

MAZAGON DOCK SHIPBUILDERS LIMITED

माझगांव डॉक शिपबिल्डर्स लिमिटेड

"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/SP/MRLC-2/ Hiring of services for piping and engineering work for Project-MRLC 2



माझगांव डॉक शिपबिल्डर्स लिमिटेड

MAZAGON DOCK SHIPBUILDERS LIMITED

Mumbai-10

# रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

**Corrigendum:3**

**Corrigendum-3 is issued for revision in SOW**

**NOTICE INVITING EXPRESSION OF INTEREST (EOI)**

**FROM REPUTED VENDORS FOR**

**HIRING OF SERVICES FOR PIPING AND ENGINEERING WORK FOR PROJECT-MRLC 2**

1. EOI Ref. No. : EY/CD/SP/MRLC-2/2022
2. Description : Hiring of services for Piping and Engineering work for  
Project-MRLC 2
3. Date of Issue of EOI : 30.03.2022
4. Last date for Submission of EOI : 29.04.2022
5. Extended date of Submission of EOI: **13.05.2022**



CERTIFIED

ISO 9001: 2008

for Submarine Division

माझगांव डॉक शिपबिल्डर्स लिमिटेड

MAZAGON DOCK SHIPBUILDERS LIMITED

(A govt. of India Undertaking) Dockyard Road,

Mumbai 400 010.INDIA

PHONE +91(22) 2376 2615

FAX No. - 91(22) 23741386

Website - www.mazdock.com

## रुचि की अभिव्यक्ति (ईओआई) का आमंत्रण

## "EXPRESSION OF INTEREST" (EOI)

EOI No: - EY/CD/SP/MRLC-2/2022 for Hiring of services for piping and engineering work for Project-MRLC

EOI date: 30.03.2022

CLOSING DATE : 29.04.2022, 12:00 Hrs, **Extended**  
**date 13.05.2022**

OPENING DATE :13.05.2022, 15:00 Hrs

**SUB: INVITATION OF "EXPRESSION OF INTEREST" (EOI) from Reputed Vendors with expertise in the field of Hiring of services for Piping and Engineering work for Project-MRLC**

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 piping and engineering work for Project-MRLC 2.

**SUB: Hiring of services for piping and engineering work for Project-MRLC**

**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. Brief Scope of work:**

MDL intends to outsource Refit work of SSK Class Submarine work of Naval Submarine (INS Shankush MRLC 2) for Engineering and Piping works on turnkey basis to be carried out inside MDL premises. MDL is floating EOI to explore suitable competent vendors to undertake the above job meeting the required quality and timelines

a) The broad scope of work for the EOI is as follows:

- i. Degutting
- ii. Storage with proper record keeping
- iii. Overhauling
- iv. Arrangement of Spares
- v. Installation
- vi. Pressure testing & Flushing of Piping systems
- vii. Setting to Work (STW)

b) Indicative work content is given in the following annexures

- i. Piping works - Annexure – 1
- ii. Engineering works - Annexure – 2

**2. Qualification Criteria:**

Bidders should have experience of PIPING AND ENGINEERING WORK on Submarines in the past 12 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas:

- a) Piping including pipe fabrication
- b) Hydraulic & Non Hydraulic valves
- c) Engineering, Hydraulic valves / Equipments
- d) Shafting and steering gear system.

Note: Bidders need to have Technical experience in at least 2 specific areas mentioned at Srl 2.

However for balance 2 areas, the bidder need to have MOU with the experienced firms with documentary evidence.

**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 (Ship building & Marine Structures/piping) in the last 12 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.

**7. 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.

**8. 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.

**9. 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](mailto:dcsonawane@mazdock.com)
- (ii) For any commercial details/queries, firm may contact Shikha Pardhi, DM (C-EY), Tel No. +91 22 23782615 or Mr. Pravin Nikhare, CM(C-EY), Tel No. +91 22 23762614, Fax no. +91 22 23741386, [pknikhare@mazdock.com](mailto:pknikhare@mazdock.com)

**10. Public Grievance Cell:**

MAZAGON DOCK SHIPBUILDERS LIMITED

**माझगांव डॉक शिपबिल्डर्स लिमिटेड**

*"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/SP/MRLC-2/ Hiring of services for piping and engineering work for Project-MRLC 2*

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.

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](http://www.mazdock.com) > Tender/EOI

**Revised SOW-II****The technical Scope of work for EOI Piping & Engineering Refit Work :**

1. MDL intends to outsource Refit work of SSK Class Submarine work of Naval Submarine (INS Shankush) MRLC-2 for Engineering and Piping works on turnkey basis to be carried out inside MDL premises. The complete submarine job will be offloaded to three firms to work parallelly with approximate work ratio of 40:30:30 to work in respective zones on the submarine. However there will be only ONE contractor each for Hydraulic and Non-Hydraulic pipes for Pressure Testing and Flushing of the entire system on-board submarine.
2. MDL is floating EOI to explore suitable competent vendors to undertake the above job on turnkey basis meeting the required quality and timelines (about 30 months)
3. The broad scope of work for the EOI is as follows:
  1. Degutting
  2. Storage with proper record keeping
  3. Overhauling & Pressure test
  4. Arrangement of Spares for Overhauling of valves
  5. Arrangement of Pipe fittings
  6. Installation onboard
  7. Pressure testing & Flushing of Piping systems
  8. Setting to Work (STW)

Above refit work in following listed jobs of INS Shankush:

- a) Piping including pipe fabrication and installation
  - b) Overhauling of Hydraulic & Non Hydraulic valves and Installation
  - c) Overhauling of Engineering, Hydraulic valves / Equipments and Installation
  - d) Shafting and steering gear system installation and supply of shortfall material if any
4. Indicative work content is given in the following annexures
 

**Piping works - Annexure – 1**

**Engineering works - Annexure – 2**
  5. **Pre-qualification Criteria** : Bidders should have experience of **PIPING AND ENGINEERING WORK** on Submarines in the past 12 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas:
    - e) Piping including pipe fabrication and installation
    - f) Overhauling of Hydraulic & Non Hydraulic valves and Installation
    - g) Overhauling of Engineering, Hydraulic valves / Equipments and installation
    - h) Shafting and steering gear system installation and supply of shortfall material if any

**Note:**

1. Bidders need to have Technical experience in at least 2 specific areas mentioned at Srl 4. However for balance 2 areas the bidder need to have MOU with the experienced firms with documentary evidence.
2. Right to accept or reject any or all Applications:
  - 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, at 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.

**The technical Scope of work for EOI Piping & Engineering Refit Work :**

6. MDL intends to outsource Refit work of SSK Class Submarine work of Naval Submarine (INS Shankush) MRLC-2 for Engineering and Piping works on turnkey basis to be carried out inside MDL premises. The complete submarine job will be offloaded to three firms to work parallelly with approximate work ratio of 40:30:30 to work in respective zones on the submarine. However there will be only ONE contractor each for Hydraulic and Non-Hydraulic pipes for Pressure Testing and Flushing of the entire system on-board submarine.
7. MDL is floating EOI to explore suitable competent vendors to undertake the above job on turnkey basis meeting the required quality and timelines (about 30 months)
8. The broad scope of work for the EOI is as follows:
  9. Degutting
  10. Storage with proper record keeping
  11. Overhauling & Pressure test
  12. Arrangement of Spares for Overhauling of valves
  13. Arrangement of Pipe fittings
  14. Installation onboard
  15. Pressure testing & Flushing of Piping systems
  16. Setting to Work (STW)

Above refit work in following listed jobs of INS Shankush:

- e) Piping including pipe fabrication and installation
  - f) Overhauling of Hydraulic & Non Hydraulic valves and Installation
  - g) Overhauling of Engineering, Hydraulic valves / Equipments and Installation
  - h) Shafting and steering gear system installation and supply of shortfall material if any
9. Indicative work content is given in the following annexures

**Piping works - Annexure – 1**

**Engineering works - Annexure – 2**

**Responsibility Matrix for Piping works and Engineering works – Annexure -3**

10. **Pre-qualification Criteria** : Bidders should have experience of **PIPING AND ENGINEERING WORK** on Submarines in the past 12 years (Documentary evidence like order copies & work completion certificates to be furnished) in following areas:
  - i) Piping including pipe fabrication and installation
  - j) Overhauling of Hydraulic & Non Hydraulic valves and Installation
  - k) Overhauling of Engineering, Hydraulic valves / Equipments and installation
  - l) Shafting and steering gear system installation and supply of shortfall material if any

**Note:**



3. Bidders need to have Technical experience in at least 2 specific areas mentioned at Srl 4.

However for balance 2 areas the bidder need to have MOU with the experienced firms with documentary evidence.

4. Right to accept or reject any or all Applications:

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, at 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.

**Annexure -1****Scope of work for Expression of Interest from Indigenous Bidders**

A) The EOI is invited for Piping and Engineering work for MRLC 2 Submarine Project (INS Shankush) at MDL for a period of 3 years tentatively from July 2022. The work required to be undertaken by the Subcontractor is briefly defined below:

**I) Piping work:**

- a) Removal of Pipes
- b) Cleaning of Pipes
- c) Offer to MDL /RMT for thickness gauging
- d) Bending of Pipes
- e) Fabrication of Pipes
- f) Galvanization of Pipes
- g) Installation of Pipes
- h) Pressure Testing of Pipes
- i) Pressure Testing of System
- j) Flushing of systems
- k) Removal of Valves
- l) Installation of Valves
- m) Opening inspection of valves to MDL /RMT
- n) Overhaul of Valves
- o) Arrangement of spares required for overhauling of valves
- p) Removal of Misc. items
- q) Installation of Misc. items
- r) Overhaul of Misc. items
- s) Fabrication of 4 nos. Exhaust gas line inside pressure hull
- t) Arrangement of Pipe fittings

**1. MDL's Scope****1.1 Documents**

Following documents will be provided:

- 1.1.1 Pipe sketches and schematic drawings.
- 1.1.2 Sample copy of QA Plan (As per MDL quality requirement).
- 1.1.3 Instruction given to contractor will be recorded in the Instruction Register. The contractor is required to report hindrances in production for recording in the Hindrance register countersigned by SM.

**1.2 Material**

- 1.2.1 Pipe Material will be provided progressively based on requirement. The pipes are made of different materials viz. SS, CS, and Copper Alloy.
- ~~1.2.2 Material required for welder's qualification.~~
- 1.2.3 Cathelco units
- 1.2.4 All test media (air 6 bar, oil, water, fresh water, nitrogen, etc.) for pressure-testing of pipes.

**1.2.5** Special tools and equipment supplied by the system/ equipment manufacturer along with the system/ equipment for special purposes.

### **1.3 Services**

**1.3.1** 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. Contractor has to bring their own porta cabin and lockable space lock and key. Electrical connections will be provided by MDL.

**1.3.2** Crane facilities for lifting heavy Pipes/ pipe devices (>50 kg) will be provided by MDL, as per requirement, taking safety and weight factors into consideration. However, forklifts, hand trolley for material handling are to be arranged by the contractor.

**1.3.3** Water and one source for compressed air (service air) supply of 4 -7 bars pressure at each location of work for blowing and cleaning of pipes, devices & accessories, gouging and running small equipments like grinding machine etc.

**1.3.4** 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. (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).

**1.3.5** Preparation of MR and authorizing Subcontractor for drawing material from EY Stores. All materials will be issued to subcontractor from locations in MDL yard at Mazagon (EY Stores/ Alcock Yard/ South Yard/North Yard etc.). (Contractor may be required to depute their personnel at Anik yard, Sewri Yard or other storage locations for easy identification while mustering the material for issue to facilitate easy take over)

**1.3.6** Covered area for Cleaning of pipes.

**1.3.7** A Non-destructive testing's, dark room and pit room facility.

## **2. Subcontractor's Scope:**

There will parallel contracts (Max. 03 Nos.) in the Approx. ratio 40:30:30.

3 separate vendors to work in zone wise as detailed below:

Zone 1: Upto soundproof bulkhead

Zone 2: From Soundproof bulkhead to PT Bulkhead

Zone 3: PT Bulkhead to Torpedo tubes including outside pressure hull

## **2.1 Mobilization**

**2.1.1** Contractor shall complete mobilization of his workforce, tools and equipment within four 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.

**2.1.2** The subcontractor has to clearly indicate how the firm is going to meet each of the technical requirements mentioned in the following headings.

- 2.2 Removal of pipes and valves:** Firm to remove pipes and valves from submarine. Before removing the valves, proper tallies to be put up on pipes and valves. After removal, pipes and valves to be stored properly and record to be maintained.
- 2.3 Cleaning of pipes:** Vendor to clean the pipes. Vendor to offer the pipes to QA/RMT for thickness gauging of pipes. Pipes found OK in thickness gauging to be used for further process.
- 2.4 Bending of Pipes**
- 2.4.1** Subcontractor shall execute bending of the pipe on the basis of the technical data of the pipe, written in inspection sheet, Drawing and according to the suitable processes as per document provided by the MDL. Also pipes which are TO-PLACE in nature, to be bent according to On-Board requirement.
- 2.4.2** The bending of pipes can be done on CNC and NC machine.
- 2.5 Degreasing, Cleaning & Pickling of pipes**  
The cleaning /degreasing/ pickling of pipes by alkaline solution & to be dried prior to welding.
- 2.6 Fabrication of Pipes (Pre-mounting work)**
- 2.6.1** Fitment of end fittings / pipe joints on tack to be as per drawing. Also pipes which are TO-PLACE in nature, to be fabricated according to On-Board requirement.
- 2.6.2** All related piping devices like valves, cocks, filters, strainers, clamps, supports, adaptors, unions and fittings, gauges, gaskets, O-rings, gland - packing, fasteners, grease, such unions, straub coupling, pipe flanges, rubber sheets for pipe joints, adhesives etc. required for fabrication and installation of pipes.
- 2.7 Welding/brazing**
- 2.7.1** The subcontractor's welder will execute the welding according to the welding procedure indicated in document supplied by MDL.
- 2.7.2** The subcontractor shall offer welding work of each pipe to MDL-EY-QA for inspection & clearance to further pipe fabrication process.
- 2.7.3** Welding/ brazing consumables including gases (Argon and filler wire /electrodes) required for welding/ brazing of pipe clamps/ studs/ supports.
- 2.7.4** **Material required for welder's qualification.**
- 2.8 NDT**  
Non destructive testing's such as visual, DP, Radiography as per QAP.

**2.9 Galvanizing of Pipes**

Galvanizing of CS pipes where ever applicable.

Note: Galvanizing & Cleaning/ pickling is under contractor's scope.

**2.10 Storage of pipes**

The firm is required to do the storage of pipes / material in an efficient manner and do the retrieval for installation in space provided by MDL. Pipes to be stored in the racks and shop floor adapted and equipped with rubber protection to avoid marking or deterioration of manufactured pipes and tubes. Management, Storage & delivery of welding filling material as per standard procedure.

**2.11 Installation of pipes.**

- a. Installation pipes with temporary identification tallies.
- b. Tack-welding/ welding of clamps, supports etc. and NDT as per requirement.
- c. Installation of Finished, Semi-Finished and Template pipes, valves, cocks, filters, strainers, reservoirs, clamps, supports, adaptors, unions and fittings, gauges, Cathelco units etc.
- d. Installation of pipes in sequence as per drawings or site conditions. Pipes located below deck/equipment shall be given priority during installation and the same are to be pressure tested before installation of the deck equipment.
- e. Flange joints are to be bolted using required rubber/ other material gaskets etc., as per the drawings and material supplied.
- f. Threaded pipe joints are to be tightened with the sealant, wherever mentioned.
- g. Cutting of joints from rubber sheets/Gaskets, joining of 'O' rings etc.
- h. Material required for manufacturing templates, shims, chock pieces etc. to be arranged.
- i. Modification on seatings by hot-work and associated painting jobs on modified seatings which are to be undertaken by case to case basis as indicated by MDL.

**2.12 Pressure Testing & Flushing of system:** This work involves System wise flushing and pressure testing of hydraulic and non-hydraulic pipe on-board submarine MRLC-2.

**NOTE: There will be only ONE contractor each for Pressure Testing and Flushing of the entire Piping on-board for Hydraulic and Non-Hydraulic systems.**

**2.13 Overhauling of valves:** Valves will be issued to vendors for overhauling. Firm to carry out opening of the valves inside MDL. QA/RMT will do the opening inspection of valves after offer by vendor. Final list to be prepared for spares required for overhauling and same to be arranged by the vendor. Overhauling of valves to be done inside MDL. For special machining, parts may be taken outside. Opening inspection of valves to be completed by the vendor within 4 months after issuing valves. Spares to be arranged within 4 months after opening inspection.

**2.14 Arrangement of spares for overhauling of valves:**

List of spares as per TM will be included for tendering, however requirement of spares will be finalised post opening inspection.

- a) Indigenous – Arrange spares as per sample/ drawing with necessary certificates (Material TC & COC from NABL)
- b) Imported – Arrange spares/ fittings from OEM(Germany) as per requirement on case to case basis.

**2.15 Fabrication of 4 Nos. Exhaust Gas Line Inside Pressure Hull (Port and Starboard)**

**QUANTUM OF WORK REMOVAL & INSTALLATION OF PIPES**

	SECTIONS	10	20	30	40	50	Total
Material	Group	TOTAL PIPES	TOTAL PIPES	TOTAL PIPES	TOTAL PIPES	TOTAL PIPES	Total Pipes
CARBON STEEL	SIZE 20-30	3	7	10			20
CARBON STEEL	SIZE 38-60	8	8	16			32
CARBON STEEL	Size 80-100		3	19			22
CARBON STEEL	SIZE 150	2					2
STAINLESS STEEL	SIZE 3 - 10	42	187	259	600	116	1204
STAINLESS STEEL	SIZE 10 - 20	49	194	519	161	67	990
STAINLESS STEEL	SIZE 20 - 45	89	116	558	103	21	887
STAINLESS STEEL	SIZE 40 - 60	6	25	66	16		113
STAINLESS STEEL	SIZE ABOVE 50				15		15
CUNI	SIZE 6 - 12	82	186	399	7	1	675
CUNI	SIZE 14 - 20	57	84	206	33	4	384
CUNI	SIZE 25 - 40	44	225	226	24	1	520
CUNI	SIZE 40 - 60	58	113	141	20	15	347
CUNI	SIZE 65 - 90	30	64	62	8	5	169
CUNI	Size 100 - 125	11	19	48	7	2	87
CUNI	SIZE 150 - 175	2	21	18	2	1	44
CUNI	SIZE 200 - 275		1	3			4
COPPER	SIZE 6 - 10	1		40			41
COPPER	SIZE 12 - 25			17			17
COPPER	SIZE 25 - 42	18	11	10	10		49
<b>Grand Total</b>		<b>502</b>	<b>1264</b>	<b>2617</b>	<b>1006</b>	<b>233</b>	<b>5622</b>

**QUANTUM OF WORK PIPE BENDING & FABRICATION OF PIPES**

Activities

MAZAGON DOCK SHIPBUILDERS LIMITED

**माझगांव डॉक शिपबिल्डर्स लिमिटेड**

"EXPRESSION OF INTEREST" (EOI) ref no. EY/CD/SP/MRLC-2/ Hiring of services for piping and engineering work for Project-MRLC 2

Sr. No.	Material	Group	Total Pipes	Total nos. bends for Pipe Bending	No. of total Joints for Pipe Fabrication
1	CARBON STEEL	SIZE 20-30	20	75	100
2	CARBON STEEL	SIZE 38-60	32	100	150
3	CARBON STEEL	Size 80-100	22	75	100
4	CARBON STEEL	SIZE 150	2	25	25
5	STAINLESS STEEL	SIZE 3 - 10	1000	3000	4000
6	STAINLESS STEEL	SIZE 10 - 20	750	3000	3225
7	STAINLESS STEEL	SIZE 20 - 45	200	3000	3000
8	STAINLESS STEEL	SIZE 40 - 60	50	300	400
9	STAINLESS STEEL	SIZE ABOVE 50	15	50	50
10	CUNI	SIZE 6 - 12	600	2250	2300
11	CUNI	SIZE 14 - 20	300	1200	1200
12	CUNI	SIZE 25- 40	200	1500	1750
13	CUNI	SIZE 40 - 60	100	1100	750
14	CUNI	SIZE 65 - 90	50	600	700
15	CUNI	Size 100 - 125	25	300	300
16	CUNI	SIZE 150 - 175	25	150	200
17	CUNI	SIZE 200 - 275	2	10	100
18	COPPER	SIZE 6 - 10	41	200	200
19	COPPER	SIZE 12 - 25	17	50	20
20	COPPER	SIZE 25 - 42	40	150	200
<b>Total</b>			<b>3491</b>	<b>17135</b>	<b>18770</b>

Item Category	Description of activity	Qty	UoM
10	Galvanization of Pipes(KG)	1,000	Kg
20	Pressure Testing of systems	26	NOS

Item Category	Service Code	Description of activity	Qty	UoM		
<b>Removal , Overhaul and Installation Valves</b>						
10	2001477	Valves 250 NB	3	NOS		
20	2001478	Valves 200 NB	1	NOS		
30	2001479	Valves 150 NB	21	NOS		
40	2001480	Valves 100 NB	65	NOS		



50	2001491	Valves 80 NB	62	NOS		
60	2001492	Valves 70 NB	18	NOS		
70	2001493	Valves 50 NB	92	NOS		
80	2001494	Valves 40 NB	35	NOS		
90	2001495	Valves 32 NB	96	NOS		
100	2001496	Valves 25 NB	163	NOS		
110	2001497	Valves 20 NB	100	NOS		
120	2001498	Valves 16 NB	140	NOS		
130	2001499	Valves 10 NB	102	NOS		
140	2001500	Valves 12 NB	34	NOS		
150	2001511	Valves 8 NB	80	NOS		
160	2001512	Valves 6 NB	220	NOS		
170	2001513	Valves 3 NB	63	NOS		

**Annexure 2****II) SCOPE OF WORK FOR ENGINEERING WORK****GENERAL TERMS AND CONDITIONS.**

1.	Best shipbuilding practices in general and Naval Standards in particular must be practiced in all installations and other work on board.
2.	The subcontractor should execute the work in accordance with Ship Building Methods Manuals of MDL, and as per requirement of ISO 9001.
3.	The installation and other works should conform to the best engineering practice and should maintain high standard of workmanship as applicable to submarine building requirements.
4.	I.T.I. trained operatives shall be deployed for all the jobs involved. The qualifications need to be authenticated by MDL Officer. Adequate supervisory staff should be deployed on board and be responsible to MDL/SOT officers.
5.	Engineers/ Supervising staff with technical background and preferably Submarine construction / operational background should be deployed and will be entirely responsible for execution of the tasks to the satisfaction of MDL Berth Officer/ Naval Overseers/other Naval trials teams, as and when applicable.
6.	The scope of work consists of removal, overhauling and re-installation of various equipments on board <del>and overhauling of equipment</del> , wherever required as well as flushing, pressure testing, test/trials on test bed and onboard.
7.	The Contractor may visit the Yard/ Submarine to assess the quantum of work

<b>8.</b>	<p>The job executed shall be strictly in accordance with the Instructions / Drawings / Specifications/ Scope of work and Standard applicable. Necessary Drawings, Part List &amp; TMs shall be provided by MDL, for reference.</p> <p>The Contractor should ensure that the right type of hardware indicated in the Drawings, Part List &amp; TM are used during installation.</p>
<b>9.</b>	<p>To blank all the hull openings of engineering fittings with suitable metal blank along with the gasket, after getting it cleaned &amp; painted by Hull Dept.- EY is the Contractor's responsibility.</p> <p>N.B.: - Material &amp; machining assistance for preparing the blanks will be provided by MDL.</p>
<b>10.</b>	<p>The Contractor should prepare a list of missing, broken items etc. in co-ordination with Berth Officer prior to commencement of work.</p>
<b>11.</b>	<p>New Shims/ chalk pieces, fit bolts required while assembly/ installation is to be prepared by the firm as per site conditions. Materials &amp; machining assistance will be provided by MDL.</p>
<b>12.</b>	<p>If re-testing is required for any associated system, during pressure testing of a particular system due to the leakage observed in pipe joints, equipment, fittings etc. shall be Contractor's liability.</p>
<b>13.</b>	<p>All the tallies along with supports / securing plates / clamps of equipment, valves, fittings etc. removed by the Contractor should be cleaned &amp; preserved and re-installed during refit of items.</p>
<b>14.</b>	<p>Grinding &amp; drilling of newly manufactured clamps &amp; foundations to suit at sight, will be Contractor's responsibility.</p>
<b>15.</b>	<p>Crane facilities, special tools for removal &amp; installation of equipment, compressed air etc. shall be supplied by MDL. Further, any material required for shrunk fitted items e.g. dry ice shall also be supplied by MDL.</p>
<b>16.</b>	<p>The Contractor should arrange test pumps with accessories for hydro testing.</p> <p>The Contractor should use calibrated pressure gauges, which will be used for pressure testing of equipments &amp; systems.</p>
<b>17.</b>	<p>The Contractor should arrange all tools &amp; special lifting arrangement for working onboard in critical places. However, any special jigs available with Engg. - EY will be provided as and when required.</p>
<b>18.</b>	<p>There would be stage inspection by QA-EY and SOT during execution of work and any shortfalls noticed during these inspections shall be attended to expeditiously. Any rework, which is not attributable to the Contractor, shall be charged extra.</p>
<b>19.</b>	<p>The contractor is to comply strictly as per working schedule forwarded to him by the respective OIC. Detailed work schedule should be prepared by the Contractor and submitted to the OIC for approval.</p>
<b>20.</b>	<p>The Contractor's responsibility will be limited to functioning of the items on board and rectify any failure of the entire system/ fittings/ equipments and setting to work in conjunction with Ship Staff.</p>
<b>21.</b>	<p>During functional trials, any fittings/ equipments found defective and which the subcontractor</p>

	has serviced, is required to arrange removal, rectification and reinstallation at his own cost. Contractor is responsible for making good all the disturbed joints in way of rectification.
<b>22.</b>	The Firm has to stand Guarantee for <b>12 Months</b> from the date of separation of Submarine from the pontoon. Any failures observed while Setting to Work or HATs, will be rectified to the satisfaction of MDL/ Naval Agency.
<b>23.</b>	The Contractor shall be required to work in all shifts, including Saturdays, Sundays and Holidays, as and when the necessity arises.
<b>24.</b>	The Contractor shall take utmost care in handling all equipments and other items while removal/ reinstallation of the same. Cost of any damages to items shall be recovered from the Contractor's Bill.
<b>25.</b>	Overhauling period is maximum of up to four months from the start date of de-gutting i.e. Start date of contract.
<b>26.</b>	Consumables like grease, cloth, etc. during overhauling of items are to be arranged by the contractor.
<b>27.</b>	Items/ equipments documented for overhaul in DL/SOW will also include removal, installation, test and trials of items.
<b>28.</b>	Items/ equipments documented for removal and installation in DL/SOW will also include overhaul except for renewal of items.
<b>29.</b>	Spares required for overhauling of equipments to be arranged by the vendor. After opening inspection of Equipments, list of spares required is to be prepared and arranged.
<b>30.</b>	Pumps/equipments to be removed along with motor and will be subsequently separated by contractor in MDL. Motors to be handed over to MDL.
<b>31.</b>	Prime mover for test bed trials will be given to the contractor before commencement of test bed trials. The same to be collected from MDL by contractor.
<b>32.</b>	Contractor must have experience of engineering work onboard submarines.
<b>33.</b>	Contractor should have the facilities for FAT (Factory Acceptance Trials) of items after completion of overhaul. i.e. Test Bed for Pump trials, Pneumatic/electrical actuators test facilities, etc.
<b>34.</b>	If firm does not own facility for few critical work such as shaft & propeller repair, then firm must have MOU/tie up with eligible firms who can execute such jobs. Eligibility of such firms will scrutinized by MDL during TNC.
<b>35.</b>	Inspection protocols after overhaul of items and for test bed trials will be provided by MDL.

**(i) SCOPE OF ENGINEERING WORK.**

Sub-contractor is required to remove, overhaul (where indicated) and re-install the items. Scope includes inspections, testing at all stages including trials.

Contractor's sequence of work will be: -

1	One set of schematic drawing, installation drawing, part lists of engineering systems will be provided by MDL. The same is to be preserved by the Contractor for reference & is to be returned after the completion of the Project.
2	The Contractor is to study the schematic drawings, identify the equipments. Make proper tallies and put them equipments before removal. Tallies should be of metallic & tied with SS wire. Materials for tally & SS wire are to be arranged by the Contractor.
3	Prepare a list of items, in triplicate prior to removal from the Submarine and handover to Engg. Dept. for cross checking the identification of the items. After obtaining the clearance, the items have to be removed from onboard Submarine.  Obtain signature from the Ship Staff on the list of items before shipping out of the Submarine and hand over a copy of the list to the OIC-Engg. for record.
4	An inventory is to be prepared by the Contractor about missing and damaged items on each equipment before removing from submarine. This is to be done in consultation with MDL and Ship's Staff.
5	Contractor is responsible for dismantling any other fittings, pipes, etc. coming on the way of removing the main equipment. A proper marking is to be done to prevent orientation problem while re-installing the same.
6	The Contractor should record the clearance between the chalk pieces & the compression of shock mounts before the removal of any major equipment.
7	Contractor is responsible for removing and replacing all shock mounts.  The foundation & rod gearing and other parts associated with equipments, to be reconditioned & painted (Painting assistance will be provided by MDL).  All the foundations of the equipment are to be marked with detail Drawing No., punched on the metallic tag tied with SS wire.  Materials for tag & SS wire are to be arranged by the Contractor.
8	Removed fasteners and any other smaller items should be kept under the custody of

	Contractor in cloth bag, equipment wise. Loss of any item will be the responsibility of Contractor and he has to compensate the same.
9	All equipments removed from submarine should be dispatched to Ready Use Store, after making proper dispatch note.
10	All fasteners/ spares required for overhauling/ re-installation of machinery/ equipments/ Hydraulic systems is to be arranged by vendor. List of fasteners, spare parts/ fittings required for re-installation is to be prepared by the Contractor after opening inspection.  The Contractor is to draw the materials as per Drawing & Part List related to Defect List (DL) from the Stores-EY by preparing the Material Requisition Note, in consultation with Engg-EY.
11	The Contractor should collect New/refurbished equipments/ items from the EY-Store or EY-Engg. Department. Preparation of area for installation of equipments is the responsibility of the Contractor.
12	Carry out pressure testing of all Hull/ Doubler valves of various systems at the pressure & media specified in the Protocol after installation of the same. Carry out pressure testing of all engineering systems at the pressure & media specified in the Protocol.
13	While removing the pump assembly, motor is to be separated and dispatched. Monoblock pumps will be intact. Main Engine should be de-coupled from Getelfo coupling while dispatching. Assembling and coupling of the above items is the responsibility of Contractor prior to installation. Hydraulic mechanisms should be dismantled for operating flaps/ cocks.
14	The Contractor is to get re-installed equipments cleared by Q.A.- EY and S.O.T.  The Contractor, to the entire satisfaction of Q.A.-EY/ S.O.T. or Ship Staff should rectify the defects while taking trials on Contractor's fitted items.
15	The Contractor is to ensure not to damage any fitting/pipe during removing reinstallation and pressure testing. In the event of damage to any fittings/pipes, the cost of the same will be recoverable from the Contractor.
16	Measuring instruments used by the Contractor should have proper Calibration Certificate.
17	All open-ended fittings/ equipments should always be kept plugged or capped to prevent dirt entering the fittings/ equipments.
18	Removal and reinstallation of Fitting/machinery identification tallies along with the system is contractor's responsibility.
19	The Firm has to stand Guarantee of their job for <b>12 Months</b> from the date of separation of Submarine from the pontoon. Any other failures of the engineering system observed, during Setting to work/HATs, also to be rectified by the firm up to the satisfaction of MDL/ Naval Agency.
20	Opening of all equipments to be done inside MDL. Overhauling of equipments to be done

	inside MDL. For special machining, parts may be taken outside.
21	Responsibility of Engineering Hull valves/ Engineering Penetrations will be with vendor working in particular zone. Any penetration to be machined; contractor is responsible for the same. MDL will give technical specification.

**NOTE: -**

1. Installation & Pressure testing to be carried out as per the Protocols and the same to be offered to Q.A (EY) and SOT for their acceptance.
2. While Pressure testing, all the valves/ fittings/ filters/ hydraulic blocks/ hoses are also to be tested along with the pipes. Any leaks observed are to be rectified by the Contractor.

**List of Engineering Items for refit:**

<b>Sr.No.</b>	<b>Name of the Equipment</b>
1	Anchor Assembly Capstan And Deck Equipment
2	Door And Hatches And Escape Trunk
3	Assembly Hatch
4	Sanitary System And Gas Ejector
5	Life Rafts
6	Damage Control Gear / Life Saving Equipment

7	Hydrazine Emergency Blow System
8	Rescue Sphere And Its Callotte
9	6000 Hourly Routines On Four Main Engines. (W-6 Routine)
10	Engine Governors (4 In Nos)
11	Exhaust Gas System
12	Fuel System
13	Lub Oil System
14	Diesel Fresh Water Cooling System
15	Induction System (Surface & Snorkel) Snorkel Mast
16	Air Coupling And Air Line (Snorkel Mast)
17	Locking Mechanism (Snorkel Mast)
18	Snorkel Valves
19	Test (Snorkel Mast)
20	Charging Generators
21	Main Battery And Battery Rooms
22	Battery Cooling System
23	Propulsion Motor
24	Shaft Turning Device
25	Stern Tube
26	Stern Gland
27	Thrust Bearing
28	Central Lubrication Plants
29	Hollow Spring Coupling
30	Main Sea Water Cooling System
31	Main Sea Water Cooling Pump
32	Shafting Propeller
33	Propeller Shaft
34	Miscellaneous And Shaft Tunnel
35	Reserve Buoyancy Meter
36	Dc Motors And Converters
37	Pt Bhd. And Pt Bhd. Door (Engineering Work )
38	Buoyancy And Stability Indicating Devices
39	Vertical Rudder
40	Hydroplane Aft & Forward
41	Hydraulic Drives Of Rudder And Planes .
42	Hydraulic Cylinders Of Aft & Rudder Planes
43	Lantern And Hydraulic Cylinder Seals
44	Bilge Pump
45	Freeing And Compensating System
46	Mbt Vents
47	Halon Fire Warning And Extinguishing Systems
48	Fresh Water Distilling Unit
49	Drink, Wash Water And Sea Water Wash Systems
50	Garbage Ejector
51	Ventilation And Air-Conditioning System
52	Hydraulics
53	Compressed Air System

54	Emergency Breathing (Bibs) And Oxygen Systems
55	Signal Ejector
56	Transport Equipment (Tubes 1 & 2)
57	Torpedo Handling And Embarkation System
58	Mine Laying Equipment
59	Shock Mounts
60	Impeller Balancing, Assembly And Installation Of Atu Fans, Boat And Battery Fans
61	Repair/ Machining Of Rudder Upper & Lower Shafts
62	Repair, Machining & Threading Of Fwd Hydroplane Shaft And Manufacture Of Nut
63	Spares For Signal Ejector For Overhauling Of Equipments
64	Spares For Garbage Ejector For Overhauling Of Equipments
65	Laser Scanning & Measurements Of Submarine Forward Escape Hatch
66	Sea Water Pumps For Ac Repair:
67	White Mettalling /Babbling And Machining Of Thrust Block Components
68	Preparation, Installation And Pressure Testing Of Hull & Doubler Valves Onboard
69	Refrigeration And Airconditioning System
70	Refilling Of Halon Bottles
71	Hydraulic Valve Refurbishment
72	Repair & Manufacturing Of Piston Head, End Cap Flange, Suitable Seals, Hydraulic Cylinders & Piston Rods At Firm'S Premises.
73	Services For Shutter Space Fitting & Installation Of Retractable Bollards
74	Spares for Stuffing Box
75	Spares for Muzzle Flap Spares
76	Installation Of Furniture And Small Items
77	Calibration And Pressure Testing Of Tanks
78	Tanks Leak Test

**Responsibility Matrix for Piping works and Engineering works -Annexure 3**

SR	Activity	Scope	Line Item	Description	Responsibility
I	<b>Documents Support</b> (Soft Copy)	Piping System	1	System Schematic	MDL
			2	Pipe Sketches	MDL
			3	Technical Manual	MDL
			4	Pipe Part List	MDL
			5	Section Wise - Routing Diagram	MDL
			6	Applicable Standards	MDL
			7	Modifications in documents/drawings arising due to onboard alteration/modification at any stage of Refit must be incorporated	MDL



II	<b>Preparatory Activity</b> (Before Degutting)	Piping System	1	Identification of Pipes & Its Routing as per Schematic Drawing/Part Drawings/Technical Manual/Layout Drawings/Pipe Sketches (Isometric Drawings)	Bidder
			2	Installing Hard Punch Metal tallies bearing RFID numbers on Degutted Pipes & Inline Devices. Material of Tallies within Bidders Scope	Bidder
			3	Carrying out Degutting Inspection in presence of MDL QA & SRMT	Bidder
			4	Build Database of Degutted Pipes, Fittings , Supports(Metal Clamps, Wooden Clamps, UCMC Clamps, Seating's & Foundation) & Inline Valves & Devices after Inspection	Bidder
			5	Report Deficiency List to MDL for Further Action	Bidder
III	<b>A. Degutting</b> of Pipes, Pipe Supports , Inline Valves & Devices	Piping System	1	Ensuring that Internal Tanks are Degassed & Emptied by Hull	Bidder
			2	Carry out Degutting Inspection (to be witnessed by MDL). Inspection involves mustering of pipes as per relevant drawings (Schematic Drawing/Part Drawings/Technical Manual/Layout Drawings/Pipe Sketches (Isometric Drawings))	Bidder
			3	Degutted Pipes, Supports , valves & devices are to be segregated (Section, System , Dn & Material Wise) & Stored at Allocated Locations in Lock and key Arrangement (Custodian - Bidder)	Bidder
	<b>B. Degutting</b> of Equipments(As per Annexure)	Engg System	1	Carry out Inspection prior degutting for mustering of components as per Installation Drawing/Part List/Technical Manual	Bidder
			2	Removal & Disassembly to individual components. Clean to bare metal individual components & Carrying out Opening inspection. Report Deficiency list to MDL for further action.	Bidder
			3	Removal of Equipment Resting Foundations & Supports. Handing over to Hull Dept for Survey,	Bidder

				Rectification , Blasting & Paintings. Take Custody of Foundation of Equipment till Installation	
			4	Removal of Equipment Securing Arrangements, Fasteners, Shock Mounts Supports , Shims , Locking Plates, Intermediate foundations etc. Preservation & Custody till Installation of Equipment	Bidder
			5	Special Jigs for Equipment Degutting & Installation will be provided by MDL	MDL
			6	Preservation , Wrapping & Storage of Individual components at allocated Locations in Lock and key Arrangement (Custodian - Bidder)	Bidder
			7	For OEM Overhauled & Renewed Items, only removal and installation will be in Sub Contractors Scope. Relevant Inspections to be carried out	Bidder
IV	Degreasing, Chemical Cleaning, Paint Removal of Pipes	Piping System	1	Bidder has to carry out Degreasing, Chemical Cleaning, Paint Removal & old Insulation of Pipes. Bidder has to arrange equipment & material for this activity within MDL Premises(Except Mandatory Renewal Pipes as per DL)	Bidder
V	Gauging & Physical Inspection of Pipes	Piping System	1	Carry out Thickness Gauging of Pipes and Survey of Welded End Fittings after Cleaning ( Pipes Other than Mandatory renewal pipes as per DL)	Bidder
VI	Pipe Fabrication 1) Rejected after thickness Gauging 2) Mandatory Renewal Pipes as per DL	Piping System	1	Bending & Fabrication of Pipes Rejected after thickness Gauging & Physical Inspection. Pipes are to manufactured using old pipe as template.	Bidder
			2	Mandatory Renewal Pipes as per Defect List. Pipes are to manufactured using old pipe as template.	Bidder
			3	Fabrication arising due to Mandatory System Upgradation	Bidder

				using Wire Set as template. (Wire Set Material within Sub Contractor Scope)	
			4	Fabrication of pipes due to obsolete Fittings( Druckrings, Quick Release Coupling etc.)	Bidder
			5	Welding & Brazing Consumables for Activity 1,2,3,4 including gases Viz-Argon Gas, MDL approved filler wire, Electrodes will be in subcontractors scope	Bidder
			6	Tubes for Manufacturing of Pipes will be issued by MDL	MDL
			7	Qualification of Brazing & Welding Personnel by MDL QA	Bidder
			8	Sufficient Equipment's like Bending Machine, Welding Machine, Brazing Set, Pipe Cutting machine, drilling machine.	Bidder
VII	Shop Pressure Test of Pipes	Piping System	1	Shop Pressure Test of All Pipes as per Technical Manual	Bidder
			2	Pressure Test Medium will be Subcontractors Scope.(Oil, Compressed Air, Nitrogen)	Bidder
			3	Testing Adapters & Fittings (Ermeto Etc.),Flanges will be in subcontractors scope	Bidder
			4	Testing Equipment like HP Air Compressors (350 Bar), LP Air Compressor , Cascade Cylinders, Hydraulic (water) Testing Pumps, Air Operated Testing Pumps, Centrifugal Pumps, Vacuum Pumps, Testing Manifolds, Hydraulic Power Packs will be in Sub Contractor Scope	Bidder
			5	End Caps fitment after pressure test. End caps to be arranged by Sub Contractor	Bidder
VIII	A. Overhauling of valves and Devices	Piping System	1	Carry out Opening Inspection of Valves and devices along with operating Handles, Levers, Combination Handles, Wrenches, Knobs, hand wheels, Gearing, Locking Mechanism etc.	Bidder
			2	Prepare list of Renewal & overhaul spares as per opening inspection report	Bidder

B. Overhaul of Equipments	Engg System	3	Inspection of Renewed of Spares ( Material in Sub-contractor Scope) and Overhaul prior boxing up. Material Test Certificate to be provided for supplied spares	Bidder
		4	Machining Activity, Lapping , Drilling, Tapping, Dechroming & hard Chrome plating, Galvanising etc. if required to be done by Sub Contractor	Bidder
		5	Shop Pressure Test of Overhauled valves	Bidder
		6	Setting to Work & Calibration of Safety Valves, Relief valves to be demonstrated to MDL QA & SRMT	Bidder
		7	Wrapping of Overhauled valves with Cling film & Placing End Caps to Open Ends . Vacuum Packing to be done in case of Hydraulic oil Fittings & Equipments (Material in Subcontractors Scope)	Bidder
		8	Overhauled as well as BER Valves & Devices to be handed over to MDL	Bidder
		1	Removal, Overhaul & Reinstallation of All components of Shafting from Propeller Cone to Main Motor,. Renewal if parts if required	Bidder
		2	Removal, Overhaul & Reinstallation of All components of Steering gear like Drives, Linkages,Deva Bushes & Blades. Items to be renewed as indicated in opening Inspection report	Bidder
		3	Balancing of Propeller Shaft & Propeller to be carried out	Bidder
		4	Balancing of Fans Impellers of ATU as well as Boat & battery Fan to be carried out	Bidder
		5	Shafting Alignment . Reaming for Hollow spring coupling Bolts	Bidder
		6	Overhaul of Refrigeration & Air Conditioning System components. R22 Gas to be Supplied by Bidder till commissioning	Bidder
		7	Overhaul of Halon Gas Cylinders. Halon Gas to be supplied by Bidder	Bidder

			8	Nitrogen Charging of Accumulators to be carried out. UHP N2 to be used in Bidders Scope	Bidder
			9	Overhaul of Hydraulic Oil station to be done. Work Involves degutting of Oil Station Emptying of Oil Tanks. Survey of Oil tank after blasting to Bare metal(Blasting will be done by MDL). Overhaul & Pressure Test of Oil Tank. Manufacturing of Internal & External Pipes. Internal gaskets, all fasteners of Oil Station and rubber hoses and compensators to be renewed Tank gauging to be carried out and new gauge glasses to be manufactured. Maximator & accessories to be overhauled. Hydraulic Circulating pump to be overhauled, Pump Control block to be overhauled. Trials to be conducted in workshop	Bidder
			10	Overhaul of Hydraulic System components like Control Blocks, Solenoid Operated Valves, Proportionate Valves, Hydraulic motors, Pumps, isolation valves, Relief & Safety Valves, to be carried out in Hydraulic Clean Room certified to ISO Class 8. Filtered oil of NAS 1638 Class 5 and Below to be used for Workshop Testing & Trials.	Bidder
			11	Machining Activity, Lapping , Drilling, Tapping, Dechroming & hard Chrome plating, Galvanising etc. if required to be done by Sub Contractor	Bidder
			12	Carry out general overhaul as per technical manual	Bidder
			13	Inspection of Renewed of Spares ( Material in Sub-contractor Scope) prior boxing up. Boxing up inspection to be carried out. (Material Test Certificate to be provided for supplied spares)	Bidder
			14	Pressure if Applicable to be	Bidder

				carried out after overhaul	
			15	Functional test to be carried out in Workshop Prior onboard Fitment. To be witnessed by MDL QA & SRMT	Bidder
			16	Bidder has to get painting activity done from MDL Nominated Painting Subcontractor for MRLC2	Bidder/Paint Sub-contractor
IX	A. Painting of Pipes, Supports, Foundations & seating's	Piping System	2	Carrying of Degutting Inspection Prior Removal. Inspection involves mustering of supports as per relevant drawings	Bidder
X	B. Painting of Equipments & Associated Foundations	Engg System	3	Survey of Non metal Supports . Survey of Metal Supports to be done from MDL Nominated agency	Bidder
XI	Survey of Pipe Supports, Pipe Foundations, UCMC Clamps, IKLN Clamps, Wooden Supports , Tafel & Ebonite Supports	Piping System	1	Manufacturing of all supports (involves wood, angle plates , Rubber, Ebonite, Tafel, Metal Clamps and associated fasteners). Material & Manufacturing consumables(Welding Consumables including gases Viz- Argon Gas, MDL approved filler wire, Electrodes ) will be in Subcontractors scope. Material Certificates to be provided	Bidder
			2	Non Destructive testing such as visual, DP, Radiography as per QAP	Bidder
			3	Non Destructive testing , dark room & pit room facility will be provided by MDL	MDL
			4	Painting of Metal Supports to be carried out from MDL Nominated Painting Subcontractor Fire Proof Coating of wooden part to be done by Bidders	Bidder
			5	Ensure clearance for Penetrations from MDL Nominated agency for Installation of pipe & valves of PT Bulkhead , Sound Proof Bulkhead, Tank Penetrations, Escape Trunk etc.	Bidder
			6	Installation of Pipes based as per sequence ( Last out-First in)	Bidder

			7	Installation of Foundations, seating , Clamps, Metal & Non Metal Supports with associated fasteners and hardware and consumables like adhesives. Material certificates to be provided.	Bidder
XII	Pipe Penetrations in Sound Proof & PT Bulkheads , Escape Trunk etc. Clearance prior installation	Piping System	1	Offer to Survey Penetrations in PT Bulkhead, Escape Trunk & Sound Proof Bulkhead. Corrections if any will be carried out by MDL	Bidder
			2	Pressure Test of Penetrations prior installation of Pipe & Devices	Bidder
XIII	Insulation checks of Pipe Liner Material, Flanged Joints & Supports for Pipes & Devices	Piping System	1	Renewal & Installation of Insulating Bush, Washers & Sleeves. (material in Sub Contractor Scope). Continuity Measurements to be shown to QA-RMT. Material certificates to be provided.	Bidder
XIV	Installation of Pipes and in Line devices	Piping System	1	Installation of Pipes based as per sequence ( Last out-First in)	Bidder
			2	Installation of Foundations, seating , Clamps, Metal & Non Metal Supports with associated fasteners and hardware and consumables like adhesives.	Bidder
			3	Renewal & Installation of Insulating Bush, Washers & Sleeves. (material in Sub Contractor Scope). Continuity Measurements to be shown to QA-RMT	Bidder
			4	Fasteners required for Installation of Activity 1,2,3 to be renewed by Bidder as per Std Mentioned in Part List. Material certificates to be provided.	Bidder
			5	Gaskets , O-rings, Pipe Connectors as per part list and site requirements required for Installation of Pipes & Valves will be in sub contractors scope. Material certificates to be provided.	Bidder

			6	Resilient Mounts for Pipes Installation, Bellows, Compensators, Inline valves & devices (new & Overhauled) will be provided by MDL	MDL
			7	Installation Inspection of Pipes and Inline Devices by MDLQA & SRMT as per QA protocols.	Bidder
XV	Installation of Equipments	Engg System	1	Pre Assembly of Equipment to be done if required	Bidder
			2	Alignment Checks to be carried out as per procedure	Bidder
			3	Foundation fasteners to be renewed. Shim plates to be renewed to for alignment	Bidder
			4	All Accessories to be installed along with equipment	Bidder
			5	Equipment Installation Activities and tools required for Drilling, Reaming, blue Matching, Machining, tapping, Torquing etc. will be Sub Contractor Scope	Bidder
			6	Consumables for Equipment Installation like Rust Releasant, grease, Emery Paper, Coolant for Machining, Oils , Adhesives will be in subcontractor scope	Bidder
			7	Packing Material like Jointing Sheets & gaskets, Rubber Sheet, Tafel, Ebonite, Lead Sheet, Profile Rubbers, Teflon will be in subcontractor scope	Bidder
			8	Onboard Installed equipments to be covered with Fire Proof Protection sheet.	Bidder
			9	Routine Maintenance to be carried out till Separation	Bidder
			10	Onboard Functional trials of overhauled equipments and liquidation of defects	Bidder
XVI	Installation & Pressure Testing of Hull & Doublor Valves	Piping System	1	Ensure Hull & Engg Structural Survey clearance for Pressure Hull penetrations from QA dept.	Bidder
			2	Blue Matching of Mating surfaces of Hull penetrations(Inside & Outside Hull) prior installation. Template Surface Plates to be provided by bidder. After Blue Matching clearance protective	Bidder



				covers to be placed on penetration faces. Inspection of blue Matching to be carried out.	
			3	Removal of Threaded Studs followed by Cleaning of Female Threads of Hull Valves fasteners as per survey report. Seized Studs to be removed by Cutting, drilling, and tapping.	Bidder
			4	Renewal of Gaskets & Fasteners of Hull & Doublor Valves (Material will be supplied by MDL)	MDL
			5	Installation & Pressure Test as per Approved QAP	Bidder
XVII	Flushing & Pressure Test of Pipes	Piping System	1	Flushing & Testing medium to be Arranged by Sub Contractor (Oil, Nitrogen, Refrigerant, Compressed Air (8 Bar to 350 Bar)	Bidder
			2	Flushing to Be carried for Hydraulics System, Lub Oil System, Oxygen System, BIBS System, Battery Distillate System, Diesel Fresh Water Cooling System	Bidder
			3	Pre Flushing of Hydraulic Oil & Lub oil to be carried out	Bidder
			4	Hydraulic Flushing Flushing & Pressure Test equipment & Accessories like Filters, Valves, Hoses , Manifolds, Pressure Gauges , Fittings, Calibrated Contamination meters will be in Subcontractors Scope. Subcontractor must ensure that Minimum of 2 Flushing Station must be operational round the clock. Redundancy in case of arising defects must be activated within 48 hrs. after breakdown of Flushing Equipment.	Bidder
			5	Results of Hydraulic Flushing to be interpreted on inline Calibrated meters with Print Function . Results will be considered valid after submitting supporting lab check report for same sample.	Bidder
			6	Lube Oil Flushing-Flushing Equipment & Medium in Subcontractor scope	Bidder

				Lube Oil Flushing to be carried out using once through technique	
			7	Battery Distillate Pipes Flushing-Flushing Equipment & Medium in Subcontractor scope Battery Distillate Pipes to be Flushed using Warm Water and caustic soda as medium. Equipment to be arranged by Sub contractor	Bidder
			8	BIBS System Pipes Flushing-Flushing Equipment & Medium in Subcontractor scope BIBS System pipes to be flushed using UHP Nitrogen	Bidder
			9	Oxygen System Flushing-Flushing Equipment in Subcontractor scope Battery Distillate Pipes to be Flushed using Warm Water and caustic soda as medium. Equipment to be arranged by Sub contractor	Bidder
			10	Diesel Freshwater Cooling System Flushing using Freshwater as medium. Flushing Equipment in Subcontractor scope STEP 1 - The flushing is to be repeated until pH value before and after flushing remains constant. STEP 2 - If The pH Value does not remain constant then flushing will be done with MDL Approved cleansing agent followed by flushing with freshwater to achieve the constant pH Value. STEP 3 - If the pH Value still not remains the same. Reflushing to be done after cleaning of diesel components by Equipment Sub-Contractor	Bidder
XVIII	Calibration of Pressure Gauges	Piping System	1	Each Onboard Pressure Gauges to be calibrated from NABL accredited Lab before fitment. Calibration to be done every year during course of Refit.	Bidder

XIX	General House Keeping	Piping System	1	Sub Contractor to carry out work adhering to applicable safety Norms and operating procedures. Hygiene of work environment to be maintained by Ensuring deployment of own House keeping personnel and supervisor. Events of Spillage, Leakage of water & oils arising during onboard pressure test must be attended by Subcontractor	Bidder
XX	Safety	Piping System	1	1) Safety Certificates All Pressure Testing accessories like manifolds, Hoses , Needle valve, ball Valve to be provided2) Calibrated Pressure gauges to be used for Pressure test3) Onboard Relief valves and safety valves to be set in workshop prior fitment.4) Onboard Lifting Shifting , will be in sub contractors scope . Sub contractor to use load tested lifting gear and trained rigging personnel to be deployed. Crane will be provided by MDL.5) Internal Transportation within MDL Premises will be in Sub Contractor Scope6) Necessary Safety permits to be obtained for onboard work	Bidder