

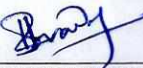
**BIFPCL- MAITREE 2X660 MW
FLUE GAS DESULFURIZATION SYSTEM**

**TECHNICAL SPECIFICATION
FOR
CHAIN PULLEY BLOCK WITH TROLLEY,
CHAIN PULLEY BLOCK HOOK TYPE
AND LIFTING HOOK (SHANK HOOK)**

CUSTOMER : **BIFPCL Bangladesh**



MAITREE: FGD: CP: 002: REV 00

Prepared	Checked	Approved
		
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1.0 PROJECT INFORMATION:

Owner	BIFPCL (BANGLADESH-INDIA FRIENDSHIP POWER COMPANY (PVT.) LIMITED), Bangladesh
Buyer	BHEL, Ranipet
Process/Application	Flue Gas Desulphurization

Bangladesh-India Friendship Power Company (Pvt.) Ltd. (BIFPCL) is a 50: 50 Joint Venture Company of Bangladesh Power Development Board, Bangladesh (BPDB) and NTPC Limited, India (NTPC), incorporated under the laws of Bangladesh. BPDB is a statutory body constituted under the Bangladesh Water and Power Development Board Order 1972, and is vested with a significant portion of the generation and distribution of electricity in Bangladesh. NTPC Limited is a Maharatna company incorporated under the Indian Companies Act, and as India's largest power company, has a diversified portfolio covering the entire value chain of the power generation business. Pursuant to the implementation agreement dated April 20, 2013, as entered into between the Government of the People's Republic of Bangladesh, and BIFPCL, and the power purchase agreement also dated April 20, 2013, as entered into between BIFPCL and BPDB, BIFPCL has entrusted BHEL the development of the Coal fired 2x660 MW Maitree Super Thermal Power Project on Turnkey Basis at Rampal, Dist.-Bagerhat, Bangladesh, on the bank of river Possur, Bangladesh, for the purposes of supply and sale of electric power to BPDB. Wet Limestone FGD System is also envisaged by customer in this project to control SO₂ Emissions from the power plant. For the purposes of setting up the Wet Limestone FGD System for 2x660 MW Coal fired Power project at Rampal, BHEL is inviting bids from suitably qualified Bidders for the subject item, pursuant to and in accordance with these bidding documents.

A) SITE CONDITIONS

1. Ambient Temperature and Relative Humidity

Average Site Condition ASC

Ambient Temperature	: 27.3 deg C
Ambient Humidity	: 87%
Ambient Pressure	: 1007.6 mbar

Summer Site condition SSC

Ambient Temperature	: 36.9 deg C
Ambient Humidity	: 60%
Ambient Pressure	: 1007.9 mbar

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Winter Site condition WSC

Ambient Temperature	: 12.2 deg C
Ambient Humidity	: 100 %
Ambient Pressure	: 1017.2 mbar

Reference Site condition RSC

Ambient Temperature	: 31 deg C
Ambient Humidity	: 88%
Ambient Pressure	: 1007 mbar

- | | | |
|----|---|---|
| 2. | Plant Elevation | : +5.0 m above sea level |
| 3. | Wind Load | : As per Bangladesh National Building code-2012, Part-6, Chapter 2.4 |
| a) | Basic Wind speed, three-second gust at 10m above ground in exposure C, having a return period of 50 years | : 73 m/s, Exposure category-"C" |
| 4. | Seismic Load | : Seismic Zone 1 as determined by Bangladesh National Building code (BNBC-2012) |

Note:

- 1) Reference site conditions shall apply for the Guarantee Values as well as for the Guarantee test/Performance test
- 2) Equipment and Material must be suitable for the range of ambient site conditions. In particular, the saline atmosphere has to be considered.

B) PROJECT LOCATION AND APPROACH

a.	State/Division	Khulna
b.	District	Bagerhat district
c.	Place	Moithara Village, Rampal Upazila
d.	Location	Latitude- 22 deg 37' 0" to 22 deg 34' 30"N Longitude- 89 deg 32'0"E to 89 deg 34'5"E

C) APPROACH TO SITE:

The nearest town Khulna is at a distance of 23 km from project site. The site is connected by road from Mangla- Khulna Highway. Nearest Domestic airport is Jessor, Bangladesh at a distance of about 107 KM and international airport is Dhaka at a distance of 263 KM, Bangladesh.

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The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given above is for general guidance and shall not be contractually binding on the Owner. Bidders shall obtain clarifications/ information, if any, before submitting their offers, regarding scope of work, facilities available at sites, etc. No additional claim shall be entertained by BHEL in future, on account of non-acquaintance of above. All relevant site data/ information as may be necessary shall have to be obtained/ collected by the Bidder.

2.0 INDENT OF SPECIFICATION

- 2.1 This specification along with data sheets, other specifications & attachments to inquiry/order describe and constitutes the minimum requirement for Chain Pulley block (hook type and trolley type) and Lifting Hook (Shank Hook) to be used for equipment handling in the process of Flue Gas Desulphurization.
- 2.2 The intent of these requirements is to supplement the requirements as given in data sheets, and other applicable standards / codes referred to in this specifications.
- 2.3 Contractor and vendor shall make all possible efforts to comply strictly with the requirements of this specification and other aforesaid specifications / attachments to inquiry / order and no deviation and exception from this specification shall be permitted without written approval of Company.
- 2.4 In case any deviations are considered essential by vendor, these shall be separately listed in vendor's offer titled as "List of deviations / exceptions to the inquiry document", supported with proper reasons for the deviation for Company's considerations. Any deviation indicated elsewhere, but not listed in the deviation list shall not be considered applicable.
- 2.5 Compliance with this specification shall not relieve Contractor / vendor of the responsibilities of furnishing equipment and accessories / auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.
- 2.6 In case Contractor / vendor considers requirement of additional instrumentation, controls, safety devices and any other accessories / auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same along with reasons in a separate section along with his offer and include the same in his scope of supply.
- 2.7 Chain pulley block vendor/manufacturer shall have adequate engineering, manufacturing and testing facilities conforming to national/international standards /codes.

- 2.8 The chain pulley block offered shall be from a regular and established manufacturer of chain pulley blocks.
- 2.9 The chain pulley block offered shall be from the existing regular manufacturing range of chain pulley block vendor/ manufacturer and already type tested at either manufacturer's works or outside. Vendor's/ manufacturer's catalogue and general reference list shall be furnished along with the offer.
- 2.10 Chain pulley block vendor/manufacturer shall assume responsibility for satisfactory performance of the equipment for the specified service.
- 2.11 Chain pulley block and all auxiliaries shall be suitable for the specified area classification.
- 2.12 Chain pulley block vendor/manufacturer shall not offer any alternative designs. Special tools and tackles required either for installation / erection or operation and maintenance of the chain pulley block shall be included in vendor's scope of supply.

3.0 SCOPE OF SUPPLY

- 3.1 Design, manufacture, testing and supply of Chain pulley block (Trolley type and Hook type) and Supply Lifting Hook (shank hook) with OEM test certificate for the duty condition as specified in respective Technical Data Sheets.
- 3.2 Base frame, all mating flange, gaskets, bolts and fastening required for the Chain pulley block shall be furnished by the Bidder.
- 3.3 The part items of the equipment should be identified by Tag Nos and should be packed as to minimize the possibility of damage during storage or transit. The equipment shall be protected for a storage of 12 months at site, if any extra precaution is to be taken by the Purchaser for storage beyond 12 months the same shall be explicitly indicated in the operation and maintenance manuals.
- 3.4 Hard copy of the O&M manual shall be sent along with the hoist. Ten (10) hard copies and five (05) sets of electronic copies of all documents are to be submitted in the English language. In addition, One (1) copy of operation and maintenance manuals shall be translated into "Bangla" and provided as paper copies and in electronic format

4.0 CODES AND STANDARDS

The design and materials shall conform to the requirements of applicable codes and regulations of the latest edition. The design, manufacture, installation and testing of the chain pulley blocks along with hand operated trolley shall follow the latest applicable ASME B30.16/ BS 3243/equivalent International (EN/Japanese) Standards. Only international standards are accepted. Indian/GB standards are not acceptable.

All chain pulley blocks shall be designed to ASME B30.16/ BS 3243 (or any equivalent international standard), the operating hand chain shall conform to equivalent international standard of IS:2429 grade 30 pitched and polished and the load chain to equivalent international standard of IS:6216 grade 80. The chain pulley block shall be suitable for duty class 2. Hooks shall be as per equivalent international standard of IS: 15560 & with antifriction bearing. Specification for Point hook with shank up to 25 Tons trapezoidal section shall be as per equivalent international standard of IS:8610.

Lifting Hook shall be shank type and Hooks shall be as per equivalent international standard of IS: 15560 or ASME B30.10-2019 latest. Hook Shall be provided with safety latches.

Other international standards may also be acceptable subject to their being equivalent or superior with prior approval of Company. For provisions not covered by the above codes & standards, applicable engineering practices & norms shall govern.

5.0 TECHNICAL REQUIREMENTS

5.0.1 Design and manufacture of chain pulley block shall be consistent with capacity, lift, headroom and other parameters as specified in Annexure - 1

5.0.2 In design of chain pulley blocks, care shall be taken for following features.

- Minimum effort to lift a specified load.
 - Self-braking system for holding the load in any position.
 - Even loading of bearings.
 - Ease of installation and maintenance.
- Compact design.

5.0.3 **For all chain pulley blocks operating in hazardous area, the materials for non-lubricated rubbing parts shall be of non-sparking type (non-ferrous).**

5.0.4 The suggested materials for such components are as follows:

Ratchet wheel, load chain wheel, hand chain wheel, chain guides for lifting mechanism.	Solid construction in Phosphor bronze or Gun metal or brass.
Rims of un-gearred runners, geared runners, hand chain wheel and hand chain wheel guides for trolley mechanism Applicable for Trolley type	Phosphor bronze or Gun metal or brass.
Load hook	Solid Phosphor Brass / Aluminium Bronze

All materials used in construction of different components shall individually conform to equivalent international standard of IS: 3832.

5.1 Frame

The frame shall be designed for proper strength built from steel plates with bolted / welded construction.

5.2 Gear

Chain pulley blocks shall be supplied with helical or worm gear. The gear shall be designed for surface durability. All gears shall be machine cut from alloy steel and case hardened. In case of enclosed gearing, means shall be provided for ample lubrication.

5.3 Load Brakes

Chain pulley block shall be provided with an automatic mechanical Ratchet and Pawl type load brake which will prevent self-lowering of the load and sustain and hold the load in all working positions. The load brake shall allow smooth lowering of the load without serious overheating which may impair efficient working of the block. The Pawl & Ratchet shall be made of steel hardened and tempered to provide satisfactory degree of wear resistance. The hardness of Pawl tip and Ratchet shall not be less than 40 and 30 HRC (Hardness, Rockwell C-Scale) respectively.

5.4 Bearing

Only antifriction bearing shall be used. All the bearing shall be adequately lubricated type and arrangement of lubrication shall be clearly indicated on the cross section drawings.

5.5 Hooks

The hooks (top and bottom applicable for Hook type Chain pulley and Only at Bottom for Trolley type) shall conform to equivalent International standard of IS 8610. The bottom hook block shall be provided with thrust bearing to enable it to free swivel in the loaded condition without twisting the load chain. The top hook if required to swivel shall also be provided with thrust bearing. Hooks shall be provided with safety latches to prevent accidental unhooking.

Suspension fitting other than hook shall be of sufficient strength to afford a static factor of safety of not less than 4.

5.6 Load Chain

The load (link) chain shall be conforming to the equivalent international standard of IS: 6216 Grade 80. The chain shall be pitched and polished. Chain shall be made of material suitable for use with load chain employed and be of adequate strength and shall be designed to ensure effective operation

5.7 Hand Chain

The hand chain shall be conforming to the equivalent international standard of grade 30 of IS: 2429 (Part-II). The chains shall be pitched & polished. The chain link dimension shall be conforming to the equivalent international standard of IS:2429 (Part-I) i.e. 6.3 mm nominal diameter chain. The length of chain shall be such that the lowest point of loop shall be 0.4 meter above the operating level.

5.8 Chain Wheel

Wheel for load chain shall be made of material suitable for use with load chain employed and be of adequate strength and shall be designed to ensure effective operation.

Wheel for hand chain shall be provided with flange.

Wheels shall be provided with guides to prevent sagging of chain.

5.9 Idler Wheel

The chain pulley blocks shall be provided with idler wheels so shaped as to avoid twisting of the chain when passing round. The pitch diameter of the idler wheels shall not be less than 16 times of size of the chain.

5.10 Trolley

The trolley for the chain pulley block shall be geared type, fabricated construction, 4 wheeled, driven by hand chain and shall have provision for mounting the chain pulley block.

Trolley shall be designed to suit the suitable joist size and the hoisting capacity.

Note: Applicable for Trolley type Chain pulley

5.11.0 LIFTING HOOK

Lifting Hooks 2T capacity (shank hook) which will be weldable at Roof shall be provided separately. Lifting Hook shall be shank type and Hooks shall be as per equivalent international standard of IS: 15560 or ASME B30.10-2019 latest. Hook shall be provided with safety latches. Proof load, SWL, Test certificates as per relevant standard shall be from OEM. Marking on Lifting hook as per as per relevant standard.

Note: The Suspension Hook of Chain pulley Hook type and the Lifting Hook (shank Hook) shall be of same Grade So that the Suspension Hook shall be insert able to Lifting Hook.

6.0 INSPECTION AND TESTING

6.1 Unless otherwise specified all the chain pulley blocks shall be stage wise inspected and witness tested. Inspection at vendor works is applicable by BHEL/BHEL approved Inspection agency according to BHEL Specification/Approved Drawing/Approved Data sheet & Relevant international standard.

6.2 As a minimum, tests shall be carried out as specified in the data sheets and elsewhere (if any). However, Company reserves the right to witness all mechanical and performance tests.

6.3 Contractor / vendor shall give at least 15 days' notice prior to commencement of testing.

6.4 Vendor shall notify his sub-vendor of Company's inspection and testing requirements.

6.5 All inspections shall be regarded as check-up only. However, acceptance of shop test shall not absolve / relieve Contractor and vendor from any of their responsibilities in any way, whatsoever.

6.6 All controls and safety devices shall be tested for satisfactory operation and settings.

6.7 Company's representative shall have access to vendor's / manufacturer's shop as well as to sub-vendor's shop at all times during manufacturing of the equipment's and vendor / manufacturer shall provide all requisite facilities including necessary monitoring and measuring devices to Company's representative for carrying out satisfactory inspection and witnessing the tests.

- 6.8 Equipment shall be subjected to stage wise inspection and testing at vendor's / sub-vendors works by third party inspection agency and/or by Company's authorized representative. Vendor shall furnish schedules for all inspections and tests to be conducted on all the equipment and auxiliaries in his scope of supply in a single document titled 'Inspection & Test Plan' within four weeks of placement of purchase order/ letter of intent for Company's review and approval. The extent of Company's participation and schedule of submission of inspection and test procedures as specified in inquiry / order shall also be reflected in 'Inspection and Test Plan'.
- 6.9 Each chain pulley block shall be subjected to one and a half times the safe working load through a length of lift which will ensure that every part of the block mechanism and each tooth of gears come under load. The trolley shall be tested for smooth operation when loaded.
- 6.10 Certificate of test and examination shall be issued with all the chain pulley giving the following information's.
- Safe working load.
 - Range of lift.
 - Load chain size and grade.
 - Proof load applied
- 6.11 100% RT on tension joints, 10% RT on compression joints of butt welds shall be done.
- 6.12 Forging of dia-50mm or more shall be UT tested.
- 6.13 Chain pulley block shall be tested as per ASME B30.16/ BS 3243/equivalent International.
- 6.14 Deflection, load, overload and travel check as per latest applicable international standard shall be done on assembled HOT.
- 6.15 UT & MPI/DPT shall be done on gear blank, pinion shaft, axles.
- 6.16 Proof Load Test on hooks shall be carried out followed by DPT.
- 6.17 100% Radiography on weld joints under tension and 25% radiography on compression butt joints followed by 100% DPT shall be done for rope drum, girder, end carriage etc.
- 6.18 Complete hoists shall be tested for load and overload test as per latest applicable international standard.

7.0 GUARANTEE / WARRANTY

- 7.1 Contractor and equipment vendor shall guarantee all equipment's and components (including all auxiliaries) supplied in respect of design, materials and fabrication and / or workmanship for 24 months from the date of supply or 18 months from the date of successful commissioning, whichever is later.
- 7.2 If any defect or mal-performance occurs during the guarantee period, Contractor and equipment vendor shall make all necessary alteration, repairs, and replacements free of charge.
- 7.3 Company's approval of the equipment design shall not relieve Contractor and equipment vendor of their responsibilities to ensure satisfactory performance of the items supplied.
- 7.4 Contractor and equipment vendor shall guarantee that all materials used are new, satisfactorily passed through acceptance procedure and is acceptable in quality, form and appearance.
- 7.5 Equipment vendor shall be responsible for overall performance of the equipment.

8.0 PROTECTION AND PAINTING

- 8.1 All exposed carbon steel parts to be painted shall be thoroughly cleaned from inside and outside to remove scale, rust, dirt and other foreign materials by wire brushing and sand blasting, as applicable. Minimum acceptable standard in case of power tool cleaning shall be St. 3 and in case of blast cleaning shall be Sa 2 1/2 as per Swedish Standard SIS: 055900 (latest edition).
- 8.2 Non-ferrous materials, austenitic stainless steels, plastic or plastic coated materials and insulated surfaces of equipment not be painted.
- 8.3 Stainless steel surfaces both inside and outside shall be pickled and passivated.
- 8.4 Machined and bearing surface shall be protected with varnish or thick coat of grease.
- 8.5 Depending on the environment, following primer and finish coats shall be applied.

Primer Coat		Intermediate Coat		Finish Coat			Total DFT μm(min)
Paint	No. of Coats	Paint	No. of coats	Paint	No. of coats	Shade	

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HB Chlorinated Rubber based Znc Phosphate Primer DFT=80 µm	1	-	-	Epoxy high solid DFT= 50 µm per coat	2	Golden yellow RAL 1004	180
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9.0 PACKAGING AND IDENTIFICATION

- 9.1 Sea worthy packing shall be done as per the specification given in annexure- A. All packaging shall be done in such manner as to reduce the volume. The equipment shall be dismantled into major Components suitable for shipment and shall be properly packed to provide adequate protection during shipment. All assemblies shall be properly match marked for site erection. The packing shall be suitable for storing in the outer yard of the plant for a minimum period of 12 months.
- 9.2 Attachments, spare parts of the equipment and small items shall be packed separately in wooden-cases. Each item shall be appropriately tagged with identification of main equipment, item denomination and reference number of the respective assembly drawings.
- 9.3 Detailed packing list in water-proof envelope shall be inserted in the package together with equipment.
- 9.4 Each equipment shall have an identification plate giving salient equipment detail / data, name of manufacturer, make / model, equipment number, year of manufacture etc.

10.0 SPARE PARTS

- 10.1 Contractor / vendor shall submit recommended list of spare parts with recommended quantities for one year as well as first two years of operation of the equipment along with the itemized price list for all parts. Proper coding and referencing of spare parts shall be done so that later identification with appropriate equipment will be facilitated.
- 10.2 Recommended spares and their quantities should take into account related factors of safety, equipment reliability, effect of equipment downtime upon production, cost of parts and availability of vendor's service facilities around proposed location of equipment.
- 10.3 Vendor shall also submit a list of recommended commissioning spares with quantities and the itemized prices. However, supply of commissioning spares shall be in Contractor's / vendor's scope of supply without any extra cost to Company.

11.0 ERECTION AND COMMISSIONING (E&C)

The erection of Pulley Blocks will be done by BHEL as per Erection Manual and check List of Vendor.

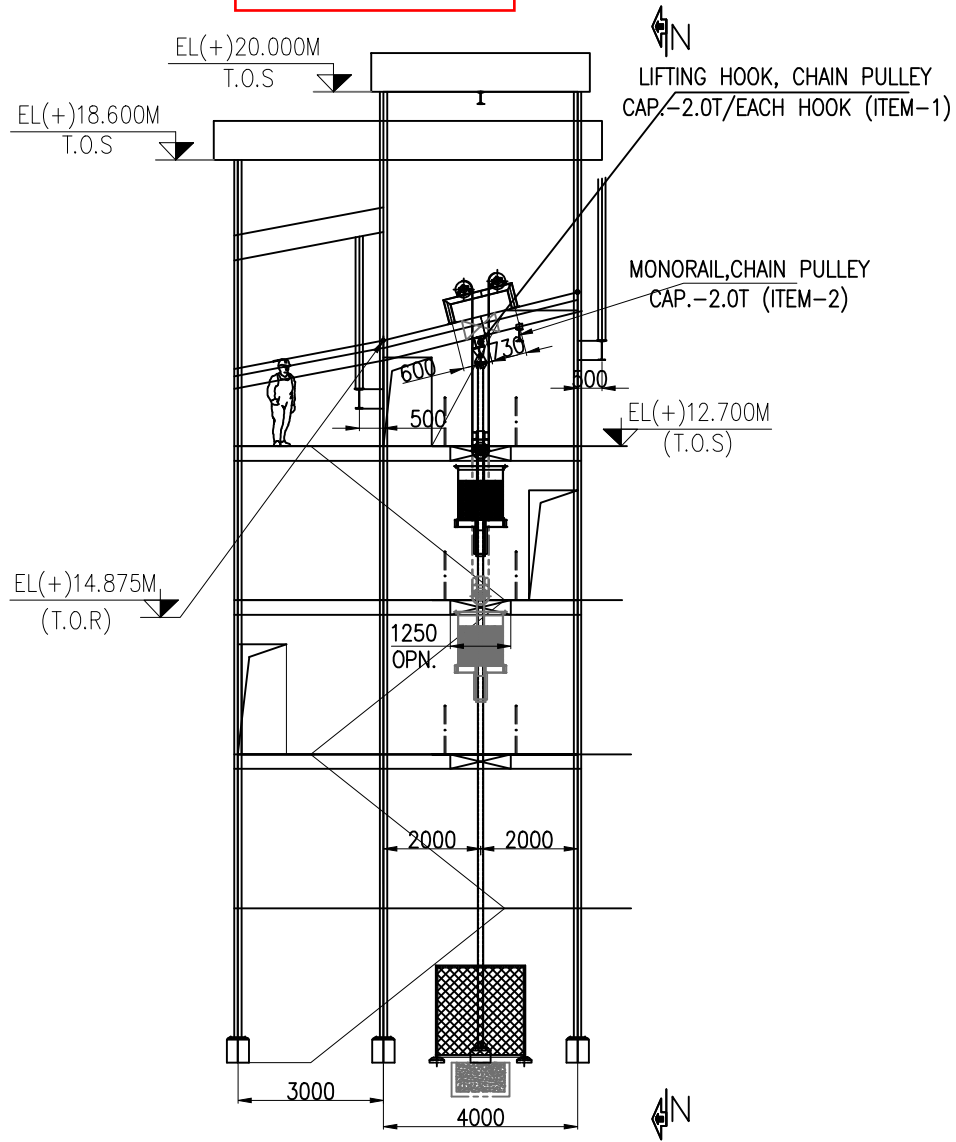
Annexure - 1

Data sheet for Chain Pulley Blocks and Lifting Hook.

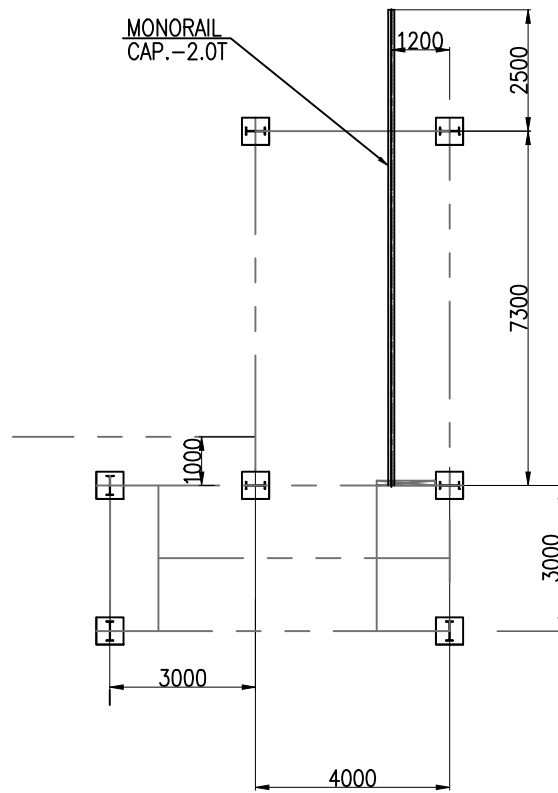
Sl.No.	Description (Application area)	Capacity (Tons)	Height (in m)	Quantity (Numbers)
1	Chain Pulley with Trolley	2.0	20	As per Enquiry
2	Chain Pulley both end Hook Type	2.0	20	As per Enquiry
3	Lifting Hooks (shank Hook)	2.0	_____	As per Enquiry

Monorail size: ISMB 300 (BHEL scope and the vendor to confirm the size)

ANNEXURE-2



ELEVATION



PLAN

EL(+)20.000M
T.O.S

EL(+)18.600M
T.O.S

EL(+)15.719M
(T.O.S)

