



NOTICE INVITING TENDER

Ref.: OS/26-27/8170/Bolted Strl./11/011

Date: 05.06.2026

Sub: Fabrication of Structure (Bolted & Welded type) against S.O. No. 8170 inside the premises of BHEL-HPVP, Visakhapatnam with free issue materials

Dear Sir,

Sealed tenders are invited for the subject work in **two-part bid** system from Vendors who are experienced in fabrication of similar jobs and fulfil the eligibility criteria specified below in clause-1. Scope of work and techno-commercial terms and conditions are as follows.

1. PRE-QUALIFICATION CRITERIA:

- 1.1 Bidders must have an experience of successful completion of similar works i.e., **Fabrication of Structure** during last 7 years ending 31.05.2026 for a minimum of one project. Bidders shall enclose Work Order, Work Completion Certificate and all other relevant documents from the customer in support of successful and satisfactory completion of the work. The works executed in own name of the individual / firm of the tenderer will only be considered for eligibility criteria.
- 1.2 Average Annual Financial Turnover of the bidder for the last 3 financial years should be a minimum of **₹ 30 Lakhs**. Bidders shall enclose Financial turnover certificate for previous three years issued by Chartered Accountant / Audited Profit & Loss Accounts, Balance Sheets and other necessary documents in support of the same.
In case audited financial statements are not available for latest financial year, then the applicable audited statements of preceding three financial years shall be considered.
- 1.3 Submission of Bank Solvency Certificate for a limit of not less than ₹ 10 lakhs and not older than Six months from the date of NIT.
- 1.4 Bidders shall also enclose the documents of ESI, EPF, PAN, GSTIN, UDYAM Registration Certificate (if registered with MSME).
- 1.5 Any Bidder falling under MSE category shall furnish the following details & submit documentary evidence/ Govt. Certificate etc., in support of the same along with their Techno-commercial offer.

Type under MSE	SC/ST Owned	Women Owned	Others (excluding SC/ST & Women Owned)
Micro			
Small			

Note: *If the bidder does not furnish the above in the tender, offer shall be processed construing that the bidder is not falling under MSE category.*

2. VENDOR SCOPE OF WORK:

- 2.1 **Fabrication of Structure (Bolted & Welded type): 370 MT (approx.)**
It may be noted that the weight indicated above is tentative only and may vary on both sides.
- 2.2 Fabrication of Structural items (Bolted type and Welded type) includes End Profiled Structural, 'I' or 'T' sections, Box Beams & Box Columns with or without Base Plate, Plate Fabricated Columns & Beams, Assemblies made from Rolled Beams or Welded Beams, Monorail Assembly, Stools, Shed, Support Structures, Bracings, Brackets, Platforms, Hand Rails & Posts, Ladders, Cut to Size items, Misc. Structure etc.
- 2.3 Complete fabrication of the above items which involves various operations like Marking, Cutting, Edge Preparation, Match Drilling of holes wherever applicable, Rolling, Machining, Assembly, Welding, NDT requirements as per QAP / SQP, Trial Assembly as per relevant drawings / specifications, Surface Preparation by Power Tool / Grit Blast Cleaning, Supply of Paints and Painting etc., as per relevant Drawings, QAP / SQP, WPS, NDE procedures, Painting Schedule, Standards & Specifications etc.

- 2.4 Collection & Transportation of Free issue raw materials like Plates, rolled sections, structural items, BOCs etc., from HPVP shop / stores to fabrication yard, Handing over of excess / balance materials and scrap at HPVP stores.
- 2.5 Loading of finished items onto the trailers by providing necessary manpower, tools & tackles and Welding of temporary supports required for transportation.
- 2.6 Rectification of Raw materials such as straightening etc., if any and trial assembly after fabrication wherever required as per Drawings / QAP and rectification of defects, if any attributable to vendors, found after handing over to Logistics dept.
- 2.7 NDT shall be carried out as per approved QAP / SQP.
- 2.8 Machining of components wherever applicable as per GMS and applicable drawings.
- 2.9 Free issue materials should be collected within 3 days from the date of intimation by Outsourcing without failure. Any delay beyond 3 days shall be considered for levying of LD.
- 2.10 In case of requirement of off-cut materials, the vendor shall have to arrange for Gas Cutting at BHEL Stores.
- 2.11 Submission of economic cutting plans for all plate materials and sections issued by BHEL and obtaining approval of competent authority is mandatory before taking up fabrication.
Wherever fabrication is done without proper approved cutting plans, any loss of materials arising due to the same will be recovered as per BHEL recovery rates.
- 2.12 No extra rates are applicable for the additional joints to be made in Plates / Rolled sections.
- 2.13 The work is to be executed as per the latest approved Drawings, Group Manufacturing Specification (GMS), QAP/SQP, WPS, Painting Schedule, Standards & Specifications etc.
- 2.14 All indirect materials, consumables like electrodes, gases, grinding wheels etc. required for fabrication are in the scope of the Vendor.
- 2.15 Identification of all items shall be hard stamped by encircling with paint and stenciled in a specific format with details of Project name, Customer No., Work Order No., PGMA No., DU No., Qty., etc., for identification and dispatch as per the instructions of the concerned. Completed job without proper identification will not be accepted by HPVP - Stores / Logistics.
- 2.16 Vendors shall have to return the excess / balance materials including off-cuts and total scrap available with them exclusive of process allowance & invisible wastage to HPVP Stores after material reconciliation but before submission of their final bill. In case the same are not returned by the vendors, Recovery shall be made as per BHEL Rates / MSTC rates plus applicable taxes, prevailing at the time of processing of the final bills.
- 2.17 Welding is to be carried out by qualified welders only. Qualification of welders shall be carried out by the vendor at HPVP under supervision of BHEL / WT dept. at their own cost. However, Test Coupons shall be provided by BHEL as free issue.
- 2.18 Hydra Cranes of sufficient capacity, Chains / Slings preferably Felt slings required for handling of all materials during Pre-fabrication, Fabrication and Post fabrication during handing over to Logistics etc., are in the scope of vendor.
- 2.19 Surface preparation & Blasting as per SSPC-SP-10, **Supply of Paints** & application of total no. of coats of Paints as per approved Painting Schedule, drawings, QAP/SQP. Compressor and other machinery / equipments required for Blasting and Painting are to be arranged by the vendor at their cost. Painting is to be carried out in a closed enclosure and by qualified Painters only. All the necessary tests like checking of Surface preparation with Profile Gauge, Tape adhesion, Elcho Meter for measuring DFT etc., required during the painting are to be carried out by a qualified agency for testing of painting and obtaining stage wise inspection clearance from HPVP (QC) / TPIA / customer as per approved painting procedure and QAP / SQP.
- 2.20 The following are the details of Paints for Supply and application. However, vendor shall follow only the approved Painting Schedule provided after ordering.
 - i) One coat of F-9 (Inorganic zinc silicate) @ 65–75 μ DFT/coat
 - ii) One coat of P-6 (Epoxy Zinc Phosphate) @ 40 μ DFT/coat
 - iii) Two coats of F-6B (Epoxy High Build) @ 100 μ DFT/coat each
 - iv) One coat of F-2 (Acrylic polyurethane) @ 40 μ DFT/coatTotal DFT of 345–355 μ approx.

- 2.21 Raw materials issued for Handrails are Hot Dip Galvanized. After fabrication of Handrails, one top coat of signal red paint is to be applied before dispatch to site. Supply and application of paint is in vendor's scope.
 - 2.22 Supply of all applicable Paints from reputed manufacturers like Asian paints, Berger paints, Kansai Nerolac, Nippon paint, Shalimar paints etc., as per approved Painting Schedule is in vendor's scope. Application of Paints as per Painting Schedule after Power Tool / Grit blast cleaning is in vendor's scope. The Paint Manufacturer's certificates for the supply of paints shall be submitted to BHEL-HPVP before starting the job.
 - 2.23 The fabricated items shall strictly conform to the dimensions and tolerances indicated in the drawings. It must be ensured that correct dimensions and deviations, if any, are recorded properly and is made available to BHEL officials or their authorized agencies.
 - 2.24 Vendor has to engage sufficient man power and resources for fabrication to meet HPVP delivery schedules.
 - 2.25 All the measuring instruments used for inspection and testing shall have valid calibration certificates from NABL Laboratory or traceable to national / international standards.
 - 2.26 Experienced Site-in-charge and Qualified Engineers & Supervisors shall be deployed for proper co-ordination of the job. **Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.**
 - 2.27 Vendors should deploy Experienced & Qualified QC personnel for carrying out the inspection activities in coordination with BHEL QC inspector / TPIA. **Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.**
 - 2.28 Vendors should deploy Qualified NDT personnel (Level III / Level II) at site for carrying out the NDT inspection activities in coordination with BHEL QC –NDT / TPIA.
Vendor shall obtain certification of BHEL Engineer-in-charge for the same and submit along with Bills for processing.
 - 2.29 Vendor shall deploy sufficient no. of calibrated Welding machines, Main Ovens & Portable Ovens required for baking of electrodes, other machinery in working condition at fabrication yard. All relevant documents shall also be made available for verification & approval by BHEL - HPVP (QC) / TPIA.
 - 2.30 Required tools & tackles, Measuring instruments like Tape, Fillet & Butt Weld Gauges, Plumb bobs with magnets etc., shall be calibrated and valid calibration certificates must be presented, whenever required.
 - 2.31 All the Bed materials required for fabrication, Scaffolding materials like Pipes, Clamps, GI Sheets, Jallies etc., for temporary platform works required during the complete course of the fabrication are to be arranged by the Vendor.
 - 2.32 Any modification work due to revision of the drawings during fabrication is to be carried out by the vendor without any additional cost.
 - 2.33 Vendors shall abide by all the rules and statutory regulations in force from time to time as per the Factories Act. It is their responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.
 - 2.34 Power will be provided at one point by HPVP. However, Arrangement of Power Distribution Board with suitable capacity Switch Fuse unit as incomer, all outgoings with necessary safe trips like MCB, ELCB etc., as per the industrial safety norms and their installation, all outgoing cables from Distribution Board, termination at the distribution board is in vendor's scope. Sufficient Area lighting at the work place shall be arranged by the vendor at their cost.
 - 2.35 Area required for fabrication, site office and Stores will be provided free of charge. All other arrangements for site enabling including Jungle Clearance & Surface Levelling etc., if required, shall be done by the vendor.
 - 2.36 Though not mentioned specifically, any activity which is required for completion of the work is deemed to be included in the scope of work of the vendor without any price implication.
- 3. BHEL SCOPE:**
- BHEL – HPVP shall provide the following as free issue:
- 3.1 Supply of Drawings, GMS, QAP/SQP, NDE Procedures, WPS, Painting Schedule etc.
 - 3.2 Plates in full / off-cuts as per requirement.
 - 3.3 Rolled Sections, Pipes, Round bars etc., in running meters.

- 3.4 Area required for fabrication, site office and stores will be provided free of charge. All other arrangements for site enabling including Jungle Clearance & Surface Levelling etc., if required, shall be done by the vendor.
- 3.5 Power and Water will be provided at one point and further distribution to the work location is to be carried out by the vendor.

4. INSPECTION:

- 4.1 Inspection shall be carried out by M/s. BHEL-HPVP, Vizag / BHEL Authorized Inspection Agency / Customer as per approved QAP / SQP. Vendor shall offer for Stage wise and Final inspection as per approved QAP and obtain necessary stage wise & final clearances before proceeding for further operations.
- 4.2 Vendor shall be solely responsible for preparation and submission of all Inspection Reports & documents duly certified by Inspection Authority for the finished items.
- 4.3 All the documentation related to inspection clearance of M/s. BHEL / TPI / Customer, Generation of Inspection Reports, Preparation of Final Documents as per BHEL standard formats etc., are included in the scope of vendor and scanned copy as well as hard copy of the same is to be submitted to BHEL-QA.

Note: Drawings & QAP/SQP enclosed with the tender document are tentative only and may be subject to revision due to incorporation of comments of the approving authority. Hence, the approved QAP/SQP & Drawings issued to the vendor after ordering shall only be followed for execution and inspection of the job.

5. DELIVERY:

Finished items along with inspection documents and all other certificates are to be handed over to HPVP-Logistics **within 3 Months from the date of issue of First consignment of free issue materials (or) 6 weeks from the date of issue of Last consignment of materials (Excl. Gaskets & Fasteners) whichever is later.** The delivery period will be calculated from the date of issue of materials to the date of delivery of finished items against respective DUs. The delivery period includes the time involved in collection of all raw materials, cutting plan approval, handing over of finished items at HPVP- Logistics.

Note: In case the delivery period offered by the vendor is more than the tender delivery, Price quoted by the bidder shall be loaded for additional period @ 0.5% per week or part thereof for the purpose of evaluation of Bidder Status.

6. SITE MOBILISATION:

Successful bidders shall complete site mobilization within 7 days from the date of receipt of order (or) from the date of intimation for the same by BHEL whichever is later.

7. PRICE:

- 7.1 **L1 status shall be evaluated based on the total quoted value.**
- 7.2 The price shall be quoted in the **Price Bid** as per the Schedule of Quantities & Rates for the detailed scope of work and the quoted price shall be inclusive of all applicable taxes & duties except GST.
- 7.3 The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.
- 7.4 GST shall be reimbursable to the vendor as detailed in Clause - 8 and as per Annexure – GST.
- 7.5 Income tax will be deducted at applicable rates from RA & Final bills.

8. GOODS & SERVICES TAX (GST):

Bidders shall make a note of the following points of GST before submission of their offer:

- a) Vendors shall have to mention their GSTIN no. (15 Digits) in their Technical Bid. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
- b) Semi-finished goods are to be delivered by the Vendors in BHEL, HPVP premises within a maximum period of one year from the date of issue of the material, failing which the whole transaction will be considered as Supply & Sale and GST is required to be paid along with interest (calculated @ SBI Base Rate + 6%) along with penalty, if any, from the date of Challan on the whole value of materials. Hence vendors shall have to ensure that materials issued to them are returned within 365 days.
- c) After fabrication, the vendors shall have to deliver the Semi - finished Goods by fulfilling the following formalities:
- i) GST invoice should be raised by the vendors by paying GST on job work charges at applicable rates and by incorporating the HPVP GSTIN no. in the invoice for availing the reimbursement of GST from HPVP.
- ii) The vendor shall also have to enter in their GST Return -1 (GSTR-1) the details of invoice raised for payment of GST so as to enable HPVP to avail input credit.

9. REVERSE AUCTION:

- 9.1 BHEL shall be resorting to Reverse Auction (RA) for this tender. RA shall be conducted among the eligible techno-commercially qualified bidders. Business Rules for Reverse Auction are given at Annexure – V. Refer Guidelines for Reverse Auction which is available on our website, www.bhel.com → supplier registration → Guidelines for Reverse Auction, before submission of offer.
- 9.2 Sealed envelope / Electronic Price bids of all the techno-commercially qualified bidders shall be opened and the same shall be considered as initial bids of the bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.
- 9.3 BHEL will inform bidders the details of service provider who will provide business rules, all necessary training and assistance before commencement of online bidding. The bidders participating in the Reverse Auction shall have to necessarily submit 'Process Compliance Form' (PCF) to the designated Service Provider.
- 9.4 Bidders are advised to read the 'Business Rules' (Annexure – V) indicating details of RA event carefully, before reverse auction event.

10. VALIDITY OF OFFER:

The offer shall be valid for a period of **3 months** from the date of Reverse Auction.

11. RISK PURCHASE:

In case the contractor fails to execute the work within the scheduled time or due to any other reasons, BHEL - HPVP reserves the right to get the same completed through some other party at the risk & cost of the contractor and any additional expenditure incurred due to the same shall be charged to the contractor. Non-performance of contract attracts penal provisions in line with BHEL Guidelines for Suspension of Business Dealings.

12. GENERAL:

- 12.1 The bidders shall study the Tender documents, Drawings, Quality Documents and all other relevant documents in detail for understanding the scope of work and the processes involved before submission of offer. Bidders shall get clarifications, if any, from concerned officials on the scope of work or any other details of the tender document, over phone between 09:00 AM and 04:00 PM on any working day or through e-mail.
- 12.2 **Conditional / Partial Price Bids** and any other deviations to the tender terms & conditions are not acceptable and BHEL reserves the right to reject such offers without further correspondence. Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry in the Techno-commercial Bids without any deviations.
- 12.3 BHEL reserves the right to modify or cancel the tender enquiry at any stage without assigning any reasons thereof.
- 12.4 The General Terms & Conditions, if any, contradicting with the specific terms & conditions given in the tender, then specific terms & conditions shall only be considered.
- 12.5 Other Terms & Conditions, whichever applicable, shall be as per Annexure – III enclosed.
13. The following documents shall form part of the tender enquiry including this Notice Inviting Tender:

PART - 1: TECHNO-COMMERCIAL BID

- i) Schedule of Quantities : Annexure – I
- ii) Details of Items to be fabricated : Annexure – II
- iii) General Terms & Conditions : Annexure – III
- iv) Acceptance to tender terms & conditions : Annexure – IV
- v) Business Rules for Reverse Auction : Annexure – V
- vi) GST Compliance for Indigenous Suppliers : Annexure – GST
- vii) Tentative Drawings, QAP/SQP

PART - 2: PRICE BID

- viii) Price Bid (Schedule of Quantities & Rates)

14. TENDER SUBMISSION (Through e-Procurement system):

- 14.1 The tender completed in all respects shall be submitted in **Two parts** (Techno-commercial bid and Price Bid) through online e-procurement portal (<https://eprocurebhel.co.in>) latest by **13:00 Hrs. on 15.06.2026**.

Note: Techno-commercial bid along with all the tender documents shall be duly signed & stamped by the bidder on all pages.

14.2 Submission of offer by the bidder implies that all the tender documents were read by the bidder and the bidder is aware of the scope and specifications of the job.


14.3 **OFFERS SENT IN ANY OTHER FORM WILL BE TREATED AS INVALID AND WILL BE SUMMARILY REJECTED.**

15. TENDER OPENING:

15.1 Techno-commercial Bids will be opened on **15.06.2026 at 15:00 Hrs.** in online e-procurement portal.

15.2 After evaluation of the Techno-commercial Bids, intimation regarding date & procedure of conducting Reverse Auction shall be given by the service provider to all the eligible techno-commercially qualified bidders through an e-mail in advance at an appropriate time.

For Bharat Heavy Electricals Limited,


05/06/2026
D. N. MURTHY
Manager (OS)
Bharat Heavy Electricals Ltd
HPVP Visakhapatnam-530 012

SCHEDULE OF QUANTITIES

Tender Enquiry ref: OS/26-27/8170/Bolted Strl./11/011

Date: 05.06.2026

Sub: Fabrication of Structure (Bolted & Welded type) against S.O. No. 8170 inside premises of BHEL-HPVP, Visakhapatnam with free issue materials

Sl. No.	S.O. No.	Description of Work	Unit	Qty.
1	8170	Fabrication of Structure (Bolted & Welded type)	MT	370
		TOTAL	MT	370

Notes :

- 1) **L1 status shall be evaluated based on the total quoted price.**
- 2) The quoted price shall be inclusive of all applicable taxes & duties except GST. Income Tax shall be deducted at applicable rates from Bills and GST shall be reimbursable to the vendor as per applicable guidelines.
- 3) The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of work.
- 4) The quantity indicated above is tentative and may vary subject to the requirement at the time of ordering / execution. However, payment shall be made for the actual quantity only.
- 5) The bidders are advised to go through all the drawings & documents before quoting the tender.
- 6) The evaluation currency for this tender shall be **INR**.

Signature of the Bidder with stamp

Tender Enquiry ref: OS/26-27/8170/Bolted Strl./11/011

Date: 05.06.2026

DETAILS OF ITEMS TO BE FABRICATED

Sub: Fabrication of Structure (Bolted & Welded type) against S.O. No. 8170 inside premises of BHEL-HPVP, Visakhapatnam with free issue materials

Sl. No.	S.O. No.	Description of Item	Approx. Wt.	Unit
1	8170	Fabrication of Structure (Bolted & Welded type)	370	MT
		Total	370	MT

Note : The above weights are approximate and may vary as per the drawings issued at the time of order / during execution.

GENERAL TERMS & CONDITIONS

1. TECHNICAL DELIVERY CONDITIONS:

The work should conform to the technical data given in our drawings, GMS, Shipping List Specifications, QAP, WPS etc.

2. PARTY'S SCOPE:

The scope of the party shall be as follows: -

- a) All welding equipments, baking oven, tools, jigs and fixtures, measuring instruments duly calibrated, handling facilities, testing facilities etc.
- b) All materials other than those mentioned under "Free Issue Materials", which are required for completion of the work.
- c) All consumables such as electrodes, gases, grinding wheels etc.

Note: Electrodes of specification mentioned in the drawings / WPS and of BHEL approved brands only shall be used and MTCs of the same shall be submitted to BHEL for verification before use.

3. REVISION OF DRAWINGS:

There may be minor changes in the drawings during execution. In such a case, party should accommodate the same without any extra claim.

4. WELDING QUALIFICATION: Qualification of required number of Welders is party's responsibility at their cost.

5. X-RAY:

All welding shall be of X-ray quality where specified on drawings. Inspection would specify the quantum of X-ray based on drawings / code requirement. Party should strictly follow the WPS and QAP issued by BHEL during welding. Getting the welds radiographed and getting them cleared by inspection is the responsibility of the party.

6. RECTIFICATIONS / REJECTIONS:

Any rectification due to defective work, if required, shall be done by the party free of charge with a suitable technology approved before hand by BHEL in writing. The cost of material, if any used for rectification work / rejection work, will be estimated by BHEL and the same shall be debited to party's account. In case any rectification / rework is to be carried out due to defective material supplied by BHEL, the replacement material and consumables will be supplied by BHEL free of Cost.

7. SECURITY DEPOSIT:

- a) Vendors shall have to submit a Bank Guarantee for **10%** of the order value in case of **HPVP ADM / Lovagarden site** (or) **25%** of the material cost in case of Vendor works towards Security Deposit and safe custody of free issue materials within 15 days from the date of intimation by Outsourcing dept. The BG shall be valid for the contract period with a claim period of 12 months. This Bank Guarantee shall be released to the contractor after completion of work and on acceptance of the same by BHEL / Owner.

Bidder agrees to submit performance security required for execution of the contract within the time period mentioned above. In case of delay in submission of performance security, enhanced performance security which would include interest (Repo rate + 4%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT/contract, from the bills along with due interest.

- b) **MODE OF DEPOSIT:** Security Deposit may be furnished in the following forms:

- i) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
- ii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
- iii) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
- iv) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
- v) Insurance Surety Bond.

(Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

8. PERFORMANCE BANK GUARANTEE:

Vendors shall have to submit Performance Bank Guarantee (claim period of 12 months) for 10% of the order value covering for the defects liability period. If PBG is not submitted, 10% of the order value shall be deducted towards PBG from the final bill and shall be refundable after performance guarantee period, if no defects are found during this period.

9. RAW MATERIALS ISSUE:

Raw materials shall be issued with appropriate processing allowance and invisible wastage over the theoretical requirement of raw materials (**Plates, Sheets, Sections and Pipes**).

10. TRANSFER / RETURN OF LEFT-OVER MATERIALS:

Party should maintain proper records for receipt & use of all free issue materials. The left-over materials & scrap as per the material accounting statement shall be returned to HPVP stores along with finished job. Material Transfer Vouchers (MTV) from one order to another or from one vendor to another and Material Return Vouchers should be submitted immediately after transfer / return. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation.

11. MATERIAL RECONCILIATION:

Orders issued to the vendors have to be completed in all respects including Material Accounting within a maximum of **180 days** from the **date of issue of material** from BHEL - HPVP stores.

Maximum of 0.5 % on the requirement of materials (**Plates, Sections and Pipes**) is admitted towards **process allowance and invisible wastage**.

Scrap quantity is permissible up to a **maximum of 1% on Structural (Beams, Channels, Angles, Rods, Pipes etc.), 2% on Sheets, 3% for Plates** on the theoretical requirement of materials.

If wastage and scrap is beyond the above limits, it should be fully justified with cutting diagrams etc. which are to be approved in advance by BHEL. **Otherwise, the cost of raw materials beyond approved limits will be recovered from the contractor as per BHEL recovery rates including applicable taxes & duties.**

Material reconciliation including return of balance materials, off-cuts is to be completed within 20 days from the date of completion of the order. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL-HPVP along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation,

Repeated occurrence of inordinate delays in returning and settling the material accounting will entail BHEL the right to terminate the contract forthwith or impose a temporary suspension on further loading at the discretion of BHEL.

12. SCRAP & OFF-CUT NORMS:

Sl. No.	Description	Scrap Size (in mm)	Off-Cut (in MM)
1.	CS/AS Sheets & Plates	Below 500 × 250	500 × 250 & above
2.	Rolled sections Rod, angles etc. (other than -tubes, pipes)	Below 1000	1000 & above
3.	Tubes & Pipes	Below 500	500 & above
4.	Universal column	Below 1000	1000 & Above
5.	SS Sheets & Plates	Below 500 × 250	500 × 250 & above
6.	SS Structural, Rods, Tubes, Pipes	Below 250	250 & above
7.	Non – ferrous: sheets & plates, rods & tubes	Below 500 × 250 (S & PL), Below 250 (Rods & Tubes)	500 × 250 & above, 250 & above
8.	Big size Scrap	(2500 & above) × (150 to 249)	-

13. INSPECTION:

Party shall contact our Quality Control Dept. for stages of inspection before commencement of job and should strictly follow the stages of inspection as per QAP.

14. WORKMANSHIP GUARANTEE:

The vendors should give workmanship guarantee for fabricated items for a period of 18 months from the date of last delivery of the order. Any defects due to incomplete work, faulty workmanship found in the fabricated items after delivery during the defects liability period shall be rectified / replaced by the vendor free of cost. Otherwise, the expenditure incurred towards the same will be recovered from the pending bills of vendors.

15. WORK PROGRESS:

The fabricator shall furnish a weekly report on the progress of work along with the status of availability of free issue materials and requirement of further materials, if any.

Outsourcing dept. personnel will visit vendor's works from time to time to assess and review the work progress. Free access shall be provided to BHEL or its inspection agency at all reasonable times of the day / night.

In case the progress is not satisfactory or supplies are delayed abnormally beyond the contractual delivery date, BHEL-HPVP, Visakhapatnam reserves the right to cancel the order in part or full or get the balance job in as is where is condition completed elsewhere by another agency at the risk and cost of Fabricator. The value of the work carried out by the party will be assessed by BHEL and the same shall be final. No compensation will be given to the fabricator in case of cancellation of order or diversion of balance job even if the jobs have been processed partly.

16. DELIVERY:

Finished items should be handed over to BHEL-HPVP on party's delivery challans along with Job completion certificate / Final Inspection Report from inspection agency / HPVP-QC department.

17. PENALTY:

Penalty calculations will be done on DU wise (Dispatchable Unit) delivery. If delivery exceeds the stipulated delivery schedule, penalty @ 1/2 % of the value of each DU per week (or) part thereof subject to a maximum of 10% of the value of each DU will be levied. However, time taken for the following will not be considered as delay on the part of the Sub-Contractor.

- 1) Intermediate operations, if any, carried out by BHEL.
- 2) Waiting time for BHEL / Third party Inspection beyond a normal time of 3 days.

18. PAYMENT TERMS:

Payment shall be made against RA Bills within 45 days for MSE (Micro & Small Enterprise), 60 days for Medium Enterprise and 90 days for non-MSEs from the date of submission of Bill.

90% payment will be made after handing over of the finished equipments along with all inspection documents to HPVP shops / Logistics dept. / ADM site / Lova Garden site, duly inspected & cleared by Inspection authority. Balance 10% payment shall be made along with the Final Bill against completion of total order in all respects including documentation.

Vendors shall have to submit the bills in the formats specified by HPVP-Outsourcing and the bills submitted in the specified format along with necessary supporting documents are only admitted for processing. The following documents shall be submitted along with the Final Bill:

1. No Claim Certificate from the contractor
2. No Dues Certificate from BHEL
3. Work Completion Certificate from BHEL
4. Material Reconciliation Statement submitted by the Contractor and certified by concerned authority of BHEL (if applicable)
5. Workmanship Guarantee certificate from the contractor

19. SECRECY:

All the documents of BHEL inclusive of Drawings, GMS and Standards made available to the fabricator should be kept in strict confidence and under no circumstance be made available to others or allow others to make use of them. Such documents shall be returned to BHEL on demand after completion of the job. This secrecy clause is binding on the employees of the fabricators also. Violation of the same may lead to suspension of business with the vendor and necessary legal action.

20. SUB-LETTING:

In general, sub-letting of jobs will not be permitted. But in special circumstances, this may be allowed. In such case, the party should obtain written approval from BHEL-HPVP, Visakhapatnam before sub-letting.

21. FACTORY RULES AND REGULATIONS:

Party shall abide by all the rules and statutory regulations in force from time to time as per factories act. It shall be party's responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

22. SAFETY:

- a) Contractor shall adhere to safe construction practices, guard against hazardous & unsafe working conditions and shall comply with the safety rules of BHEL and local authorities. He shall maintain First Aid facilities for all his employees and labour. Contractor's responsibility includes supply of welder kit, all safety items such as safety belts, white and colour glasses, goggles, safety helmets, safety shoes etc.
- b) Contractor and his employees shall follow all fire & safety, security regulations of BHEL.

23. HOUSE KEEPING:

During execution of work, the contractor at all times keep the working place and storage area clean and free from accumulation of waste materials, rubbish etc.,

24. ACCIDENT / DAMAGE / CONDUCT ETC.:

Contractor will be held responsible for any disorderly conduct / misconduct, indiscipline, theft, smoking etc., on the part of his men. He will ensure summarily eviction of such men from his premises failing which BHEL would remove them from the factory on his responsibility. Any damage to and or loss of equipment, machinery, building etc., to BHEL or BHEL employees, visitors or other contractors resulting from his own or any of his men's negligence shall be liable to be made good by him. Contractor shall be solely responsible for any accident in which you or your men or your equipment may be involved during the execution of contract on account of any reason what so ever.

25. TERMINATION OF CONTRACT:

In the event of any failure on the part of the contractor, BHEL reserves the right to terminate the contract by giving a notice of 2 weeks for any of the following lapses and contractual violations: -

- a) Failure to make labour payments in time as per the rules
- b) Failure to progress the job according to the agreed schedule
- c) Failure to mobilize adequate man power, tools & tackles and consumables in time
- d) Failure to adhere to Quality Standards of BHEL
- e) Refused to co-operate with other agencies working in the same area
- f) Failure to resolve labour disputes like strikes etc., within 7 days of occurrence
- g) Failure to comply with statutory regulations applicable at BHEL

BHEL shall also be free to intervene and take necessary remedial measures. All costs incurred with interest and overheads shall be recovered from contractor by such foreclosing or off-loading any part of the contract work.

26. CONFLICT OF INTEREST AMONG BIDDERS / AGENTS:

A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. ***The bidder found to have a conflict of interest shall be disqualified.*** A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

- a) they have controlling partner (s) in common; **or**
- b) they receive or have received any direct or indirect subsidy / financial stake from any of them; **or**
- c) they have the same legal representative / agent for purposes of this bid; **or**
- d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
- e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; or
- f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent / dealer. There can be only one bid from the following:
 1. The principal manufacturer directly or through one Indian agent on his behalf, and
 2. Indian/foreign agent on behalf of only one principal,
- g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, **or**
- h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sisters' common business/ management units in same/ similar line of business"

27. TAXES & DUTIES:

- a) BOCW Cess if applicable is to be paid by Contractor.
- b) In addition to existing taxes, any new taxes, cess, duties, levies imposed by Central/ State Govt. shall be borne by the contractor.
- b) In case, any new tax is imposed instead of existing tax, difference of the amount shall be reimbursed/ recovered on submission of documentary evidence.
- c) Any new tax is imposed by Central/ State Govt. (or) there is any variation in taxes after expiry of delivery / contract period, the same shall be borne by contractor only.
- d) All terms & conditions of the contract in respect of taxes & duties are subject to new taxation laws introduced from time to time by Govt. and Terms & conditions will deemed to be modified in accordance with the provisions of New Laws.

28. CONTRACTOR's MATERIAL:

Security of Contractor's Equipment, Tools & Tackles, Machinery etc., is in the scope of Contractor. BHEL is not responsible for the same.

29. RETURNING OF BHEL MATERIAL:

All Materials, machinery, equipment etc., of BHEL sent to site from BHEL-HPVP for execution of the Order are to be returned back to BHEL by the Contractor.

30. OVER RUN COMPENSATION (ORC) / IDLE CHARGES:

The contractor shall not be entitled to claim and the company shall not be liable to pay any amount on account of overrun compensation and idle charges, the overrun/ idling may be for whatsoever reasons.

31. DISPUTES:

Head of BHEL- HPVP Unit will be the final authority for any disputes arising out of this contract. The disputes / arbitration / settlement of contractual or legal issues shall be under the Jurisdiction of Visakhapatnam Court.

- 32.** For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of Contract / PO / WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable.

- 33.** The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

34. GRIEVANCE REDRESSAL MECHANISM:

To promote transparency and ensure fair treatment of all bidders, a structured Grievance Redressal Mechanism is in place to address any concerns or issues arising during the tendering process or in subsequent business dealings with the company.

Suppliers/Contractors are requested to follow the below escalation process for grievance resolution:

1. **First Level:** Any grievance should initially be addressed to the designated Dealing Officer, whose contact details are provided in the Notice Inviting Tender (NIT) / Contract.
2. **Second Level:** If the issue remains unresolved, it may be escalated by lodging a formal grievance through the SUVIDHA Portal: <https://suvidha.bhel.in/suvidha/>. Responses will be provided in accordance with the defined escalation matrix."

35. ORDER ACCEPTANCE:

If the order acceptance is not received within 03 days from the date of release of Sub-contract order, it shall be assumed that the same has been accepted by you thereof.

Signature of the Bidder with stamp

Acceptance to Tender Terms & Conditions

I / We hereby confirm that the Tender documents, Drawings, Quality documents etc. have been studied in detail and we have fully understood the scope of work.

I / We accept to all the Terms and Conditions of the Tender Enquiry without any deviations and the prices quoted are in accordance with the same.

I / We give our acceptance to participate in reverse auction for this tender.

Tender documents duly signed on all the pages by the Owner / authorized representative of the bidder are attached herewith.

Signature of the bidder with Stamp

BUSINESS RULES FOR REVERSE AUCTION (RA)

This has reference to tender no. **OS/26-27/8170/Bolted Strl./11/011, dated 05.06.2026**. BHEL shall finalise the Rates for **Fabrication of Structure (Bolted & Welded type) against S.O. No. 8170 inside premises of BHEL-HPVP, Visakhapatnam with free issue materials** through Reverse Auction mode. BHEL has made arrangement with an authorized Service provider (details will be shared before reverse auction) for conducting RA. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enquiry No. **OS/26-27/8170/Bolted Strl./11/011, dated 05.06.2026**, (b) Bidders' technical & commercial bid (in case of two-part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning:

- i) Price bids of all techno-commercially qualified bidders shall be opened.
- ii) **Reverse Auction:** The 'bid decrement' will be decided by BHEL.
- iii) The lowest bidder in sealed envelope price bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.
- iv) Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.
- v) After the completion of the reverse auction, the Closing Price shall be available for further processing.
- vi) Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.

2. Schedule for reverse auction: The Reverse Auction schedule will be intimated to the techno-commercially qualified bidders at a later stage.**3. Auction extension time:** If a bidder places a bid in the last {...} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {...} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {...} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {...} minutes. In case, there is no bid in the last {...} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc. The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Reverse Auction.

4. Bid price: The Bidder has to quote the {...} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, taxes, duties, freight and insurance as specified in tender document including loading (if indicated by BHEL due to deviations in technical/ commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL (To be specified by Unit as per NIT conditions).**5. Bidding currency and unit of measurement:** Bidding will be conducted in *Indian Rupees per Unit* of the material as per the specifications mentioned in the tender.

In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

6. **Validity of bids:** Price shall be valid for 90 days from the date of reverse auction. These shall not be subjected to any change whatsoever.
7. **Lowest bid of a bidder:** In case the bidder submits more than one bid, the lowest bid at the end of Reverse Auction will be considered as the bidder's final offer to execute the work.
8. Unique user IDs shall be used by bidders during bidding process. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders' company.
9. **Post auction procedure:** BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.
10. Any commercial/ technical loading shall be separately intimated to respective bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during Reverse Auction. Modalities of loading & de-loading shall be separately intimated to the bidders. The responsibility for correctness of total cost to BHEL shall lie with the bidders.
11. Reverse auction shall be conducted by BHEL (through M/s {Service Provider}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained.

In order to ward-off contingent situation of connectivity failure bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {Service provider} is responsible for such eventualities.

12. **Proxy bids:** Proxy bidding feature is a pro-bidder feature to safe guard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid.

Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant.

In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price.

Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of Screen, quantity being auctioned, tender value being auctioned etc. from M/s. {Service provider}.

14. M/s. {*Service provider*}, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {*Service provider*}, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.
15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure – VI) for price breakup, quoted during the Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {*Service provider*} besides BHEL within two working days of Auction without fail.
16. Any variation between the final bid value and that in the confirmatory signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).
17. Bidders' bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. **OS/26-27/8170/Bolted Strl./11/011, dated 05.06.2026**. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).
18. Bidders shall be able to view the following on their screen along with the necessary fields during Reverse Auction:
 - a. Leading (Running Lowest) Bid in the Auction (only total price of package)
 - b. Bid Placed by the bidder
 - c. Start Price
 - d. Decrement value
 - e. Rank of their own bid during bidding as well as at the close of auction.
19. BHEL's decision on award of contract shall be final and binding on all the Bidders.
20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.
21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.
22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.
23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. {*Service provider*}, the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.
24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action *as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com)*, shall be initiated by BHEL.

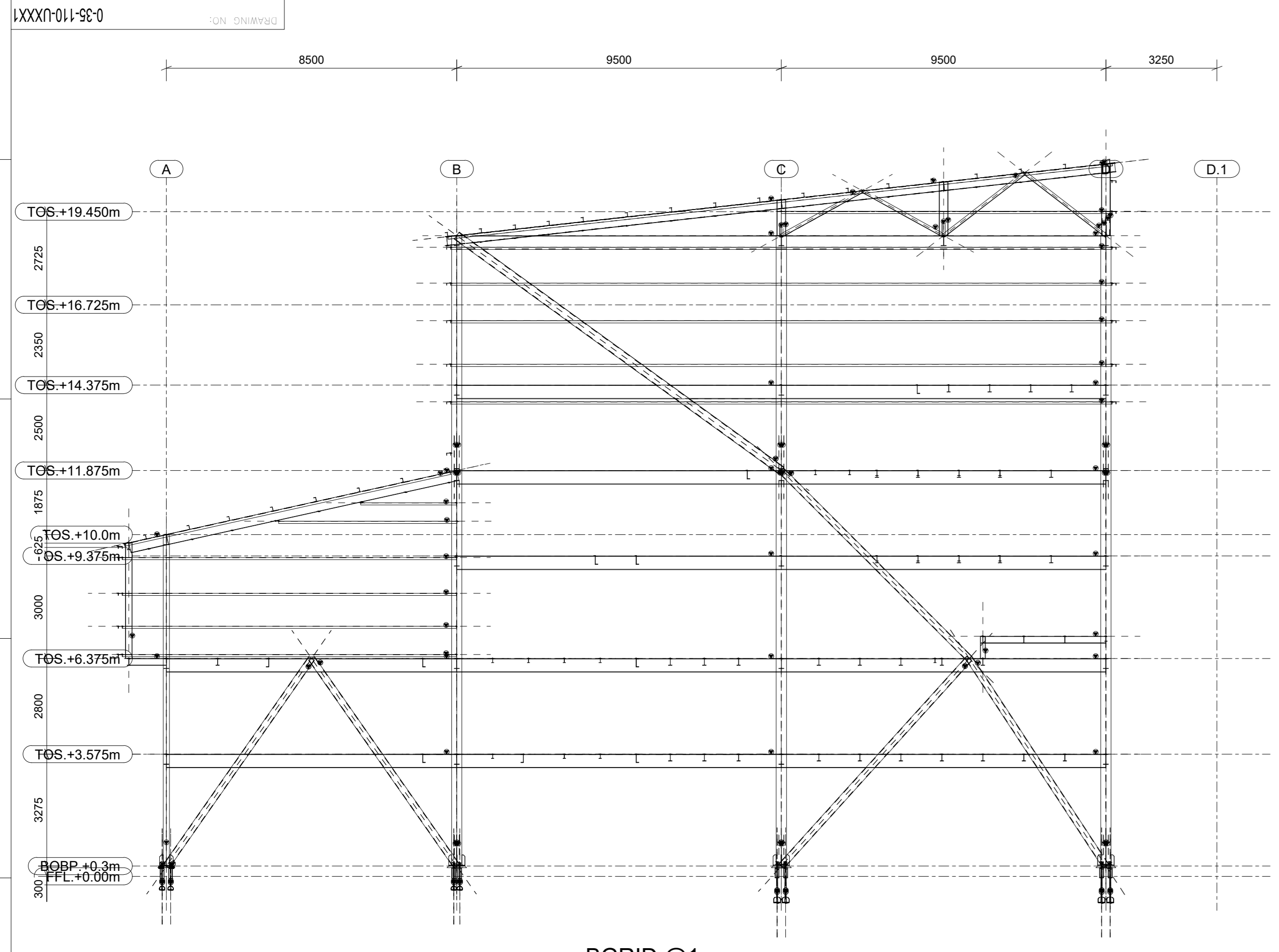
Signature of the Bidder with Stamp

GST COMPLIANCE FOR INDIGENOUS SUPPLIERS

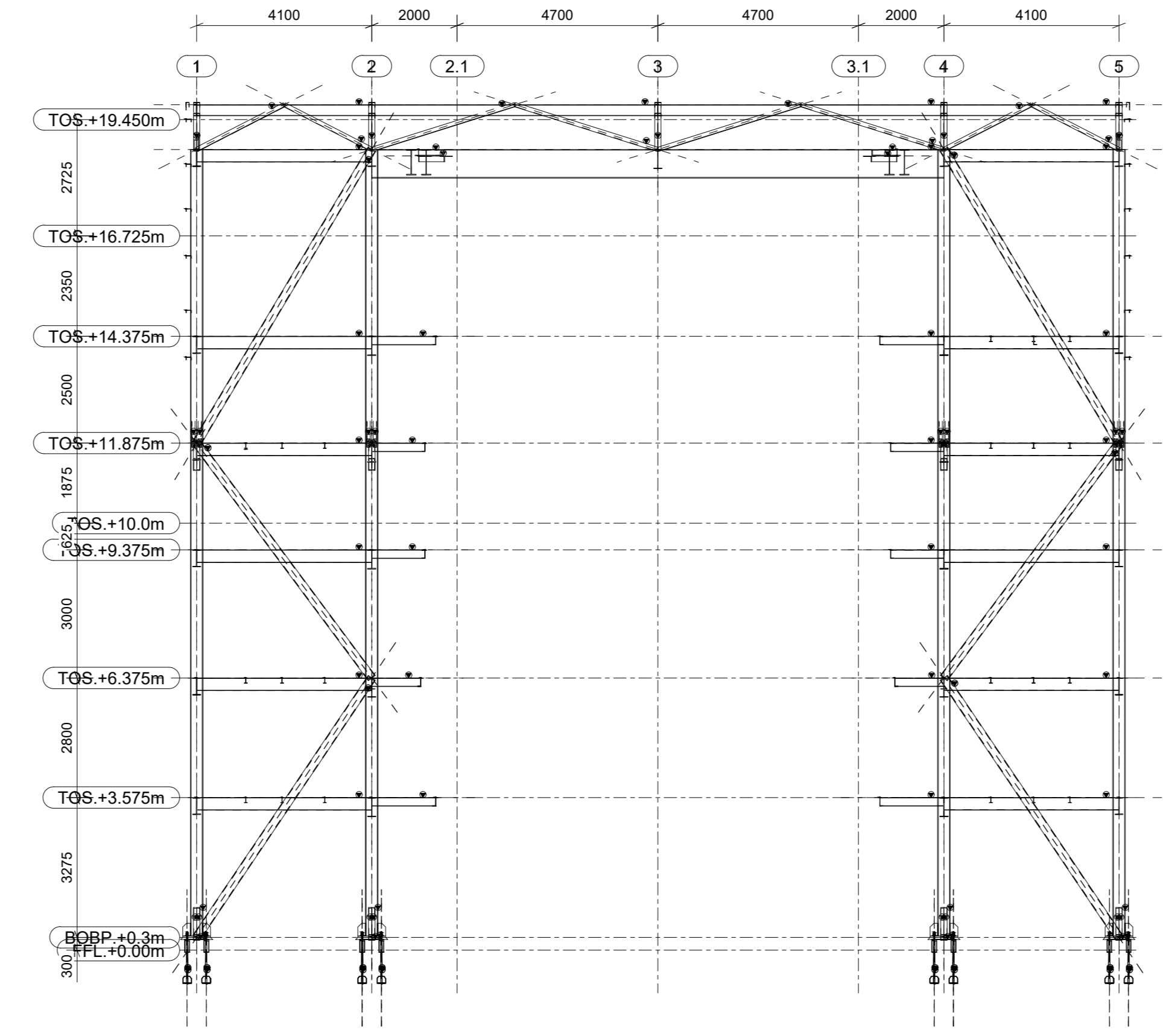
1. In Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GSTIN which should be clearly mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
2. Supplier shall mention their GSTIN in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.
3. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
4. A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.
5. All documents like Test Certificate, LR copy, Guarantee/Warranty certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment where ever applicable. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.
6. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the suppliers, within the calendar month notified by BHEL.
7. For any such delay in availing of tax credit for reasons attributable to supplier (as mentioned above), interest (calculated @ SBI Base Rate + 6%) along with penalty if any will be deducted for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
8. Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.
9. This is to inform that GST portion of invoice, shall be released only upon Vendor declaring such invoice in his GSTR-1 and receipt of goods and Tax invoice by BHEL and Confirmation of payment of GST thereon by vendor on GSTN portal. Alternatively, BG of appropriate value may be obtained from vendor which shall be valid At least one month after the confirmation of date of payment of GST by vendor on GSTN portal and receipt of Tax invoice and receipt of goods, whichever is later. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
10. That in case vendor delays Declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.

Note: The above will be followed strictly for processing vendor payments to ensure GST Compliance.

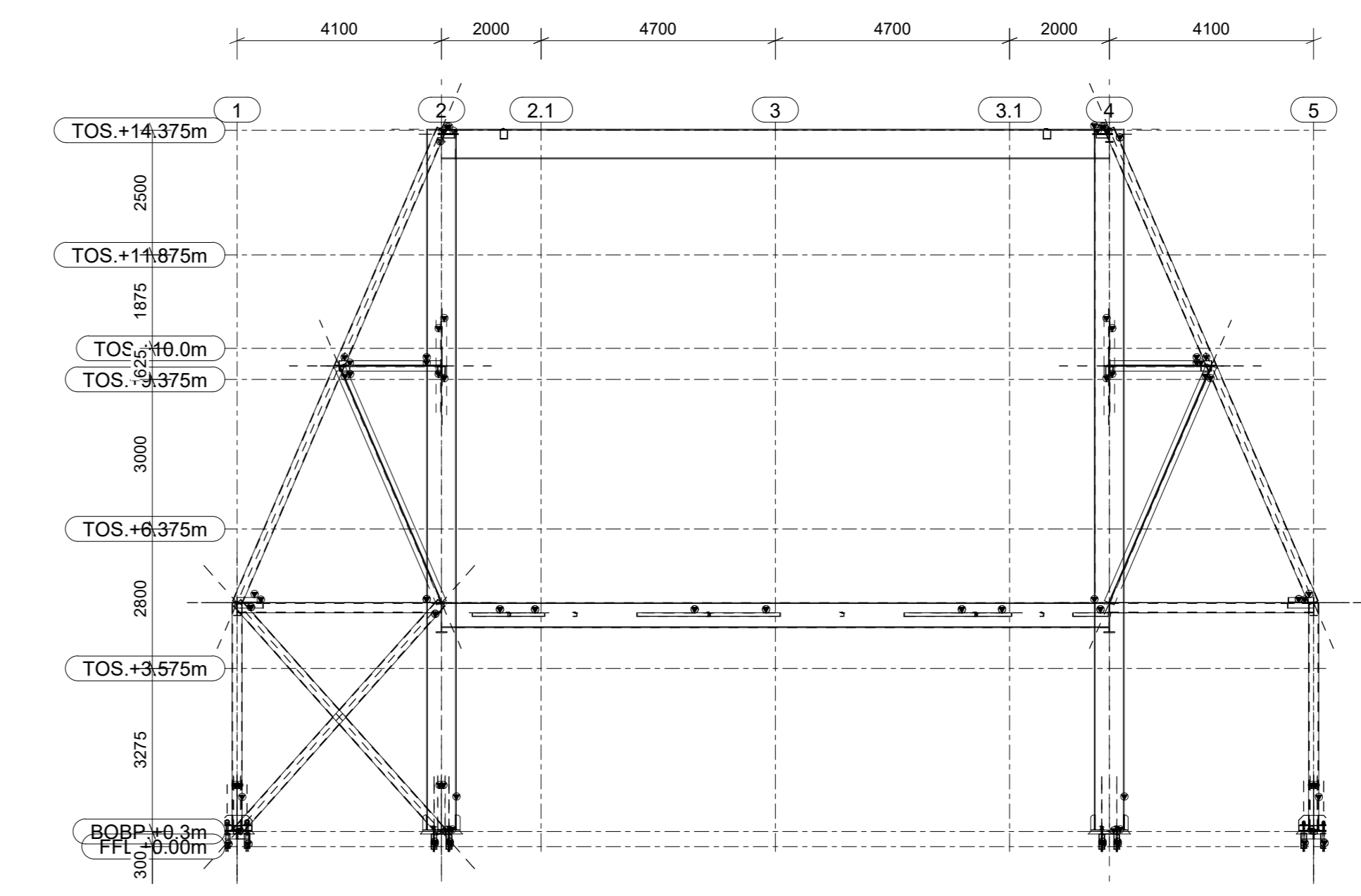
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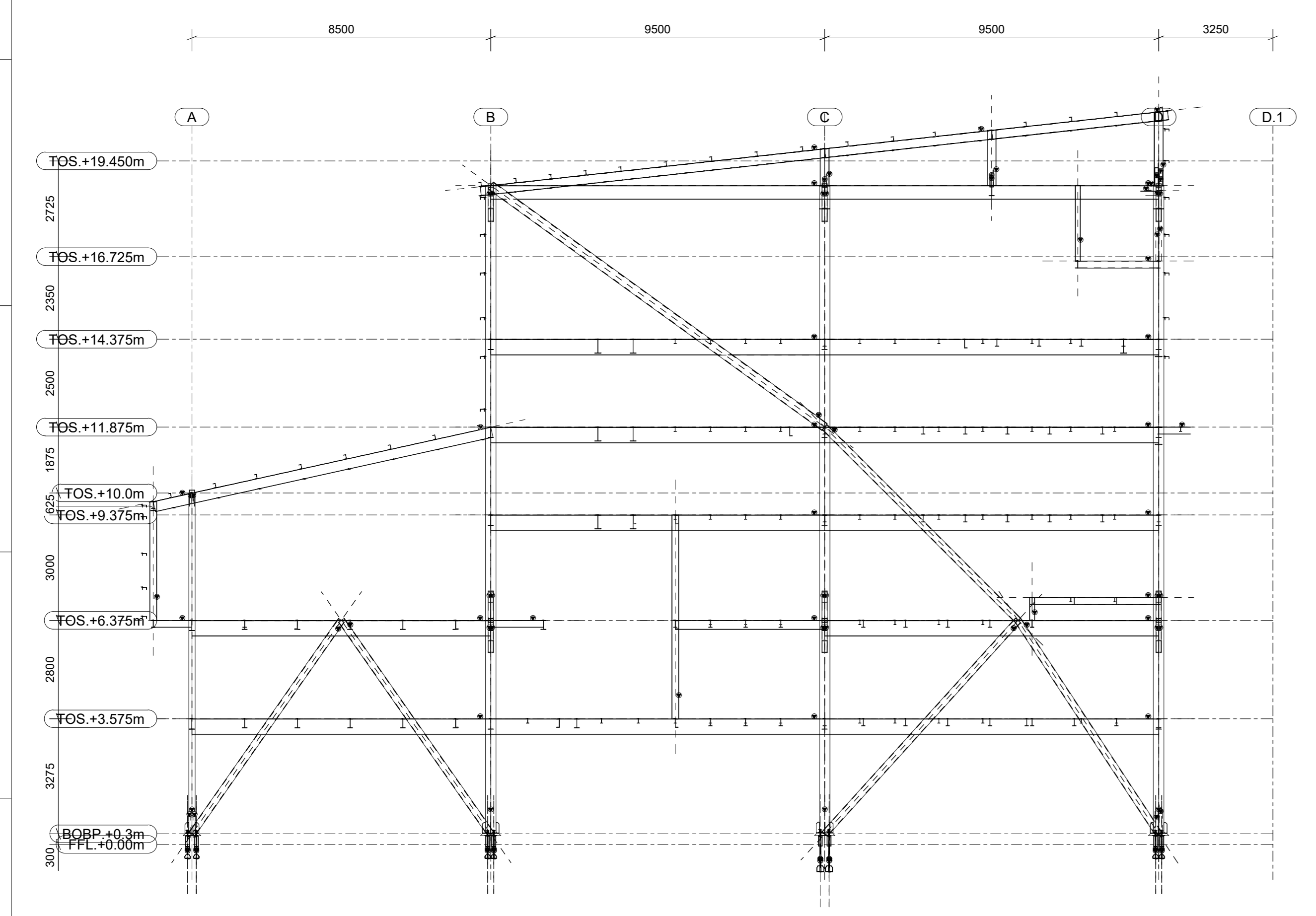
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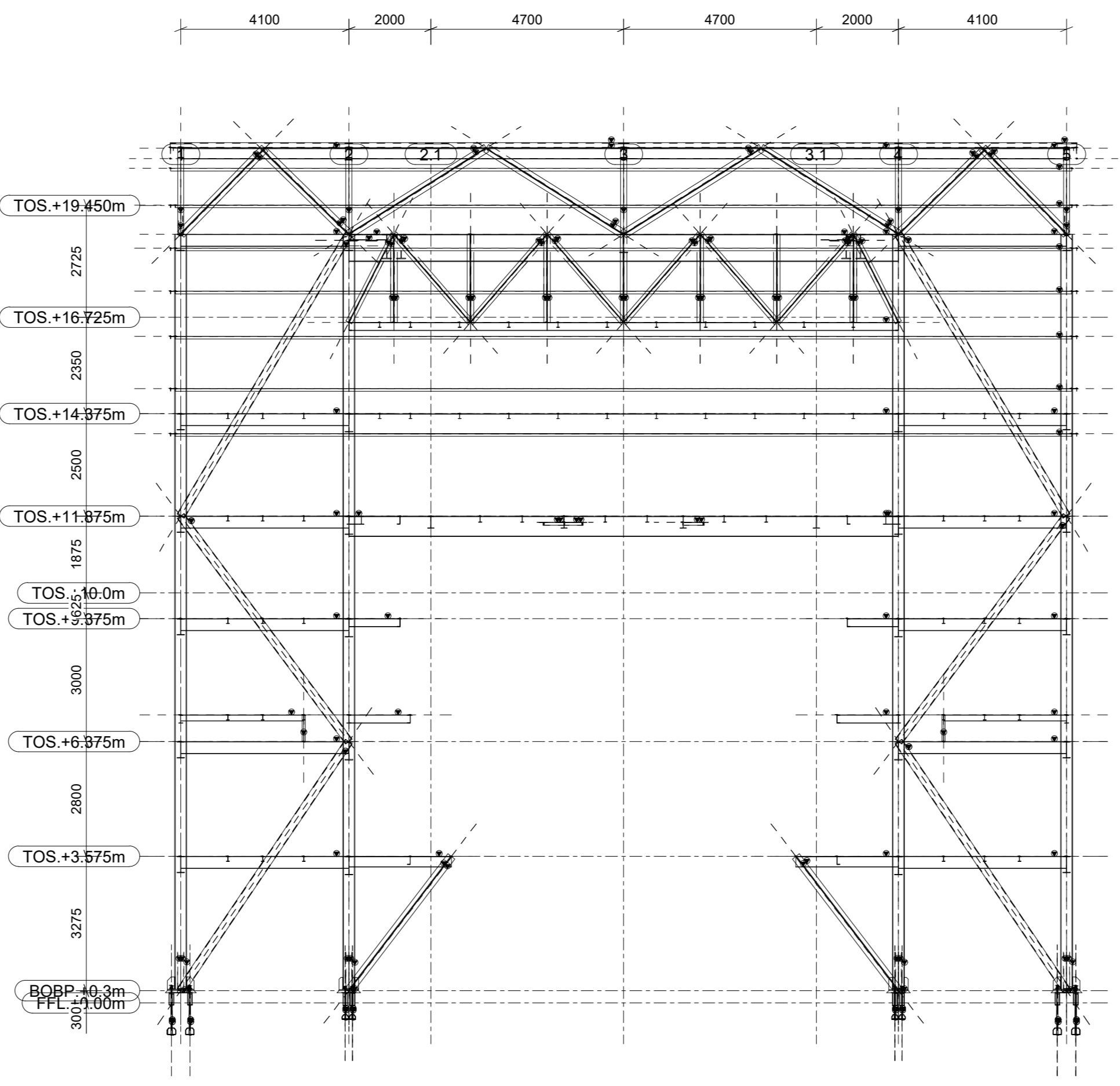
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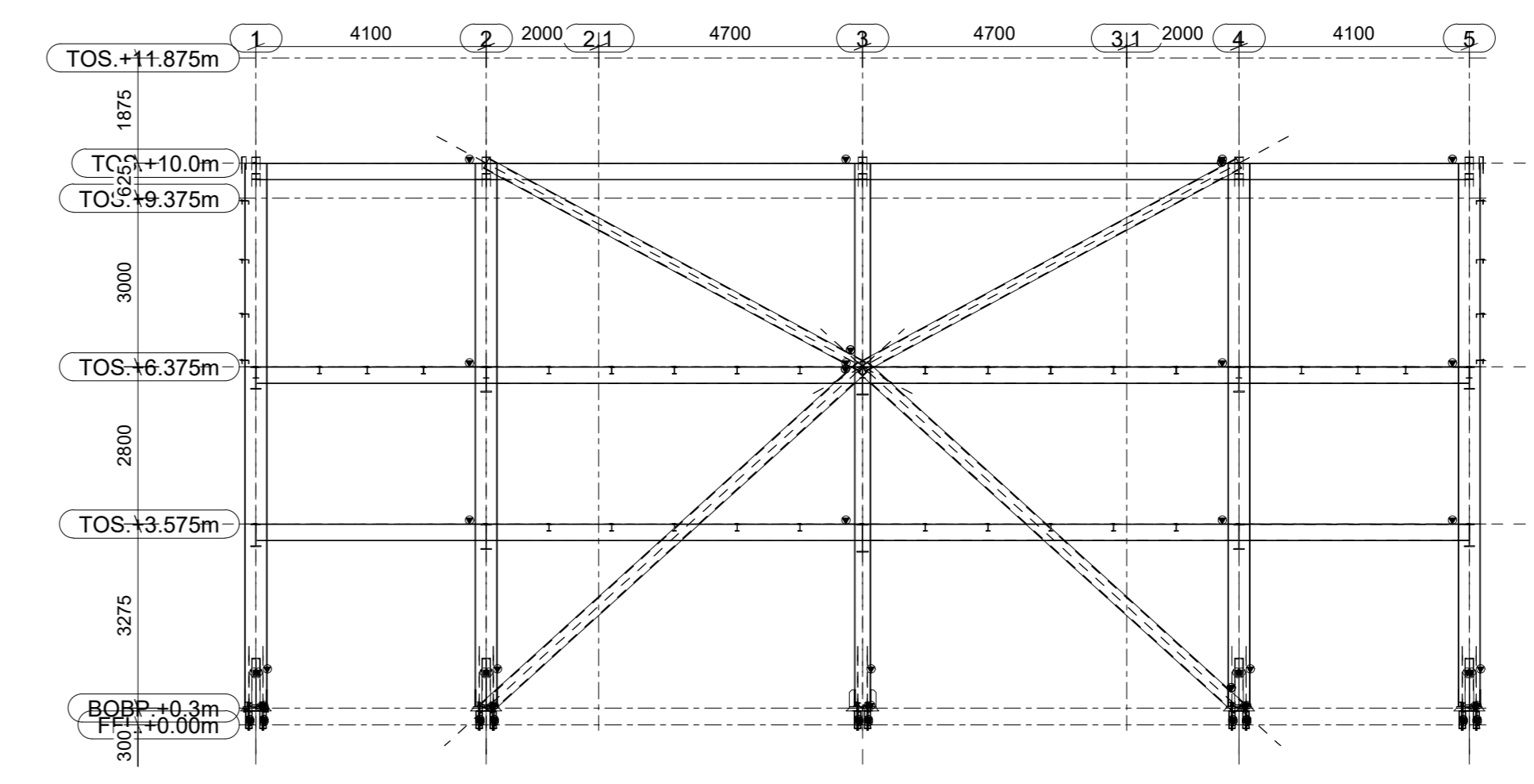
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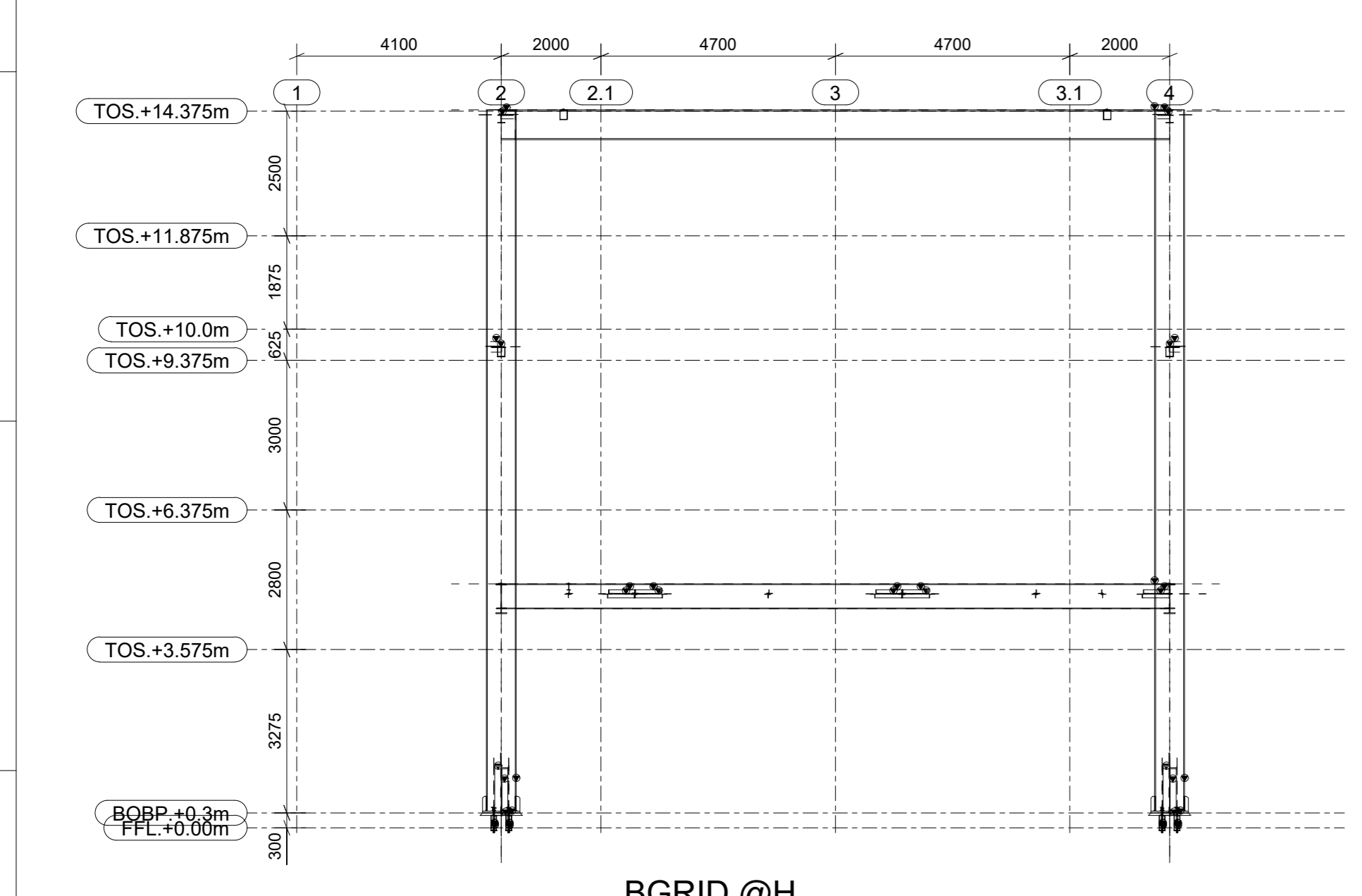
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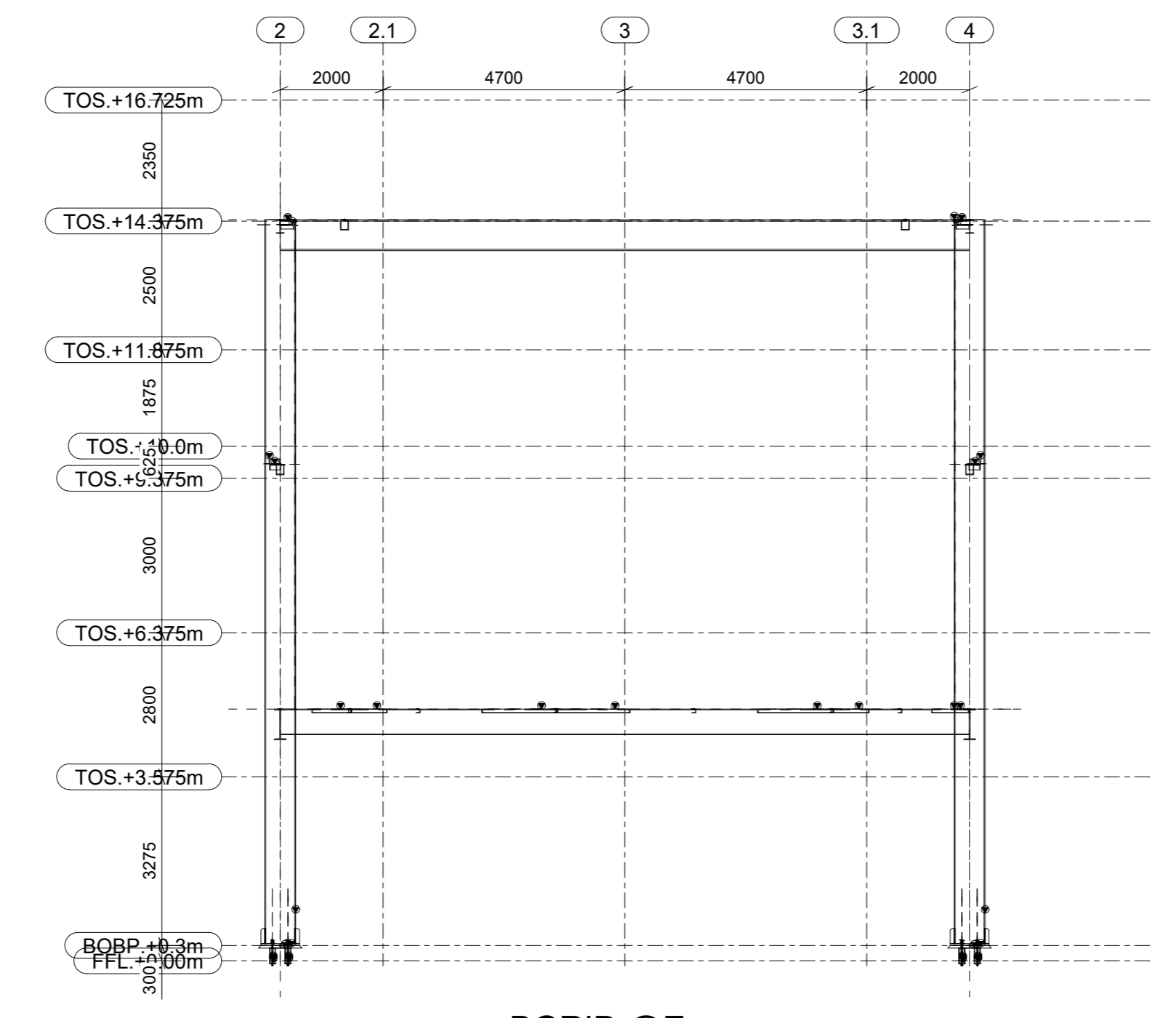
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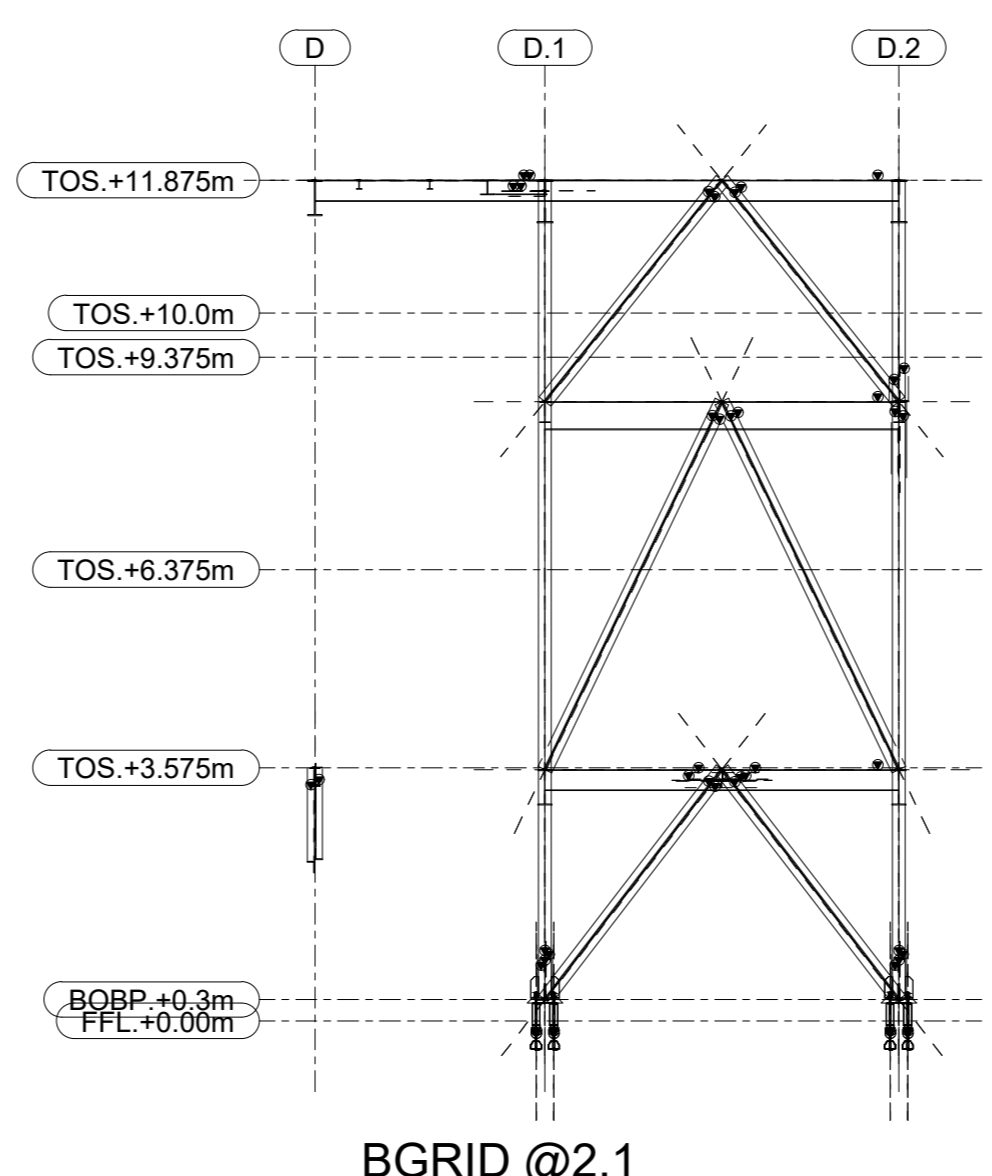
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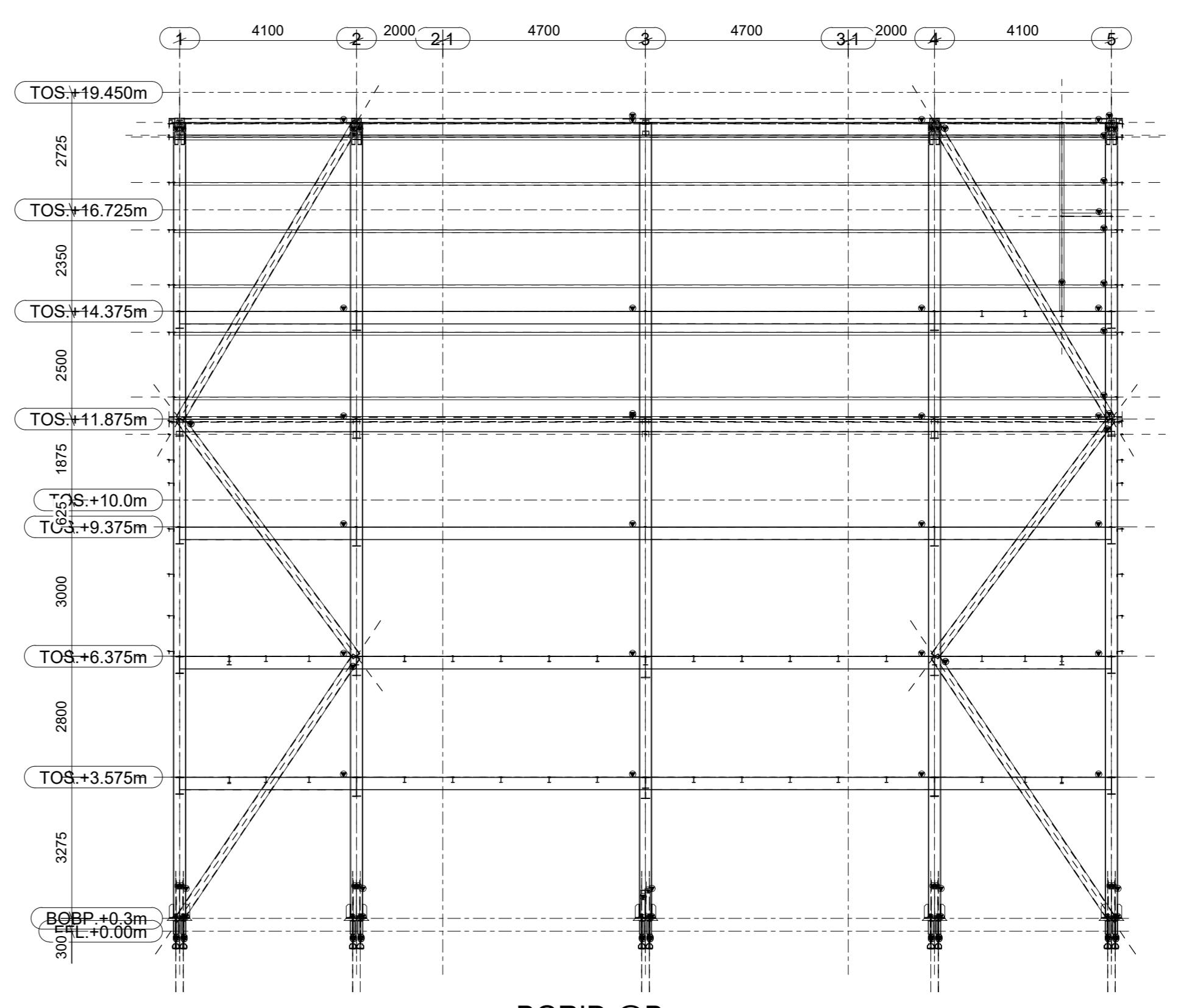
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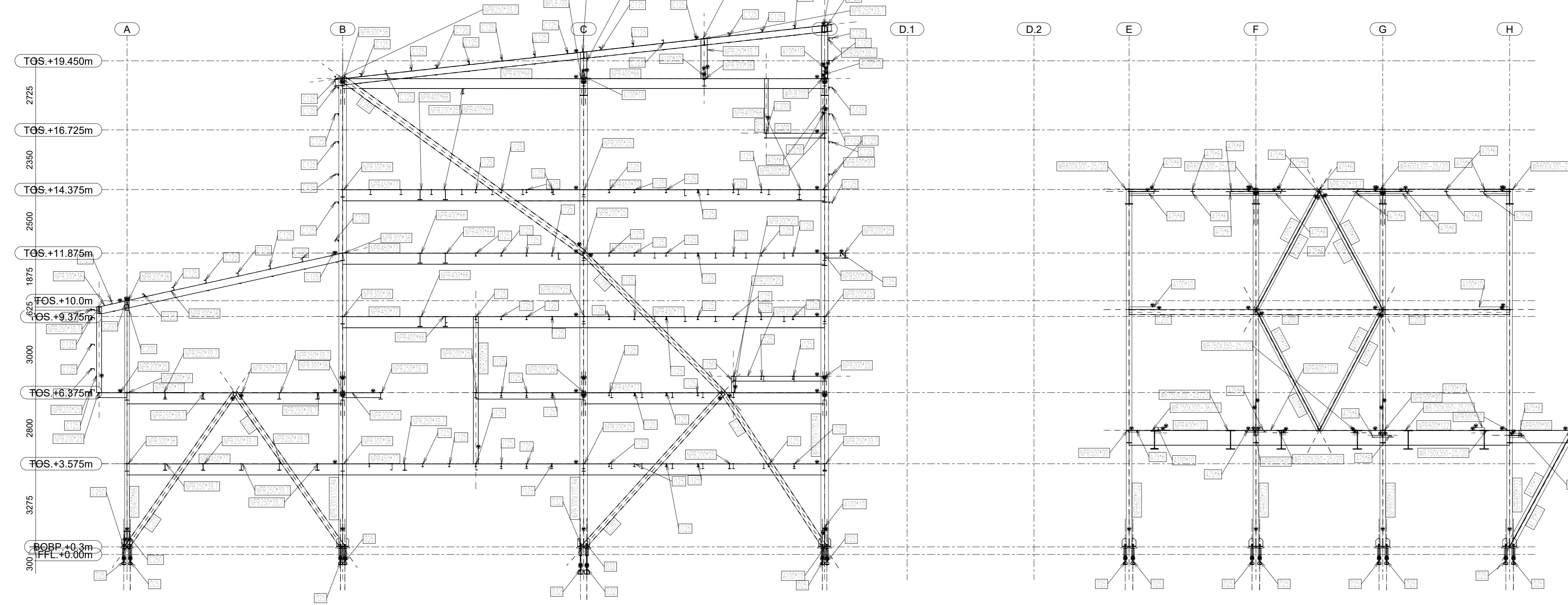


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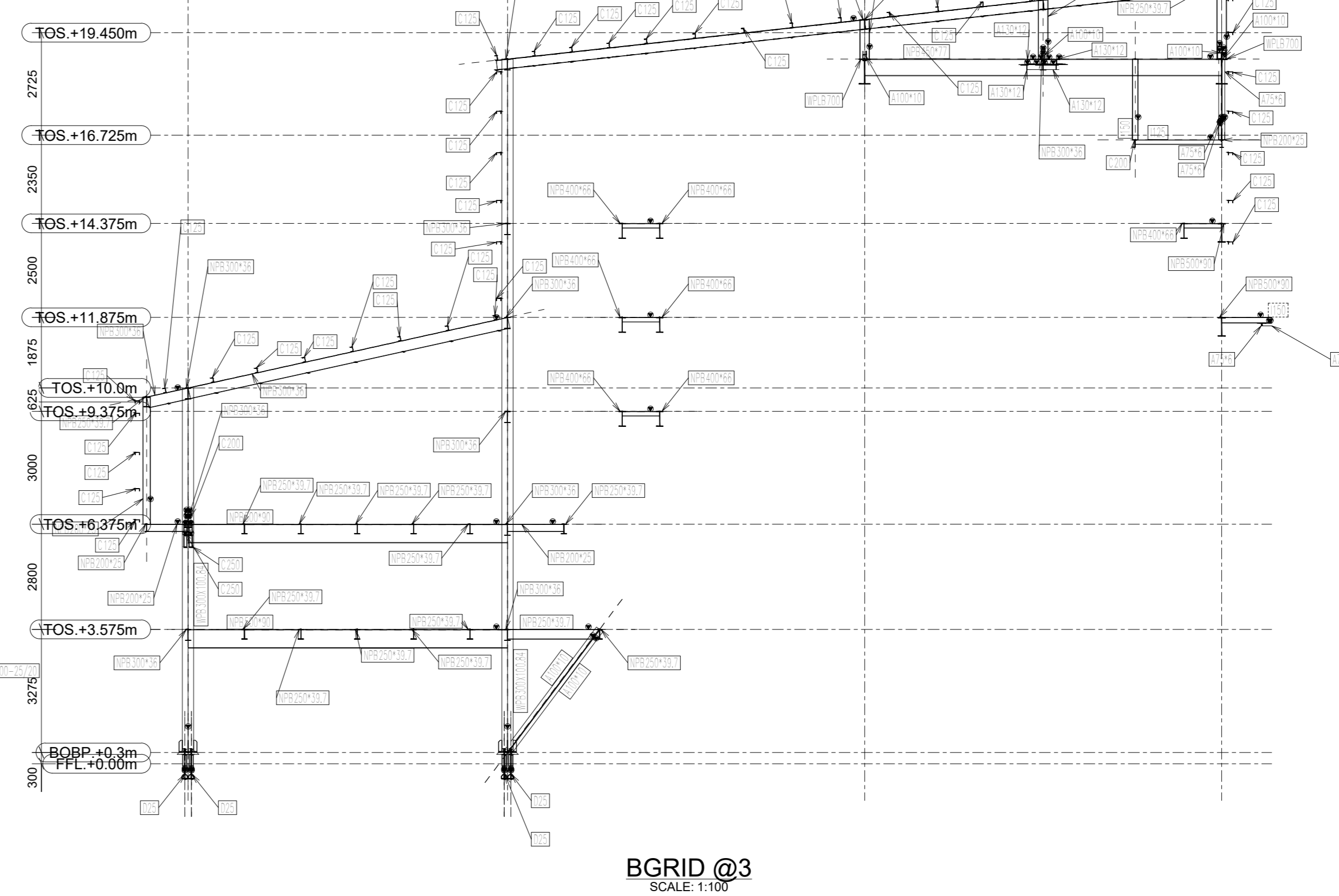
NOTE:
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER
2. ALL FABRICATION SHALL BE DONE AS PER IS:800
3. ALL MATERIAL SHALL BE AS PER IS:2062 Q&A/R UNLTD

PROJECT	8170
BHARAT HEAVY ELECTRICALS LTD., PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012	
DRAWN	N.PRAVEENA
CHECKED	N.V. REDDY
APPROVED	N.V. REDDY
DATE	07-06-2020
ALL DIMENSIONS ARE IN MILLIMETRES	
SCALE	1:100 N.T.S.
TITLE	SUPPORTING STRUCTURE GA ELEVATION
DRG. No.	0-35-110-UXXX1

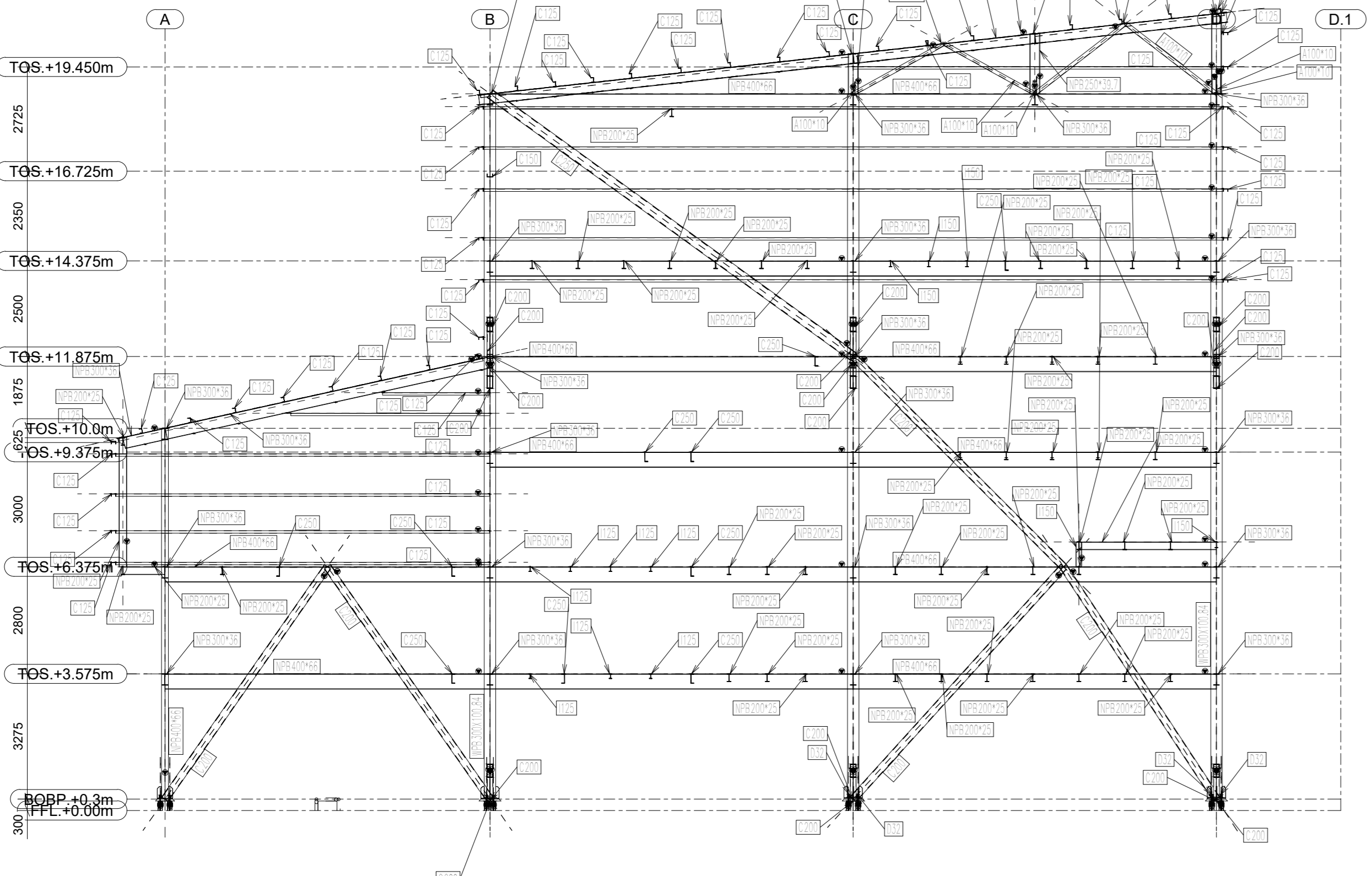
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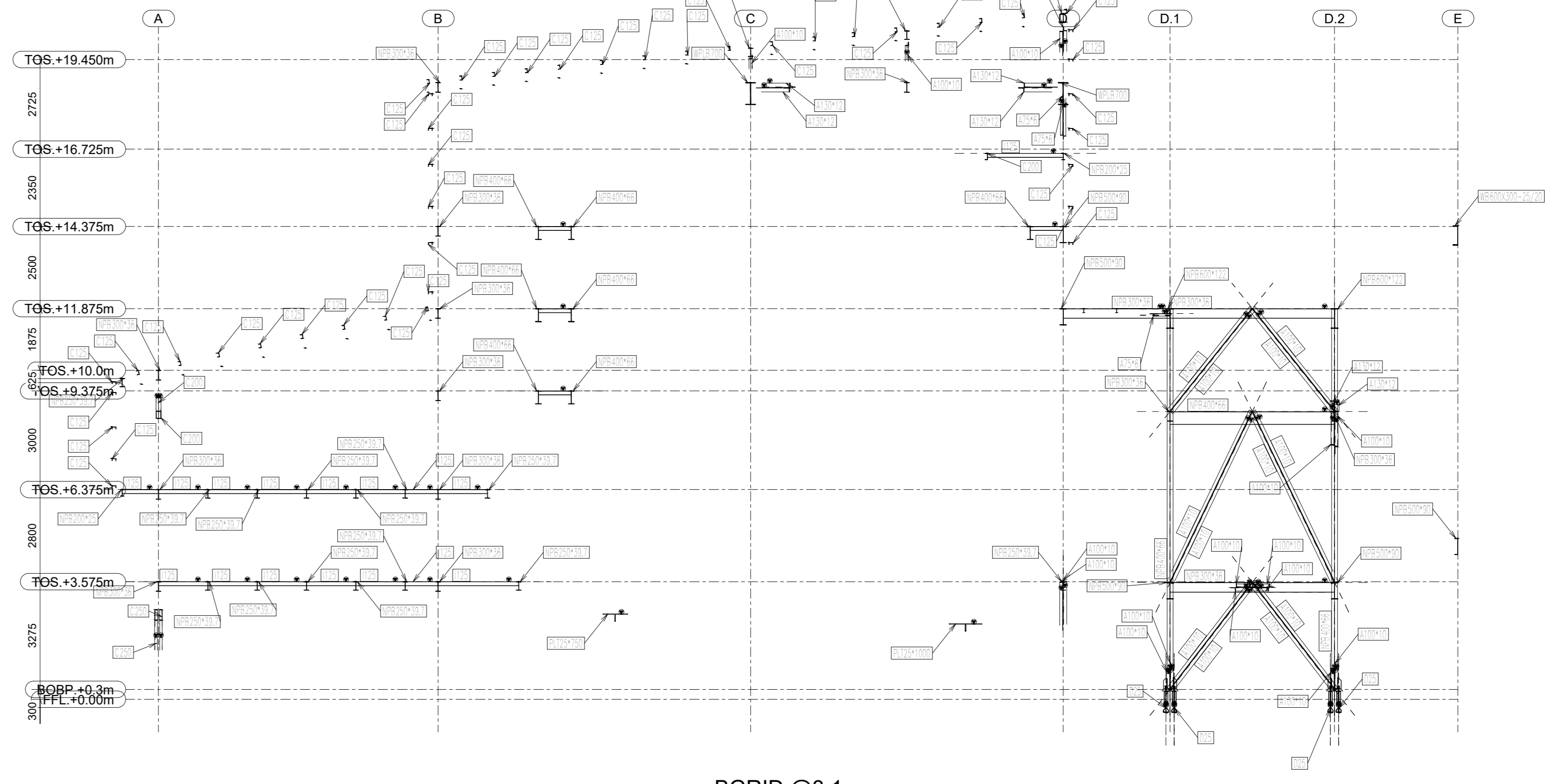
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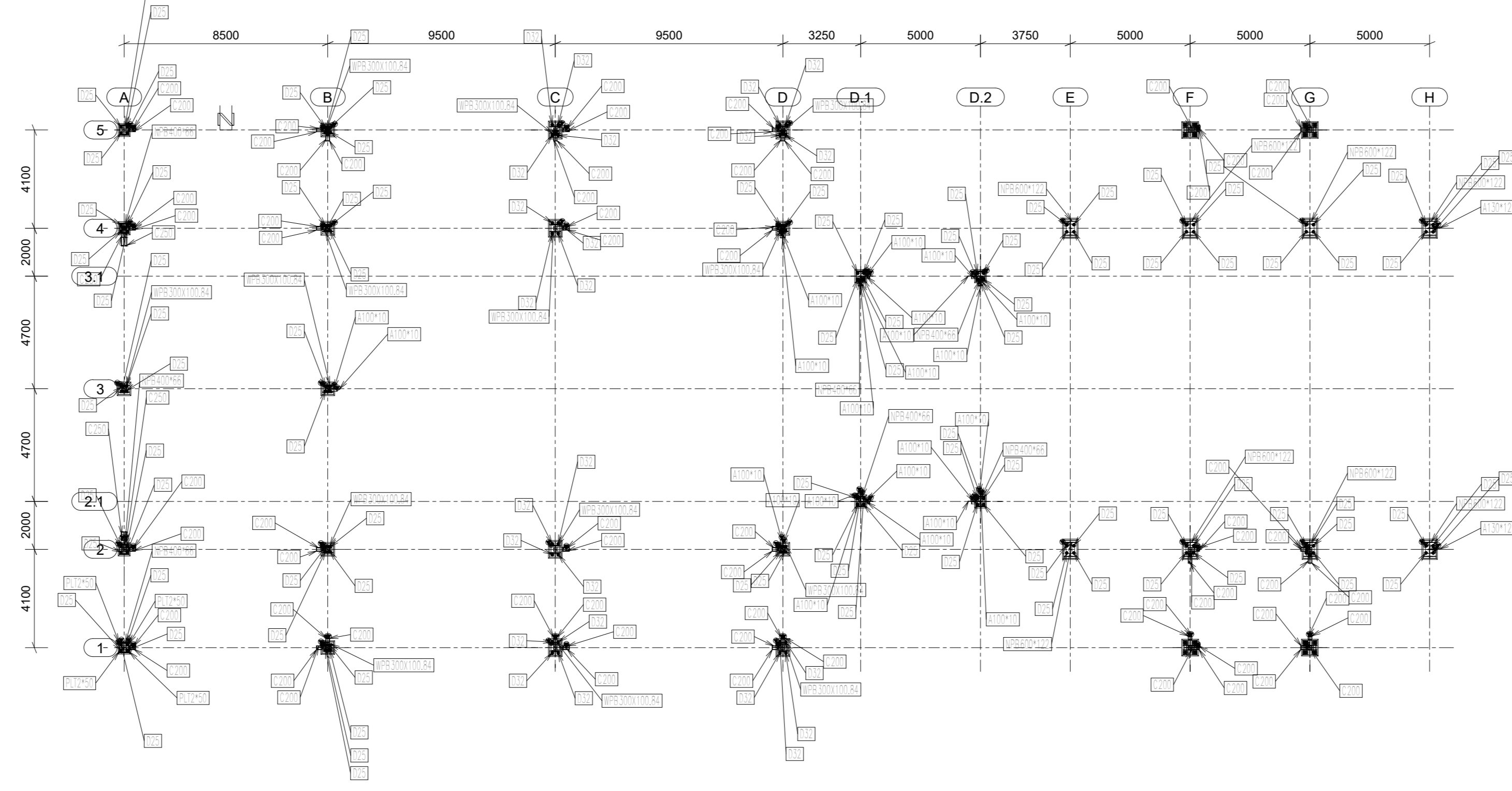
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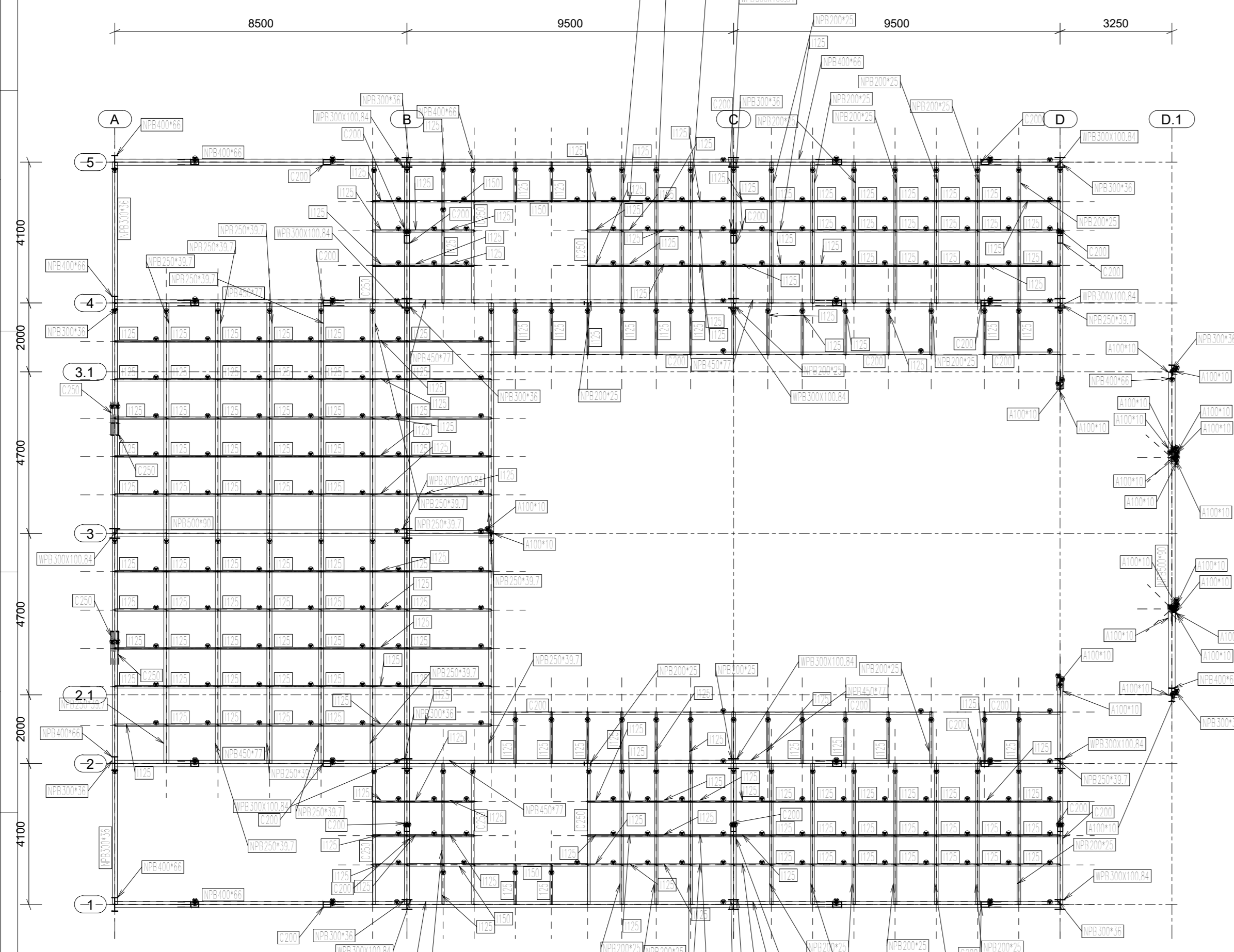


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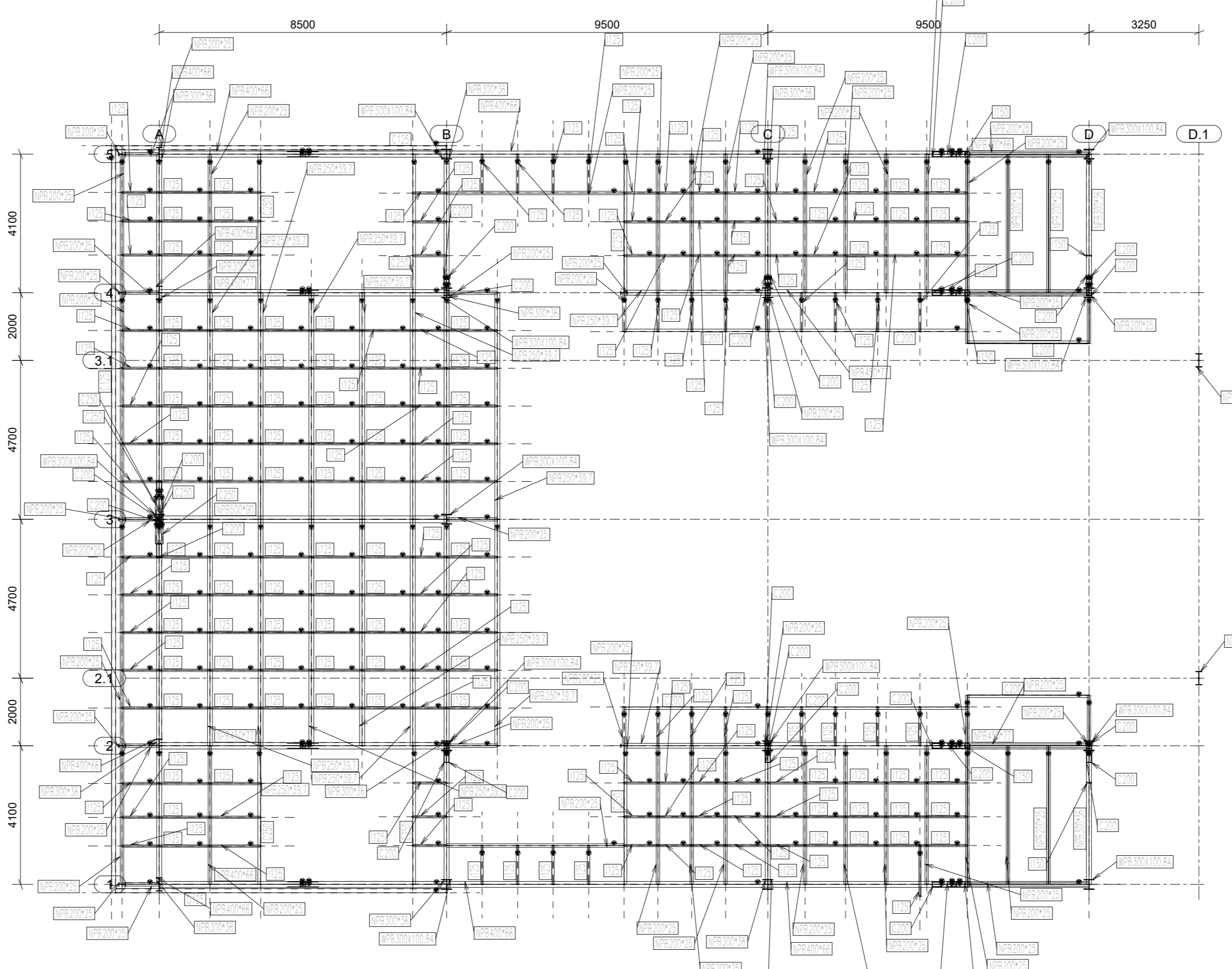
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 1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES
 2. ALL FABRICATION SHALL BE DONE AS PER IS:800
 3. ALL MATERIAL SHALL BE AS PER IS:2002 GRADE UNLTD

PROJECT	8170	TITLE	SUPPORTING STRUCTURE GA ELEVATIONS
BHARAT HEAVY ELECTRICALS LTD., PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012		DRG No.	0-35-110-UXXXX
DRAWN	K.PRAVEENA	DATE	07/08/2025
CHECKED	N.V. REDDY	SCALE	SCALE: 1:100 N.T.S.
APPROVED	N.V. REDDY		

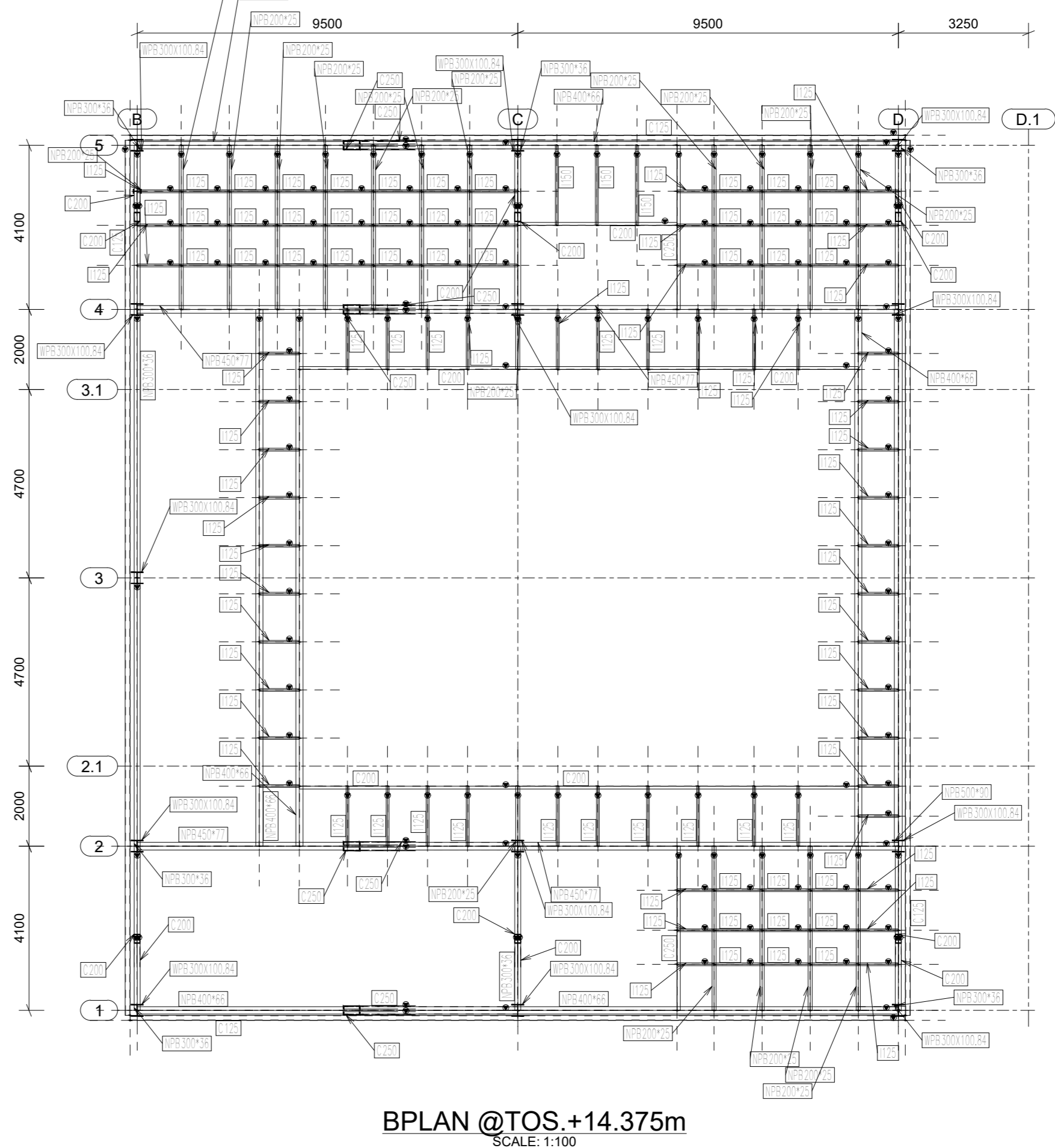
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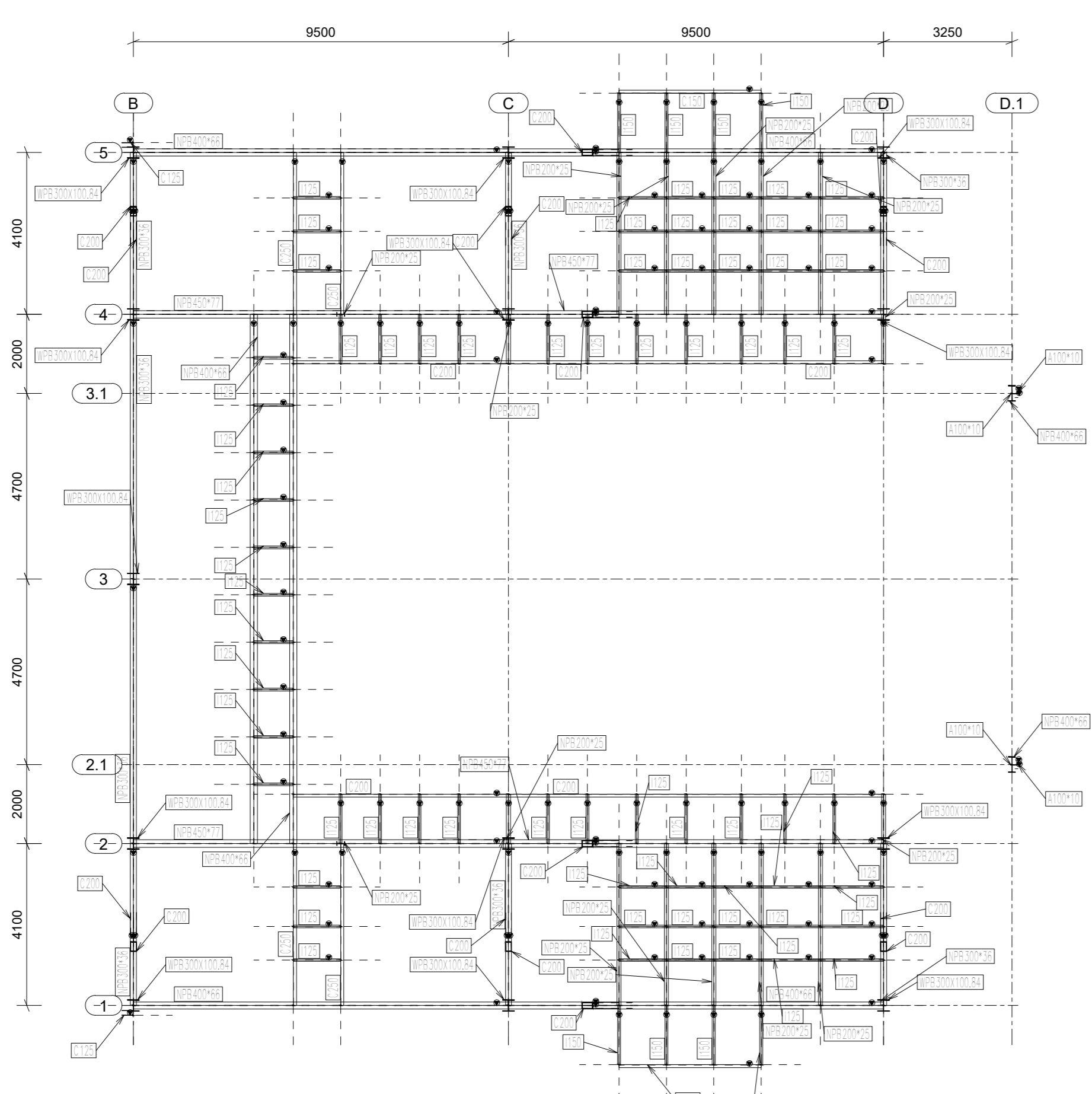
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SCALE: 1:100



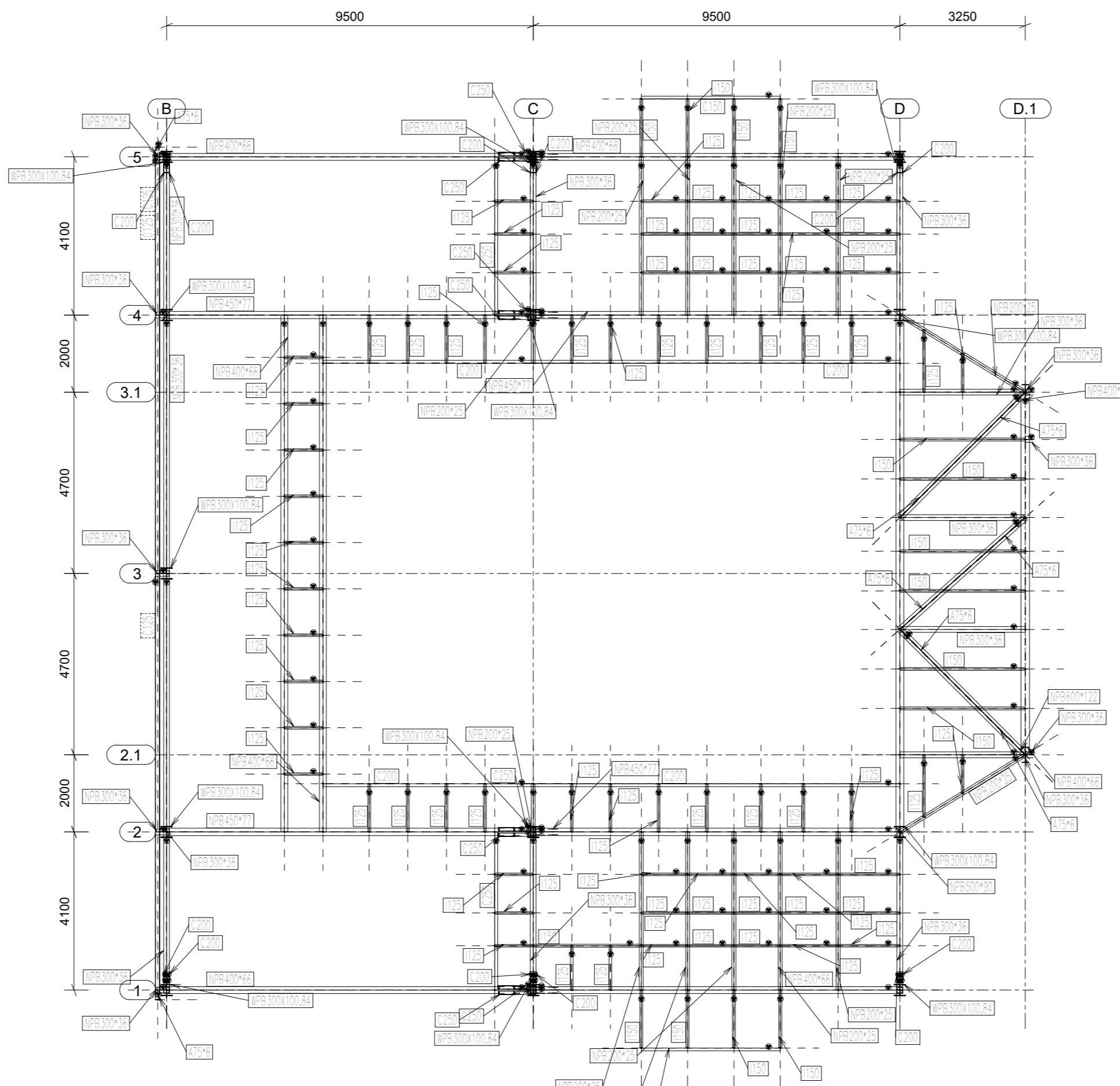
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SCALE: 1:100



BPLAN @TOS.+14.375m
SCALE: 1:100



BPLAN @TOS.+9.375m
SCALE: 1:100



BPLAN @TOS.+11.875m
SCALE: 1:100

NOTE:
 1. DIMENSIONS ARE IN MM & LEVELS ARE IN MMSL
 2. ALL FABRICATION SHALL BE DONE AS PER IS:800
 3. ALL MATERIAL SHALL BE AS PER IS:2062 QAYB 10/10

PROJECT	B170	TITLE	SUPPORTING STRUCTURE GA PLANS
DRAWN	K.PRIYANKA	DATE	03.08.2023
CHECKED	N.V. REDDY	SCALE	1:100 N.T.S.
APPROVED	N.V. REDDY	DRG No.	035-110-UXXX3
BHARAT HEAVY ELECTRICALS LTD., PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012			

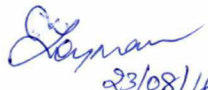

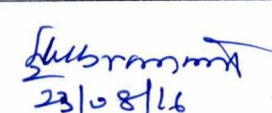

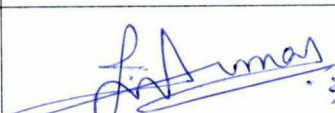
PLEASE CHECK THE INFORMATION ON THE CORNER OF THE DRAWING FOR ANY CHANGES AND REVISIONS. ALL DIMENSIONS SHALL BE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED IN THE DRAWING.


**BHARAT HEAVY ELECTRICALS LIMITED,
TIRUCHIRAPPALI 620 014
QUALITY ASSURANCE DEPARTMENT**

**STANDARD QUALITY PLAN FOR
COLUMN AND CEILING GIRDER**

SQP: NP: 06/04

Page 1 of 14

Prepared by	Jeyaram M	 23/08/16
Quality Assurance		
REVIEWED BY		SIGNATURE
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OUT SOURCING (P. Subramani,)		 23/08/16
QUALITY CONTROL (N. Ramasamy)		 23/8/16
QUALITY ASSURANCE (J V V Aruna Kumar)		 23/08/2016

Revision No.	Date	Approved by	Signature
04	23/08/16	AGM / QA&BE	 23/08/16
03	05/12/07	SDGM/QA	-----
02	14/04/01	DGM/QA	
01	15/07/96	SM/QA	
00	01/04/93	SM/QA	

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Rev. No.	Clause No.	Details of revision
00	--	This document consolidates all requirements of various previous SQPs.
01	--	Totally revised incorporating all amendments issued and latest TDC numbers.
02	--	SIP nos updated.
	Cl3.2 in Note 3	Tolerances for depth of section revised in line with AWS D1.1 (2002 edition)
	Cl 4.1.3 & 4.1.4 in Note 4	Modified to incorporate Amendment A3 to rev.01
	Cl 4.2.4 in Note4	deleted under Fillet welds and included under Butt welds as 4.1.7
	Cl4.3.4 in Note 4	Added to incorporate Amendment A4 to rev.01
	Cl5.1 (VI) in Note 5	Added to incorporate Amendment A2 to rev.01
	Cl 5.2.3 in Note 5	Out of straightness revised in line with AWS D1.1 (2002 edition)
	Cl 5.2.5	Revised in line with AWS D1.1
	P5 in Note 6	Modified to incorporate Amendment A1 to Rev 01
03	Note:	Material specifications Re-Designated.
	Note-3-	
	Cl.No.3.2	Tolerance for Mono Rail beam added.
	Note-4-	
	Cl.No.4.1.3	RT Requirements re worded
	4.1.4	RT Requirements re worded
	4.2.3	New clause added.
	Note-5-	
	5.2.3	New Dimensional requirement added
	Note-6	Sr temp for P4 matl. Changed.
04	CL:1,2&3	Verification/Witness point added and latest NDE procedures updated.
	Cl 2.1	weld edges of girder added.
	Cl 2.4.2	class deleted
	Cl 3.1	Amendment A2 of rev03 incorporated.
	Cl 3.4	Quantum of check- 100% included.
	Note-1	E350 material added.
	Note-2	
	2.3.1	Centre line marking for plus-I and H columns defined
	Note-3	
	3.2	moved to Cl 5.0 Cl 3.3 change to 3.2
	3.2.3	Flatness value added
	Note-4	
	4.1.1&4.2.2	10% scope added
	4.1.3	Spot RT changed to 100%RT
	4.3.4	UT clause added for ceiling girders

Note-5

5.1,
5.2.2

Out of squareness added
OLV of ceiling girder restricted to 5mm.

Note- 6

6.1

PWHT for butt and fillet joints specified upto
P5 material.

6.2

Preheat table added.

6.3

Sketch for type of joints and SR requirement
added, Amendment A1 of rev -03 incorporated



QUALITY ASSURANCE

Tiruchirappalli

STANDARD QUALITY PLAN

COLUMNS AND CEILING GIRDERS (Welded Design)

QP NO. : SQP:NP: 06 REV.: 04

DATE : 23/08/16

PAGE : Page 4 of 14

SL. NO.	COMPONENT AND OPERATION	CHARACTERISTICS	CI.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency **			REMARKS
								D	M	C	
1.0	MATERIAL *	* The materials used shall be as per Drg.									
	Plates, & Rolled Sections	Chemical & Mechanical Properties	A	Review of documents	100%	TDC/Mtl.Spec. & Note 1	TC	P	V		
2.0	INPROCESS CONTROL	(Refer QCP 002 for details)									
2.1	Marking, Cutting, Edge Preparation. Att. plates and splicing of Wide Flange beams.	Shape, Size, Diagonal, Straightness	B	Visual & Measurement	100%	Drawings Note-2 & 3	R	P	V		
		Gas cut edges		MPI/LPI	100%	BHE:NDT:PB:MT01latest	R	P	W		
		Girder- site & Shop weld edges		MPI&UT	100%	BHE:NDT:PB:PT 01latest BHE:NDT:PB:UT 31latest Note-4.3.4		P	W		
2.2	Welding	Procedure Qlfn.	A	Review of documents	100%	SIP:NP:07 latest	WP	P	V*		*Witness in case of new qualification
		Personnel Qlfn.	A	Review of documents	100%	SIP:NP:07latest	R	P	V		

LEGEND : CI: Class (A: Critical B: Major , C: Minor) * M : Manufacturer C :BHEL QC/TPI N : CUSTOMER QC :Quality Control ND: NDT Lab., PL: Plant lab, R : Record
P-Perform ,W-Witness , V-Verification



**QUALITY
ASSURANCE**

Tiruchirappalli

STANDARD QUALITY PLAN

COLUMNS AND CEILING GIRDERS (Welded Design)

QP NO. : SQP:NP: 06 REV.: 04
DATE : 23-08-2016
PAGE : Page 5 of 14

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	CI.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency **			REMARKS
								D	M	C	

2.3	Weld Inspection	Weld size and finish	B	Visual Measurement	100%	Drawing SIP:NP:06 latest	-		P	W		
	1.a Butt welds	Soundness	A	RT/UT	Note 4	BHE:NDT:PB:latest, BHE:NDT:SS:RT05,latest, BHE:NDT:PB:MT01latest	R		P	W*		*For RT, review of films.
	1.b T.Butt Joints	Soundness		RT/UT	Note 4	BHE:NDT:PB:PT01,latest	R		P	W*		
	2 Fillet welds	Soundness		LPI/MPI	Note 4	BHE:NDT:PB:UT31,latest	R		P	W		
	3. Groove welds	Soundness		UT/MPI	Note 6.4							
2.4	DIMENSIONAL INSPECTION											
2.4.1	Individual pieces	Shape,Size, Straightness & Verticality	A	Visual Measurement	100%	Drawings & Note 5	R		P	W		
2.5	POST WELD HEAT TREATMENT(PWHT)	Time & Temp. ROH,ROC	A	Review of HT chart	100%	Note 6.1 QCP 002 latest	R		P	V		



**QUALITY
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STANDARD QUALITY PLAN

COLUMNS AND CEILING GIRDERS (Welded Design)

QP NO. : SQP:NP: 06 REV.: 04
DATE : 23-08-2016
PAGE : Page 6 of 14

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	CI.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency **			REMARKS
								D	M	C	
3.0	FINAL INSPECTION										
3.1	Trial assembly	Matching, Water level Diagonals Dimensions & Verticality Identification	A	Visual Alignment Measurement	100%	Drawing SIP:NP:02 ,SIPNP09 latest Note 5.	R		P	W	
3.2	Match marking, reference line & Level marking	Dimension WO/DU Number Designation & S/c code	B	Plumb. Visual Measurement	100%	Drawings SIP:NP:02 latest	R		P	V	
3.3	Identification	Surface preparation, DFT	C	Visual Measurement	100%	SIP:PP:22 latest	-		P	W	
3.4	Painting and Preservation	Stability Cover/shim plates	C	Visual	100%	Drawings, SIP:NP:02 latest, Note7	-		P	V	
3.5	Packing and Protection										

Refer SQP:NP: 027 latest for bolted design of columns and Ceiling Girders.

Note:1

Material	Specification	TDC no(latest revision)
Rolled sections	ASTM A36 IS2062/E250A&BR E350BR,B0&C	0:301,0:318 as per Specification.
Plates and sheets	IS2062 E410 IS2062 E250A&BR, P1 E350BR,B0&C ASTM A36	0:301,0:318 as per specification
	DIN 17100 St 52.3	0:302
	SA 515 Gr 60 & 70-P1	0:202
	SA 387 Gr11&12 -P4	
	SA 387 Gr 22 -P5	0:202
	HSFG bolts, nuts & washers	5.037

Note:2

- 2.1 For ceiling girders, no temporary stiffeners /struts shall be provided for connecting web and flange during set up. If stiffeners are welded during forming I-section, MPI shall be done after removing the same.
- 2.2 Tension flanges are to be identified with hard stamping indicating tension flange.
- 2.3 **Centre line marking:**
 - 2.3.1 For plus-I columns centre line shall be marked on all four faces/flanges of column.H &Box section columns shall be marked with centre lines on each flange and both sides of web portion. L section column shall be marked on the middle of leg.
 - 2.3.2 Flange centre line shall be obtained by aligning the centre point of both web and flange thickness at both ends.
 - 2.3.3 Web centre line shall be obtained by taking the mid-points of the section depth at both ends.
 - 2.3.4 After marking, the centre line shall be identified by legible centre punches of 25 mm length at an interval of 2mtrs. The punched portion of centre line shall be bordered with white paint.

NOTE 3

- 3.1 **Marking for built-Up Columns/Beams / Girders:**
 - 3.1.1. The length and width of individual plates must be marked, punched at intervals of 2M. The diagonals shall be checked and the difference shall be within 2mm.

3.2 Marking and preparation of attachment plates

- 3.2.1 All attachment plates like base plates, top plates, gusset plates, bracings, bearing and guide plates shall be marked, cut to size and prepared by machining/shearing/grinding as per the drawing requirements.
- 3.2.2 The variation in length/width shall be within $\pm 2\text{mm}$ and diagonal difference shall be within 3mm.
- 3.2.3 The flatness of plates shall be checked and shall not exceed 2mm for plate thickness of 50mm & below, and 3mm for plate thickness above 50mm. **Flatness for rest plates & Cover/Splice plates and where contact surfaces are shown in the drawing shall be within 0.3mm**
- 3.2.4 The bolt holes and grout holes shall be correctly located and drilled as per drawing. Wherever specified in the drawing, match drilling shall be done with the mating part. The tolerance for finished holes are as follows:
1. Hole dia for friction grip bolts : $+0.5/-0\text{mm}$
 2. Hole dia for other holes : $+1\text{mm}/-0\text{mm}$
 3. Individual pitches : $\pm 1\text{mm}$
 4. Cumulative pitch : $\pm 2\text{mm}$
- 3.2.5 Where splicing of rolled sections are envisaged, it shall be ensured that the rolled section is straightened and meets the requirements given below:
1. Straightness : 5mm
 2. Splicing edge : Square to surface
 3. Weld ends : Ground flush & LPI/MPI tested
 4. Web centre line offset : 2mm max.

NOTE 4

4.0 Type and extent of NDE requirements:

4.1 Butt welds:

- 4.1.1 10% MPI on **each item per DU** for all thickness upto and including 25mm.
- 4.1.2 100% MPI for thickness above 25 mm upto and including 32 mm.
- 4.1.3 a. **For Ceiling Girders:**
100% RT for all butt weld joints.
- b. **For others:**
100% RT for carbon steel if $t > 32\text{mm}$
P4: SA387Gr12 if $t > 16\text{mm}$
P5: SA387Gr22 if $t > 12\text{mm}$
- c. 10% RT on each item per DU for thickness above 25 mm upto and including 32 mm if specified in the contract
- d. **In case of defect in 10% RT, take RT on another 10%. In case of further defects, 100% RT shall be done. All defects which requires repair shall be done with prior approval from BHEL.**

- 4.1.4 100% MPI on flange and web of splice joints of rolled sections.
- 4.1.5 100% LPI/MPI for back gouged / ground grooves before second side welding.

4.2 Fillet welds:

- 4.2.1 100 % MPI if both plates are over 25 mm thickness.
- 4.2.2 10% MPI/LPI on each item per DU all other fillet welds.
- 4.2.3 100% MPI for welds of tension flange with web and bearing Stiffeners.
- 4.2.4 100% MPI/LPI on fillet welds of splice plates with beams

4.3 Gas cut edges and weld edge preparation:

- 4.3.1 100% MPI/LPI for all gas cut edges for $t \geq 38\text{mm}$.
- 4.3.2 10% MPI/LPI for all gas cut edges for $t \geq 20\text{mm}$ and below 38mm.
- 4.3.3 100% MPI/LPI for all bevel edges for $t \geq 20\text{mm}$ prior to welding.
- 4.3.4 100% UT to be done at shop for bevel edges meant for welding at site (for all thickness of flange and web butt joints) in ceiling girder. This UT shall be done for a width of 100mm from the edge after edge preparation. The depth of 100 mm in web plate on both sides from the fillet weld of web to flange shall be UT tested to the full length of Ceiling Girder.

5.0 Tolerances for Individual and Assembly:

- 5.1 Individual columns / girders.
 - i. Length : $\pm 5\text{mm}$
 - ii. Twist : 0.005h per 5m length or 10mm whichever is less where "h" is the height of beam /girder in mm.
 - iii. Camber : 1mm/M and max of 10mm
 - iv. Sweep : 1mm/M and max of 10mm
 - v. Combined warpage and tilt of flange : W /100 or 6 mm (whichever is greater) Where "W" is width of flange.
 - vi. Bow in base plate of column : 3mm or 1mm / mtr. of diagonal whichever is higher.
 - Vii Out of squareness : 2 mm
 - Viii The tolerances for depth of section size are as follows.
 - Up to 1 M : $\pm 3.0 \text{ mm}$
 - 1M to 2M : $\pm 5.0 \text{ mm}$
 - Above 2 M : $+ 8.0 \text{ mm} / -5.0 \text{ mm}$
 - iX. Flange width : $\pm 3 \text{ mm}$
 - X. Web shift : 2mm

5.2 Trial assembly:

5.2.1 Trial assembly shall be performed by butting of ends without providing any root gap as per SIP:NP:02 latest. Metallic contact between bearing stiffener and flange shall be ensured for atleast 80% of the stiffener bearing cross sectional area in contact with the inner surface of the flanges. The outer surface of the flanges when bearing against a steel base or seat shall fit within 0mm gap for 80% of the projected area of web and stiffeners and not more than 0.5mm for the remaining 20% of the projected area. Refer Figure 1

5.2.2 Alignment of centre line of all the pieces of flanges and webs water level deviation shall be within 2mm.

In trial assembled condition for entire assembly:

- i) Overall length of columns : ± 15mm
- ii) Overall length of ceiling girders : ± 5mm
- iii) Out of straightness
 - For length upto 15 metres : 1 mm/M and Max. 10 mm
 - Length over 15 metres : 10mm + 1mm/M for the length in excess of 15 M

5.2.3 For ceiling girders location of load bearing stiffeners shall be maintained within ± 4mm from specified location.

NOTE 6

6.1 PWHT :

6.1.1 Butt welds/Groove welds:

- P1 All welds when $t > 50\text{mm}$ and for web stiffeners at end bearing locations along with stool plate(except web to flange fillet & groove weld) : 600-650°C
- P3 All butt welds in tension members and all welds when $t > 16\text{mm}$: 620-650°C
- P4 All butt welds in tension members and all welds when $t > 16\text{mm}$: 650-680°C
- P5 All welds : 680-710°C

Where t =plate thickness in case of butt welds and weld thickness in case of groove welds for P1 materials. In case of combination of groove and fillet welds, both weld depth and throat thickness are to be considered.

6.1.2 Fillet welds:

- P1- Not required
- P3 -if throat thickness $> 13\text{mm}$: 620-650°C
- P4 -if throat thickness $> 13\text{mm}$: 650-680°C
- P5 -All thickness : 680-710°C

6.1.3 Heat treatment for flame cut edges prior to welding shall be done as per Table -2. **Alternatively for flame cut edges, the cut edges shall be ground or machined upto 3mm to remove HAZ.**

Table -2:

scope	Material	Thickness	Heat treatment cycle
Flame cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 16 mm	620°- 650°C for 30 minutes.
	P4	> 16 mm	650°- 680°C for 30 minutes.
	P5	all thickness	680°- 710°C for 30 minutes.
Shear cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 13 mm	620°- 650°C for 30 minutes.
	P4	> 13 mm	650°- 680°C for 30 minutes.
	P5	> 10mm	680°- 710°C for 30 minutes.

For materials other than P5, this heat treatment may be clubbed with the final heat treatment of the product.

6.2 Preheat:

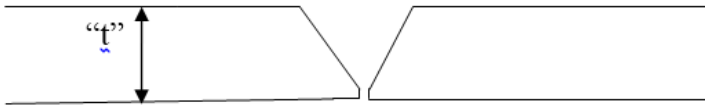
The preheat for welding and gas cutting shall be followed as per table -3 .Preheat and post heat temperature referred in Table-3 shall be followed unless otherwise specified in WPS.

Table:3

Scope	Material	Preheat	Post heat
Welding	P1-IS2062	t>38mm, 150°C	-
	E250	t>63mm, 150°C	-
	P1-IS2062	t>25mm, 150°C	-
	E350		
	P3&P4	all thickness, 150°C	-
	P5	allthickness, 150°C	250°C for 2 hours
Flame cutting	P1	t>50mm, 150°C	-
	P3&P4	t>16mm, 150°C	-
	P5	t<13mm, 120°C	-
		t=13to25mm, 150°C	
		t>25mm, 200°C	

6.3 **Welding Process:** Except as permitted by BHEL the welding process to be followed are SMAW (manual) & SAW (Auto weld)
 For better clarity on PWHT & RT requirement the following guidelines are provided.

Sketch-1 (Full penetration weld joint)



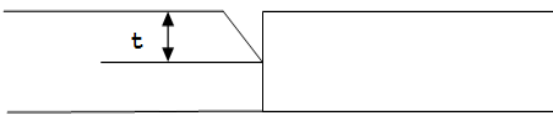
Where "t" is base metal thickness. If "t" is > 50mm PWHT to be done. RT is applicable and to be carried out as per Cl 4.1.3 and CQP.

Sketch:2 (Full penetration weld joint double V)



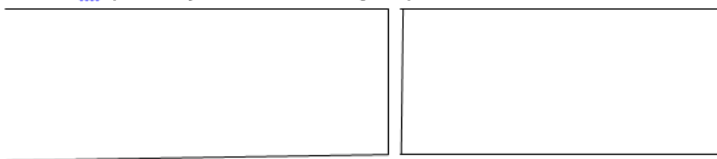
If "t1/t2" > 50mm PWHT to be done. RT is applicable and to be carried out as per Cl 4.1.3 and CQP.

Sketch:3 (Partial penetration weld joint bevel)



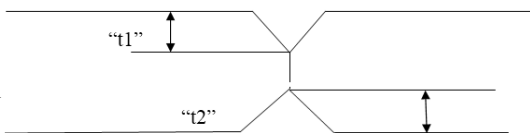
Where "t" is weld metal thickness. If weld depth is > 50mm PWHT to be done, RT is not applicable, MPI to be done.

Sketch:4 (Partial penetration weld joint)



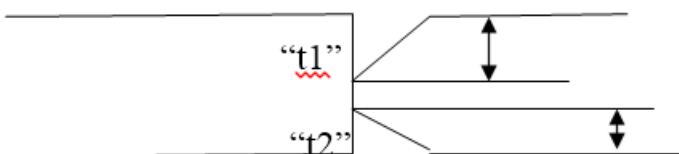
PWHT & RT is not applicable in this case, since only seal welding is required and the weld thickness does not exceed 50 mm. MPI to be done.

Sketch:5 (Partial penetration weld joint double V)

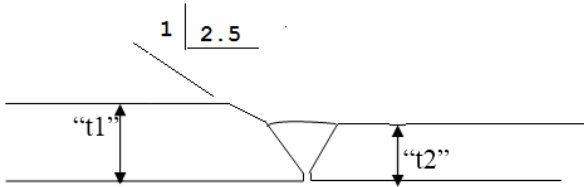


Where "t" is equal to t1+t2. If "t" is > 50mm PWHT to be done. RT is not applicable. MPI to be done

Sketch:6 (K connection Partial penetration weld joint)



Where "t" is equal to t1 + t2. If "t" is > 50mm PWHT to be carried out. RT is not applicable. MPI to be done.

Sketch: 7 (Bi thickness joint)

If t_2 is $>50\text{mm}$ PWHT to be carried out and if $t_2 > 32\text{mm}$ RT is to be carried out as per C14.1.3 and CQP. Chamfering in t_1 shall be taken with taper 1:2.5

For local PWHT, general guidelines shall be as per QCP:002 (latest) and [SIP:NP:11](#) (latest) shall be followed.

Guidelines for fixing of Thermo couples shall be as follows

Cap Assembly: Two Numbers (2 Nos) of thermo couples will be welded inside the assembly and one Number (1 No) of thermo couple will be welded on outside (Either side for each joint cap Assembly) totaling 24 Numbers and connected to 4 recorders. However for the other welds thermocouples shall be placed suitably (Min 3 Nos) one on the weldment and the other two on either side of the base metal in HAZ.

6.4 Refer QCP 002 for process controls and other details.

NOTE 7

- 7.1 While stacking of columns, ensure that the flange portion of the column is kept horizontal and parallel to the firm ground. Adequate supports shall be provided so as to avoid sagging or distortion.
- 7.2 The requirements for cover and shim plate dispatch is detailed out in [SIP:NP:02](#) latest
- 7.3 Storage, Preservation and shipping shall be as per relevant packing Instructions.

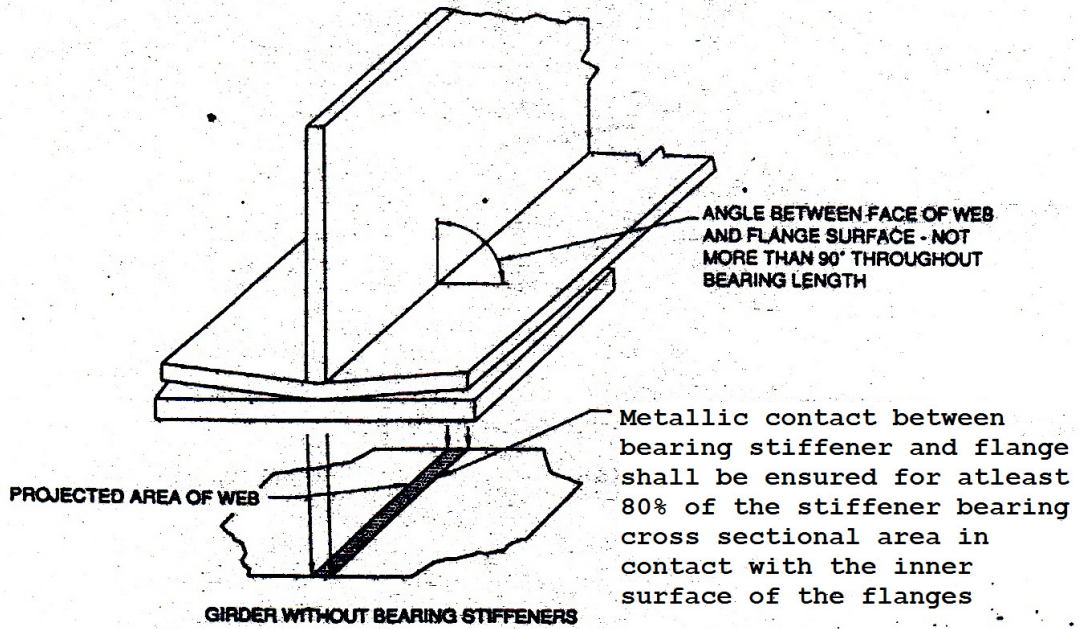
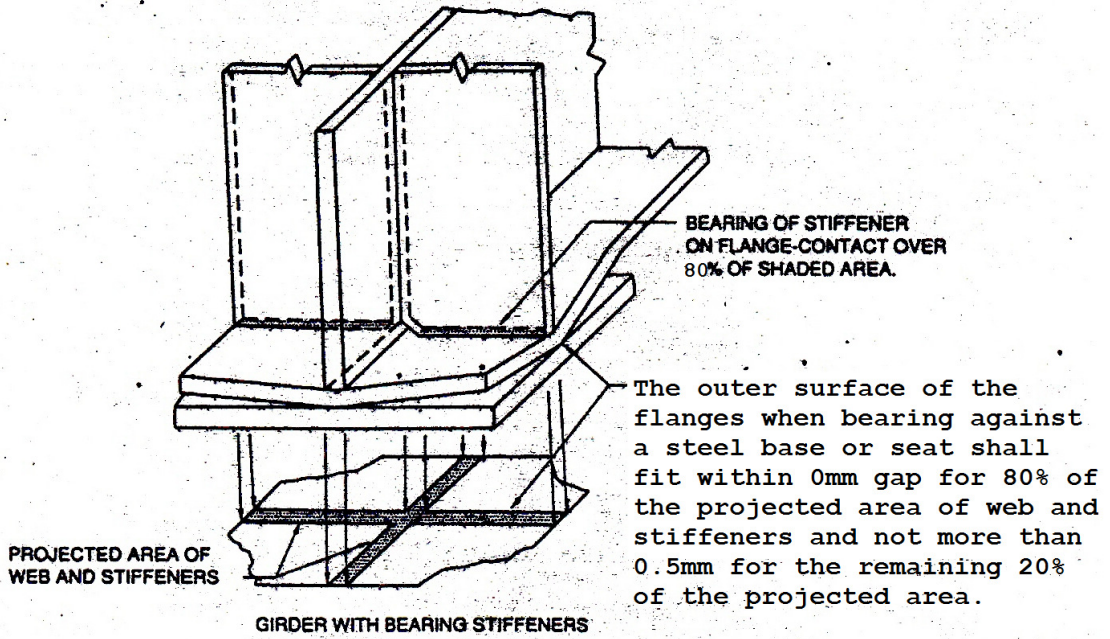


Figure - 1 - Tolerances at Bearing Points

**BHARAT HEAVY ELECTRICALS LIMITED,
TIRUCHIRAPPALI 620 014
QUALITY ASSURANCE DEPARTMENT**

**STANDARD QUALITY PLAN FOR
General Structural**

SQP: NP: 07/04

Page 1 of 10

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Revision No.	Date	Approved by	Signature
04	23/09/16	AGM / QA&BE	<i>Revised by</i> <i>J V V Aruna kumar</i> 23/09/16
03	01/12/07	SDGM/QA	-----
02	14/04/01	DGM/QA	
01	15/07/96	SM/QA	
00	01/04/93	SM/QA	

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RECORD OF REVISIONS

Rev. No.	Clause No.	Details of revision	
00	--	This document consolidates all requirements of various previous SQPs.	
01	--	All amendments issued has been regularised and editorial corrections made for better clarity.Latest applicable TDC numbers incorporated.	
02		SIP numbers updated	
	2.4.1 Note 2	Deleted. Cl.2.4.2 to 2.4.5 renumbered.	
	Note 3	Deleted. Consequently, Note 4 to Note 7 renumbered as Note 3 to Note 6.	
	3.2 & 3.2.1 in Note 3	Modified in line with QCP:002	
	4.1.7 in Note 4	Out of straightness revised in line with AWS D1.1 (2002 edition)	
	4.1.7.10(7)	Twist included	
03.	Note-1	Matl. IS 2062 Re-designated & IS 8500 replaced with new designation	
	NOTE-3	3.2 & 3.2.1 is Re-worded	
	Note-4	3.2.3 Cl. Added	
	Note-5	4.1.10 new sub clause no added.	
	Note-5	Clause no. 5 SR Temp changed.	
04.	Cl 2.1, 2.4.3,2.4.4	Latest revision of NDE procedures updated.	
	Cl 2.3	RT/UT included	
	Note-1	E350 material added.IS 8500 removed.	
Note	{	2.4.5	Material substitution details given.
		3.2.1	Removed
		3.1.1,3.2.3	10% scope added.
		3.1.2.3	Newly added.
		3.2.4	Newly added.
		4.1.9	Monorail trial assembly added. Amendment A1 incorporated
		5.1,5.2&5.3	SR details added.

SL. NO.	COMPONENT AND OPERATION	CHARACTERISTICS	CI.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency *				REMARKS
								D	M	c	n	

1.0	MATERIAL Plates, Sheets & Rolled Sections	Chemical & Mechanical Properties	A	Review of documents	100%	TDC/Matl. Spec. Note 1	TC	P	W			
2.0	INPROCESS CONTROL											
2.1	Marking, Cutting, Edge Preparation	Shape, Size, EP, Diagonal Straightness Gas cut edges	B	Measurement	100%	Drawings & Note 2	R	P	V			
				MPI/LPI	Note-3	BHE:NDT:PB:MT 01, latest, BHE:NDT:PB:PT 01, latest	R	P	W			
2.2	Welding	Procedure Qlfn. Personnel Qlfn.	A	Review of Documents	100%	BHEL Procedure SIP:NP:07 latest	WPS	P	V			
				Review of Documents	100%	SIP:NP:07 latest	R	P	V			

LEGEND : CI: Class (A: Critical B: Major , C: Minor) * M : Manufacturer C :BHEL QC/TPI N : CUSTOMER QC :Quality Control ND: NDT Lab., PL: Plant lab, R : Record



QUALITY ASSURANCE

STANDARD QUALITY PLAN

GENERAL STRUCTURALS –Welded Design

QP NO. : SQP:NP: 07 REV.: 04
 DATE : 23/09/16
 PAGE : Page 5 of 10

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	CI.	TYPE OF CHECK	Quantum	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency *			REMARKS
							D	M	c	n		

2.5	POST WELD HEAT TREATMENT(PWHT)	Temp,soaking Time,ROH/ROC		Review of HT chart	100%	Note 5		R	P	V		
3.0	Final inspection	Alignment, Matching, Orientation, & Inclination		Visual Measurement/ Water level	100%	SIP:NP: 09 latest Note 4 Drawing		R	P	W		
3.1	Trial assembly											
3.2	Match marking Reference line,	Identification		Visual Measurement	100%			R	P	V		
3.3	Identification	WO.No.,DU No.& S/C code		Visual	100%	Drawings &QCP 002 latest		-	P	V		
3.4	Painting and Preservation	Surface preparation, DFT		Visual Check	100% Random	SIP:PP:22 latest		R	P	W		
3.5	Packing and Protection	Stability Cover/Shimplates		Visual	100%	Drawings SIP:PP:22 latest& NOTE-6		-	P	V		

Refer SQP:NP:027 rev03 for bolted design structures

NOTE-1

MATERIAL	MATERIAL SPEC.	TDC No.
Rolled sections	IS 2062 E250A/BR, E350 A, BR, BO&C ASTM A36, BSEN10025	0:301. as per specification
Plates and sheets	IS 2062 E250A/BR, ASTMA36, E350A, BR, BO&C	0:301, 0:318 as per specification
	DIN 17100 St 52.3	
	SA387 Gr 12 & Gr 22	0:202
	SA 515 Gr 60&70	0:202

NOTE-2

2.0 MARKING

- 2.1 Wherever applicable the squareness shall be ensured by checking Diagonals and reference lines shall be marked and punched.
- 2.2 For Rolled Beams dimensional tolerances shall be as given below.

- 1) Depth of section
 - a) Upto 1 M : ± 3 mm
 - b) 1M to 2M : ± 4.5 mm
 - c) Above 2 M : + 7.5 mm, - 4.5 mm
- 2) Flange width : ± 3 mm
- 3) Web shift : 2 mm
- 4) Length : 1 mm / M. Max.5mm

2.3 CENTER LINE MARKING

- 2.3.1 All I section columns/Beams shall be marked with center lines, one on flange and other on one side of web. Box section columns will be marked on the web side. L section column shall be marked on the middle of leg.
- 2.3.2 Flange center line shall be obtained by joining the center point of web thickness at both ends.
- 2.3.3 Web center line shall be obtained by joining the mid points of the section depth at both ends.
- 2.3.4 After marking, the center line shall be identified by legible center punching to the length of 25mm with 5 dots and of size of dia. 2mm at the interval of 2 meters. The punched portion of center line shall be bordered with white paint.

2.4 MARKING AND PREPARATION OF ATTACHMENT PLATES

- 2.4.1 The length/width variation shall be within ±2mm, diagonal difference within 3 mm.
- 2.4.2 The flatness shall be checked and shall not exceed 2mm for plate size 50mm & below and 3mm above 50mm.

2.4.3 The bolt holes and grout holes shall be marked and drilled as per drawing. Wherever specified in the drawing, match drilling shall be done with the mating part. The tolerance for finished holes are as follows:

1. Hole dia for friction grip bolts :+0.5 /-0 mm
2. Hole dia for other holes :+1 mm /- 0 mm
3. Individual pitches :±1 mm max.
4. Cumulative pitch :±2 mm max.

2.4.4 Where splicing of rolled sections are envisaged, it shall be ensured that the rolled section is straightened and meets the requirements given below:

1. Out of Straightness : 5 mm max.
2. Splicing edge : Square to surface
3. Web centre line offset : 1.5 mm max

2.4.5 Shop joint for rolled sections/plates shall be followed as per **drg No:3-35-110-00686-Latest, Production notes drg. No: 4-35-110-00347/latest, 3-35-110-00995/latest.**

NOTE-3

3.0 TYPE AND EXTENT OF NDE **unless additional NDE is specified in CQPs.**

3.1 BUTT WELDS - MPI

3.1.1 100 % M P I. for thickness above 25 mm upto and Including 32 mm.
10 % MPI **per DU** for thickness less than 25 mm.

3.1.2.0 MPI ON FLAME CUT EDGES

3.1.2.1 100% MPI-P3,P4&P5 - Flame cut edges t>12 mm
10% MPI- P1 - Flame cut edges t>20mm and below38mm
100% MPI-P1 - For all flame cut edges t>=38mm
100%MPI- All beveled edges for t> 20mm for all materials.

3.1.2.2 100% LPI- Root groove areas after back chipping prior to welding second side for all groove plate butt weld and all spliced joint for rolled section.

3.1.2.3 **Wherever Heat treatment is applicable required MPI/LPI shall be done after HT.**

3.2 BUTT WELDS -RT

3.2.1 100% RT for carbon steel for t>32 mm.
For P3,P4 if t > 16 mm
For P5 if t > 12 mm

- 3.2.2 100% RT on flange butt joint for mono rail beams of all sizes.
- 3.2.3 10% RT **per DU** for web butt joint in all built up monorail beams.
- 3.2.4 **Wherever RT is not feasible UT shall be carried out with the discretion of BHEL/QC.**

3.3 FILLET WELDS

- 3.3.1 100 % MPI, if both plate thickness over 25 mm.
- 3.3.2 10% MPI/LPI **per DU** all other fillet welds.
- 3.3.3 100% MPI/LPI on fillet welds of spliceplates for all thickness built up beams and rolled sections
- 3.3.4 100% MPI on all fillet welds of mono rail beam.

NOTE-4

4.0 FABRICATION TOLERANCES

4.1 The tolerances for fabrication shall be as per the relevant product drawing. However the following tolerances can be adopted, where not specified.

4.1.1 Length:

- a) For members where ends are free: $\pm 1 \text{ mm/M}$ subject to 5mm max
- b) Members connecting between : $+0 \text{ mm} - 3\text{mm}$
two structural members

4.1.2 Web shift : 2mm

4.1.3 Out of squareness : 2mm

4.1.4 Combined warpage and tilt of flange of welded beams shall not exceed 1/100 of total width of flange or 6 mm whichever is greater.

4.1.5 The twisting of the beams or members shall not exceed $0.005h / 5M$ length subject to a maximum of 10 mm. (where "h" is the height of beam)

4.1.6 Out of Straightness

- Length upto 15 Mtr. : 1 mm/Mtr and max. 10mm.
- Length over 15 mtr. : 10mm + 1mm/M for the length in excess of 15M.

4.1.7 For Frames of General Structures the following tolerances shall apply:

- Length and width : $\pm 1.5 \text{ mm/M}$ max. 6 mm
- Difference between diagonals : 2 mm/M max. 8 mm
- Height : + 1.5 mm/M max. 6 mm
- Spacing of intermediate members : $\pm 3 \text{ mm}$

4.1.8 For handrails the variation permitted in length is $\pm 3\text{mm}$ and bow is $\pm 2\text{mm}$ per meter subject to a maximum of 10mm.

4.1.9 For monorail beams the following tolerances shall apply (clause Nos. 1 & 2 applies for all other beams also)

1.Depth of section	:±3 mm
2.Flange width	:+/- 3 mm
3.Flange width	:+2 mm, for monorail(+2,-0mm)
4.Web shift	: $\overline{2}$ mm
5.Length:	
Runways connected in between two structures (Span upto 12m)	: +0 mm,-2 mm
6.Mono rails	:+/-5mm.
7.Combined Warpage and tilt	: 3 mm max.
8.Sweep/Camber	: 5 mm max.

Monorail beams shall be checked for trial assembly as per Clause 7.0 of SIP :NP:02

NOTE:5

PWHT shall be performed for:

5.1 **Butt welds/Groove welds**

P1	All butt welds when $t > 50\text{mm}$ and web stiffeners at end bearing locations along with stool plate (except web to flange fillet & groove weld)	600-650°C
P3	All butt welds in tension members and all welds when $t > 16\text{mm}$	620-650°C
P4	All butt welds in tension members and all welds when $t > 16\text{mm}$	650-680°C
P5	All welds	680-710°C

5.2 **Fillet welds**

P1-	Not required	
P3	-if throat thickness $> 13\text{mm}$	620-650°C
P4	-if throat thickness $> 13\text{mm}$	650-680°C
P5	-All thickness	680-710°C

Where t =plate thickness in case of butt welds and weld thickness in case of groove welds for P1 materials .In case of combination of groove and fillet welds both weld depth and throat thickness are to be considered.

The load carrying members shall be heat treated for flame cut edges prior to welding as per Table -2. Alternatively for flame cut edges, the cut edges shall be ground or machined upto 3mm to remove HAZ.

For Local PWHT, general guidelines shall be as per QCP:002 (latest) and SIP:NP:11 (latest) shall be followed.

Table -2

scope	Material	Thickness	Heat treatment cycle
Flame cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 16 mm	620°- 650°C for 30 minutes.
	P4	> 16 mm	650°- 680°C for 30 minutes.
	P5	all thickness	680°- 710°C for 30 minutes.
Shear cut edges	P1	> 50 mm	600°- 650°C for 30 minutes.
	P3	> 13 mm	620°- 650°C for 30 minutes.
	P4	> 13 mm	650°- 680°C for 30 minutes.
	P5	>10mm	680°- 710°C for 30 minutes.

For materials other than P5, this heat treatment may be clubbed with the final heat treatment of the product

5.3 The preheat for welding and gas cutting shall be followed as per table -3. Preheat and post heat temperature referred in Table-3 shall be followed unless otherwise specified in WPS

Table:3

Scope	Material	Preheat	Post heat
Welding	P1-IS2062	t>38mm, 150°C	-
	E250	t>63mm, 150°C	-
	P1-IS2062	t>25mm, 150°C	-
	E350		
	P3&P4	allthickness, 150°C	-
	P5	allthickness, 150°C	250°C for 2 hours
Flame cutting	P1	t>50mm, 150°C	-
	P3&P4	t>16mm, 150°C	-
	P5	t<13mm, 120°C	-
		t=13to25mm, 150°C	
	t>25mm, 200°C		

5.4 Refer QCP 002 for process controls and other details

NOTE-6

6.1 While stacking of beams, ensure that the flange portion of the beam is kept horizontal and parallel to the firm ground. Adequate supports shall be provided so as to avoid sagging or distortion.

6.2 Storage, preservation, shipping shall be as per the relevant packing instruction.



BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620 014
QUALITY ASSURANCE DEPARTMENT

AMENDMENT TO QUALITY WORK INSTRUCTIONS (QWI)

QWI NO: SQP: NP:027 REV: 03

AMENDMENT SL NO: A1 DATE: 18.03.2020


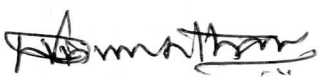
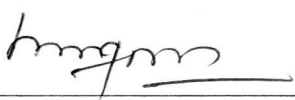



DESCRIPTION: STANDARD QUALITY PLAN for Bolted Structures


Clause No.	Existing...	Amended as...	Remarks / Basis for Amendment
10.1	CHARACTERISTICS: Dimension, Straightness (Camber & Sweep), Twist, Squareness and Orientation	Dimension 1.Length 2.Hole size 3. Hole Pitch 4.Reference hole location. The hole pitch has to be measured using pitch gauge.	Based on RCA corrective action for Bolt hole mismatch issue from Patratu site
	Class: B	Class : A	
NOTE	The above-mentioned changes will be incorporated in the QWI during the next revision of the document.		
Prepared by: M.Jeyaram		Approved by: J V V Aruna Kumar	
 Signature & Dt: 18.03.2020		 Signature & Dt: 18.03.2020	

**BHARAT HEAVY ELECTRICALS LIMITED,
TIRUCHIRAPPALI 620 014
QUALITY ASSURANCE DEPARTMENT**

**STANDARD QUALITY PLAN FOR
BOLTED STRUCTURES**

SQP: NP: 27/03

PREPARED BY QUALITY ASSURANCE (M.Jeyaram)	
REVIEWED BY	
ENGINEERING (D. Viswanathan)	
WTC (S.Singaravelu)	
OUT SOURCING (M. Murugiah,)	
QUALITY CONTROL (N.Ramasamy)	
QUALITY ASSURANCE (R.Ramasamy)	

Revision No.	Date	Approved by	Signature
03	08/06/15	AGM / QA&BE	
02	17/02/15	AGM / QA&BE	-----
01	24/11/14	Tender purpose	-----

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RECORD OF REVISIONS

Rev. No.	Clause No.	Details of revision
01		The document released for tender purpose
02	Note-2 3.2	Post heating after welding details added.
	Note-5 10.a	Hole dimension value changed.
03	1.1	BSEN10025-4 S460N removed. TMCP condition added for E450BR/BSEN10025-4 S460M UT for $t \geq 10$ mm for TMCP plates added.
	3.1.5	Gas cut edges NDE requirement added
	3.1.6	Quantum of inspection changed from 100% to random, bevel edges thickness value added
	4.1	Welding consumables TC verification added.
	5.1	Quantum of inspection changed from 100% to random
	5.4	100% RT/UT added for ceiling girder welds
	6.2	100% for ceiling Girder welds
	7.0	specified for contract quality plan
	Note-1	TDC: 0:317 included for E450BR/BSEN10025-4 S460M
	Note-2&3	SA 299 Gr A material condition added.
	Note-4	PWHT requirement of E450BR/BSEN10025-4 S460M for TMCP condition added for welding and gas cutting. Ceiling girders specified
	Note-5	detail for machining added.
	Note-6	Table: 2 camber value added. 10.a Fit bolts value added
	Note -7	SIP no.added for better clarity.



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QUALITY ASSURANCE

STANDARD QUALITY PLAN for Bolted Structures

Columns (Box, Plus & I type), Beams, Bracings & Ceiling Girders

QP NO. : SQP:NP: 027 REV.: 03

DATE : 08/06/15

PAGE : Page 1 of 9

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Class	TYPE OF CHECK	Quantum		REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency			REMARKS
					M	C			D	M	C	N	

1.0	Raw Material*	* The materials used shall be as per Drg.										
1.1	Plates & Rolled Sections. ASTM A36 , IS2062/ E250A&BR,E350C, E450 BR , BSEN10025-4/ S460M BSEN10025-2 / S355J2+N	Chemical & Mechanical Properties, Dimensions	A	Verification	100% \$	100%	TDC/Mtl.Spec. & Note 1	TC	√	V	V	\$ Raw.matl. correlated to TC for t > 40 mm on receipt. Further correlation to W.O. number&Matl Grade. Plates of t >40mm shall be : a.100% furnace normalised for E250 BR and normalised rolling is acceptable for 40 > t ≤ 63 mm for E250 BR. b.100% furnace normalised for ASTM A36. IS 2062 E350C, E355J2/BSEN10025-2 shall be 100% furnace normalized condition only for all thickness. E450BR/ BS EN 10025-4 S460M shall be 100% TMCP rolled condition only for all thickness.
		Soundness of plates	A	UT *	100%	100%	ASTM A435 / A578 Level A or B	TC	√	V	V	*UT for plates of 't' ≥10 mm for TMCP plates and t>40mm for others



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STANDARD QUALITY PLAN for Bolted Structures

Columns (Box, Plus & I type), Beams, Bracings & Ceiling Girders

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SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Class	TYPE OF CHECK	Quantum		REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency			REMARKS
					M	C			D	M	C	N	

2.0	Qualification												
2.1	Welding Control	Procedure Qualification	A	Review of documents	100%	100%	AWSD 1.1/ SIP:NP:07	WPS/PQR	√	P	W		
2.2		Personnel Qualification	A	Review of documents	100%	100%	AWSD1.1/ SIP:NP:07	WPQ	√	P	W		
2.3	NDE Personnel	Personnel Qualification	B	Review of documents	100%	100%	SNT-TC-1A, or Equiv.	Certificates	√	P	V		
3.0	In process :	Refer QCP :002 for process control											
3.1	Cutting Edge preparation , Fit up												
3.1.1	Material Traceability	Transfer of Heat Number, Plate Number, Grade, DB. Number	B	Visual	100%	100%	Material Test certificates, Drawing	DB Report	√	P	W		Note 1
3.1.2	Material Marking	Marking	C	Review of documents	100%	Random	Drawing	Dim. Rec.	√	P	V		
3.1.3	Cutting , Punching, Drilling	Dimension	C	Visual, measurement	100%	Random	Drawing	Dim. Rec	√	P	V		
3.1.4	Preheating for gas cutting	Preheating Temperature	B	Visual	100%	100%	Note 2		√	P	W		Gas cut edges shall be free from slag and ground smooth.
3.1.5	Gas cut edges	NDE	B	MPI	100%* 10% #	Random	BHE:NDT:PB:MT-01(latest revision)	R	√	P	W		* t ≥ 38mm # 20 ≤ t < 38 mm
3.1.6	Edge Preparation (shop & site welds)	Groove Angle, Land & MPI	B	Visual, measurement & MPI	100%*	Random	Drawing / BHE:NDT:PB:MT-01(latest revision)	R	√	P	V		* bevel edges of t ≥ 20 mm.
4.0	Welding												
4.1	Welding consumables*	TC	B	Verification	100%	Batch / Lot	WCPI-207,417 (latest revision)		√	P	W		*For E450BR/ BS EN 10025-4 S460M and SA299
4.2	Fit Up	Root Gap, Groove angle , Mismatch	B	Visual & measurement	100%	Random	Drawing/WPS		√	P	V		
4.3	Welding Control	Preheating, Consumables, Welding	B	Measurement, Verification	100%	Random	WPS, Drawing, Preheating, Note-3		√	P	V		
4.4	Visual welds	Surface Quality, Profile	B	Visual	100%	100%	Drawing/ SIP:NP:06		√	P	V		



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QUALITY ASSURANCE

STANDARD QUALITY PLAN for Bolted Structures

Columns (Box, Plus & I type), Beams, Bracings & Ceiling Girders

QP NO. : SQP:NP: 027 REV.: 03

DATE : 08/06/15

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SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Class	TYPE OF CHECK	Quantum		REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency			REMARKS
					M	C			D	M	C	N	

5.0	NDE on Butt Welds												
5.1	After back gouging	Weld Soundness	C	PT	100%	Random	BHE:NDT:PB:PT-01(latest revision)	R	√	P	W		
5.2	Finished Welds (Full penetration)- other than Ceiling Girders	Weld Soundness Plate Thickness. $t \geq 32$ mm	B	RT/UT	100%	100% @	BHE:NDT:PB:PT-01(latest revision) BHE:NDT:PB:MT-01(latest revision) BHE:NDT:PB:RT-05(latest revision) BHE:NDT:PB:UT-31(latest revision)	R	√	P	W		@ Review of films/UT Witness. #10% of joints per PGMA / Vendor
		Weld Soundness Plate Thickness. $25 \text{ mm} < T < 32 \text{ mm}$		RT & MT	10% & 100%	10% #		R	√	P	W		
		Weld Soundness Plate Thickness. $T < 25 \text{ mm}$		MT	10%	10%		R	√	P	W		
5.3	Partial Penetration Weld	Weld Soundness	B	MT/PT	100%	100%		R	√	P	W		
5.4	Ceiling Girder Flanges and webs	All thickness	B	RT/UT	100%	100% @	BHE:NDT:PB:RT-05(latest revision) BHE:NDT:PB:UT-31(latest revision)	R	√	P	W		@ Review of films/UT Witness.
6.0	NDE on Fillet Welds												
6.1	Finished Welds- other than Ceiling Girders	Weld Soundness	B	LPI/MPI	100%\$ /10% #	100%	BHE:NDT:PB:PT-01(latest revision) BHE:NDT:PB:MT-01(latest revision)	R	√	P	W		\$ when 't' in both plate members is 25 mm and above # other fillet welds
6.2	Ceiling girder-flange ,web and stiffeners	Weld Soundness	B	MPI	100%	10%	BHE:NDT:PB:MT-01(latest revision)	R	√	P	W		
6.3	Lifting Hook	Weld soundness	B	MPI	100%	100%	BHE:NDT:PB:MT-01(latest revision)	R	√	P	W		
7.0	Production Test Coupons (if specified in Contract Quality Plan)												
7.1	For Butt Welds	Weld Soundness	B	RT and Mechanical Test (Tensile, Bend)	100%	100%	BHE:NDT:PB:RT-05(latest revision),	R	√	P	W		
7.2	Fillet Weld	Weld Soundness	B	Weld Fusion (Macro Etch)	100%	100%	AWS D 1.1	R	√	P	W		



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QUALITY ASSURANCE

STANDARD QUALITY PLAN for Bolted Structures

Columns (Box, Plus & I type), Beams, Bracings & Ceiling Girders

QP NO. : SQP:NP: 027 REV.: 03

DATE : 08/06/15

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SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Class	TYPE OF CHECK	Quantum		REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency			REMARKS
					M	C			D	M	C	N	

8.0	Post Weld Heat Treatment												
8.1	Post Weld Heat Treatment	Time and Temperature ROH, ROC	B	Verification of HT Chart	100%	100%	Note 4	R	√	P	V		
9.0	End Plates/ Splice Joint Plates for bolted Connections												
9.1	Machining/End milling	Surface finish, Squareness, Flatness	B	Measurement	100%	Random	Drawing	R	√	P	V		0.25 feeler gauge max. during assembly. Note-5 &Note7
9.2	Match Drilling	Dimension, Size and Pitch distance	B	Measurement	100%	Random	Drawing/ IS 7215	R	√	P	W		
10.0	Final Inspection												
10.1	Individual Piece	Dimension, Straightness (Camber & Sweep), Twist, Squareness and Orientation	B	Visual & measurement	100%	100%	Note -6	R	√	P	W		
10.2	Columns End	Dimension	B	Measurement	100%	100%	Note-6	R	√	P	W		
10.3	Marking identification of Parts	WO/DU Number Designation & S/c code	B	Visual	100%	100%	Drawing	R	√	P	V		
10.4	Trial Assembly of Columns,beams,bracings and Ceiling Girders & Grid Assembly	Overall Dimensions, Alignment, Elevation, Squareness and Match Marking	A	Visual & measurement	100%	100%	Trial Assembly Procedure /Drawing	R	√	P	W		Note-7
10.5	Surface Preparation and Painting	Surface finish, Shade, Dry film Thickness	B	Visual & measurement	100%	Random	Approved Painting scheme	R	√	P	W		
10.6	Verification of completion	Over all dimensions, compilations,marking,stencil,punching &dispatch clearance	B	Verification	100%	100%	All documents identified as 'R' in the D column			P	V		



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**QUALITY
ASSURANCE****STANDARD QUALITY PLAN for Bolted Structures****Columns (Box, Plus & I type), Beams, Bracings & Ceiling Girders**

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SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	Class	TYPE OF CHECK	Quantum		REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency			REMARKS
					M	C			D	M	C	N	

Note 1

Material	Specification	TDC No.(latest revision)
Plates & Rolled Sections.	ASTM A36 , IS 2062/ E250A, E250 BR, E350C. E450 BR, BSEN10025-4/S460M, BSEN10025-2/S355J2+N	TDC:0:301 TDC: 0:317
Separate colour code to be maintained for BHEL material with separate storage area.		

Note 2


Preheating for gas cutting

Material	Thickness (mm)	Preheat Temperature (minimum)
E350C	>50	100 ⁰ C
E450 BR, BSEN10025 /S460M&S355J2	>25	150 ⁰ C
SA299 Gr A	all thickness	150 ⁰ C

Note-3

3.1 Preheating before welding (Unless specified otherwise in the WPS)

Material	Wall Thickness (mm)	Preheating Temperature (°C)
E 350C	< 20	NIL Ensure freedom from water condensation
	>20	150
SA 299 Gr A	all thickness	150
E 450BR, BSEN10025 /S460M& S355J2	all thickness	220

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					M	C			D	M	C	N	

3.2 Post Heating after welding: (Unless specified otherwise in the WPS)

Material	Wall Thickness (mm)	Post heating Temperature (°C)
E 350C	< 20	NIL
	>20	150
SA 299 Gr A	all thickness	150
E 450BR, BSEN 10025/ S460M &S355J2	all thickness	220 -250

Note- 4

4.0 Post weld heat treatment (Stress relieving) shall be performed for:

- All welds when t>50 mm..... applicable for E250BR, E350C
- All welds for all thickness applicable for SA299
- All welds when t>35 mm..... applicable for E 450BR, BSEN 10025 /S460M&S355J2

(Where t = plate thickness in case of butt welds and weld thickness in case of groove/fillet welds.)

The actual PWHT requirements shall be as per the BHEL approved WPS.

PWHT for all butt welds in ceiling girder flanges and webs.

- All gas cut edges of plates above 50mm thickness shall be stress relieved after cutting. In case of E450BR/S460M material, stress relieving shall be done after gas cutting for thickness above 35mm.Alternatively, the gas cut edges shall be ground/machined to 3mm width.

Note- 5

The machined/bolted surface shall be applied with rust preventive oil coating and the painting of that surface shall not be done.

All the machined and bolted surfaces should be suitably masked to avoid handling damages.

Legend:

M: Manufacturer / Sub- contractor, C : BHEL / Nominated Inspection agency. N: Customer/ Nominated Inspection agency. P: Perform, W: Witness, R –Records V: Verification of records for “W” Marked items
 TMCP : Thermo mechanical Controlled Process



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					M	C			D	M	C	N	

Note:6 Tolerance

Table: 1 Individual Columns / Girders/Box Beams / Box Bracings

Sl.No.	Structural Parts / Parameters	Tolerance in mm		
1	Section Depth / width upto and including 1.0 metre	+3 / -2 (± 1 at the joints)		
2	Section Depth/Width over 1.0 metre	+3 / -2 (± 2 at the joints)		
3	Web Shift	± 2		
4	Tolerance depending on length dimensions of structural items	Length Dimensions in mm		
		≤ 6000	> 6000 - ≤ 12000	> 12000
a	Columns	± 1	± 2	± 2.0
b	Built up beams	+0 / -2	+0 / -3	+0 / -4
c	Diagonal Bracings	+0 / -2	+0 / -2	+0 / -2
5	Bow in column Base Plate	1mm per metre of diagonal or 3mm whichever is greater		
6	Camber			
a	Column /Girder/ Built-up Beam	± L /2000 = 0.50 mm/ m where 'L' is overall length of column/ Beam / Diagonal Bracing subject to maximum of 5mm		
7	Sweep			
a	Column /Girder/ Built-up Beam	± L /2000 = 0.50 mm/ m where 'L' is overall length of column/ Beam / Diagonal Bracing subject to maximum of 5mm		
8	Twist	± a/3000 = ± 0.33mm/m, where 'a' is depth of member		
9	Combined warpage	W /100 or 3 mm whichever is greater where 'W' is the width of flange other than joint area		
10	Drilled Holes for Bolts			
a	Hole Dimension	+0.6 / -0 for others, +0.16/-0 for Fit bolts of TMG (Reaming required)		
b	Pitch distance of holes and distance between rows of holes	± 1		


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					M	C			D	M	C	N	

TABLE: 2 Fabrication tolerances - Individual Beams & Bracings -Rolled Sections

Sl.No.	Structural Parts / Parameters	Tolerance in mm
1	Length	
a	For members where ends are free	± 1mm / m subject to 5mm max.
b	For members connecting between two structural members	+0 / -3
2	Deviation in straightness	
a	Sweep	1mm/m upto 15m subject to max. of 10mm and for length over 15m : 10mm+1mm/m for the length in excess of 15m
b	Camber	5mm max.
3	Twist	± 1mm / metre or 6mm whichever is greater, where 'h' is depth of member
4	Drilled Holes for Bolts	
a	Hole Dimension	+0.6 , -0
b	Pitch distance of holes and distance between rows of holes	± 1

7.0 TRIAL ASSEMBLY

7.1 Trial assembly shall be performed by butting of ends (contact joints) without providing any gap. Variation in gap shall not be more than 0.25 mm for 80% of nominal contact area. Ensured by feeler gauge.

7.2 Alignment of centre line of all the pieces of flanges and webs water level deviation shall be within 2 mm.

7.3 As per Trial assembly procedure applicable SIP NP:018 & SIP NP:020.