



MAZAGON DOCK SHIPBUILDERS LIMITED

(Formerly known as Mazagon Dock Ltd.)

CIN : U35100MH1934GOI002079

(A Government of India Undertaking)

Shipbuilders to the Nation

Dockyard Road, Mazagon,

Mumbai 400 010.

INDIA

Modernisation of Marine Piles NY, MDL Mumbai.

VOLUME-III

**Scope of Work
List of Tender Drawings
Price Bid (Part-II)**

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1. कार्य का ब्योरा / SCOPE OF WORK:

1.1. Scope of Work in brief is as under.

- i. Chipping/ breaking & removal of dilapidated Concrete
- ii. Crack Injection with low viscous grout using injection packers.
- iii. Rust removal from existing corroded reinforcement.
- iv. Anti corrosive coating on reinforcement.
- v. Providing & fixing zinc based galvanic disk type anodes.
- vi. Providing & fixing shear connectors and new reinforcement.
- vii. Providing & applying bond coat, application of Polymer Modified Mortar (PMM) with hand application and with spray technology.
- viii. Jacketing work with Micro concrete.
- ix. Providing & applying concrete penetrating hi-tech corrosion inhabitation coating.
- x. Structural strengthening using Carbon Laminate System.
- xi. Structural strengthening using Fibre Wrapping System.
- xii. Application of Anti-carbonation coating on entire surface after repair.
- xiii. Any other item which is not mentioned but is available in BOQ will have to be executed by the contractor.
- xiv. The floating craft/Boat (if required & directed by Engineer) required for the work and the price quoted shall be deemed to be inclusion of the same.

2. निविदा हेतु चित्रकारी की सूची / LIST OF TENDER DRAWINGS

SR. No.	DRG. REF.	DESCRIPTION
1	REPAIR OF MARINE PILES DWG 1	Layout of Deck of Assembly shop.
	REPAIR OF MARINE PILES DWG 2	Layout of Deck Opposite to Assembly shop.

Enclosure-1

PRICE BID (PART-II)
BILL OF QUANTITIES
(To be submitted online)

Sub: Repair /Restoration of Marine Piles at NY, MDL.

Ref: MDL Tender No. 1800000044

INSTRUCTION TO THE BIDDER:

1. The Goods & Service Tax **IS NOT INCLUDED** in the rates indicated below for this section. Bidder is required to quote Goods & Service Tax **SEPERATELY** in Percentage which will be added to the rate quoted for this section.
2. Bidder to note Clause No. 2 (Defect Liability Period), Clause No 3 (Performance bank Guarantee), Clause No 5 (Safety and Training), Clause No 6 (Terms of Payment), Clause No 7 (Prices and Taxes), Clause No 12 (Housekeeping), Clause No 15 (Insurance), Clause No 11.10 (Availability of sand/ other construction material) of Volume II before quoting.
3. MDL reserves the right to increase the quantity of any item in the BOQ to 100 % in individual quantity of item provided the increase in the total Estimated Amount due to this change in the quantity over BOQ quantity multiplied by specified rate for all the items put together do not exceed 25% of the Accepted Contract Value. Bidder to note Clause No 13.1 of Volume II before quoting.
4. Bidder should also note Clause No 27 (Integrity Pact Bank Guarantee), Enclosure- 6 (Safety Officer) and Enclosure- 6 (Solvency Certificate) of Volume I before quoting.

SR. NO	Service Accounting Code (SAC)	ITEM DESCRIPTION	UNIT	QTY	RATE in ₹	AMOUNT
1		Providing and applying average 30mm thick POLYMER MODIFIED MORTAR (PMM) in proportion of 1 (Polymer) : 5 (Cement): 15 (Quartz sand) by weight with water cement ratio of 0.35 after application of bonding coat of approved make including cleaning of surface with air mixed with water under pressure, and in two layers and including curing after initial setting time etc. as per manufacturers specification etc. complete as directed. (Polymer manufactured by Krishna Conchem, Sunanda, Pidilite, BASF, BECK BOND, Fosroc or equivalent as approved by Engineer In-charge.)	M2	1700	1313.72	2233324

2	<p>Providing and applying average 15mm thick POLYMER MODIFIED MORTAR (PMM) in proportion of 1 (Polymer) : 5 (Cement): 15 (Quartz sand) by weight with water cement ratio of 0.35 after application of bonding coat of approved make including cleaning of surface with air mixed with water under pressure, and in two layers and including curing after initial setting time etc. as per manufacturers specification etc. complete as directed. (Polymer manufactured by Krishna Conchem, Sunanda, Pidilite, BASF, BECK BOND, Fosroc or equivalent as approved by Engineer In-charge.)</p>	M2	1150	885.37	1018175.5
3	<p>P/L MICRO CONCRETE : Replacing distressed / loose / cracked / porous carbonated, loose part of concrete with fibrous micro concrete and repairing the damaged surface of concrete, fix the form work / shuttering across the profile of damaged structural element, pour the free flow ready mix micro concrete mix with 5 lt to 7 lt of water in the form work. Micro concrete should be mixed in steel tray homogeneously makeup concrete is based on type of structural element and its location. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc. complete</p>	KG	126000	90.07	11348820

4	CHIPPING OF RCC : Breaking carefully the loose concrete of distressed member without damaging existing strong concrete by means of sharp chisel which should tempered regularly of high frequency low impact hammer is used, cleaning the surface by water jet pressure pump at 4 to 5 kg / sq cm pressure to remove chlorides and loose particles, air drying the surface etc. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor. (The damaged ceiling /concrete will be measured etc. complete)	M2	3200	107.78	344896
5	Dismantling R.C.C. Work including breaking concrete by chiseling, wedging etc., cutting the reinforcement, stacking the serviceable materials and stacking the debris up to a distance of 50 meters or spreading etc. complete.	M3	12	1905.85	22870.2
6	Replenishment/making up of lost area of reinforcement due to corrosion providing additional steel reinforcement. The steel shall confirm to IS 1786 grade Fe 415/Fe 500.Anchor the steel rebar in sound concrete body up to desire depth by structural GRADE Adhesive Anchor Fasteners of HILTI HY 150/RE500V3 or equivalent make, fixing of shear connectors of required length including drilling holes, cleaning holes, injecting epoxy in holes, placing shear connectors in position and	Kg.	46500	174	8091000

		<p>allowing to remain undisturbed till epoxy is set etc. as approved by Engineer in Charge. Fixing of Rebar is to be welded or binded by binding wires to existing steel/new steel/shear connector at regular grid as in compatibility to original design. Any additional space bars are welded to keep main reinforcement in perfect vertical position to keep the bar equidistant from center of gravity and center of mass, minimum diameter of stirrups should be 8 mm dia for columns and 10 mm dia for beams, slabs and maximum spacing should be 150 mm C/C or as directed by Engineer in Charge and designed results, minimum tensile strength should be 430 N/mm² aligning be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc...complete as directed by Engineer in Charge.</p>				
7		<p>Providing & applying approved epoxy resin EPIBOND of M/s. Krishna Conchem or equivalent before Polymer plaster/concrete to have the perfect bond between old concrete and new concrete/ polymer plaster surface using nylon brushes scaffolding labour etc. all complete as directed.</p>	Sqm	3200	367.45	1175840

8	Providing and applying Anticorrosive treatment to exposed Reinforcement portion with one coat of alkaline Rust Converter "feovert/ Rusticide or equivalent on exposed reinforcement after cleaning the surface by wire brushing, chipping to remove loose rust, followed by two coats of Rust preventive coating of IPNETRB (CBRI)/ POLYALK FIXOPRIME or equivalent make and penetration corrosion inhibitor EPCO KP-100/POLYALK CP113 or equivalent over adjoining concrete surface i) For Slab	Sqm	1100	268.17	294987
9	Providing and applying Anticorrosive treatment to exposed Reinforcement portion with one coat of alkaline Rust Converter "feovert/ Rusticide or equivalent on exposed reinforcement after cleaning the surface by wire brushing, chipping to remove loose rust, followed by two coats of Rust preventive coating of IPNETRB (CBRI)/ POLYALK FIXOPRIME or equivalent make and penetration corrosion inhibitor EPCO KP-100/POLYALK CP113 or equivalent over adjoining concrete surface. li) For Beam/column/piles/wall	Sqm	2100	334.7	702870
10	Providing and fixing Structural steel work riveted, bolted or welded in built up sections, trusses and framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer complete as directed by engineer.	Kg.	1000.00	93.6	93600

11	Supply and install hard wood edge protection having size 200mm x 150mm length 1.00 mtr, edge rounded including necessary bolting, grouting as directed including epoxy painting over a coat of wood primer etc complete.	Meter	100	8586.47	858647
12	Supply and fix florescent light marker in strip of approved quality, colour & size at the edge on wooden/RCC as directed by MDL.	Meter	100	2146.62	214662
13	Provide and install 25 thk Shalitek or approved equivalent joint filler board as specified.	SqM	25	4293.24	107331
14	PROVIDING & FIXING M.S LINER of 600 mm dia or any dia of required shape/size with 6 mm Plate including making male & female arrangement &/or Nut-bolts arrangement to piles including welding etc. complete as per the direction of Engineer In Charge.	MT	15	104553.23	1568298.45
15	Providing and erecting at site self supported steel H-Frame Scaffolding for all structural repairs of beam, slab, piles/ columns etc. with cross bracings of good quality (without dents & corrosion) to reach place of work including making approaches, extension, working platform, access ladder from new opening, internal ladders, lifting tackles necessary wall anchors for men and material movement till completion of all structural items of work and curing period and removal of the same after completion of work etc. complete. The work should be carried out with all the	M2	2200	244.63	538186

		safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor. This item should be used only for structural repair work for entire period (Payment should be only once considering total plan area irrespective of duration of scaffolding) etc. complete.				
16		Providing, Drilling and fixing M 20 X 260MM Anchor Bolt, including making holes in concrete/RCC and fixing the same with reinforcement etc complete as directed by EIC.	NOS	10	288.71	2887.1
17		Providing and fixing chicken mesh (Ref IS 3150) of 19 size of aperture at the junction of RCC members and brickwork of approved quality including fixing mesh in position by necessary railing in concrete or BB masonry and or tying by binding wire, complete as directed.	M2	600	408.4	245040
18		Making up the lost section of concrete/mortar with thixotropic repair mortar is one component thixotropic dual shrinkage compensated fibre reinforcement formulation for structural members .build up section by hand packing as per manufacturers specification, applied by mean of hand gloves by expert applicator, the rehabilitated surface should be free from air gaps, voids should be in line with existing concrete surface inclusive of curing, cleaning the area etc complete. The work should be carried out with all the	Kg	102000	81.37	8299740

		safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc complete as directed by Engineer in Charge				
19		Providing and Fixing Glass laminate (50mm x 2.5mm) on the structural members to take additional bending moment and shear to RCC slab, beams etc. by expert team of fixers with required bonding of high grade epoxy. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor. Etc... complete.	RMT	800	2925.3	2340240
20		P/F FIBER SHEAR ANCHOR : Providing & applying 10mm effective dia. Glass Fiber Anchor including drilling holes of 12mm dia. 100mm deep hole across the width and length span to fiber glass treatment, of readymade glass fiber anchor with spread of 100mm. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc. complete.	NOS	1000	336.43	336430

21	DOING EXCAVATION (HARD ROCK): Excavation for foundation in hard rock including boulders by chiseling, wedging, line drilling etc. including trimming and levelling the bed, removing the excavated material upto a distance of 100 meter beyond the building area and lift upto 1.50 meter, stacking as directed including dewatering manually, backfilling with available earth, murum, ramming and watering complete	M3	380	1282.51	487353.8
22	P/DOING SOILING 230MM THICK as per the direction of the Engineer In Charge	M2	630	936.55	590026.5
23	Providing and casting in situ dense and impervious M 40 grade cement concrete of trap metal for RCC Slabs, beams, columns, landing above 12.5 cm thickness and up to and inclusive of 15 cm thickness as per detailed designs and drawings or as directed including providing and erecting steel centering and shuttering with strutting, propping etc and removal of formwork, necessary compaction, roughening the surface if special finish is to be provided and curing (Excluding steel reinforcement)	M3	190	11012.35	2092346.5

24	<p>P/GROUTING EPOXY IN RCC BEAMS, SLABS ETC : Injecting low viscosity grade epoxy by pressure by epoxy or grouting pump and compressor. Mixing : - Material components DR BECK 505C + EH 411 HARDNER + SOLVENT 100:50:50 weight batching, Grouting : Fill the grouting gun with resin mix, maintain desired pressure at exit (7 to 10kg / Cm2) by monitoring pressure gauge at exit. Grout the material through prefixed nozzles in the structural elements till its refusal, seal the nozzle with epoxy sealent (EPCO 1010) after the refusal. Monitor leakages through other nozzles while grouting and seal them as per the requirement. Repeat the process all the nozzles. Complete the operation at pot life of material, grouting is continued to all the nozzles from bottom to top and not from top to bottom. Cleaning the gun and accessories : - Clean the gun and the accessories (Valves, pipes and other fixtures) with T-60 thinner / or equivalent of dr. fixit, krishna chemical, sunanda etc. after the operation to avoid jamming of gun. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc. complete.</p>	KG	2000	1163.77	2327540
25	<p>Providing & fixing anchor fastener 12mm x 100mm, including drilling the hole etc. Complete as per the direction of Engineer In Charge.</p>	NOS	1000	192.6	192600

26		CORE CUTTING 100 MM DIA : Core Cutting by Mechanical Measures in RCC Element for 50mm dia & upto 300mm lap etc all complete as per the direction of Engineer In charge.	NOS	75	1997.25	149793.75
27		Dismantling plain cement concrete work including breaking concrete by chiseling, wedging etc. and filling, levelling the dismantled concrete in the low level areas and levelling the the bed, stacking the serviceable materials etc. complete.	M3	93	1077.8	100235.4
28		P/APPLYING CONCRETE PENETRATING HITECH CORROSION INHIBITOR : P/A two coats of concrete penetrating hi-tech corrosion inhibition mechanism inhibits corrosion of steel in concrete at the poles, cathode & anodic simultaneously on concrete surface and steel surface. This is applied by paint brush thoroughly on concrete surface which is prepared earlier. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor. (The damage ceiling / concrete all be measured) etc. complete	M2	4500	496.63	2234835
29		P / Doing fiber wrapping : Providing and Applying 940 GSM Unidirectional Glass fibre Sheet, the surface to be applied with is prepared in round or with minimum two dimension, the same is applied with two component epoxy primer by paint brush to fill all the gaps, sents etc. and left for curing ,the saturate	M2	700	4345.98	3042186

		two component epoxy is applied on the surface liberally and fibre glass sheet is applied/fixed on the structural element, the mat is saturated properly and made with additional mechanical bonding, cleaning surface and the vicinity etc. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc complete as directed by Engineer in Charge.				
30		GALVENIC ANODE : Providing and Fixing zinc based galvanic disk type anodes (SUNANODE - SUNANDA MAKE) or Canode of Krishna make or equivalent to the reinforcement on column / beam as directed. The anode shall be connected to the reinforcement steel by connectors provided with the anode application area is at the junction of repair. One anode per meter including typing to bar etc. complete work shall be executed by certified applicator only and work shall be executed by certified applicator only and work shall be guaranteed for 5 years.	NOS	2300	954.05	2194315

31	ANTI CARBONATION COATING : Providing high performance Anti carbonation protective coating for repair with mortar and micro concrete for repaired / new surface, by cleaning the surface to remove dirt, loose particles etc. by wire brush or any other suitable method and applying a primer coat of SUNDEKOTE SP by mixing 400-500 ml of potable water in clean container. Apply by brush, roller or spray. After 24 Hrs. apply two more coats of SUNDEKOTE SP without addition of water at an interval of 24 hrs. between each coat (for ease of application if required add water not more than 100 ml). After final coat / layer is completed allow it to set for 24 hrs. Work shall be executed by certified applicator only and work shall be guaranteed for 5 years.	M2	4510	309.26	1394762.6
32	Providing & applying one component pre-packed cement based spray mortar MasterEmaco S 810, Dr. Fixit Polymer Mortar HB or equivalent, using spraying equipment, including providing and applying bonding / priming coat as specified by the manufacturer etc. Cost includes material, manpower, shuttering etc. complete as specified and as directed.	Kg	325000	54.93	17852250
33	Providing and fixing Solar road studs red colour in aluminium casting with blinking lights.	NOS	20	4537.68	90753.6
34	Providing and fixing road studs made from polycarbonate Abs material in white/red and yellow/red colour.	NOS	200	555.3	111060

35	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete. - Steel supplied by MDL	Kg.	1000	41.33	41330
36	Dismantling steel work in built up sections in angles, tees, flats and channels including all gusset plates, bolts, nuts, cutting rivets welding etc. including dismembering and stacking within 50 meters lead.	Kg.	1000	3.32	3320
37	Providing and laying in position plain ready mix M20 grade cement concrete (RMC) as per approved mix design based on guidelines given in IS 456:2000 for foundation and bedding the item inclusive of admixtures of approved manufacturing company required during the period of transportation to maintain the workability of concrete. The RMC concrete should be manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads having continuous agitated mixer including admixtures to accelerate, retard setting of concrete to improve the workability impairing strength and durability. The items includes pumping/laying of RMC from transit to site of laying includes bailing out water manually centering, shuttering compacting by vibrator and curing etc. complete (excluding reinforcement)	CuM	60	7781.01	466860.6

38	Providing & fixing in position reinforcement bars including straightening, cutting, bending, placing in position & binding with binding wires / welding where ever necessary for slabs / beams / columns; etc. all complete as directed at any location (Lapping / chairs will be measured & paid) Thermo-Mechanically Treated bars	Kg	1000	78.37	78370
39	Disposal of excavated earth, building rubbish / malba / ROCK (hard/soft) similar unserviceable, dismantled or waste materials by mechanical means, including loading, transporting, unloading to approved Municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all leads including all lifts involved.	CuM	645	570.38	367895.1
40	Removing Existing Shells/Burth from piles with grinder machine	SqM	458.754	1080	495454.32
41	INJECTION PACKER: Providing and Fixing standard injection packers of 10 mm diameter after drilling holes of required diameter along the crack, sealing the packer inside the hole in square area of 25 mm x 12 mm, with 15 mm thick Polymer Mortar in proportion of (1:5:15) , removal of packer after grouting inclusive of all Material, manpower and equipment complete etc as per direction of Engineer in Charge / Consultant.	NOS	537	124.02	66598.74
	Total				74217731.16
	Goods & Service Tax (in Percentage)				
	GRAND TOTAL				