opening covers of in build duct to be renewed or repaired as per survey report

MAIN DRAWINGS

SR. NO	DRG. NO.	DISCRPTION
1	4620-11-00-00	Schematic diagram ventilation system
2	4678-02-00-00	Assembly drg ventilation system Sec20
3	4678-03-00-00	Assembly drg ventilation system Sec31 &32
4.	4678-04-00-00	Assembly drg ventilation system Sec 41
5.	TM 407	Ventilation system air regenerating plant and air treatment system
8.	4678-07-00-00	Ventilation in Battery Room No1
9.	4678-08-00-00	Ventilation in Battery Room No2

10	1177-32-02-00	Only Inbuild Trunk of Battery Room No2 AFT (Fr 44759) to be considered from the drawing.
11	1175-42-01-00	Only Inbuild Trunk Battery Room No2 FWD (Fr 52600) to be considered from the drawing.
12	1176-31-05-00	Ventilation Trunking (FR30437 to FR35272 SB)
13	1176-33-01-00	Air trunk SB
14	1177-32-04-00	Vent Trunk STB PT BHD
15	1176-31-02-00	Only Inbuild Trunk from Inner Snorkel Valve to be considered from the drawing.
16	1176-31-04-00	Only Ventilation Trunk BHD 29580 (CIC) to be considered from the drawing.
17	1178-31-02-00	Ventilation Trunk Below MSB (Control Room Port Side)
18	1673-08-00-00	AIR DUCTS
19	4620-31-30-00	below CO's cabin

GENERAL TERMS AND CONDITIONS

5. **Work Duration**. The work period will be six months for degutting, survey, renewal, Repair and fabrication of ducts. Installation and pressure testing to be completed within 12 months from date of placement of order.
6. **Responsibility Matrix**: As per Annexure-2.
7. **Rate Sheet**: As per Annexure-3.
8. **Performance Bank Guarantee**: Applicable.
2. **Parallel Contract**. No.
3. **Rework**. Any rework arising due to MDL will be paid extra as per the man-days rates indicated in the rate sheet.

Annexure-2

RESPONSIBILITY MATRIX

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Arrangement of Gate pass for personnel		<input type="checkbox"/>
2	Issue of drawings and related documents required for execution of work	<input type="checkbox"/>	
3	Procurement of material		<input type="checkbox"/>
4	Slings, shackles, chain pulley, lifting clamps etc. required for lifting & shifting (Duly calibrated)		<input type="checkbox"/>
5	Special tool (if required).		<input type="checkbox"/>
6	Necessary tools, tackles and men required for fabrication		<input type="checkbox"/>
7	Fabrication of necessary jig/ fixtures along with material and consumable		<input type="checkbox"/>
8	Fabrication degutting, survey, repair, fabrication and installation of ducts. Installation ,pressure testing and test and trials		<input type="checkbox"/>
9	Forming/ bending of plates wherever required		<input type="checkbox"/>
10	Transportation of any kind required for work		<input type="checkbox"/>
11	Crane facility in MDL	<input type="checkbox"/>	
12	Preparation of QAP & approval from RMT		<input type="checkbox"/>
13	Call for inspections		<input type="checkbox"/>
14	Arranging Inspection	<input type="checkbox"/>	
15	Blasting and priming	<input type="checkbox"/>	

16	Arranging NDT (Except qualification of welders)		<input type="checkbox"/>
17	Preparation of Reconciliation statement & submission to MDL		<input type="checkbox"/>
18	Issue of WCC	<input type="checkbox"/>	
19	Submission of invoices for payment		<input type="checkbox"/>
20	Payment for work carried out	<input type="checkbox"/>	

Annexure-3

Sr. No	Description of Work/Job
1.	Degutting and survey of all ducts , fittings and clamps of ventilation, air regeneration and air treatment system as per TM 407
2.	Removal and renewal of insulation of all ventilation ducts (procurement of insulation material subcontractors scope)
2.	Repair of all ducts of ventilation system as per survey report.
3.	Renewal of all ducts of ventilation system as per survey report.
4.	Opening and boxing up of cover plates , survey (grinding, NDT, thickness gauging),complete stud renewal, repair by weld build-up of all inbuilt ducts and cover plates as per survey report.
5	Plate renewal for on-board for inbuilt ducts as per survey report (rate per m2)
6	Plate renewal of opening covers for inbuilt ducts as per survey report (rate per m2)
7	Install all ducts as per assembly drawings.
8	Removal and refit of compensators (procurement of MDL scope)
9	Survey all rubber connector and renew and refit. (material subcontractors scope)
10	Remove and renew ninety- three (93) pieces Punkah louvers and refit. (procurement of MDL scope)
11	Remove all pneumatically operated ventilation flaps: - P1, P2, P3, P5, P6, P7, P8, P9, P15 & P17. Renew and refit the following pneumatically operated ventilation flaps: - P1, P2, P3, P5, P6, P7, P8, P9, P15 & P17. (procurement of new flaps in MDL scope)

12	Remove and renew P-33, P34 and P35 hydraulically operated ventilation flaps. Manual operation linkages to be removed, overhauled and refit. Carry out manual, hydraulic operational trails of P33, P34,P35. Procurement of P33,P34,P35 valves are in MDL scope.
13	Remove, overhaul and refit the following manually operated ventilation flaps: - P4, P11, P12, P13, P14, P16, P18 & P19. Remove, refit and Overhaul various flexible drive linkages. Renew parts if necessary. Renew flexible linkages of P4,P11,P16,P18and P19
14	Remove, overhaul and refit the following throttle flaps:- P28, P29, P30 & P31.
15	Overhaul air regeneration plant clamping devices and testing cocks.
16	Renew the carbon dioxide canisters. (procurement in subcontractors scope)
17	Renew the differential pressure gauges P112 & P113 and connecting pipelines and fittings to static plate as per schematic drawing. (Procurement of differential pressure gauge in MDL Scope)
18	Renew the rough dust filter P116 and filters of all air temperature units. (procurement in MDL scope)
19	Renew the grease vapour separating plates in vapour vent in the galley and overhaul the vent.(Procurement of grease vapour separating plates will be in MDL)
20	Dismantle selector cock of air regenerating system to components. Inspect and carry out general overhaul as per TM ref and refit. (All spares are in subcontractors scope.)
21	Replace the tubes of flow meters of air regeneration plant.(Procurement of tubes in MDL scope.)
22	Pressure testing of ventilation air regeneration and air treatment system as per TM 407
23	Test and trials of ventilation air regeneration and air treatment system as per TM 407

Q) SCOPE OF WORK FOR REMOVAL AND FIXING INSULATION ON PRESSURE HULL, BULKHEADS, COMPARTMENTS & PIPING SYSTEMS OF SUBMARINE (MRLC-1) AT MDL/ND(MB)

ANNEXURE-1

Sr. No.	DESCRIPTION	QTY	Material
1	Pressure hull internal surface (engine room ,control room & CIC)	100 Sq.m.	Hard Foam ,Prodisol glue, Polylyte, MEKP

			hardner ,fibre glass mat
2	Pressure hull internal surface (accommodation)	100 Sq.m	Hard Foam
3	Pressure hull internal surface (accommodation)	100 Sq.m	GRP covering
4	<u>SOUND PROOF BULKHEAD</u> -Penetrations in sound proof bhd as per drg 186/1673-02-00-00	23nos	glass /Mineral wool covered with sandwich type plates
5	<u>INSULATION IN VENTILATION SY STEM</u> Ventilation duct/ pipes and fittings	200 Sq. mt.	Misselon sheet / hoses , asbestos cloth / fiber glass cloth, armafex adhesive
6	Insulation in air duct, radio room, air conditioning /cooling machinery room, inside stowage boxes, accommodation ceiling	70 Sq. mt.	self adhesive antiphone 40/25/10mm

Notes: WCC will be certified only for actual quantity/ area of job done.

1) MDL's scope

- i) All the drawings and relevant drawings and documents for insulation will be provided by MDL.
- ii) Staging if required will be provided by MDL.
- iii) Power supply (110V, 230V) will be provided at free of cost.
- iv) Compressed Air supply will be provided by MDL. However, Subcontractor has to arrange his own distribution box along with all accessories.
- v) Blasting & Painting of surface to be insulated is in MDL's scope

2) Sub contractor's Scope

- I. Subcontractor has to remove insulation and GRP cover plates as per annexure I. After removal of insulation the area to be cleaned from all traces of insulation
- II. Subcontractor has to prepare/clean surface as per procedure and get cleared from QA-EY & SRMT before starting insulation.

- III. Subcontractor should deploy one supervisor and minimum six qualified operatives with previous experience of insulation activities in surface ships or submarine.
- IV. Procurement of all insulation materials (except GRP covers sl no 3) at annexure I are in subcontractor's scope.
- V. Old GRP cover plates (sl no 3) to be removed safely without damage and keep safely to reused. Proper identification tally to be made for each cover plate before removal. All fasteners removed to be kept properly. All fasteners to be renewed. Procurement of all fasteners are in subcontractor's scope.
- VI. All tools required for the job including power tools such as pneumatic grinders, are in subcontractor's scope.
- VII. All consumables such as cotton waste, diesel or other cleaning agents are in subcontractor's scope.
- VIII. Calibrated inspection /measuring tools such as digital hygrometer, rubber hammer required for inspection are in subcontractor's scope.
- IX. Contractor has to arrange his own hose pipes & fittings for pneumatic power tools.
- X. Subcontractor has to keep record of all materials removed from different compartments. Reconciliation of material supplied to Contractor is in Contractor's Scope which is to be approved by user Dept (MRLC-EY)).
- XI. The contractor has to provide all safety gears and personal protective equipments to his employees and they have to follow safety rules and regulations.
- XII. All stage and final inspections will be carried out by QA(EY) and RMT. The defects /rectification after inspection to be carried out free of cost.
- XIII. Actual work done area will be certified by MRLC HULL based on the inspection reports duly signed by EY-QA and SRMT for WDC.
- XIV. **Work completion certificate (WCC):** Work Completion Certificate (WCC) shall be issued on satisfactory completion of respective work based on inspection and acceptance reports issued by QA-EY and RMT.
- XV. The subcontractor should handle all equipment with utmost care. Cost of any damage to the equipment and pipes caused by the subcontractor will be recovered from his bills.
- XVI. The subcontractor will be required to work in shifts duties including Sundays/ Holidays as and when required.

- XVII. The subcontractor may have to work at East Yard, MDL, and at Naval Dockyard after undocking of boat from MDL.


ANNEXURE-2

Responsibility Matrix for insulation

Sr. No.	Activity	Responsibility	
		MDL	Sub-contractor
1	Mobilization work		✓
2	Arrangement of Gate pass for personnel		✓
3	Provision of space in MDL for carrying out work	✓	
4	Arrangement of boxes with lockers for safety (for keeping tools & materials)		✓
5	Issue of drawings, Work Instructions, documents	✓	
6	Procurement of material & adhesive		✓
7	Removal of insulation and GRP covers from compartments		✓
8	Arrangement of transportation trips between MDL stores and sub-contractors premises		✓
9	Preparation of QAP & get it approval from EY design		✓
10	Call for inspections		✓
11	Arranging Inspection	✓	
12	Blasting and priming	✓	
14	Preparation of Reconciliation statement & submission to MDL		✓
15	Handover of balance /left over material		✓
16	Issue of WCC	✓	

17	Submission of invoices for payment		✓
18	Payment for work carried out	✓	
20	Tools and man power for fabrication		✓

Sample QAP for installation of Insulation

MAZAGON DOCK LTD.  EAST YARD	PROJECT - INS SHISHUMAR	DOCUMENT NO.			
	SAMPLE QUALITY PLAN	EY/QAP/ INS SHISHUMAR/	REV No.		
	SECTION -	Page 1 of 1	DATE:		
	HULL	CHECKED BY:			
Title: <i>Insulation</i> Pressure hull internal surface (engine room, control room & CIC)					
SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY- QA	SRM T
1	Surface cleaning	Visual inspection	186/1676-04- 00-00 186/1676-03- 00-00	W	
2	Application of K100	a) Visual inspection b) Humidity, air temp.	186/1676-04- 00-00 186/1676-03- 00-00	W	W
3	Fixing of Hard Foam	Visual Inspection	186/1676-04- 00-00 186/1676-03- 00-00	W	W
4	Fixing of fiber glass mat	Visual Inspection	186/1676-04- 00-00	W	W

			186/1676-03-00-00		
Title: <i>Insulation Pressure hull internal surface (accommodation)</i>					
SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface cleaning	Visual inspection	186/1671-05-00-00	W	
2	Fixing of Hard Foam	Visual inspection	186/1671-05-00-00	W	W
3	Fit up of GRP Covering	Visual inspection	186/1671-05-00-00	W	W
Title: <i>Insulation Cold store</i>					
SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface cleaning	Visual inspection	NA	SELF	SELF
2	Hard Foam	fitup		EY-QA	SRMT
3	Mineral wool	fit-up		EY-QA	SRMT
Title: <i>Insulation sound proof bhd</i>					
SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface before insulation	cleanliness	NA	SELF	SELF

2	Mineral Wool	fitup		EY-QA	SRMT
3	Sandwich Plate	fit-up		EY-QA	SRMT

Title: *Insulation ventilation system*

SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface before insulation	cleanliness	NA	SELF	SELF
2	Misselon sheet / hoses	fitup		EY-QA	SRMT
3	asbestos cloth / fiber glass cloth	fit-up		EY-QA	SRMT

Title: *Insulation inside rescue sphere*

SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface before insulation	cleanliness	NA	SELF	SELF
2	Back Isolation	fitup		EY-QA	SRMT

Title: *Insulation air duct, radio room, air conditioning /cooling machinery room, inside stowage boxes*

SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT

1	Surface before insulation	cleanliness	NA	SELF	SELF
2	self-adhesive antiphone 40/25/10mm	fit-up		EY-QA	SRMT
Title: <i>Insulation air-conditioning and refrigeration system</i>					
SR. NO.	DESCRIPTION	TYPE OF INSPECTION	REFERENCE DOCUMENT	INSPECTED BY	
				EY-QA	SRMT
1	Surface before insulation	cleanlines s	NA	SELF	SELF
2	Misselon sheet / hoses	fitup		EY-QA	SRMT
3	asbestos cloth / fiber glass cloth	fit-up		EY-QA	SRMT

SR. NO.	DESCRIPTION	QUANTITY
1	Pressure hull internal surface (engine room ,control room & CIC)	100 sq. m.
2	Pressure hull internal surface (accommodation)	100 sq.mt
3	Pressure hull internal surface (accommodation)	100 sq. mt.
4	SOUND PROOF BULKHEAD -Penetrations in sound proof bhd as per drg 186/1673-02-00-00	23nos
5	Insulation in air duct, radio room, air conditioning /cooling machinery room, inside stowage boxes	50 Sq. mt.

Removal of insulation is also included for SL no 1,2,3,5