Trainee Batch - 2024

GREAVES ENGINEERING

2024

Presented by: Madhura Kolte

Function: Digital Engineering

Trainer: Imran Khan

Mentor: Imran Khan

GREAVES ENGINEERING

Title of Project : Assembly Checksheet System

- **Brief Overview :**

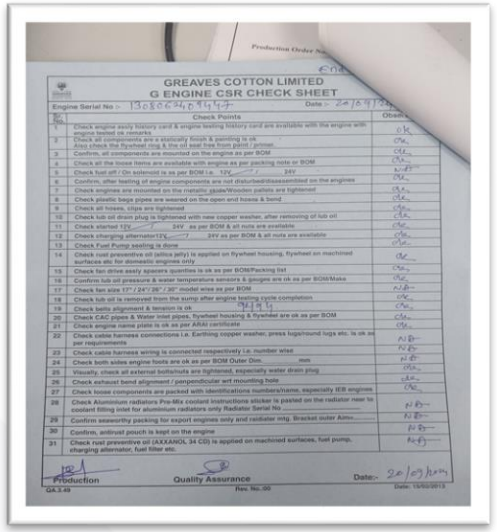
The project is focused on developing a paperless system for managing engine assembly processes. This system replaces traditional paper methods with an electronic platform, to manage and monitor engine production across various stages like CSR, Assembly, and Testing. It digitizes the production data, ensuring real-time data entry, validation, and visualization for different stations.

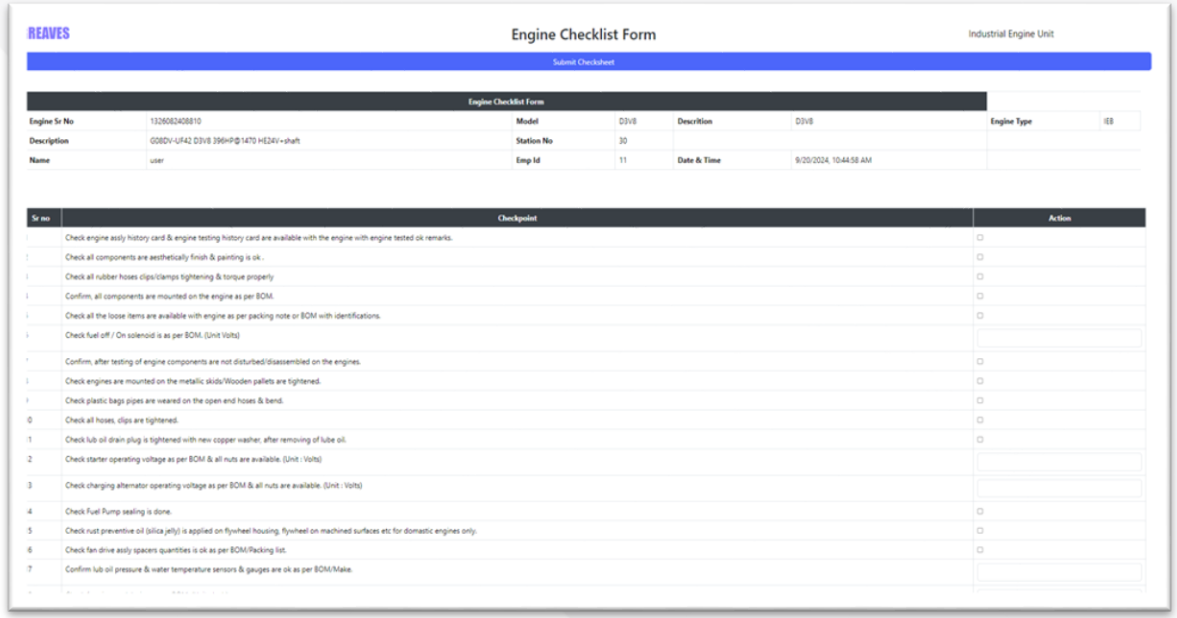
- **Scope of the Project**

- Includes station-based operations (stations 10, 12, 30), barcode integration, data submission, role-based access control, and report generation.
- Efficient data management through digital checksheets improved operational efficiency.
- Real time data visualization improved transperancy in production metrices.

Objective of Study: List tangible outcomes & deliverables

OUTCOME:


GREAVES COTTON LIMITED
G ENGINE CSR CHECK SHEET


REAVES
Engine Checklist Form
Industrial Engine Unit
Submit Checksheet

Engine Checklist Form

Engine Sr No	1326082408810	Model	D3V8	Description	D3V8	Engine Type	IE8
Description	G08DV-UF42 D3V8 396HP@1470 HE24V+shaft	Station No	30				
Name	user	Emp Id	11	Date & Time	9/20/2024, 10:44:58 AM		

Sr no	Checkpoint	Action
	Check engine assly history card & engine testing history card are available with the engine with engine tested ok remarks.	
	Check all components are aesthetically finish & painting is ok .	
	Check all rubber hoses clips/clamps tightening & torque properly	
	Confirm, all components are mounted on the engine as per BOM.	
	Check all the loose items are available with engine as per packing note or BOM with identifications.	
	Check fuel off / On solenoid is as per BOM. (Unit Volts)	
	Confirm, after testing of engine components are not disturbed/disassembled on the engines.	
	Check engines are mounted on the metallic skids/Wooden pallets are tightened.	
	Check plastic bags pipes are weared on the open end hoses & bend.	
0	Check all hoses, clips are tightened.	
1	Check lub oil drain plug is tightened with new copper washer, after removing of lube oil.	
2	Check starter operating voltage as per BOM & all nuts are available. (Unit : Volts)	
3	Check charging alternator operating voltage as per BOM & all nuts are available. (Unit : Volts)	
4	Check Fuel Pump sealing is done.	
5	Check rust preventive oil (silica jelly) is applied on flywheel housing, flywheel on machined surfaces etc for domastic engines only.	
6	Check fan drive assly spacers quantities is ok as per BOM/Packing list.	
7	Confirm lub oil pressure & water temperature sensors & gauges are ok as per BOM/Make.	

Paperless checksheet

Objective:

- Improves efficiency and data management in engine production by handling dynamic checksheets and real-time data interaction.
- Ensure secure data storage with real-time updates across departments.
- Provide role-based access to sensitive engine data.
- Improve efficiency and accuracy in tracking production metrics for CSR, Assembly, and Testing departments.

Project Methodology/ Approach: Describe the approach and methodology including tools and techniques

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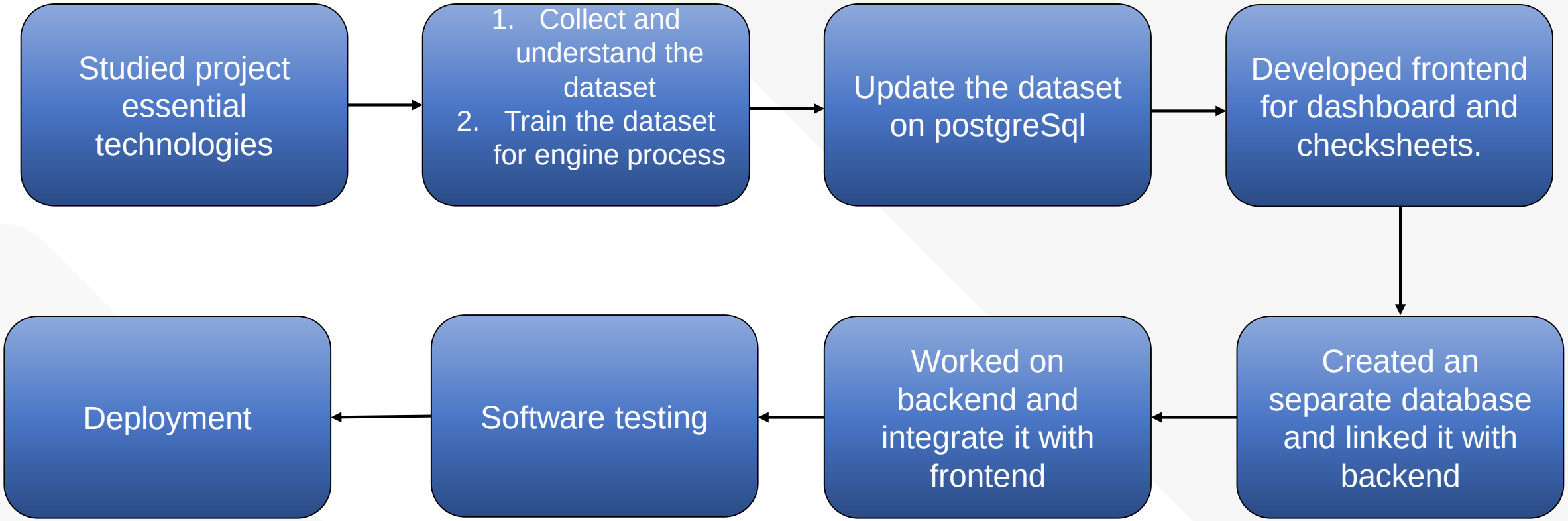

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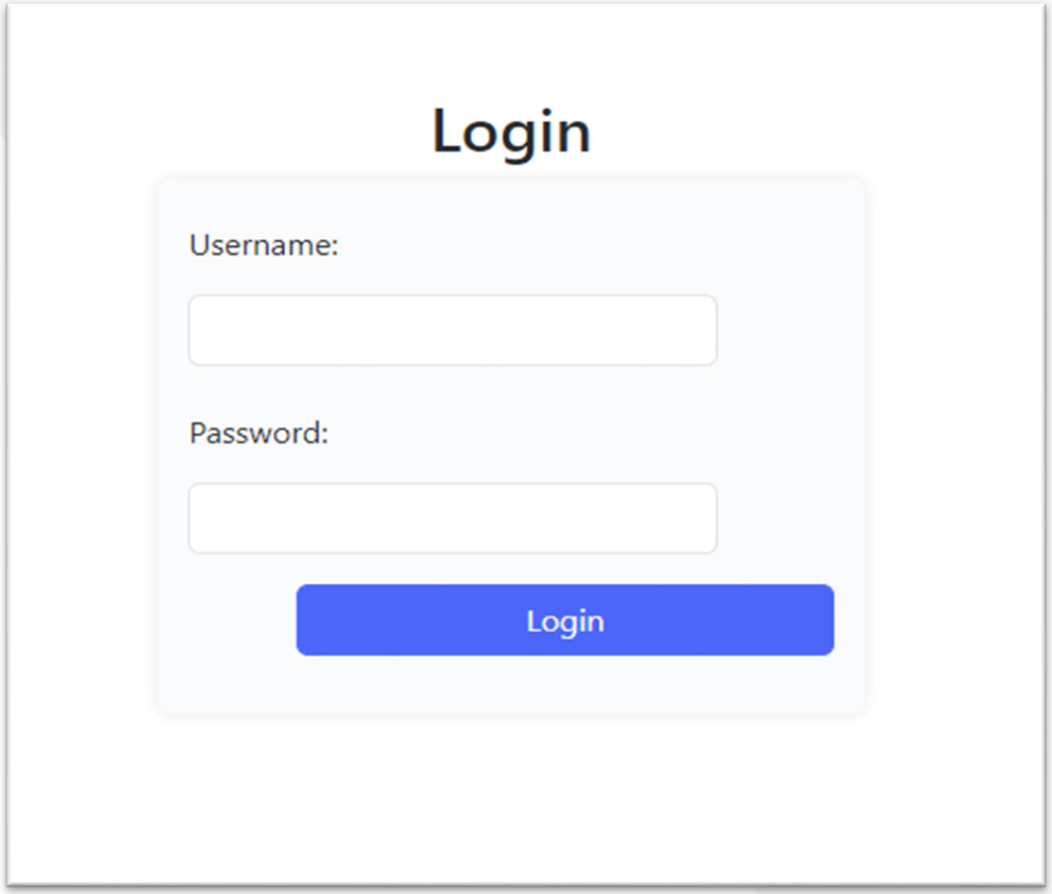
Tools and Techniques :

- **ReactJS :** Frontend development for building user interfaces
- **Django :** Backend development framework.
- **Python :** General-purpose programming language used for backend logic.
- **PostgreSQL :** Relational database management system
- **PyCharm :** Integrated Development Environment (IDE) for Python.
- **VS Code :** Lightweight code editor for various languages
- **Excel :** Data analysis and visualization tool

Project updates:

User Login:
User can login through this login page



Project updates:

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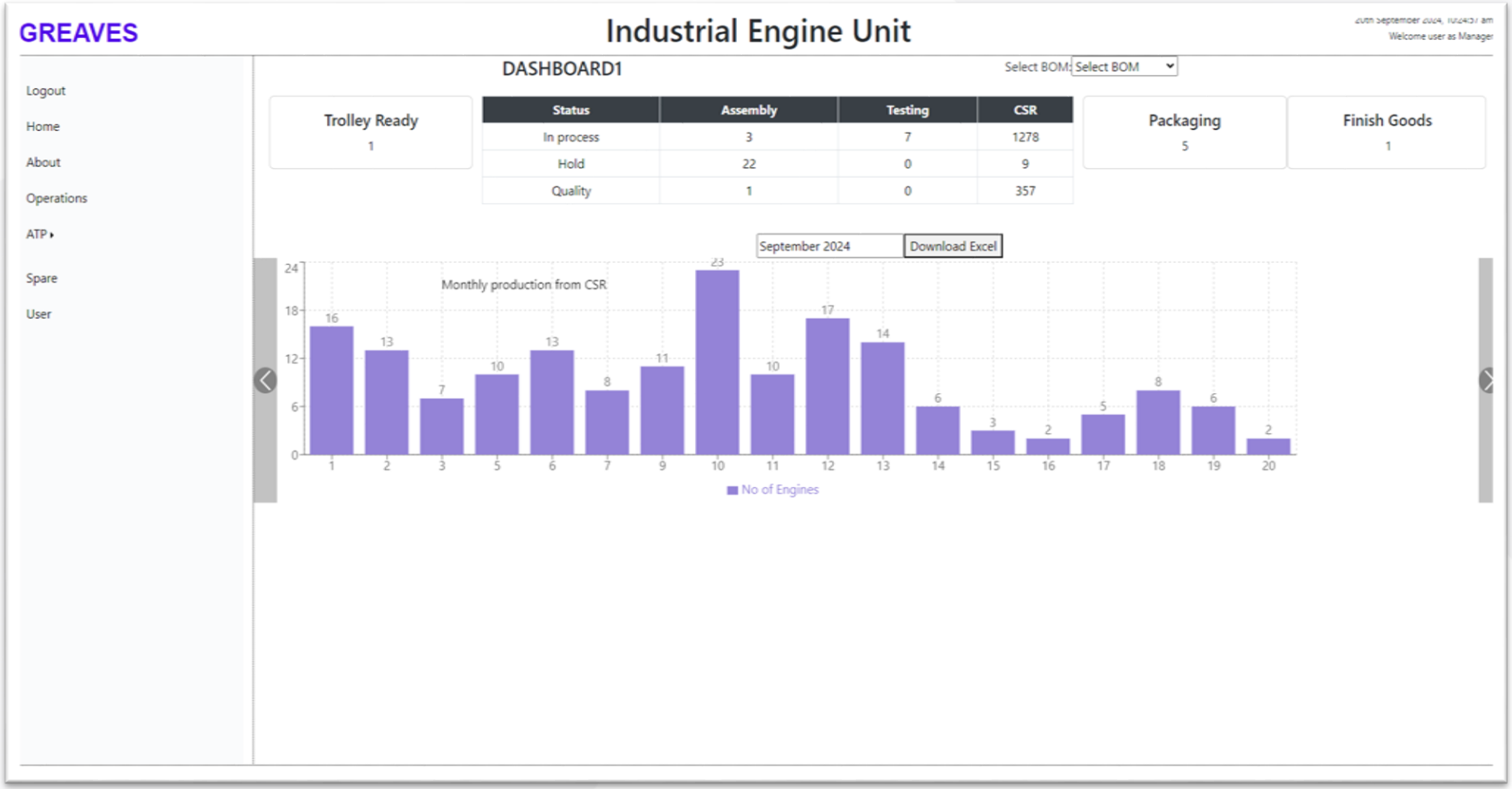
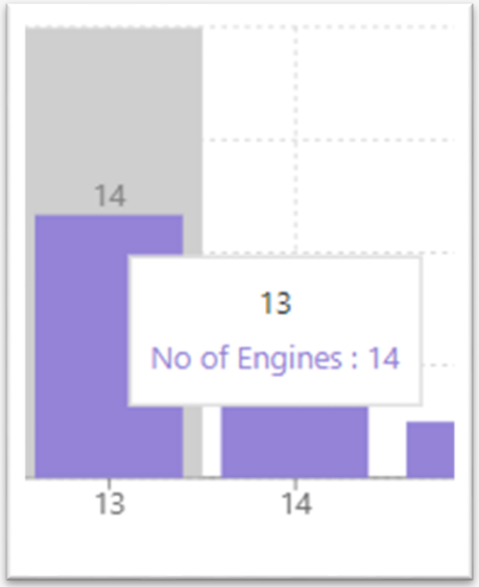
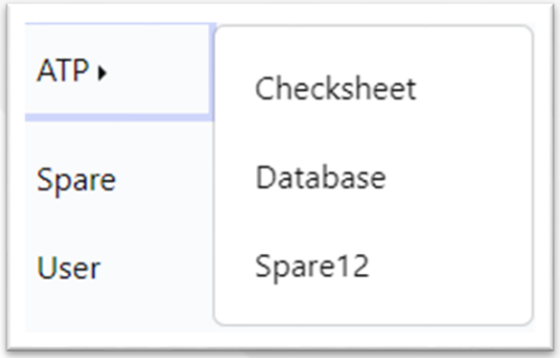
Home Page:

- It consist of Navbar which includes links to key section such as Dashboard, Checksheet submission, Reports.
- It also has dashboard which is a real time overview of production data for CSR, Assembly and testing.
- It has the table which shows the status of the engines.







Project updates:

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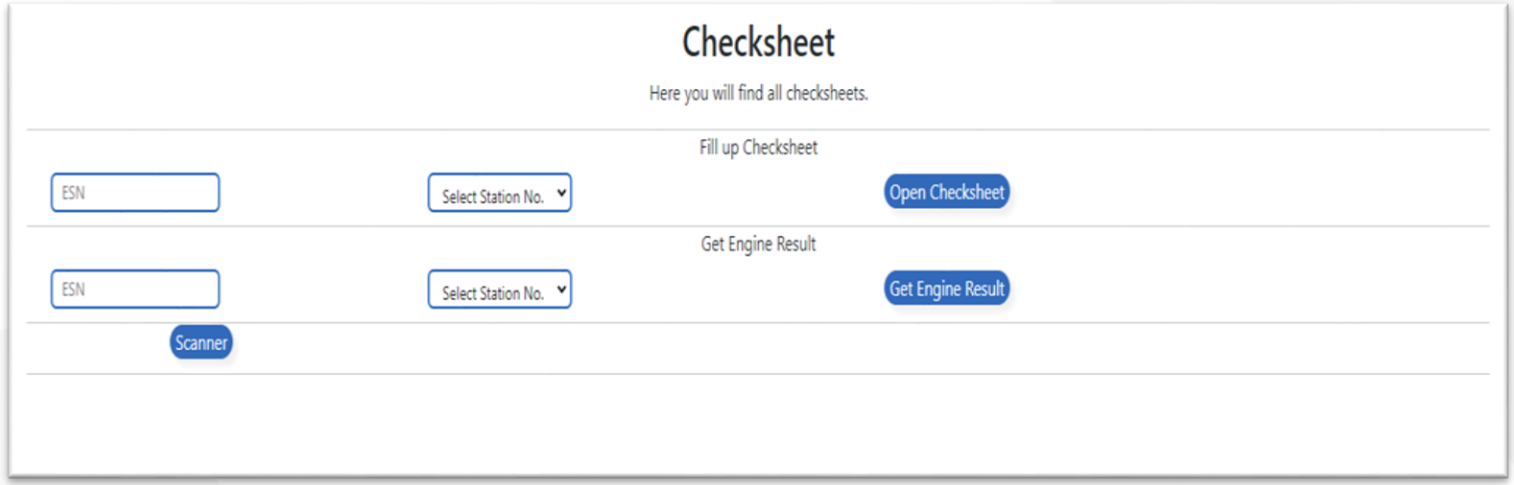
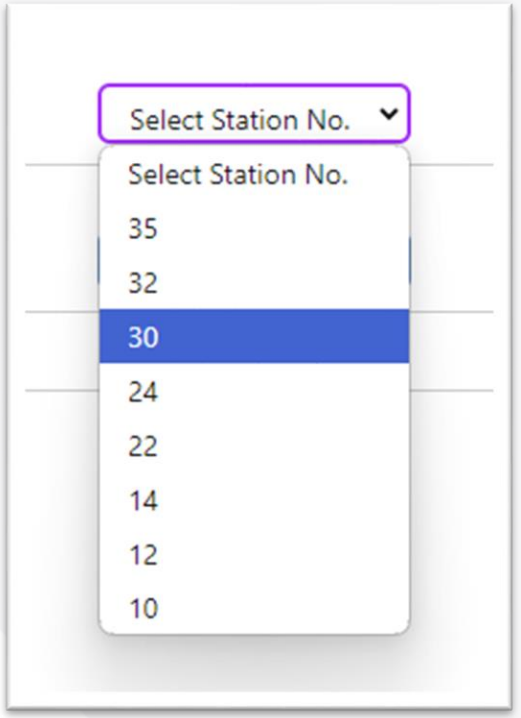
3. Checksheet page:



Dropdown box for selecting station no.



- By given the correct esn and the station no, checksheet for respective station no opens.
- Also you can get the result submitted for any esn by clicking on “Get Engine Result” button.

Project updates:

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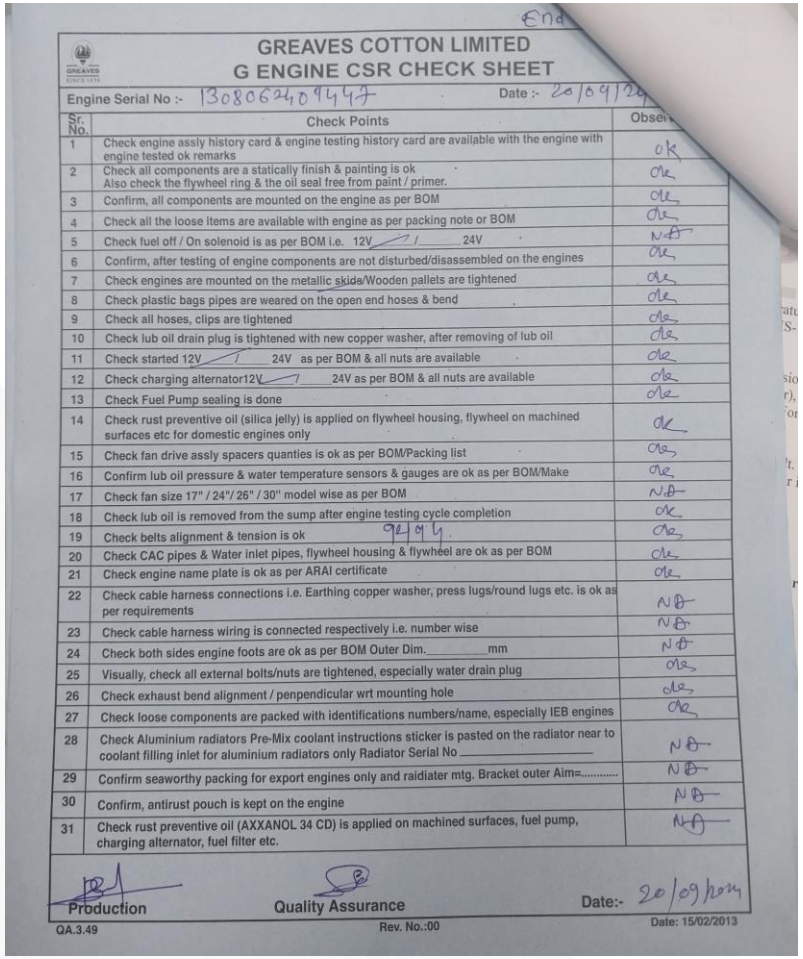
Checksheet form for station 30:



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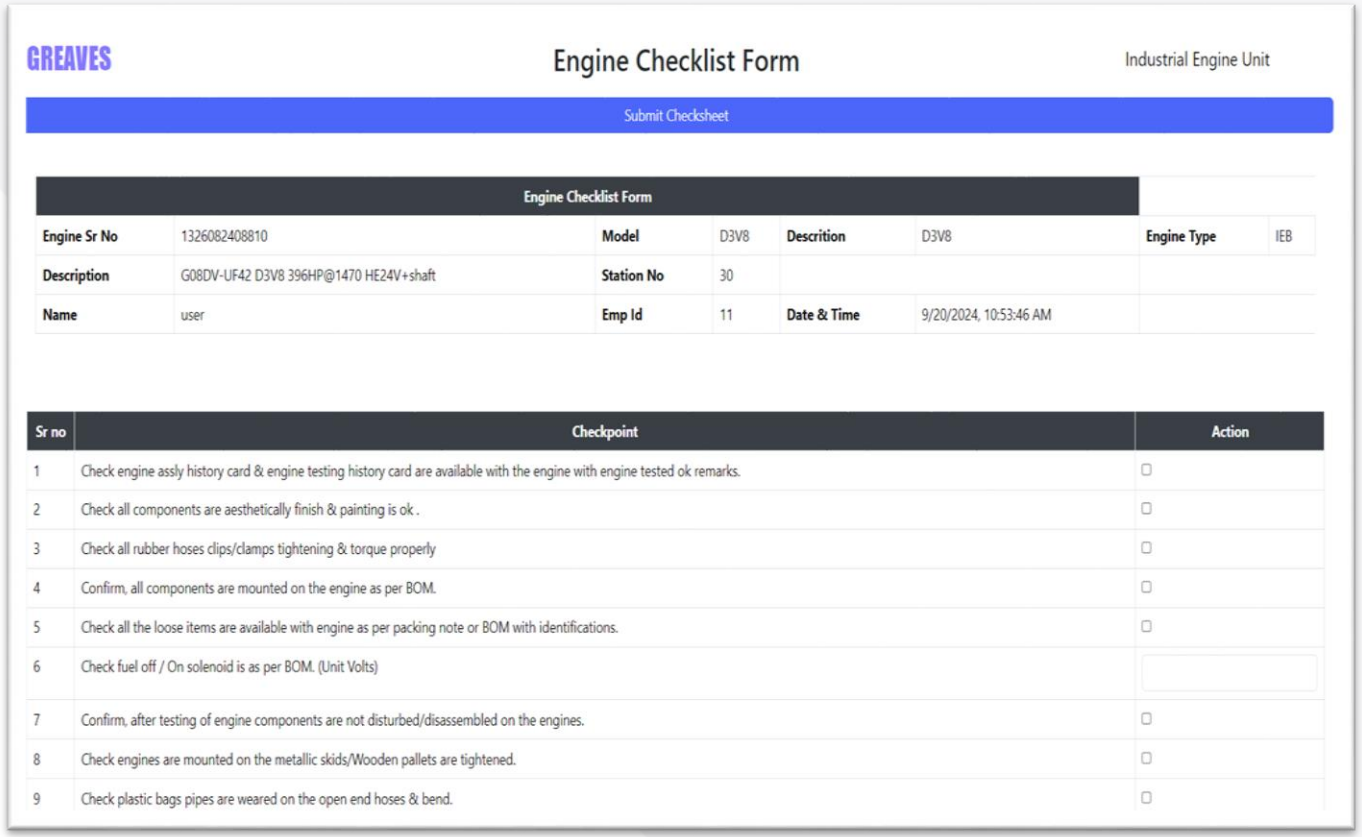
G ENGINE CSR CHECK SHEET

Engine Serial No :- 13080240944 7 Date :- 20/09/2

Sr. No.	Check Points	Obser
1	Check engine assly history card & engine testing history card are available with the engine with engine tested ok remarks	OK
2	Check all components are a statically finish & painting is ok Also check the flywheel ring & the oil seal free from paint / primer.	OK
3	Confirm, all components are mounted on the engine as per BOM	OK
4	Check all the loose items are available with engine as per packing note or BOM	OK
5	Check fuel off / On solenoid is as per BOM i.e. 12V / 24V	N.A
6	Confirm, after testing of engine components are not disturbed/disassembled on the engines	OK
7	Check engines are mounted on the metallic skids/Wooden pallets are tightened	OK
8	Check plastic bags pipes are weared on the open end hoses & bend	OK
9	Check all hoses, clips are tightened	OK
10	Check lub oil drain plug is tightened with new copper washer, after removing of lub oil	OK
11	Check started 12V / 24V as per BOM & all nuts are available	OK
12	Check charging alternator12V / 24V as per BOM & all nuts are available	OK
13	Check Fuel Pump sealing is done	OK
14	Check rust preventive oil (silica jelly) is applied on flywheel housing, flywheel on machined surfaces etc for domestic engines only	OK
15	Check fan drive assly spacers quanties is ok as per BOM/Packing list	OK
16	Confirm lub oil pressure & water temperature sensors & gauges are ok as per BOM/Make	OK
17	Check fan size 17" / 24"/ 26" / 30" model wise as per BOM	N.A
18	Check lub oil is removed from the sump after engine testing cycle completion	OK
19	Check belts alignment & tension is ok	OK
20	Check CAC pipes & Water inlet pipes, flywheel housing & flywheel are ok as per BOM	OK
21	Check engine name plate is ok as per ARAI certificate	OK
22	Check cable harness connections i.e. Earthing copper washer, press lugs/round lugs etc. is ok as per requirements	N.A
23	Check cable harness wiring is connected respectively i.e. number wise	N.A
24	Check both sides engine foots are ok as per BOM Outer Dim. mm	N.A
25	Visually, check all external bolts/nuts are tightened, especially water drain plug	OK
26	Check exhaust bend alignment / penpendicular wrt mounting hole	OK
27	Check loose components are packed with identifications numbers/name, especially IEB engines	OK
28	Check Aluminium radiators Pre-Mix coolant instructions sticker is pasted on the radiator near to coolant filling inlet for aluminium radiators only Radiator Serial No	N.A
29	Confirm seaworthy packing for export engines only and raidiater mtg. Bracket outer Aim=	N.A
30	Confirm, antirust pouch is kept on the engine	N.A
31	Check rust preventive oil (AXXANOL 34 CD) is applied on machined surfaces, fuel pump, charging alternator, fuel filter etc.	N.A

Production Quality Assurance Date:- 20/09/2024

QA.3.49 Rev. No.:00 Date: 15/02/2013



GREAVES

Engine Checklist Form

Industrial Engine Unit

Submit Checksheet

Engine Checklist Form							
Engine Sr No	13260824088 10	Model	D3V8	Description	D3V8	Engine Type	IEB
Description	G08DV-UF42 D3V8 396HP@1470 HE24V+shaft	Station No	30				
Name	user	Emp Id	11	Date & Time	9/20/2024, 10:53:46 AM		

Sr no	Checkpoint	Action
1	Check engine assly history card & engine testing history card are available with the engine with engine tested ok remarks.	☐
2	Check all components are aesthetically finish & painting is ok .	☐
3	Check all rubber hoses clips/clamps tightening & torque properly	☐
4	Confirm, all components are mounted on the engine as per BOM.	☐
5	Check all the loose items are available with engine as per packing note or BOM with identifications.	☐
6	Check fuel off / On solenoid is as per BOM. (Unit Volts)	
7	Confirm, after testing of engine components are not disturbed/disassembled on the engines.	☐
8	Check engines are mounted on the metallic skids/Wooden pallets are tightened.	☐
9	Check plastic bags pipes are weared on the open end hoses & bend.	☐

2	Check rust preventive oil (AXXANOL 34 CD) is applied on machined surfaces, fuel pump, charging alternator, fuel filter etc.	

mment:

Project updates:

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Result Checksheet for station 30.

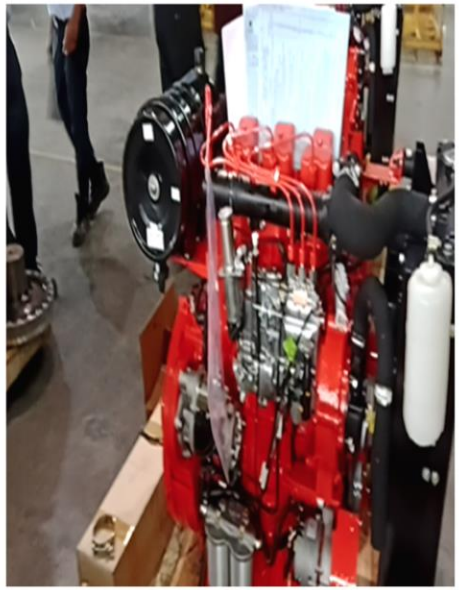
Engine Checksheet						
Engine No	1208032407798		**Station No**	30	**Model**	3G
Engine Series	G	**BOM No** 14119007195P	**Operator**	user	**Operator ID**	11
Engine Description	3G11T 80HP 1500RPM RC 12V		**Status**	Passed	**Timestamp**	11/07/2024, 14:16:43

eq	Checkpoint	Checkpoint Status
	Check engine assly history card & engine testing history card are available with the engine with engine tested ok remarks.	True
	Check all components are aesthetically finish & painting is ok .	True
	Check all rubber hoses clips/clamps tightening & torque properly	True
	Confirm, all components are mounted on the engine as per BOM.	True
	Check all the loose items are available with engine as per packing note or BOM with identifications.	True
	Check fuel off / On solenoid is as per BOM. (Unit Volts)	12
	Confirm, after testing of engine components are not disturbed/disassembled on the engines.	True
	Check engines are mounted on the metallic skids/Wooden pallets are tightened.	True
	Check plastic bags pipes are weared on the open end hoses & bend.	True
)	Check all hoses, clips are tightened.	True

2	Check rust preventive oil (AXXANOL 34 CD) is applied on machined surfaces, fuel pump, charging alternator, fuel filter etc.	True

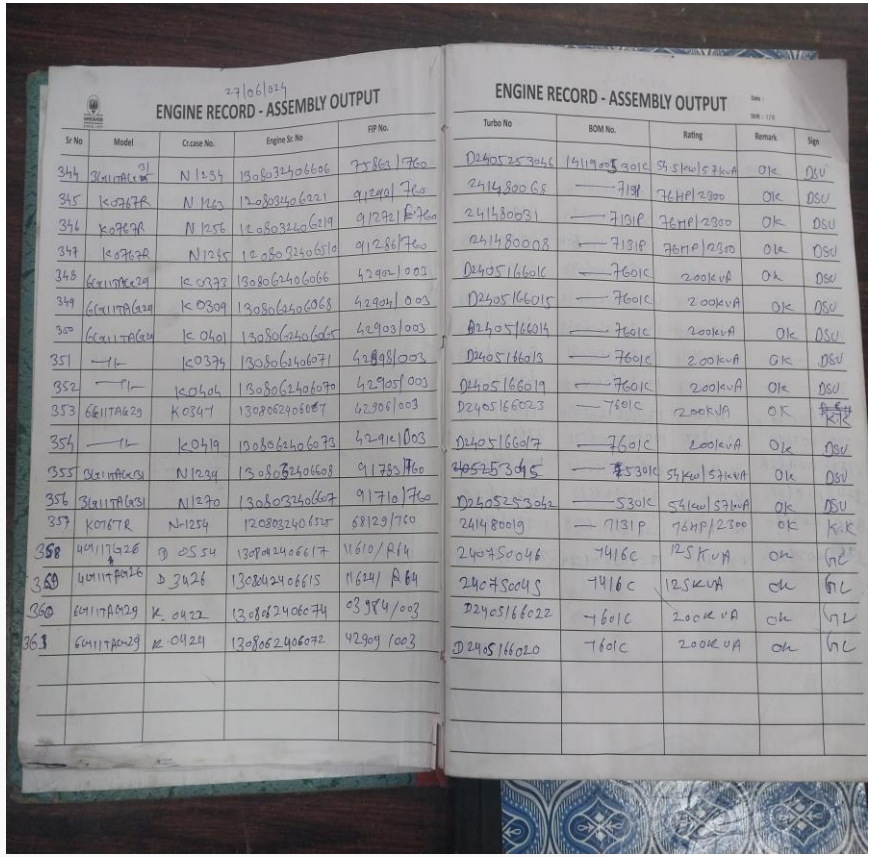
mment: FIP pump sealing missing,,, Done ok

Engine Images



Project updates:

Assembly Engine checksheet for station no 10.

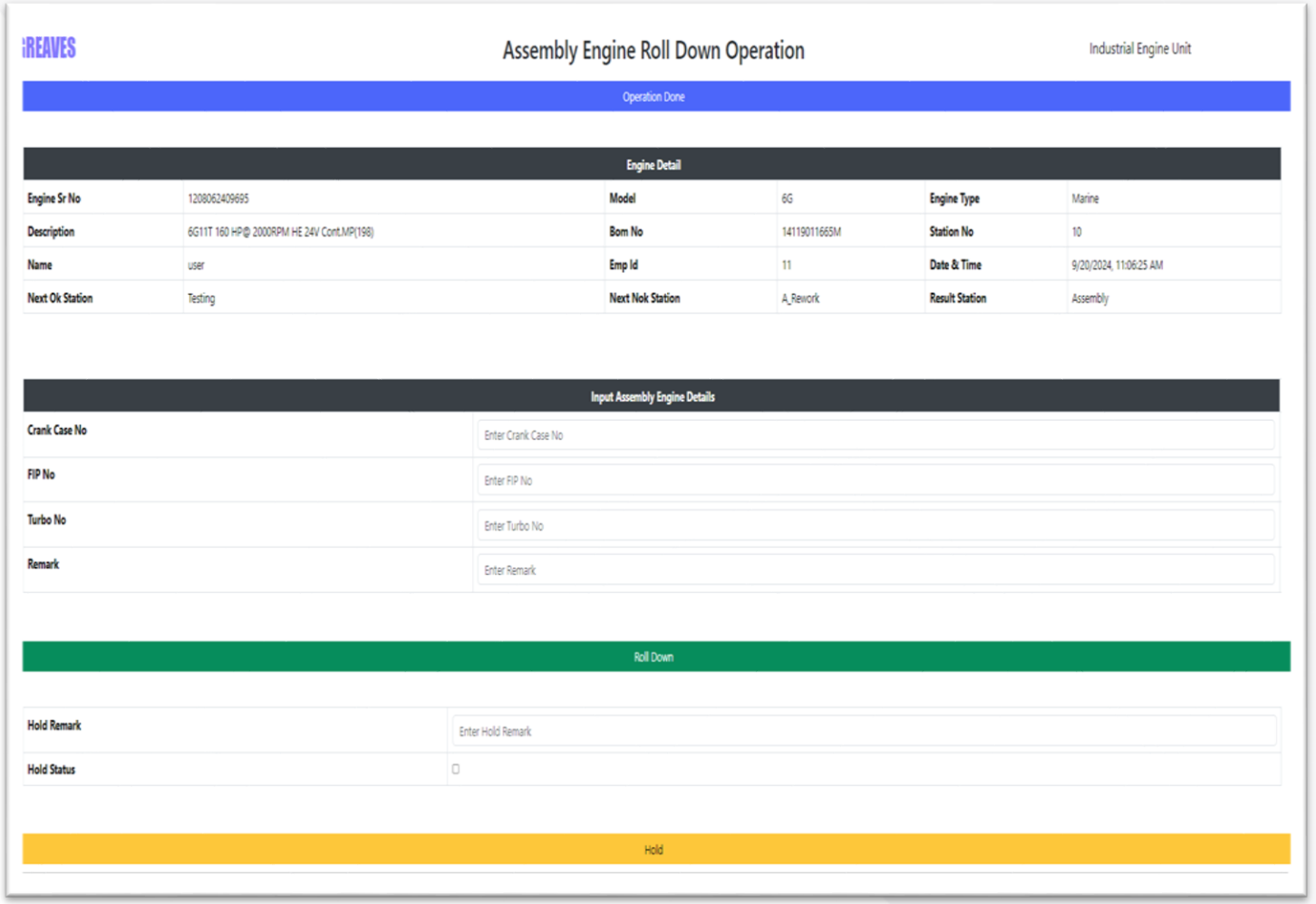


ENGINE RECORD - ASSEMBLY OUTPUT

Sr No	Model	Crcase No.	Engine Sr. No	FIP No.
344	6G11TA(G3)	N1234	1308032406606	75862/760
345	K0767R	N1263	1208032406221	91240/760
346	K0767R	N1256	1208032406219	91272/760
347	K0767R	N1245	1208032406510	91286/760
348	6G11TA(G29	K 0377	1308062406066	42902/003
349	6G11TA(G29	K 0309	1308062406068	42904/003
350	6G11TA(G29	K 0401	1308062406065	42903/003
351	—"—	K 0375	1308062406071	42898/003
352	—"—	K 0406	1308062406070	42905/003
353	6G11TA629	K 0347	1308062406067	42906/003
354	—"—	K 0419	1308062406073	42911/003
355	6G11TA(G3)	N1229	1308032406608	91783/760
356	6G11TA(G3)	N1270	1308032406607	91710/760
357	K0767R	N-1254	1208032406515	58129/760
358	6G11TA629	D 0554	1308062406617	11610/A64
359	6G11TA629	D 3426	1308062406615	11624/A64
360	6G11TA629	K 0422	1308062406074	03984/003
361	6G11TA629	K 0424	1308062406072	42909/003

ENGINE RECORD - ASSEMBLY OUTPUT

Turbo No	BOM No.	Rating	Remark	Sign
D2405253046	14119005301C	54.5kw/57kVA	Ok	DSV
24148006S	7131P	76HP/2300	Ok	DSV
24148003I	7131P	76HP/2300	Ok	DSV
24148000S	7131P	76HP/2300	Ok	DSV
D2405166016	7601C	200kVA	Ok	DSV
D2405166015	7601C	200kVA	Ok	DSV
D2405166014	7601C	200kVA	Ok	DSV
D2405166013	7601C	200kVA	Ok	DSV
D2405166019	7601C	200kVA	Ok	DSV
D2405166023	7601C	200kVA	OK	
D2405166017	7601C	200kVA	Ok	DSV
2405253045	5301C	54kw/57kVA	Ok	DSV
D2405253042	5301C	54kw/57kVA	Ok	DSV
24148001g	7131P	76HP/2300	Ok	K.K
2407S0046	7416C	125KVA	Ok	
2407S0045	7416C	125KVA	Ok	
D2405166022	7601C	200KVA	Ok	
D2405166020	7601C	200KVA	Ok	



REAVES

Assembly Engine Roll Down Operation

Industrial Engine Unit

Operation Done

Engine Detail					
Engine Sr No	1208062409695	Model	6G	Engine Type	Marine
Description	6G11T 160 HP@ 2000RPM HE 24V Cont.MP(198)	Bom No	14119011665M	Station No	10
Name	user	Emp Id	11	Date & Time	9/20/2024, 11:06:25 AM
Next Ok Station	Testing	Next Nok Station	A_Rework	Result Station	Assembly

Input Assembly Engine Details	
Crank Case No	Enter Crank Case No
FIP No	Enter FIP No
Turbo No	Enter Turbo No
Remark	Enter Remark

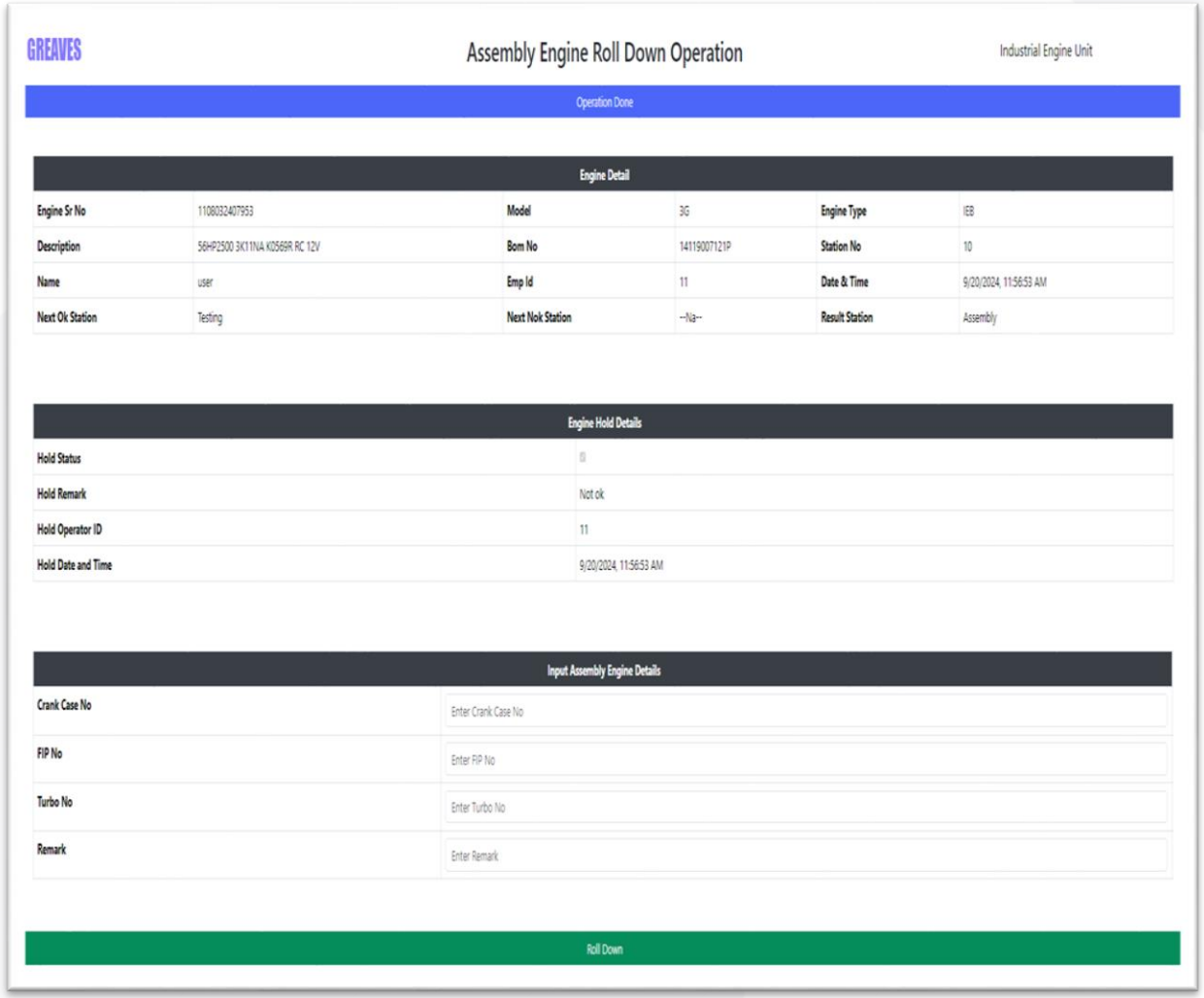
Roll Down

Hold Remark	Enter Hold Remark
Hold Status	☐

Hold

Project updates:

Assembly engine checksheet when submitted at station 12



GREAVES

Assembly Engine Roll Down Operation

Industrial Engine Unit

Operation Done

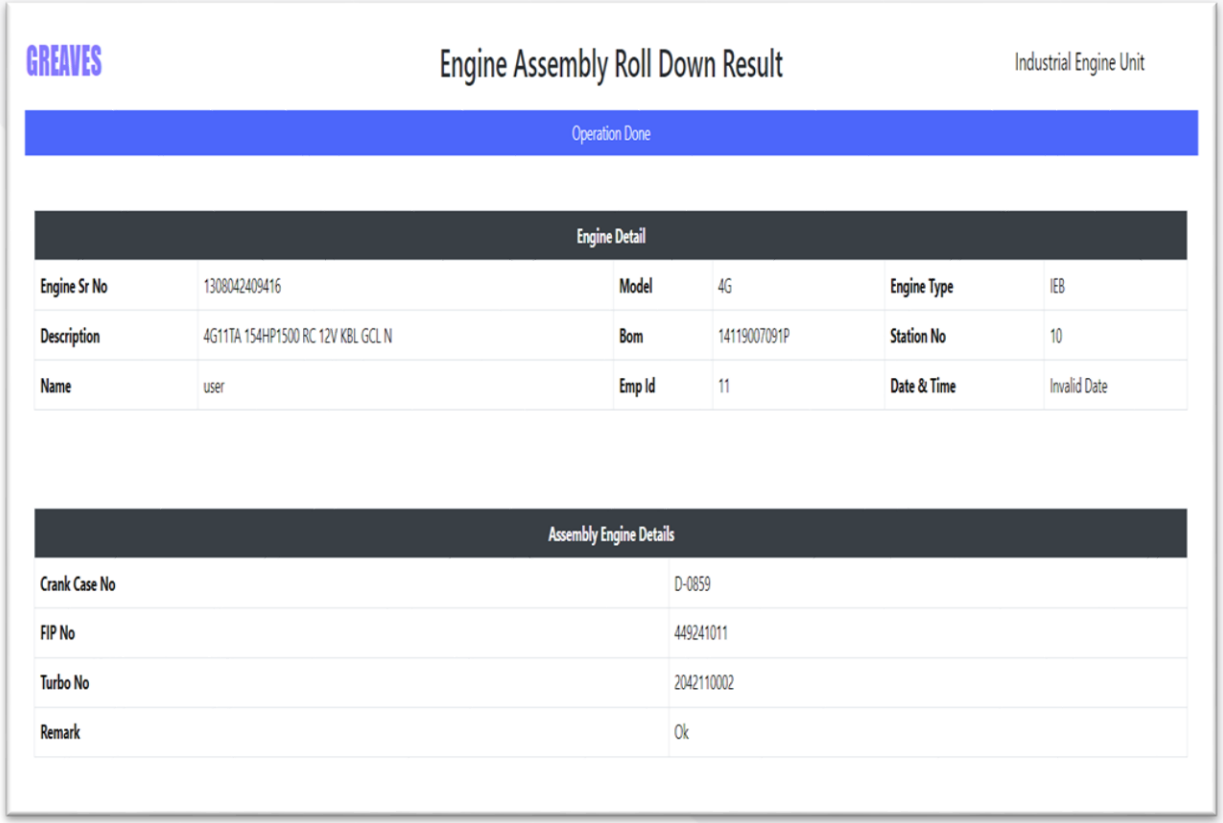
Engine Detail					
Engine Sr No	1108032407953	Model	3G	Engine Type	IEB
Description	56HP2500 3K11NA K0569R RC 12V	Bom No	14119007121P	Station No	10
Name	user	Emp Id	11	Date & Time	9/20/2024, 11:56:53 AM
Next Ok Station	Testing	Next Nok Station	--Na--	Result Station	Assembly

Engine Hold Details	
Hold Status	
Hold Remark	Not ok
Hold Operator ID	11
Hold Date and Time	9/20/2024, 11:56:53 AM

Input Assembly Engine Details	
Crank Case No	Enter Crank Case No
FIP No	Enter FIP No
Turbo No	Enter Turbo No
Remark	Enter Remark

Roll Down

Engine assembly result for station no 10.



GREAVES

Engine Assembly Roll Down Result

Industrial Engine Unit

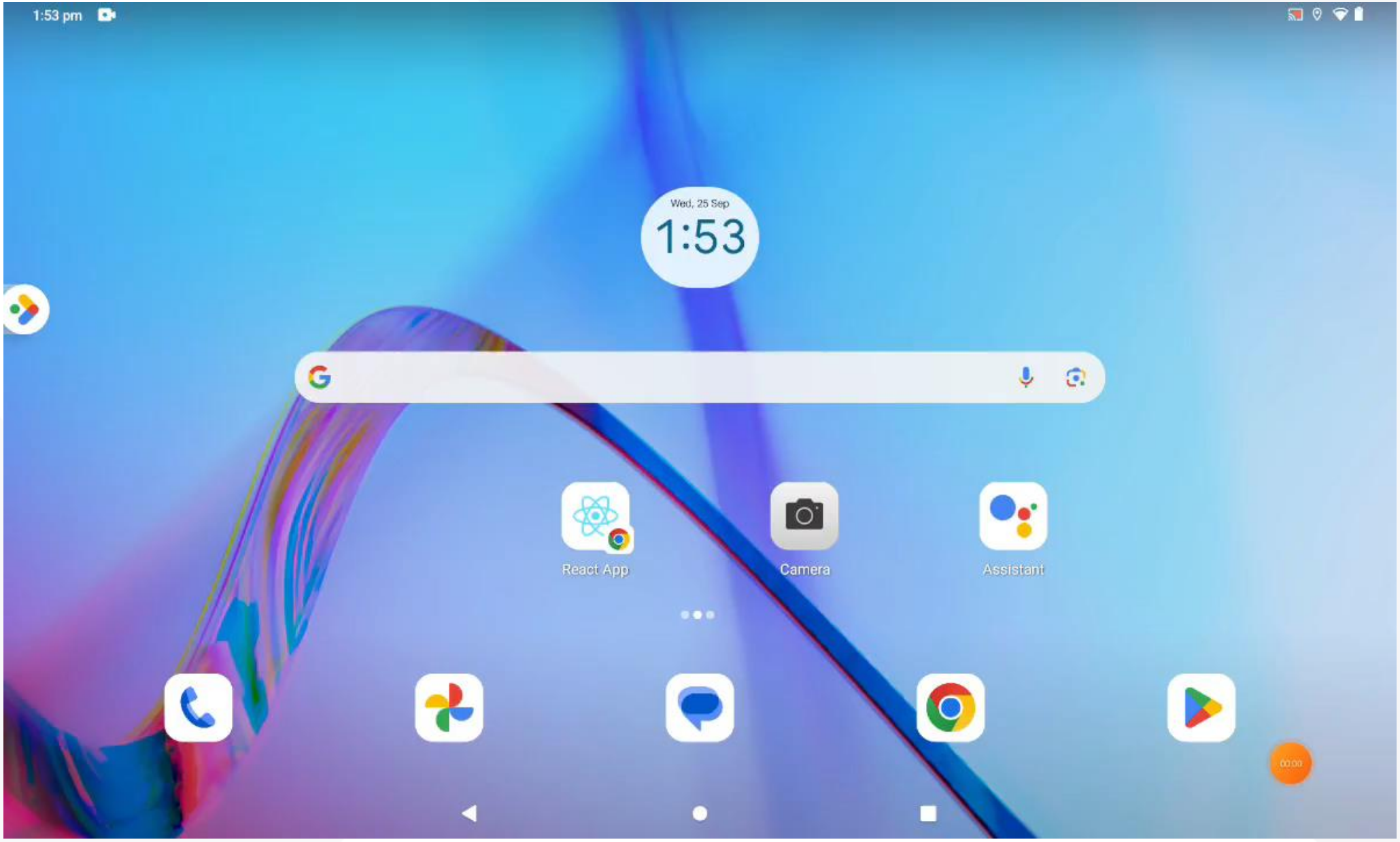
Operation Done

Engine Detail					
Engine Sr No	1308042409416	Model	4G	Engine Type	IEB
Description	4G11TA 154HP1500 RC 12V KBL GCL N	Bom	14119007091P	Station No	10
Name	user	Emp Id	11	Date & Time	Invalid Date

Assembly Engine Details	
Crank Case No	D-0859
FIP No	449241011
Turbo No	2042110002
Remark	Ok

Project updates:

Video for station no 10.



Findings :

•**Paperless Checksheet System**: The project successfully replaced manual paper-based checksheets with a digital system, enhancing efficiency.

•**Efficient Data Management**: Digital checksheets streamline data management, ensuring real-time data updates and improved transparency across production stages.

•**Barcode Integration:** Barcode scanner integration has improved the speed and accuracy of data entry.

Suggestion :

•**Enhance Dashboard Interactivity**: Implement data filtering, real-time analytics, and customizable views to make dashboards more actionable and user-friendly.

•**User Experience Improvements**: Optimize the user interface (UI) for better accessibility and ease of use

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Thanks