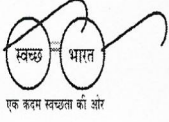


दीनदयाल पत्तन प्राधिकरण
DEENDAYAL PORT AUTHORITY



Office of the Executive Engineer (C-I),
Administrative Office Building
Room no. 206, First Floor
Post Box No. 50, Gandhidham-Kachchh
Email: dpt.roro@gmail.com
www.deendayalport.gov.in

No: CN/WK/Ghogho/1666/ 691

Date: 12.02.2026

To,

_____,
_____,

Expression of Interest

Sub: - Request for EOI for “Fabrication, Installation of New Pontoon and Repair and Maintenance of Existing Pontoon for Ro-Ro/Ropax Facility at Ghogha-Gujarat.” - Reg.

Sir,

Deendayal Port Authority intends to carry out the work for “Fabrication, Installation of New Pontoon and Repair and Maintenance of Existing Pontoon for Ro-Ro/Ropax Facility at Ghogha-Gujarat”.

Kindly submit your Expression of Interest along with a budgetary – offer as per the prescribed format i.e. Annexure – I and II.

The rates quoted must be inclusive of all taxes, duties for performing the scope of work & exclusive of GST. The GST applicable shall be shown separately, which shall not be considered for evaluation purposes.

Your expression of interest along with a budgetary quotation for the above work should reach the following address on or before 20.02.2026 by 15:00 Hrs.

Address: -

Office of the Executive Engineer (C-I),
Project Division, Administrative Office Building,
Room No. 206, First Floor, Annexe,
P.O. Box No. 50, Gandhidham – Kachchh.

Thanking you,

Yours faithfully,

- Sd -

Executive Engineer (C-I)
Deendayal Port Authority

Project Division								
Name of Work :- FABRICATION, INSTALLATION OF NEW PONTOON AND REPAIR AND MAINTENANCE OF EXISTING PONTOON FOR RORO/ROPAX FACILITY AT GHOGHA- GUJARAT								
Budgetary quotation Sheet								
Annxure-I								
Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
Part - A :- NEW PONTOON								
A1	Supply, fabricate, handle and transport Structural steel shapes, plates, special plates and built-up sections in pontoon confirming to steel grades specified in construction drawings and specifications including profile cutting, assembling, hoisting, fixing in position, welding, inspection, transportation and erection at site as per drawings and specification including cost of all materials, fitting charges, all labour charges, and minor tools etc. complete. The cost shall include all fabrication, minor equipment, transportation by suitable means and instruments required for installation of pontoon at site and all labour charges etc. complete. It is hereby explicitly stipulated that all preparatory works associated with the establishment and operation of the fabrication yard—including, without limitation, site levelling, temporary works, access and logistical arrangements, provision of utilities, and all facilities and measures necessary for the safe and proper launching of the pontoon into the water—together with any and all survey works required in connection with these activities, shall be deemed to be fully included within the quoted rate. No separate or additional claim on these grounds shall be admissible or entertained.Following clauses apply to the floating pontoon fabrication and installation. i. Structural steel shall comply with Project Specifications Annexure-II Clause 1 and the coating system shall comply with the Project Specifications Annexure-II Clause 2. ii. Plan approval from classification society has been obtained by Employer including payment to Classification society for plan approval. iii. Contractor shall obtain classification society approval for its material, fabrication including payment to certification agency for inspection and survey, surveyors to visit, inspect and approve the materials, and fabrication. iv. Contractor shall arrange for the transportation of surveyors and pay for the day charges as per the number of visits required during materila inspection and fabrication. v. All fabrication, welding, cutting, bending of plates on site to be as per BS 5400 Part 6 / AWS D1.1 and relevant classification society (IRS/ABS/BV etc.) rules etc. including surveying/ supervision of fabrication and obtaining certification approval from classification society (IRS/ABS/BV etc.).							
		1	1	1289.00		M.T.		
A2	Supply, fabricate and install Aluminum anodes of 95 kg net weight (GALVALUM III) as per specifications and drawings to the pontoon bottom surface and inside the compartments as per the locations indicated in the drawings using welded connections to protect the surface against corrosion. The anode characteristics, design and material composition shall be all as per specifications.							
		42	1	42.00		No.		
A3	Supply and provide manpower for surface preparation to SA 2.5 and Painting internal and external surfaces of pontoon with 4 coats of anti-corrosive epoxy painting system with minimum 750 DFT including tools, equipment, manpower, material etc. all inclusive as per specifications.							
		1	1	25178.00		Sq. Mt.		
A4	Supply, and provide manpower for Non-skid Painting on the deck surfaces of pontoon of suitable specification including tools, equipment, manpower, material etc. complete. Antiskid finish shall be minimum 5.5mm Nominal Thickness using Cicol NT Slurry by ROCOL UK (or equivalent approved make) + 5.0mm compatible aggregate on top surface of the pontoon.							
		1	1	1500.00		Sq. Mt.		
A5	Supplying, testing, fixing and installation of Dipti Arch fender -DAV 1000H or equivalent system including cost of fender with all its accessories, steel fender frame, PTFE facial pads (low friction), chains, anchors including all labour charges, transportation charges up to site, installation and fixing of fenders on to the face of the pontoon and minor tools etc., complete.							
		1	1	30.00		R. Mt.		
A6	Supplying, transporting, fixing and installation of watertight steel manhole covers provided on the deck surfaces of pontoon as shown in drawings including the cost of manhole cover with all its accessories,cover plates,handles,bolts, all labour charges, transportation charges up to site and minor tools etc., complete.							
		32	1	32.00		No.		
A7	Supplying, transporting, fixing and installation of UHMW - PE Rubber Pad as shown in drawings including the cost of Rubber Pad and all other fittings,labour charges, transportation charges up to site and minor tools etc., complete.							
		4	1	4.00		No.		

Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
A8	Supplying, transporting, storing, fabricating & erecting in position and testing/examining welded and hot dipped galvanised (120 microns) iron works made of pipes, plates, shapes, bars, strips, and rods for base plates, crash barrier, edge protection and miscellaneous works including labour charges, tools, tackle and installation etc. complete. The cost shall include, base plate grouting, anchor bolts, etc. No separate payment will be made for these items.							
		1	1	9.00		MT		
A9	Providing, Installing and commissioning of Centrifugal Pumps set with accessories for ballasting and de-ballasting having flow rate of 510 Cu/hr, pump head of 6 Mtr. Pump power input at duty point of 10.55 KW, Driver motor of 15 KW and rated speed of 1450 RMP. Note: a) Pump should be Kirloskar or equivalent make b) Cost include all pipeline and commissioning of pump for ballasting and deballasting of water in to the pontoon compartments. c) Any residual engineering required to coordinate with the pump vendors, electrical connection and piping within the pontoon shall be carried out by the contractor.							
		2	1	2.00		No.		
Part - B :- MODIFICATION OF EXISTING PONTOON								
B1	The scope includes disconnection of existing pontoon of weight 1350 MT from the guide pin piles (after securing the linkspan structure with new guide pile support), inspection, obtaining permission/approval from IRS, DNV, and/or BV. for towing to the pontoon from existing location to the proposed dry-docking location identified by DPA within the existing RO-RO terminal including any dry transport by barge and safely storing in the proposed location. The cost should include all manpower, equipment hire / rental or own such as crane, floating vessels or floating crane, barge, tugboats, trailers, hydraulic jacks etc. and all other accessories for the relocation and temporary supports beneath the pontoon etc. The bidder shall propose in the bid the transportation methodology for the existing pontoon.							
		1	1	1.00		No.		
B2	Supply, fabricate, transport, handle and erect in position of Structural steel shapes, plates, special plates and built-up sections in modified pontoon confirming to steel grades specified in construction drawings and specifications including profile cutting, assembling, hoisting, fixing in position, welding, inspection as per drawings and specification including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. Following clauses apply to the floating pontoon fabrication and installation. i. Structural steel shall comply with Project Specifications Annexure-II Clause 1 and the coating system shall comply with the Project Specifications Annexure-II Clause 2. ii. Plan approval from classification society has been obtained by Employer including payment to Classification society for plan approval. iii. Contractor shall obtain classification society approval for its material, fabrication and installation including payment to certification agency for inspection and survey, surveyors to visit, inspect and approve the materials and modification . iv. Contractor shall arrange for the transportation of surveyors and pay for the day charges as per the number of visits required during fabrication and installation. v. All modification, welding, cutting, bending of plates on site to be as per BS 5400 Part 6 / AWS D1.1 and relevant classification society (IRS/ABS/BV etc.) rules etc. including surveying/ supervision of fabrication and obtaining certification approval from classification society (IRS/ABS/BV etc.). vi. All tests on materials + Welds (Ultrasonic, dye penetration for welds + Water tightness test).							
		1	1	147.00		M.T.		
B3	Supply, fabricate, transport, handle and erect in proposed ramp strcuture made of Strcutual steel tubular members of any diameter conforming to API SL Grade B or its equivalent and/or Structural steel shapes, plates, anchor bolts and built up sections conforming to IS 2062 Grade BR-E250 including profile cutting, assembling, hoisting, fixing in position, welding, inspection and applying a priming coat of approved steel primer and top coat of minimum thickness as specified in the specifications made of approved paint all as per specifications and drawings including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. The cost shall include all fabrication, transportation of the steel structure assembly in part or as a whole, lifting using floating crafts and cranes, erection and fixing on the pontoon with appropriate supporting arrangement, base plates and anchor bolts etc complete.							
		1	1	10.00		M.T.		
B4	Providing and laying Reinforced Cement concrete of M-30 grade with 20 mm and down size graded crushed stone aggregates/ gravel in pontoon for slabs, surface application for all concrete surfaces, and including plasticizer and Bipolar as per manufacture's specification providing pockets, openings, recesses, chamfering, etc., wherever required, vibrating, tamping, curing and rendering if required to give a smooth and even surface etc. (excluding the Cost of Reinforcement) for all depths in any shape, position and thickness etc. all complete as specified, shown and directed.							
		1	1	90.00		Cu. Mt.		

Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
B5	Supply, deliver and transportation of CRS reinforcement steel with a minimum yield strength of 500 N/mm2 and minimum elongation of 16% or equivalent confirming to IS 1786 with corrosion resistant (CR) element for Fabrication and fixing of reinforcement cages as per drawing for cast-in-situ piles, slabs, in link span support structure and pontoon etc including cost of fabrication, fixing dowels, shear ties, cutting, bending, tying, lapping and welding in position wherever necessary with black 18 SWG annealed binding wire, all labour charges, transportation charges of all materials to Work Site, cost of binding wires, all other items including cover blocks required for the work and minor tools etc. complete.							
		1	1	90.00				
				300.00		kg/cum		
				27.00		M.T.		
B6	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge. The cost of dismantling includes tools, equipment, manpower, material etc. all inclusive as per specification.							
		1	1	24.00		Cu. Mt.		
B7	Dismantling of structural steel members, plates, shapes and tubular members on the existing pontoon as per the drawings including the cost of cutting, removing, transportation and safe storage of the removed materials. The cost of dismantling includes tools, equipment, manpower, material etc. all inclusive as per specification. The cost also includes site visit, inspection and approval from the classification society.							
		1	1	7.00		M.T.		
B8	Supply, fabricate and install Aluminum anodes of 95 kg net weight (GALVALUM III) as per specifications and drawings to the pontoon bottom surface and inside the compartments as per the locations indicated in the drawings using welded connections to protect the surface against corrosion. The anode characteristics, design and material composition shall be all as per specifications.							
		42	1	42.00		No.		
B9	Supply and provide manpower for surface preparation to SA 2.5 and Painting internal and external surfaces of pontoon with 4 coats of anti-corrosive epoxy painting system with minimum 750 DFT including tools, equipment, manpower, material etc. all inclusive as per specifications.							
		1	1	2362.00		Sq. Mt.		
B10	Supply, and provide manpower for Non-skid Painting on the deck surfaces of pontoon of suitable specification including tools, equipment, manpower, material etc. complete. Antiskid finish shall be minimum 5.5mm Nominal Thickness using Cicol NT Slurry by ROCOL UK (or equivalent approved make) + 5.0mm compatible aggregate on top surface of the pontoon.							
		1	1	936.00		Sq. Mt.		
B11	Supplying, testing, fixing and installation of Dipti Arch fender -DAV 1000H or equivalent system including cost of fender with all its accessories, steel fender frame, PTFE facial pads (low friction), chains, anchors including all labour charges, transportation charges up to site, installation and fixing of fenders on to the face of the pontoon and minor tools etc., complete.							
		1	1	30.00		R. Mt.		
B12	Supplying, transporting, fixing and installation of watertight steel manhole covers provided on the deck surfaces of pontoon as shown in drawings including the cost of manhole cover with all its accessories,cover plates,handles,bolts, all labour charges, transportation charges up to site and minor tools etc., complete.							
		2	1	2.00		No.		
B13	Supplying, transporting, storing, fabricating & erecting in position and testing/examining welded and hot dipped galvanised (120 microns) iron works made of pipes, plates, shapes, bars, strips, and rods for base plates, crash barrier, edge protection and miscellaneous works including labour charges, tools, tackle and installation etc. complete.							
	The cost shall include base plate grouting, anchor bolts, etc. No separate payment will be made for these items.							
		1	1	4.00		MT		
Part - C :- LINKSPAN SUPPORT STRUCTURE								
C1	Supply and fabricate structural steel pipe piles of 1200mm diameter with thickness and material as specified in construction drawings and specifications or its equivalent including profile cutting, assembling, welding, inspection including cost of all materials, fitting charges, all labour charges and minor tools etc. complete. The cost shall include all transportation, handling, loading, unloading, lifting etc., for the fabricated piles at site till final position. Note: The concrete and the reinforcement for the piles are paid separately							
		1	1	171.00		M.T.		

Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
C2	Driving of steel pile to the specified termination level and drilling and removal of soil plug inside the pile as per the construction drawing. The cost shall also include positioning the pile at the location as per construction drawings and driving below existing sea bed level to the required depth (the depth shall be as specified in the construction drawings, specifications and as directed by the Engineer in-charge or Authority Engineer) for linkspan support structure including all equipment such as jack up barge, pile driving hammer, drilling equipment for removal of soil plug etc. complete. The cost shall include the required tests to be conducted at site and laboratory as instructed by the engineer-in-charge.							
		1	1	88.00		R. Mt.		
C3	Providing and laying design mix concrete of RCC M40 grade in accordance with IS 456 (Latest Edition) using coarse aggregate, sand and 53 grade Portland Slag cement confirming to IS 455 for RCC piles by using tremie with hopper arrangements, excluding cost of fabrication, fixing of reinforcement, centering and shuttering, which will be paid separately, but including cost of cement, stone chips, sand, cost of all labour charges, mixing, conveying, placing, consolidation, screening and washing of coarse aggregate and sand, transportation charges of all materials to the Work Site, hire charges and running charges of batching plant, vibrator, consumables and all other equipment, cost of minor tools etc. complete. (The design mix shall be approved by laboratory Approved by NABL, Govt. of India).							
		1	1	159.00		Cu. Mt.		
C4	Supply, deliver and transportation of CRS reinforcement steel with a minimum yield strength of 500 N/mm2 and minimum elongation of 16% or equivalent confirming to IS 1786 with corrosion resistant (CR) element for Fabrication and fixing of reinforcement cages as per drawing for cast-in-situ piles, slabs, in link span support structure and pontoon etc including cost of fabrication, fixing dowels, shear ties, cutting, bending, tying, lapping and welding in position wherever necessary with black 18 SWG annealed binding wire, all labour charges, transportation charges of all materials to Work Site, cost of binding wires, all other items including cover blocks required for the work and minor tools etc. complete.							
		1	1	55.00		M.T.		
C5	Supply, fabricate, transport, handle and erect in position of Structural steel shapes, plates, special plates and built-up sections in link span and link span support frame confirming to steel grades specified in construction drawings and specifications including profile cutting, assembling, hoisting, fixing in position, welding, inspection and painting of priming coat and top coat as per drawings and specification including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. The cost shall include all fabrication, transportation of the support frame assembly, minor equipment, installation of frame on to the piles and all labour charges etc. complete.							
		1	1	18.00		M.T.		
C6	Supply, fabricate, transport, handle and erect in position of structural steel frame made of structural steel pipes, through thickness steel tubulars, plates, special plates with through thickness quality and built-up sections conforming to steel grades specified in construction drawings and specifications including profile cutting, assembling, hoisting, fixing in position, welding, inspection as per drawings including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. The cost shall include all fabrication, transportation of the frame assembly, minor equipment, installation of frame by lifting and placing and welding with through thickness weld and all labour charges etc. complete.							
		1	1	56.00		M.T.		
C7	Supply, fabricate, install Aluminium anodes of 95 kg net weight (GALVALUM III) as per specifications and drawings to the guide pin piles as per the locations indicated in the drawings using welded connections to protect the surface against corrosion. The anode characteristics, design and material composition shall be all as per specifications.							
		16	1	16.00		No.		
C8	Conducting geotechnical investigation of soil at the proposed locations as per the drawings including the cost of boring through soils of various strengths and drilling through all kinds of weathered and hard rocks, collection of 90/100mm diameter and 450mm long undisturbed samples from bore holes, conducting SPT in in-situ condition and conducting laboratory experiments on the samples. The cost shall also include preparation and submission of draft report for comments and geotechnical investigation report including detailed results of laboratory studies, recommendation for foundation design etc. including the cost of jack-up barge, drilling rig, other drilling tools and accessories and personnel, minor tools etc. The cost may also include the cost of mobilisation and demobilisation of the equipments and personnel.							
		2	1	2.00		No.		

Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
Part - D :- MODIFICATION OF LINKSPAN								
D1	Supply, fabricate, transport, handle and erect in position of Structural steel shapes, plates, special plates and built-up sections in linkspan modification confirming to steel grades specified in construction drawings and specifications including profile cutting, assembling, hoisting, fixing in position, welding, inspection and painting of priming coat and top coat as per drawings and specification including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. The cost shall include all fabrication, transportation of the linkspan assembly, minor equipment, installation of members of linkspan and all labour charges etc. complete. complete. Following clauses apply to the linkspan modification and installation. i. Structural steel shall comply with Project Specifications Annexure-II Clause 1 and the coating system shall comply with the Project Specifications Annexure-II Clause 2. ii. Plan approval from classification society has been obtained by Employer including payment to Classification society for plan approval . iii. Contractor shall obtain classification society approval for its material, fabrication and installation including payment to certification agency for inspection and survey, surveyors to visit, inspect and approve the material and modification. iv. Contractor shall arrange for the transportation of surveyors and pay for the day charges as per the number of visits required during fabrication and installation. v. All modification, welding, cutting, bending of plates on site to be as per BS 5400 Part 6 / AWS D1.1 and relevant classification society (IRS/ABS/BV etc.) rules etc. including surveying/ supervision of fabrication and obtaining certification approval from classification society (IRS/ABS/BV etc.). vi. All tests on materials + Welds (Ultrasonic dye penetration for welds + Water tightness test)	1	1	31.00		M.T.		
D2	Dismantling of structural steel members, plates, shapes and tubular members on the existing linkspan bridge as per the drawings including the cost of cutting, removing, transportation and safe storage of the removed materials. The cost of dismantling includes tools, equipment, manpower, material etc. all inclusive as per specification. The cost also includes site visit, inspection and approval from the classification society.	1	1	216.00		M.T.		
D3	Supplying, transporting, fixing and installation of Ramp protector as shown in drawings including the cost of Ramp Protector and all other fittings,labour charges, transportation charges up to site and minor tools etc., complete.	1	1	21.00		Sq. Mt.		
D4	Supply, fabricate, transport, handle and erect in position proposed trolley structure made of Structural steel shapes, plates, anchor bolts and built up sections conforming to IS 2062 Grade BR-E250 including profile cutting, assembling, hoisting, fixing in position, welding, inspection and applying a priming coat of approved steel primer and top coat of minimum thickness as specified in the specifications made of approved paint all as per specifications and drawings including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete. The cost shall include all fabrication, transportation of the steel structure assembly in part or as a whole, lifting using floating crafts and cranes, erection and fixing on the linkspan with appropriate supporting arrangement, roller plates etc complete.	1	1	6.00		M.T.		
D5	Supply, fabricate, transport, handle and erect in position Hot dipped Galvanised Electro forged Grating purchased from approved manufacturer and thickness as shown in construction drawings and all as per specifications including clips, supports using steel conforming to IS 2062 Grade E250 A/B including cutting, hoisting, fixing in position and including cost of all materials, fitting charges, all labour charges, transportation charges and minor tools etc. complete.	1	1	10.00		Sq. Mt.		
Part - E :- ELECTRICAL AND FIRE FIGHTING WORKS								
E1	Supplying, testing and fixing of LED lighting system including 3 m high lighting poles at the bridges and side corners of the pontoon, complete with LED luminaires, poles, mounting brackets/arms, junction boxes, internal and external wiring, cables, conduits, connectors, earthing arrangements, control gear and all other accessories required for proper functioning of the lighting system. The item shall also include transportation of lighting poles, LED lights and fixtures to site, erection, alignment, testing, commissioning, all labour charges, use of minor tools and tackles, and any incidental works necessary for satisfactory completion of the item, as per specifications and directions of the Engineer-in-Charge.	1	4	4.00		Nos		

Item No.	Description of Items	Number		Quantity	Rate	Unit	Amount in word	Amount in Figure
		Nos.	Nos.					
E2	Supplying, transporting, installing, testing and commissioning of 75 kg Dry Chemical Powder (DCP) fire extinguisher, trolley-mounted type, complete with cylinder, discharge hose, nozzle, operating valve, pressure gauge, wheels, trolley frame, safety pin, wall/ground signage, certification tags and all accessories, conforming to relevant IS/IMO/Marine safety standards, including all labour, handling, transportation to site, fixing in position, testing, commissioning and handing over, complete as directed by the Engineer-in-Charge.							
		1	2	2.00		Nos		
E3	Supplying, transporting, fixing, testing and commissioning of 5 kg Dry Chemical Powder (DCP) fire extinguisher, portable type, complete with cylinder, hose, nozzle, operating valve, pressure gauge, mounting bracket, safety pin, identification signage, certification tags and all required accessories, conforming to applicable IS standards, including all labour, transportation, installation, testing and commissioning, complete as directed by the Engineer-in-Charge.							
		1	8	8.00		Nos		
E4	Supplying, transporting, fixing, testing and commissioning of 6.8 kg Carbon Dioxide (CO ₂) fire extinguisher, portable type, complete with seamless cylinder, discharge horn/nozzle, operating valve, safety pin, mounting bracket, identification signage, certification tags and all accessories, conforming to relevant IS/Marine safety standards, including all labour, transportation to site, installation, testing and commissioning, complete as directed by the Engineer-in-Charge.							
		1	6	6.00		Nos		
E5	Supplying and placing of marine-grade life jackets, SOLAS/approved type, made of buoyant material with reflective tapes, whistle, adjustable straps and fastening arrangements, suitable for adult use, complete with inspection tags and markings, including transportation to site, handling and placement in designated locations, complete as directed by the Engineer-in-Charge.							
		1	50	50.00		Nos		
E6	Supplying, transporting and fixing of life buoy rings, marine-grade, made of high-visibility buoyant material, complete with grab line/rope, mounting bracket, buoy light (where required), identification markings and accessories, suitable for marine and pontoon applications, including all labour, transportation, fixing in position and making good, complete as directed by the Engineer-in-Charge.							
		1	6	6.00		Nos		
	SUMMARY							
				Estimated project cost (A+B+C+D) = Rs.				

Project Specifications**1. Materials****1.1. Structural Steel**

All steelwork comprising of rolled shapes, plates and pipes shall comply with IS 800, IS 808, IS 2062 and relevant international standards such as British codes, ASTM, API and Euro Norms, unless specified otherwise. The material for the steel structures shall be selected from the table below together with the material requirement specified in the GFC drawings. Any substitution shall not be allowed unless it is approved by the Engineer.

No	Application	Specification	Minimum Yield Strength (MPa)
1	Plates and Shapes for Floating Pontoon secondary structures – handrails support, coming, pile liners and miscellaneous applications.	IS 2062 E250 Quality A	250
2	Plates and Shapes for Floating Pontoon - Plates [bottom, Side shell, Deck and Bulkhead], Primary Girders/Web Frames, all Secondary members & brackets for all primary & secondary members - manhole cover, hatch covers, crash barrier, stiffening under equipment. - Pile Guide SHS 500X500 section Plates & Shapes for Linkspan Bridge - Roadway Plate in Linkspan bridge, Transition Flap structural plates - Longitudinal & Transverse Girders in Linkspan Bridge, Stiffener plates in Transition flap structure, brackets, - Hinge plates & wing plates in flap structure - Main Hinge plates, stiffener plates, side plates, vertical & Horizontal plates, closing plates at Sliding & Hinge support of Bridge structure	ASTM-A131-DH36 Or Equivalent Indian Grade Steel (IS 2062 E350 Quality C)	350
3	Plates for rolled tubulars for linkspan bridge top and bottom chords (other than at joints) and guide pin piles. Ø 508X16mm, Ø 508X25mm, Ø 610X20 mm Diameter larger than 406mm (Rolled as per API Spec. 2B)	ASTM-A131-DH36 Or Equivalent Indian Grade Steel (IS 2062 E350 Quality C) (Rolled as per API Spec. 2B)	350
4	Plates and plates for rolled tubulars for through thickness application (Z'') above 19mm thickness involving primary items at critical areas like tubular joint in linkspan bridge, framed steel structure, installation pad eyes, lifting eyes and cheek plates and other applications requiring through thickness load transfer.	API 2H Grade 50Z with through thickness property (Z35) and Low Sulphur content (Rolled as per API Spec. 2B)	345

No	Application	Specification	Minimum Yield Strength (MPa)
5	Solid Pin for Linkspan bearing supports at both ends.	42CrMo4 Steel pin	600
6	Anchors bolts for all base plates.	IS5624 & IS 1367 Part 3 – Class 8.8	640
7	Structural bolts for steel connections.	IS3757 & IS 1367 Part 3 – Class 8.8	640
8	Steel Grating	ASTM A36	250
9	Handrail pipes	IS 1161 Yst 250	250
10	Sacrificial Anodes	GALVALUM III or equivalent	-

Notes

- All material shall be new stock and shall be free from deformations.
- All steel shall be manufactured by processes which ensure a product which is substantially free of segregation.
- All fabricated structural pipe shall conform to API Specification 2B, "Specification for Fabricated Structural Steel Pipe", except as modified by this General Specification.
- Spirally welded pipe shall not be used. ERW pipe may be allowed provided that it is supplied from an API certified manufacturer.
- All fabricated structural pipe less than 762mm O.D. shall conform to API Specification 5L, "Specification for Line Pipe", except as modified by this General Specification.
- Contractor shall furnish three (3) certified original mill certificates for all pipe, structural shapes, and plate for integration into the Trace of Material Notebook. Mill certificates shall include chemical analysis, and mechanical and non-destructive examinations and shall be identified by heat number, plate number, mill certificate number, page number, purchase order number, and mill identification.
- All testing of material shall be witnessed by an Engineer/Engineer's Representative who shall also countersign the mill certificate and shall be approved by the classification society surveyor.
- Grating and stair treads shall be steel, 32mm X 5mm serrated bar grating with bearing bars at 30mm on centres and cross bars at 50mm on centre except as modified on Fabrication Drawings. All gratings shall be serrated and galvanized.

1.2.Special Requirements

Fabrication, welding, cutting bending of plates to be as per BS5400 Part 6 and relevant classification society (IRS/ABS/BV/DNV etc.) rules. Contractor has to bear the cost of classification society surveyor visits including transportation and day charges based on the number of visits during inspection and approval. Where provisions of BS: 5400-6 differ from Classification Society rules, the Classification Society rules shall be adopted.

Structural steel shall comply with the applicable national steel standards listed in section 2.0. and the supplementary requirements given in this section. All steel shall be new and unused. All steel shall be manufactured by basic oxygen or electric arc furnace processes. All steel shall be fully killed and made to fine grain practice.

Unless further restricted by the applicable national material standard, the maximum permitted carbon equivalent (C.E.) shall be 0.43.

$$CE = C + (Mn/6) + (Cr+Mo+V)/5 + (Ni+Cu)/15$$

Steel greater than 10mm thick shall be Charpy-V impact tested at a maximum temp of 0°C, at a minimum frequency of one test set per cast and heat treatment batch.

Plate material shall be examined by ultrasonic examination in accordance with ASTM A435 as follows: -

For plate thickness of 12.5mm and above, 5% of plates from each heat produced shall be examined. Should any plates not comply with the acceptance criteria of ASTM A435 then a further 5% of plates from the same heat shall be examined. Should any of these plates then be found defective then all other plates from that heat shall be examined.

For plate used to fabricate lifting points (padeyes, padears), 100% of plates from each heat shall be examined by ultrasonic examination.

Where structural members are identified during structural analysis as being subject to high through thickness stress the use of material with guaranteed through thickness properties (Z-Quality) (Z35) is required.

Z-Quality Plate shall comply with the following:

All plate to be subject to 100% ultrasonic examination in accordance with ASTM A435 or BS 5996.

1. Maximum permitted sulphur content to be 0.005% (Ladle).
2. The through-thickness tensile strength shall be not less than 80% of the minimum specified tensile strength.
3. The minimum short transverse reduction of area shall be 35% average, and 25% individual reading when measured in accordance with the testing and sampling requirements of BS EN 10164.

CONTRACTOR shall fully define materials requirements in his steel MR including any items listed in the applicable national steel standard that are subject to purchaser / supplier agreement. CONTRACTOR shall also specify material certification level and inspection requirements to the steel supplier. Minimum Certification level for primary structural members shall be ISO 10474 3.1B.

All structural steel shall be fully identified against the relevant material certificate. Material identification marking shall be transferred during cutting such that full traceability is achieved.

All bolting materials shall be hot dip galvanized in accordance with IS 1367 (Part 13) or equivalent.

1.3.Fasteners

All bolts, screws, nuts and other fasteners shall be of adequate cross-sectional area to safely withstand the envisaged or specified working forces. Unless otherwise specified all fasteners shall be at least of carbon steel according to IS 1363 and shall be hot dip galvanized. All anchor bolts shall be furnished with at least two nuts to facilitate installation.

1.4.Welding Electrodes

Steel welding electrodes shall comply with the requirements of IS 814, except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel during its use with the maximum amperage as specified by the manufacturer.

1.5.Plant Inspection

The Contractor shall provide the Engineer's Representative with full access to inspect materials and fabrication. The Engineer's Representative may undertake the inspection of materials at the source. Manufacturing plants may be inspected periodically for compliance with specified manufacturing methods, and materials samples shall be obtained for laboratory testing for compliance with materials quality requirements. This may be the basis for acceptance of manufactured lots as to quality. In the event plant inspection is undertaken, the following conditions shall be met:

- The Engineer's Representative shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.
- The Engineer's Representative shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.
- The inspection agency shall be advised of the production and/or fabrication schedule a minimum of 48 hours prior to beginning work on any item requiring inspection. All materials for which the Engineer's Representative has requested plant inspection and which are fabricated without such inspection shall be considered unacceptable. Any testing required proving acceptability of such materials shall be performed at the Contractor's expense.
- The type and extent of inspection shall be at the discretion of the Engineer's Representative's representatives: every item, procedure and connection associated with the work shall be subject to non-destructive inspection by the Engineer's Representative's representatives.

- Methods of non-destructive control shall include but not be limited to visual, dimensional, radiographic, ultrasonic and magnetic particle inspections.
- The Engineer's Representative may call for a coupon to be cut out for destructive testing.
- During the progress of the work, the Engineer's Representative may order in writing to the Contractor:
 - The removal from the Contractor's or Subcontractor's yard of any improper materials and equipment which are not appropriate for the work and their replacement.
 - The repair or proper re-execution, notwithstanding any previous test, of any works which in respect of materials or workmanship, is not in accordance with the contract.
- Acceptability of materials and fabrication shall be as stated in each corresponding specification and in the contract drawings. All material and work found not in conformity with these documents shall be rejected or repaired at the Contractor's sole expense to the satisfaction of the Engineer's Representative.
- The Engineer's Representative shall be the sole judges for the acceptability and their decisions shall be final.

The Engineer's Representative reserves the right to retest all materials which have been tested at the source of supply, prior to incorporation into the Work, and to reject all materials which, when retested, do not meet the requirements of the specifications.

1.6.Manufacturer's Certification

The Engineer's Representative may permit the use, prior to sampling and testing, of certain materials or assemblies when accompanied by manufacturer's certificates of compliance stating that such materials or assemblies fully comply with the requirements of the contract. The certificate shall be signed by the manufacturer. Each lot of such materials or assemblies delivered to the Work shall be accompanied by a certificate of compliance in which the lot is clearly identified.

Materials or assemblies used on the basis of certificates of compliance shall be sampled and tested at any time and if found not to be in conformity with contract requirements shall be subject to rejection whether in place or not.

All steel for the steel work and fasteners shall be supplied with test certificates. The contractor shall submit these certificates to the Engineer's Representative prior to the supply of the materials. Materials obtained from stocks may be checked by the Engineer's Representative for exterior defects either in the workshop or at the site.

Test requirements for the materials to be ordered are specified in IS 2062 and shall include V notch impact tests at 0° C from each quantity of 20 tonnes or part thereof. The results of these tests shall be included in the test certificates.

1.7.Storage of Materials

Materials shall be so stored as to assure the preservation of their quality and fitness for the Work. Stored materials, even though approved before storage, shall again be inspected prior to their use in the Work. Stored materials shall be located so as to facilitate their prompt inspection.

Storage locations shall be approved by the Engineer's Representative.

Private property shall not be used for storage purposes without written permission of the owner or lessee. Evidence of permission shall be furnished to the Engineer's Representative upon his request.

All material shall be properly stored on wood timbers or pallets and shall be protected from standing water, corrosive products, blast cleaning, painting and dropped object.

Damaged materials or materials with defects shall not be used in the fabrication. Replacement or reparation of this material shall be decided by the Inspector.

1.8.Handling Materials

All materials shall be handled in such a manner as to preserve their quality and fitness for the Work. Material shall be transported to the work area in vehicles so constructed as to prevent damage or loss of material.

All materials shall be handled with suitable and approved handling devices and methods, which do not induce excessive deformation or stresses.

1.9.Unacceptable Materials

All materials not conforming to the Plans and Specifications at the time they are used shall be considered unacceptable and all such materials shall be rejected and shall be removed immediately from the site of the Work unless otherwise instructed by the Engineer's Representative. No rejected material, with defects corrected, shall be used until approval has been given by the Engineer's Representative.

1.10. Materials Traceability and Tracking System

The Contractor shall be responsible for maintaining the tracking system for all materials, including primary and secondary steelwork, from receipt of materials to final assembly

within the structure. The material's tracking system shall include material utilization forms. The Contractor shall submit procedure to the Engineer's Representative for approval.

1.11. Marking of Steel

All structural steel shall be fully identified against the relevant mill test certificate. The cutting of plates, pipes and beams, and transferring of unique identification numbers and other marks shall be carried out such that a particular grade of steel, including scrap, can be identified against its materials certificate. The specified identification shall be maintained at all times. The Contractor shall transfer markings when cutting steel, using round nosed dies only. The Contractor shall submit procedure to the Engineer's Representative for approval.

If any material is found without the appropriate reference or material certification, it shall not be used in any part of the fabrication until it can be identified to the satisfaction of the Engineer's Representative. For unidentified material found in the fabrication, the Contractor shall be responsible for proving the identity of the material to the satisfaction of the Engineer's Representative at no extra cost to the Engineer's Representative.

The Contractor shall establish and maintain a quarantine area and an appropriate marking system, for material found defective, damaged or certification. This material shall not be used without the prior authorization of the Engineer's Representative.

The Contractor shall take care to preserve the plate rolling direction in marking plates.

Different grades of steel, including cut segments or shapes, plate and remnants shall be marked. The steel types shall be stored in well-defined locations to avoid inadvertent mixing.

1.12. Member Identification

Before starting the works, the Contractor shall establish a numbering system to identify each member or element of the structure. This identification numbering system shall be used as an aid for indexing radiographs, repairs, etc. Identification system shall be furnished to the Engineer's Representative and the Inspector before the start of the job. This numbering shall be used on all shop drawings.

1.13. Marking

It is the Contractor's responsibility that all materials supplied are adequately marked for identification against delivered test certificates. When materials are stored, the identification marking shall be easily accessible. Material that cannot be identified by proper marking shall be rejected.

Each rolled plate and shape shall be mechanically marked with the following information:

- Material heat or batch number.
- Steel type and supply condition (see below)
- Producer's trademark.
- Section number (if relevant).

Supply condition shall be indicated by marking after the Steel Type designation.

All such markings shall be carried out by die stamping in a frame of white paint. The letters used for the stamping shall be at least 8 mm in height and performed with a round nose tool.

Die stamping shall include the certifying Engineer's Representative stamp for all primary and special categories steel.

Paint marking shall be as follows:

- A 300mm-by-300mm rectangle with the following data stencilled in 50mm high white letters shall be printed on each item of the material:
 - Project Reference
 - Purchase Order number and designation
 - Item size (thickness, width, length, section identification diameter and wall thickness, etc...)
 - Type of steel and grade
 - Heat number from which it was produced.
 - Destination
 - Gross and Net Weights
 - Package Number
 - Mark principal rolling direction for plates (arrow)

1.14. Inspection by the Engineer's Representative

The Engineer's Representative shall inspect the material, fabrication, assembly, coating, loading and transport of all items and shall have free access at all times to any part of the Contractor's or Subcontractor's mill or yard that concerns his work.

The Engineer's Representative shall have the right to inspect at all times any tools, materials, procedures and equipment used or to be used in the fabrication, assembly, coating and loading of the structures.

The Contractor shall furnish, install and maintain in a safe operating condition the necessary scaffolding, ladders, walkways, adequate lighting, etc., for a safe and thorough inspection by the Engineer's Representative's representative.

The Contractor shall assist the Engineer's Representative in the execution of inspections and tests by providing personnel, inspection and test equipment as required.

1.15. Inspection by the Contractor

The Contractor shall give or provide all necessary superintendence and constant inspection during the completion and maintenance of the works.

The Contractor shall provide and have continuously available equipment required for inspection of the works or parts of the works. This equipment (including X-Ray or radiographic equipment) shall be suitable for examining, measuring and testing any work and quality of specification. All inspection equipment shall be calibrated whenever necessary, be in good condition and properly maintained. The equipment shall be used and maintained

exclusively by personnel qualified to an approved standard. All inspection personnel shall be subject to the approval of the Engineer's Representative.

2. Painting

2.1 Painting Generally

All preparation, priming and painting, in colours selected by the Engineer, shall be deemed to be included in the Contract price.

Painting shall generally be in accordance with ISO 12944 and IS 14428:1997.

All items of equipment shall be suitably protected and packed to resist corrosion and impact damage. Machined surfaces treated with a proprietary sealing agent for transportation and storage.

Paint materials shall be in accordance with the appropriate Indian Standard and shall be obtained from approved manufacturers and applied in accordance with the manufacturers' instructions or as ordered by the Engineer. All materials shall be delivered to the Site in sealed and labelled containers.

The paint for each coat shall be from the same manufacturer, compatible with the underlying coat and shall be a different colour for ease of identification.

Particular regard shall be paid to the maintenance of the recommended temperature and humidity during application and curing. Painted steelwork shall not be over coated or handled until the recommended curing period has elapsed. No finished paint coating will be accepted until the specified dry film thickness has been achieved to the entire surface including edges.

All steel surfaces shall be completely dry and free from oil and grease and all welds ground smooth and weld spatter removed. All fins at saw cuts, burrs and sharp edges shall be removed, and the edges shall be rounded off.

Where steelwork is to be blast cleaned, an approved method shall be used in accordance with BS 7079 so as to achieve Swedish Standard SA 2.5. The average blast profile is to be 75 microns; below 25 microns or above 100 microns is not acceptable. After blasting, all spent shot or grit shall be removed by vacuum cleaning or by air line and brush.

An approved primer to a minimum dry film thickness of 75 microns in one coat shall be applied after blast cleaning before visible deterioration has occurred as compared with a freshly blast cleaned area. The primer proposed must be compatible with all other paints used and full details must be submitted to the Engineer for approval. If this preparation is done before fabrication a blast primer shall be applied within four hours of the preparation. The Contractor shall put his proposals for such a primer to the Engineer for prior approval. If shot blasting is carried out after fabrication the application of a blast primer may be omitted but the first coat of paint shall be applied within four hours of shot blasting.

For all painted items, the Contractor shall submit for approval a 'Paint System Sheet' stating full

details of each paint system proposed indicating the following information.

- surface preparation
- system reference together with manufacturer's brand name and product reference
- dry film thickness
- colour
- time to repaint.

2.2 Coating system

Steel shall be protected from corrosion in accordance with EN ISO 12944. Durability shall be high (H). The environment category shall be C5M and Im2, i.e. the selected protection system shall provide high durability for both environment categories. The Contractor shall furnish the details of the painting / coating system he proposes to adopt to the Engineer for his prior approval.

The painting / coating system proposed for all steel surfaces shall be as follows:

System parameters	System 1	System 2
Environmental class	C5M as per ISO 12944	Im2 as per ISO 12944
Surface preparation	SA 2.5	SA 2.5
Design life	10 years	10 years
Primer	1 coat of Zinc Rich Primer, 75 microns	2 coats of Epoxy primer, 75 microns each
Coating	3 coats of High Build Epoxy 150 microns each	4 coats of Ultra High Build Glass Flake Epoxy 150 microns each
Total thickness	525 microns	750 microns
Finishing color	Orange	Black
Application	Linkspan Bridge (external surfaces)	Fender frame (external surfaces) Pontoon (internal and external surfaces) Linkspan support structure (external surface)

2.3 Application of Painting

Steelwork will be primed and painted under shop conditions before delivery to site unless the Engineer approves an alternative approach.

All joints shall receive the full specified preparatory and painting treatment. All primed areas shall receive sweep blasting before the application of any further coats of paint.

The Contractor shall take all precautions to keep areas of painting clean and dry and to maintain the recommended temperature and humidity. Care shall be taken during loading, unloading, stacking and erection of any painted steelwork to minimise damage to the protection system. All slings, ropes and chains used to handle the steelwork shall be protected with rubber sheaths or similar. The Contractor shall make good to the approval of the Engineer all paint work damaged during fabrication, transport, assembly and erection.

Where a paint system is required, but not specified, the Contractor shall submit to the Engineer

for his approval details of a paint system which will meet the requirements of BS 5493: 1977 Table 3 Part 9 minimum 15 years to first maintenance. In proposing a paint system for approval, the Contractor shall take into account the system's resistance to mechanical damage and abrasion as well as the exposure conditions. A minimum total dry film thickness of 450 microns shall be applied. All paints used are to be solvent free. Full technical details of any paint system proposed shall be submitted to the Engineer for approval.

2.4 Standard

The pre-treatment, workmanship and equipment for painting shall generally comply with the requirements of IS 1477 (Parts I & II) "Pre-treatment and Painting" except in so far this specification modified it.

2.5 Pre-Treatment

After inspection and approval and before leaving the fabrication shop, the surfaces of all steel work to be painted shall be prepared. Traces of oil and grease shall be removed with solvent and cleaning rags and scales and rust removed by hand tools. Hand tool cleaning consists of chipping and scrapping followed by vigorous wire brushing and emery paper cleaning. The rust and scales shall be removed by the use of electric or pneumatic tools such as sanding machine, scalers, etc. No painting shall commence until the prepared surface has been approved by the Engineer.

2.6 Painting Schedule

Immediately after the surface has been prepared, the steel work shall be given one coat of Bison Metal conditioning solution manufactured by Berger Paints or Rust converter developed by Central Electro-Chemical Research Institute, Karaikudi or approved equivalent. The first coat of primer paint shall be applied within 24 hours of the application of the conditioning solution. The primer paint shall consist of one coat of Linosol High Build Zinc Phosphate Primer manufactured by Berger Paints or approved equivalent. The dry film thickness of the primer shall be at least 50 Microns. Thereafter the steel work shall be given one coat of Linosol High Build Micaceous Iron Oxide Paint manufactured by Berger Paints or approved equivalent with dry film thickness of not less than 50 microns. The colour and the shade of the paints shall be as approved by the Engineer. All priming and finishing paints shall, preferably, be obtained from the same manufacturer. The contractor shall guarantee that the paints for priming and finishing coats are compatible with each other, in addition to their satisfying the specified requirements. The first and second coats of finishing paint shall have different tints to distinguish one from the other.

2.7 Painting at Shop

All painting shall be carried out by brushing spray and roller application of paint shall not be allowed without the written permission of the Engineer. Painting shall be done immediately after surface preparation. The prepared surface shall not be allowed to stand in rain or overnight before painting. Where galvanized surfaces are to be painted, they shall be cleaned and washed with a solution of Copper Sulphate before the application of the first coat of primer. Each coat of paint shall be allowed to dry thoroughly before the subsequent coat is applied. The drying time shall be in accordance with the manufacturer's specifications. The first primer coat shall follow immediately thereafter. Unless otherwise approved by the Engineer, finishing painting shall not commence before four days or after thirty days from the application of the second primer coat in the shop. Before the application of the second coat of the primer, all steel work shall be cleaned with emery paper and all damaged areas shall be carefully cleaned and repainted.

2.8 Painting after Erection

After erection, the whole of the steel work shall be thoroughly cleaned of all dirt, marks, grease and overspills of primer paint. Areas where the coat has either been damaged or has deteriorated shall be cut back and repainted with primer in the same manner in the fabrication shop. All exposed surfaces of metal, bolt heads and connections left unpainted in the shop shall be similarly treated. After preliminary work of making good has been approved by the Engineer, all surfaces shall be thoroughly washed down with fresh water and when dried, the finishing coat shall be applied. The finishing coat shall consist of one coat of Linosol Chlorinated Rubber Paint manufacturer by Berger Paints or approved equivalent.