

WAGON WORKSHOP Guntupalli.
South Central Railway

CII National Award for Environmental Best Practices Award – 2021

**WELCOMES
CII & MEMBERS**

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SUSTAINABLE RESOURCE CONSERVATION PROJECTS

Welding Simulator

➤ Virtual reality welding simulator which is of Current Rating: 0.5 - 11 Amp only compared to 400 Amp Welding plant that enables students:

- ❖ to rapidly refine basic welding skills,
- ❖ various welding systems,
- ❖ learn proper welding technique
- ❖ explore welding career paths in a safe, virtual environment,
- ❖ without the need for consumables like metal, electrodes and gas.

Roller Bearing Cleaning Plant

- Improved cleaning Quality and Quantity improves by which operating cost decreases.

- No usage of Kerosene oil for cleaning of bearings components hence, no traces of kerosene fumes and no affect on the health of the staff working in the vicinity.

Distributor Valve Cleaning Machine

- ♣ No usage of Kerosene oil for cleaning of Distributor Valves Housing, Sub-assemblies.
- ♣ Hence, no traces of kerosene fumes and no affect on the health of the staff working in the vicinity.

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| | | | |
|---|--|---|---|
| <ul style="list-style-type: none"> Trigger of the project/Level of operation Uniqueness of the project Date of commencement: Date of completion of project compared with initial planned dates: Major milestones of project accomplishment vis-à-vis initial mapping of project road map (Planned and actual are same) | <h3>Welding Simulator</h3> | <h3>Roller Bearing Cleaning Plant</h3> | <h3>Distributor Valve Cleaning Machine</h3> |
| | <ul style="list-style-type: none"> When Planning to reduce usage of electrical energy and easy learning possibilities. The project conceived through Senior management Environmental Benefits due to eliminating the use of welding plant, welding material, electrodes, flux, CO₂, argon gas etc and provides many other advantages Indented on : Commissioned on: 22.06.2019 Purchase Order Date: 12.03.2019 | <ul style="list-style-type: none"> When Planning to reduce usage of kerosene. The project conceived through Senior management No Usage of kerosene, no repetitive work, life of the bearing increases. Indented on : Commissioned on: Purchase Order Date: | <ul style="list-style-type: none"> When Planning to reduce usage of kerosene. The project conceived through Senior management No Usage of kerosene, no repetitive work, life of the bearing increases. It is first of its kind in Wagon workshops of Indian Railways Indented on : Commissioned on: Purchase Order Date: |

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|---|--|--|--|
| <p>Challenges faced and brief on countering</p> | <h3>Welding Simulator</h3> | <h3>Roller Bearing Cleaning Plant</h3> | <h3>Distributor Valve Cleaning Machine</h3> |
| | <ul style="list-style-type: none"> Allocating area and infrastructure Lack of Knowledge Shifting from Old method to New method Adjusting controls Capital Expenditure | <ul style="list-style-type: none"> Allocating area and infrastructure Lack of Knowledge Shifting from Old method to New method Adjusting controls Maintenance by OEM Capital Expenditure | <ul style="list-style-type: none"> Allocating area and infrastructure Lack of Knowledge Shifting from Old method to New method Adjusting controls Maintenance by OEM Capital Expenditure |

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| Equipment | Analysis | | | Machine cost (Rs. In lakhs) | Monetary Benefits in lakhs |
|------------------------------------|---|----------|---------------------------|--------------------------------|-------------------------------|
| | Savings in | Quantity | Unit | | |
| Welding Simulator | Electrical energy | 52416 | kWh | 24.485 | 5.76576 |
| | GHG emission | 42.98 | MT of CO ₂ eq. | | |
| | Material Conservation | 6 | MT of material | | |
| Roller Bearing Cleaning Plant | Material Conservation (Kerosene oil) | 31,500 | Litres/year | 100.06 | 12.6 |
| | Time | 21,600 | Manhours/year | | 32.4 |
| Distributor Valve Cleaning Machine | Material Conservation (Kerosene oil) | 7200 | Litres/ year | 31.4 | 2.88 |
| | Time | 900 | Mandays/Year | | 10.8 |

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| I b n e t n a e n f i t b s l e | Welding Simulator | Roller Bearing Cleaning Plant | & | Distributor Valve Cleaning Machine |
|--|-------------------|--|---|------------------------------------|
| | | <ul style="list-style-type: none"> Precise weld tracking Training takes place in a safe and environmentally friendly surrounding without the dangers from heat, radiation, infra-red rays and fumes. Guidance for skill parameters during welding. Maximization of "Time on Arc" for the trainee. Visualization of the saved welding runs where each trainee's practices and hand movement can be viewed and evaluated. Remote maintenance and updates through online support. Competition-inducing assessment scoring system increases the learning readiness of trainees. | <ul style="list-style-type: none"> Kerosene fumes are very much hazardous to lungs especially for women employees. Health effects due to inhalation: <ul style="list-style-type: none"> As it is volatile (Volatile pressure: 0.48mm Hg at 20° C), it can cause: Vertigo, Hallucination, confusion, convulsion, cough, respiratory distress, nervousness, loss of appetite, restlessness, drowsiness. Causes skin irritation, Dermatitis(Eczema) CNS symptoms (Dizziness, Headache and vomiting) Kerosene is a natural resource which can be used for some other efficient works like a fuel where it's actual utilization can be made. Where as for cleaning, Detergents can be used which actually breakup the molecular structure so that grease will lose it's basic nature and likely will not contaminate much compared to kerosene oil. Kerosene gets vaporised in free form. Where as kerosene mixed with grease doesn't vaporises easily and definite land pollution happens due to spillage. | |

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Replication Potential Of Project Within Sector

First of its kind in Wagon workshops of Indian Railways

Sharing the Information, Manuals, Videos in the website

Whatsapp Group to share
Maintenance and Troubleshooting information

Knowledge Hub :-

Quarterly Training Programmes for all Workshops in Indian Railways
in Knowledge Center having Projector, Display Boards, Manuals etc.

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Achieving National Benchmarks/Standards

At par with satisfying
all Pollution & Environmental standards.

Welding Simulator

Roller Bearing
Cleaning Plant

Distributor Valve
Cleaning Machine

• No Effect on
Environment

• ETP 0.5 KL Capacity

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Achieving National Benchmarks/Standards

| | Energy Consumption in Lakh KWH | Outturn in wagons | SEC in KWH /wagon | | | | |
|-----------------|--------------------------------|-------------------|-------------------|--|------------------|------|-------|
| RYPS Workshop | 20.92 | 6006 | 348.31 | | | | |
| KOTA Workshop | 14.34 | 5892 | 357.33 | | | | |
| JHANSI Workshop | 50.16 | 7896 | 635.27 | Benchmarking with Other Railway Workshops | | | |
| RAIPUR Workshop | 15.21 | 5128 | 296.78 | Water Consumption (KL) | Outturn (Wagons) | SWC | |
| | | | | RYPS Workshop | 76810 | 6006 | 12.78 |
| | | | | Jhansi Workshop | 156800 | 7896 | 20.66 |
| | | | | KOTA Workshop | 99460 | 5892 | 16.88 |

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Priority plans on fast track for +1 year and +2 year, including resource requirement

Short term:

1. Installation of Roof top Solar power plants of capacity 4.0 MWp,
2. Installation of 75 KLD ETP
3. Portal Wheel Lathe,
4. CNC Press Brake,
5. Hydraulic Press 500T,
6. NC Plate Bending,
7. 3 nos. Lorries,
8. FLT-3nos.,
9. Huck Bolting Machines-03nos.,
10. 30Welding Plants 5stared
11. Universal NC AJTB

Long term:

1. 106 conventional oil cooled welding plants replacement with inverter type
2. Provision of Energy efficient machinery Overaged EOT Crane-13 Nos. with EOT Crane (VVVFdrive)
3. Awareness training to the staff on Conservation of Electrical Energy, Water and Emission of Green House gas emissions.



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Major Learnings From The Project Implementation

- 1) Adaptation to new technology
- 2) Implementation of Eco – friendly technologies
- 3) Team Work and Experience

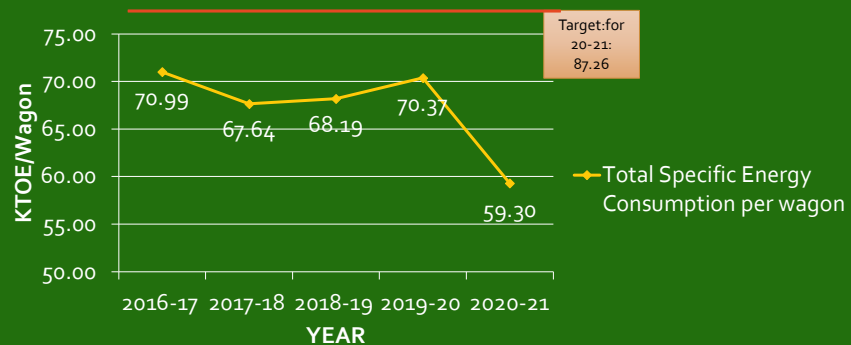
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Environmental Performance Evaluation (EPE)

- 1) Management performance indicator (MPI) of the plant:–
- 2) Operational performance indicator (OPI):-
- 3) Environmental condition indicator (ECI) :-

Reduction in Consumption of Energy is achieved due to usage of 5 star rated ACs, fans, water coolers and LED lights, Inverter type welding plants, welding simulator and Air compressor

Total Specific Energy Consumption per Wagon



Total reduction Specific Energy Consumption since 2016-17 = -16.46

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