National Centre for Radio Astrophysics

NCRA • TIFR

Internal Project report
GMRT/Mech/2023/001

A Novel Approach for Antenna Structure Maintenance: Lowering and Replacement of Corroded Quadripod, CST structure

By

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Abstract

The efficient functioning of antenna structures is critical for maintaining seamless astronomical observations. However, prolonged exposure to the open atmosphere can lead to corrosion of crucial components, compromising the overall integrity of the system. Among the affected antennas, the Quadripod structure of the C03 antenna has experienced the most significant corrosion, necessitating urgent replacement to preserve the operational capabilities of the Giant Metre wave Radio Telescope (GMRT).

This abstract presents a pioneering approach to address the corrosion issue by safely lowering the entire antenna dish, including the Quadripod, to ground level around the concrete tower. This method will enable the replacement of corroded Quadripod legs while avoiding the challenges and risks associated with working at a height of approximately 25 meters above the ground.

The proposed procedure leverages advanced mechanical and electrical technologies to control the lowering and raising of the antenna dish. The lowering process ensures careful and precise handling of the delicate components, preventing any further damage during maintenance. The replacement of the Quadripod legs will be conducted with meticulous attention to detail to ensure seamless integration and alignment with the existing feed system.

Key aspects of the abstract include a thorough evaluation of the corrosion's impact on antenna performance and an analysis of the proposed approach's benefits. By addressing the corrosion issue promptly and replacing the deteriorated Quadripod legs, the GMRT can sustain its operational capabilities, safeguarding uninterrupted data collection and analysis.

The abstract underscores the significance of this novel maintenance approach in mitigating risks associated with corrosion and improving overall maintenance efficiency. By minimizing downtime and streamlining the replacement process, this method optimizes antenna structure maintenance while ensuring the longevity of the GMRT's functionality.

In conclusion, the introduction of a lowered maintenance procedure for the C03 antenna's corroded Quadripod structure demonstrates the GMRT's commitment to maintaining its operational excellence. This innovative approach provides a blueprint for effectively managing corrosion-related challenges in other antennas, ultimately enhancing the performance and reliability of the GMRT's communication infrastructure.

1. INTRODUCTION

The National Centre for Radio Astrophysics (NCRA) located on the Pune University Campus is the Radio Astronomy Group of Tata Institute of Fundamental Research (TIFR), established in the early 1960s. It is the premier institute for radio astronomy in India, operating under the Department of Atomic Energy (DAE), Government of India, and is recognized as one of the world's leading institutions in this field. The NCRA is responsible for the operation of the Giant Metrewave Radio Telescope (GMRT), which consists of 30 identical steerable 45-meter diameter porous dish antennas spread over a 25 sq. km area, working in unison with centralized control.

Out of the 30 antennas, 12 are operating in the central cluster, while the remaining 18 antennas are placed on three Y-shaped arms with six antennas on each arm. The dish backup structure is made from IS:1161 mild steel tubes of various diameters, supporting a stretched wire mesh made of stainless-steel wires (0.5 mm diameter) forming the reflector surface of the antenna. The antennas were fabricated and installed in the year 1996 and have been operating continuously, 24x7, 365 days a year.

Over time, some corrosion has been noticed on the members of the antenna structures, particularly on the dish structures and the Quadripod legs (four legs supporting the Feed system) of several antennas due to their exposure to the open atmosphere. Among these antennas, C03 antenna's Quadripod structure is the most affected, and it has been decided to replace it with a newly fabricated one as soon as possible.

Due to the difficulty of replacing the Quadripod at a height of approximately 25 meters above the ground, the plan is to lower the entire dish (along with the Quadripod) to the ground around the Concrete tower, replace the Quadripod legs, and then raise the antenna dish back to its original level of 25 meters above the ground. This procedure will ensure the proper functioning of the antennas and maintain the GMRT's operational capabilities.

2. OBJECTIVE AND SCOPE OF WORK

2.1. Objective

The objective of this project is to develop a comprehensive methodology for safely replacing Quadripod (QPD) and Cage supporting structure (CST) structures within a complex system. The methodology aims to minimize risks, ensure the continuity of operations, and maintain the overall integrity of the system throughout the replacement process.

2.2. Scope of work

I. Design and develop the procedure for the replacement of the QPD and CST structure:

- Preliminary Assessment: Conduct a thorough inspection of the existing QPD and CST structures to identify any damages or wear.
- Design of Replacement Structures: Develop detailed engineering drawings and specifications for the new QPD and CST structures to be installed.
- Material Procurement: Source and procure the required materials for the construction of the replacement QPD and CST structures.
- Structural Analysis: Perform a structural analysis to ensure the new structures meet safety and load-bearing requirements.
- Procedure Development: Create a step-by-step procedure for the safe removal of the old QPD and CST structures and installation of the new ones.

II. Design and analysis of Column structure required for lowering antenna:

- Requirements Gathering: Understand the specific requirements for the column structure to facilitate the lowering of the antenna.
- Structural Design: Design the column structure considering factors like height, weight-bearing capacity, and stability.
- Analysis and Simulation: Conduct a structural analysis and simulation to ensure the column's integrity and safety during the lowering process.

III. Fabrication of QPD, CST, and Column structure:

- Fabrication Plan: Develop a fabrication plan outlining the processes, materials, and timelines for each component.
- Fabrication: Fabricate the QPD, CST, and column structure based on the approved design and engineering specifications.

IV. Lowering of antenna:

- Preparatory Steps: Ensure all safety protocols are in place and secure the area around the antenna.
- Lowering Procedure: Follow the developed procedure to lower the antenna using the designed column structure.

V. Replacement of QPD and CST structure:

- Dismantling Old Structures: Carefully remove the old QPD and CST structures following safety guidelines.
- Installation of New Structures: Install the newly fabricated QPD and CST structures securely in their designated positions.

VI. Erection of antenna and its alignment:

- Erection Plan: Develop a plan for erecting the antenna on the newly installed structures.
- Alignment: Precisely align the antenna to the desired position for optimal performance.

VII. Astronomical test:

- Test Execution: Conduct the astronomical test and analyze the data to verify the antenna's functionality.

3. Design and develop the procedure

3.1. Preliminary Assessment

During the structural repair work on the RIM Section, it was observed that the QPD (Quadripod) pipes exhibited heavy pitting. To assess the extent of pitting, visual inspections were conducted, and a pitting depth gauge was used to measure the severity. Additionally, the presence of holes in the QPD Bottom pipe was identified, which seemed to be caused by water stagnation under the aluminium plate used for the mounting arrangement of the 50 MHz feed. This report outlines the findings of the pitting depth inspection conducted on the two QPD legs, with a focus on C03 QPD, and proposes a plan for periodic checks and comparisons to monitor any further deterioration.

Inspection Results:

C03 QPD Inspection (October 2018 and January 2020): The pitting depth inspection of C03 QPD was carried out on October 2018, and the readings obtained were as follows:

Location: Inspection of QPD which are resting on PRF 3, 7, 11, 15 are carried out and report prepared

Pitting Depth:

- 2.8 mm max depth of pitting thickness observed on QPD resting on PRF 3
- 2.35 mm max depth of pitting thickness observed on QPD resting on PRF 15
- 2.19 mm max depth of pitting thickness observed on QPD resting on PRF 11
- 2.6 mm max depth of pitting thickness observed on QPD resting on PRF 7

Observations: Heavy pitting observed and three holes are observed on QPD

structure

Recommendations: Considering the presence of holes and significant pitting in the QPD pipes, it is essential to take preventive measures to mitigate further deterioration and ensure the structural integrity of the equipment. The following recommendations are proposed:

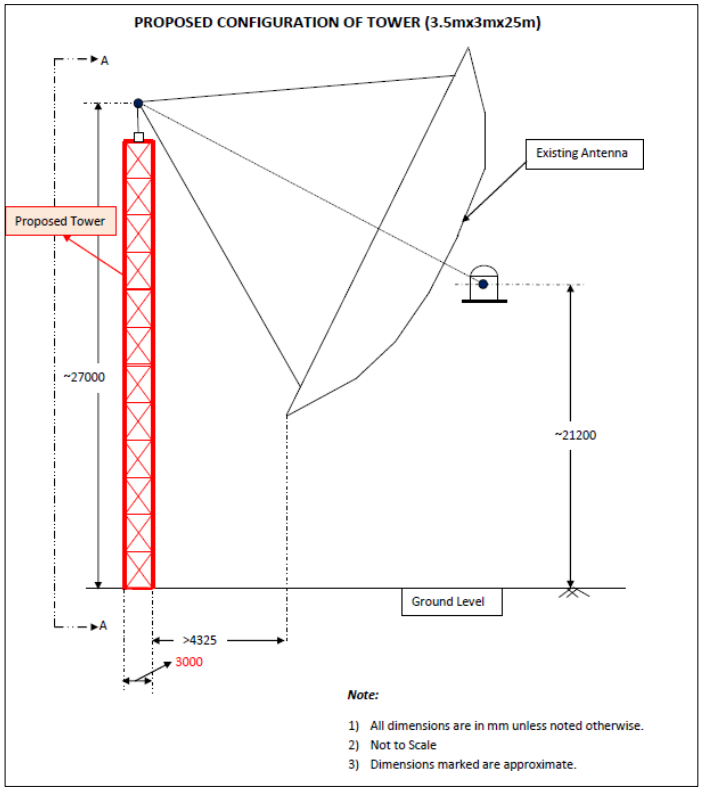
Immediate Remediation: Holes on QPD structures are closed by two half sleeve pipes to avoid further corrosion and entering of water inside the QPD structure

Inspection report is prepared for submission.

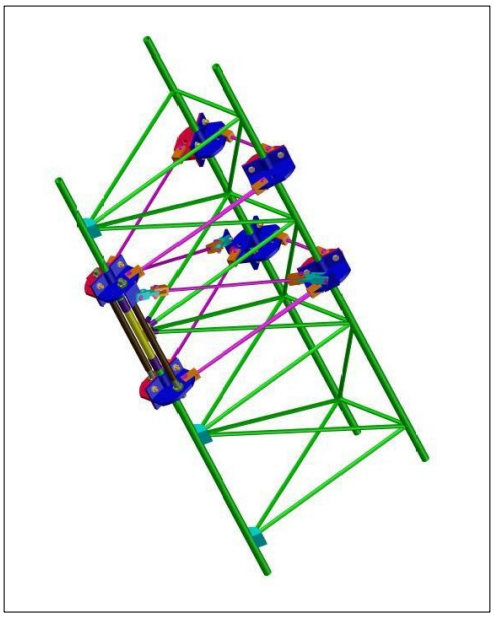
3.2. Design of Replacement Structures

Based on the information provided, it appears that Tata Consultant Engineers (TCE) was assigned a task to assess and propose a replacement method for the QPD structure. After completing their assessment, TCE suggested two methods, namely Configuration 01 and Configuration 02, for evaluation.

Configuration 01 involved designing a new tower and submitting the operation sequence for review by GMRT.



In Configuration 02, TCE recommended a local repair method to address observed holes in the structure. However, during inspection, it was discovered that heavy pitting affected the entire length of the pipe, making the local repair approach insufficient.



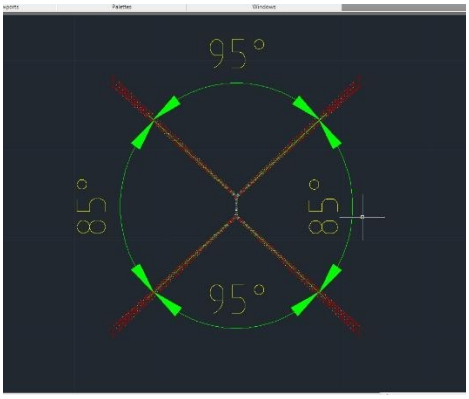
Due to the high costs and time requirements associated with both proposed methods, GMRT decided to explore an old conventional method that was used during the original construction of GMRT.

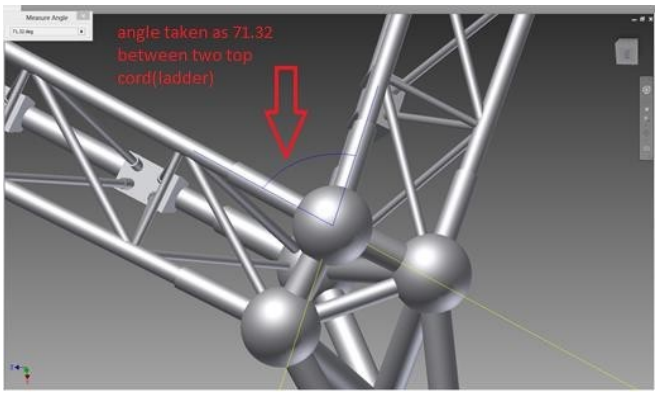
After that we have requested to TCE to design and make drawing of the QPD structure, and during this process, they must carefully consider the offset values of Leg1 and Leg1x. These offset values play a crucial role in the assembly of the QPD structure.

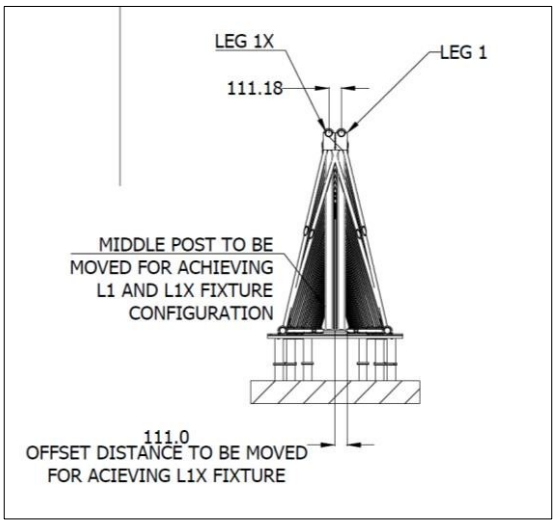
Additionally, to address the issue of water stagnation at the RIM joints, we have proposed new connector boxes. These new connector boxes are designed to prevent water stagnation problems, ensuring better performance and longevity of the QPD system.

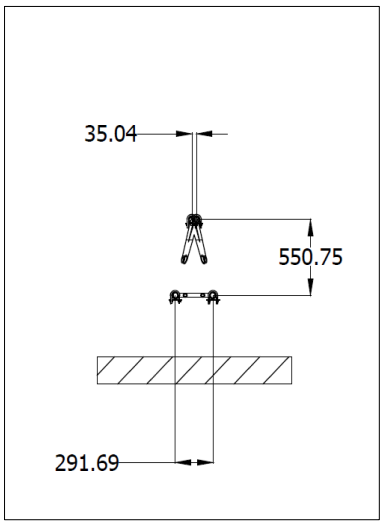
Building on the success of the new connector box prepared for RIM junction, we have requested TCE to design the connector junction. This connector junction should be based on a similar concept to the new connector boxes, effectively resolving any water stagnation issues that may have occurred at the junction points of the QPD structure.

By paying attention to the offset values and implementing the new connector junction, we aim to create a highly efficient and reliable QPD structure that can withstand water-related challenges, improving its overall performance and usability.









As per TCE's calculations and the corresponding drawing, the offset between Leg1 and Leg1x has been determined. On the bottom side, where the QPD is resting on the PRF, the offset is measured to be 55.29 mm.

On the CST end, the offset is found to be 17.3 mm. This measurement indicates the difference in position between Leg1 and Leg1x at the CST end.

3.3. Material Procurement

We have started by identifying the key items critical for procurement, as well as those with significant lead times. These are crucial to ensure smooth and timely project execution. To track progress and meet target dates effectively, we have developed a Gantt chart and a comprehensive tracking mechanism.

The Gantt chart provides a visual representation of the project schedule, outlining the tasks, their dependencies, and the timeline for completion. It allows us to monitor the progress of each task and identify any potential delays early on. By using this tool, we can proactively address any issues that may arise and take corrective actions to keep the project on track.

The tracking mechanism complements the Gantt chart by providing real-time updates on the status of procurement activities. It enables us to monitor the actual progress against the planned milestones and target dates. Through this mechanism, we can identify any deviations

from the schedule promptly and implement necessary measures to mitigate risks and maintain the project's progress.

With the Gantt chart and tracking mechanism in place, we are confident that we can effectively manage the procurement process, ensure timely delivery of critical items, and ultimately achieve our project's objectives as per the established target dates

CST bearing, IS1161 pipes are some example of critical items which we have tackled with procurement plan.

3.4. Procedure Development

The Procedure was made as per the erection procedure done during the erection phase and It is as follows

3.4.1. Erection and alignment of the Erection columns on the RCC foundation block around the RCC tower as per the attached drawing, by using the required crane and theodolite for checking the plumb of the lifting columns. Each of the lifting structural columns is 24 meters long and is made through 5 segments (3 nos. 6m long and 2 nos. 3m long).

3.4.2. After erection and alignment of four Lifting columns, undertaking fitting of all purlins, cross bracing pipes to the lifting columns with the help of fasteners, welding, etc. as per the attached drawing. Installation of 4 nos. Electric winch machines on the RCC Foundation Blocks around the antenna concrete tower.

3.4.3. Installation of 4 nos. Electric winch machines on the RCC Foundation Blocks around the antenna concrete tower.

3.4.4. Carrying out weaving of wire rope coming out from the rope drum over the diverter pulleys through the Lifting columns up to the height of around 24 meters. There are about 6 falls of wire rope & one winch machine wire rope length will be around 300 meters wound on the rope drum. All the necessary lifting accessories such as D-shackles, U-clamps, lifting hooks, slings, etc. will be used to connect the rope to the final lifting point.

First, remove three pipes i.e. Erection cradle bracing from the location of PRF 03. For removal of these pipes, remove the present assembled fasteners of M24 size with the help of a nut splitter/ cutter/ grinder, etc. as suitable.

After this remove further three pipes i.e. Erection cradle bracing from the location of PRF 07 by the same procedure

3.4.5. Finally remove further three pipes i.e. Erection cradle bracing *from the location of PRF 15*

3.4.6. Total of about 400 fasteners will be required to be removed to dismantle all the 12 bracing - pipes. For this work, the hanging platforms are essential at a height of 20 meters.

3.4.7. After removal of the joining fasteners of M24 size between the Cradle and Dish and the Erection of bracing pipes from 20-meter height, lower the antenna dish with the help of winch machines & rest/ lock the dish on the four foundation blocks of about 1.2 meters height above the ground.

3.4.8. Provide a minimum of four supports to the PRF numbers 3,7,11& 15 on which QPDs are resting to avoid vibrations/ fluctuation near the feed turret

3.4.9. Provide/ fabricate support structure to the feed turret on the cradle base frame.

3.4.10. Remove old QPD Leg1X which is resting on the PRF03.

3.4.11. Remove old QPD Leg1X which is resting on the PRF11.

3.4.12. Remove old QPD Leg1 which is resting on the PRF07.

3.4.13. Remove old QPD Leg1 which is resting on the PRF15.

3.4.14. Remove old CST & feed turret assembly.

3.4.15. Carry out the alignment of the new CST & feed turret assembly with the help of theodolite to the required focal point by using/ making a proper stool which is to be properly bolted to the Cradle structure. For achieving this, use the collimation plane marking for getting the required F/D ratio of about 18570 mm.

3.4.16. Installation of new QPD Leg1 which is resting on the PRF number 07.

3.4.17. Installation of new QPD Leg1 which is resting on the PRF number 15.

3.4.18. Installation of new QPD Leg1X which is resting on the PRF number 03.

3.4.19. Installation of new QPD Leg1X which is resting on the PRF number 11.

3.4.20. Preparation of all 12 erection bracing pipes (Ø219mm & Ø273mm) with star plate connection as per the attached drawing.

3.4.21. Before the erection of the dish put all 8 inner PRFs on the Cradle base frame. The weight of one inner PRF is around 100kg.

3.4.22. Conduct the load test.

3.4.23. Complete the 40-ton dish erection work up to the height of 20 meters with the help of winch machines.

3.4.24. After erection, dish entering, levelling & alignment work with the help of theodolite.

3.4.25. Fixing of all 12 bracing pipes/ dish to cradle joining pipes. It includes star plate welding, and M24 bolts – about 400 nos. torqueing work up to the value of 106 kg-m with the help of a torque wrench.

3.4.26. After star plates welding, and bolt torqueing, release the load of winch machines.

3.4.27. Dismantling of Lifting columns set-up including winch machines and making the site clear for usual antenna rotation.

3.4.28. Inspection of the said site work in all respects for the satisfactory completion and its acceptance to the owner and handing over the subject antenna to the owner for GMRT operation.

4. Design and analysis of structures

For completion of replacement we need to design column, T bracket, Hub resting stool, pulley block.

4.1. Column Design and Analysis

Based on the Finite Element Analysis (FEA) conducted by Tata Consulting Engineers (TCE) for the column structure at full load condition with 40 Ton load on four columns, the stress values and maximum deflection have been determined. The objective of this analysis is to ensure that the column design can handle the challenging and critical task of supporting the antenna and accounting for fouling members, wire ropes, and their routes during the lowering of the antenna.

The material considered for the column structure is MS E250, and the design criteria are as follows:

Yield strength: 230 MPa

Allowable stress: 0.75 of yield strength, i.e., 172 MPa

The maximum vertical deflection allowed at full load condition is 25 mm.

In the FEA, the worst-case scenario was considered, where the load is applied on only three columns.

Case 1- Load on Four column

Case 2 Load on three column

Sr no	Load case	Max Equiv. stress MPa	Allowable stress MPa	Design margin
1	Case 1	64.6	172.5	2.7
2	Case2	71	172.5	2.4

And Deflection results are as below

Sr no	Load case	Max Deflection mm	Allowable deflection mm
1	Case1	13.5	25
2	Case 2	18.8	25

Based on the FEA analysis and the practical measurements conducted, it can be concluded that the lifting columns are safe to use. The FEA analysis likely indicated that the stress values and maximum deflection at full load condition are within acceptable limits, ensuring the structural integrity of the columns under the specified loading conditions.

Additionally, theodolite measurements were performed to check the alignment of the columns, and the results show that the alignment is within the limits specified by IS12843 tolerance for the erection of steel structures. According to this standard, a tolerance of up to 30 meters has a permissible deflection of ±25mm.

Furthermore, a practical deflection test was conducted with a 1-ton load applied for 24 hours. Presumably, the deflection observed during this test was within acceptable limits, confirming the stability and performance of the lifting columns under practical conditions.

Combining the FEA analysis, theodolite measurements, and the practical deflection test, it can be confidently stated that the lifting columns meet the safety requirements and are suitable for their intended purpose.

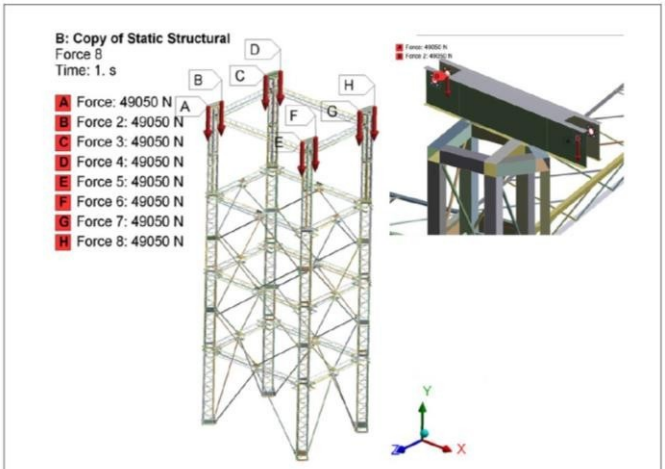


Figure 6 - Load on Lifting Column for Load Case-1

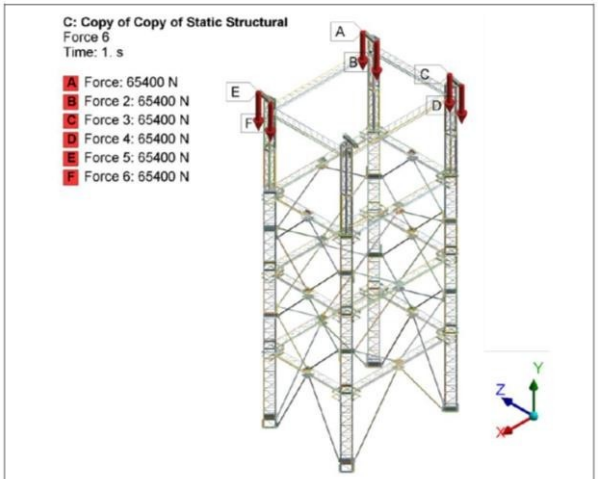
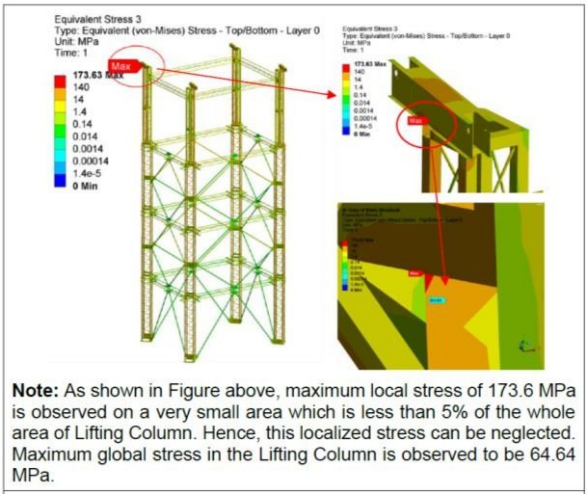
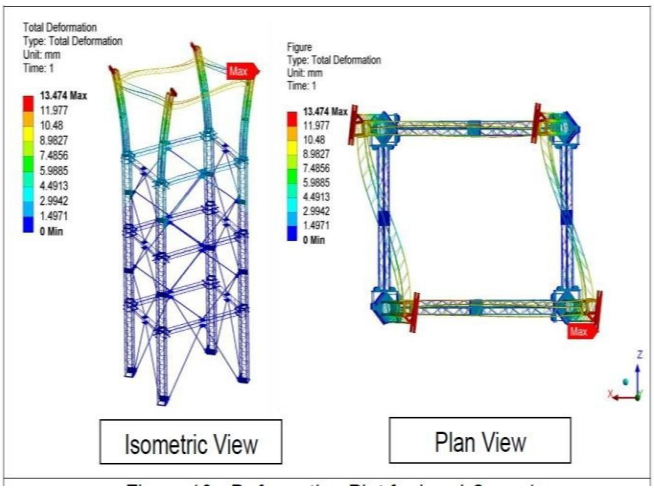


Figure 7 - Load on Lifting Column for Load Case - 2

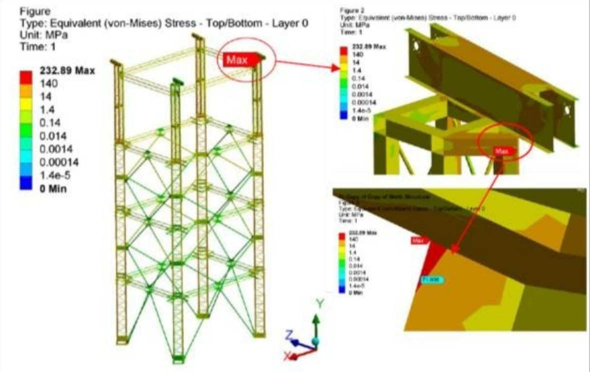
Load Case-1: Lifting Column with total load acting on 4 columns



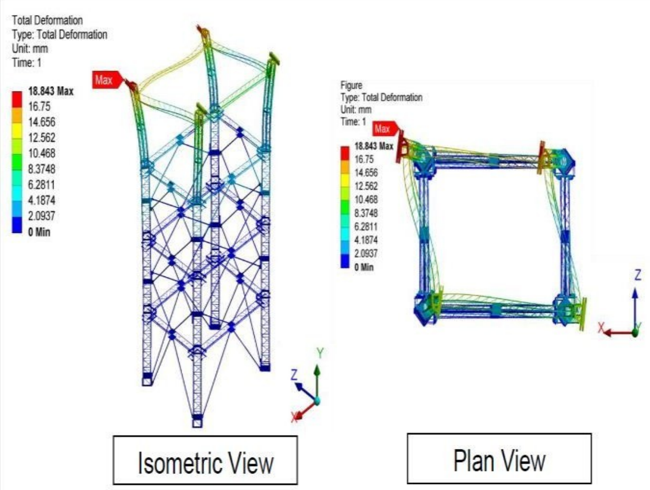
Note: As shown in Figure above, maximum local stress of 173.6 MPa is observed on a very small area which is less than 5% of the whole area of Lifting Column. Hence, this localized stress can be neglected. Maximum global stress in the Lifting Column is observed to be 64.64 MPa.

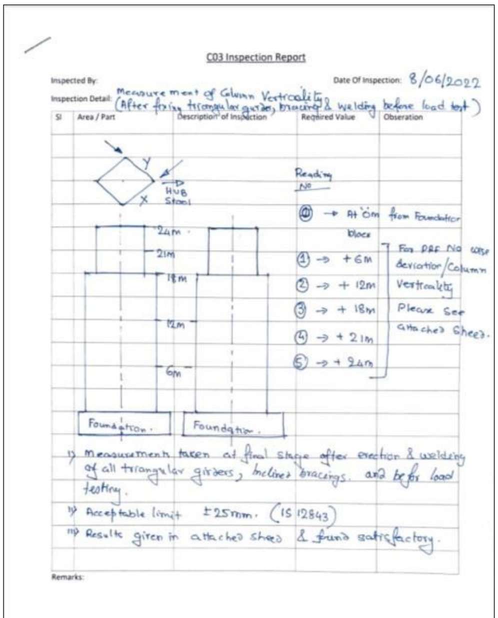


Load Case-2: Lifting Column with total load acting on 3 columns



Note: As shown in Figure above, maximum local stress of 232.9 MPa is observed on a very small area which is less than 5% of the whole area of Lifting Column. Hence, this localized stress can be neglected. Maximum global stress in the Lifting Column is observed to be 71.04 MPa.




C03 Inspection Report

Inspected By:

Date Of Inspection: 8/06/2022

Inspection Detail: Measurement of Column Verticality (After fixing triangular girder, bracing & welding before load test)

Sl	Area / Part	Description of Inspection	Required Value	Observation

i) Measurements taken at final stage after erection & welding of all triangular girders, inclined bracings. and befor load testing.

ii) Acceptable limit ±25mm. (IS 12843)

iii) Results given in attached sheet & found satisfactory.

Remarks:

4.2. Hub Stool resting design

After lowering the antenna, it must rest on some kind of platform. The task of designing the load resting stool has been assigned to TCE.

The specifications provided for the load resting stool are as follows:

Maximum intended weight to be rested on each stool: 40 tons.

Maximum vertical load on each stool: 10 tons.

Height of the stool: 1200 mm.

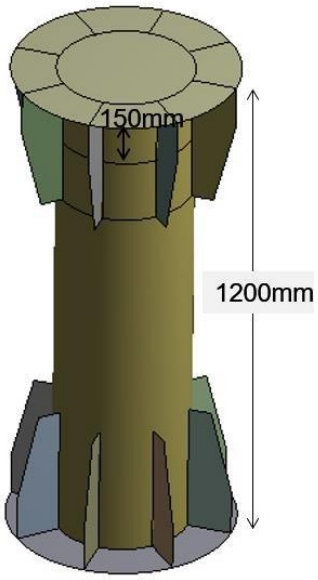
Diameter of the stool: φ500 mm.

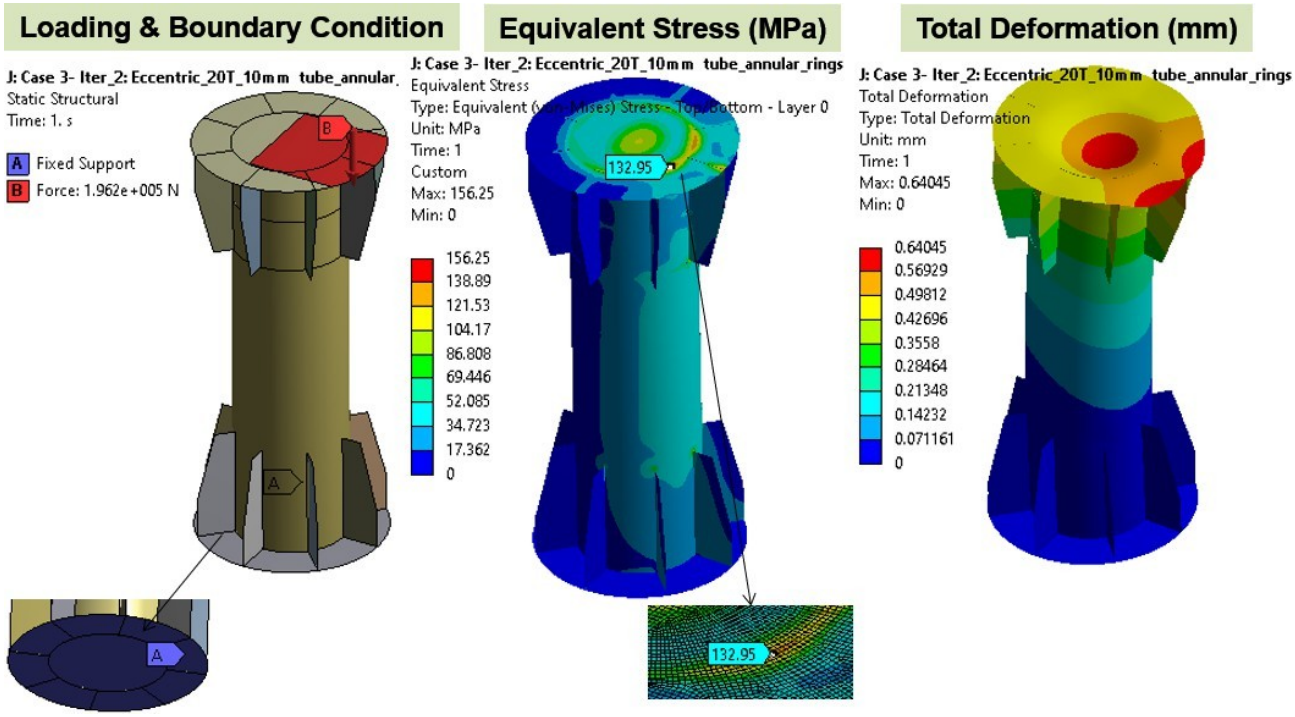
Material considered for the stool: E250, with a yield strength of 230 MPa.

To ensure safety, the design must have an allowable strength less than 172.5 MPa, which is 75% of the yield strength of the chosen material.

TCE will need to design the load resting stool to withstand the maximum vertical load of 10 tons while ensuring that the stress in the material does not exceed the allowable strength of 172.5 MPa. This design must also account for any potential factors such as environmental conditions, dynamic loads, and safety factors to ensure the stability and reliability of the stool. Once the design is completed, it can be fabricated and used to safely support the antenna and its associated load.

Based on the analysis of three iteration cases, a pipe size of 300NB (Nominal Bore) with a thickness of 10mm has been selected. In this analysis, the maximum equivalent stress is approximately 132.9 MPa, and the deformation is around 0.64 mm.

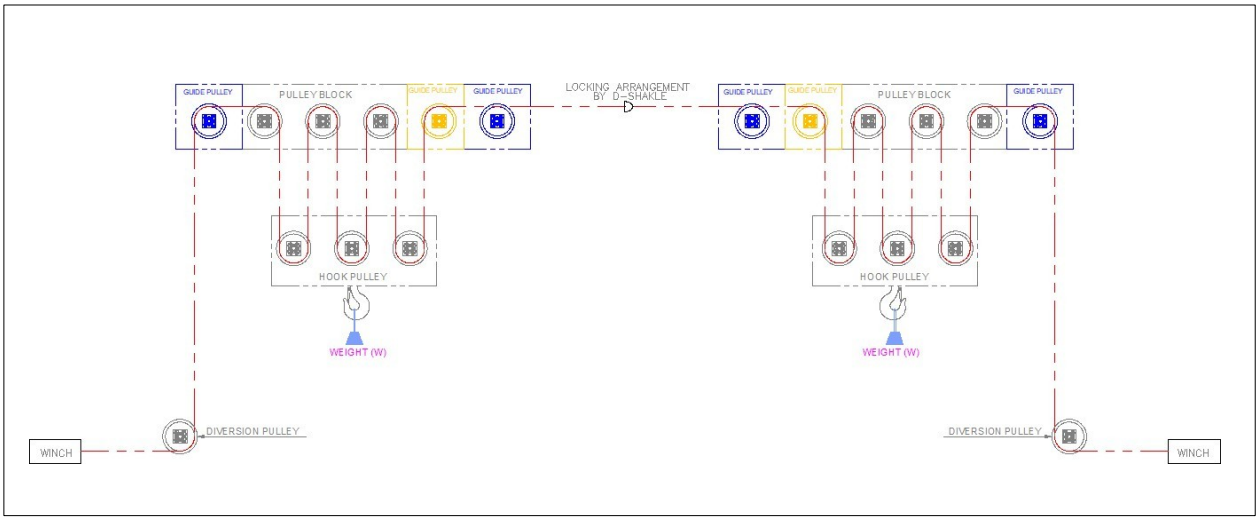


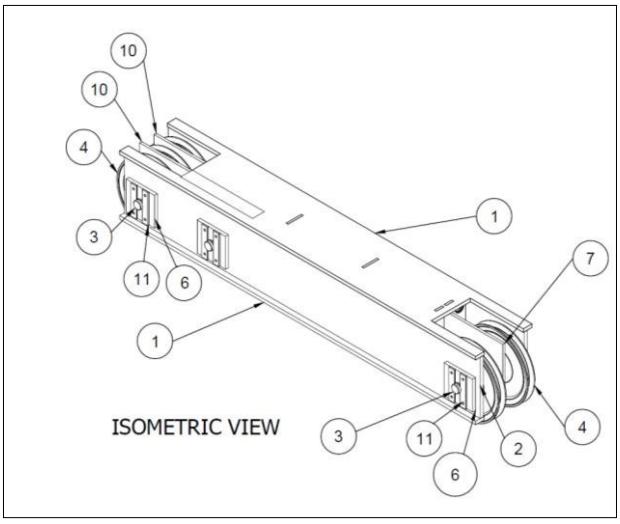


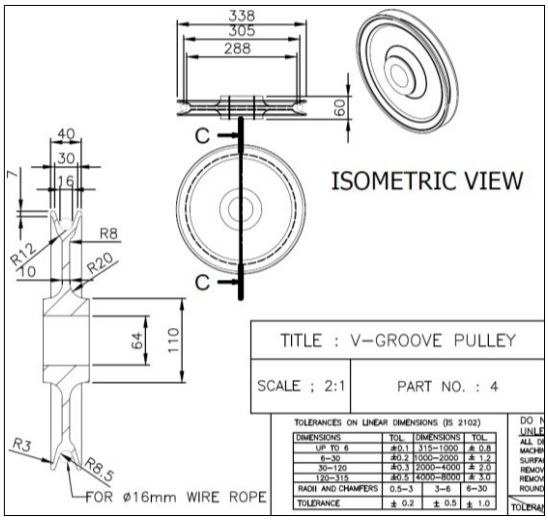
4.3. Pulley Block design

Following are the points consider during the design of pulley block

- Design Challenge: The main challenge is to design a pulley block that can handle a load of 10 tons on each pulley.
- Pulley Block Assembly: The task involves finalizing all the components required for the assembly of the pulley block. This includes selecting appropriate items such as pulleys, wire ropes, and the shaft diameter.
- Wire Rope Selection: Wire rope diameter needs to be chosen carefully to ensure that it can lift the maximum load of the dish while keeping it as small as possible.
- Three-Sheave Pulley Design: The design selected for the pulley block involves using a three- sheave system to handle the maximum load effectively.
- Fabrication and Welding: The pulley block is fabricated using a high-quality welder. A non-destructive Ultrasonic Testing (UT) is conducted on the welding joints to ensure welding quality.
- Stress Relieving: Stress relieving is carried out after welding to eliminate stress that occurs during the welding process, ensuring the pulley block's structural integrity.
- Shaft Material: The material for the shaft is selected according to IS 1570 Part 4 and is designed to handle a load of 10 tons in both shearing and bending conditions.
- Allowable Stress: The allowable shear stress for the selected shaft material is 187.5 MPa, and the allowable bending stress is 375 MPa.
- Stress Calculations: Shear stress and bending stress are calculated for the given load. The calculated shear stress is 39 MPa with a 4.8 design margin, and the calculated bending stress is 128 MPa with a 2.9 design margin.





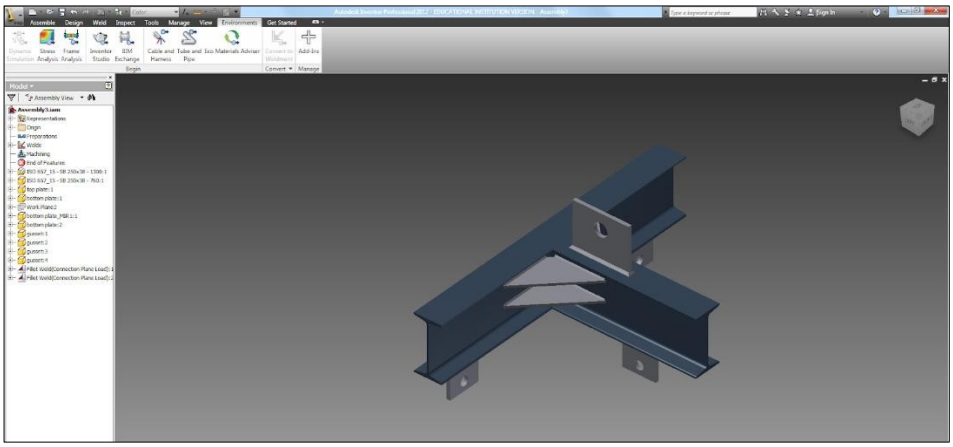


4.4. T bracket

The T-bracket is a component that is attached to the pulley block, specifically the hook pulley block. Its purpose is likely to serve as a hook or attachment point for lifting operations. It is designed to complement the functionality of the pulley block, allowing for the efficient and safe lifting of heavy loads.

The fabrication process for the T-bracket involves welding, and after the welding process, stress relief is carried out. Stress relief is a heat treatment process that helps to reduce internal stresses in the material caused by welding. This step is essential to ensure the structural integrity and longevity of the T-bracket.

Additionally, the welding quality is checked using Dye penetration (DP) and Ultrasonic Testing (UT). UT is a non-destructive testing method that uses high-frequency sound waves to detect flaws, defects, or inconsistencies in welded joints. By conducting UT, the quality of the welding can be verified, and any potential issues can be addressed before the T-bracket is put into service.



4.5. Foundation Block

Foundation block design is a crucial aspect of construction as it bears the main load from the columns and transfers it to the ground. To undertake this task, Tata Consultant Engineers was assigned to design and calculate the grade of cement and steel reinforcement (bars) required for the foundation blocks. The maximum vertical loading on each block is considered to be 15KN, while the maximum horizontal pulling force is taken as 100KN on each block.

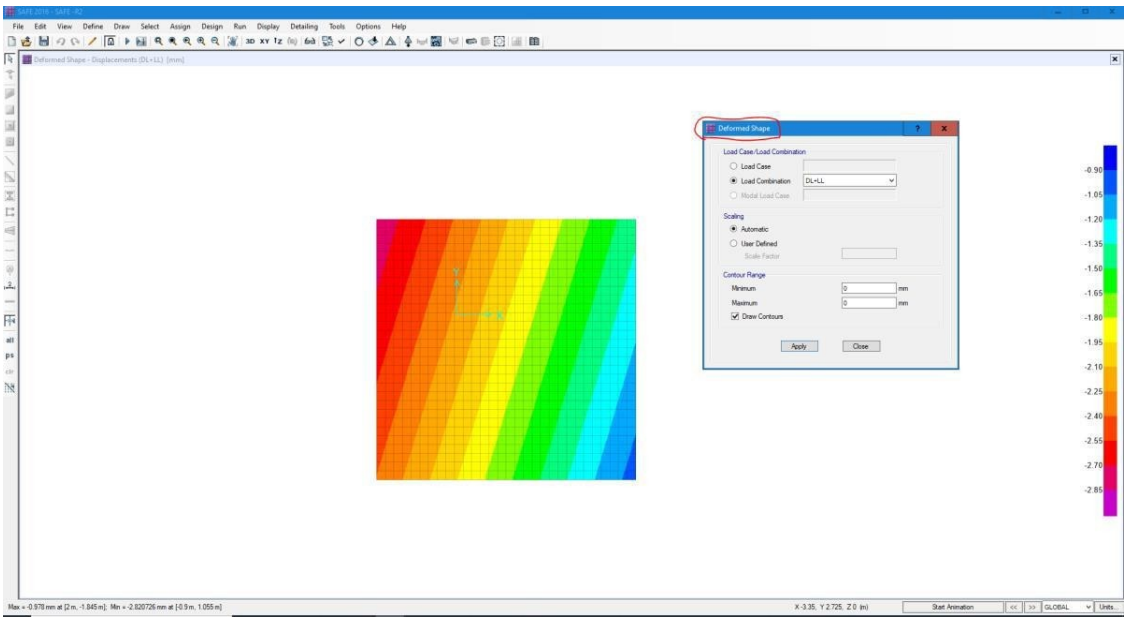
For the design process, the safe bearing capacity of the soil was determined to be 25KN/m2 based on the plate load test conducted at the site by M/s Durrocrete Engineers Pvt. Ltd.

Once the design was received from the consultant engineer, the construction order was given to Precast Pvt. Ltd. to manufacture these foundation blocks. To ensure the quality of the blocks, two compressive strength tests were performed, one after 7 days and the other after 28 days of curing.

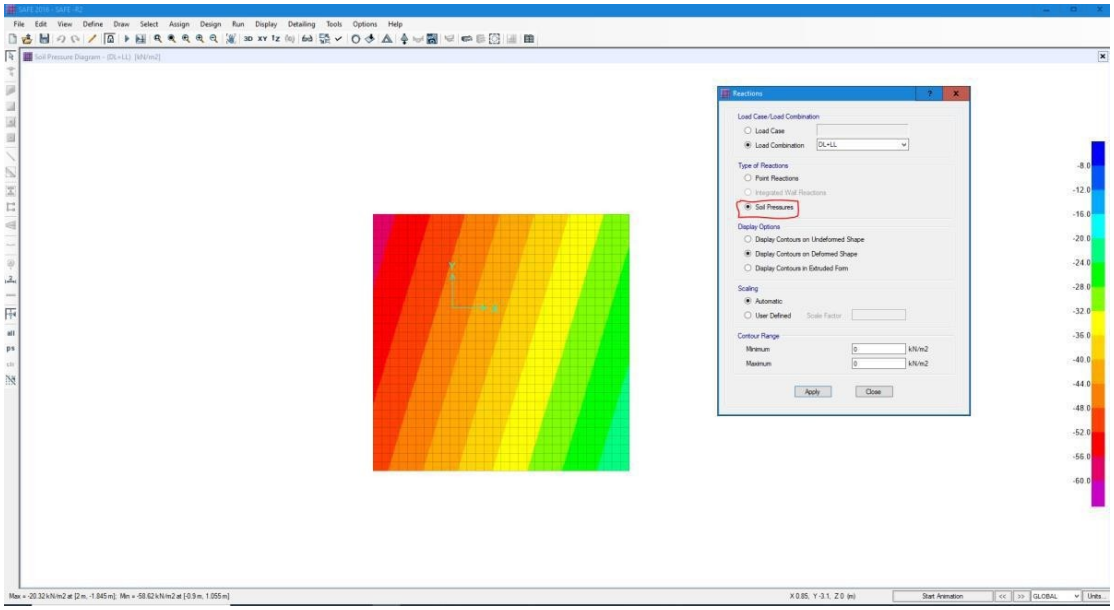
During testing, the compressive strength of the foundation blocks was found to be 54MPa, which is higher than the acceptable limit of 30MPa for M30 grade concrete. This indicates that the blocks possess excellent strength and should meet or exceed the required safety standards for their intended use in the project.

After running the structural analysis we get the following results

Maximum settlement (mm)	Allowable settlement (mm)	Max. Soil pressure (KN/m^2)	Allowable soil pressure (KN/m^2)
2.82	11.79	58.62	245



Settlement (mm)



Soil pressure

5. Fabrication of structure

5.1. QPD & Fixture fabrication

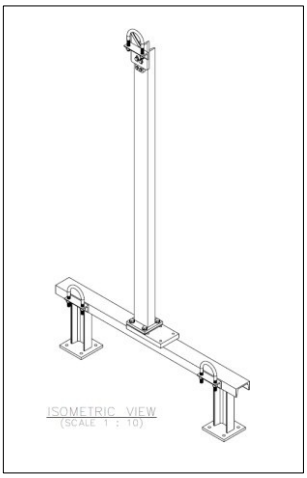
To obtain the precise offset as specified by Tata Consultant Engineers (TCE), they provided a fixture drawing that guides the fabrication process. This fixture drawing ensures that the exact offset is achieved at both ends of the QPD.

Upon receiving the fixture drawing, two setups were fabricated to create one set of QPD fabrication at a time, including leg 1 and leg 1x. Throughout the fabrication process, the offset was carefully checked using a theodolite. Theodolites are precision instruments used for measuring angles in both the horizontal and vertical planes, making them suitable for accurately determining the offset as required by the design.

Reports were prepared to document the measurements and ensure that the fabricated QPDs meet the specified requirements. These reports likely include details of the measured offsets, any adjustments made during fabrication, and verification that the final QPDs conform to TCE's design standards and specifications. This meticulous approach helps guarantee the quality and accuracy of the fabricated QPDs for their intended application.

During the fabrication of the QPDs, welding quality and dimensional measurements are typically recorded as part of the quality assurance and control process. These records are essential to ensure that the fabricated QPDs meet the required standards and specifications set by Tata Consultant Engineers (TCE).

- Welding Quality: The welding quality is crucial for the structural integrity and safety of the QPDs. Welding parameters, such as welding technique, welding current, voltage, travel speed, and filler material, are closely monitored during the fabrication process. Welding inspections and tests, such as visual inspection, dye penetration tests are conducted to assess the soundness of the welds. Any defects or deviations found during these inspections are recorded, and necessary corrective actions are taken to ensure the welding quality meets the specified standards.
- Dimensional Measurement: Precise dimensional measurements are vital to ensure that the fabricated QPDs have the correct geometry and dimensions as per the design requirements. These measurements are recorded to verify that the QPDs meet the specified tolerances and alignment criteria.



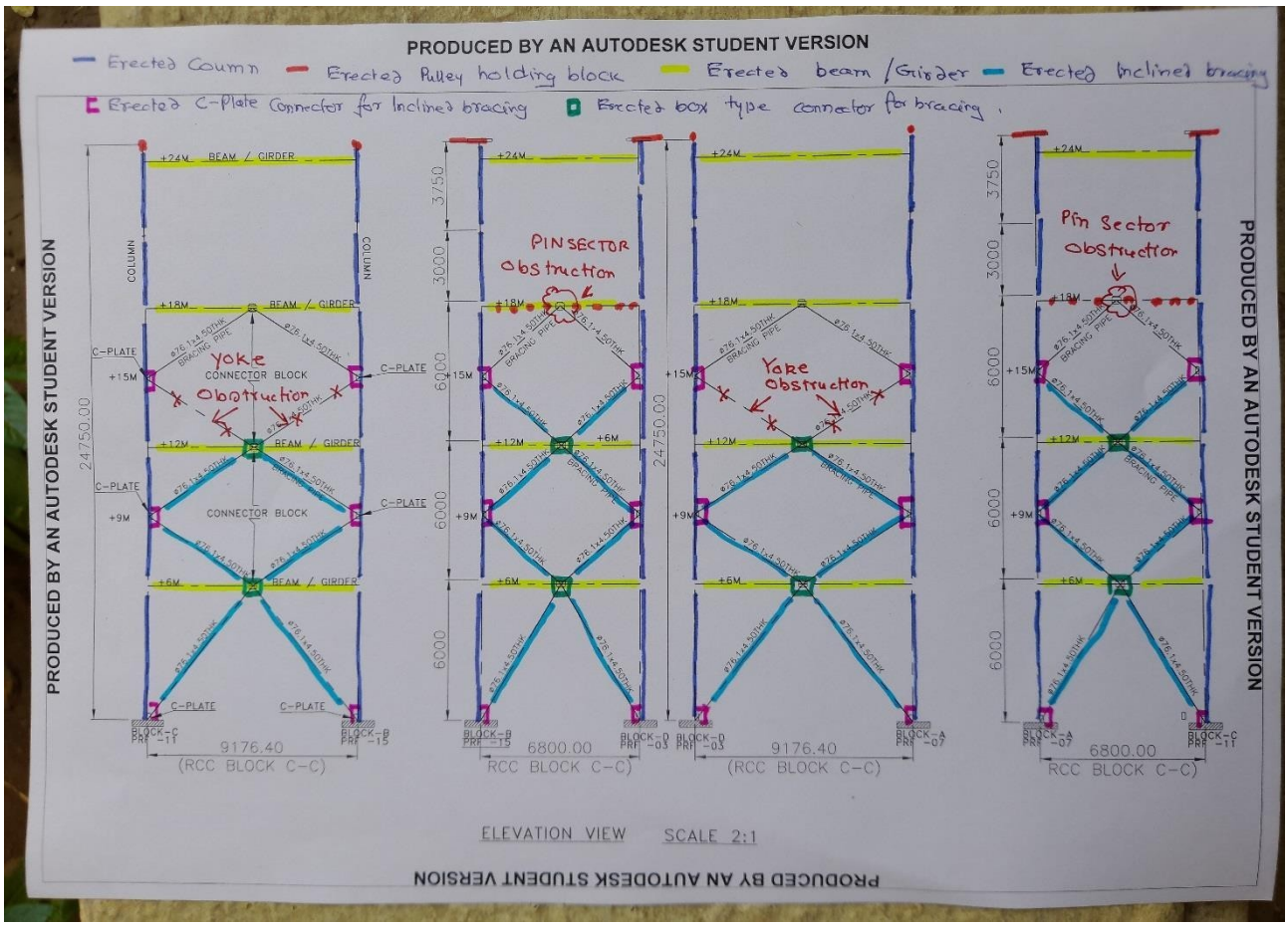
6. Lowering of Antenna

6.1. Modification of column bracings

During the erection of the column, an issue was identified where certain bracing members were obstructing the antenna. This concern was promptly addressed, and all designers were involved in discussions to find a suitable solution. To gain further insights, we thoroughly examined old GMRT erection photos, which had faced a similar problem.

After careful analysis, we made modifications to the fabrication process, incorporating changes based on what was observed in the old GMRT erection photos. These modifications were aimed at ensuring that the bracing members do not interfere with the antenna's functioning and movement.

The following images provide a visual representation of the work carried out, showcasing the adjustments made during the fabrication process:



Girder fouling on Pin sector

Bracing members are fouling @ Yoke body

By addressing the bracing member fouling issue and implementing the necessary changes, we have taken proactive measures to ensure the smooth and unobstructed functioning of the antenna during its operation. These modifications enhance the overall efficiency and effectiveness of the column's erection, contributing to the successful completion of the project.

6.2. Preparatory Steps

Before lowering the antenna, it is crucial to follow a set of preparatory steps to ensure safety and proper execution

- *Safety Assessment*: Conduct a thorough safety assessment of the entire lowering operation. Identify potential hazards and implement necessary safety measures to protect personnel and equipment.
- *Equipment Inspection*: Inspect all equipment, including winches, Lifting hooks, and cables, pulleys to ensure they are in good working condition and meet safety standards.
- *Weather Check*: Check weather conditions to ensure it is safe to proceed with the lowering operation. Avoid high winds or adverse weather that could jeopardize the safety of the process
- *Secure the Area*: Clear the area around the antenna to prevent any obstructions or potential hazards during the lowering process.

- *Personal Protective Equipment (PPE)*: Ensure all personnel involved in the operation wear appropriate PPE, including helmets, safety harnesses, gloves, and other required safety gear.
- *Column alignment:* The columns have been carefully aligned using a theodolite, and upon inspection, it is confirmed that the erected columns are within the specified tolerance limits. This alignment and compliance with tolerance standards are essential to ensure the stability and structural integrity of the columns during the antenna lowering process we have also taken stability certificate from certified structural engineer

  A load test has been conducted on the columns to assess their structural strength and capacity. During the load test, a predetermined amount of weight or load was applied to the columns, and their response was carefully monitored and analysed. The purpose of this load test is to verify that the columns can safely withstand the expected loads during the antenna lowering process without experiencing any significant deformations or failures. By performing this test, we can ensure that the columns are robust enough to support the antenna lowering operation with a sufficient safety margin.

- *Winch machine test:* The winch machine synchronization has been meticulously checked and calibrated to ensure smooth and coordinated operation during the antenna lowering process. All winches involved in the operation have been synchronized to work in unison, allowing for precise control and preventing any unbalanced forces that could jeopardize safety.

  Additionally, a comprehensive load test has been conducted on the wire rope to evaluate its strength and reliability. During the load test, the wire rope was subjected to a predetermined load that represents the expected forces during the antenna lowering process. The wire rope's performance, including its tensile strength and elongation under load, was closely monitored and evaluated. This load test ensures that the wire rope is in optimal condition and capable of safely handling the anticipated stresses during the operation. By completing these tests, we can confidently rely on the winch machine and wire rope to facilitate the smooth and secure lowering of the antenna.

- *Pulley block system:* The pulley block alignment has been meticulously verified to ensure smooth and efficient operation during the antenna lowering process. Proper alignment is critical to minimize friction and reduce wear on the pulley block, allowing for smooth movement of the wire rope.

  In addition to alignment, the pulley block has undergone a thorough welding process to ensure its structural integrity and reliability. Skilled welders have used appropriate welding techniques and high-quality materials to reinforce the pulley block's components, ensuring it can withstand the anticipated forces and stresses during the antenna lowering operation.

The combination of precise alignment and robust welding ensures that the pulley block will function seamlessly and safely, contributing to the overall success of the antenna lowering process. These measures provide confidence in the equipment's performance and contribute to a safer working environment for the team involved in the operation.

- *Wind monitoring:* It is an essential part of the preparatory steps before lowering the antenna. It involves continuously monitoring the wind speed and direction in the vicinity of the antenna and surrounding structures.

  To achieve accurate wind monitoring, an anemometer or wind monitoring system is typically installed at Jog shed which is near to C03 antenna structure. The anemometer measures wind speed, and in some cases, a wind vane may be used to determine wind direction.

  The data collected from the wind monitoring system provides crucial information about the prevailing wind conditions. It helps in assessing the potential risks associated with lowering the antenna during windy conditions. High winds can create additional stresses on the structure and the lowering equipment, potentially compromising the safety of the operation.

  Based on the wind monitoring data, the team involved in the antenna lowering process can make informed decisions about whether to proceed with the operation, delay it until safer conditions are present, or implement additional safety measures to mitigate the effects of the wind.

  By considering wind monitoring as part of the preparatory steps, the team can ensure the safety of personnel, equipment, and the antenna structure during the entire lowering process. This proactive approach helps minimize risks and enhances the overall efficiency and success of the antenna lowering operation

7. Replacement of QPD & CST

7.1. Dismantling of old structure and installation of new

After the antenna lowering process was completed successfully, we proceeded to create a fixture and reference table to securely rest the CST structure. This fixture and reference table will prove to be highly beneficial during the installation of the new CST structure, as it will ensure precise alignment and positioning.

With the fixture in place, we initiated the gas cutting procedure on the QPD structure at its base. This procedure was carried out meticulously and in adherence to safety protocols to remove the QPD structure effectively. After that we have lifted the QPD structure with the 100 Meter crane.

By employing the fixture and reference table, we can maintain the structural integrity of the CST and facilitate a smooth installation process. Additionally, the careful execution of the gas cutting procedure on the QPD structure ensures a safe and efficient dismantling process.

To enhance the strength and stability of the base where the QPDs are resting, a half sleeve was welded on the PRF. This welding procedure was carried out with precision and attention to detail to ensure a secure and robust connection.

7.2. Alignment of CST

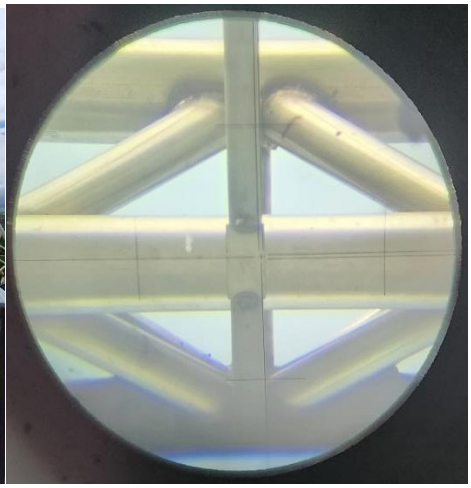
During the inspection of the old CST structure, we observed a deviation where the CST was shifted to one side, resulting in misalignment with the centre of the dish structure. Recognizing the importance of proper alignment for optimal performance, we promptly decided to address this issue.

To rectify the misalignment, corrective measures were undertaken to realign the CST with the centre of the dish structure. Skilled technicians and engineers collaborated to ensure precise adjustments and positioning.

A comprehensive report detailing the observation, corrective actions taken, and the realignment process was meticulously prepared. This report includes detailed documentation, photographs, and relevant data to provide a clear understanding of the situation and the steps taken to resolve it.

The report was then circulated to all concerned. Disseminating this information ensures that everyone involved is aware of the corrective actions and the impact on the overall project.

By making these necessary corrections and realigning the CST with the dish centre, we have taken proactive steps to optimize the antenna system's performance and guarantee the highest level of functionality and precision. The prompt action and transparent reporting demonstrate our commitment to maintaining the integrity and efficiency of the antenna infrastructure.



8. Erection of antenna

After the successful installation of the new QPD and CST structure, we are now prepared to lift the antenna. Having previously executed the antenna lowering process with success, we have the confidence and experience to proceed with this task once again. However, we acknowledge that wind conditions are a critical factor that needs to be continuously monitored to ensure the safety and stability of the lifting operation.

- To verify the alignment of the antenna after its erection, a meticulous alignment check was conducted using a theodolite. The alignment was assessed at four positions - 0 degrees (PRF1), 90 degrees (PRF13), 180 degrees (PRF09), and 270 degrees (PRF05)
  - to ensure that the dish is fitted level and accurately positioned in relation to the reference points. This alignment verification is essential to ensure precise pointing and accurate operation of the antenna during its usage. The dish collimation is within 4mm and AZ angle deviation in theodolite is observed in +2 mm

  With safety as our utmost priority, we will closely monitor the wind conditions during the entire lifting process. If wind speeds exceed safe operational limits, we will delay the lifting operation until wind conditions are favourable. By closely adhering to safety protocols and continuously monitoring wind levels, we will ensure the secure and efficient lifting of the antenna, maintaining the integrity of the structure and the safety of all personnel involved.

- After measuring the focal length of the antenna before replacement of QPD we found a deviation of 24 mm on the higher side compared to the theoretical value of focal length, we took corrective actions during the erection of the QPD and CST structures to rectify this issue.

  During the measurement process, precise instruments, such as theodolites was used to obtain accurate distance readings.

  Our commitment to precision alignment and safety measures ensures that the antenna is optimally positioned for its intended functions, guaranteeing reliable and accurate performance in its future operations.

- After completing the alignment of the dish, the next phase involved the fitting of the inner PRF and the mesh. This step is crucial in ensuring the structural integrity and precise positioning of the antenna.

  The inner PRF fitting process involved carefully securing the PRF components to the appropriate locations within the antenna system.

  Simultaneously, the mesh fitting process was initiated to install the antenna mesh surface. The mesh is a critical component of the antenna, as it shapes the parabolic surface necessary for proper signal reflection and transmission. The mesh fitting process requires meticulous attention to detail to ensure a uniform and tensioned mesh across the entire dish surface.

Once the mesh fitting was complete, the mesh alignment process followed. This step involved verifying that the mesh was accurately positioned and maintained its intended parabolic shape with the use of theodolite. Precise adjustments were made to ensure optimal alignment, allowing the dish to perform with maximum efficiency in signal reception and transmission.

During the entire process of inner PRF fitting and mesh installation, strict quality control measures were implemented to guarantee the accuracy and integrity of the antenna structure. The success of these fitting and alignment processes is essential to achieve optimal performance and reliability of the antenna in its operational environment.

- The next step in the erection process is to thoroughly check the servo drive system after the installation of the new QPD and CST components. This verification involves multiple assessments to ensure the smooth and efficient operation of the servo drive system.

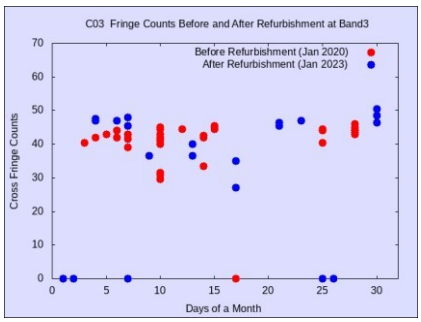
  Current Level Verification: We will meticulously verify the current level in the servo drive system to ensure it is within the specified operating range.

  Unbalance Condition Check: We will carefully inspect the servo drive system for any unbalance conditions that may have occurred during installation or adjustments. Unbalance in the system can lead to irregular forces or vibrations, potentially affecting the antenna's stability and performance. We successfully tested current and unbalance condition and found that all parameters are within the range.

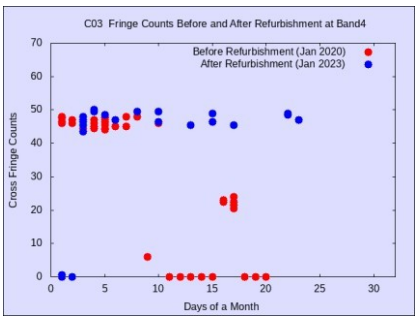
9. Astronomical test

After the successful testing of all drives and the completion of the Feeds installation, the antenna is now ready for astronomical observations. As part of this phase, a critical check known as the fringe count check is performed using well-known astronomical sources, such as 3C48, 3C147, and 3C286.

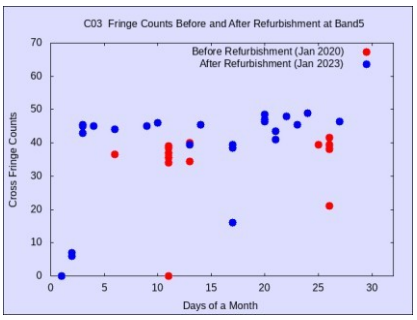
These astronomical sources, 3C48, 3C147, and 3C286, are considered standard calibrators in radio astronomy due to their well-defined and stable radio emission characteristics. They serve as reference points for the fringe count check and provide a reliable basis for assessing the accuracy of the antenna's interferometric observations.



Band 3 increased by3.14 %



Band 4 increased by4.7%

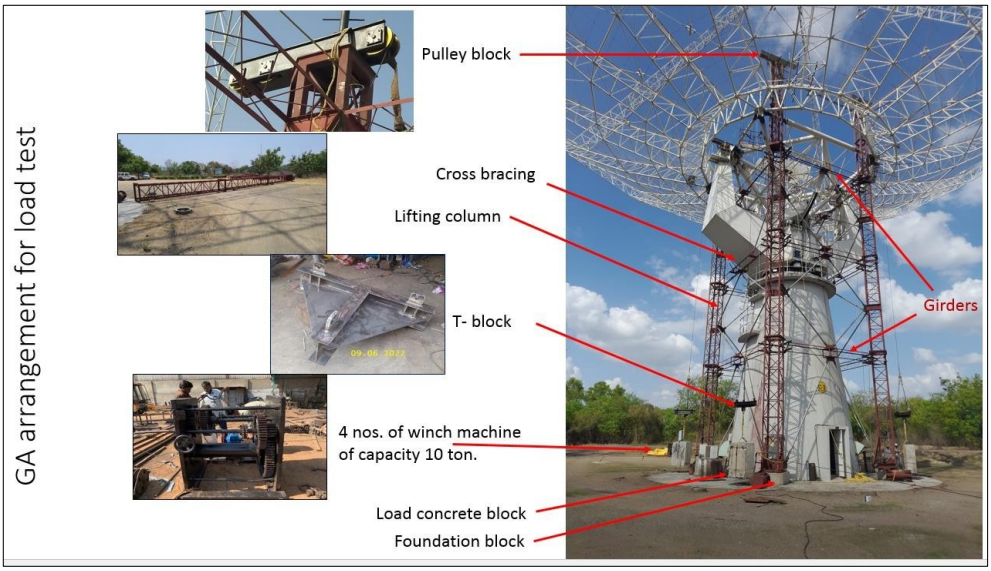


Band 5 increased by 19.5%

10. SUMMARY

Based on the successful implementation of various improvements, including lowering the antenna, replacing the QPD, CST structure, adjusting the feed on the center axis, and matching the focal point near to the theoretical value, it can be concluded that these enhancements have significantly increased the overall performance and lifespan of the antenna. The combined efforts have led to improved signal reception and optimized antenna functionality.

Photographs



Fabrication work- Pulley Block section

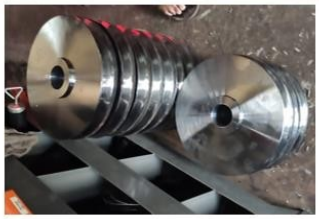
Pulley Block section fabrication

DP Test

UT Test

Pulley block assembly

There are 6 Pulley is each pulley block section



Lifting Hook & T- block Fabrication work

DP Test

UT Test

Erection of Lifting Column & Beam

Lifting column total height is 24 mtr. Mainly divided in to 5 parts3 parts of 6 mtr and two parts of 3 mtr. And it is made up in the angle and Square tube structure.

Erection Column alignment checking

Accuracy of column is maintained within 15 mm As per IS 12843 acceptance limit of the 25 mtr structure is 25 mm

Fabrication work related to C03 Antenna

Quadripod legs Fabrication

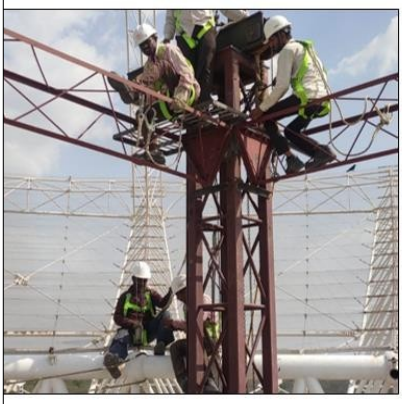
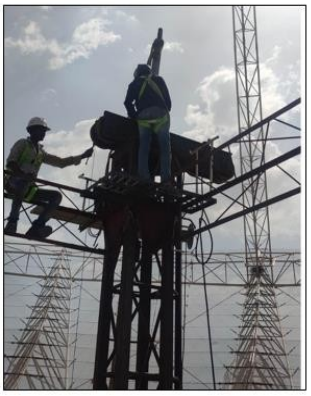
Fabrication Work related to C03 Antenna

Feed Turret in SS material

Testing of Thin section bearing

Winch Machine testing at Ahmedabad

Installation of Pulley Block section


Waving of wire rope

Wire rope length is approx. 250 mtr on each winch machine

Hook Pulley

Fabrication Work related to C03 Antenna

Feed Turret in SS material

Testing of Thin section bearing

Load testing of column assembly

C03 Antenna Speed calculation					
Winch	Input RPM	Output openig of rope mm/min	Frequncy Set at VFD	RPM measured on motor shaft	Actual output by calculation
Winch 01	1170	350.0	19.6	1074	321.3
Winch 02	1445	350.1	48	1453	352.1
Winch 03	1445	350.1	48	1453	352.1
Winch 04	591	350.2	36	585	346.7
Winch 01					
ut RPM	1170	rpm			
ar box reduction (1:50)	23.4	rpm	Gear box output		
um dia	219.5	mm		689.669	
ion (Driving)	22	15	15	16	
ar (Driven)	18	51	51	78	
	1 stage	2 nd stage	3rd stage	4th satge(on drum)	
duction Ratio	0.8181818182	3.4	3.4	4.875	
tPut RPM @ respective stage	28.60	8.41	2.47	0.51	
	Cable length open at 3rd stage output			350.0	mm/min
Winch 02					
ut RPM	1445	rpm			
ar box reduction (1:50)	28.9	rpm	Gear box output		
um dia	242	mm		760.364	
ion (Driving)	22	12	12	11	
ar (Driven)	18	45	45	60	
	1 stage	2 nd stage	3rd stage	4th satge(on drum)	
duction Ratio	0.8181818182	3.75	3.75	5.454545455	


16/06/2022 14:57


16/06/2022 16:48

Installation of Inner PRF

For more photos click on

Erection Photos - Google Drive

Inspection reports

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 13/05/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Weld joint checking for column to triangular girder at 6 meter level

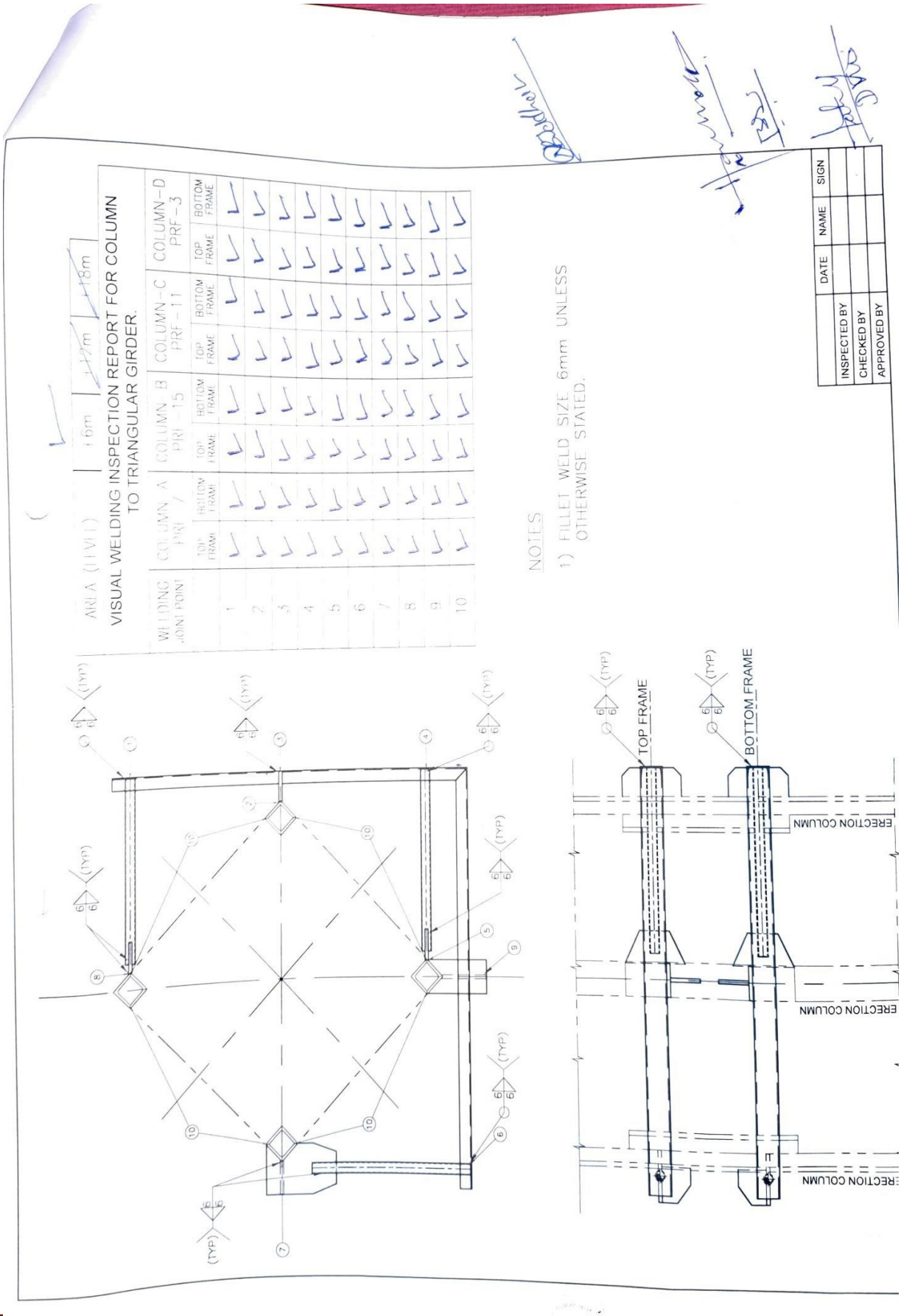
Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
01	Column to triangular girder weld joint at 6 meter level	08 junctions	Carried out visual inspection of all 8 junctions. Checked all points of all 8 junctions as per the attached sheet & found satisfactory in all respects. Released for further work

Thanking You,

for DVDalvi


VISUAL WELDING INSPECTION REPORT FOR COLUMN
TO TRIANGULAR GIRDER.
AREA (I/II/I)
6m
12m
18m
WELDING JOINT POINT
COLUMN A PRF - 7
COLUMN B PRF - 15
COLUMN-C PRF - 11
COLUMN-D PRF - 3
TOP FRAME
BOTTOM FRAME
NOTES
1) FILLET WELD SIZE 6mm UNLESS OTHERWISE STATED.
DATE
NAME
SIGN
INSPECTED BY
CHECKED BY
APPROVED BY
(TYP)
TOP FRAME
BOTTOM FRAME
ERECTION COLUMN

|| Jai Ganesh ||

Mobile: [illegible]

PANDHARINATH P. MULEY

Specialist: Handling of heavy equipments, Heavy machinery loading, Unloading, Erection, Boiler Erection and Transformer Shifting and Labour Services

Email: [illegible] Web: [illegible]

[illegible] Apts. Flat No. C-4, [illegible] Nagar, Alandi Road, [illegible] Pune-[illegible]

Date [illegible]/05/25

To,

The Project incharge

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. [illegible] dated [illegible]

Inspection call for: [illegible] checking for Column to Triangular frame at 12 meter level

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

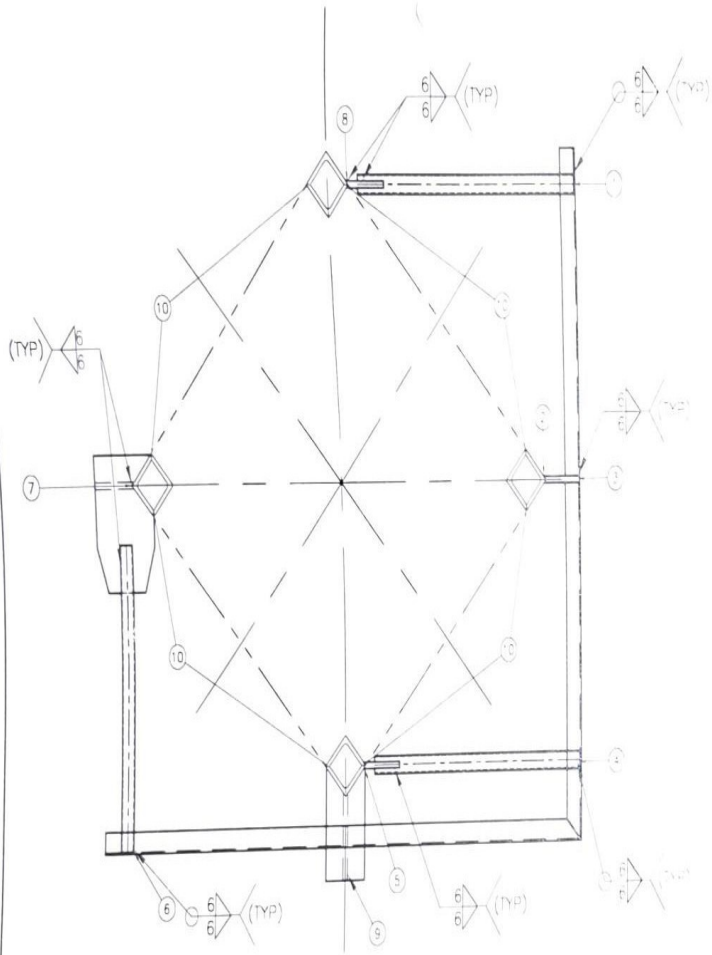
SR NO.	ITEM	QTY.	INSPECTION REMARKS
01	Column to Triangular girder weld joint at 12 meter level	[illegible]	Carried out visual checking of all 8 [illegible] [illegible] all [illegible] of all 8 [illegible] [illegible] the [illegible] found satisfactory [illegible] Released for [illegible]

Thanking You.

For M/S PANDHARINATH P. MULEY

Pandharinath P Muley

Proprietor



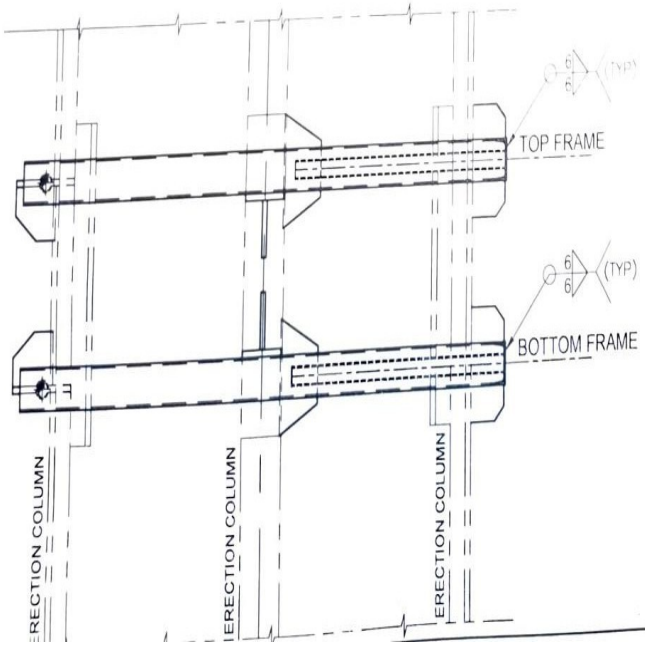
AREA (LEVEL)	+6m	+12m	+18m

VISUAL WELDING INSPECTION REPORT FOR COLUMN TO TRIANGULAR GIRDER.

WELDING JOINT POINT	COLUMN-A PRF-7		COLUMN-B PRF-15		COLUMN-C PRF-11		COLUMN-D PRF-3	
	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME
1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓	✓

NOTES

1) FILLET WELD SIZE 6mm UNLESS OTHERWISE STATED.



	DATE	NAME	SIGN
INSPECTED BY			
CHECKED BY			
APPROVED BY			

PPM

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 27/5/22.
12.30

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Weld Joint checking for column to triangular girder @ 18 mt. Ht.

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1	column to triangular Girder weld joints at 18 mt.	08 Junction	- carried out visual inspection for all Junctions.
			→ 1 Girder at 15° side. redesign of size 700 X 550 H Installed - lap joint ok.
			- Girder at 115° side. Lap Joint is clear.

Welding Rectification is given to P.P. Mule on column 'D'. Report attached.

Thanking You,

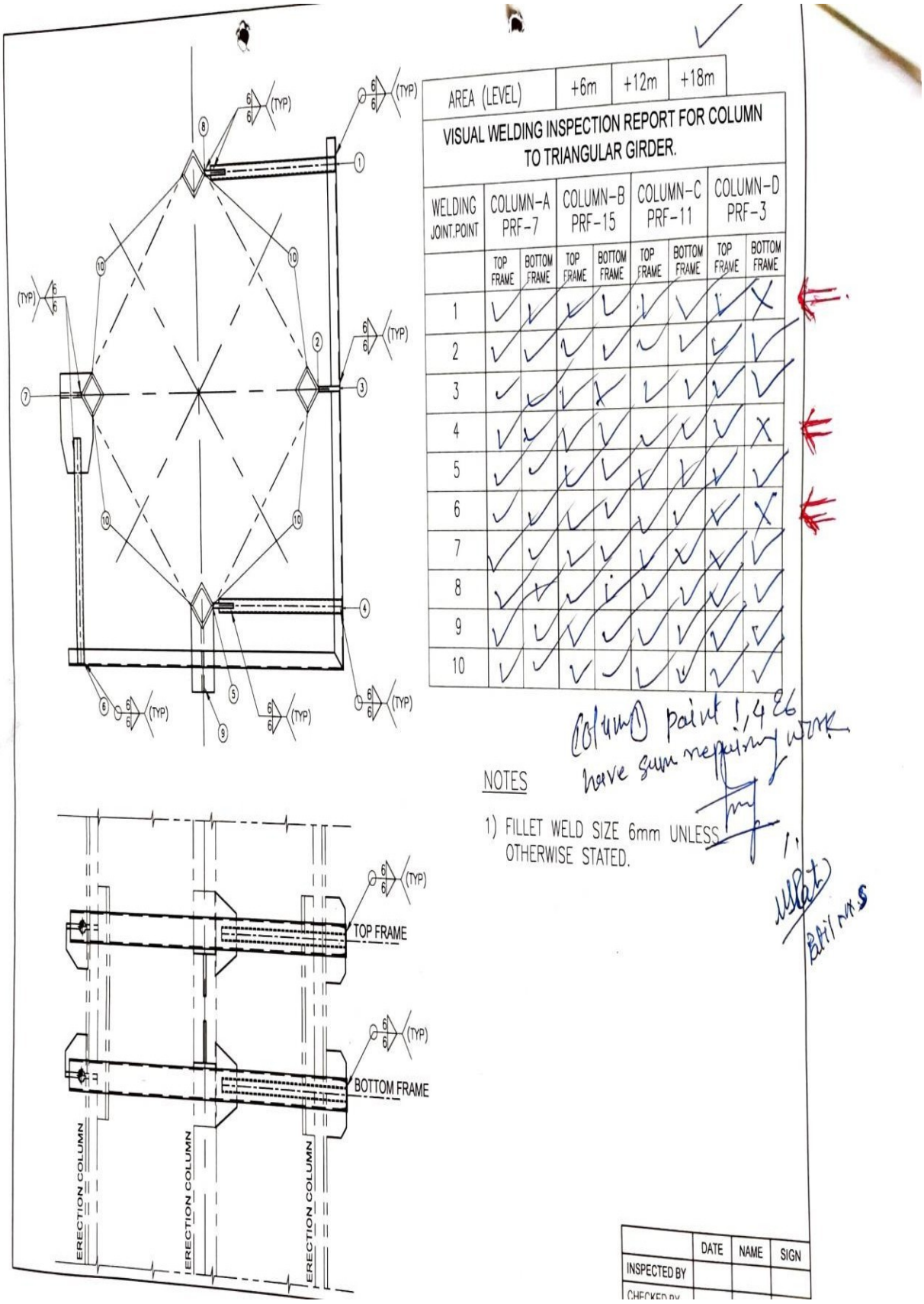
[signature]

धर्मेंद्र सी चौधरी

For M/s PANDHARINATH P. MULEY

Pandharinath P. Muley

Proprietor



AREA (LEVEL)	+6m	+12m	+18m

VISUAL WELDING INSPECTION REPORT FOR COLUMN TO TRIANGULAR GIRDER.

WELDING JOINT.POINT	COLUMN-A PRF-7		COLUMN-B PRF-15		COLUMN-C PRF-11		COLUMN-D PRF-3	
	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME
1	✓	✓	✓	✓	✓	✓	✓	X
2	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	X	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓	✓	X
5	✓	✓	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓	✓	X
7	✓	✓	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	✓	✓	✓	✓
9	✓	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	✓	✓	✓	✓

Column point 1, 4 & 6 have sum repairing work.

NOTES

1) FILLET WELD SIZE 6mm UNLESS OTHERWISE STATED.

	DATE	NAME	SIGN
INSPECTED BY			
CHECKED BY			

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 27/5/22.
2.30pm.

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Weld joint inspection for column to triangular girder @ 18 mtr Ht.

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

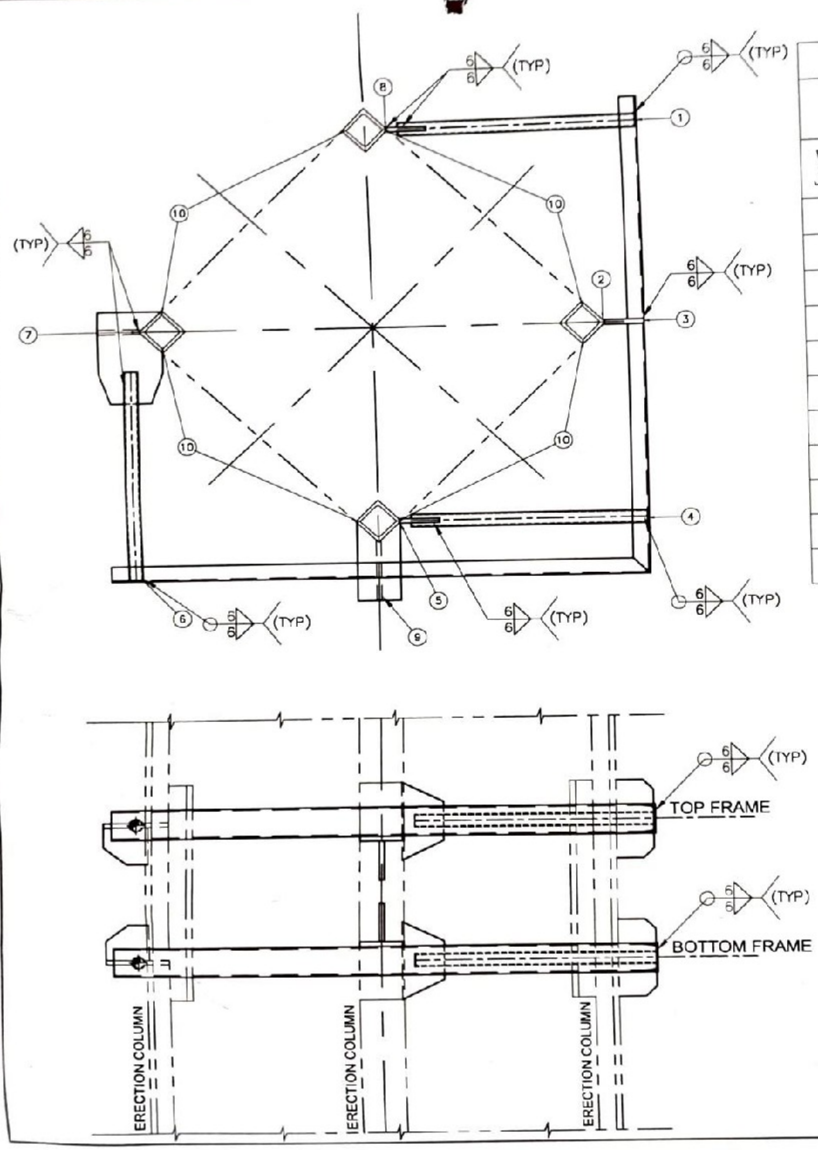
SR. NO.	ITEM	QTY.	INSPECTION REMARKS
01	Weld Joint inspection @18 mtr Joint column to Girder	01 column D	- After Rectification clear & found o/k. - Report attached.

Thanking You,

For M/s PANDHARINATH P. MULEY

Pandharinath P. Muley

Proprietor



AREA (LEVEL)		+6m		+12m		+18m		
VISUAL WELDING INSPECTION REPORT FOR COLUMN TO TRIANGULAR GIRDER.								
WELDING JOINT.POINT	COLUMN–A PRF–7		COLUMN–B PRF–15		COLUMN–C PRF–11		COLUMN–D PRF–3	
	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME	TOP FRAME	BOTTOM FRAME
1								✓
2								
3								
4								✓
5								
6								✓
7								
8								
9								
10								

Checked after rectification found ok [signature]

[signature] Patil

NOTES

1) FILLET WELD SIZE 6mm UNLESS OTHERWISE STATED.

	DATE	NAME	SIGN
INSPECTED BY			
CHECKED BY			
APPROVED BY			

C03 ANTENNA

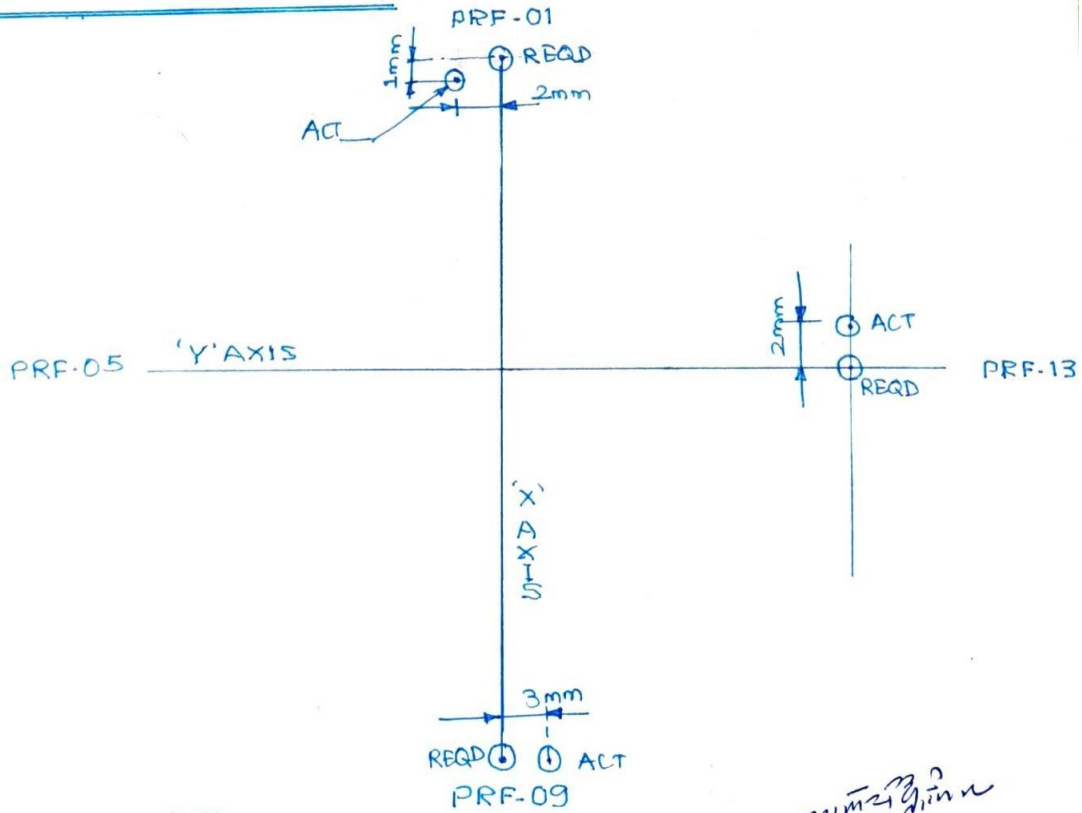
DATE:- 18/08/2022

DISH ALIGNMENT AT GROUND
(BEFORE DISH LIFTING & QPD ALIGNMENT)

DISH LEVELLING

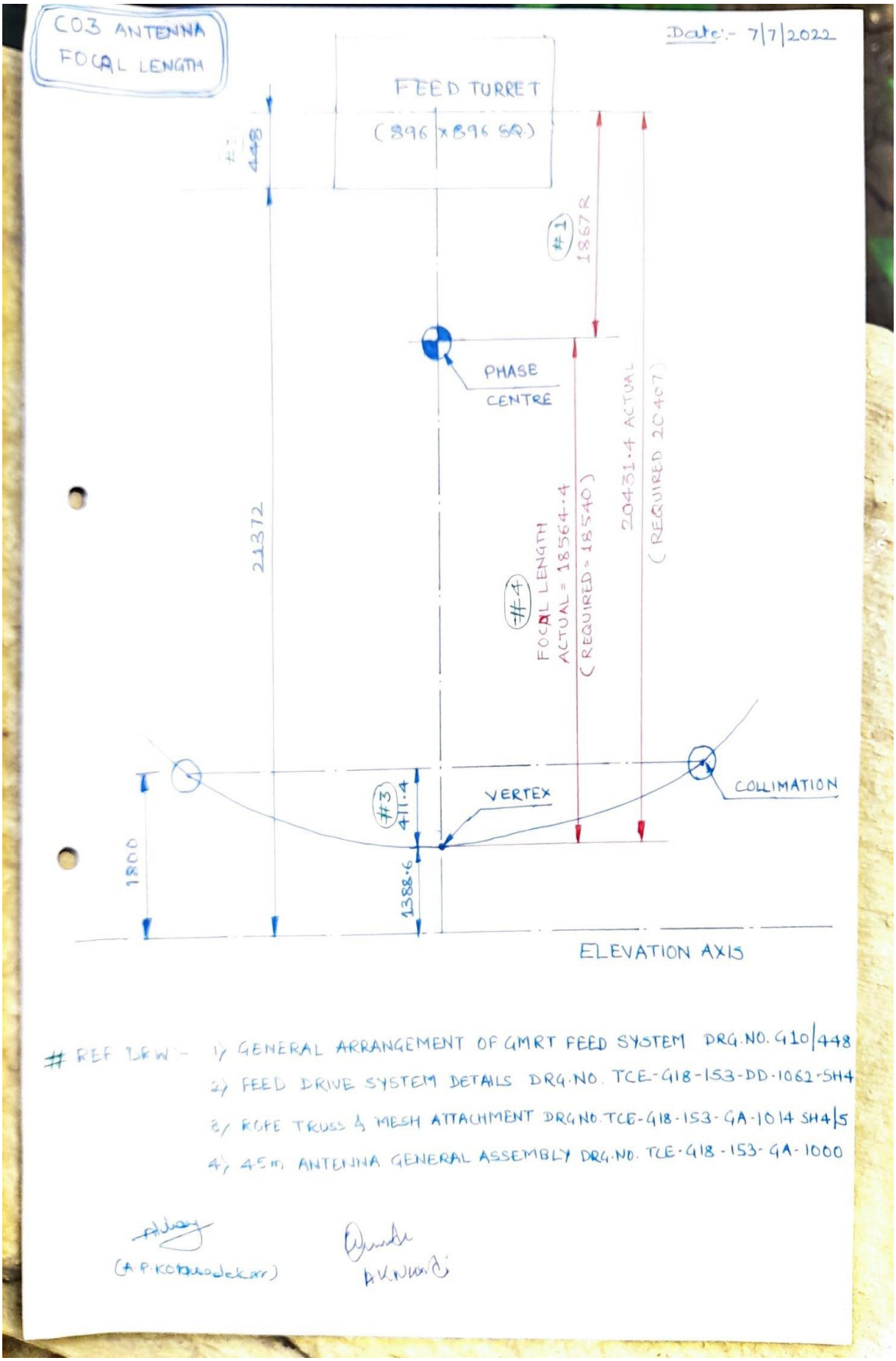
CRADLE CON. PT. NO.	READING	PLUS/MINUS
03	255 mm	0
07	256 mm	+1
11	255mm	0
15	255mm	0

DISH CENTERING (PLAN VIEW)



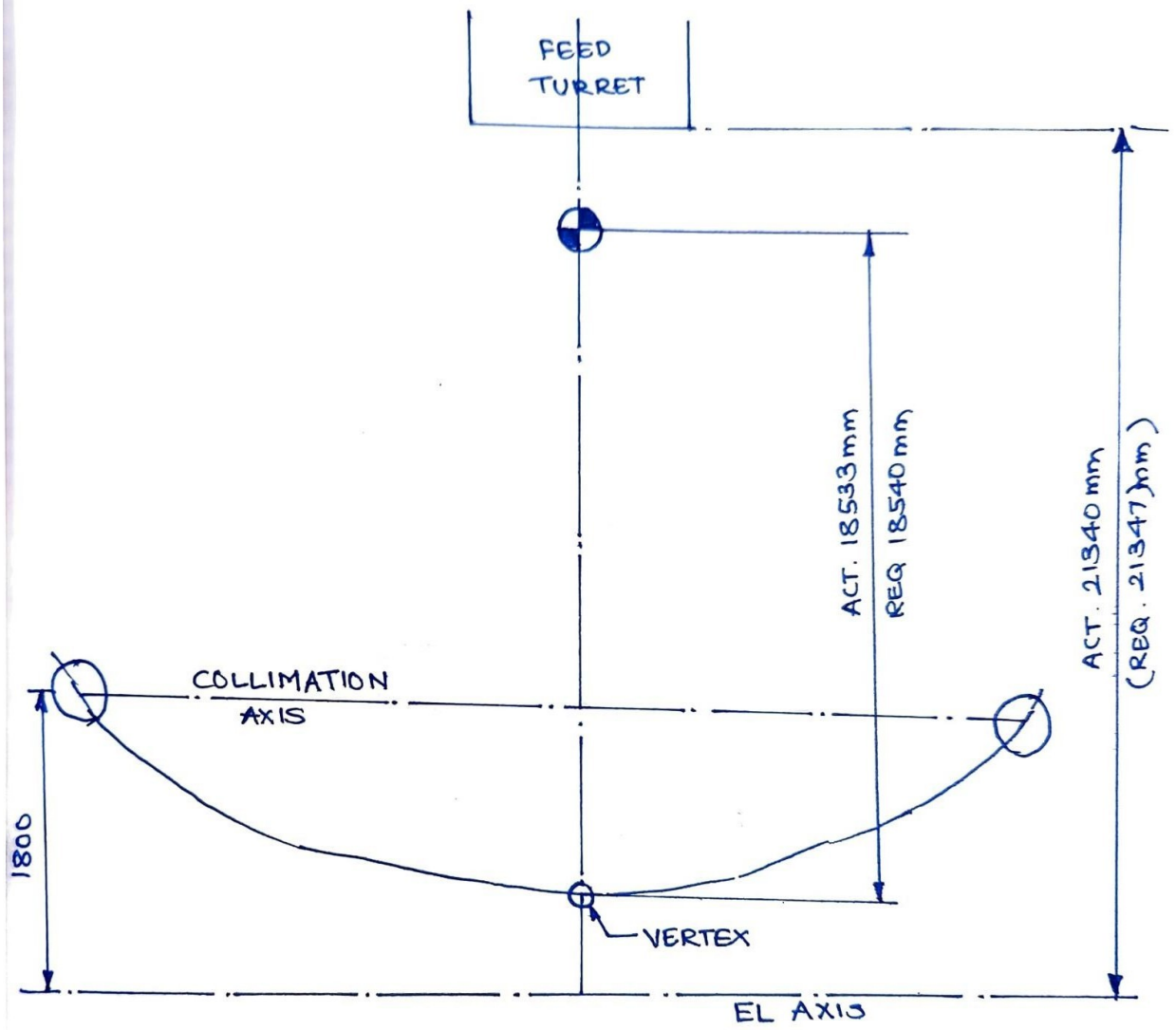
(A.P. Kotawadekar)

(ADITYA SURVEY)


C03 ANTENNA
FOCAL LENGTH
Date:- 7/7/2022
FEED TURRET
(896 x 896 SQ.)
#2
448
#1
1867R
PHASE
CENTRE
21372
#4
FOCAL LENGTH
ACTUAL = 18564.4
(REQUIRED = 18540)
20431.4 ACTUAL
(REQUIRED 20407)
#3
411.4
VERTEX
COLLIMATION
1800
1388.6
ELEVATION AXIS
REF DRW:- 1) GENERAL ARRANGEMENT OF GMRT FEED SYSTEM DRG.NO. G10/448
2) FEED DRIVE SYSTEM DETAILS DRG.NO. TCE-G18-153-DD-1062-SH4
3) RCFE TRUSS & MESH ATTACHMENT DRG NO. TCE-G18-153-GA-1014 SH4/5
4) 45m ANTENNA GENERAL ASSEMBLY DRG.NO. TCE-G18-153-GA-1000

C03 ANTENNA FOCAL LENGTH - AFTER QPD ERECTION

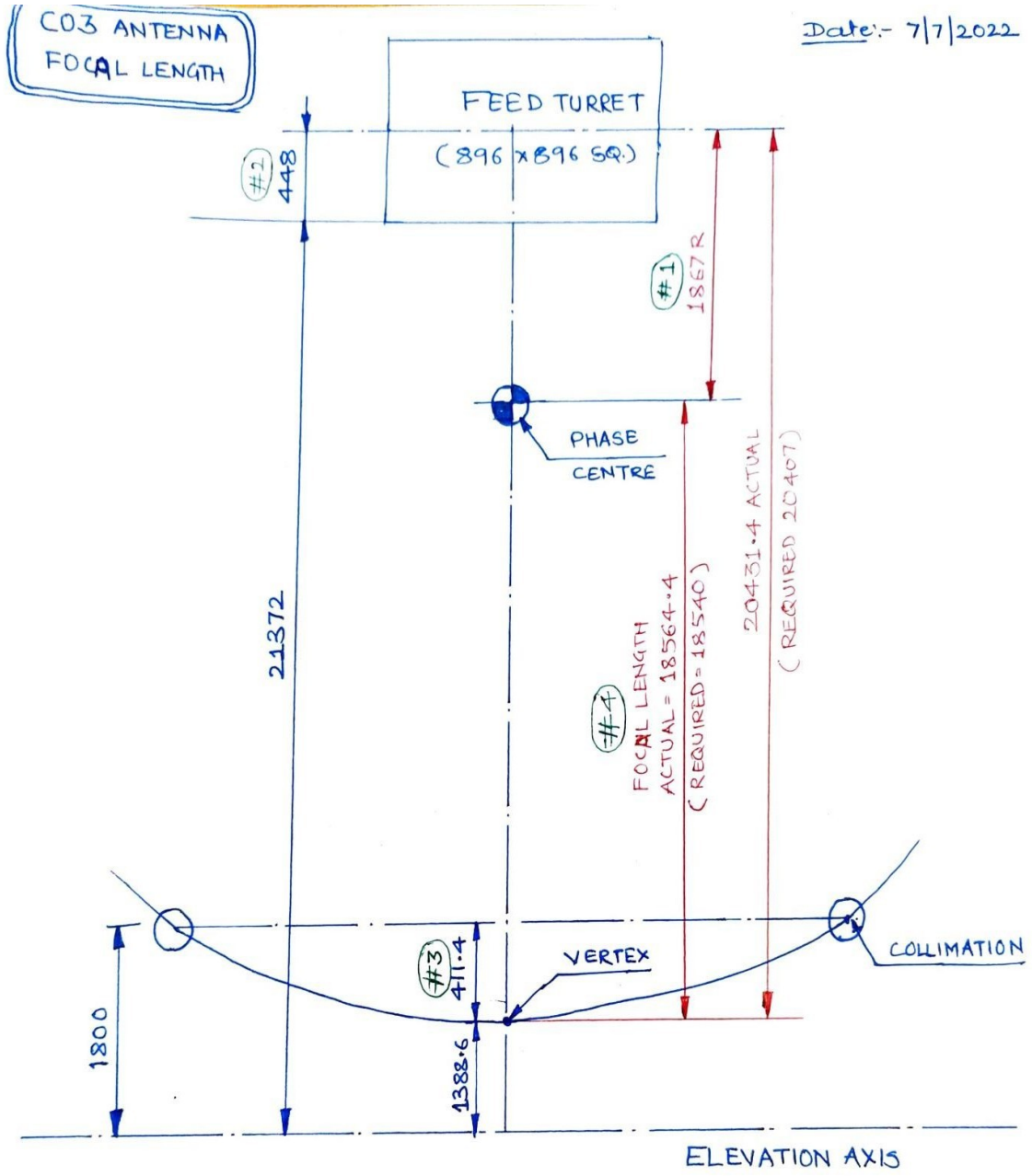
Date:- 01/09/2022



(A.P.Kotawadekar)

K.R.Gaikwad

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

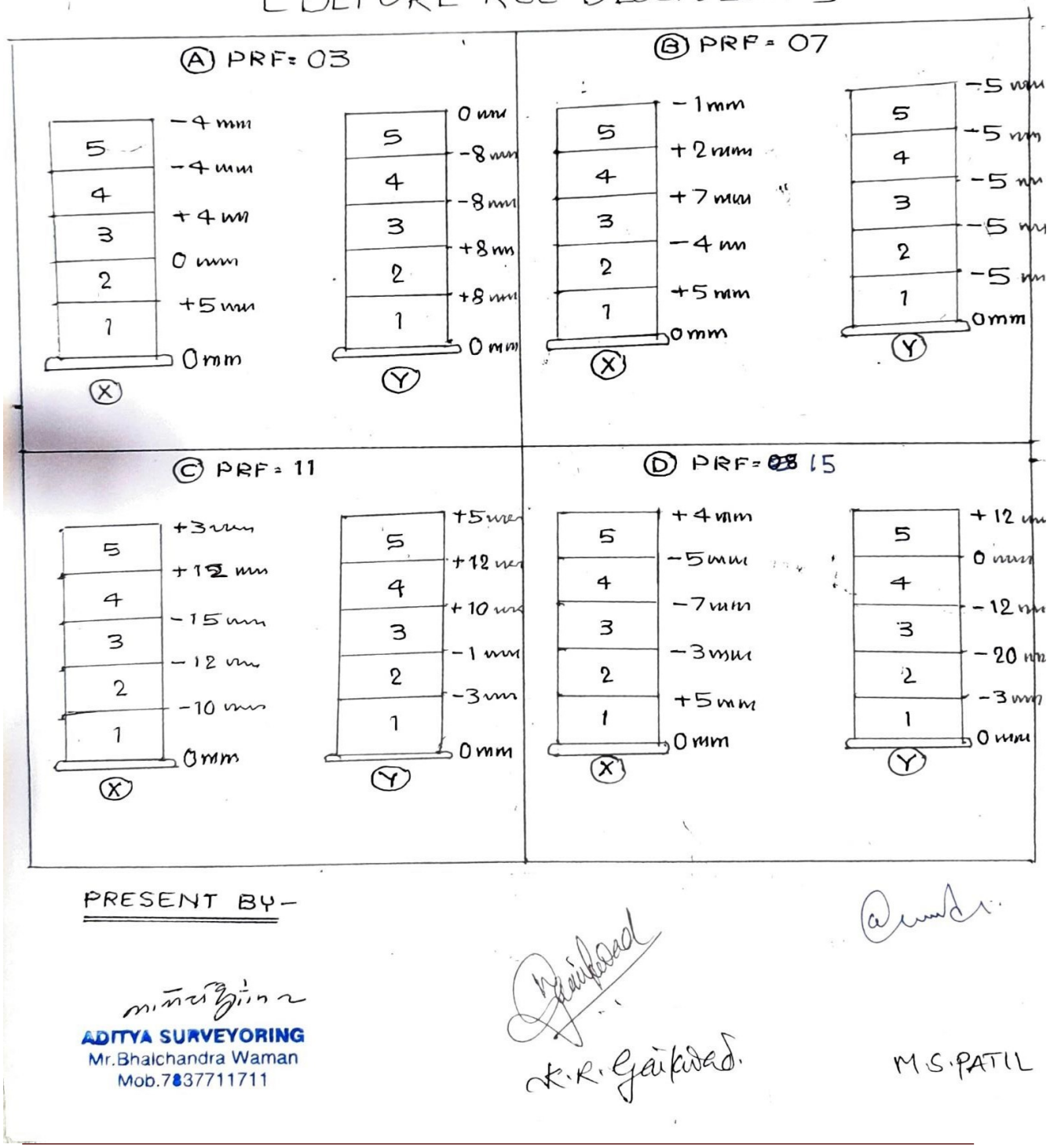


REF. DRW:-
1) GENERAL ARRANGEMENT OF GMRT FEED SYSTEM DRG.NO. G10/448
2) FEED DRIVE SYSTEM DETAILS DRG.NO. TCE-G18-153-DD-1062-SH4
3) ROPE TRUSS & MESH ATTACHMENT DRG NO. TCE-G18-153-GA-1014 SH4/5
4) 45m ANTENNA GENERAL ASSEMBLY DRG.NO. TCE-G18-153-GA-1000

DATE- 08 JUNE 22

COLUMN VERT. POSITION - C-03

[BEFORE RCC BLOCK LOAD]



PRESENT BY-

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

K.R. Gaikwad.

M.S. PATIL

C03 Inspection Report

Date Of Inspection: 7/5/2022

Inspected By: Waman , MSP

Inspection Detail: Measurement of Column Verticality

Sl	Area / Part	Description of Inspection	Required Value	Obseration
	* Measurement after rectification *			
				Obsevation.
			Level (From Foundation Top)	Verticality X Face / Y Face
		24m	1) 0	+0mm / 0mm
		18m	2) 6	+8 / +10
		12m	3) 12	+2 / +8
			4) 18	+10 / -10
		6m	5) 24	0 / 0
			6) 24	+1 / -2

X Face
Block-D
PRF-03
X Face

Y Face.
Block-D
PRF-03
Y Face.

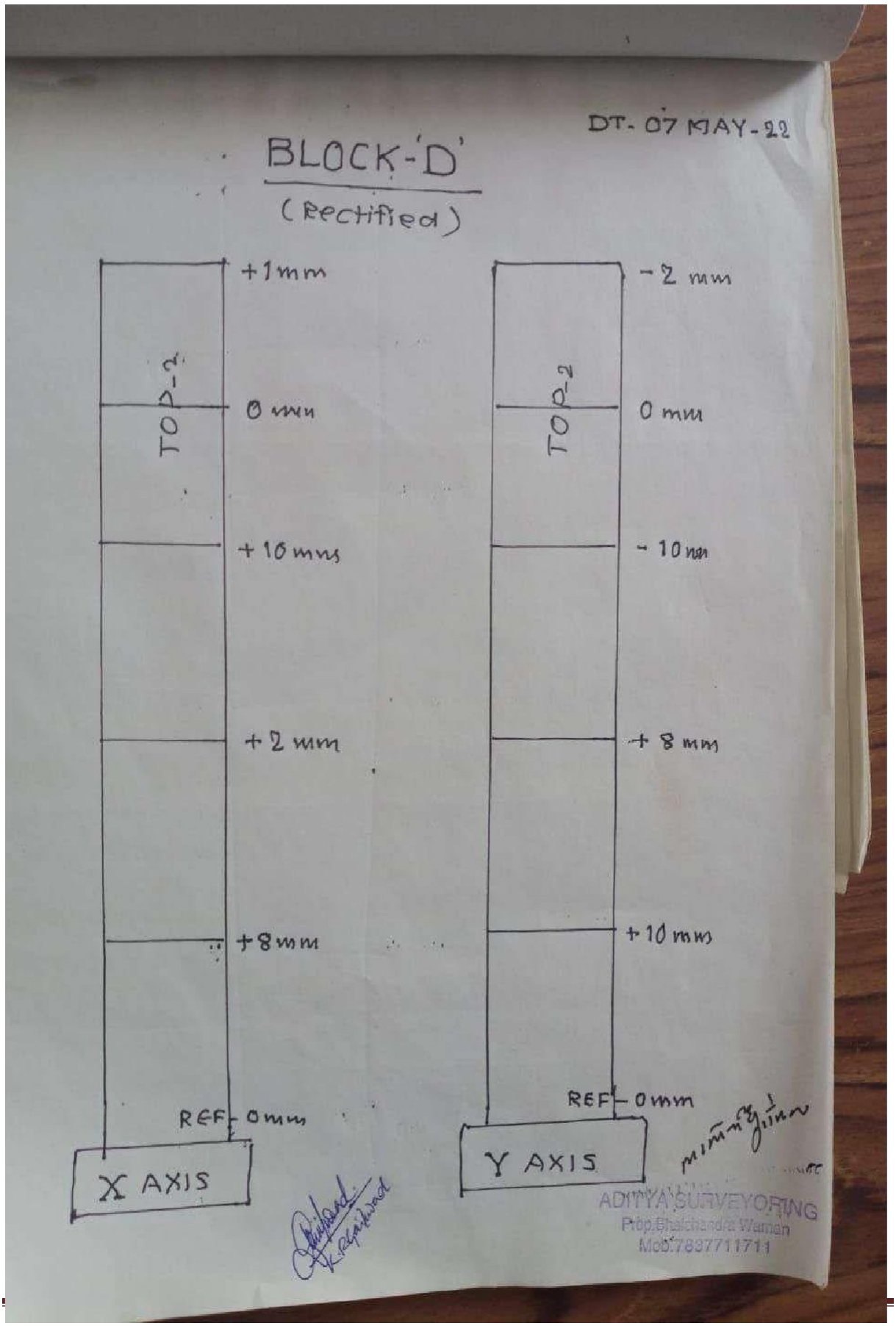
Note 18128 43 Acceptable limit for verticality = $\frac{H}{1000}$ or ±25 mm

Remarks: Within acceptable limit.

Inspected By
Sign

ADITYA SURVEYORING

Approved
Sign
10/5/2022

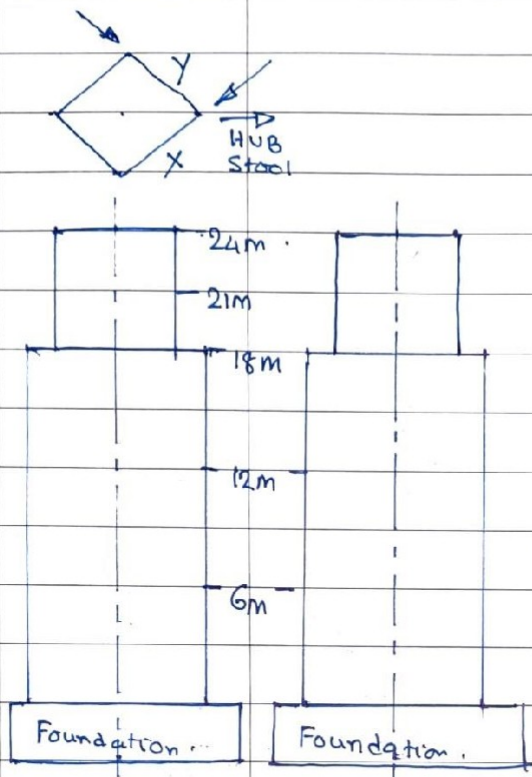

DT. 07 MAY-22
BLOCK-'D'
(Rectified)
+1mm
TOP-2
0 mm
+10 mms
+2 mm
+8mm
REF-0mm
X AXIS
-2 mm
TOP-2
0 mm
-10 mm
+8 mm
+10 mms
REF-0mm
Y AXIS
ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7887711711

C03 Inspection Report

Inspected By:

Date Of Inspection: 8/06/2022

Inspection Detail: Measurement of Column Verticality (After fixing triangular girder, bracing & welding before load test)

Sl	Area / Part	Description of Inspection	Required Value	Observation
			Reading No ① → At 0m from Foundation block ② → +6m ③ → +12m ④ → +18m ⑤ → +21m ⑥ → +24m	For PRF No wise deviation/Column Verticality Please see attached Sheet.

1) Measurements taken at final stage after erection & welding of all triangular girders, inclined bracings. and befor load testing.

2) Acceptable limit ±25mm. (IS 12843)

3) Results given in attached sheet & found satisfactory.

Remarks:

Inspected By

Sign

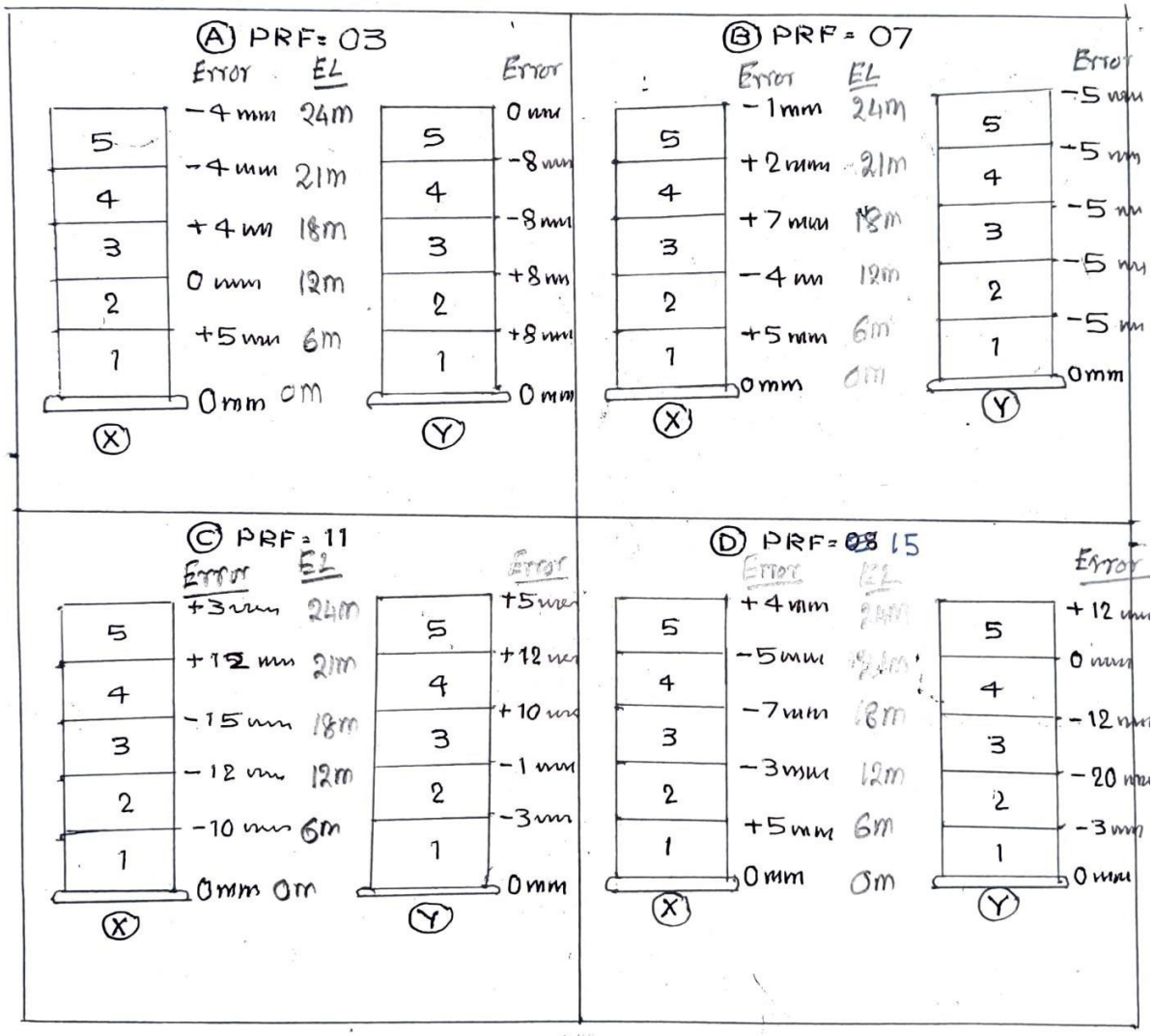
Approved

Sign

DATE- 08 JUNE 22

COLUMN VERT. POSITION - C-03

[BEFORE RCC BLOCK LOAD]

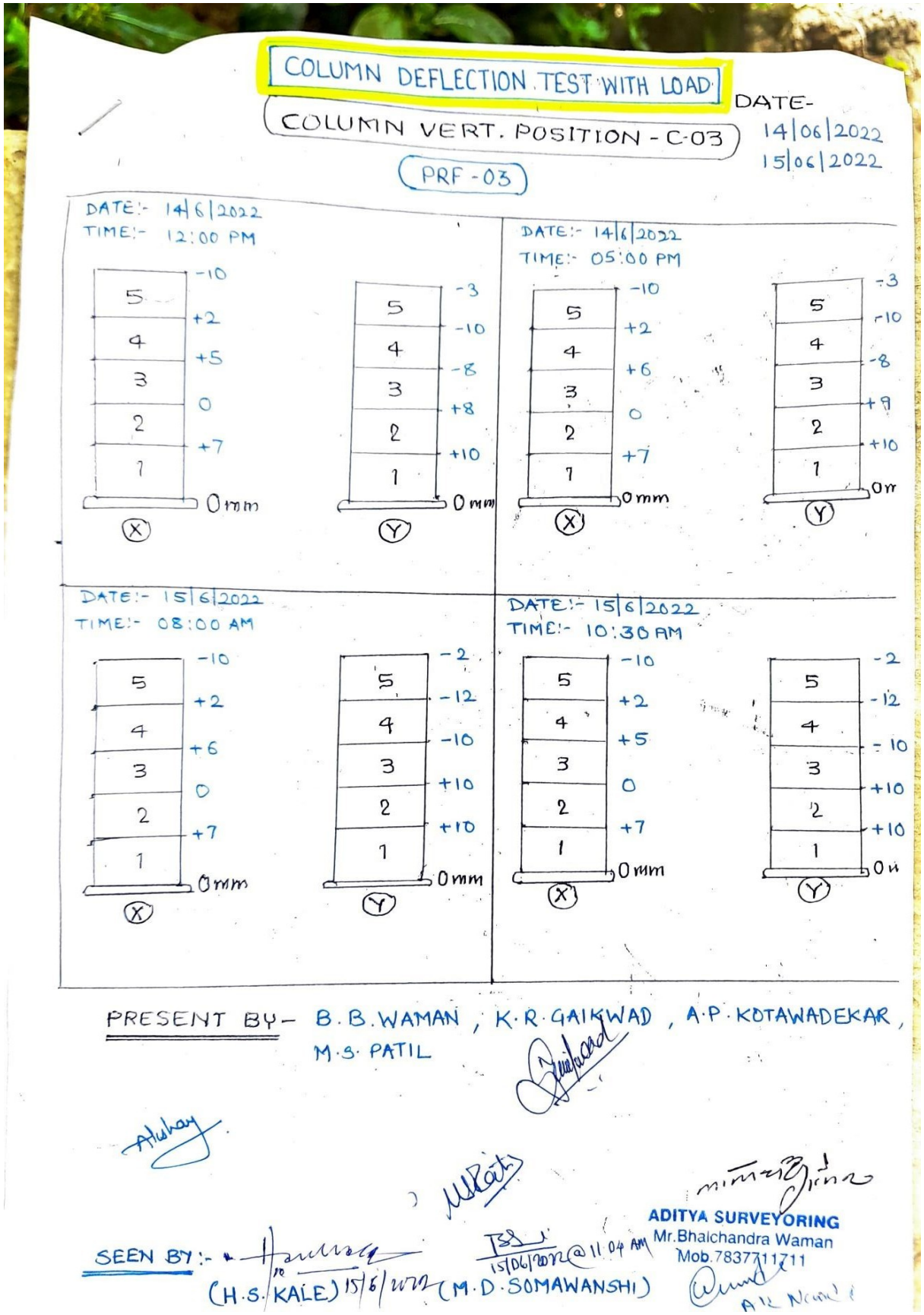


PRESENT BY-

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

K.R. Gaikwad.

M.S.PATIL



COLUMN DEFLECTION TEST WITH LOAD

COLUMN VERT. POSITION - C-03

PRF - 03

DATE- 14/06/2022
15/06/2022

DATE:- 14/6/2022
TIME:- 12:00 PM

	X	Y
5	-10	-3
4	+2	-10
3	+5	-8
2	0	+8
1	+7	+10
	0 mm	0 mm

DATE:- 14/6/2022
TIME:- 05:00 PM

	X	Y
5	-10	-3
4	+2	-10
3	+6	-8
2	0	+9
1	+7	+10
	0 mm	0m

DATE:- 15/6/2022
TIME:- 08:00 AM

	X	Y
5	-10	-2
4	+2	-12
3	+6	-10
2	0	+10
1	+7	+10
	0 mm	0 mm

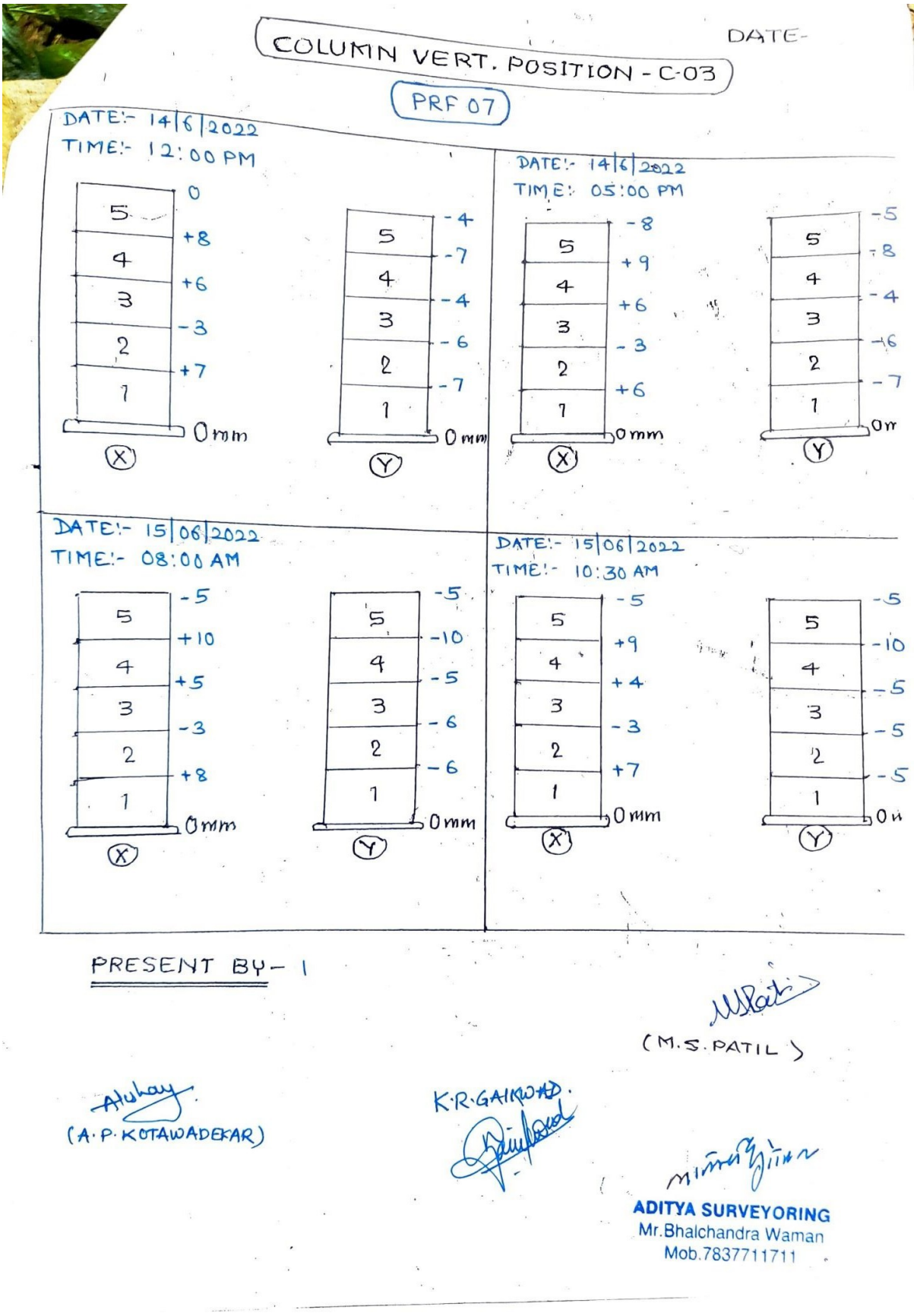
DATE:- 15/6/2022
TIME:- 10:30 AM

	X	Y
5	-10	-2
4	+2	-12
3	+5	-10
2	0	+10
1	+7	+10
	0 mm	0 m

PRESENT BY- B.B.WAMAN , K.R.GAIKWAD , A.P.KOTAWADEKAR , M.S. PATIL

SEEN BY :- (H.S. KALE) 15/6/2022 (M.D. SOMAWANSHI) 15/06/2022 @ 11.04 AM

ADITYA SURVEYORING
Mr.Bhaichandra Waman
Mob.7837711711

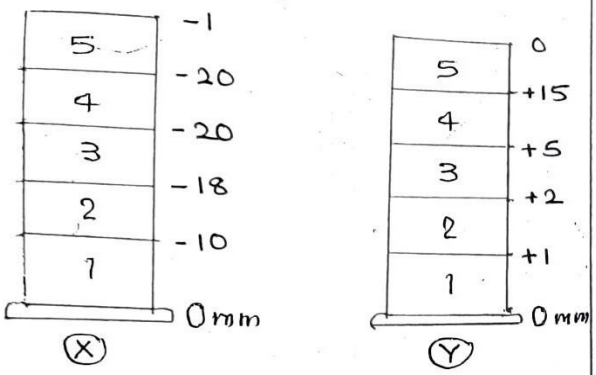

COLUMN VERT. POSITION - C-03
DATE-
PRF 07
DATE:- 14/6/2022
TIME:- 12:00 PM
5 4 3 2 1
0 +8 +6 -3 +7
0mm
X
5 4 3 2 1
-4 -7 -4 -6 -7
0mm
Y
DATE:- 14/6/2022
TIME:- 05:00 PM
5 4 3 2 1
-8 +9 +6 -3 +6
0mm
X
5 4 3 2 1
-5 -8 -4 -6 -7
0m
Y
DATE:- 15/06/2022
TIME:- 08:00 AM
5 4 3 2 1
-5 +10 +5 -3 +8
0mm
X
5 4 3 2 1
-5 -10 -5 -6 -6
0mm
Y
DATE:- 15/06/2022
TIME:- 10:30 AM
5 4 3 2 1
-5 +9 +4 -3 +7
0mm
X
5 4 3 2 1
-5 -10 -5 -5 -5
0m
Y
PRESENT BY- 1
(M.S.PATIL)
(A.P.KOTAWADEKAR)
K.R.GAIKWAD.
ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

DATE-

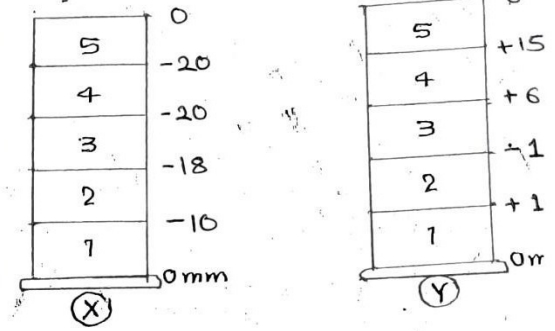
COLUMN VERT. POSITION - C-03

PRF-11

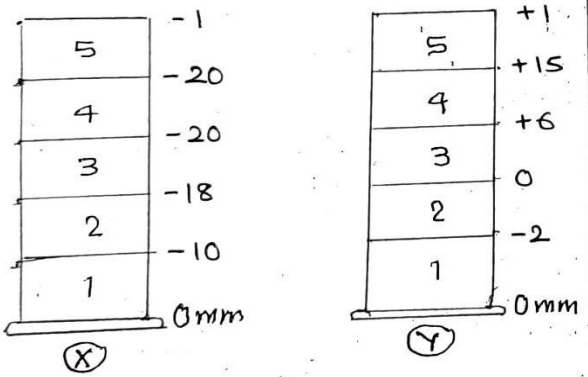
DATE:- 14|06|2022
TIME:- 12:00 PM



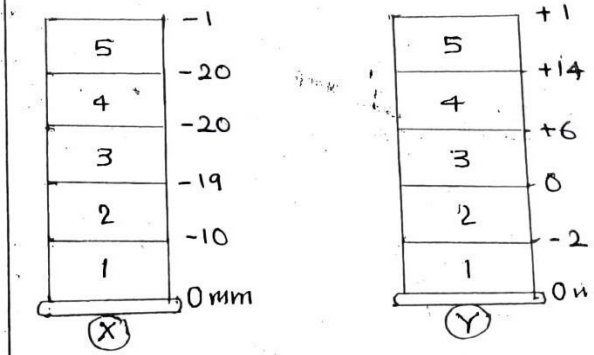
DATE:- 14|6|2022
TIME:- 05:00 PM



DATE:- 15|06|2022
TIME:- 08:00AM



DATE:- 15|06|2022
TIME:- 10:30 AM



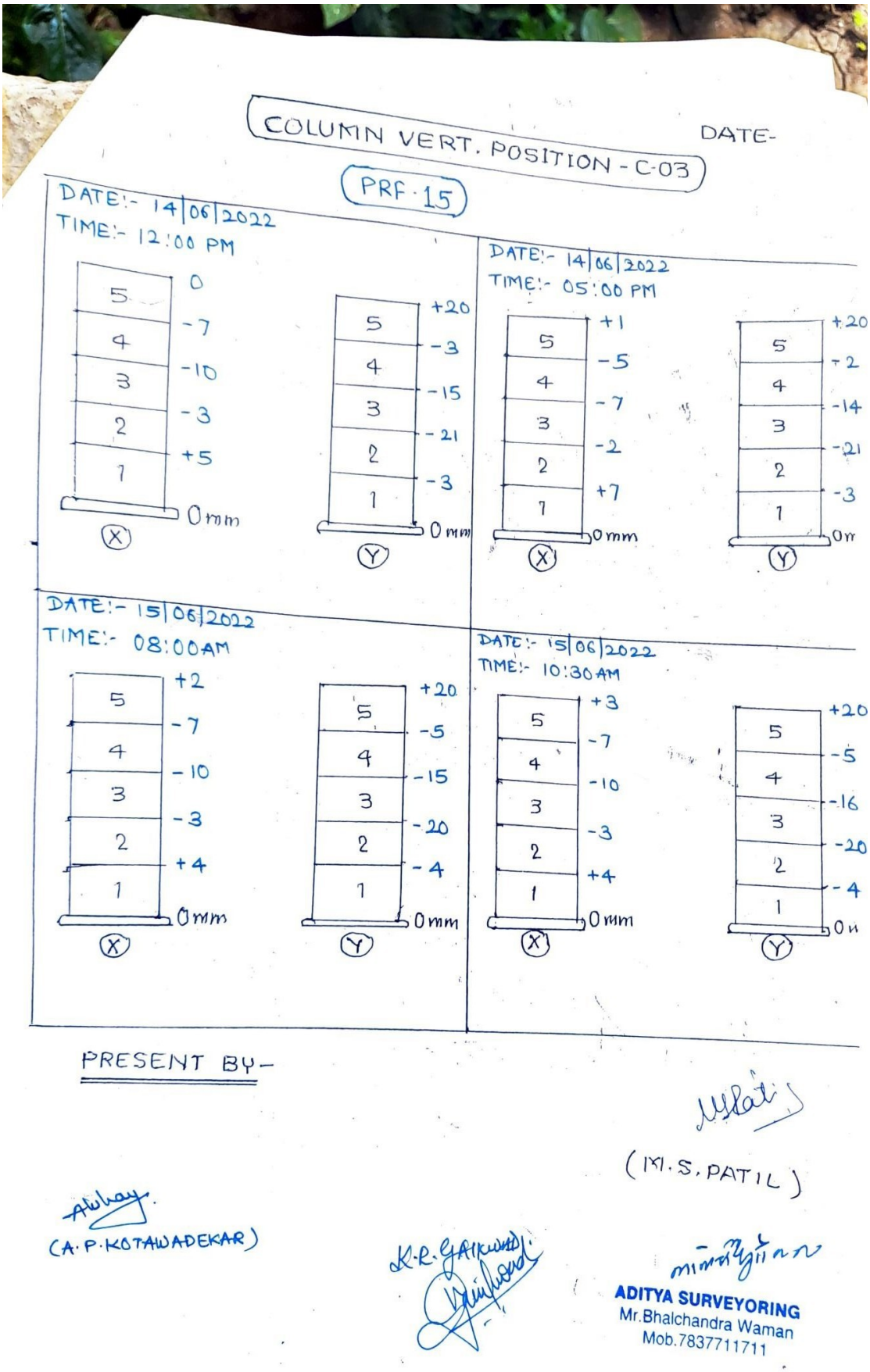
PRESENT BY-

(M. S. PATIL)

(A. P. KOTAWADEKAR)

K. R. GAIKWAD

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711



COLUMN VERT. POSITION - C-03

DATE-

PRF 15

DATE:- 14/06/2022
TIME:- 12:00 PM

5	0	+20
4	-7	-3
3	-10	-15
2	-3	-21
1	+5	-3
	0mm	0mm
	(X)	(Y)

DATE:- 14/06/2022
TIME:- 05:00 PM

5	+1	+20
4	-5	+2
3	-7	-14
2	-2	-21
1	+7	-3
	0mm	0m
	(X)	(Y)

DATE:- 15/06/2022
TIME:- 08:00AM

5	+2	+20
4	-7	-5
3	-10	-15
2	-3	-20
1	+4	-4
	0mm	0mm
	(X)	(Y)

DATE:- 15/06/2022
TIME:- 10:30AM

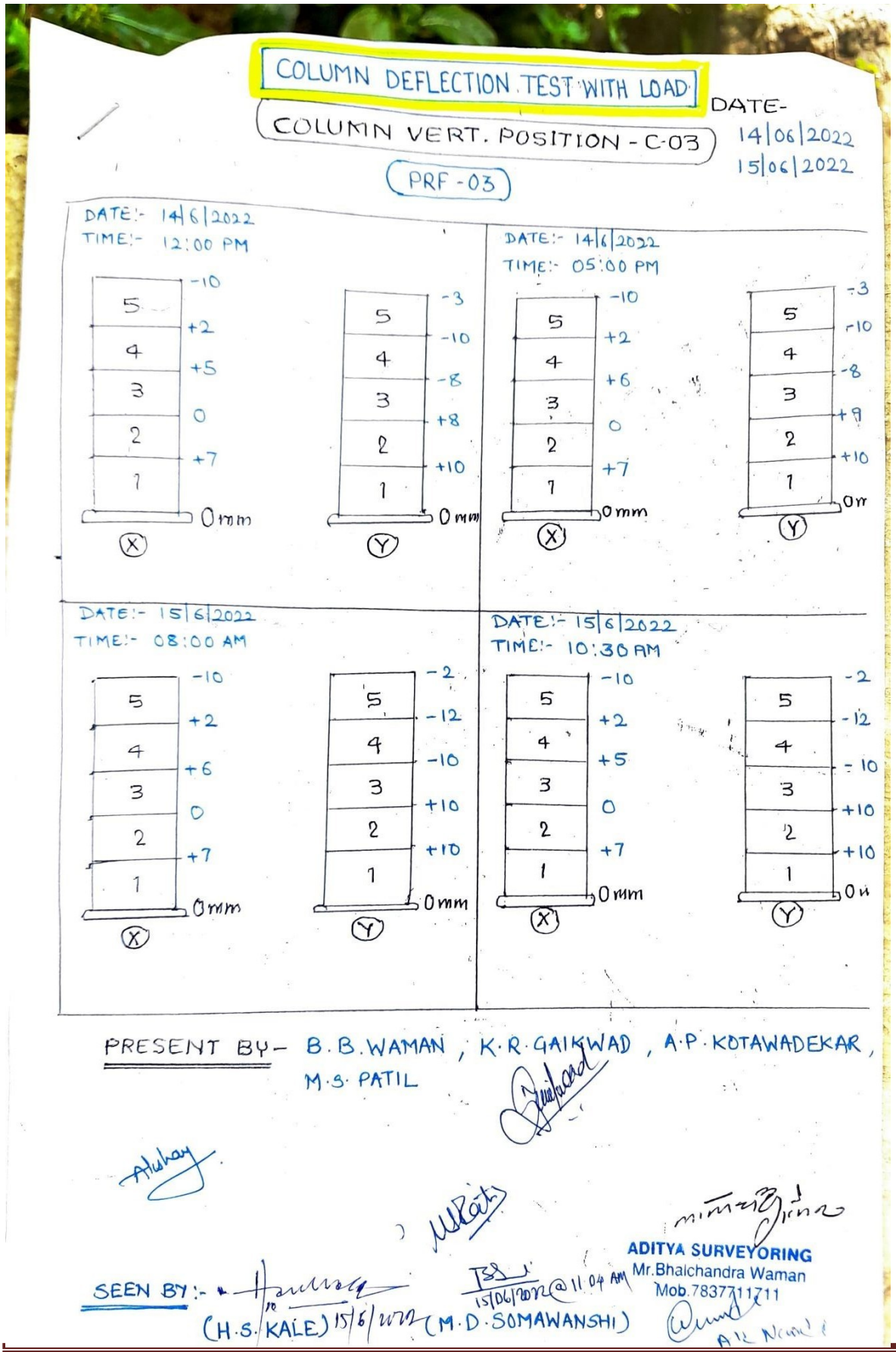
5	+3	+20
4	-7	-5
3	-10	-16
2	-3	-20
1	+4	-4
	0mm	0m
	(X)	(Y)

PRESENT BY-

(M.S. PATIL)

(A.P. KOTAWADEKAR)

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711



COLUMN DEFLECTION TEST WITH LOAD

DATE- 14/06/2022
15/06/2022

COLUMN VERT. POSITION - C-03

PRF - 03

DATE:- 14/6/2022
TIME:- 12:00 PM

	X	Y
5	-10	-3
4	+2	-10
3	+5	-8
2	0	+8
1	+7	+10
	0mm	0mm

DATE:- 14/6/2022
TIME:- 05:00 PM

	X	Y
5	-10	-3
4	+2	-10
3	+6	-8
2	0	+9
1	+7	+10
	0mm	0m

DATE:- 15/6/2022
TIME:- 08:00 AM

	X	Y
5	-10	-2
4	+2	-12
3	+6	-10
2	0	+10
1	+7	+10
	0mm	0mm

DATE:- 15/6/2022
TIME:- 10:30 AM

	X	Y
5	-10	-2
4	+2	-12
3	+5	-10
2	0	+10
1	+7	+10
	0mm	0m

PRESENT BY- B.B.WAMAN , K.R.GAIKWAD , A.P.KOTAWADEKAR , M.S. PATIL

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

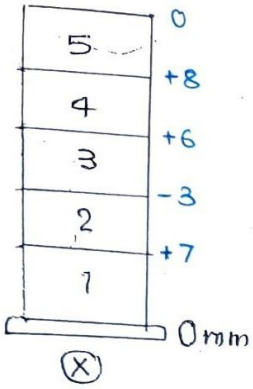
SEEN BY :- (H.S. KALE) 15/6/2022 (M.D. SOMAWANSHI) 15/06/2022 @ 11.04 AM

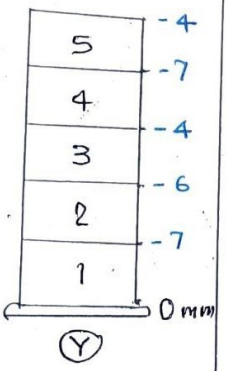
DATE-

COLUMN VERT. POSITION - C-03

PRF 07

DATE:- 14/6/2022
TIME:- 12:00 PM





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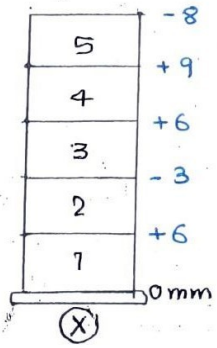
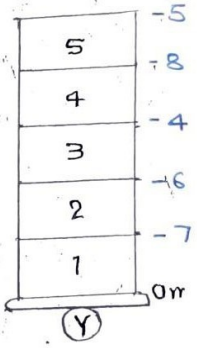
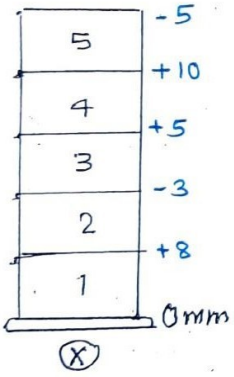
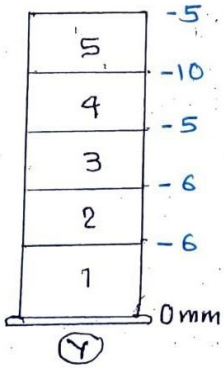
TIME:- 05:00 PM



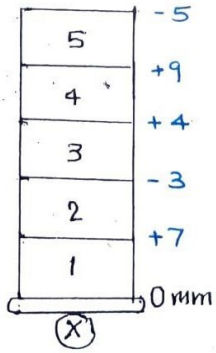


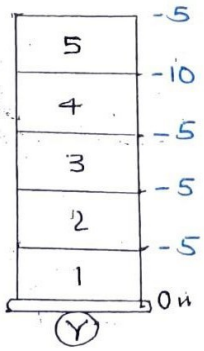
DATE:- 15/06/2022
TIME:- 08:00 AM





DATE:- 15/06/2022
TIME:- 10:30 AM





PRESENT BY- 1

(M.S. PATIL)

(A.P. KOTAWADEKAR)

K.R. GAIKWAD.

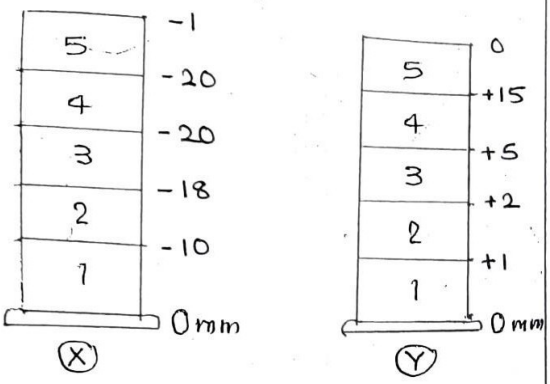
ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

DATE-

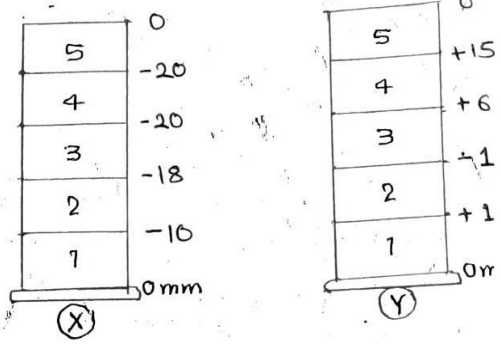
COLUMN VERT. POSITION - C-03

PRF - 11

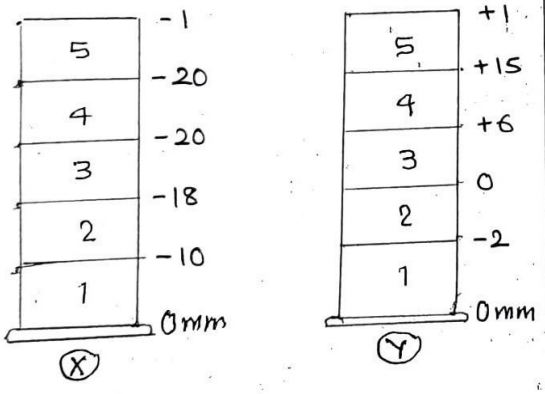
DATE:- 14|06|2022
TIME:- 12:00 PM



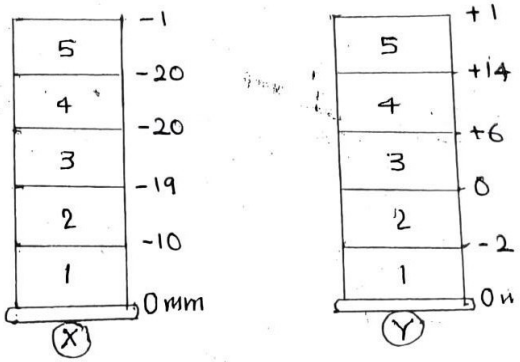
DATE:- 14|6|2022
TIME:- 05:00 PM



DATE:- 15|06|2022
TIME:- 08:00AM



DATE:- 15|06|2022
TIME:- 10:30 AM



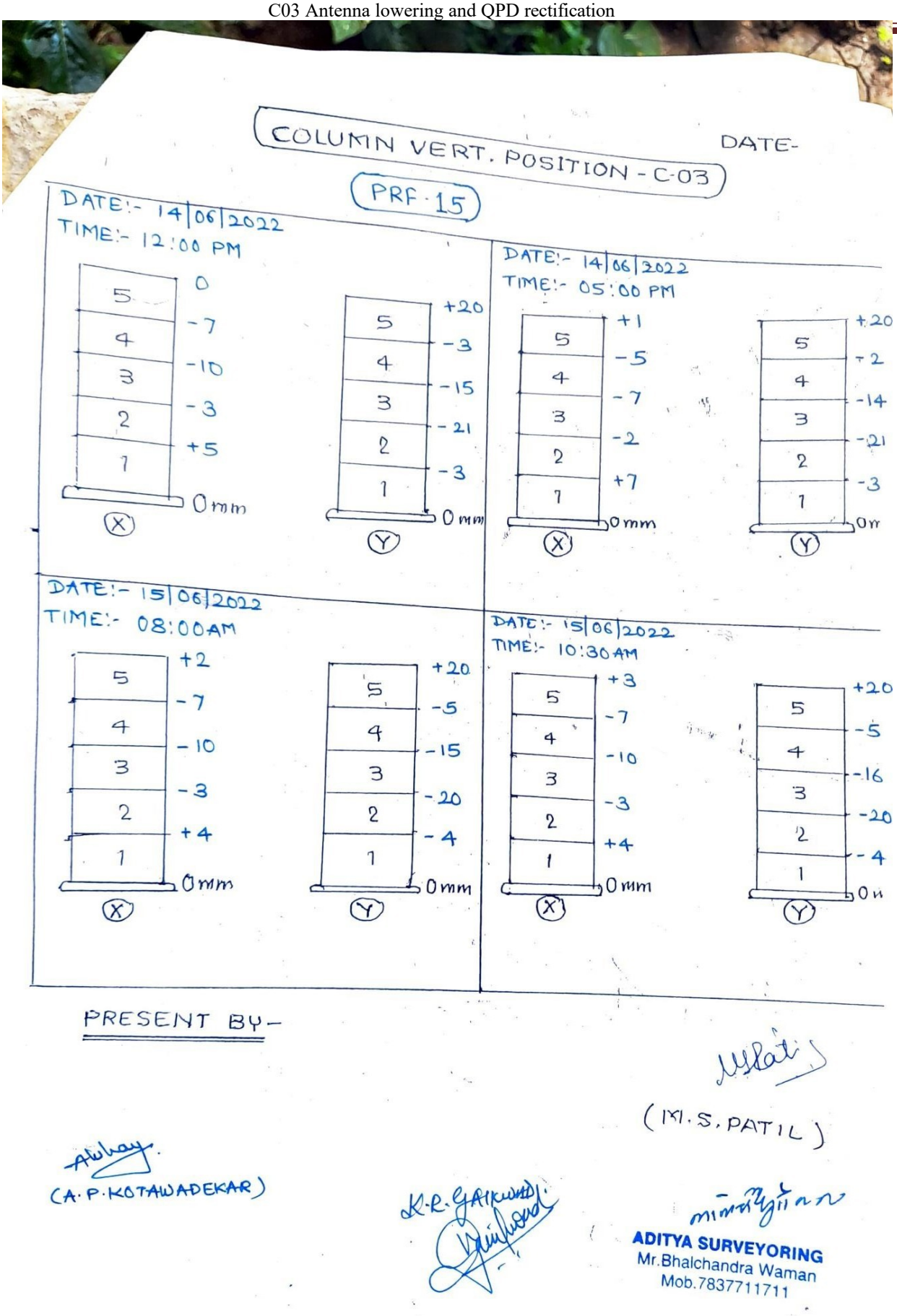
PRESENT BY-

(M. S. PATIL)

(A. P. KOTAWADEKAR)

K. R. GAIKWAD

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711



COLUMN VERT. POSITION - C-03

DATE-

PRF-15

DATE:- 14|06|2022
TIME:- 12:00 PM

5	0	+20
4	-7	-3
3	-10	-15
2	-3	-21
1	+5	-3
	0mm	0mm
	(X)	(Y)

DATE:- 14|06|2022
TIME:- 05:00 PM

5	+1	+20
4	-5	+2
3	-7	-14
2	-2	-21
1	+7	-3
	0mm	0m
	(X)	(Y)

DATE:- 15|06|2022
TIME:- 08:00AM

5	+2	+20
4	-7	-5
3	-10	-15
2	-3	-20
1	+4	-4
	0mm	0mm
	(X)	(Y)

DATE:- 15|06|2022
TIME:- 10:30 AM

5	+3	+20
4	-7	-5
3	-10	-16
2	-3	-20
1	+4	-4
	0mm	0m
	(X)	(Y)

PRESENT BY-

(M.S. PATIL)

(A.P. KOTAWADEKAR)

(K.R. GAIKWAD)

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

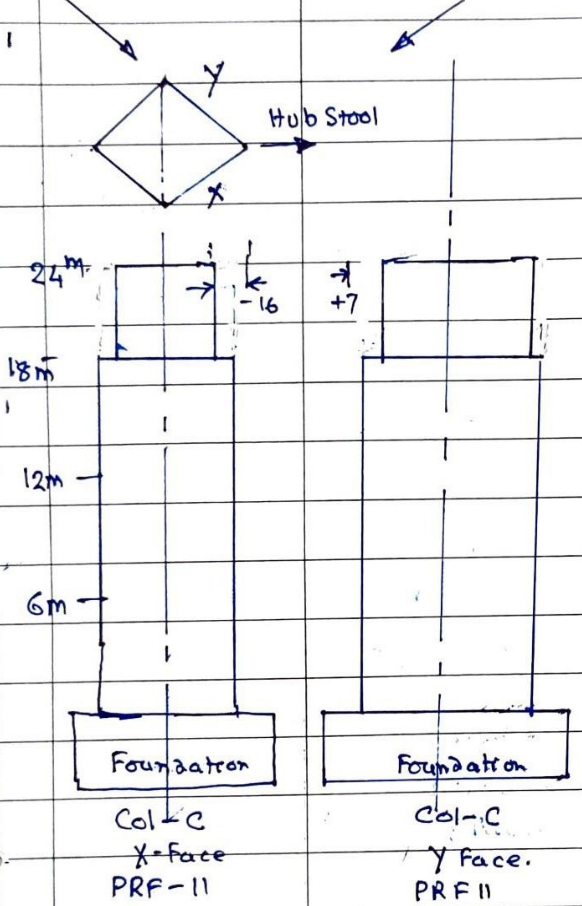
C03 Inspection Report

Date Of Inspection: 02 MAY-22

Inspected By: APK, Waman.

Inspection Detail: Measurement for Verticality for Col erection

Sl	Area / Part	Description of Inspection	Required Value	Obseration
1				



Level (From foundation top)	Observation Verticality X-Face	Y-Face
1) 0	0 mm	0
2) 6m	-7 mm	0
3) 12m	-14 mm	+2 mm
4) 18m	-16 mm	+7 mm
5) 24m	-16 mm	+7 mm

(-)error ← | → (+)error

Note IS-12843 Acceptable Limit $\pm \frac{H}{1000}$ or ±25 mm (for Verticality)
H - Height of Col.

Remarks: Within acceptable Limit

Inspected By Sign: APK, ADITYA SURVEYORING Prop. Bhalchandra Waman Mob.7837711711, AKNandi, (M.D. Somwanshi)

Approved Sign

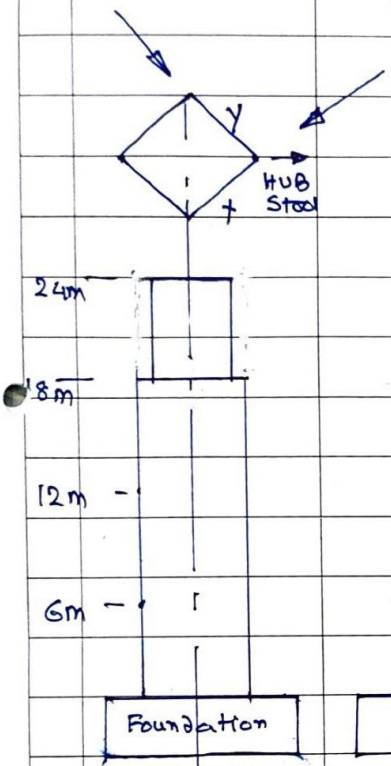
C03 Inspection Report

03 MAY-22

Inspected By: APK, Waman

Date Of Inspection:

Inspection Detail: Measurement for Verticality of Columm

Sl	Area / Part	Description of Inspection	Required Value	Obseration
				Observation verticality
			Level (From Foundation Top)	'X'-Face 'y'Face
			1) 0	0 mm 0 mm
			2) 6 m	-2 mm +4 mm
			* 3) 12 m	-20 mm -4 mm
			4) 18 m	-12 mm -10 mm
			5) 24 m	+10 mm 0 mm
			* - Fab error.	
	Foundation		Acceptable as top level ok.	
	Block B PRF 15 X - Face	Block B PRF 15 y Face.		

Note IS 12843 Acceptable Limit for Verticality $\pm \frac{H}{1000}$ or ±25mm

Remarks: With in acceptable Limit

Inspected By

Sign

ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7837711711

Approved

Sign

(M.D. Somasanthu)

C03 Inspection Report

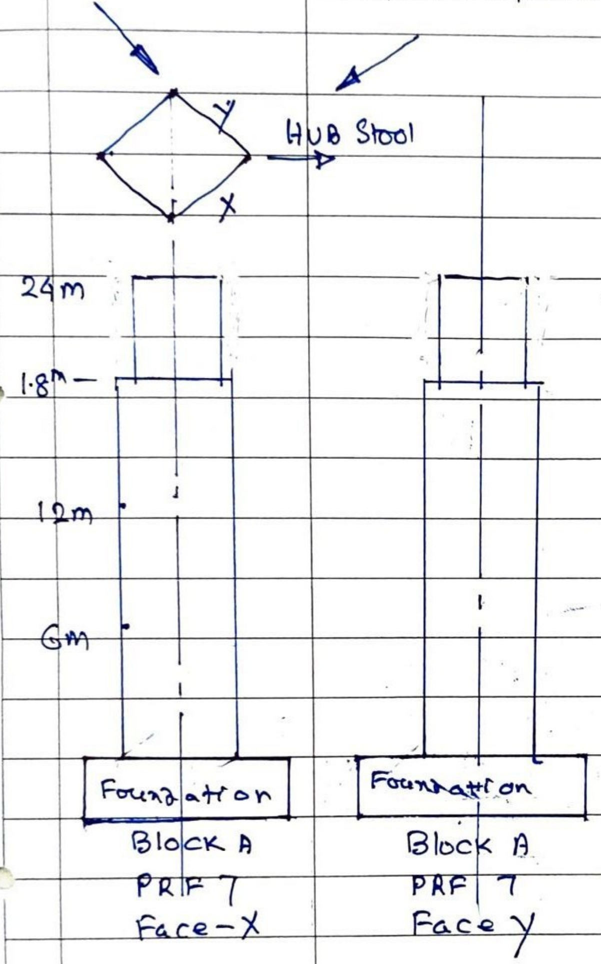
03 MAY-22

Inspected By: APK, Waman

Date Of Inspection:

Inspection Detail: Measurement of Column Verticality

Sl	Area / Part	Description of Inspection	Required Value	Obseration



Observation Verticality

Level (From Foundation top)	X-Face	Y-Face
1) 0 m	0	0
2) 6 M	-3 mm	+5 mm
3) 12 m	-2 mm	-7 mm
4) 18m	-3 mm	+7 mm
5) 24m	-3 mm	0 mm

Note IS-12843 Acceptable limit $\pm \frac{H}{1000}$ or ±25 mm

Remarks: With in acceptable limit.

Inspected By

Sign

ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7837711711

AKNandi.

(M.D. Somwanshi)

Approved

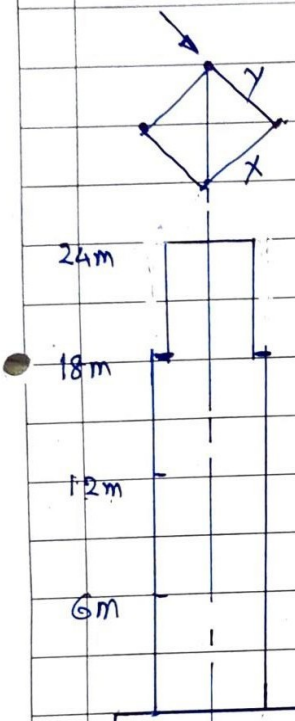
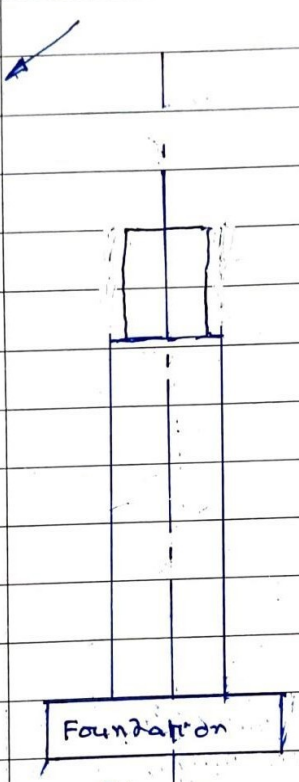
Sign

C03 Inspection Report

Date Of Inspection: 04 MAY-22

Inspected By: APK, Waman.

Inspection Detail: Measurement of Column Verticality

Sl	Area / Part	Description of Inspection	Required Value	Observation
			Level (From Foundation Top)	Observation - Verticality X-Face Y-Face
			1) 0	0 0
			2) 6 m	+2 mm +5 mm
			3) 12m	-3 mm +8 mm
			4) 18m	0 mm -15 mm
			5) 24m (*)	-35 mm -2 mm.
			(*)	To be rectified.
	Note IS 12843	Acceptable Limit for Verticality		$\pm \frac{H}{1000}$ or ±25

Remarks: To be rectified

Inspected By

Sign

ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7837711711

AKNandi.

(M.D. Somwanshi)

Approved

Sign

CRADLE BOLT TORQUING REPORT

M24 Bolt

Date:- 15/9/22

No. of Junctions :- 24 Nos.

Bolt size :- M24 (Grade 10.9) HSFG Bolts, Nuts & Washers.

Bolt torque value :- 106 kg.m

No. of bolts :- 336 Nos.

Report :-

All bolts are tightned by Hydraulic torque wrench at torque value 106 kg.m.
50 Nos. Bolts at Item no. 2 (ϕ219.mm pipe) not removed during lowering.

Remark :- Bolt tightning accepted.
Bolt tightning done successfully. Winch load may be released.

REF :-

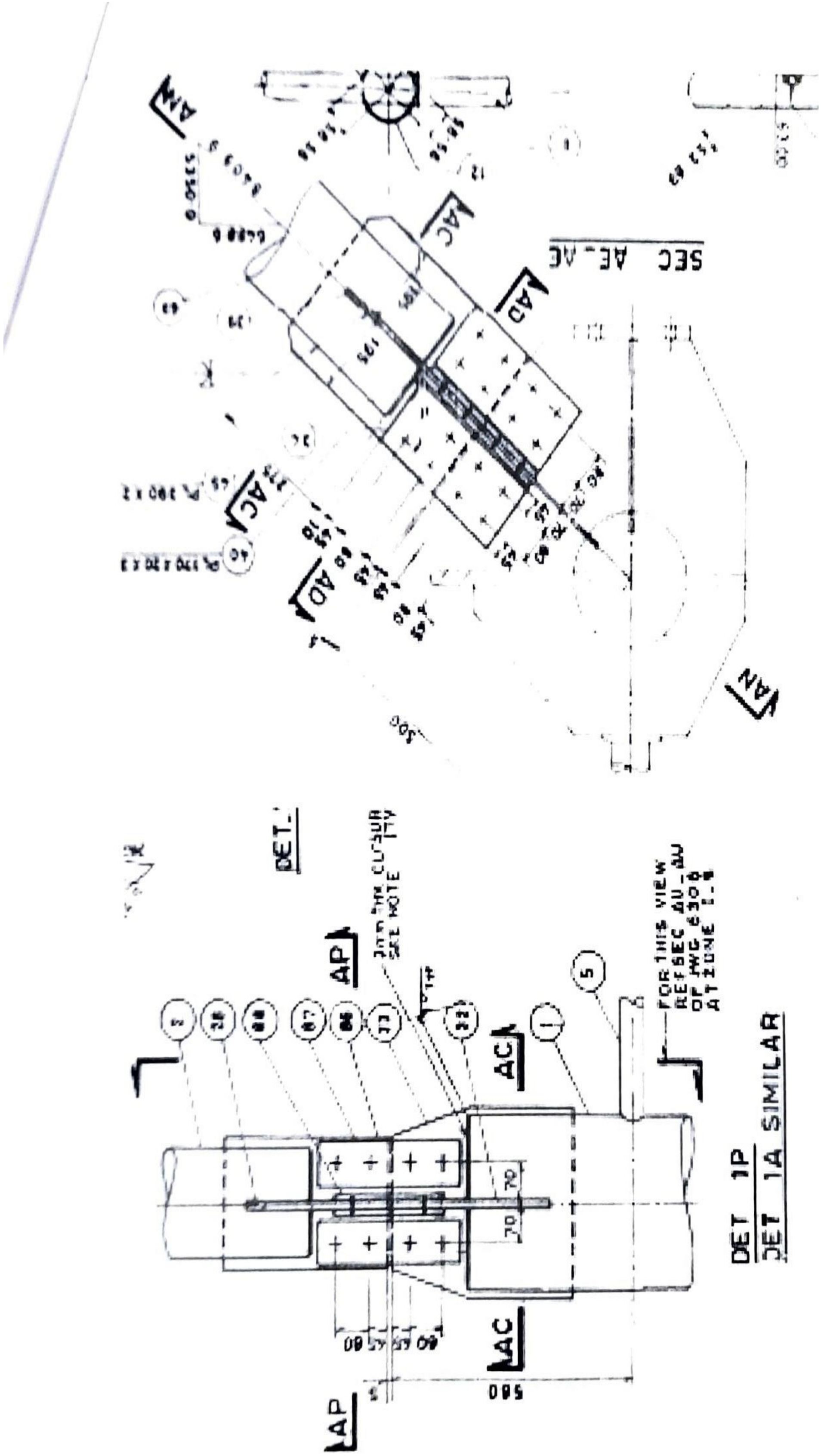
① Torque value :- Ref. TCE Design Document G18 dtd 9.04.1991

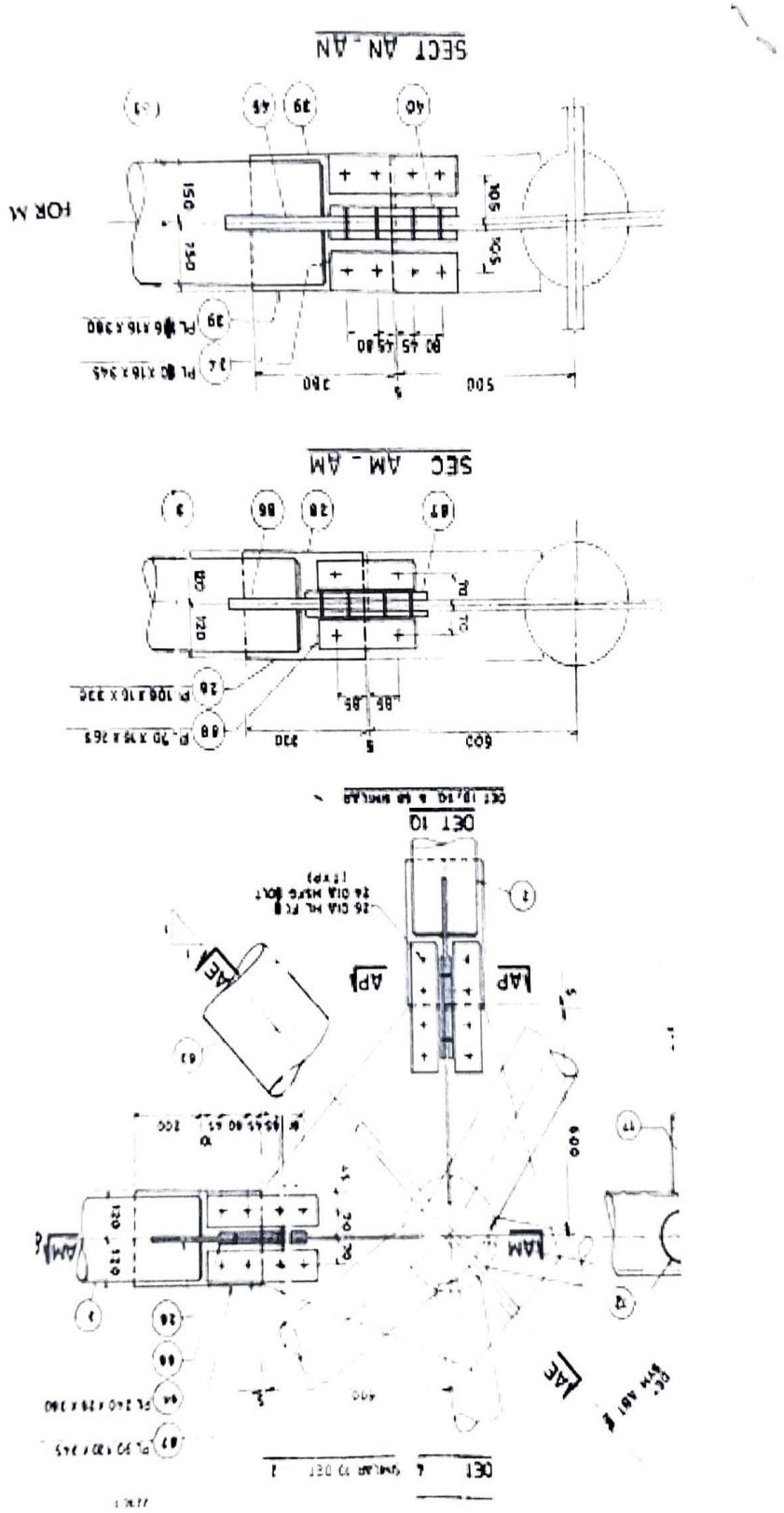
(A.P. Kotawadekar)

AK Nande

15/09/2022
(C.M.D. Somwanshi)

15/9/2022


SEC AE_AE
DET 1P
DET 1A SIMILAR
FOR THIS VIEW
AP
AC
AD
AN
AM



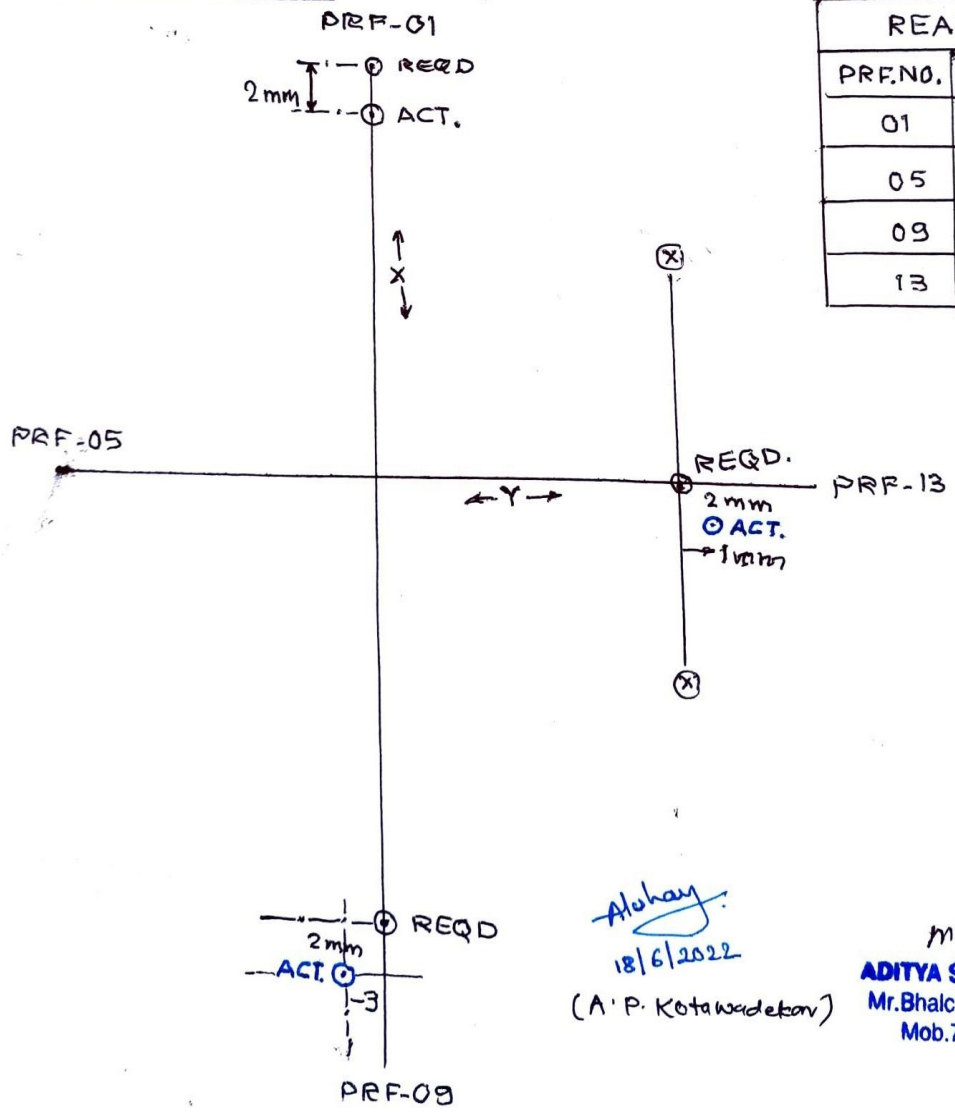
C-03 ANTENNA DATE : 18 JUNE-22

DISH ALIGNMENT AT GROUND

DISH LEVELING –

CRADLE CON. PT. NO.	READING	PLUS/MINUS
03	236 ~~283~~ mm	-3.0 mm
07	238 mm	-1.0 mm
11	239 mm	0.0 mm
15	237 mm	-2.0 mm

DISH CENTERING



READING		
PRF.NO.	'X' AXIS	'Y' AXIS
01	↓2mm	0mm
05	N.V.	N.V
09	-3mm	↓2mm
13	+1 mm	↓2mm

Alokay
18/6/2022
(A. P. Kotawadekar)

ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711

C-03 ANTENNA DATE : 18 JUNE-22

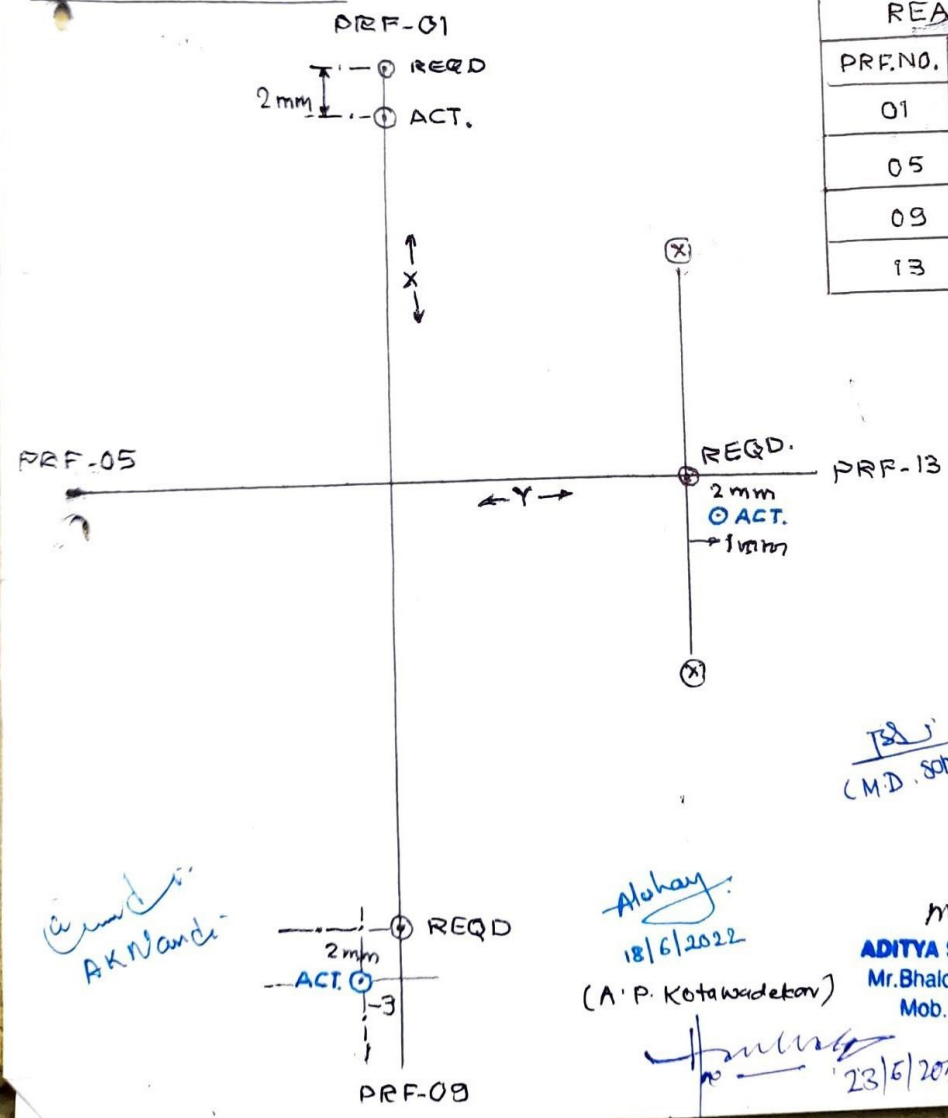
RAC-01

DISH ALIGNMENT AT GROUND

DISH LEVELING –

CRADLE CON. PT. NO.	READING	PLUS/MINUS
03	236 ~~283~~ mm	– 3.0 mm
07	238 mm	– 1.0 mm
11	239 mm	0.0 mm
15	237 mm	– 2.0 mm

DISH CENTERING – (PLAN VIEW)



READING		
PRF.NO.	'X' AXIS	'Y' AXIS
01	↓2mm	0mm
05	N.V.	N.V
09	–3mm	↓2mm
13	+1 mm	↓2mm

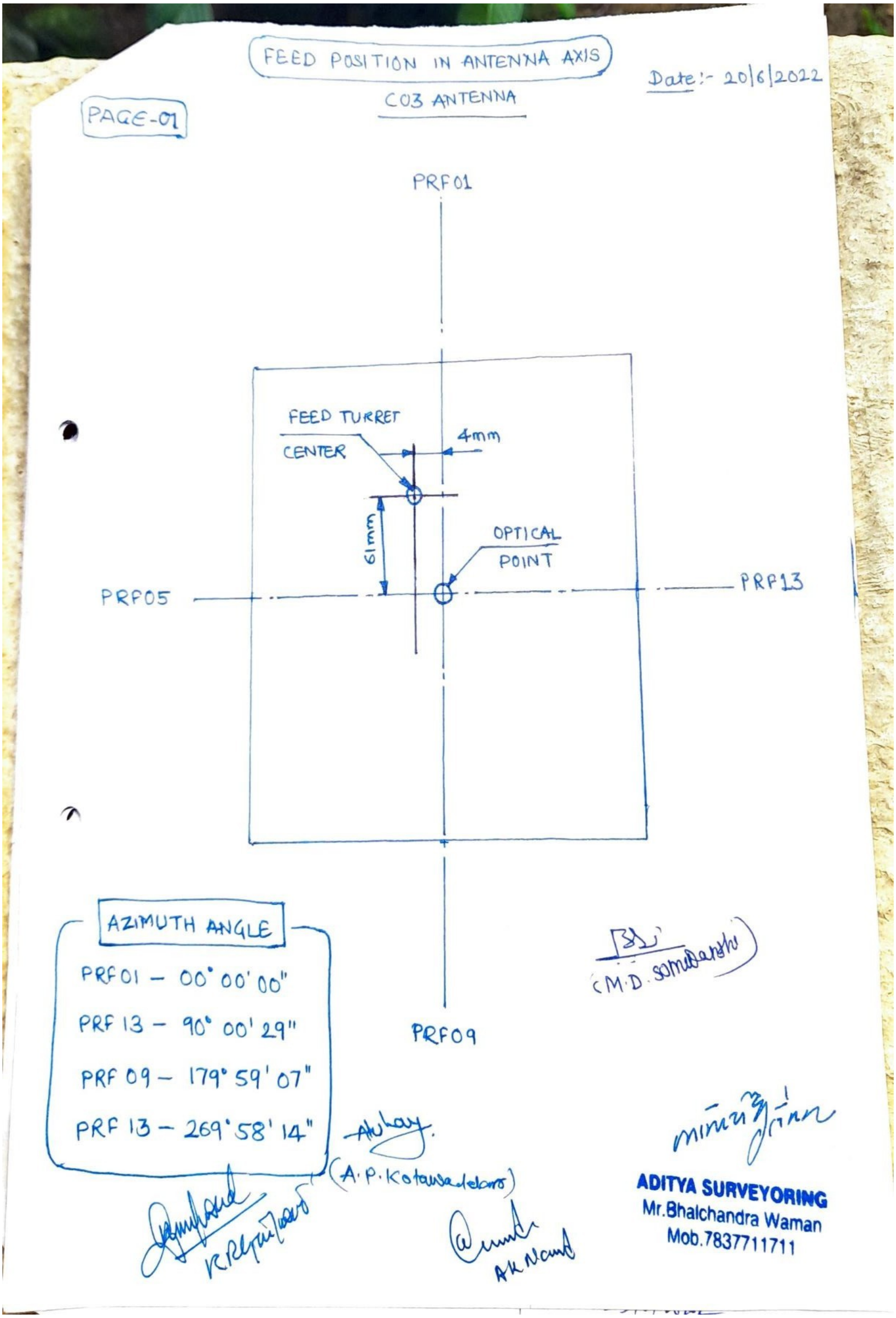
(M.D. Somwanshi)

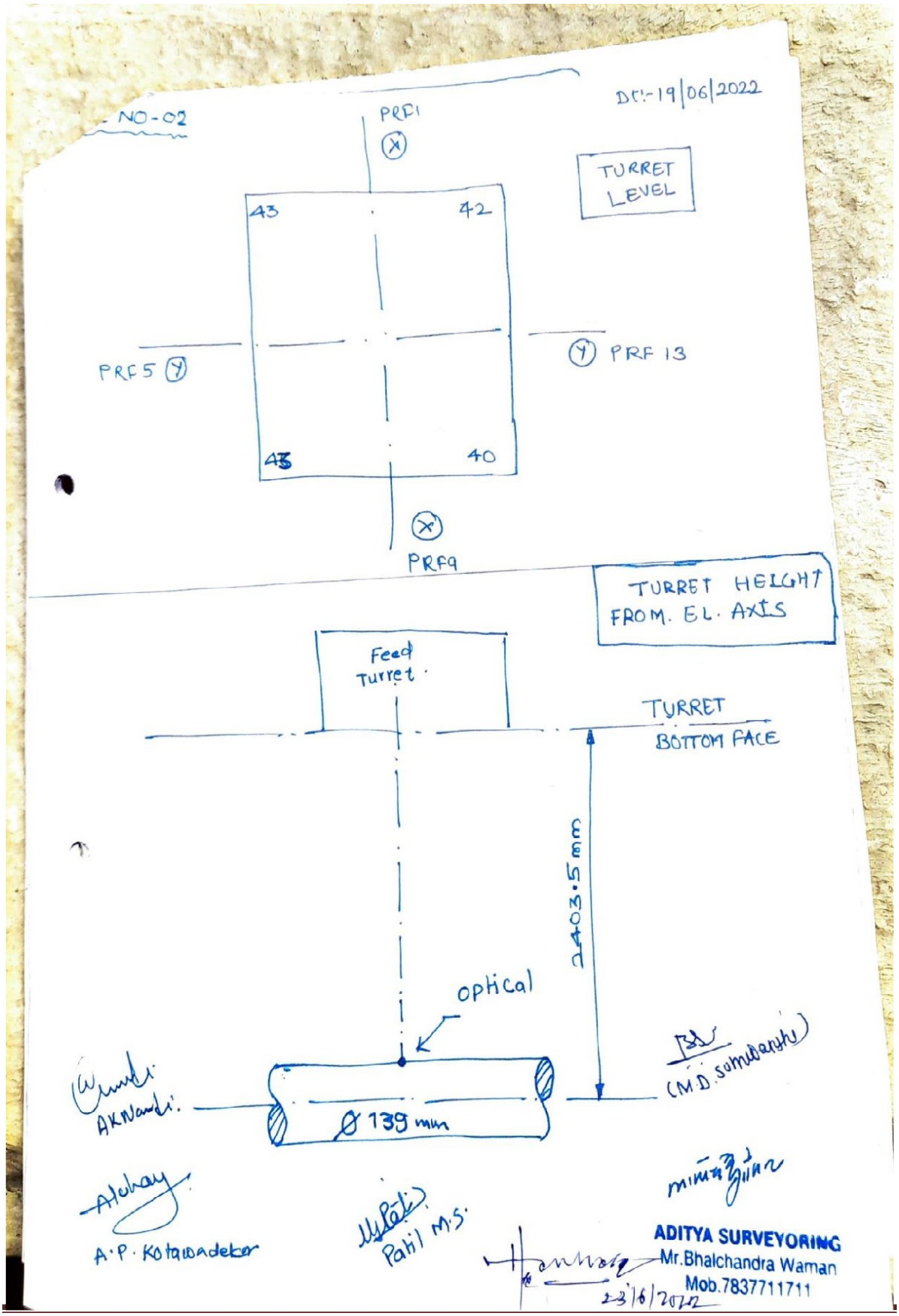
A.K. Wandi

Alohary 18/6/2022 (A. P. Kotawadekar)

ADITYA SURVEYORING
Mr. Bhalchandra Waman
Mob. 7837711711

23/6/2022


FEED POSITION IN ANTENNA AXIS
C03 ANTENNA
Date:- 20/6/2022
PAGE-01
PRF01
FEED TURRET CENTER
4mm
61mm
OPTICAL POINT
PRF05
PRF13
PRF09
AZIMUTH ANGLE
PRF01 – 00° 00' 00"
PRF 13 – 90° 00' 29"
PRF 09 – 179° 59' 07"
PRF 13 – 269° 58' 14"
(C.M.D. Sambandh)
(A.P. Kotawadekar)
ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711


NO-02
Dt:-19/06/2022
PRF1
TURRET LEVEL
43
42
PRF 5
PRF 13
40
PRF9
TURRET HEIGHT FROM. EL. AXIS
Feed Turret
TURRET BOTTOM FACE
2403.5 mm
optical
Ø 139 mm
A.P. Kotamadekar
Patil M.S.
ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711
23/6/2022

C03 ANTENNA

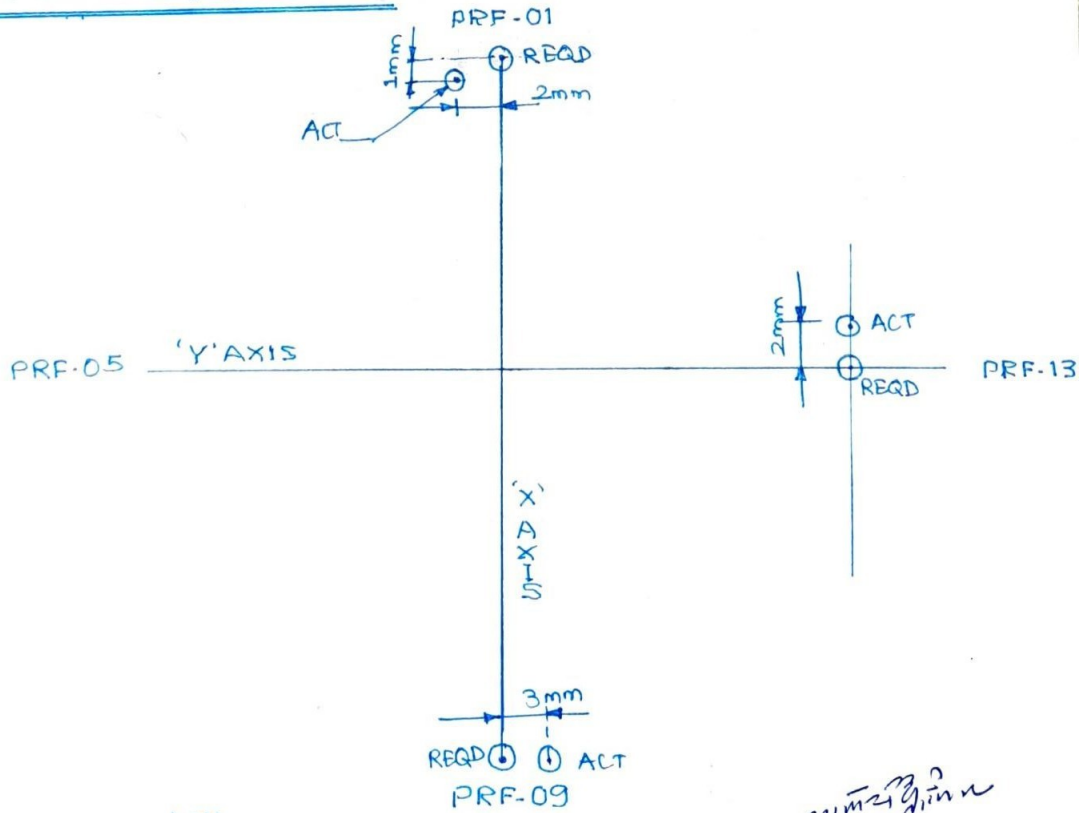
DATE:- 18/08/2022

DISH ALIGNMENT AT GROUND
(BEFORE DISH LIFTING & QPD ALIGNMENT)

DISH LEVELLING

CRADLE CON. PT. NO.	READING	PLUS/MINUS
03	255 mm	0
07	256 mm	+1
11	255mm	0
15	255mm	0

DISH CENTERING (PLAN VIEW)



Akolay
(A.P. Kotawadekar)

(ADITYA SURVEY)

C03 Inspection Report

Inspected By: APK, Waman.

Date Of Inspection: 29/4/2022

Inspection Detail: Foundation Block alignment report.

Sl	Area / Part	Description of Inspection	Required Value	Obseration
		See attached report.		

Remarks:

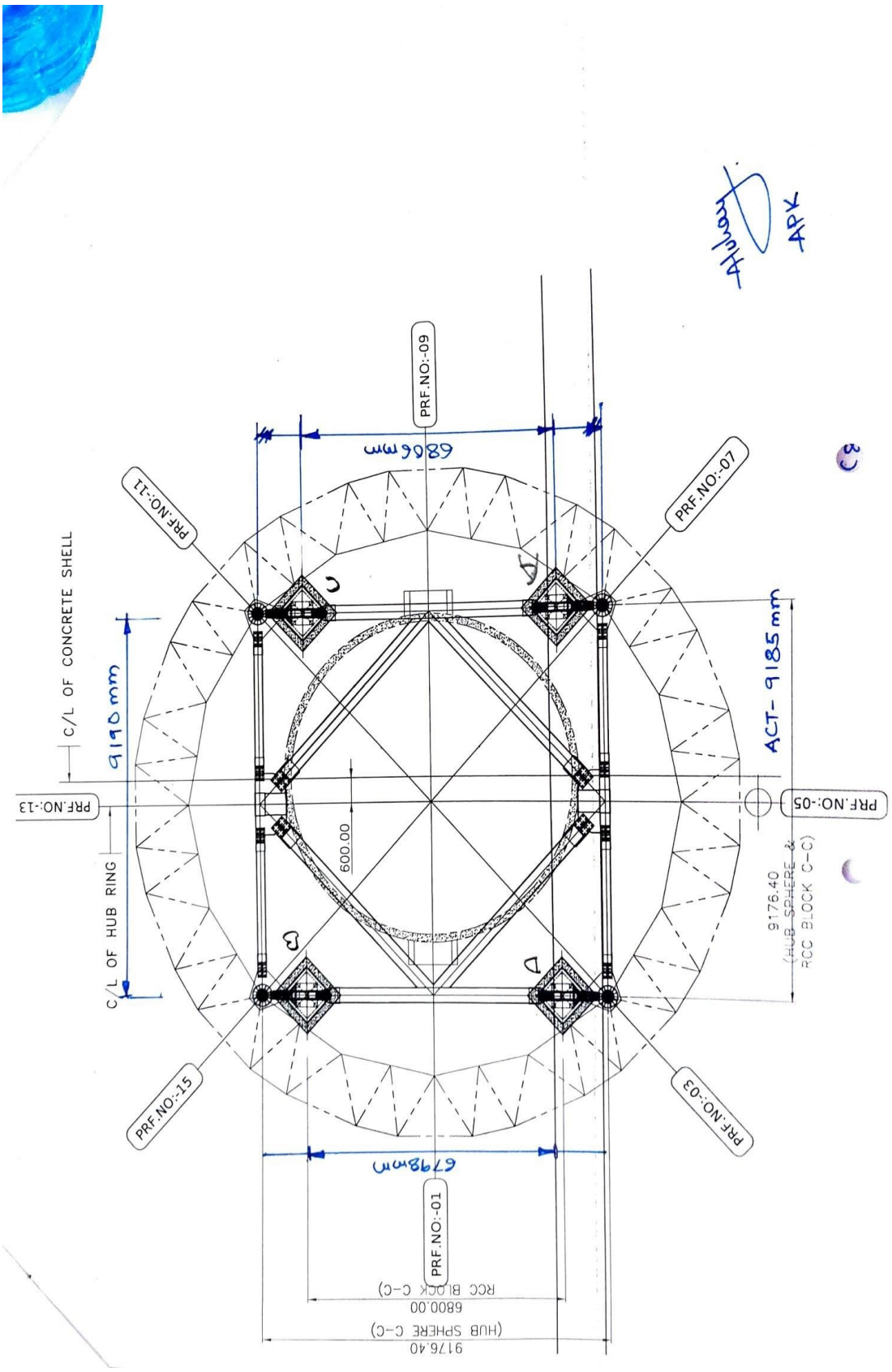
Inspected By

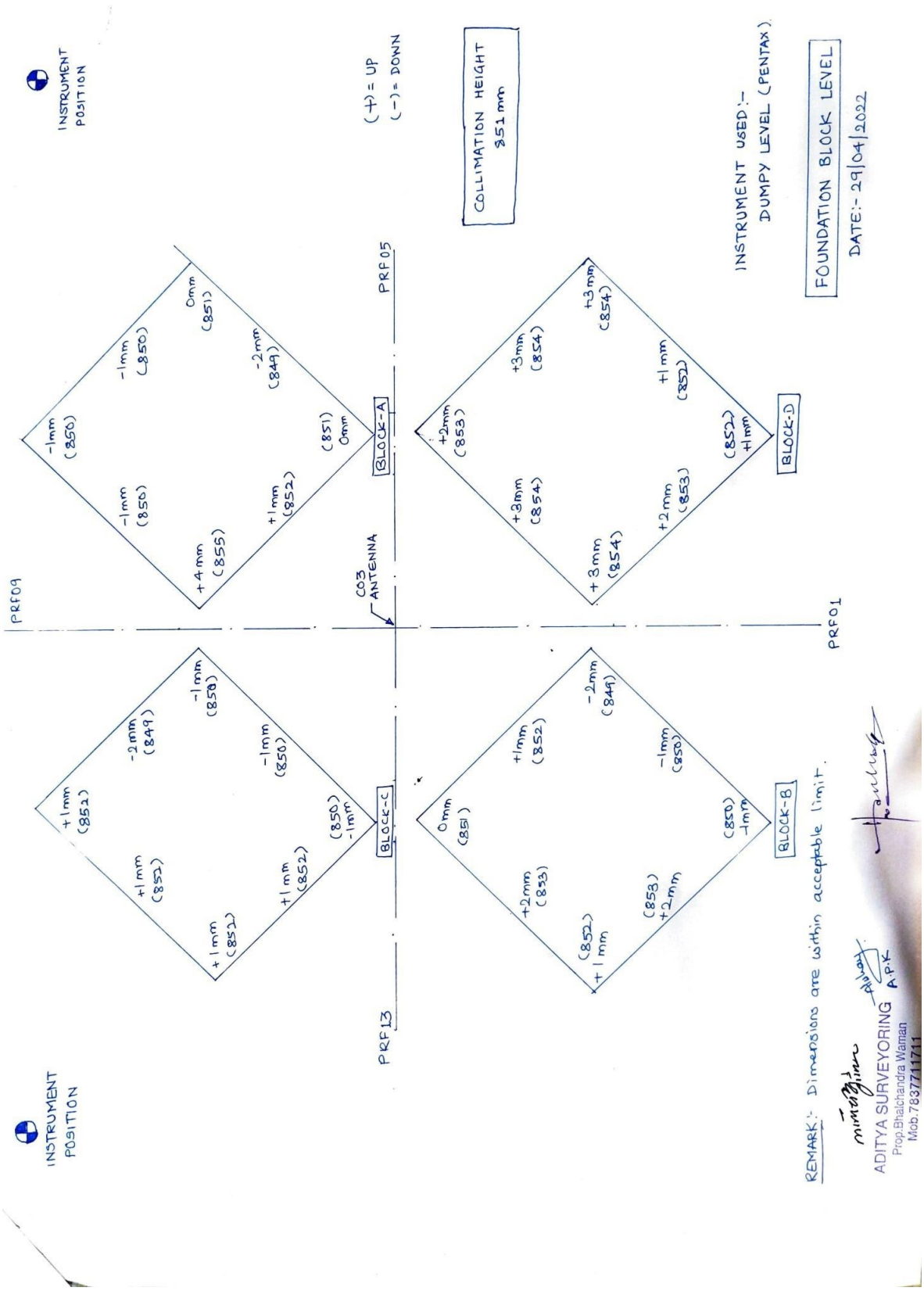
Sign

Approved

Sign

(M.D. Somwanshi)


PRF.NO:-09
PRF.NO:-11
PRF.NO:-07
PRF.NO:-13
PRF.NO:-05
PRF.NO:-15
PRF.NO:-03
PRF.NO:-01
C/L OF CONCRETE SHELL
C/L OF HUB RING
9190 mm
ACT- 9185 mm
600.00
9176.40
(HUB SPHERE & RCC BLOCK C-C)
6798mm
6800.00
RCC BLOCK C-C)
9176.40
(HUB SPHERE C-C)
A
B
C
D
APK


INSTRUMENT POSITION
(+) = UP
(-) = DOWN
COLLIMATION HEIGHT
851 mm
INSTRUMENT USED:-
DUMPY LEVEL (PENTAX)
FOUNDATION BLOCK LEVEL
DATE:- 29/04/2022
PRF09
PRF05
PRF01
PRF13
C03 ANTENNA
BLOCK-A
BLOCK-B
BLOCK-C
BLOCK-D
REMARK:- Dimensions are within acceptable limit.
ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7837711711

C03 Inspection Report

Inspected By: APK, Waman.

Date Of Inspection: 29/4/2022

Inspection Detail: Foundation Block alignment report.

Sl	Area / Part	Description of Inspection	Required Value	Obseration
		See attached report.		

Remarks:

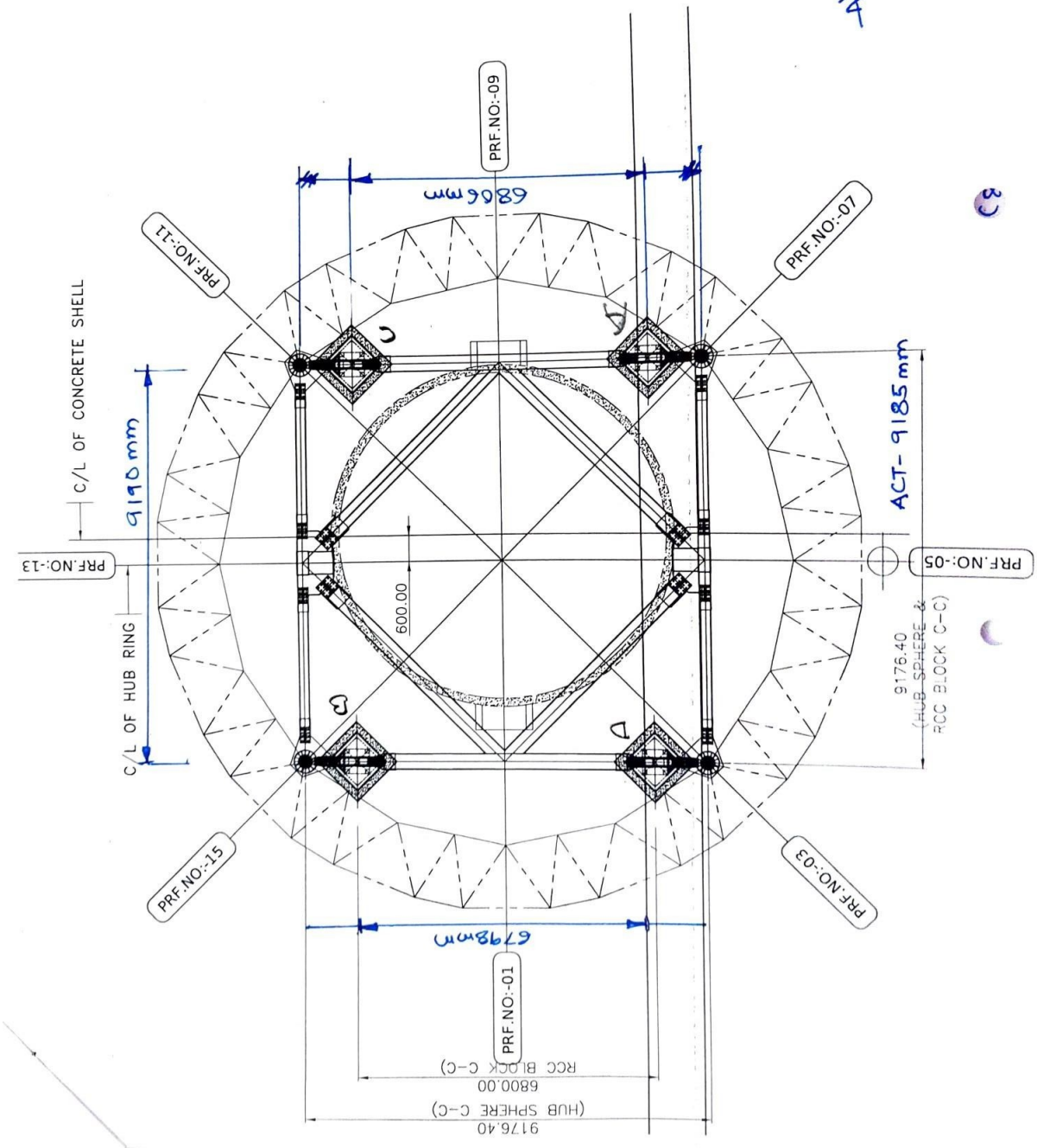
Inspected By

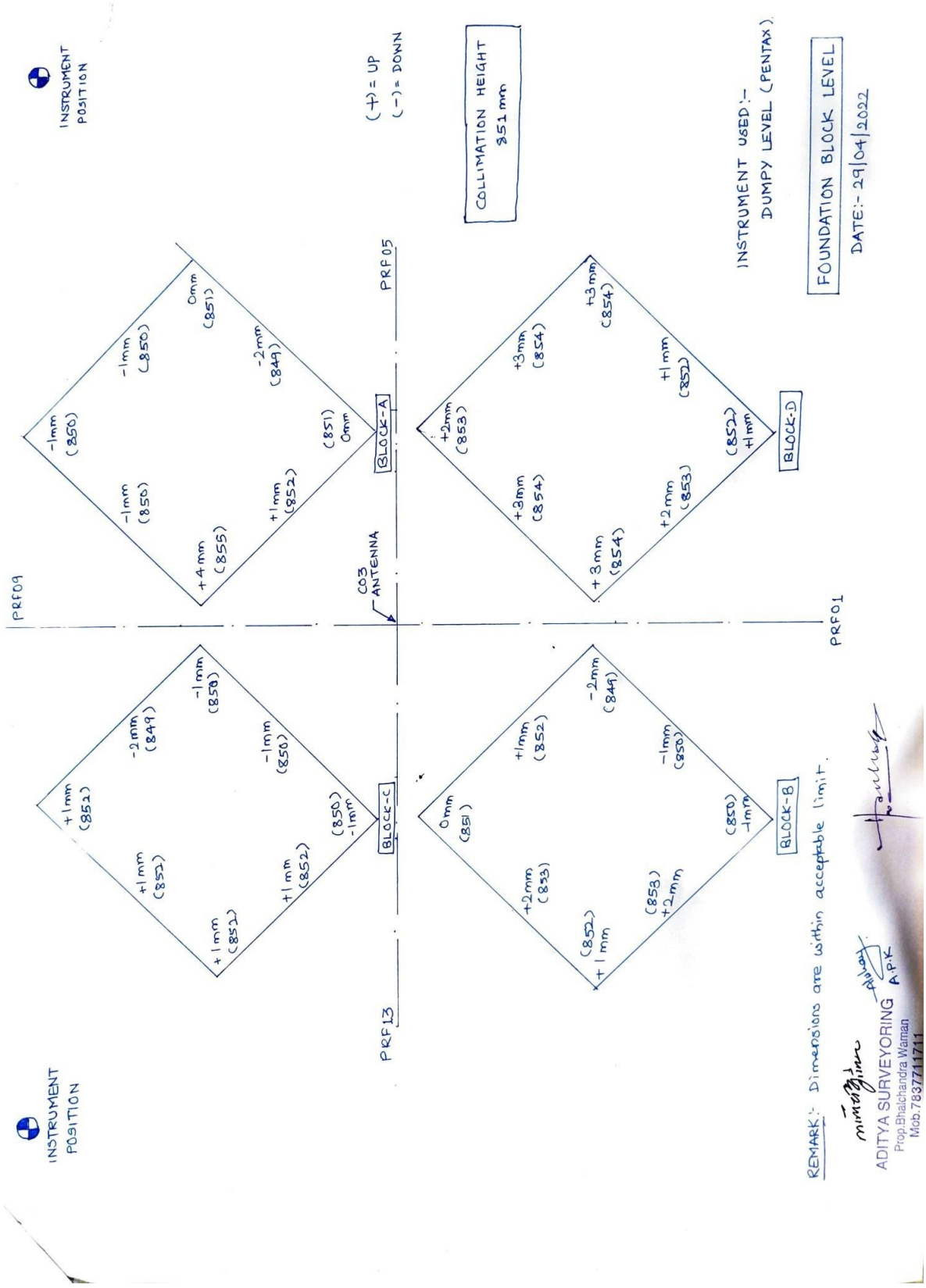
Sign

Approved

Sign

(M.D. Somwanshi)


PRF.NO:-09
PRF.NO:-11
PRF.NO:-07
PRF.NO:-13
PRF.NO:-05
PRF.NO:-15
PRF.NO:-03
PRF.NO:-01
C/L OF CONCRETE SHELL
C/L OF HUB RING
9190 mm
ACT- 9185 mm
600.00
9176.40
(HUB SPHERE & RCC BLOCK C-C)
6800.00
RCC BLOCK C-C)
9176.40
(HUB SPHERE C-C)


INSTRUMENT POSITION
(+) = UP
(-) = DOWN
COLLIMATION HEIGHT 851 mm
INSTRUMENT USED:-
DUMPY LEVEL (PENTAX)
FOUNDATION BLOCK LEVEL
DATE:- 29/04/2022
PRF09
PRF05
PRF13
PRF01
C03 ANTENNA
BLOCK-A
BLOCK-B
BLOCK-C
BLOCK-D
REMARK:- Dimensions are within acceptable limit.
ADITYA SURVEYORING
Prop.Bhalchandra Waman
Mob.7837711711

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 27/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Inclined bracings Inspection
Column Face PRF 3 to PRF 7

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
	Inclined bracings connections between Triangular girder and Column face - PRF 03 - PRF 07	11 Nos bracings	① Erection welding ② Bolt Tightening.
a)	Level - 0m - 6m - 2 Nos		
b)	Level 6m - 9m - 2 Nos		
c)	Level 9m - 12m - 2 Nos		
d)	Level 12 m - 1 No (additional) *		
e)	Level 12m to 15m - 2 Nos		
f)	Level 15m to 18m - 2 Nos		

Thanking You,

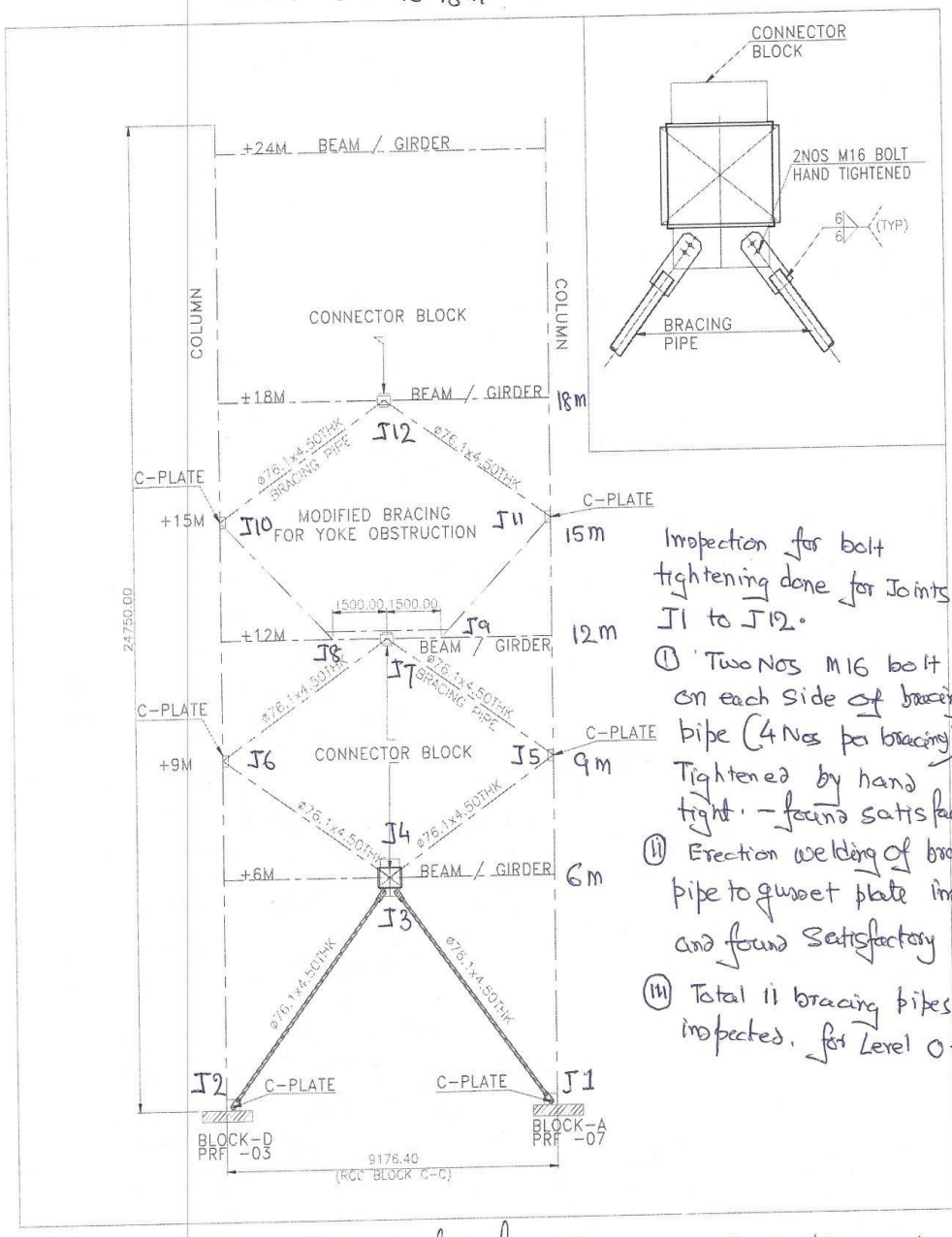
Pandharinath P. Muley
Proprietor
For M/s PANDHARINATH P. MULEY

* Additional bracing provided due to bracing offset at 12m Level for yoke fouling.

Inspection of Inclined bracing bolt joints & Erection Weldings

Face : PRF 03 – PRF 07

Level 0m to 18m



Inspection for bolt tightening done for Joints J1 to J12.

(i) Two Nos M16 bolt on each side of bracing pipe (4 Nos per bracing) Tightened by hand tight. – found satisfactory

(ii) Erection welding of bracing pipe to gusset plate inspected and found Satisfactory

(iii) Total 11 bracing pipes inspected. for Level 0 to 18m

Note : i) Additional bracing pipe provided at 12m Level between to inclined bracing at 12-15m.

ii) Bracing between 12-15 m offset by 1.5m. as discussed with EX TCE

(S24001)

(M.D. Somwanshi)

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Errection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 28/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Inclined bracing Inspection
Face PRF 15 to PRF3

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1	Inclined bracing connections between triangular girder and	10 Nos	① Erection welding
	Column Face – PRF15 – PRF3		② Bolt tightening
	a) Level on 0m to 6m		
	b) Level on 6m to 9m		
	c) Level on 9m to 12m		
	d) Level on 12m to 15m		
	e) Level on 15m to 18m.		

Thanking You,

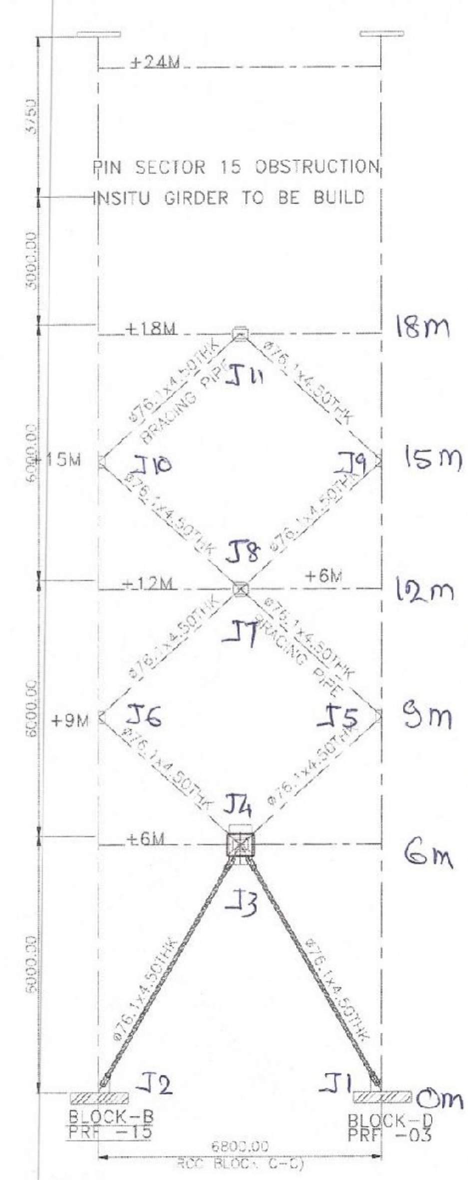
Pandharinath P. Muley
पांडुरंग पी. मुळे

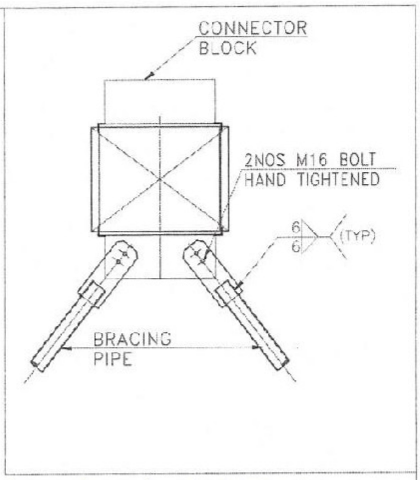
For M/s PANDHARINATH P. MULEY
Proprietor

Inspection of Inclined bracing pipe bolt joints & Erection welding

Face PRF 15 to PRF3

Level 0m to 18m





(I) Inspection for bolt tightening done for Joints J1 to J11

(II) 2 Nos M16 bolt on each side of bracing (total 4 Nos per bracing) tightened by hand tight – found OK

(III) Erection welding of bracing pipe to gusset plate inspected and found satisfactory

(IV) Total 10 Nos bracing inspected between 0m & 18m.

(524001) D Wateri

C.M.D. Somasekhar)

A K Nandi

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Errection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 27/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Inclined bracings. Inspection
Column Face – PRF 7 to PRF 11

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

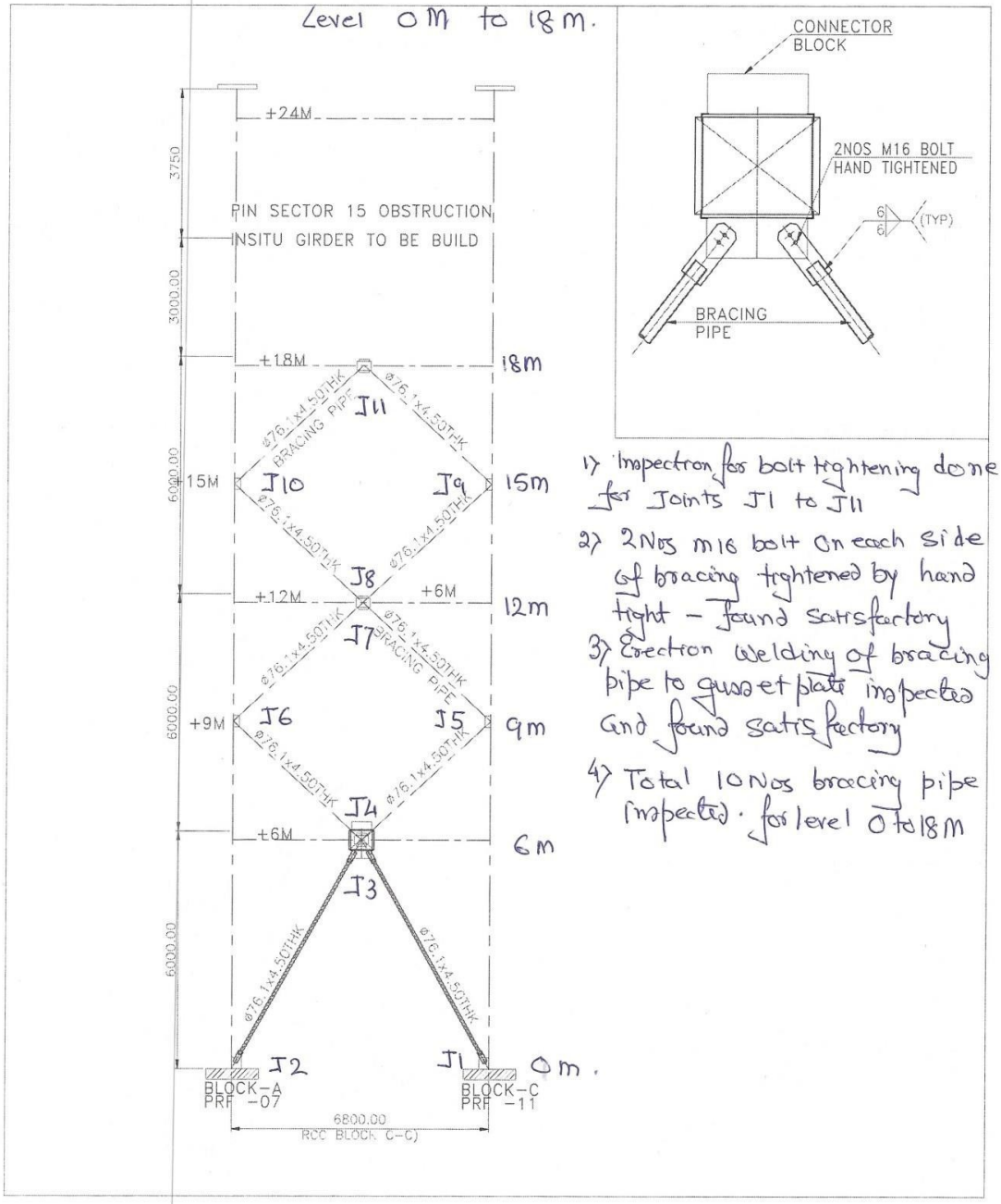
SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1)	Inclined bracing connections between triangular girder	10 Nos	① Bolt tightening ② Erection Welding.
	and Column Face PRF 7 to PRF 11		
	a) Level 0m to 6m – 2 Nos b) Level 6m to 9m – 2 Nos c) Level 9m to 12m – 2 Nos		
	d) Level 12m to 15m – 2 Nos e) Level 15m to 18m – 2 Nos		

Thanking You,

Pandharinath P Muley
Proprietor
For M/s PANDHARINATH P. MULEY

Inspection of Inclined bracing pipes bolt joints & Erection Welding Face. - PRF-7 to PRF 11

Level 0M to 18m.



1) Inspection for bolt tightening done for Joints J1 to J11
2) 2Nos m16 bolt on each side of bracing tightened by hand tight - found satisfactory
3) Erection welding of bracing pipe to gusset plate inspected and found satisfactory
4) Total 10Nos bracing pipe inspected. for level 0 to 18m

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

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Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 28/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Inclined Bracings. Inspection Column Face- PRF 11 to PRF 15

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1	Inclined bracing connections between Triangular bracing girder & Column for Face ~~C~~ - PRF 11 - PRF 15	11 Nos	(1) Erection welding of bracings (2) Bolt tightening of bracings.
	a) Level 0m - 6m - 2 Nos		
	b) Level 6m to 9m - 2 Nos		
	c) Level 9m to 12m - 2 Nos		
	d) Level 12m - 1 No (additional) *		
	e) Level 12m - 15m - 2 Nos		
	f) Level 15m to 18m - 2 Nos		

Thanking You,

Pandharinath P Muley
पांडुरंग पी मुळे

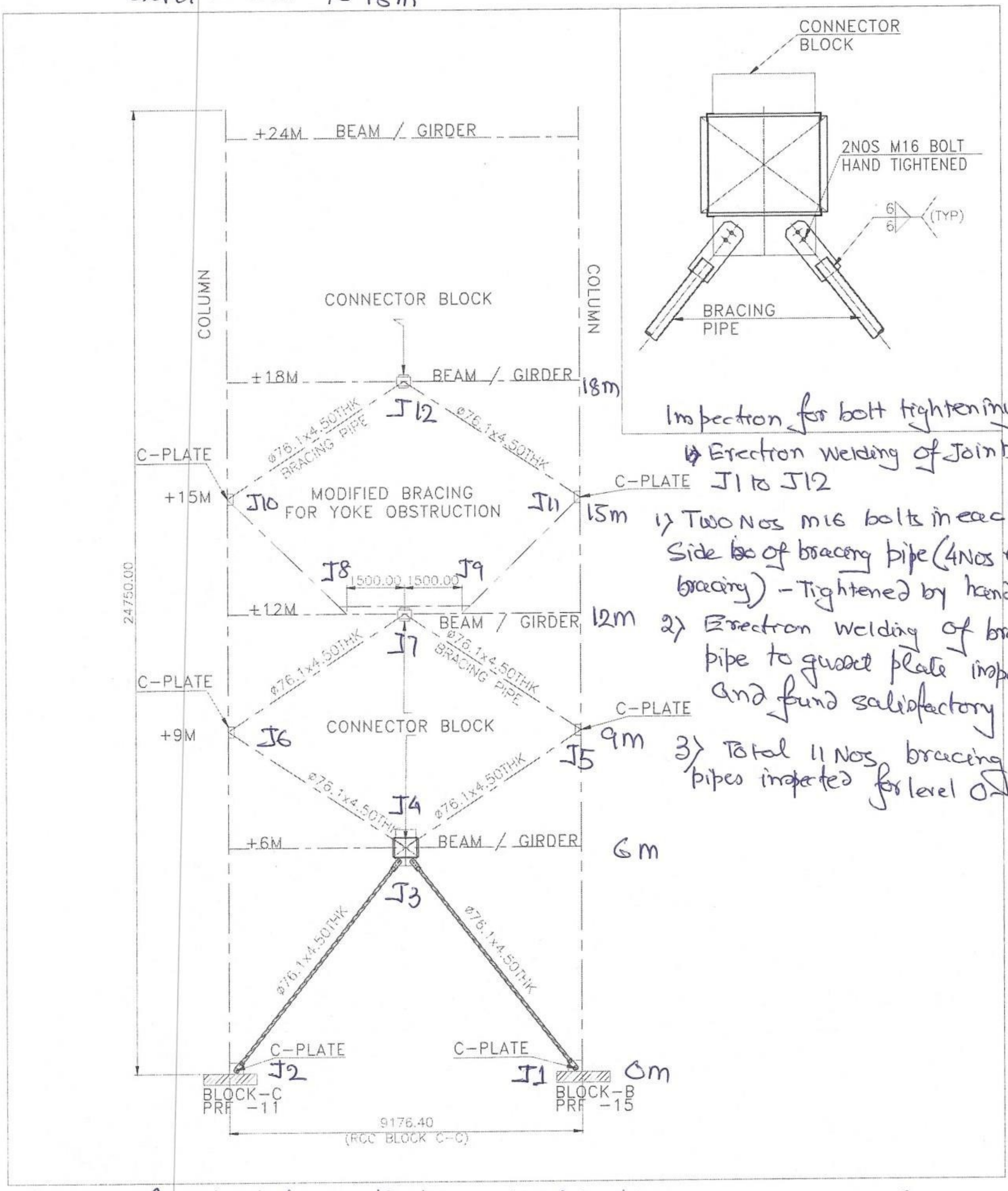
For M/s PANDHARINATH P. MULEY
Proprietor

* Additional bracing provided due to bracing offset at 12m Level for Yoke obstruction.

Inspection of Inclined bracing pipes bolt joints & Erection Welding

Face – PRF 11 to PRF 15

Level – 0m to 18m

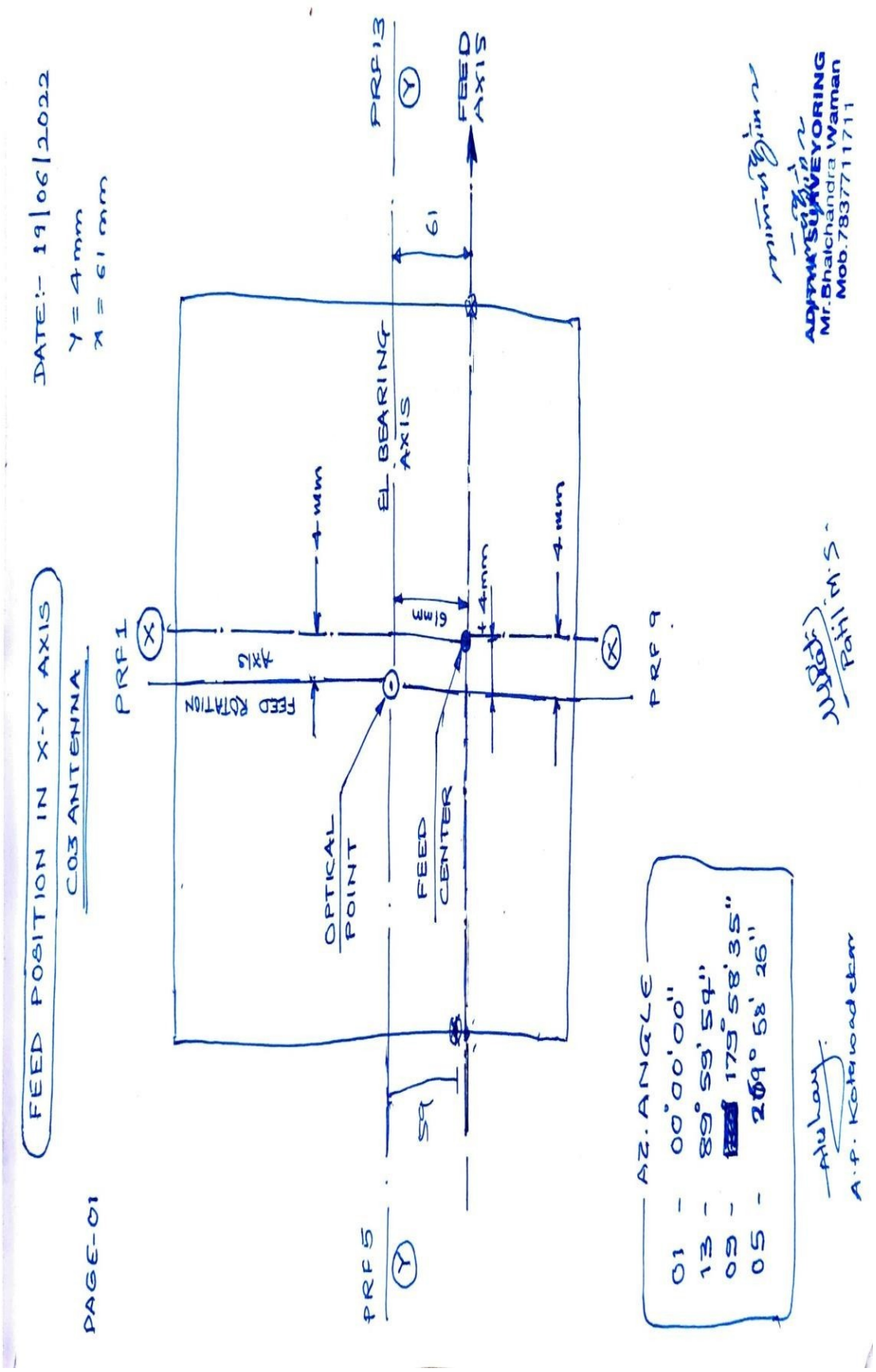


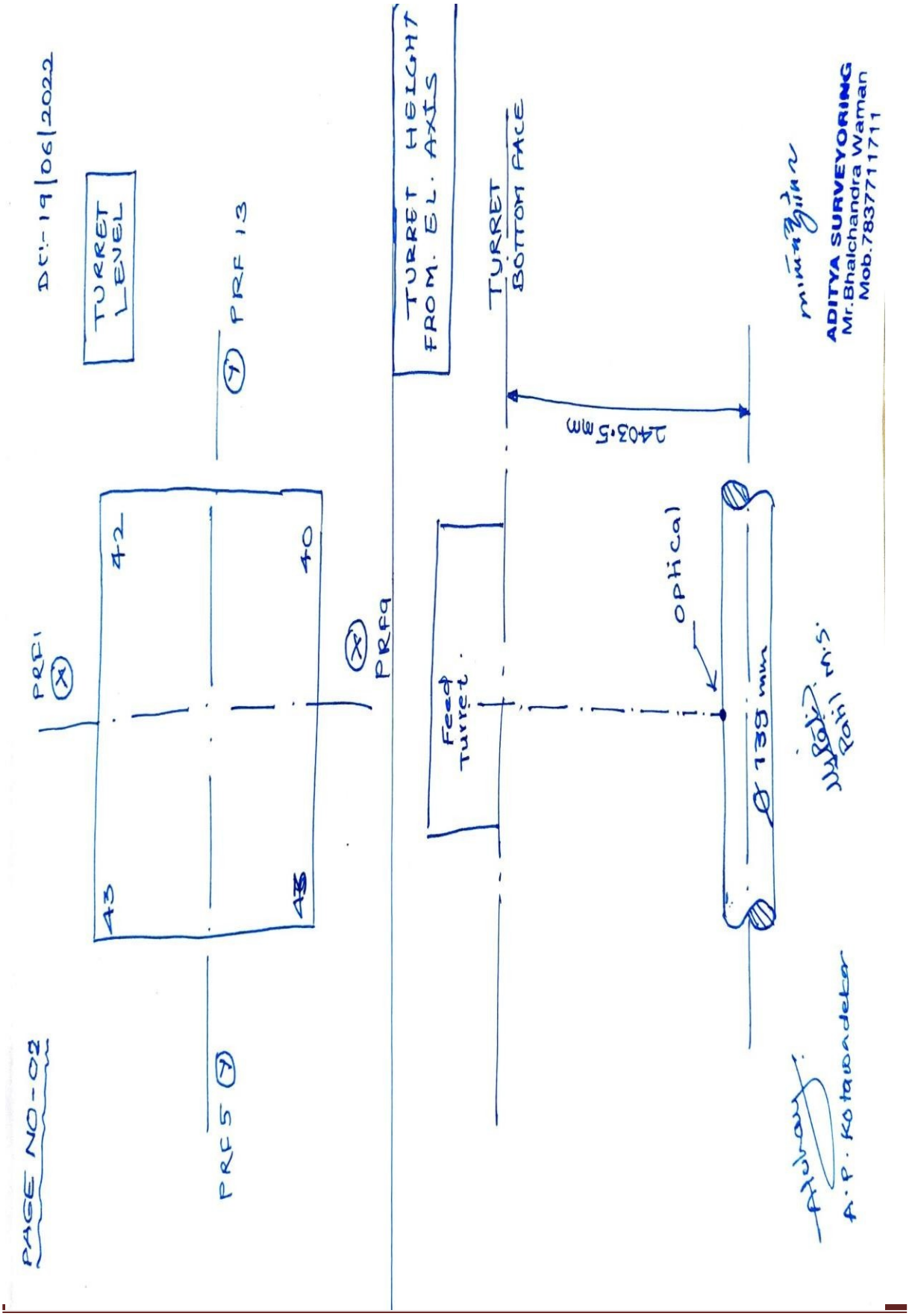
Inspection for bolt tightening & Erection welding of Joints J1 to J12

1) Two Nos M16 bolts in each Side of bracing pipe (4Nos each bracing) – Tightened by hand Tight
2) Erection welding of bracing pipe to gusset plate inspected and found satisfactory
3) Total 11 Nos bracing pipes inspected for level 0–18m

Note 1) Bracing between 12-15m offset by 1.5m as discussed with Ex TCE
2) Additional bracing pipes provided at 12 m Level between two inclined bracings of 12–15m Level.

D.V. ... (S24001) (M.D. Somuvanshi) A.K. Nandi


FEED POSITION IN X-Y AXIS
C03 ANTENNA
DATE:- 19/06/2022
Y = 4mm
X = 61mm
PAGE-01
PRF 1
PRF 13
PRF 5
PRF 9
EL BEARING AXIS
FEED AXIS
FEED ROTATION AXIS
OPTICAL POINT
FEED CENTER
4mm
61mm
AZ. ANGLE
01 - 00°00'00"
13 - 89°59'54"
09 - 179°58'35"
05 - 269°58'26"
ADVANCE SURVEYORING
Mr. Bhalchandra Waman
Mob. 7837711711
A.P. Kotwal ekam


Dt:- 19/06/2022
TURRET LEVEL
PRF 13
PRF1
PRF5
PRF9
42
40
43
TURRET HEIGHT FROM EL. AXIS
TURRET BOTTOM FACE
14035.5mm
Feed Turret
optical
139 mm
ADITYA SURVEYORING
Mr.Bhalchandra Waman
Mob.7837711711
A.P. Kotwadekar
PAGE NO-02

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

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Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 26/5/2022.

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Plumb allignment of Pulley block.

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

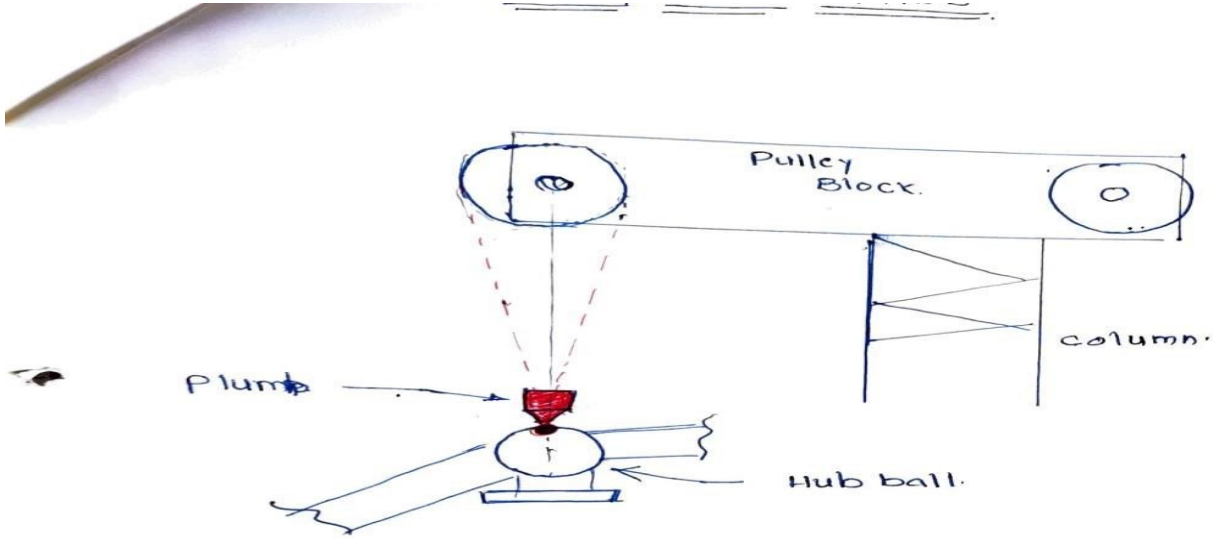
SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1	Pulley block allignment with Plumb	4NOS	· Allignment checked. to all 4 Pulley block. → Rectification/ Redlignment request given to PP. muley For Pulley block Placed on the column C → After redllignment. it is within limit. Report is attached.

Thanking You,

For M/s PANDHARINATH P. MULEY

Pandharinath P Muley

Proprietor



Sr. No.	Pulley Block No.	Plumb accuracy achieved.	After rectification if any.
1	Fixed on column A	3-4 mm	
2	Fixed on column B	Within 3 mm	
3	Fixed on column C	20 mm. (*)	3-4 mm.
4	fixed on column D	2-3 mm.	

(*) - To be rectified & Try to make within 5 mm accuracy

Pulley Block on column C → cleared.

Patil M.S. (M.D. Somwanshi)

YASHWANT NDT SERVICES

- Ultrasonic (UT) Testing
- Magnetic Particle Testing
- PMI Testing
- Hardness Testing
- NDT Consultancy
- DYE Penetrant Testing

Office : Jai Shivashankar Hsg. Soc. No.1, Sr. No.1419, Mhetrewasti, Chikhali, Pune - 410501.
Contact : +91 8888298642 / 7776933187 Email : yashwant.ndt@gmail.com

ULTRASONIC TESTING REPORT

Report No:YNS/UT/04	**Date: 02-04-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**
Part Description	Plate
Material Specification	IS2062 E250BR
Material form	As Rolled
Temperature of job	Ambient
Extent of testing	100%(Accessible Area)

Test Procedure Details

Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Water
Acceptance Standard	ASTM A 435
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	B.W.E. set to 80 % of FSH+6dB Add
Primary Reference	40.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	TR	24	----	4	0 – 50	40.0	46.0

Cables used: 1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	1250x2500x16mmThk. H.No.341049 Pl.No.P2815941	04 Nos.	NRI-Acceptable

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL II Mr. Amar K. Waleka (Diploma in Mech.) UT, MT, PT, RT		

BEST IN NDT & INSPECTIONS

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

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Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 30/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Erection Welding of Pulley block to col top plate.

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1)	Inspection Call for welding of	2Nos	a) Root run DP test
	Pulley block base plate to Column top plate		b) Final Weld visual
	a) On PRF 3		
	b) On PRF 15		

Thanking You,

पांडुरंग पी. मुळे

Pandharinath P. Muley

Proprietor

For M/s PANDHARINATH P. MULEY

C03 Inspection Report

Inspected By:

Date Of Inspection: 30/5/2022

Inspection Detail: DP Test & Weld visual

Sl	Area / Part	Description of Inspection	Required Value	Obseration

1) Inspection of welding joints for Pulley block to Column top plate PRF-03 [Preheating done at about 100°C for Plates & used E7018 electrode]

1) 2 Nos horizontal joint –] ① Root run DP test carried out

2) 2 Nos Overhead joint –] for weld joints – Defect observed at 3 points, subsequently rectified and again DP test carried on repair area & found satisfactory.

Ⓘ Weld visual carried out for all weld runs – found satisfactory.

2) Inspection of Welding joints for Pulley block to Colum top plate. PRF-15 [Preheating done at about 100°C for plates and used E7018 electrode for welding]

1) 2 Nos horizontal joint –] ① Root run DP test carried out

2) 2 Nos Overhead joint –] for weld joints – Defect observed at 1 Point, subsequently rectified and again DP Test done & found satisfactory

Ⓘ Weld visual carried out for all weld runs – found satisfactory

Remarks:

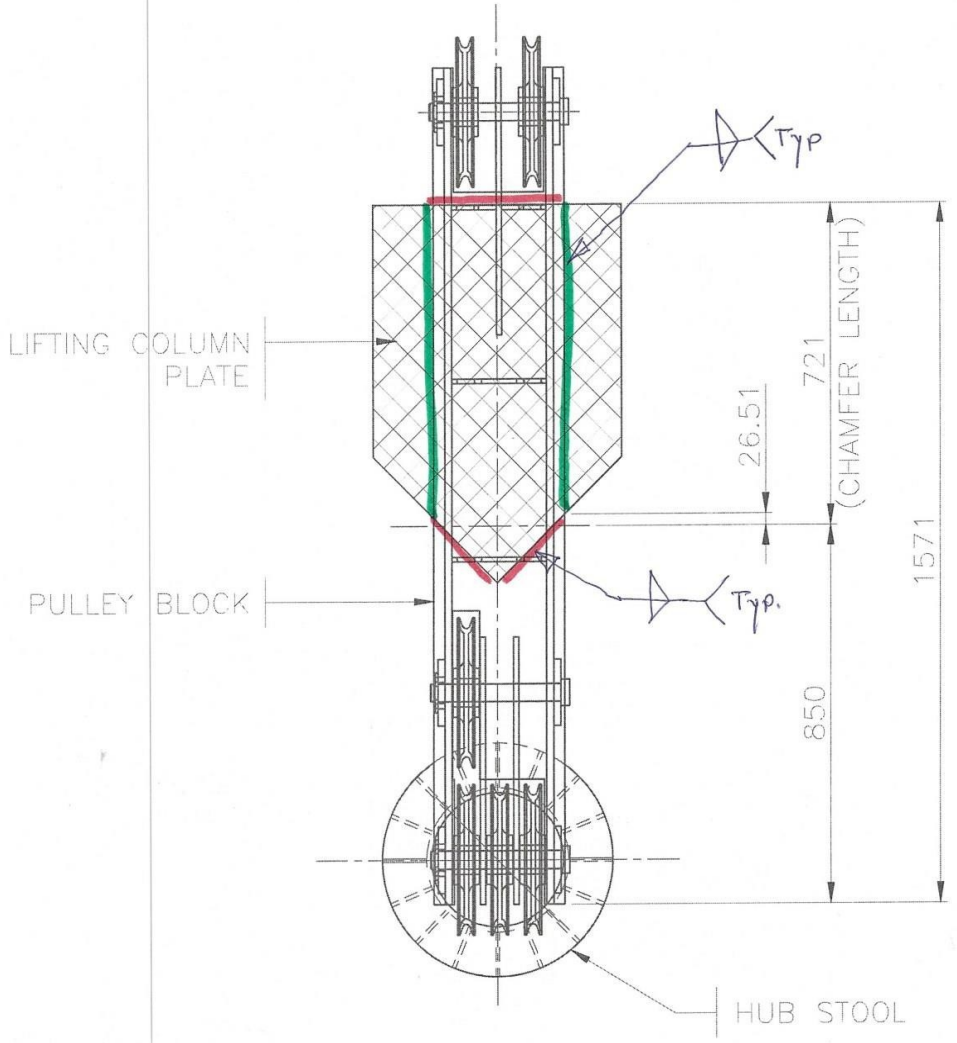
Inspected By

Sign D.V. Walunj

Approved

Sign

(M.D. Somwanshi)


Typ
LIFTING COLUMN PLATE
721
(CHAMFER LENGTH)
26.51
1571
PULLEY BLOCK
Typ.
850
HUB STOOL

|| Jai Ganesh ||

Mobile : 9890278043
9527337752
8308525252

PANDHARINATH P. MULEY

Specialist : Handling of heavy Equipments, Heavy Machinery loading, Unloading, Structurals, Boiler Tank and Transformer all Steel Erection and Labour Supplier.

Email : ppmuley_52@rediffmail.com, ppmuley52@gmail.com **Web :** www.ppmuley.com

Bhagyashri Apts. Flat No. C- 4, Sambhaji Nagar, Alandi Road, Bhosari, Pune-39.

Date: 29/5/2022

To,

The Project In-charge,

GMRT, Khodad

Subject: Antenna C03 lowering and erection work.

W.O. No. NCRA: WF099:PUB427:2021/WO006 dated 06/04/2022

Inspection call for: Erection welding of Pulley block to Col top

Dear Sir,

The following items are ready for your inspection. Kindly depute your authorized representative to inspect the same at the earliest.

SR. NO.	ITEM	QTY.	INSPECTION REMARKS
1)	Inspection of welding for Pulley	2 Nos	Root run DP Test
	block to Column top plate		Final weld visual
	a) On PRF 7		
	b) On PRF 11		

Thanking You,

Pandharinath P. Muley

Proprietor

For M/s PANDHARINATH P. MULEY

C03 Inspection Report

Inspected By:

Date Of Inspection: 29/5/2022

Inspection Detail: DP Test & Weld Visual

Sl	Area / Part	Description of Inspection	Required Value	Obseration
1	Inspection of welding joints for Pulley Block to Column top plate PRF-7	Preheating carried out for plates at about 100°C and E7018 electrode used for welding		
	1) 2 Nos horizontal joints — 2) 2 Nos overhead joints —	(i) Root run DP test carried out for weld joints — Defect observed at 4 Points subsequently rectified and again DP Test done on rectified area and found satisfactory		
		(ii) Weld visual for all welding runs — found satisfactory.		
2)	Inspection of welding joints for Pulley block to Column top plate. PRF-11	Preheating of plates done at about 100°C and E7018 electrode used for welding		
	1) 2 Nos horizontal joints — 2) 2 Nos Overhead joints —	(i) Root run DP test carried out for Weld joints — Defect observed at 3 Points, Subsequently repaired and again DP Test done after repair — found satisfactory.		
		(ii) Weld visual done for all welding run — found satisfactory.		

Remarks:

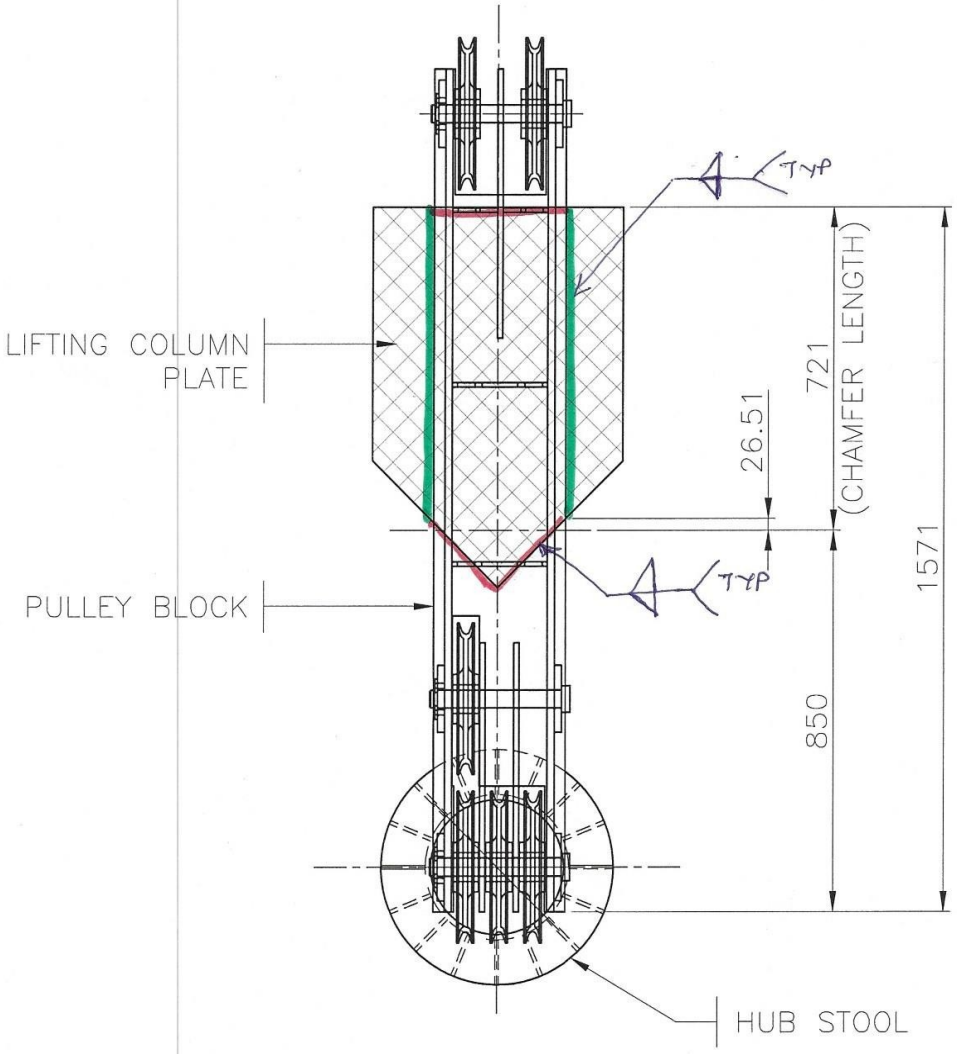
Inspected By D.V.Walunj

Sign

Approved

Sign

(M.D. Somvanshi)


LIFTING COLUMN PLATE
PULLEY BLOCK
HUB STOOL
TYP
TYP
721
(CHAMFER LENGTH)
26.51
1571
850

YASHWANT NDT SERVICES

- Ultrasonic (UT) Testing
- Magnetic Particle Testing
- PMI Testing
- Hardness Testing
- NDT Consultancy
- DYE Penetrant Testing

Office : Jai Shivashankar Hsg. Soc. No.1, Sr. No.1419, Mhetrewasti, Chikhali, Pune - 411062.
Contact : +91 8888298642 / 7776933187 Email : yashwant.ndt@gmail.com

ULTRASONIC TESTING REPORT

Report No:YNS/UT/34							**Date: 27-04-2022**	
Name of the client	**M/S NCRA-TIFR, Pune.**							
Part Description	Pulley Assembly Block							
Material form	As Welded							
Temperature of job	Ambient							
Extent of testing	100%(Accessible Area)							
Test Procedure Details								
Technique used	A scan, Pulse echo, Direct contact							
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)							
Couplant used	Oil							
Acceptance Standard	ASME Sec.V,Sec.VIII Div.1App.12							
Basic calibration block	I. I.W. V2 block. Job It Self							
Reference reflector	DAC plotted using 19mm SDH block+6dB Add							
Primary Reference	43.0 dB							
Search Unit / Probe No.	**Search Unit / Probe make**	**Type of search unit**	**Size of search unit**	**Angle in Degree**	**Frequency MHz**	**Scale used in mm.**	**Reference gain level (dB)**	**Scanning gain level (dB)**
117	EEC	Angle	8x9	70	4	0 – 100	43.0	49.0
Cables used	1.5 mtrs long, co axial cables fixed with above probes as a single unit.							
Evaluation Details								
Sr. No.	**Size**				**Qty.**		**Observation Remarks**	
1	**Pulley Assembly Block Weld Joints: Weld 16mm thk. to 10mm thk.plate. Weld Length:1900mm Block Sr.Nos. 1,2,3,4**				**04 Nos.**		**NRI-Acceptable**	
Note:1.NRI- No Recordable Indication								
Test performed by	Client Representative				**Witnessed By**			
NDT LEVEL Mr. Amar K. Walekar (Diploma in Mech.) UT, MT, PT, RT								

BEST IN NDT & INSPECTIONS

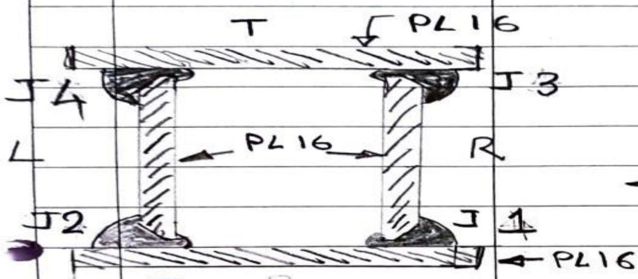
C03 Inspection Report

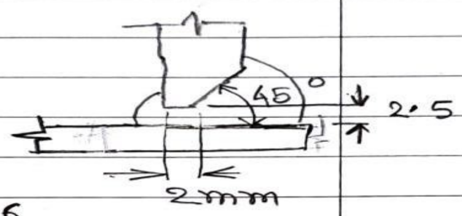
Date Of Inspection: 21 ~~23~~/4/2022

Inspected By: SZG, MSP

Inspection Detail: Pulley block NO 1

SI	Area / Part	Description of Inspection	Required Value	Obseration





Dimensional Checking — Overall dimension of box see dwg & found acceptable. Checked as per

Root run Check

1) Fitup
J1 — Fitup Checked & found OK
J2 — Fitup checked & found OK
J3 — Fitup Checked & found OK
J4 — Fitup Checked & found OK

2 Root Run DP Test observation
J1 — 4 Nos palaces pinhole & Slag Rectified OK
J2 — 4 Nos places pinhole & Slag rectified OK.
J3 — 5 Nos places pinhole & Slag rectified OK
J4 — 4 Nos places pinhole & Slag rectified OK

Final weld visual —
Stress leaving — done on 26/4/2022 — 27/4/2022

Remarks: UT — UT of pulley assy blocks (weld joints) — Acceptable 27/4/2022
See attached sketch, for fitup & fixture detail

Inspected By Sign: Gauri. S.Z, Patil M.S.

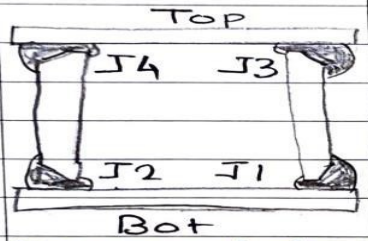
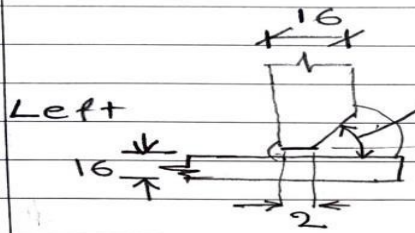
Approved Sign

C03 Inspection Report

Inspected By: MSP, SZG

Date Of Inspection: 21/4/2022

Inspection Detail: Pulley block No 2

Sl	Area / Part	Description of Inspection	Required Value	Obseration
				
		Dimensional Check - Overall dimensional found acceptable.	Checking done	as per drg and
	Root Run Check			
1)	Fit up - J1	Fitup for weld joints	Checked & found acceptable	
	J2	Fitup for weld joints	Checked & found acceptable	
	J3	Fitup for weld joints	Checked & found acceptable	
	J4	Fitup for weld joints	Checked & found acceptable	
2)	Root Run DP Test			
	J1	6 Nos places pinhole	rectified OK	
	J2	4 Nos places pinhole	rectified OK	
	J3	7 Nos places pinhole/slag	rectified OK	
	J4	6 Nos places pinhole	rectified OK	
	Final Weld Visual			
	Stress Leaving	done on 24/4/22	to 27/4/22	

Remarks: UT — UT of pulley assey block weld joints — Acceptable 27/4/2022

Inspected By Sign

Gavit S.Z.

Patil M.S.

@

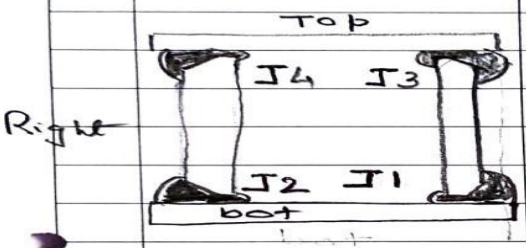
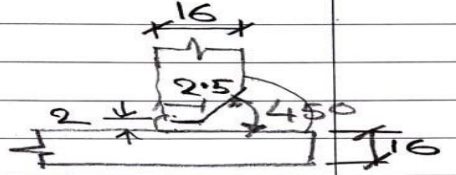
Approved Sign

C03 Inspection Report

Inspected By: SZG, MSP

Date Of Inspection: 28/4/2022

Inspection Detail: Pulley block No 3

Sl	Area / Part	Description of Inspection	Required Value	Obseration
				
	Dimensional Check-	Over all dimensional checking and found acceptable.		done as per drg
	Root Run			
1>	Fitup J1 —	Fit up of weld joints checked & found acceptable.		
	J2 —	Fit up of weld joints checked & found acceptable.		
	J3 —	Fit up of weld joints checked & found acceptable.		
	J4 —	Fit up of weld joints Checked & found acceptable.		
2	Root run DP test			
	J1 — 5 Nos	places pinhole rectified OK		
	J2 — 4 Nos	places pinhole rectified OK		
	J3 — 8 Nos	places pinhole rectified OK		
	J4 — 4 Nos	places pinhole rectified OK.		
	Final Weld Visual-			
	Stress leaving-	done on 26/4/2022 to 27/4/2022		

Remarks: UT — UT of pulley assy block weld joints done- Acceptable 27/4/22

Inspected By
Sign
Gavit S Z

Patil M.S.

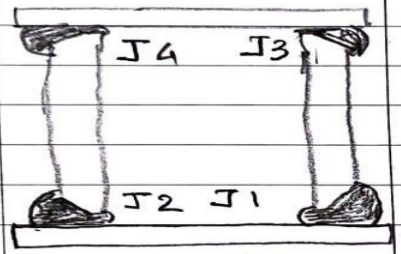
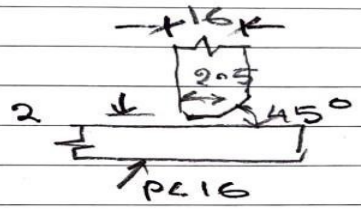
Approved
Sign

C03 Inspection Report

Inspected By: SZG, MSP

Date Of Inspection: 23/4/2022

Inspection Detail: Pulley block No – 4

Sl	Area / Part	Description of Inspection	Required Value	Obseration
				
	Dimensional Check –	Overall dimensional Checking done as per drg and found acceptable.		
1>	Fitup J1 =	Fitup of Weld joint checked & found ok		
	J2 –	– do –		
	J3 –	– do –		
	J4 –	– do –		
2	Root run DP test			
	J1 – 3 Nos places pinhole observed rectified ok			
	J2 – 6 Nos places pinhole observed rectified ok			
	J3 – 4 Nos places pinhole observed rectified ok			
	J4 – 5 Nos places pinhole observed rectified ok			
	Final Weld visual –			
	Stress leaving – done on 26/4/2022 – 27/4/2022			

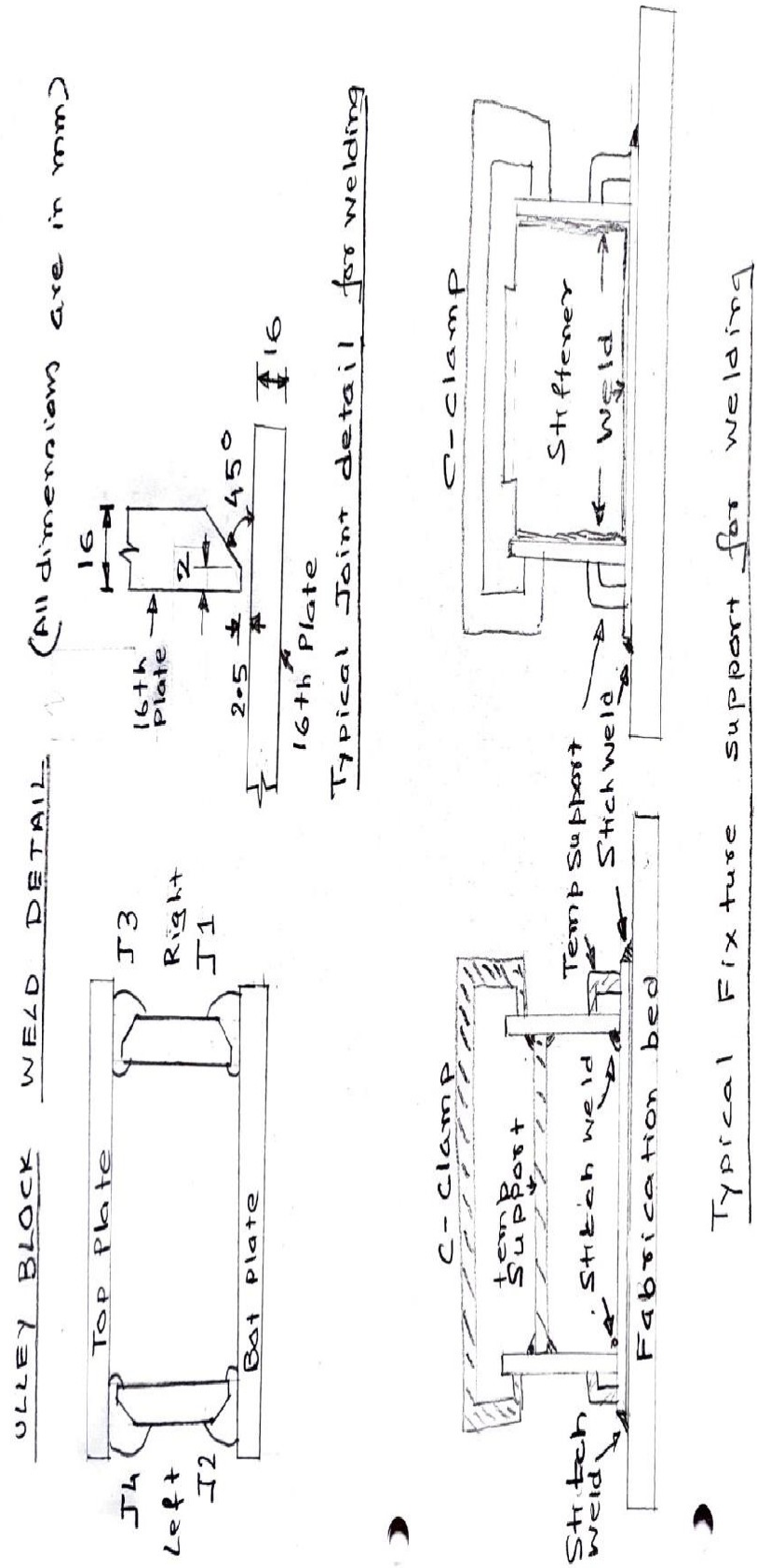
Remarks: UT – UT of pully assy blocks done – Acceptable 27/4/2022 (Weld joints)

Inspected By Sign

Gavit. S.Z

Patil M.S

Approved Sign


ULLEY BLOCK WELD DETAIL
(All dimensions are in mm)
Top Plate
Bot plate
J3
Right
J1
J4
Left
J2
16
16th Plate
2
2.5
45°
16th Plate
Typical Joint detail for welding
C-clamp
Stiffener
Weld
Temp Support
Stich weld
C-clamp
temp Support
Stitch weld
Stitch weld
Fabrication bed
Typical Fixture support for welding

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ULTRASONIC TESTING REPORT

Report No:YNS/UT/34	**Date: 27-04-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**
Part Description	Pulley Assembly Block
Material form	As Welded
Temperature of job	Ambient
Extent of testing	100%(Accessible Area)

Test Procedure Details

Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Oil
Acceptance Standard	ASME Sec.V,Sec.VIII Div.1App.12
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	DAC plotted using 19mm SDH block+6dB Add
Primary Reference	43.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	Angle	8x9	70	4	0 – 100	43.0	49.0

Cables used: 1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	**Pulley Assembly Block Weld Joints: Weld 16mm thk. to 10mm thk.plate. Weld Length:1900mm Block Sr.Nos. 1,2,3,4**	**04 Nos.**	**NRI-Acceptable**

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL Mr. Amar K. Walekar (Diploma in Mech.) UT, MT, PT, RT		

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Pulley block Weld joint UT

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ULTRASONIC TESTING REPORT

Report No:YNS/UT/04	**Date: 02-04-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**
Part Description	Plate
Material Specification	IS2062 E250BR
Material form	As Rolled
Temperature of job	Ambient
Extent of testing	100%(Accessible Area)

Test Procedure Details

Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Water
Acceptance Standard	ASTM A 435
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	B.W.E. set to 80 % of FSH+6dB Add
Primary Reference	40.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	TR	24	----	4	0 – 50	40.0	46.0

Cables used: 1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	1250x2500x16mmThk. H.No.341049 Pl.No.P2815941	04 Nos.	NRI-Acceptable

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL II Mr. Amar K. Waleka (Diploma in Mech.) UT, MT, PT, RT		

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ULTRASONIC TESTING REPORT

Report No:YNS/UT/34		**Date: 27-04-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**	
Part Description	Pulley Assembly Block	
Material form	As Welded	
Temperature of job	Ambient	
Extent of testing	100%(Accessible Area)	

Test Procedure Details

Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Oil
Acceptance Standard	ASME Sec.V,Sec.VIII Div.1App.12
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	DAC plotted using 19mm SDH block+6dB Add
Primary Reference	43.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	Angle	8x9	70	4	0 – 100	43.0	49.0

Cables used	1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	**Pulley Assembly Block Weld Joints: Weld 16mm thk. to 10mm thk.plate. Weld Length:1900mm Block Sr.Nos. 1,2,3,4**	**04 Nos.**	**NRI-Acceptable**

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL Mr. Amar K. Walekar (Diploma in Mech.) UT, MT, PT, RT		

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Paresh Gaikwad.
B. E. (Civil) MIE, FIV
* Chaartered Engineer
* Govt Reg Valuer CAT I/399
* Competent Person under Factories Act
Office -204, Gulab Court, Shirole Lane, Near PMC Building, Shivajinagar, Pune 411005
Email - pagparesh@gmail.com Phone - 9850747426

RE/2022-23/005 Date: 09.06.2022

To,
National Centre for Radio Astrophysics.
Site Address – GMRT
Khodad Campus
Narayangaon, Tal Junnar
Dist. Pune 410503

STRUCTURAL CONDITION ASSESMENT REPORT

I have been assigned as third party Structural Auditor to check stability of footing and structure of lifting structure installed in GMRT campus for client GMRT, Pune Maharashtra, Structures manufactured by GMRT and design provided by Tata Consulting Engineers Limited.

The following listed firms/persons are associated with the work

Owner - M/s GMRT.

Client's Representative – Mr. A. K. Nandi/ Mr. M D Somwanshi

Name of Structure – Lifting Towers

No of Structure – 04 No (As per attached drawings)

I hereby certify and confirm adequacy of the structural design for intended use represented through structural drawings of lifting columns and foundation block issued by the client.
Based on as build drawing and site visit report after completion the details of structure is as follows

1) Description of structure – Lifting column and foundation block
2) Type of Work – Fixing of Square Tube and foundation plate on concrete block
3) Size of structure - Refer Table No 1
4) Type of section –
5) Lifting capacity of column -40000 Kg for 4 columns
6) Height of Tower – 24.75 m
7) Grade of Concrete - M30

Paresh Gaikwad.
B. E. (Civil) MIE, FIV
* Chaartered Engineer
* Govt Reg Valuer CAT I/399
* Competent Person under Factories Act
Office -204, Gulab Court, Shirole Lane, Near PMC Building, Shivajinagar, Pune 411005
Email - pagparesh@gmail.com Phone - 9850747426

The details of the structure is as follows Table No 1

Sr No	Description	Details
1	Size of foundation block	1300 x 13000 x 450 mm
2	No of foundation blocks	04
3	Volume of Concrete	0.76 m^3
4	Top Steel & Bottom steel	16 mm bar in both directions @ 170 mm c/c in both directions
5	Tower crane section	Vertical section – ISA 75 x 75 x 8 Inclined bracing pipe – 25 mm dia, 2.60 mm thick Horizontal bracing pipe - 25 mm dia, 2.60 mm thick Locking Pin – 30 mm dia 132 mm long Gusset plate – 59 x 59 x10 (L X B X H)
6	Horizontal Bracing & Cross bracing	76 mm dia pipe 4.50 mm thick, dimensions as per drawings 20 pipes in one column
7	Spacing of columns	X Direction – 9176 mm C/C Y Direction – 6800 mm C/C

Further confirm that the structural design is based upon relevant Indian Standard Codes Especially –

1. IS 800 - Code of Practice for Steel Structure

As a Consulting Engineer my responsibilities are limited for checking Structural design and drawings in accordance with the provisions of relevant prevailing Indian Standard codes and visit to site at specified stages called for by the supervision Engineer for verification of Joining of Steel structures and their installation on site as per drawing.

All issues related to supervision, materials, workmanship are the sole responsibility of the Supervising Engineer and visits made by the Structural Consultant are not for the Supervision, since I am not responsible for supervision and quality of work.

Paresh Gaikwad * M-15398-1 891 of 2019-20 Chartered Engineer & Govt. Valuer

Paresh Gaikwad.
B. E. (Civil) MIE, FIV
* Chaartered Engineer
* Govt Reg Valuer CAT I/399
* Competent Person under Factories Act
Office -204, Gulab Court, Shirole Lane, Near PMC Building, Shivajinagar, Pune 411005
Email - pagparesh@gmail.com Phone - 9850747426

I have inspected the structure on site on 07.06.2022 and found that the fabricated structures and precast footing sections are built as per drawing designed by T.C.E. and it is stable (steel structure and precast footing section) to unload the existing dish structure.

This certificate is issued on the clear understanding that overall design responsibility for safety in lowering the dish structure and proper performance of structural design ceases, moment any addition and or alteration or any damage to structural frame is caused by accident or by tampering with geometrical sections of structural members for any purpose whatsoever or due to overloading of the structure or lack of maintenance or any act that is detrimental to the structure as a whole.

This certificate is issued in conjunction with the certificate of licensed Engineer/Owner certifying the quality of work

Paresh

Paresh Gaikwad
Chartered Engineer
B. E. Civil MIE FIV

This certificate is valid for 02 years from date of issue.

Paresh Gaikwad * M-15398-1 891 of 2019-20 Chartered Engineer & Govt. Valuer

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ULTRASONIC TESTING REPORT

Report No:YNS/UT/122	**Date: 11-06-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**
Part Description	Lifting T Bracket
Material Specification	IS 2062 E 250BR
Material form	As Welded
Temperature of job	Ambient
Extent of testing	100%(Accessible Area)
Test Procedure Details	
Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Oil
Acceptance Standard	ASME Sec.V,Sec.VIII Div.1App.12
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	DAC plotted using 19mm SDH block+6dB Add
Primary Reference	27.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	Angle	8x9	70	4	0 – 100	27.0	33.0

Cables used	1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	**Lifting T Bracket Weld Joints: 12mm Bottom Lug, 20mm Top Lug,T Joint Weld(All Weld Joints) Job Sr.Nos. 1,2,3,4**	**04 Nos.**	**NRI-Acceptable**

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL II Mr. Amar K. Walekar (Diploma in Mech.) UT, MT, PT, RT		

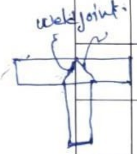
BEST IN NDT & INSPECTIONS

C03 Inspection Report

Inspected By: DVW / AKN

Date Of Inspection: 4/06/2022

Inspection Detail: TBracket welding Inspection.



Sl	Area / Part	Description of Inspection	Required Value	Obseration
	T-Bracket Welding Inspection			
	(1) ISMB 250 Flange to	— Qty	2Nos joints	Per bracket
	Flange Groove	joint (J1)	(top & bottom)	
		Total	- 4 brackets	(2x4 = 8 joints)
	— Root run	DP test carried out	and found	Satisfactory
	— ~~[illegible]~~			
	(2) ISMB 250 Web to	— Qty 2nos	joints per bracket (J2)	
	web fillet joint (J2)	— Total 4	brackets (8 joints)	
	— Final	Weld DP test	done & found	Satisfactory

Remarks:

Inspected By

Sign D.V.Watharij

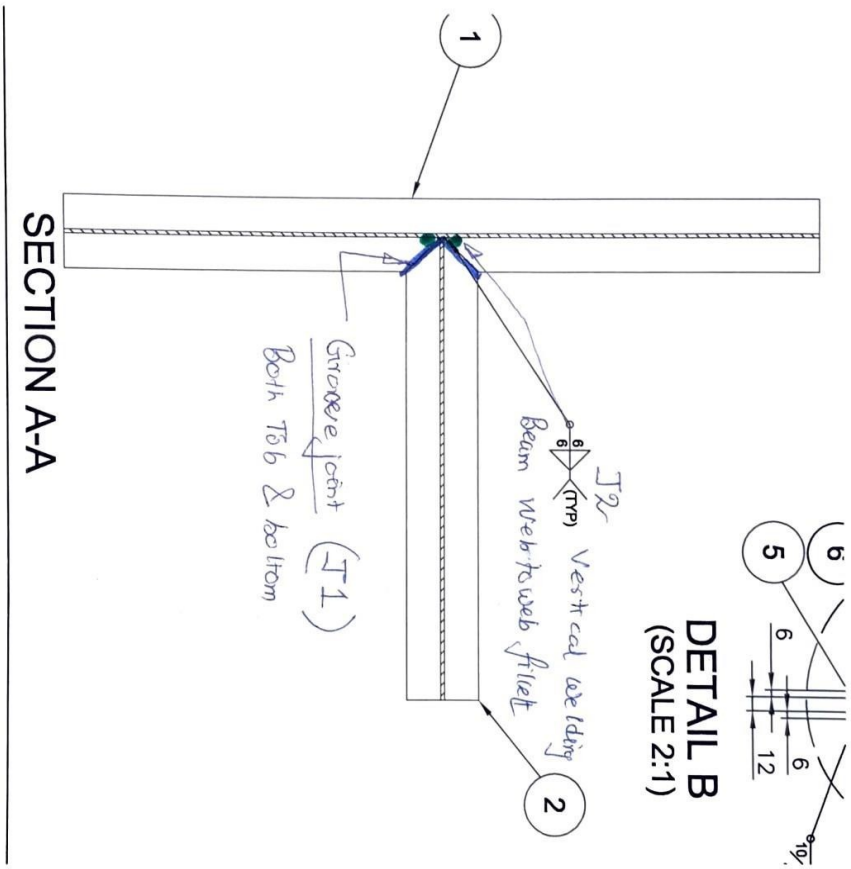
C.M.D. Somavanshi

AKNandi

Patil

Approved

Sign



C03 Inspection Report

Inspected By: AKN

Date Of Inspection: 7/6/2022 & 8/6/2022

Inspection Detail: DP Test of weld joints.

Sl	Area / Part	Description of Inspection	Required Value	Obseration
.	T Bracket Welding Inspection			
①	D Test & final for stiffener to beam welding as shown in the drawing –	DP tests carried out for all 4 Nos T-Bracket. Minor defects observed are rectified and DP Test carried out on rectified areas and found satisfactory, – Qty Inspected – 4 Nos T Bracket. (4 joints Per bracket) 8/6/2022.		

Remarks:

Inspected By

Sign

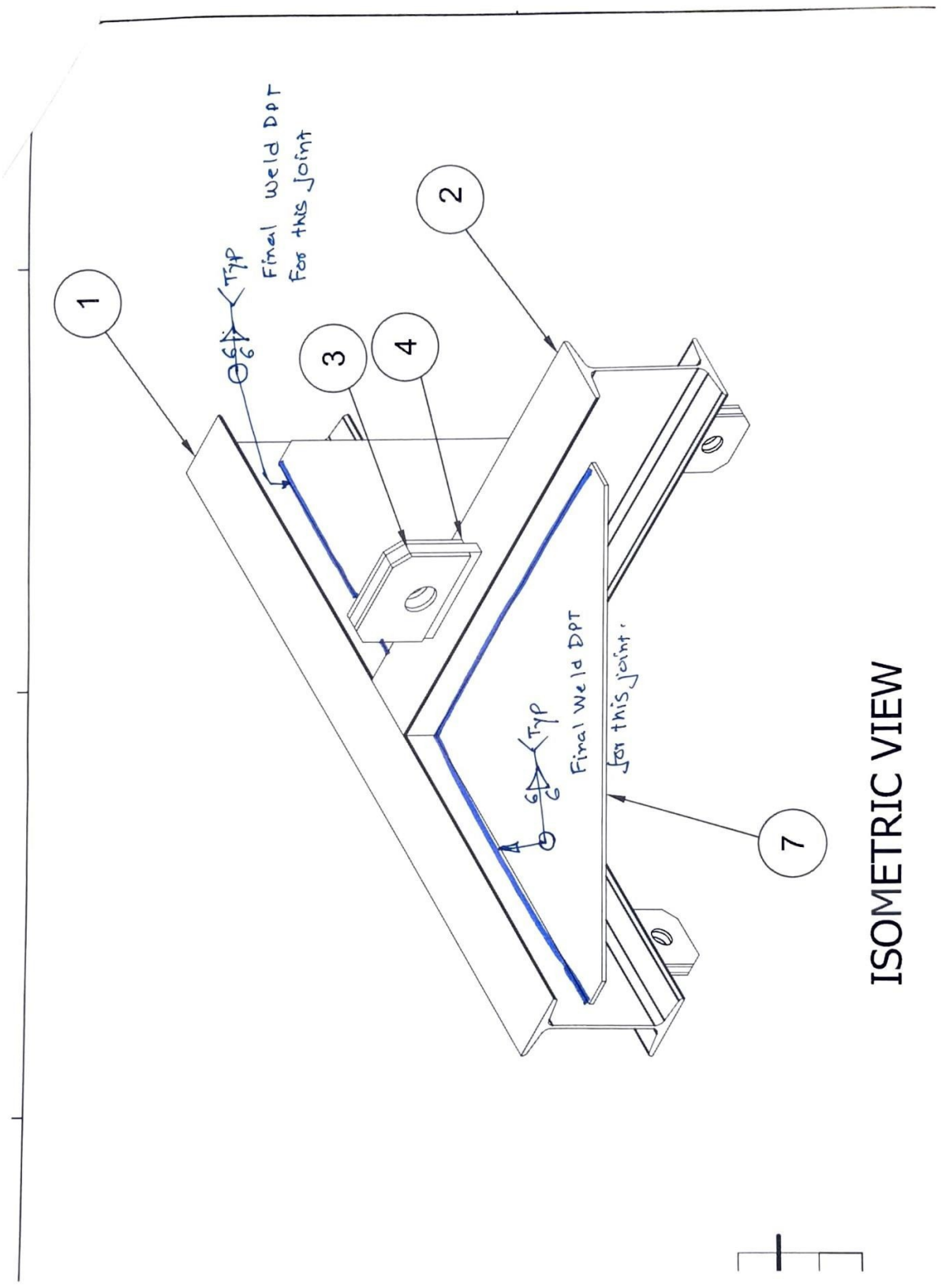
Approved

Sign

Patil

(M.D. Sonawane)

8/6/2022.


1
2
3
4
7
Typ
Final Weld DPT
For this Joint
Typ
Final Weld DPT
For this Joint
ISOMETRIC VIEW

VFD synchronization for 2 T Load

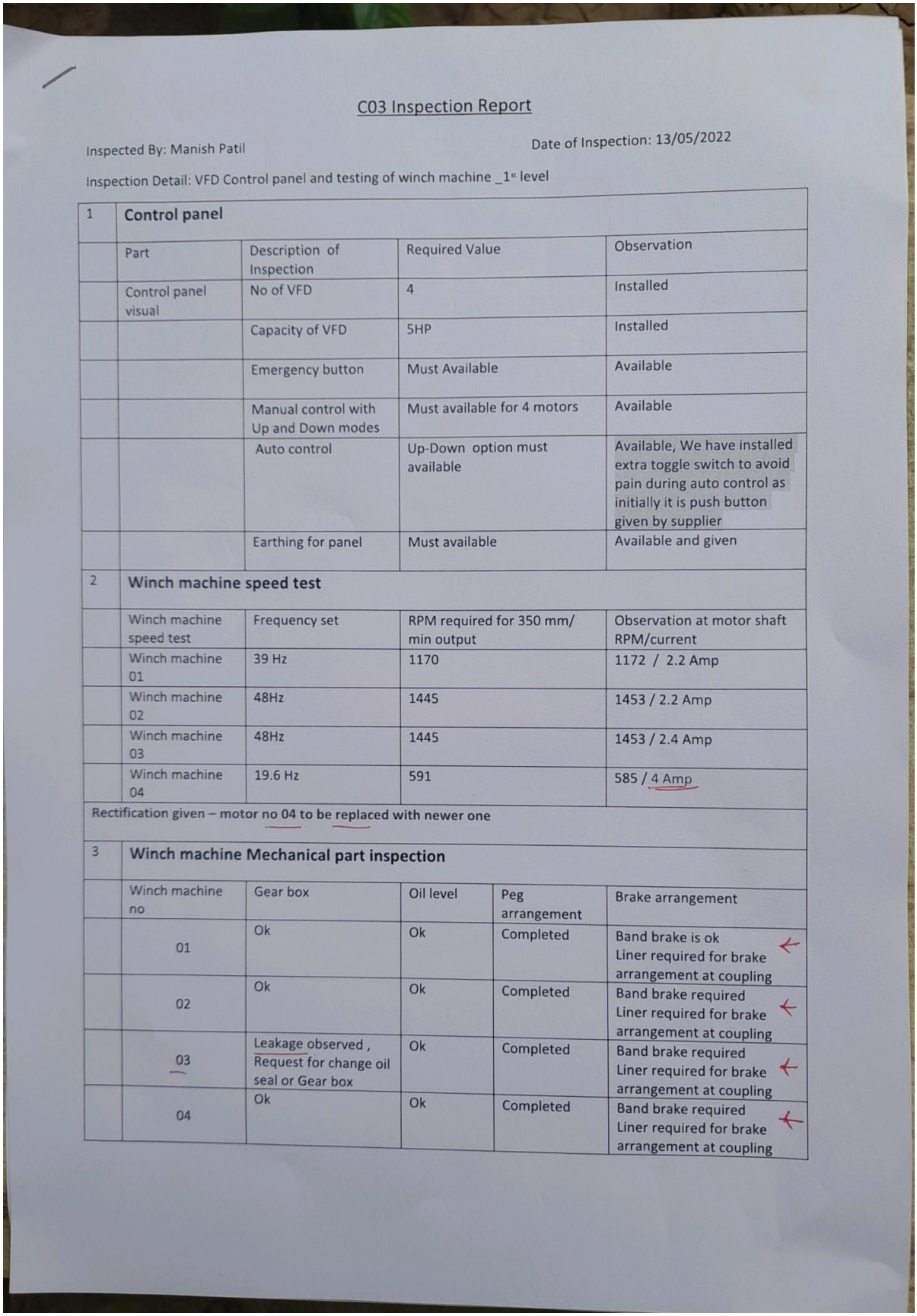
date:- 14/6/22.

Winch m/c no.	speed at drum out in mm	speed at 2T load in mm	RPM @ motor	VFD freq.
01	350	350	653	21.9
02	350	365	1200	40.11
03	340	270 *	900	30.10
04	356	230 *	321	10.94

* - 2T load is not in square shape.

Patil M.S. M.D. Somwanshi B.K.Nandi

Note: Speed at 2T load useful for 12 hrs loading.



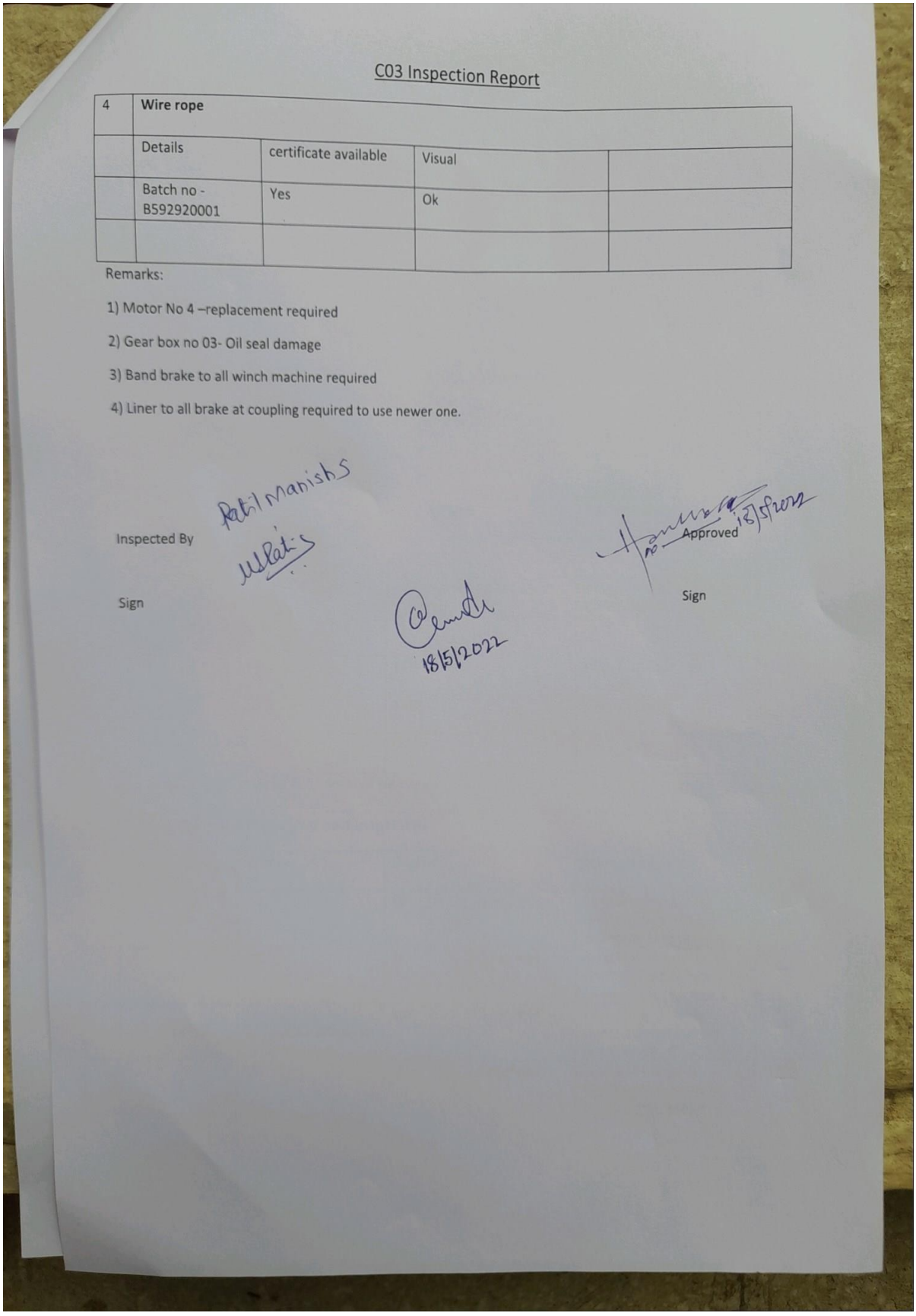
C03 Inspection Report

Inspected By: Manish Patil

Date of Inspection: 13/05/2022

Inspection Detail: VFD Control panel and testing of winch machine _1st level

1	**Control panel**			
	Part	Description of Inspection	Required Value	Observation
	Control panel visual	No of VFD	4	Installed
		Capacity of VFD	5HP	Installed
		Emergency button	Must Available	Available
		Manual control with Up and Down modes	Must available for 4 motors	Available
		Auto control	Up-Down option must available	Available, We have installed extra toggle switch to avoid pain during auto control as initially it is push button given by supplier
		Earthing for panel	Must available	Available and given
2	**Winch machine speed test**			
	Winch machine speed test	Frequency set	RPM required for 350 mm/ min output	Observation at motor shaft RPM/current
	Winch machine 01	39 Hz	1170	1172 / 2.2 Amp
	Winch machine 02	48Hz	1445	1453 / 2.2 Amp
	Winch machine 03	48Hz	1445	1453 / 2.4 Amp
	Winch machine 04	19.6 Hz	591	585 / 4 Amp
Rectification given – motor no 04 to be replaced with newer one				
3	**Winch machine Mechanical part inspection**			
	Winch machine no	Gear box	Oil level	Peg arrangement	Brake arrangement
	01	Ok	Ok	Completed	Band brake is ok Liner required for brake arrangement at coupling
	02	Ok	Ok	Completed	Band brake required Liner required for brake arrangement at coupling
	03	Leakage observed , Request for change oil seal or Gear box	Ok	Completed	Band brake required Liner required for brake arrangement at coupling
	04	Ok	Ok	Completed	Band brake required Liner required for brake arrangement at coupling



C03 Inspection Report

4	**Wire rope**			
	Details	certificate available	Visual	
	Batch no - B592920001	Yes	Ok	

Remarks:

1) Motor No 4 –replacement required

2) Gear box no 03- Oil seal damage

3) Band brake to all winch machine required

4) Liner to all brake at coupling required to use newer one.

Inspected By Patil Manish S

Sign 18/5/2022

Approved 18/5/2022

Sign

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ULTRASONIC TESTING REPORT

Report No:YNS/UT/23	**Date: 18-04-2022**
Name of the client	**M/S NCRA-TIFR, Pune.**
Part Description	Wire Rope Pulley
Material Specification	EN9
Material form	As Machined
Temperature of job	Ambient
Extent of testing	100%(Accessible Area)
Test Procedure Details	
Technique used	A scan, Pulse echo, Direct contact
Equipment	Digiscan DS322 (Sr.No.DSC199AQ)
Couplant used	Oil
Acceptance Standard	ASTM A 388
Basic calibration block	I. I.W. V2 block. Job It Self
Reference reflector	B.W.E. set to 80 % of FSH+6dB Add
Primary Reference	40.0 dB

Search Unit / Probe No.	Search Unit / Probe make	Type of search unit	Size of search unit	Angle in Degree	Frequency MHz	Scale used in mm.	Reference gain level (dB)	Scanning gain level (dB)
117	EEC	TR/N	10	----	4	0 – 50,125	40.0	46.0

Cables used	1.5 mtrs long, co axial cables fixed with above probes as a single unit.

Evaluation Details

Sr. No.	Size	Qty.	Observation Remarks
1	**Wire Rope Pulley- OD 338mm. Inner thk.Measured-10mm. Hub thk.measured-60mm.**	**12 Nos.**	**NRI-Acceptable**

Note:1.NRI- No Recordable Indication

Test performed by	Client Representative	Witnessed By
NDT LEVEL II Mr. Amar K. Walekar (Diploma in Mech.) UT, MT, PT, RT		

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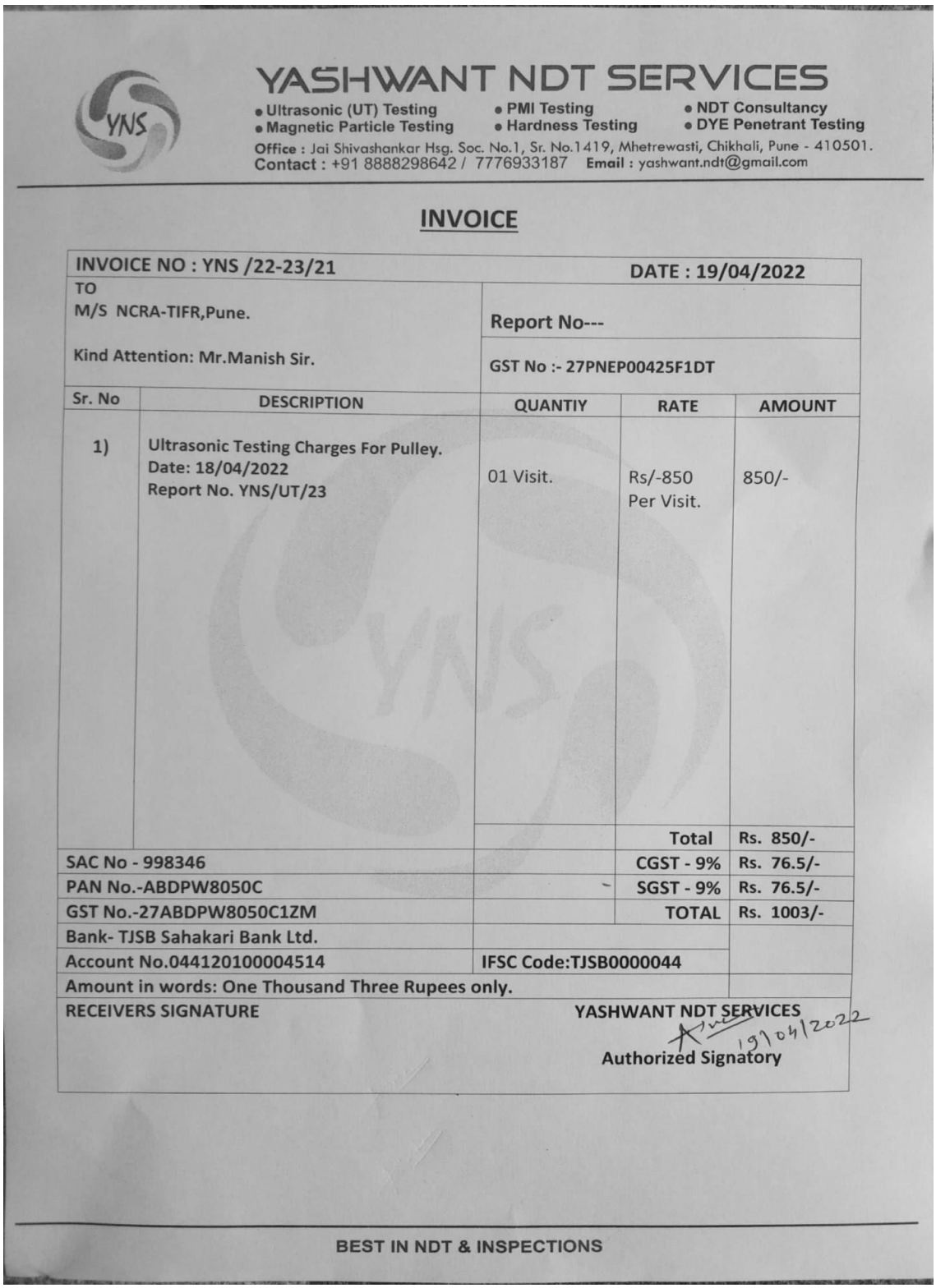

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Office : Jai Shivashankar Hsg. Soc. No.1, Sr. No.1419, Mhetrewasti, Chikhali, Pune - 410501.
Contact : +91 8888298642 / 7776933187 Email : yashwant.ndt@gmail.com

INVOICE

INVOICE NO : YNS /22-23/21			DATE : 19/04/2022	
TO M/S NCRA-TIFR,Pune. Kind Attention: Mr.Manish Sir.		Report No--- GST No :- 27PNEP00425F1DT		
Sr. No	DESCRIPTION	QUANTIY	RATE	AMOUNT
1)	Ultrasonic Testing Charges For Pulley. Date: 18/04/2022 Report No. YNS/UT/23	01 Visit.	Rs/-850 Per Visit.	850/-
			Total	Rs. 850/-
SAC No - 998346			CGST - 9%	Rs. 76.5/-
PAN No.-ABDPW8050C			SGST - 9%	Rs. 76.5/-
GST No.-27ABDPW8050C1ZM			TOTAL	Rs. 1003/-
Bank- TJSB Sahakari Bank Ltd.				
Account No.044120100004514		IFSC Code:TJSB0000044		
Amount in words: One Thousand Three Rupees only.				
RECEIVERS SIGNATURE		YASHWANT NDT SERVICES 19/04/2022 Authorized Signatory		

BEST IN NDT & INSPECTIONS

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For more report click on

C03QPD - Google Drive