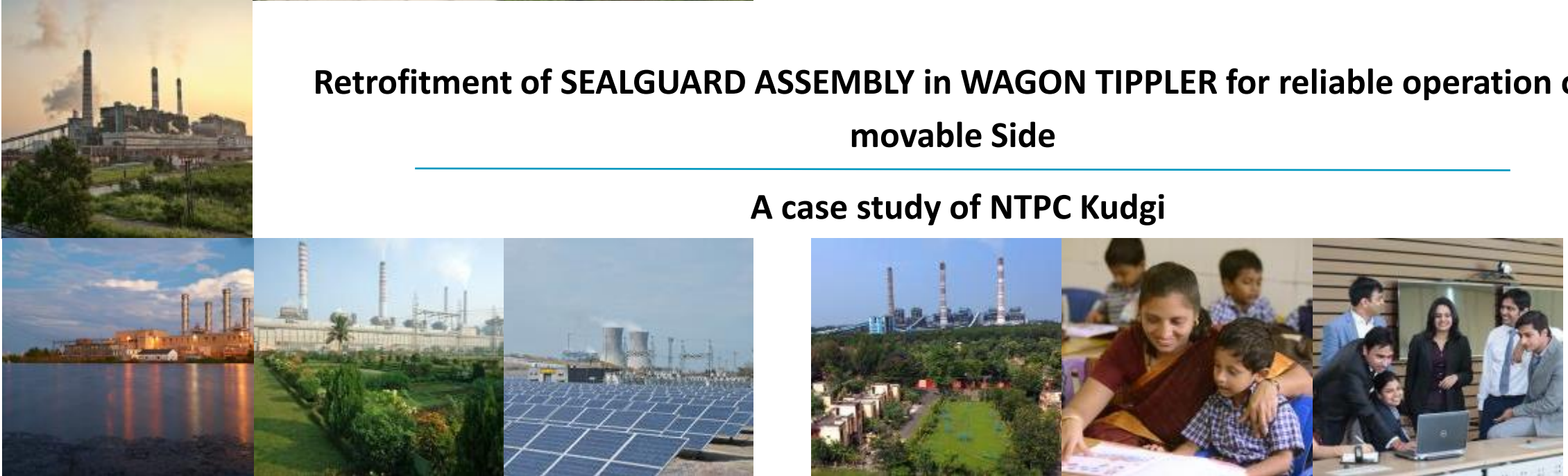




## Retrofitment of SEALGUARD ASSEMBLY in WAGON TIPPLER for reliable operation of movable Side

### A case study of NTPC Kudgi



**PRESENTED BY :** HIMANSHU KR , DGM (FHMM) – Main Author  
Manish Kumar Sah , AGM ( FHMM) - Co - Author



# Let us start from SAFETY !!!



# Plan of Presentation

- ❑ Basics of NTPC KUDGI Plant & CHP layout
- ❑ Problem Statement
- ❑ Modelling of Wagon Tippler Seal Guard
  - Phase 1 – Concept Modelling
  - Phase 2- Functional Testing
  - Phase 3 – Revalidation Phase
- ❑ Conclusion



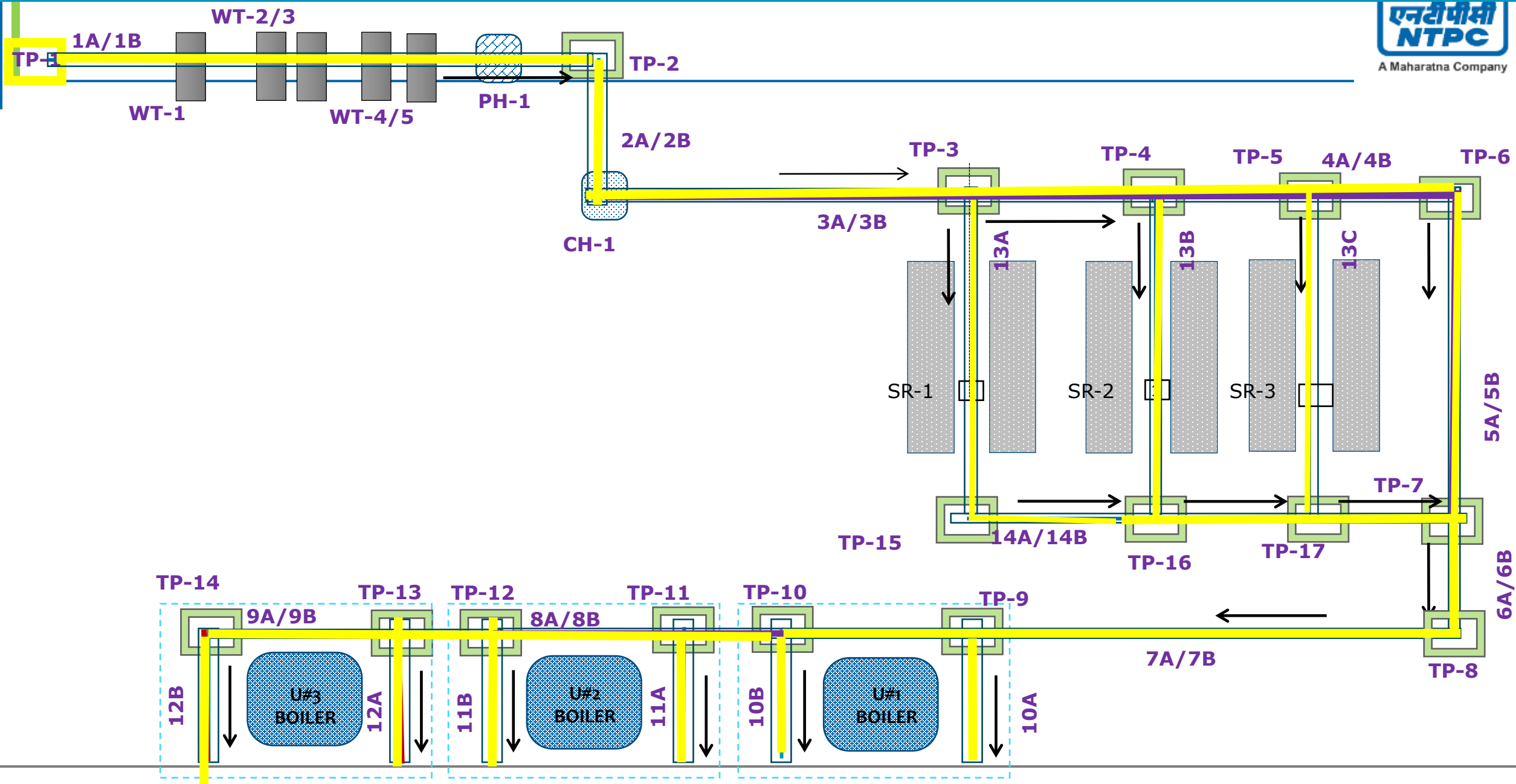
## BASIC FEATURES OF NTPC KUDGI

About the Project	The Project is under operation for the benefit of States of Southern Region. Power allocation is Karnataka (50%), Telangana (17%), Tamilnadu (15%), Kerala 5%, Un allocated (15%)
Plant Capacity	2400 MW (3 units of 800 MW )
Water Source	Almatti Reservoir in Krishna River (18 Km)
Coal Source	NTPC Mines PAKRI BARWADIH (2028Kms Distance) SCCL (800 Kms distance), Imported , e-auctioned etc
Plant Location	Site is near to Kudgi Village, Basavana Bagewadi Taluk of Vijayapur district of Karnataka

## BASIC DETAILS OF “CHP” AT NTPC KUDGI

<b>Conv Belt details</b>	<b>Width 2200 MM, about 22 km length 1250 NN 5/4, 1600 NN 5/4, ST 2000</b>
Wagon Tipler	05 Numbers Make :TRF
Crusher/ VSF	04 Numbers Make :Thyssen krupp
BWSRs	03 Numbers Make: Ms Sandvik Asia (FLSmidth) & Ms Elecon
Conveyor Details	Total 29 Conveyors, 17 no TPs

# LAYOUT DIAGRAM of CHP





WAGON TIPPLER at KUDGI



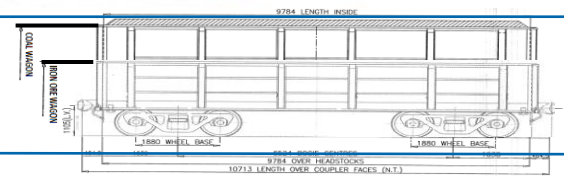
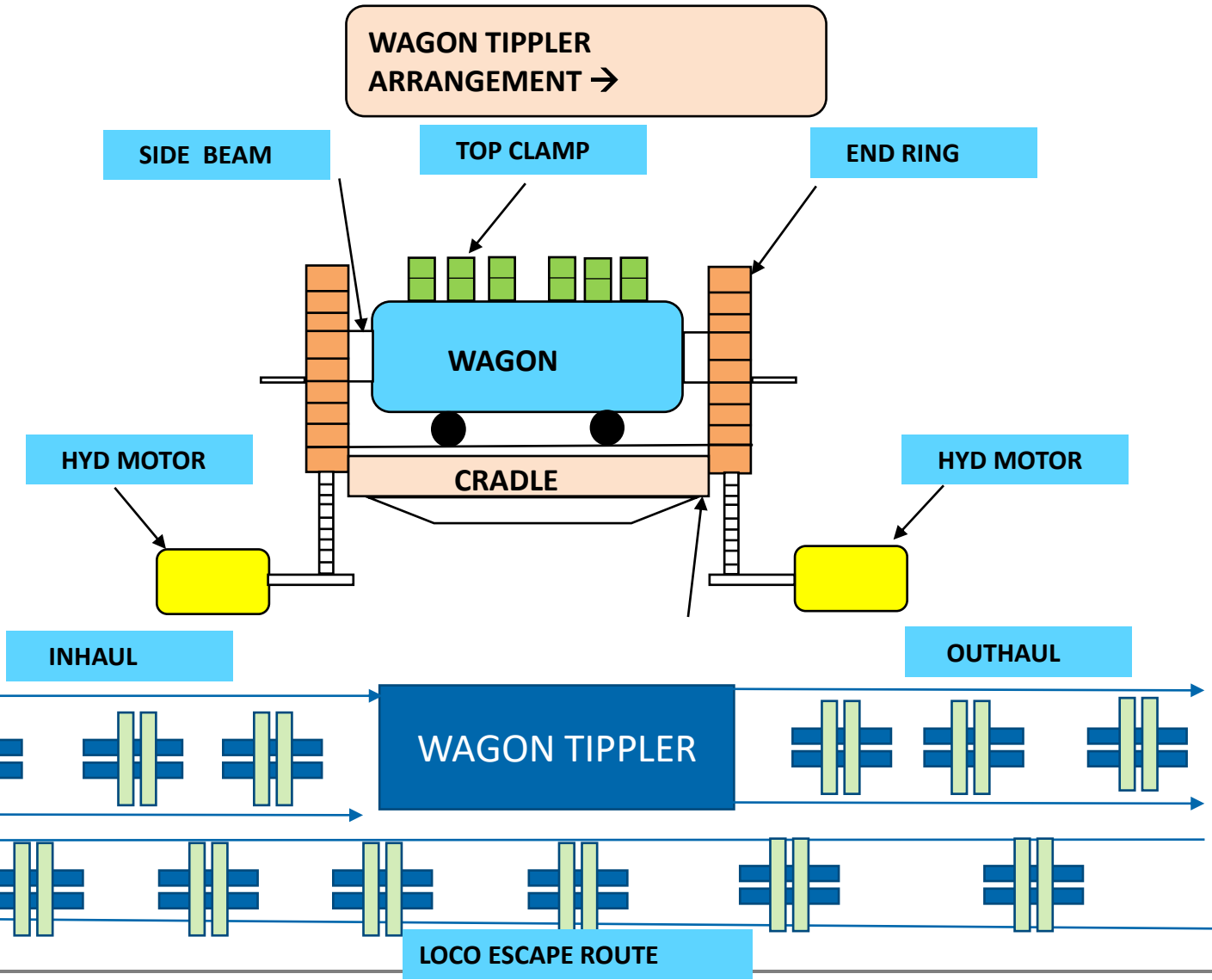
realme

Shot by HIMANSHU

2022.12.24 10:57



# Basic Outline of KUDGI WAGON TIPPLER





# PROBLEM STATEMENT – SIDE BEAM NOT TOUCHING WAGON PROPERLY



As per RDSO Guidelines  
consult the concerned zonal railway for this confirmation) suitable slots shall be provided in the side support beam, to permit the top clamping of the wagons] **There shall be metal to metal contact between the side support beam and the side stanchions of the wagon i.e. no rubber pad or any other alternative, shall be provided on the contact face of the side support beam**





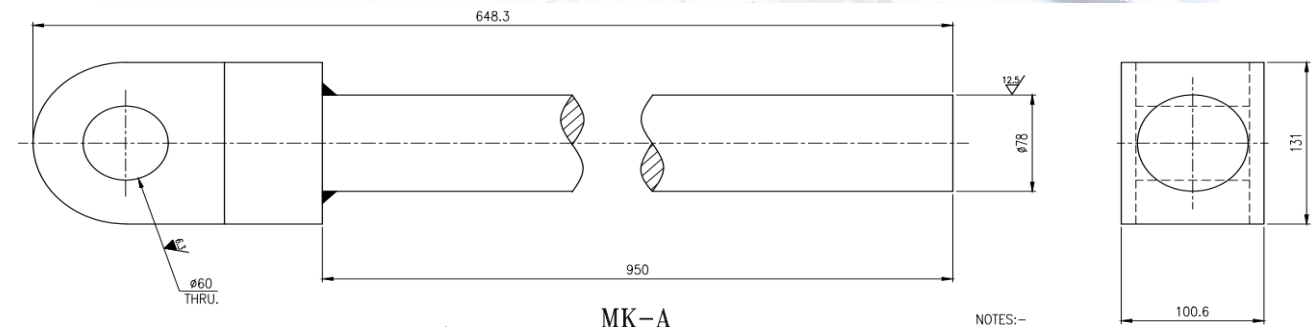
# EFFECT SIDE BEAM NOT TOUCHING WAGON PROPERLY





# PROBLEM STATEMENT – SIDE BEAM NOT TOUCHING WAGON PROPERLY

- e. **Tippling angle of coal wagons to be increased:** Refer MOM "TRF has agreed to experimentally increase the tippling angle of one tippler to 140 degree initially and later increase in incremental steps of 1 degree upto 145 degree based on site condition "
- f. **Reduce unloading time:** M/s TRF have already demonstrated 25 tips per hour (rounded off). During PG test we understand from site that due to obstruction of Dust for side movable clamp, it took more than 5 seconds during function of the guide rod of the side movable clamp. After greasing the guide rod properly 25 tips per hour can be reached. However we feel not to disturb the wheel choker location and SAC speed margin enhancement as it may cause vibration in the SAC. However, we are looking for the alternative solution for further improvement in the capability beyond 25 tips per hour
- g. **To supply operational spares as requested and ordered by NTPC:** We shall be submitting our offer as & when required.
- h. **Wagon Tippler modification -** For Top beam of all 5 (five) wagon tipplers, following strengthening had been carried out as per attached Sketch as annexure-IV:
  - i. 6 nos 300mm dia cutouts on top flange to be covered & welded with 450mm dia 25thk plate.
  - ii. 6 nos 200mmx350mm cutouts in side web to be covered & welded with 350mmx500mm 12thk plate.
  - iii. 2 nos 400mm x 250mm 20thk plate to be welded on each side clamp arm of all wagons tipplers
- i. **Status for misc. points as per MOM dated 05-11-2019**
  - i. **Load Cell** – We along with our Vendor Avery have upgraded the tripod arrangement design to eliminate/minimize this issue.
  - ii. **NTLS Problem** – Please refer the attached mail as annexure-V showing alternate proximity type switch mounted on screw cam limit switch as per MOM.
  - iii. **Wagon Tippler Axial Piston Pump failure problem:** TRF had already agreed to provide all necessary support whenever required on NTPC's account as per MOM.
  - iv. **Movable side beam** -During PG test we understand from site that due to obstruction of Dust for side movable clamp, it took more time during function of the guide rod of the side movable clamp. After greasing, the guide rod may work properly & the efficiency can be increased. This item is subjected to continuous maintenance supervision for smooth and efficient functioning.



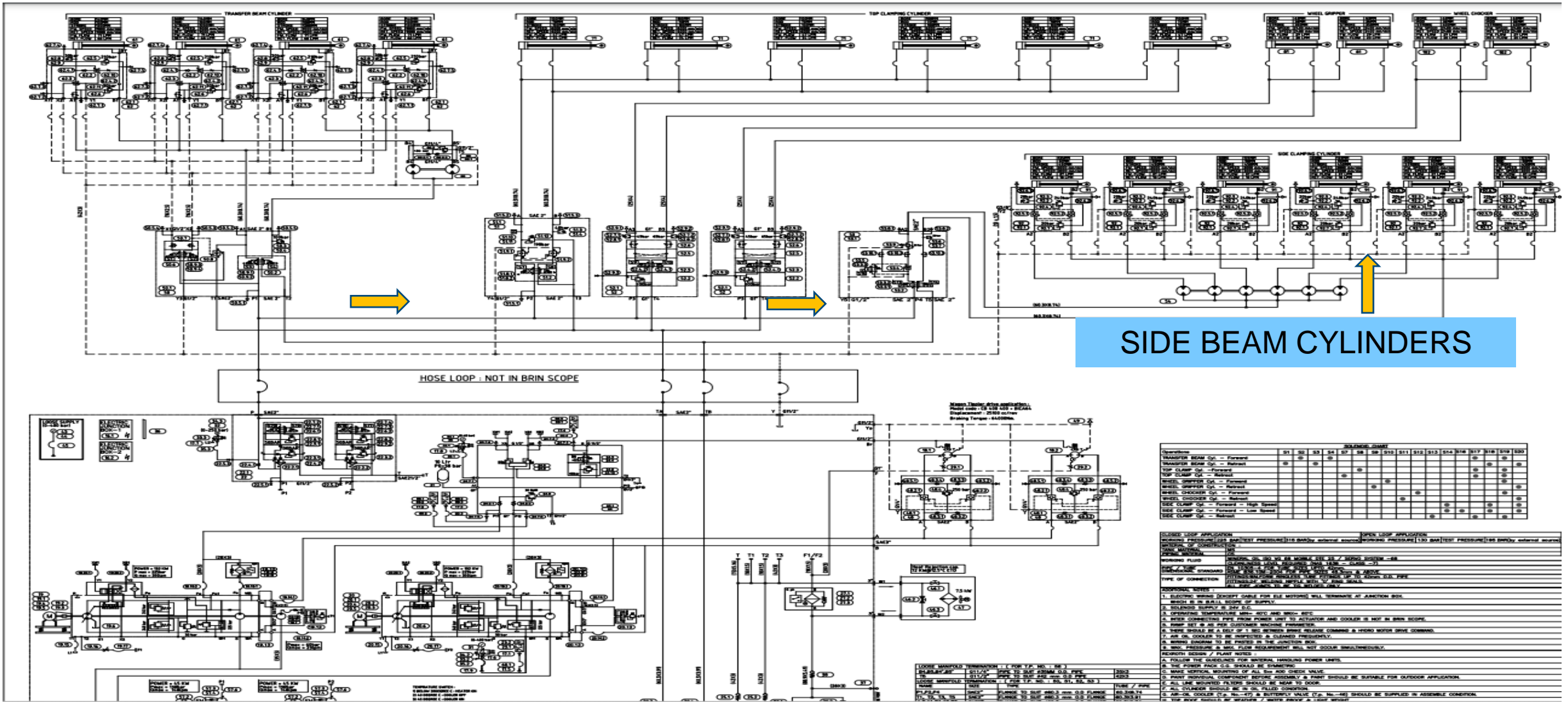
## OEM PG TEST REMARKS



## PROBABLE CAUSE OF PROBLEM

Probable Cause	Action Taken
Flow cum pressure at each cylinder end not same	Pressure Checking done . Flow divider is not at centre. (Inhaul side – 12 mtr / Outhaul side – 2 mtr) Equalisation of all cylinders done if it is required.
Obliquity of Side Beam (Taperness)	Not very significant
Cylinder Forward MOVEMENT not even	Being checked on regular interval but may change
Guide shaft material being soft and high stress stiffening	Material is soft . Future procurement high grade can be used
Cylinders damage like bent piston or internal leakage	Cylinder replacement to be done if found
Pressure Switch healthiness	Regular operational checks
Misalignment of Guide Shaft	Checked and old guide shaft replaced with new one and alignment checked – Aug 2022

# HYD. CIRCUIT OF SIDE BEAM OPERATION



**SIDE BEAM CYLINDERS**

Operation	S1	S2	S3	S4	S7	S8	S9	S10	S11	S12	S13	S14	S16	S17	S18	S19	S20
TRANSFER BEAM Cyl. - Forward	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
TRANSFER BEAM Cyl. - Retract	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
TOP CLAMP Cyl. - Forward	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
TOP CLAMP Cyl. - Retract	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
WHEEL GRIPPER Cyl. - Forward	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
WHEEL GRIPPER Cyl. - Retract	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
WHEEL CHOOSER Cyl. - Forward	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
WHEEL CHOOSER Cyl. - Retract	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
SIDE CLAMP Cyl. - Forward - High Speed	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
SIDE CLAMP Cyl. - Forward - Low Speed	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
SIDE CLAMP Cyl. - Retract	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙

**OPEN LOOP APPLICATION**  
 Maximum Working Pressure: 130 bar (1875 psi)  
 Maximum Flow: 100 L/min (2.64 gpm)  
 Maximum Torque: 4400 Nm (3230 ft-lb)

**CLOSED LOOP APPLICATION**  
 Maximum Working Pressure: 130 bar (1875 psi)  
 Maximum Flow: 100 L/min (2.64 gpm)  
 Maximum Torque: 4400 Nm (3230 ft-lb)

**OPERATING INSTRUCTIONS:**

1. ELECTRICAL WIRING (EXCEPT CABLE FOR EYE MONITOR) WILL TERMINATE AT JUNCTION BOX.
2. BLEEDING SUPPLY IS 20% OIL.
3. OPERATING TEMPERATURE MIN: -40°C AND MAX: 60°C.
4. WHEN CONNECTING PIPE FROM POWER UNIT TO ACTUATOR AND COOLER IS NOT IN BRIN SCOPE.
5. PUMP SET @ AS PER CUSTOMER MACHINE PARAMETERS.
6. TUBE SHOULD BE 1.5 TIMES STRONGER THAN CRANE COMMAND & WORK WITH DRIVE COMMAND.
7. AIR OIL COOLER TO BE INSPECTED & CLEANED FREQUENTLY.
8. WHEEL GRIPPER TO BE INSPECTED & CLEANED FREQUENTLY.
9. WHEEL CHOOSER & WHEEL GRIPPER TO BE INSPECTED & CLEANED FREQUENTLY.
10. WHEEL CHOOSER & WHEEL GRIPPER TO BE INSPECTED & CLEANED FREQUENTLY.

**PROOFING SIGNATURE / PLANT NOTES:**

- A. FOLLOW THE DIMENSIONS FOR INTERNAL HANDLING POWER LINES.
- B. THE POWER PACK O.G. SHOULD BE STANDARD.
- C. THE POWER PACK O.G. SHOULD BE STANDARD.
- D. ALL PARTS AND MATERIALS SHOULD BE OF THE BEST QUALITY.
- E. PAINT INDIVIDUAL COMPONENT BEFORE ASSEMBLY & FINISH SHOULD BE SUITABLE FOR OUTDOOR APPLICATION.
- F. ALL LUBRICATION POINTS SHOULD BE MARKED CLEARLY.
- G. ALL CLAMPERS SHOULD BE IN OIL FILLED CONDITION.
- H. AIR-OIL COOLER (I.P. No. 47) & BUTTERFLY VALVE (I.P. No. 48) SHOULD BE SUPPLIED IN ASSEMBLY CONDITION.
- I. THE PUMP SHOULD BE WHEELER / WORTH VALVE (I.P. No. 49).

# PREVENTIVE REMEDIAL STEP FOR SIDE BEAM PROBLEM – GUIDE ROD GREASING AFTER COMPLETION OF EACH RACK TIPLING

## GUIDEROD GREASING PERMIT (ANNUAL YEAR 2023-24)

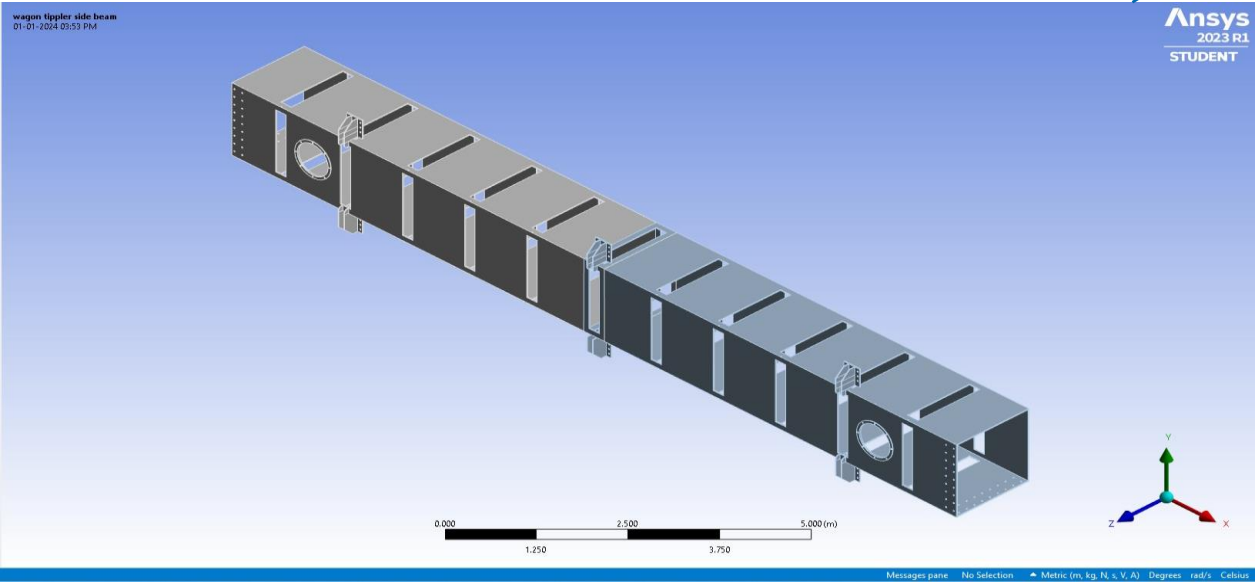
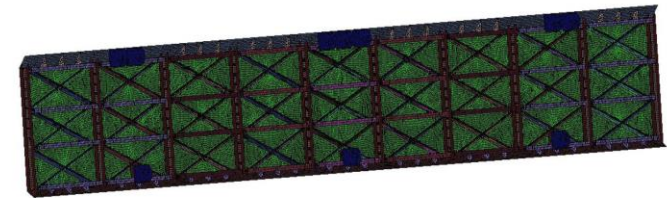
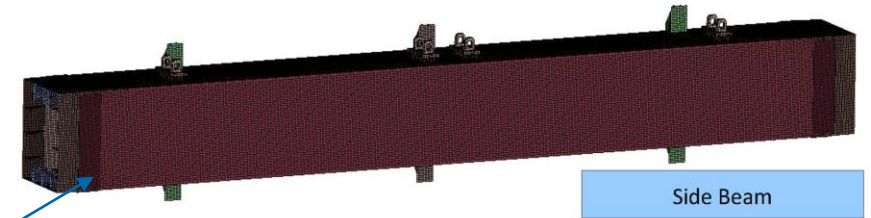
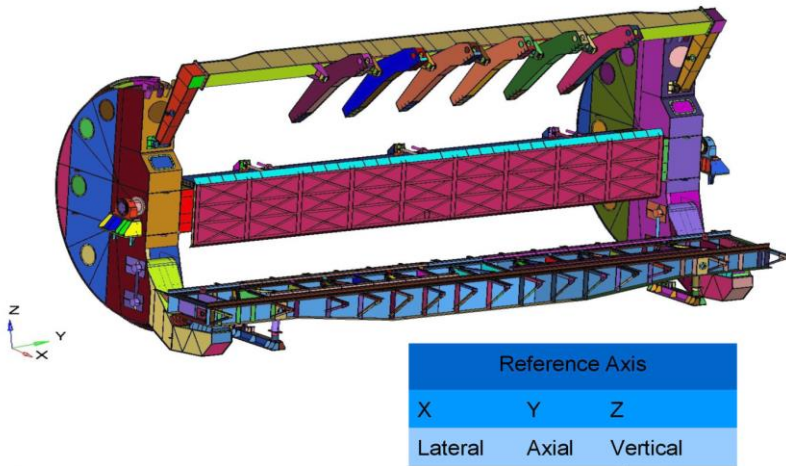




# PREVENTIVE REMEDIAL STEP FOR SIDE BEAM PROBLEM – GUIDE ROD GREASING AFTER COMPLETION OF EACH RACK TIPLING



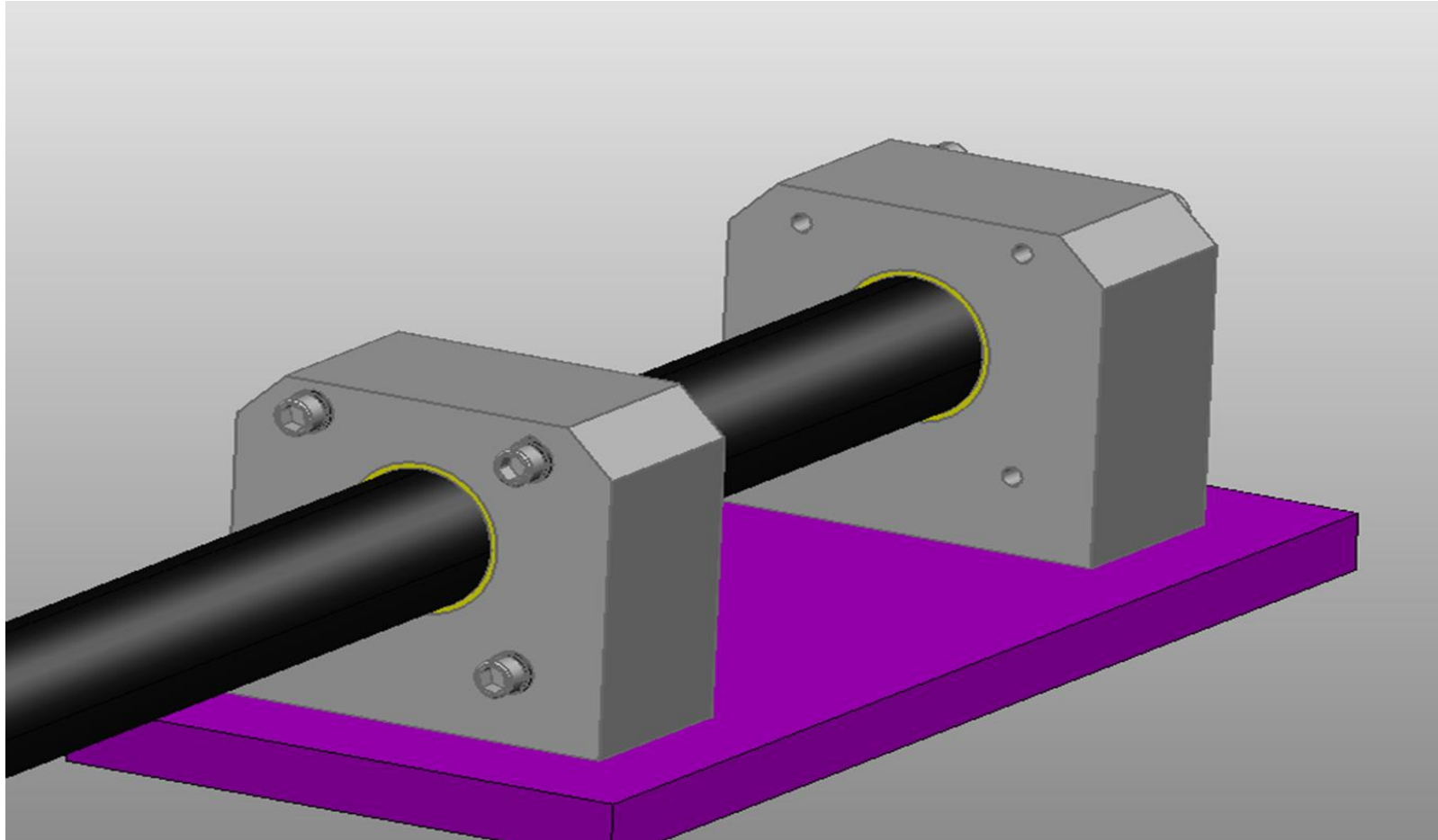
# MODELLING OF WAGON TIPPLER SEAL GUARD



Project Life Cycle Steps	Timeline
Phase -1 : Concept Modelling	June- Aug 2023
Phase -2 : Functional Testing	Sep – Nov 2023
Phase -3 : Revalidation	Dec – May 2024



# SEALGUARD ASSEMBLY DEVELOPMENT – CONCEPT MODELLING

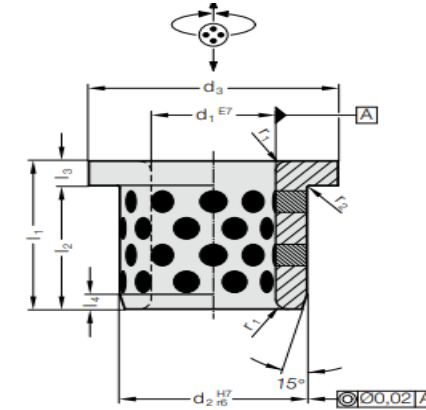
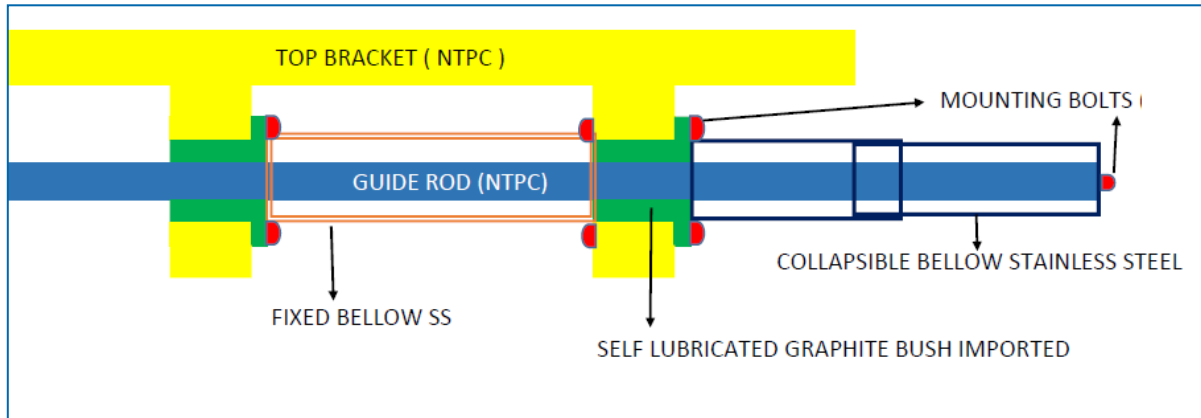


OLD DESIGN

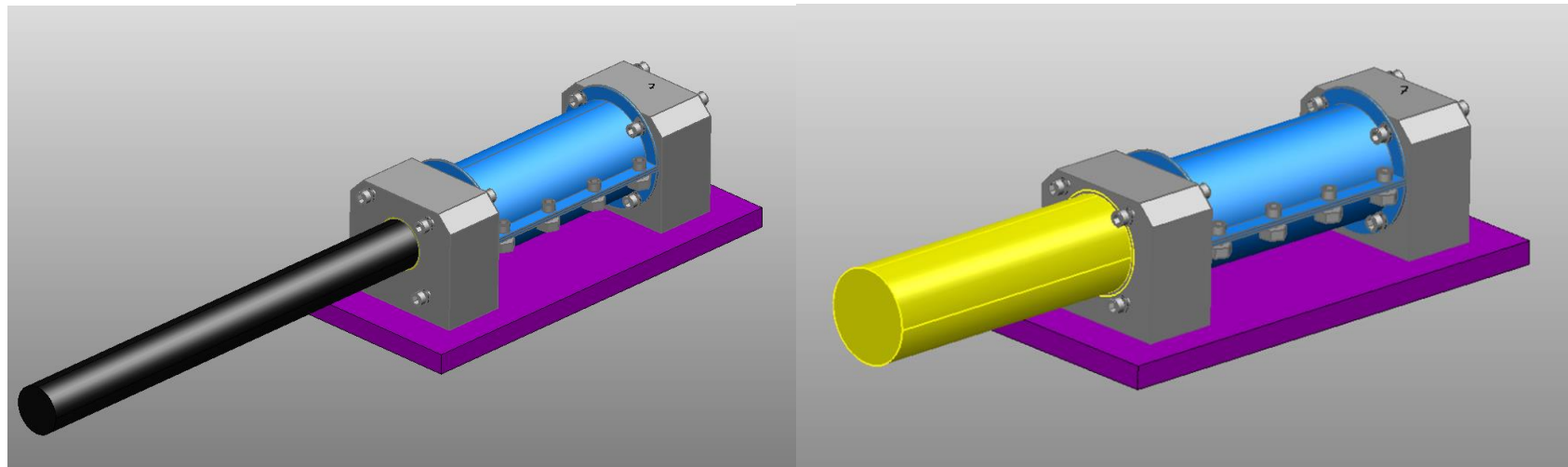
Old Design – Shaft movement with PB2 Bush in open environment exposed to dust



# SEALGUARD ASSEMBLY DEVELOPMENT – CONCEPT MODELLING

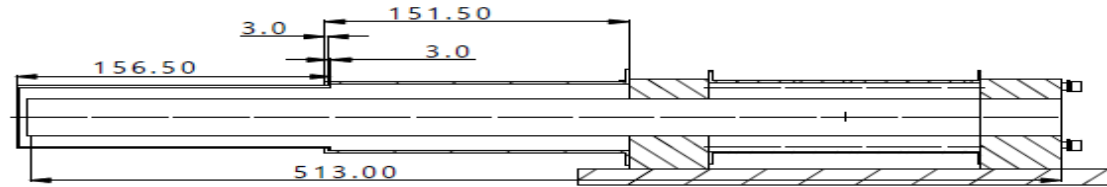
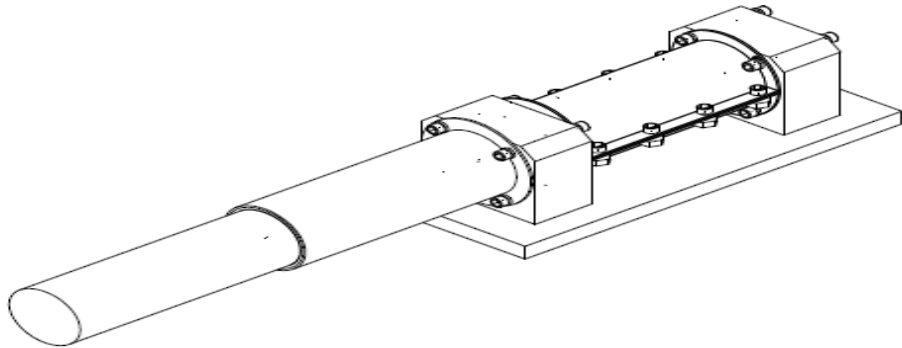


**Material:**  
Bronze with solid lubricant, oilless lubricating

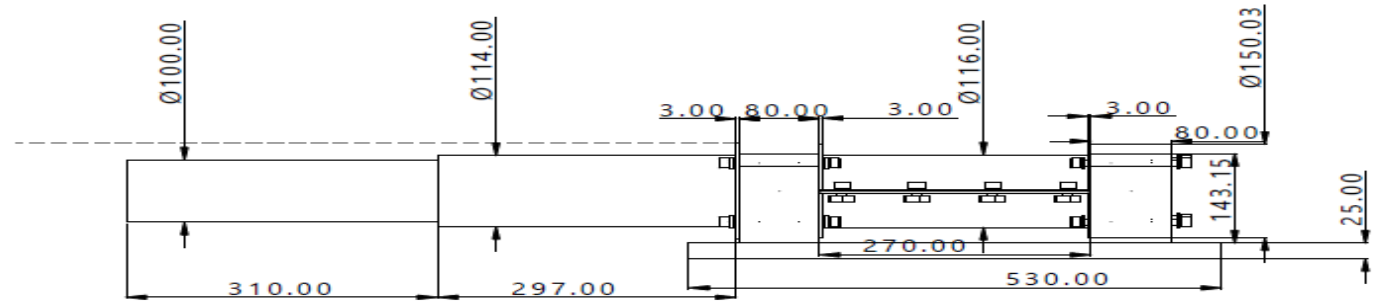
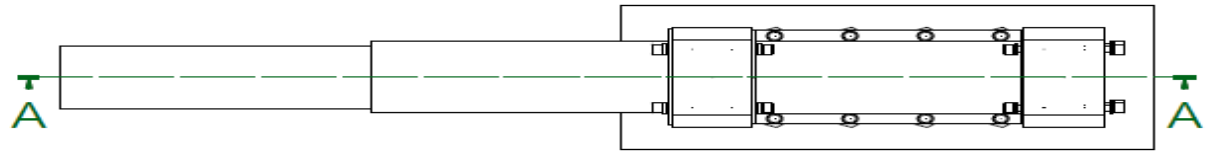


NEW DESIGN

# SEALGUARD ASSEMBLY DEVELOPMENT – CONCEPT MODELLING



SECTION A-A



NOTE-THESE DIMENTIONS ARE APPROX WILL BE REVIEWED AS PER SITE DIMS

WAGON TIPPLER PROPOSAL S2 29 April 2023 19:16:46

INCHES ALL DIMENSIONS UNLESS NOTED OTHERWISE UNLESS SPECIFIED OTHERWISE UNLESS SPECIFIED OTHERWISE UNLESS SPECIFIED OTHERWISE UNLESS SPECIFIED OTHERWISE	TECHNICAL AND QUALITY CONTROL ENGINEER QUALITY CONTROL ENGINEER QUALITY CONTROL ENGINEER QUALITY CONTROL ENGINEER QUALITY CONTROL ENGINEER	SANGHVI Unit No 1000, Mulund West, Near Holy Spirit Church Road, Santacruz (W), Mumbai - 400046. India
DESIGNER DRAWN BY CHECKED BY APPROVED BY	SANGHVI SANGHVI SANGHVI SANGHVI	TITLE- WAGON TIPPLER - SEALGUARD ASSEMBLY SERIAL NO. DATE TREATMENT DRAWN BY
PROJECT NO. DRAWING NO. SHEET NO.	SC-100002 R.A. SEE NOTE	PART NO-SC-WT-99



# SEALGUARD ASSEMBLY DEVELOPMENT – FUNCTIONAL TESTING



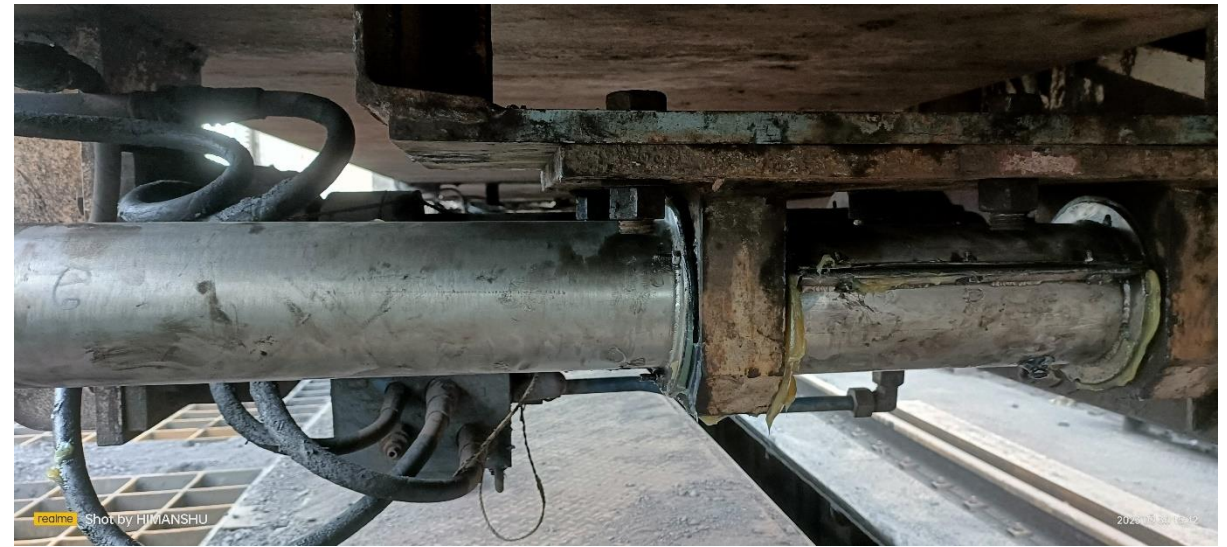


# SEALGUARD ASSEMBLY DEVELOPMENT – FUNCTIONAL TESTING





# SEALGUARD ASSEMBLY DEVELOPMENT – FUNCTIONAL TESTING





# SEALGUARD ASSEMBLY DEVELOPMENT – FUNCTIONAL TESTING

## MINUTES OF MEETING

**Minutes of Meeting** held on 30.09.2023 between NTPC and SABIOCORP for Supply of SABIOCROP SEALGUARD assembly for Wagon Tippler Guide rod in CHP  
( Refer PO No 4000309115-M55-1035)

### Members present:

#### NTPC Ltd.

1. Manish Kumar Sah , AGM
2. Himanshu Kumar – DGM CHP

#### Ms SABIOCORP

1. Bharat Sharma
2. Jejaram Bhoje

Followings Activities were completed are observations after final assembly: -

1. SABIOCORP Engineers had taken / issued material from NTPC Stores ( Ref PO No 4000309115-M55-1035) for insitu assembly at WAGON TIPPLER 2 on 25<sup>th</sup> Sep 2023.
2. Assembly was done in presence of NTPC CHP Team till 29<sup>th</sup> Sep 2023.
3. Following Assly procedure was followed :-
  - a. 12 Oil less Collar type bushes were press fitted in Base brackets after removal of old bush followed by bore cleaning. ( refer Pic 1)
  - b. Bush Face butting with Base bracket was ensured.
  - c. Cup type (SS 304 material )cover assly was fitted with 3 M10 threaded studs which were TIG welded to bracket. ( refer Pic no 2)
  - d. 5 mm rubber packing was fitted between Cup type SS cover & bracket face to ensure perfect sealing. ( refer Pic no 3)
  - e. Central split type cover (SS 304 material )was also fitted with 5 mm rubber sheet packing to ensure perfect sealing. ( refer Pic no 3)
  - f. Additional greasing nipple arrangement was provided so that regreasing can be done externally without disassembly of the whole system. ( refer Pic no 4)
4. All 6 child part sub assemblies as per BOM of abovesaid PO at Wagon tippler Site between 25 Sep to 29 Sep 2023. ( refer pic 4 & 5 )
5. Dry run / Trial Run after fitment was found satisfactory (smooth , without any noise ) on **30<sup>th</sup> Sep evening.**
6. SABIOCORP proposes to regrease this assembly on weekly basis initially, later on this frequency can be increased to 10 -15 days after one month of observation.
7. SABIOCORP will have joint inspection after 2 weeks as advised by NTPC CHP Head .

**NTPC LTD.**



**Himanshu Kumar**  
DGM – CHP

**DT 30.09.23**

**SABIOCORP**

**Bharat Sharma**

## MINUTES OF MEETING

**Minutes of Meeting** held on 15<sup>th</sup> Nov. 2023 between NTPC and SABIOCORP for Supply of SABIOCROP SEALGUARD assembly for Wagon Tippler Guide rod in CHP

( Refer PO No 4000309115-M55-1035)

Subject : Joint Inspection at WT 2 Site.

### Members present:

#### M/s. NTPC Ltd., Kudgi. STPP

1. Manish Kumar Sah - AGM
2. Himanshu Kumar – DGM CHP

#### M/s. SABIOCORP

1. Mr. Naresh Kumar Sharma,  
[CEO]

With reference to PO No. 4000309115-M55-1035 for the Supply of SABIOCROP SEALGUARD assembly for Wagon Tippler Guide rod in CHP.

All the 6 nos parts are jointly inspected at the W T 2 Site, during inspection below points are observed. From 45 DAYS of installation of SEALGUARD assembly there was no any operational problem observed. There was no need of guiderod greasing requirement since 45 days of continued operation.

1. The inspection was carried out in presence of above said persons.
2. All 6 nos parts were checked and found satisfactory.
3. Some observation points are discussed for improvement.
  - A) External greasing points to be incorporated/improved in the design.
  - B) Back side locking to be improved for flawlessness.  
(Two out of six Bush found shift/moved during Assembly. Same can be attended by providing in-situ locking arrangement)

**For NTPC, Kudgi STPP**

15/11/2023  
मनिष कुमार साह / MANISH KUMAR SAH  
जन. १५/०९/१९८५, कडगी, कर्नाटक  
एनटीपीसी लिमिटेड, कडगी, एस.टी.पी.एस.  
NTPC Limited, Kudgi, S.T.P.S.  
विजयपुर कर्नाटक / Vijayapura, Karnataka-586124

**For SABIOCORP**

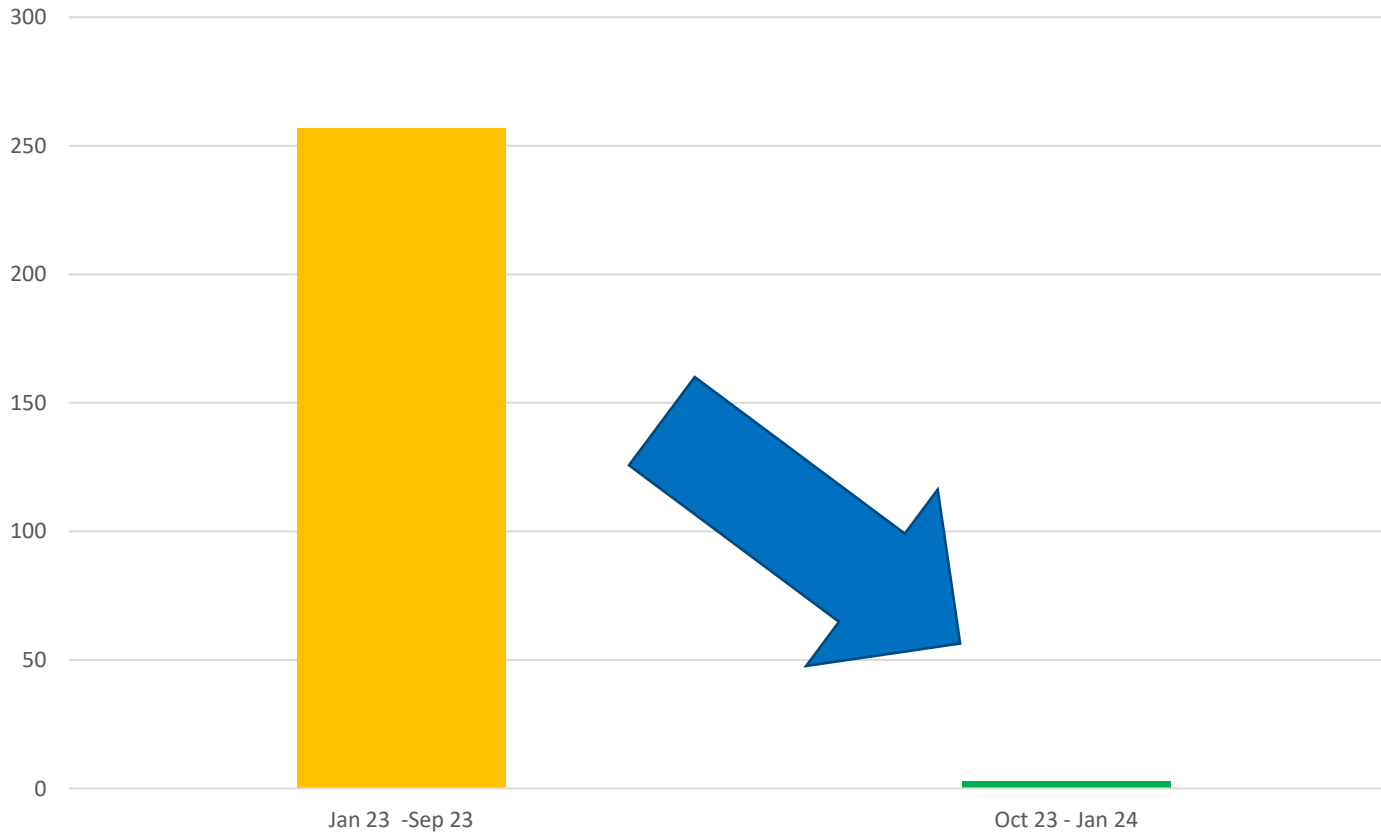


**Mr. Naresh Kumar Sharma**  
[CEO]

**DT 15.11.23**

# SEALGUARD ASSEMBLY DEVELOPMENT – FUNCTIONAL TESTING (DT 15.11.23)

Guide Rod Greasing Requirement

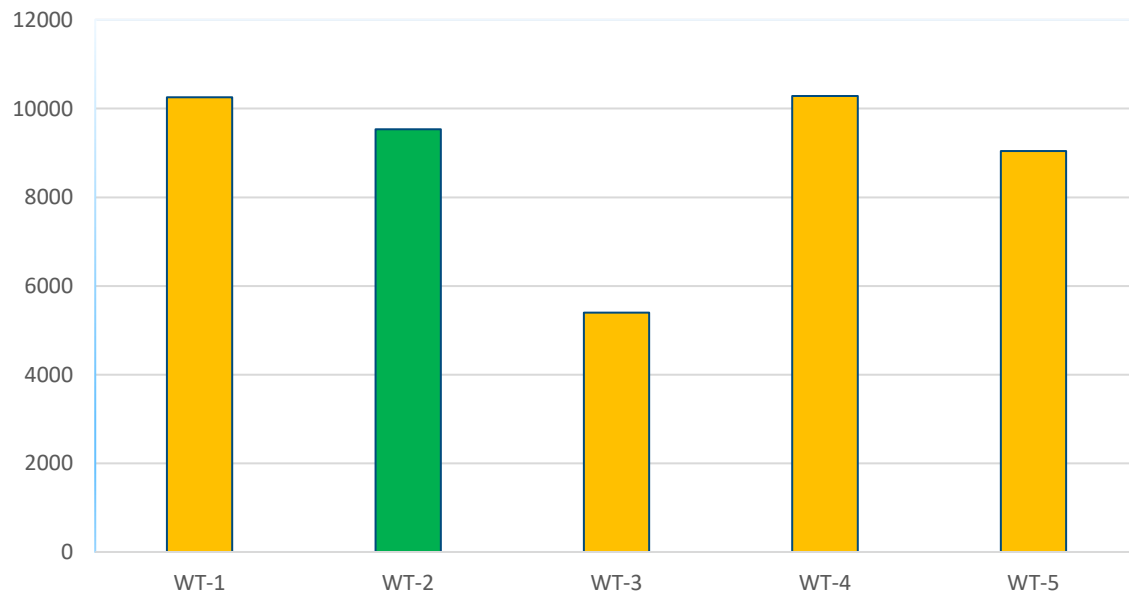


Greasing Frequency decreased 60 times per month to 1 time in 3 months. SAFETY FACTOR increased and maintenance cost reduced exponentially.

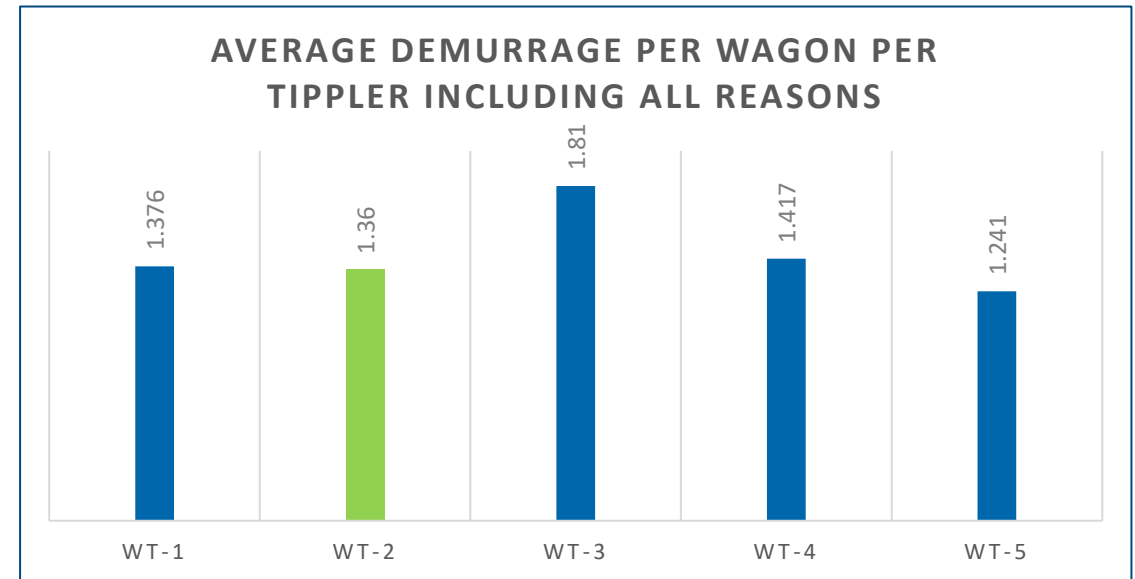
Break Even Period of Retrofitment of Sealguard = 5 Months

# SEALGUARD ASSEMBLY DEVELOPMENT – DELIVERABLES

### WAGON HANDLED POST MODIFICATION IN WT-2



### AVERAGE DEMURRAGE PER WAGON PER TIPPLER INCLUDING ALL REASONS





# SEALGUARD ASSEMBLY PERFORMANCE CERTIFICATE BY OPERATION & FT DEPTT

Re: Performance of RETROFITTED GUIDEROD SEALGUARD ASSEMBLY in WAGON TIPPLER -2

Sd.Nawaz Amir <NAWAZAMIR@NTPC.CO.IN>

Mon 23-10-2023 17:07

To: Himanshu Kumar <HIMANSHUKUMAR@NTPC.CO.IN>

Cc: Manish Kumar Sah <MANISHKSAH@NTPC.CO.IN>; Sandip S Malekar <SMALEKARSANDEEP@NTPC.CO.IN>; V P SATYENDRA KUMAR AMPOLU <AVPSATYENDRA@NTPC.CO.IN>; O. Srinivas <OSRINIVAS@NTPC.CO.IN>; Bidyanand Jha <BJHA02@NTPC.CO.IN>

Dear Sir,

After the modification in WT-2 Guide Rod Seal Guard Assembly, it has been observed that the greasing requirement in WT-2 has drastically reduced without any interruption in tipping due to side clamp greasing issue so far. The reduction in requirement of Guide Rod Greasing permits have helped in improving safety (reduction of WHP), tipping delay etc.

Regards,

Sd. Nawaz Amir / सैयद नवाज़ अमीर  
Addl. General Manager (FH-Oprn.) / अतिरिक्त महाप्रबन्धक (ईंधन प्रबंध-प्रचालन)  
NTPC Ltd - KUDGI, एन टी पी सी  
Basavan Bagewadi, Bijapur(Dist.) / बसवन बागेवडी, बीजापुर (जिला)  
Karnataka-586121 / कर्नाटक- ५८६१२१  
Contact: 9431600789 / दूरभाष - ९४३१६००७८९  
Alternate E-mail Id: sdnawazamir@gmail.com /  
अल्टिमाट ईमेल: sdnawazamir@gmail.com

From: Himanshu Kumar <HIMANSHUKUMAR@NTPC.CO.IN>

Sent: 21 October 2023 7:17 PM

To: Sd.Nawaz Amir <NAWAZAMIR@NTPC.CO.IN>; V P SATYENDRA KUMAR AMPOLU <AVPSATYENDRA@NTPC.CO.IN>

Cc: Manish Kumar Sah <MANISHKSAH@NTPC.CO.IN>; Sandip S Malekar <SMALEKARSANDEEP@NTPC.CO.IN>

Subject: Performance of RETROFITTED GUIDEROD SEALGUARD ASSEMBLY in WAGON TIPPLER -2

सादर महोदय / महोदया

As you all are aware that CHP-MM deptt has retrofitted Wagon tippler -2 Guide Rod with SEALGUARD ASSEMBLY and since installation of WAGON TIPPLER GUIDEROD SEAL GUARD assembly there has been very much improvement in WT SIDE BEAM OPERATION. Since 30<sup>th</sup> September 2023 till date there has been NO ANY REQUIREMENT of guide rod greasing. As per MM , Till now , performance of GUIDE ROD SEAL GUARD assembly retro fitment in WAGON TIPPLER existing guide rods ( 6 numbers ; 3 Top and 3 bottom) seems to be VERY GOOD. We want to replicate same type of modification in other WAGON TIPPLERS that will help in avoiding recurring guide rod greasing permit and loss to organisation in terms of delay due to system outage.

Please give your kind response , So that further procurements can be made on TOP PRIORITY.

With warm regards

हिमांशु कुमार / Himanshu Kumar  
ईंधन संवहन - यांत्रिक अनुरक्षण / Fuel Handling - Mechanical Maintenance  
एनटीपीसी कुडगी /NTPC KUDGI

Re: Performance of RETROFITTED GUIDEROD SEALGUARD ASSEMBLY in WAGON TIPPLER -2

Lingam Venkat Reddy <LVREDDY@NTPC.CO.IN>

Wed 07-02-2024 18:09

To: Himanshu Kumar <HIMANSHUKUMAR@NTPC.CO.IN>; SUDHIR WARPE <SUDHIRWARPE@NTPC.CO.IN>; SRINIVASA REDDY <MUDIMALASREDDY@NTPC.CO.IN>

आदरणीय महोदय / Dear Sir

With ref to the trailing mail and as per the feedback from Tippler Operation, Side Beam of WT2 is performing smoothly compared to other tippers and same modification/improvement may please be replicated in all other tippers to avoid frequent greasing and reduction of demurrage in unloading due to Side Clamp operation.

सादर / with regards,

एल. वेंकट रेड्डी / L VENKAT REDDY  
अपर महा प्रबन्धक (ईंधन प्रबंधन) / AGM(FM)  
एनटीपीसी कुडगी /NTPC KUDGI

From: Himanshu Kumar <HIMANSHUKUMAR@NTPC.CO.IN>

Sent: Wednesday, February 7, 2024 5:53 PM

To: SUDHIR WARPE <SUDHIRWARPE@NTPC.CO.IN>; SRINIVASA REDDY <MUDIMALASREDDY@NTPC.CO.IN>

Cc: Lingam Venkat Reddy <LVREDDY@NTPC.CO.IN>

Subject: Fw: Performance of RETROFITTED GUIDEROD SEALGUARD ASSEMBLY in WAGON TIPPLER -2

सादर महोदय / महोदया

As you all are aware that CHP-MM deptt has retrofitted Wagon tippler -2 Guide Rod with SEALGUARD ASSEMBLY and since installation of WAGON TIPPLER GUIDEROD SEAL GUARD assembly there has been very much improvement in WT SIDE BEAM OPERATION. Since 30<sup>th</sup> September 2023 till date there has been NO ANY REQUIREMENT of guide rod greasing. As per MM , Till now , performance of GUIDE ROD SEAL GUARD assembly retro fitment in WAGON TIPPLER existing guide rods ( 6 numbers ; 3 Top and 3 bottom) seems to be VERY GOOD. We want to replicate same type of modification in other WAGON TIPPLERS that will help in avoiding recurring guide rod greasing permit and loss to organisation in terms of delay due to system outage.

Please give your kind response , So that further procurements can be made on TOP PRIORITY.

With warm regards

हिमांशु कुमार / Himanshu Kumar  
ईंधन संवहन - यांत्रिक अनुरक्षण / Fuel Handling - Mechanical Maintenance  
एनटीपीसी कुडगी /NTPC KUDGI

# FUNCTIONAL TESTING - AFTER FOUR MONTHS OF INSTALLATION



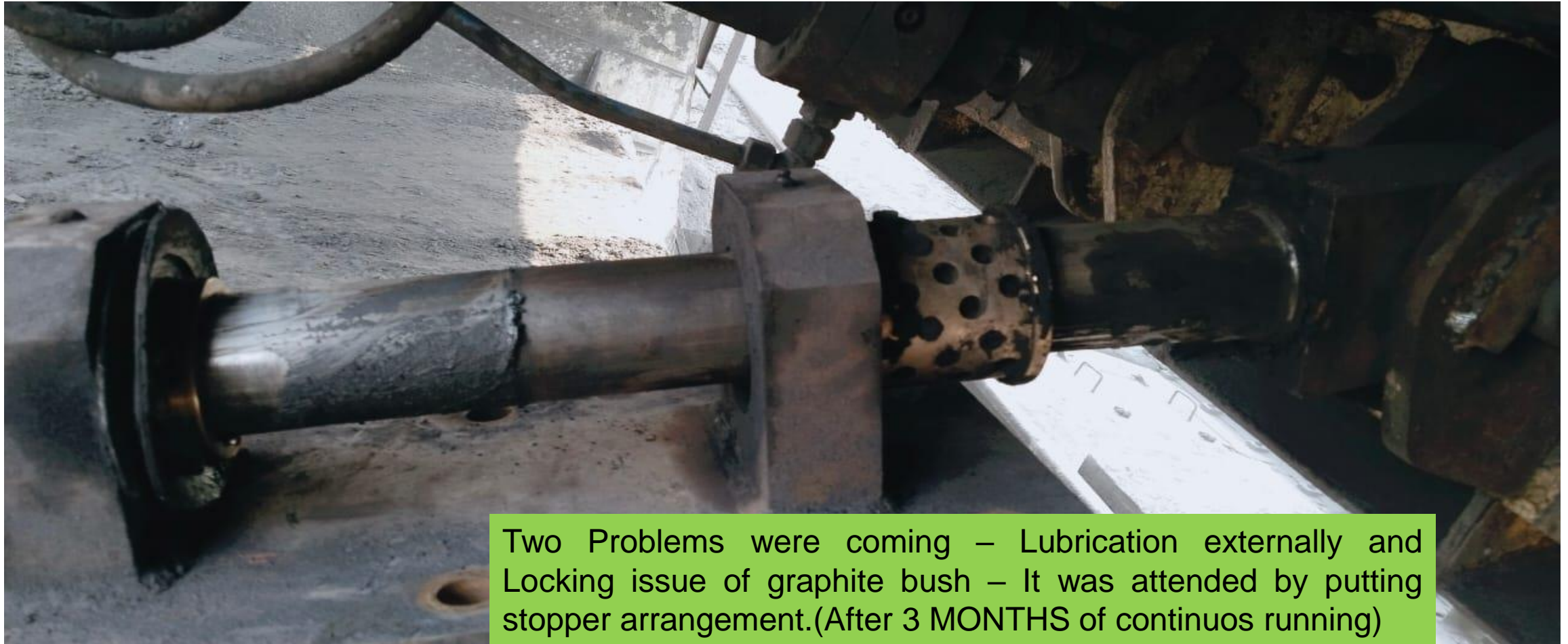
**SAFETY FACTOR = RISK X LIKELIHOOD OF OCCURRENCE.**  
SAFETY FACTOR reduced and repetitive maintenance eliminated.

- NO TIPLING INTERRUPTION DUE TO GUIDE ROD GREASING. No Problem of PU PAD FALLING





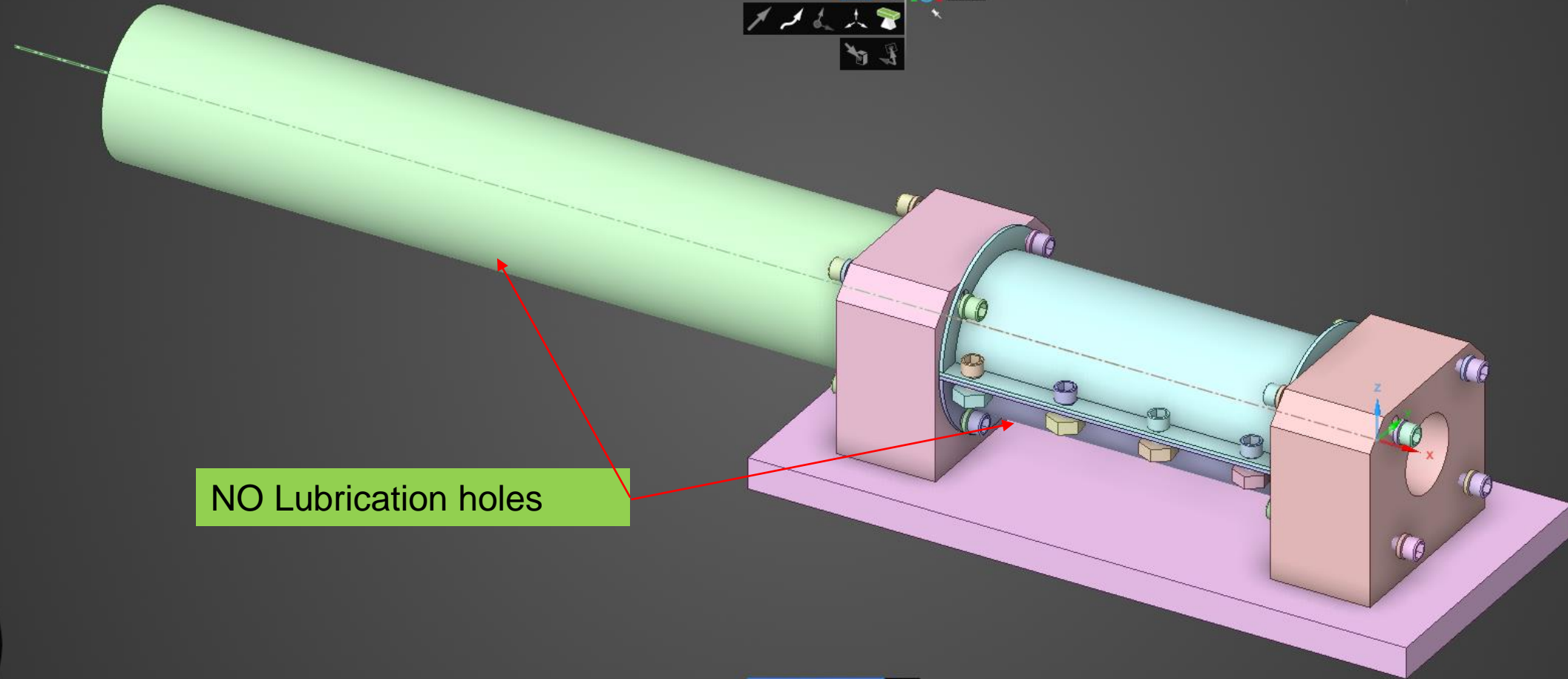
## FUNCTIONAL TESTING- AFTER FOUR MONTHS OF INSTALLATION





# MODIFICATION IN SEALGUARD ASSEMBLY – REVALIDATION

Design1\*  
WAGON TIPPLER PROPOSAL (2)  
Physics

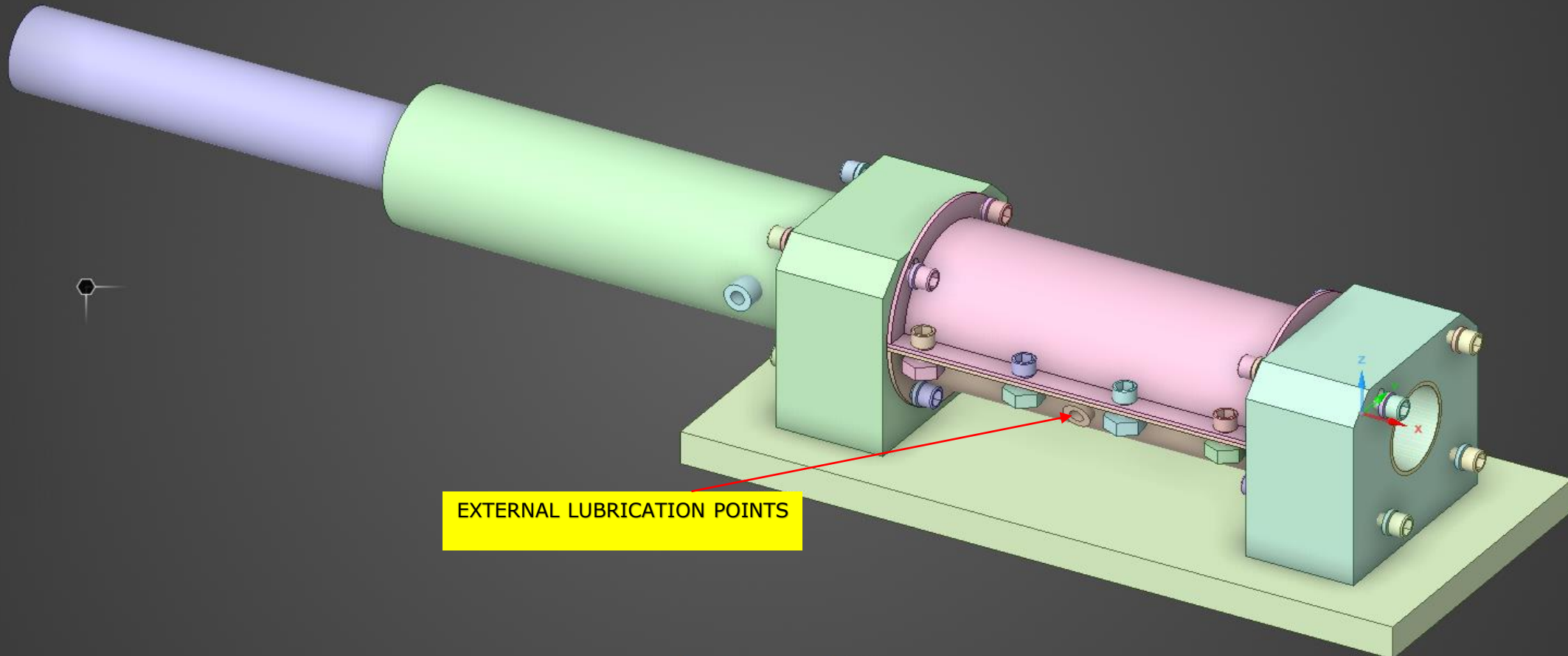


NO Lubrication holes

MODEL >



# MODIFICATION IN SEALGUARD ASSEMBLY – REVALIDATION



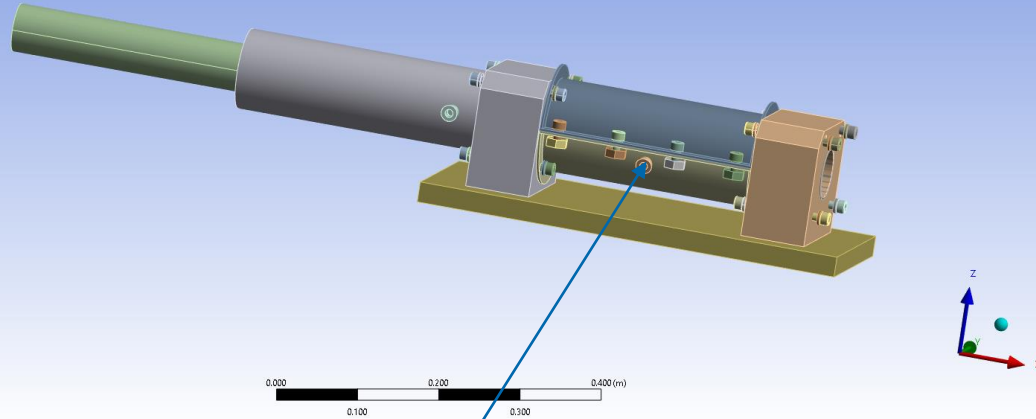
EXTERNAL LUBRICATION POINTS

MODEL >

# MODIFICATION IN SEALGUARD ASSEMBLY – REVALIDATION

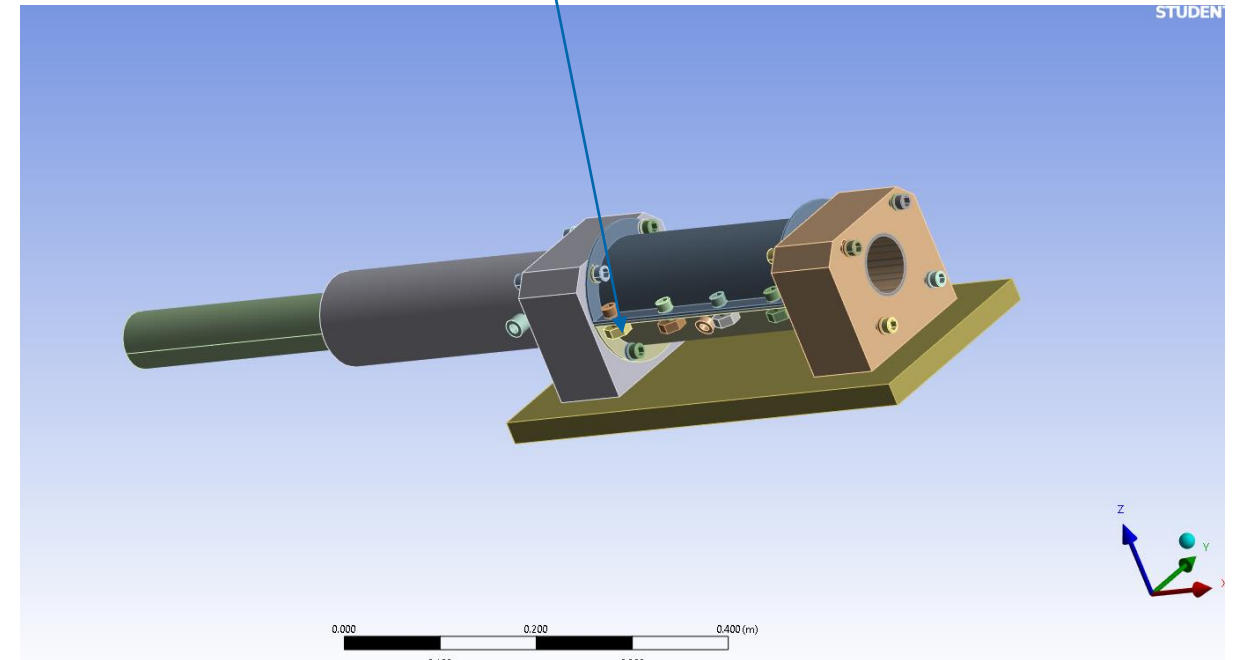
Geometry Report  
06-07-2024 04:49 PM

Ansys  
2023 R1  
STUDENT



**EXTERNAL LUBRICATION POINTS**

**GRAPHITE BUSH LOCKING ARRANGEMENT**





## CONCLUSION

- So far Sealguard assembly Retrofitment has been impressive and requirement of guiderod greasing have been nullified and hence there is improvement in SAFETY FACTOR and MAINTENANCE COST and ofcourse elimination of tipping interruptions.
- Guideshaft material can be enhanced from present C40 to EN-19 /28 which has less stress stiffening.
- Proposal has been moved for implementation of same retro fitment in other wagon tippler whose materialisation is expected by April 2024.
- Breakeven is less than 5 months but operational efficacy is very high.



**THANKS...**

“After climbing a great hill, one only finds that there are many more hills to climb”  
- Nelson Mandela