OPE Process Manual

SPW Maintenance Domain

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Why Are We Here?

Overview

- This manual provides guidance on how to understand, measure, and improve Overall Production Efficiency (OPE) within each area of the plant. By identifying the main contributors that affect OPE%, teams can prioritize their limited resources on the areas that deliver the greatest impact.

What is OPE?

- Overall Production Efficiency (OPE) is a **key performance indicator** that measures how effectively a plant utilizes its resources to produce vehicles.
- Specifically, OPE% represents: The number of vehicles **actually produced** compared to the **maximum number** that could have been produced without losses.
- The OPE methodology has been proven effective in the automotive industry. Its application strengthens standard conformance, supports continuous process improvement, and ensures the best use of manpower and assets..

Why is a formal process needed?

- A formalized OPE process ensures consistency in measurement across all plants. Standardized metrics enable more accurate comparisons, allow anomalies to be detected more quickly, and create a foundation for targeted problem-solving.

Why stratify our losses into categories?

- Not all production losses are the same, and each type requires a tailored approach. OPE methodology groups losses into distinct categories, enabling teams to:
    - Apply the right tools to the right problems.
    - Focus resources more effectively.
    - Implement timely and permanent countermeasures.
    - Ensures that problem-solving efforts are both efficient and sustainable.

Why are E-Wall and Business Intelligence Applications needed?

- Effective OPE management requires robust data analysis tools.
- **E-Wall:** Enables drill-down analysis to identify shifting bottlenecks, while ongoing monitoring improves data accuracy.
- **Business Intelligence Applications:** Provides extensive data for rapid root-cause analysis, trend visualization, and shift-to-shift comparisons that are not immediately visible through manual review.
- Together, these tools accelerate decision-making and improve resource deployment. Rather than reacting only to top losses, teams can take a systematic approach—analyzing data across systems to uncover common root causes. This allows multiple issues to be addressed proactively and simultaneously, driving long-term efficiency gains.

OPE Loss Categories and Definitions

- OPE Definition and Formula
- OPE Loss Categories
- OPE Reporting Process

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OPE Definition and Formula

Overall Production Efficiency % (OPE): Stellantis KPI used to drive efficiency of manpower and asset utilization:

Formula

$$OPE = \frac{\text{Actual number of good units produced}}{\text{Maximum potential units}} = \frac{\text{Actual number of good units produced}}{\text{Gross JPH at measurement point x line running time}}$$

OPE Example:

- We have a piece of equipment capable of producing parts at 100 jobs per hour
  - Gross JPH = 100 JPH
- We plan to produce parts for 1 hour
  - Runtime = 1 hour
- Maximum Achievable Production = Gross JPH * Runtime = 100 JPH * 1 hour = 100 Units
- We produced 80 parts in the hour we planned to produce parts
  - Units Produced = 80 Units
- **OPE% = 80 Units / (100 JPH * 1 Hour) = 80%**

Scope Includes:

- **Actual good production units** is the number of units produced during the defined time period (shift, day, week, month, year) excluding any scrap units. Units requiring rework before moving to the next part of the process are counted as good production.
- **Maximum potential units** is the number of units that could be produced during the defined time period when no loses would occur. The Maximum number of units is a product of the gross line speed units per hour of the defined measurement point and the line running time of the defined period (shift, day, week, year).
- **Line running time** is the available production time of the area, production time lost due to breakdowns, operational issues (e.g. Andon, labor shortages, Covid cleaning), material shortages and blocked or starved by upstream or downstream manufacturing process are counted as available production time. Planned stops within the schedule production time (Planned TPM, social breaks and team briefings) are to deducted from the line running time.

Link To Stellantis KPI Book:

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OPE Loss Categories

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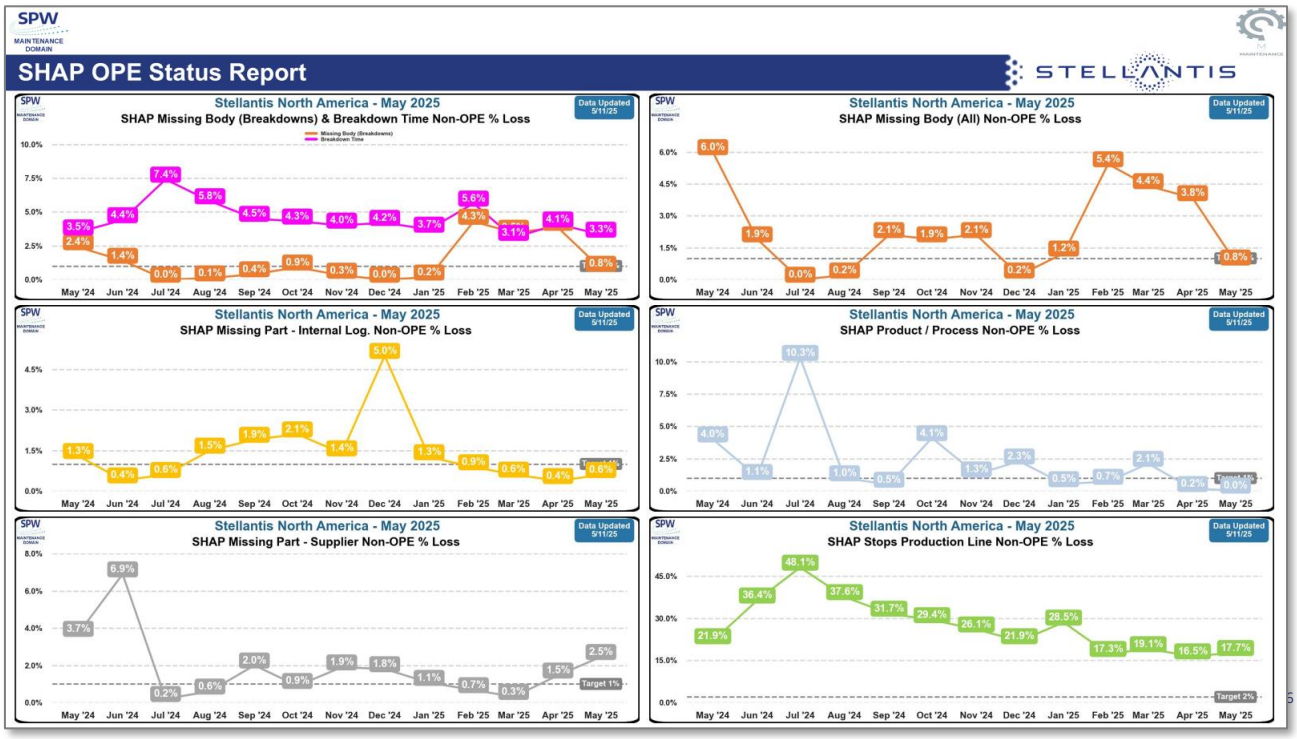
GENERAL ASSEMBLY OPE LOSSES STANDARD FAMILIES		
Category	**Explanation**	**Example**
Energy / IT	Energy breakdown supplied by services external to the shop (STELLANTIS or external company)	Lack of : Electricity, compressed air, stream, cool water..
	IT failure under the responsibility of services external to the shop (STELLANTIS or external company)	Lack of IT système for production management, flow, quality or other affecting the production level.
Missing Body	Car lost at the end of the shop due to Lack of car entering in the shop from the upstream shop	Lack of cars due to breakdown in paintshop or bodyshop.
Missing Part - Supplier	Cars lost at the end of the shop due to parts not supplied in time by supplier	Lack of component, truck delay....
Missing Part - Internal Log.	Cars lost at the end of the shop due to parts not supplied internal supply chain team	Parts not arrived in time on the line due to a issue in our internal supply chain team
Stops production Kit	Specifical focus on the losses due to the kitting	Issues in intriduction and exit of the kit from the line. Car lost due to kits AGV.
Stops production Line	Manual stop of the production line	Andon stops, Waiting operator stops, stops for trainings, reduction of line speed due to absentéisme, stops due to backup operation or backup mode, quality rework...
Breakdown time	Stops due to equipments, technical issue.	All equipments breakdowns, Automatic screwing issues, feeling, glazing, gluing issues. AGV breakdowns. "Marriage" issues.
	Machine related downtime both **breakdowns** and **microstops**.	Any machine faulted condition whether it meets the breakdown level time frame or not.
Saturation	Line blocked due to a downstream area issue. No "place" to exit the car, the carrier out of the line to the next step.	Downstream saturation, Carrier, hanger, trolley evacuation issue
Product / Process	Specifical focus on the losses due to launching. Cars or equipment, facility launching	Car launching: Stops due to training, quality issues, worstation issues, bad design of parts...
		Equipment launching: stops due to fine tuning, bad design, breakdowns, cycle time issue...
	Any short shift condition that penalizes the plant for short work week.	The plant decides to reduce its runtime for the week by short shifting below the short work week threshold. The short work week time will be added to OPE, but that loss will go under here.

OPE loss reporting example from weekly OPE deck:



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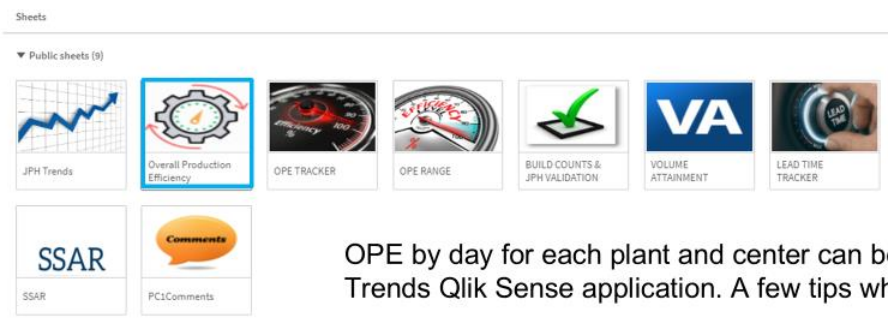
OPE Reporting Process

Where to Find OPE Reporting in Qlik Sense



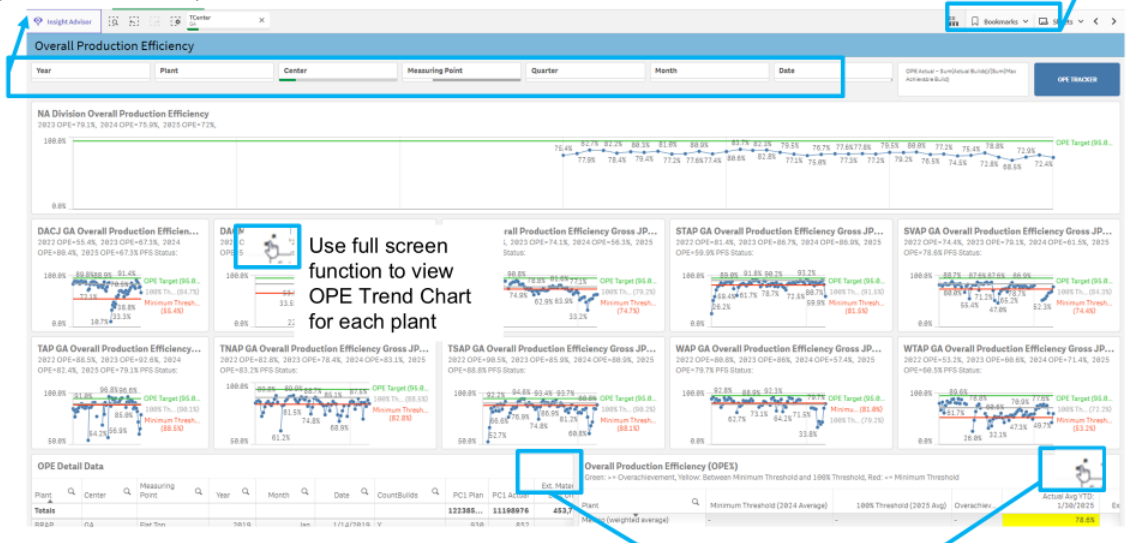
OPE by day for each plant and center can be found the JPH Trends Qlik Sense application. A few tips when navigating:

- In each tab, the tables are exportable: right click on the information you want to export and select “Export” then select ”Export Data”
- All filters are linked between the JPH Trends sheets. For example, any filters selected in the “Overall Production Efficiency” sheet will stay selected when you switch to “OPE Tracker” sheet

Overall Production Efficiency Sheet in Qlik Sense

Filter by Year, Plant, Center, Month and Date (Default Center is GA)

Use drop down to select sheet



Use full screen function to view OPE Trend Chart for each plant

Use full screen function to view “OPE Detail Data” for selected filters.

$$\text{Overall Production Efficiency \%} = \frac{\text{PC1 Actual}}{(\text{Runtime} \times \text{Gross})}$$

OPE Reporting Process

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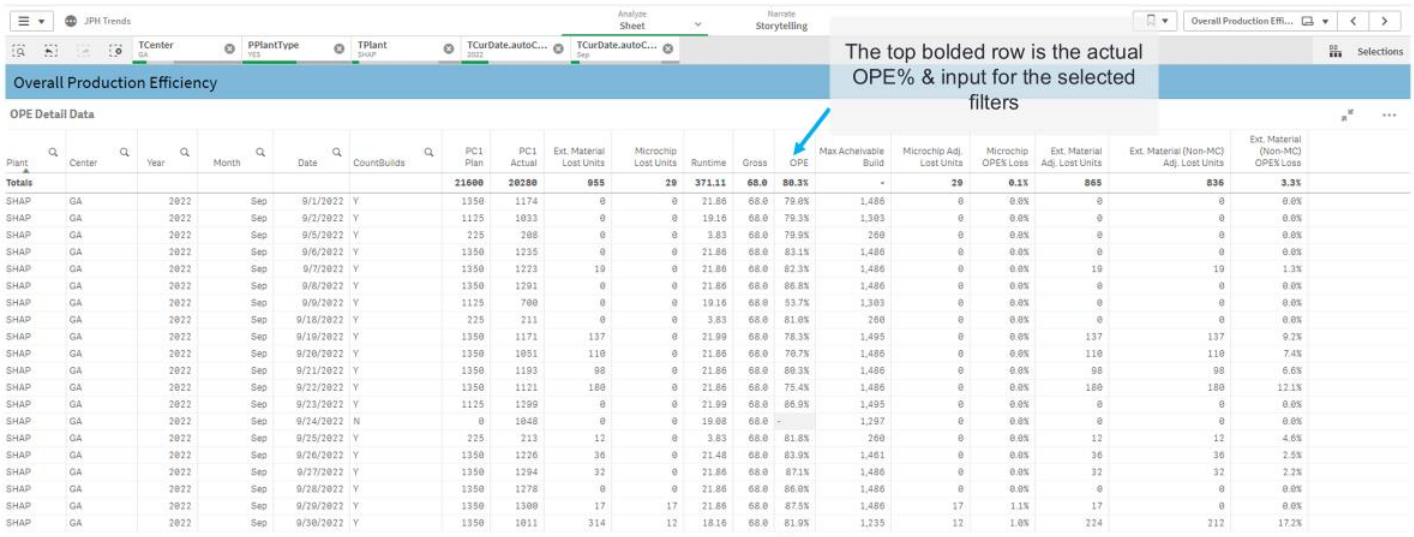
Overall Production Efficiency: OPE Detail Data



Plant	Center	Year	Month	Date	CountBuilds	PC1 Plan	PC1 Actual	Ext. Material Lost Units	Microchip Lost Units	Runtime	Gross	OPE	Max Achelvable Build	Microchip Adj. Lost Units	Microchip OPE% Loss	Ext. Material Adj. Lost Units	Ext. Material (Non-MC) Adj. Lost Units	Ext. Material (Non-MC) OPE% Loss
Totals						**21600**	**20280**	**955**	**29**	**371.11**	**68.0**	**80.3%**	-	**29**	**0.1%**	**865**	**836**	**3.3%**
SHAP	GA	2022	Sep	9/1/2022	Y	1350	1174	0	0	21.86	68.0	79.0%	1,486	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/2/2022	Y	1125	1033	0	0	19.16	68.0	79.3%	1,303	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/5/2022	Y	225	208	0	0	3.83	68.0	79.9%	260	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/6/2022	Y	1350	1235	0	0	21.86	68.0	83.1%	1,486	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/7/2022	Y	1350	1223	19	0	21.86	68.0	82.3%	1,486	0	0.0%	19	19	1.3%
SHAP	GA	2022	Sep	9/8/2022	Y	1350	1291	0	0	21.86	68.0	86.8%	1,486	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/9/2022	Y	1125	700	0	0	19.16	68.0	53.7%	1,303	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/18/2022	Y	225	211	0	0	3.83	68.0	81.0%	260	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/19/2022	Y	1350	1171	137	0	21.99	68.0	78.3%	1,495	0	0.0%	137	137	9.2%
SHAP	GA	2022	Sep	9/20/2022	Y	1350	1051	110	0	21.86	68.0	70.7%	1,486	0	0.0%	110	110	7.4%
SHAP	GA	2022	Sep	9/21/2022	Y	1350	1193	98	0	21.86	68.0	80.3%	1,486	0	0.0%	98	98	6.6%
SHAP	GA	2022	Sep	9/22/2022	Y	1350	1121	180	0	21.86	68.0	75.4%	1,486	0	0.0%	180	180	12.1%
SHAP	GA	2022	Sep	9/23/2022	Y	1125	1299	0	0	21.99	68.0	86.9%	1,495	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/24/2022	N	0	1048	0	0	19.08	68.0	-	1,297	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/25/2022	Y	225	213	12	0	3.83	68.0	81.8%	260	0	0.0%	12	12	4.6%
SHAP	GA	2022	Sep	9/26/2022	Y	1350	1226	36	0	21.48	68.0	83.9%	1,461	0	0.0%	36	36	2.5%
SHAP	GA	2022	Sep	9/27/2022	Y	1350	1294	32	0	21.86	68.0	87.1%	1,486	0	0.0%	32	32	2.2%
SHAP	GA	2022	Sep	9/28/2022	Y	1350	1278	0	0	21.86	68.0	86.0%	1,486	0	0.0%	0	0	0.0%
SHAP	GA	2022	Sep	9/29/2022	Y	1350	1300	17	17	21.86	68.0	87.5%	1,486	17	1.1%	17	0	0.0%
SHAP	GA	2022	Sep	9/30/2022	Y	1350	1011	314	12	18.16	68.0	81.9%	1,235	12	1.0%	224	212	17.2%

The OPE by day detail is displayed in the table

$$\text{Overall Production Efficiency \%} = \frac{\text{PC1 Actual}}{(\text{Runtime} \times \text{Gross})}$$

Source Data:

Units Produced:

- GA: PC1 database, measured at Flat Top.
- BIW: PFS database, measured at Framer
- Paint: PFS database, measured at Sealer

Runtime:

- GA: “JPH Runtime Validation.xlsx” runtime hours entered by the plants.
- BIW: FIS at Framer based on FIS scheduler
- Paint: FIS at Sealer based on FIS scheduler

GA Runtime Entry:

Gross JPH:

- GA: Flat Top Gross JPH measured by IE
- BIW: Framer Gross JPH measured by IE
- Paint: Sealer Gross JPH measured by IE

Note: A work order must be submitted to the throughput team to change the gross JPH for OPE reporting with evidence the rate has been validated by IE.

OPE Reporting Process

Pilots:

Pilot units that do not count towards the PC1 units built, must be logged on the “GA Pilot Units Input Sheet” in the “JPH Runtime Validation.xlsx” file. The runtime will be adjusted down by 1 cycle at the net JPH for each pilot unit produced that does not count towards PC1. If pilot units do count towards PC1 total, then no action is required.

		Pilot Units Input Sheet (Not counted in PC1)										
DATE	DAY	BRAP	DACJ	DACM	SHAP	STAP	SVAP	TAP	TNAP	TSAP	WAP	WTAP
1/8/24	Monday				8.00							
1/9/24	Tuesday				4.00							
1/10/24	Wednesday				17.00							
1/11/24	Thursday				4.00							
1/12/24	Friday				10.00							
1/13/24	Saturday											
1/14/24	Sunday											
1/15/24	Monday				1.00							
1/16/24	Tuesday				6.00							
1/17/24	Wednesday											
1/18/24	Thursday				7.00							
1/19/24	Friday				9.00							

GA Runtime Entry:

Short Shifting and Short Work Week:

US and Canadian plants have short work week benefit for employees where if an employee works less than 40 hours in a week, they will get paid 80% of the gap between the hours worked and 40 hours. For example, an employee that works only 30 hours in a week will get paid for 38 hours. OPE utilizes runtime based on paid hours, not hours worked. Below are two examples showing short work weeks and the corresponding runtime used for OPE.

2023 UAW Contract:

(2) Automatic Short Week Benefit

(a) The Automatic Short Week Benefit payable to any eligible Employee for any week beginning on or after December 16, 2019, shall be an amount equal to the product of the number by which 40 exceeds his Compensated or Available Hours, *counted to the nearest tenth of an hour multiplied by 80% of his Base Hourly Rate as to an Hourly Employee or Base Weekly Salary divided by 40 as to a Salaried Employee.

Date	DOW	WTAP		
		SHIFT 1	SHIFT 2	SHIFT 3
9/17/2023	Sunday	0.00	0.00	0.00
9/18/2023	Monday	5.57	5.07	0.00
9/19/2023	Tuesday	5.57	6.47	0.00
9/20/2023	Wednesday	3.57	4.57	0.00
9/21/2023	Thursday	3.57	4.57	0.00
9/22/2023	Friday	3.97	6.07	0.00
9/23/2023	Saturday	0.00	0.00	0.00

22.25 * (1 + (5/60)) = 24.1 hrs
(5 min paid break per hour)

40 hrs – 24.1 hrs = 15.9 hrs
15.9 hrs * 80% = 12.7 hrs

22.25	runtime hours actual
24.1	paid hours for 22.25 hrs runtime
12.7	additional short work week paid hours
36.8	total paid hours
33.8	total runtime with SWW penalty
11.5	SWW penalty hours for OPE

26.75	runtime hours actual
29.0	paid hours for 26.75 hrs runtime
8.8	additional short work week paid hours
37.8	total paid hours
34.6	total runtime with SWW penalty
7.9	SWW penalty hours for OPE

OPE Reporting Process

Cancelled Shifts:

In the event a shift is cancelled prior to the commencement of the shift, the shift is excluded from the OPE calculation. Cancelled shifts should not be considered when determining the runtime in the OPE calculation for a short work week. For example, if a shift works 8 hours Monday – Thursday and cancels Friday production, there is no runtime adjustment for short work week. If a shift works 8 hours Monday – Wednesday, short shifts 2 hours on Thursday, and cancels Friday production, The runtime will only be adjusted up by 80% of the 2 hours short shifted, not 80% of 10 hours (the gap to 40 hours worked in this case).

Planned Maintenance:

The runtime adjustment for short work week can be avoided if the short shifting is due to planned maintenance activities. In order to avoid the runtime adjustment, the planned maintenance must abide by these rules:

- Short shift at the end of the shift, (PFS should not show cars built during the short shift time)
- PM must be done and bought off on the day of short shifting.
- PM must be static with a frequency greater or equal to monthly
- A work order must be submitted to the SPW Maintenance Domain with the details of the completed PM's and a screen shot of the completed work showing trade comments.
- Work ticket must be submitted during the week of short shifting before reporting is published.
- The PM manhours must exceed the time short shifted
- Launch pull ahead work can also be considered; this work must be documented with a WT in TMS.

SPW Maintenance Domain Work Order System:

Other Exclusions:

- Shifts that are scheduled strictly for make-up volume where the PC1 plan is 0, are excluded for the OPE calculation. For 3 shift plants that run a make up shift on Sunday, the first 4 hours of Monday's midnight shift are also excluded. This is due to the PC1 system changing days at 2am.
- Plants going through a new product launch are excluded from the division OPE for a maximum of 3 months after Job 1.

Maintenance Domain

SPW Maintenance Domain Website

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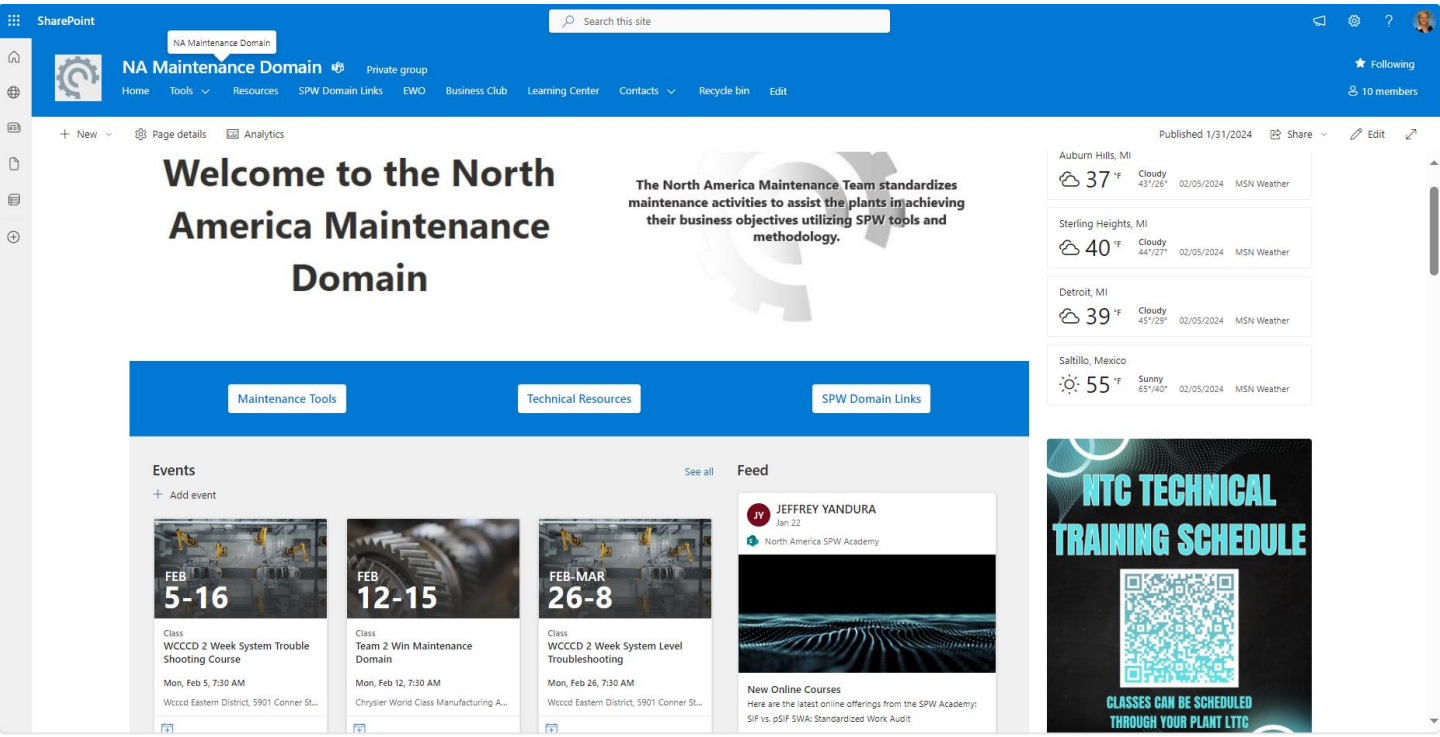
Each section holds a unique subset of information including important internal & external contacts, links to reporting tools, maintenance loss information (EWO), links to training opportunities and registration & more!



What each section houses:

Tools:

- Links to commonly used Corporate Resources (The HUB, DriveIT, CATS, Uselect, etc.)
- Quick Access to Reporting Tools (Business Intelligence Applications, EWALL, Scorecard Power BI, etc.)
- Corporate Policies

Resources:

- Technical Resources
- Orange Room Repository (Standard templates, Examples, Data, KPIs, etc.)
- Computerized Maintenance Management System (CMMS)
- Spare Parts Management resources & links (Red Tag Process, Critical Spare Parts, RWP Process)

SPW Domain Links:

- Quick links to domain resources & tools:
  - KPI Book, Book of Knowledge, Best Practice Database, etc.

Emergency Word Order (EWO):

- Weekly Plant EWO Review Presentations
- Countermeasure Read-Across PDCA
- PC1 EWO tracking lists (by plant)

Business Club:

- Business Club Call presentation repository. The Business Club is hosted monthly to communicate domain related information and foster best practice sharing among plants
- Maintenance Domain tool implementation tracking (by plant)
- Quick Access to domain call Meeting Minutes

Learning Center:

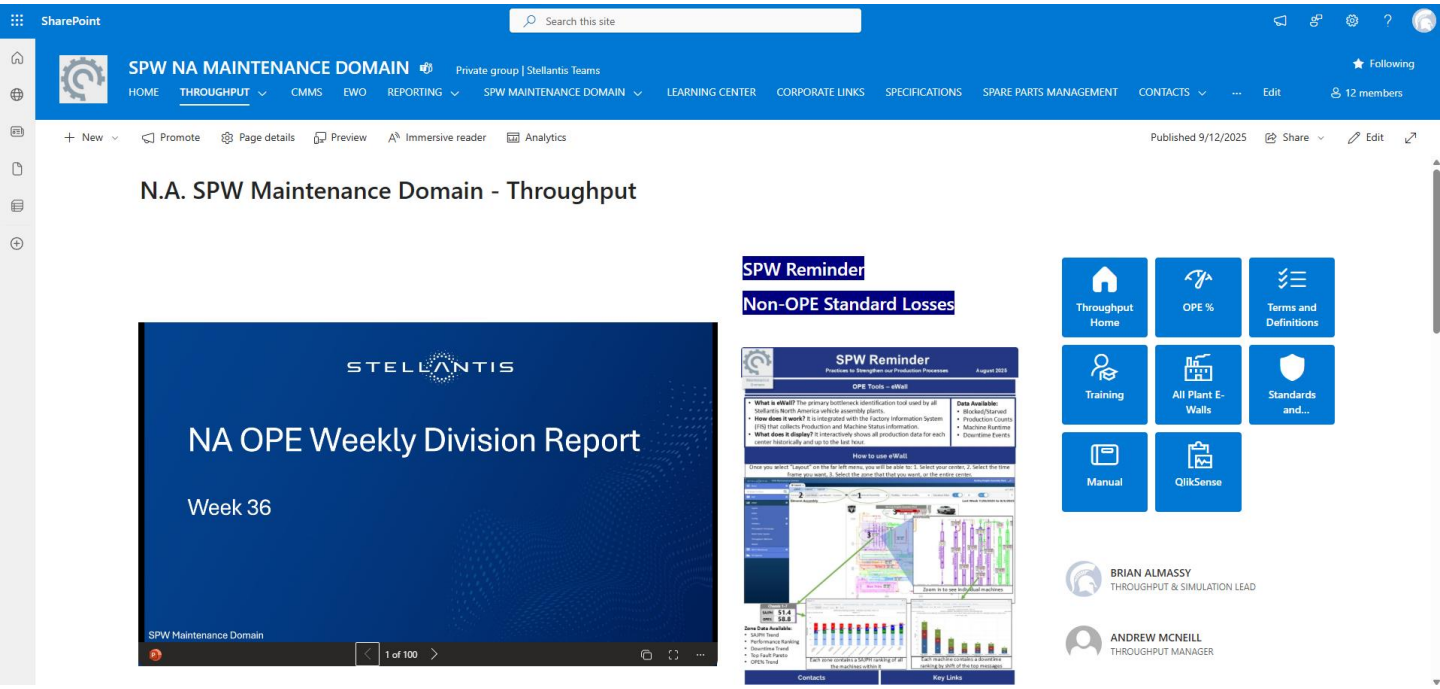
- Central location for upcoming SPW and Technical Training events and registration
- Course Registers
- Maintenance Training Tracking

Contacts:

- Internal Stellantis Contact List
- External Supplier Contact List
- Technical Support Hotline List
- Website Admin Contact Form

Scan the QR Code to request access and see for yourself

SPW Maintenance Domain Website - Throughput



What each section contains:

OPE%:

- Link to weekly division OPE report
- Link to monthly plant OPE one pagers
- Link to OPE Business Intelligence Data Page

Terms and Definitions:

- Throughput terms and definitions overview

Training:

- Links to various training modules including: Center level OPE board, cycle time training, eWall training, and OPE management training.

All Plant E-Walls

- Links to eWalls reports for each plant
- Links to plant specific reports

Standards and Documents:

- Links to standards such as: burst build, CARE throughput spec, and top 20 machines

Manual:

- Link to this manual

Business Intelligence:

- Links to Business Intelligence applications with pages for OPE reporting and downtime data

SPW Throughput Website:

OPE Management Processes

- OPE Best Practices
- Orange Room Standard
- OPE Escalation Process
- Top 20 Machine Process

OPE Maturity Assessment Matrix (OMAM)

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OPE Management Grid

Update : June 2023	ASS --%	Assessment: VOR / OAX / DOJAI	
Monthly OPE Result - Month / Year			
Prerequisites	Organisation described		The roles and responsibilities of OPE Management are defined and documented within the job description for all levels of the organisation from Team Leader to Plant Manager. BP59534 (define an OPE management standard) The roles and responsibilities describe the mission and the limits of each position in the Management of OPE and the application of the defined standards.
	Data availability for the Team Leaders / PSP		
	Bottleneck identification		
	Define the governance		
	Prepare the OPE Management implementation		
Training	Train the leadership		
	Train the Production Supervisors and Shift Managers		
	Train the Team Leaders / PSP		
Technical	Production stop methodology		
	Define the overspeed		
	Production Area Target Setting		Each production area has a defined downtime allowance allocated that is calculated based on the Target OPE of the unit and the overspeed of the Production area. The downtime allowance of each Production area should be aligned to Overspeed validated by Simulation . BP60137 (Define the OPR and ANDON target per area)
	Team Leader / PSP Target Setting		Each TL / PSP has a defined allowance of downtime for the perimeter of their responsibility, the allowance is based on the overall downtime allowance of the Production area. The total downtime allowance of all TL / PSP within a production area cannot exceed the total downtime allowance of the production area. BP60137 (Define the OPR and ANDON target per area)
	Workstation set up		Equipment with potential to create an automatic line stop (Error Proof tools, handling devices) are described in the standardized chronology and place in way to minimize the risk of stoppage i.e.: in the first step of the chronology. An action plan exists to rectify any workstation where the devices with line stop potential are not compliant to the relative "effective workstation grid" criteria.
Process	Apply Volume gate		Implementation of Volume gates for each production area, the production supervisor is the owner of the process, ensuring recording the actual production of each hour, identifying the gap to gross capacity, explaining the reasons for all losses, assigning the correct classification of loss type and developing the appropriate action plans to eliminate the loss. BP61618 (Volume gates) Maintenance, Quality and Logistic support the Production supervisor to develop the action plans where required. Production Supervisor reviews the results minimum once per shift with Shift Manager. Also a shop level volume gate should be managed by the shift manager identifing each hour the gap between actual production and maximum capacity, reason for losses impacting shop level result, action plan and allocation of losses based on the standard categories.
	Manage the performance		Team Leader / PSP visualizes and manages in real time the downtime of his area on the Team Leader desk / Totem / PSP Dashboard. BP60148 (Perform the "Animation" of OPE in the UEP) Zone downtime is accurate and accounts for all lost time differential between actual production achieved and gross capacity TL/PSP knows and measures its recurring TOP3 Andon stations and develops actions to solve problems with the help of management and support functions In the same way, Shift and Shop manager follow up the top 20 downtime workstations over a period of the previous 4 weeks, daily review of the results are visualised, an action plan is developed.
	Problem solving Skills		Team Leader / PSP develop action plans based on the actual shift performance autonomously, they monitor the results of the action and request support where required. BP60148 (Perform the "Animation" of OPE in the UEP) There is evidence of the competence of action plan development and execution through the reduction of downtime in the Team Leader / PSP area of responsibility.
	Escalation Process		An escalation process is defined and operational, the escalation process operates in real-time based on the downtime results of the current shift to protect the defined shift target of an area. BP60148 (Perform the "Animation" of OPE in the UEP) The escalation process is known by all members and is visualised in the workplace
	Breaking down of losses		The losses of each shift are categorised according the defined standard. BP60153 (OPR breaking down standard) The losses are affected to the correct categories/origins based on the real-time follow-up that is done at shop level by production or Maintenance teams in order to assign the losses to the correct area and root cause (it is not an automatic data given by the IT)
	Manage Bottlenecks		Bottlenecks are identified and communicated for each unit based on defined criteria, at least 1 bottleneck per workshop or flow. Design Bottlenecks are agreed with VPE/UPE and validated through simulation. There is an action plan to tackle restrictions at bottleneck stations (line balancing, investments, etc.) Bottlenecks are managed to reduce impact (Cycle time improvement, buffer sizing, temporary - increase material, overstaffing, increased management support) A visualisation of the bottleneck management has been implemented BP61617 (Bottleneck management)
	Management Engagement		Plant Managers drive the OPE improvement through regular reviews of the unit performance at the Unit OPE Board and on the shop floor in the bottleneck areas to validate the action plans defined and support quick implementation. Plant Managers promotes a "Fighting spirit" to win every car and that the line must never stop
	Manage Backup processes		Backup processes have been defined for all critical processes / equipment, all required standardised work documentation is available at the workstation and Team Members are trained, a schedule for the frequent testing of the backups has been defined and is executed, trigger criteria for Backup mode exists. BP59526 (backup process) Losses due to failure of backup processes (e.g. extended change over time, lower than planned cycle time, etc..) must be immediately escalated, an action plan developed and validated by the unit manager within 24 hours.
	Maintenance Maturity		The SPW Maintenance Domain self assessment of the Area Maintenance department has been completed the overall result is less than 1.3 The Preventive Maintenance compliance rate is greater than 95% Backlog hours <60h Equipment losses <2% OPE
	Manage points of change		Points of change (Model launch, MCE, Line Speed, Shift model, sourcing) are managed by applying the SPW CI Domain Fundamental 17
Monitoring	Visualise the results		Weekly review of the OPE Results is managed by the Unit Manager at the OPE board, Production supervisors report their area results and action plans. Maintenance, Production and Logistic Managers report their results and strategic action plans, Review of the OPE Roadmap implementation plan. BP59535 (weekly meeting)
	Manage KPI's through Shop Floor Management at all plant levels		The OPE Management, results and associated KPI's are managed at all levels of the plant within the Gemba Tour & daily Shop Floor Management performance meetings, action plans are developed according the results The unit managers drive the results with their team through the daily performance reviews, attack OPE losses and offenders, and organize the improvement plan with the Weekly OPE meeting. BP59535 (weekly meeting) The shift managers have the details of the losses of each day and together with the maintenance and logistics managers, they present the actions in the daily meeting to the unit manager
Plant Score		0%	G : Implemented to the required level in all areas O : Partial implementation - plan required R : Not started - Plan required

OPE-Best Practice BP60135

OMAM (OPE Maturity Assessment Matrix)

High level GAP Assessment tool created to help visualize the OPE maturity of the center.

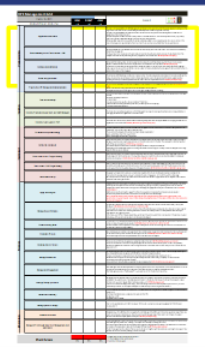
- **Completed Quarterly by center manager.**
- GAPs identified and then put into action items. (BP-3 OPE Road Map)
- Responsible: Center Manager/Shift and OPS managers/supervisors and TL support on the floor.

OPE Management Training:

OMAM Template:

OPE Maturity Assessment Matrix (OMAM)

OPE Maturity Assessment Matrix – Prerequisite / OPE Monitoring



Prerequisites	Organisation described				The roles and responsibilities of OPE Management are defined and documented within the job description for all levels of the organisation from Team Leader to Plant Manager. BP59534 (define an OPE management standard) The roles and responsibilities describe the mission and the limits of each position in the Management of OPE and the application of the defined standards. The job description describes the role of each position, in the OPE animation - in real time & previous shift / day / week / month. The required skills & knowledge of the standards must be identified. Where possible: A production supervisor should be solely responsible for one complete production area (a section of the manufacturing process separated by buffers at each end) to ensure clear accountability for the area performance.
	Data availability for the Team Leaders / PSP				Downtime & OPE data is available in real-time for each team leader / PSP at the workstation - the downtime is identified by Workstation / equipment. The Downtime data is visualised on the Andon Boards (or other shop floor visualisation screens) to clearly identify at the workplace the TOP 3 worst performing stations / equipment of the current shift. BP59525 (bottleneck display)
	Bottleneck identification				Historical OPE data (Downtime, Cycle time & buffers) is analysed to identify bottlenecks within the unit and sub areas. Reports of bottleneck & downtime data are generated and distributed each day & week. BP60147 (daily report) In particular, for downtime resulting from Andon calls by the operators, the top stations recurrently generating stoppages (over a period of one month) are identified and are subject to daily monitoring by the management with associated actions to eradicate the causes of the stoppage.
	Define the governance				The schedule of OPE Meetings is defined and communicated, the schedule promotes involvement of senior leadership in the review of production areas (Volume Gates), bottleneck performance and action planning. Particularly weekly meeting allowing to identify and follow improvement levers with Continuous improvement vision. BP59535 (weekly meeting)
	Prepare the OPE Management implementation				Define the OPE Management Roadmap to implement fully all elements of the OMAM and Best Practices. BP60136 (OPE road map) Actions are defined for the gaps identified on the OPE Matrix and are planned. The implementation plan is managed in the unit managers weekly performance meeting.

Target : Treat problems at the right level, everyone knows their responsibilities and their limits. To bring under control the fundamentals

- Roles and Responsibilities are clear from Shift/Area Manager down to team leader and their impact on OPE in the center - in real time & previous shift / day / week / month everyone must know their role, their limits, and escalation. The skills and knowledge of the standards must be identified
- **A Schedule is defined for the implementation of the OPE Maturity Assessment Matrix actions: Actions are defined for the gaps identified on the OPE Maturity Assessment Matrix and are planned**. An OPE committee (integrated into the RPO Weekly) includes the follow-up of the planning - the realization of the actions is in conformity with the forecast.
- Change points: Consider and put in place the standards to manage changes. Organize and control change points at all levels. An analysis of management, resources, costs, works... exist.

OPE Maturity Assessment Matrix – Prerequisite / Training

Training	Train the leadership				The Plant leadership (Plant Manager, Unit Managers) has been trained regarding their roles and responsibilities in managing the OPE The Plant Leadership understand - volume target - maximum production capacity = line running time * Cycle time - OPE calculation method (performed production / maximum production capacity) - standard classification of losses
	Train the Production Supervisors and Shift Managers				The Production Leadership (Supervisors and Shift Managers) have been trained regarding their roles and responsibilities in managing the OPE and the application of associated tools
	Train the Team Leaders / PSP				The Production Team Leaders / PSP have been trained regarding their roles and responsibilities in managing the OPE and the application of associated tools BP61630 (OPE training for team leader / PSP)

Training of the OPE Management :

- Establish a standard OPE training- plan defined and tailored for all staff levels- Can be virtual or physical.
- OPE committee includes the follow-up of the training plan and gap closures.
- Standard process set up to upgrades skills and ensure training course is effective and being applied properly on shop floor.

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OPE Maturity Assessment Matrix (OMAM)

OPE Maturity Assessment Matrix – Technical

Technical	Production stop methodology				The line stops when a production team member calls for support from the team leader at the defined fixed position of the workstation. (in case the TL isn't able to solve the issue) The correct methodology for Production line stop has been implemented plants with OPE less than 95%: stop at Pitch+1 plants with OPE greater than 95%: stop at Pitch
	Define the overspeed				Each production area has a defined overspeed that is calculated based on the target production output of the unit, buffers between downstream and upstream processes, and the technical content of the area. The overspeed is validated together with VPE based on simulation. BP59527 (Flow simulation) The volume objective considers the maximum capacity identified at the plant's bottleneck Overspeed can be temporarily increased to manage a bottleneck, but the target is to always decrease overspeed once a high level of OPE in an area is achieved
	Production Area Target Setting				Each production area has a defined downtime allowance allocated that is calculated based on the Target OPE of the unit and the overspeed of the Production area. The downtime allowance of each Production area should be aligned to Overspeed validated by Simulation . BP60137 (Define the OPR and ANDON target per area)
	Team Leader / PSP Target Setting				Each TL / PSP has a defined allowance of downtime for the perimeter of their responsibility, the allowance is based on the overall downtime allowance of the Production area. The total downtime allowance of all TL / PSP within a production area cannot exceed the total downtime allowance of the production area. BP60137 (Define the OPR and ANDON target per area)
	Workstation set up				Equipment with potential to create an automatic line stop (Error Proof tools, handling devices) are described in the standardized chronology and place in way to minimize the risk of stoppage i.e.: in the first step of the chronology. An action plan exists to rectify any workstation where the devices with line stop potential are not compliant to the relative "effective workstation grid" criteria.

- A responsiveness/reactivity matrix (duration / occurrence) or escalation process is operational. It is known to all members, It is visibly present in the workplace.
- Targets for downtime allowance are set to achieve the OPE target. Targets are set at all levels from the area all the way down to the operator.
- The measurement of the OPE and its management are carried out in the workplace on several points in the workshop - a synoptic exists showing the actual measuring points. This measurement is accessible in real time (hourly minimum) , on the production follow-up in production or on the monitor workplace, or Shop Visualization.

OPE Maturity Assessment Matrix – Processes / Current performance and improvement

	Apply Volume gate				Implementation of Volume gates for each production area, the production supervisor is the owner of the process, ensuring recording the actual production of each hour, identifying the gap to gross capacity, explaining the reasons for all losses, assigning the correct classification of loss type and developing the appropriate action plans to eliminate the loss. BP61618 (Volume gates) Maintenance, Quality and Logistic support the Production supervisor to develop the action plans where required. Production Supervisor reviews the results minimum once per shift with Shift Manager. Also a shop level volume gate should be managed by the shift manager identifing each hour the gap between actual production and maximum capacity, reason for losses impacting shop level result, action plan and allocation of losses based on the standard categories.
	Manage the performance				Team Leader / PSP visualizes and manages in real time the downtime of his area on the Team Leader desk / Totem / PSP Dashboard. BP60148 (Perform the "Animation" of OPE in the UEP) Zone downtime is accurate and accounts for all lost time differential between actual production achieved and gross capacity TL/PSP knows and measures its recurring TOP3 Andon stations and develops actions to solve problems with the help of management and support functions In the same way, Shift and Shop manager follow up the top 20 downtime workstations over a period of the previous 4 weeks, daily review of the results are visualised, an action plan is developed.
	Problem solving Skills				Team Leader / PSP develop action plans based on the actual shift performance autonomously, they monitor the results of the action and request support where required. BP60148 (Perform the "Animation" of OPE in the UEP) There is evidence of the competence of action plan development and execution through the reduction of downtime in the Team Leader / PSP area of responsibility.
	Escalation Process				An escalation process is defined and operational, the escalation process operates in real-time based on the downtime results of the current shift to protect the defined shift target of an area. BP60148 (Perform the "Animation" of OPE in the UEP) The escalation process is known by all members and is visualised in the workplace

OPE Process Management :

- Apply a volume gate at each area of the plant. All departments of the plant to support an action plan to meet these gates.
- Downtime is managed in real time at all levels of the organization. Action plans are developed to show the problems are being attacked.
- An escalation process is in place that clearly defines the actions taken to meet the shift targets.

OPE Maturity Assessment Matrix (OMAM)

OPE Maturity Assessment Matrix – Processes / Current performance and improvement

Breaking down of losses				The losses of each shift are categorised according the defined standard. BP60153 (OPR breaking down standard) The losses are affected to the correct categories/origins based on the real-time follow-up that is done at shop level by production or Maintenance teams in order to assign the losses to the correct area and root cause (it is not an automatic data given by the IT)
Manage Bottlenecks				Bottlenecks are identified and communicated for each unit based on defined criteria, at least 1 bottleneck per workshop or flow. Design Bottlenecks are agreed with VPE/UPE and validated through simulation. There is an action plan to tackle restrictions at bottleneck stations (line balancing, investments, etc.) Bottlenecks are managed to reduce impact (Cycle time improvement, buffer sizing, temporary - increase material, overstaffing, increased management support) A visualisation of the bottleneck management has been implemented BP61617 (Bottleneck management)
Management Engagement				Plant Managers drive the OPE improvement through regular reviews of the unit performance at the Unit OPE Board and on the shop floor in the bottleneck areas to validate the action plans defined and support quick implementation. Plant Managers promotes a "Fighting spirit" to win every car and that the line must never stop

The breakdown of losses are classified into families according to the standard. Each family is attached to a responsibility (Prod., LOG, MAI, PROJECT, ...). Families exceeding the target require analysis and precautionary measures - actions to return to target. The indeterminate in the breakdown of the OPE loses must be close to ZERO.

For each loss family, - an objective is defined and shared by the stakeholders, a connection trajectory is defined - the objectives are written in the contract of each (production and support function) - they are displayed in OPE committee - the trajectory is analysed / it triggers actions.

OPE Maturity Assessment Matrix – Processes / Current performance and improvement

Manage Backup processes				Backup processes have been defined for all critical processes / equipment, all required standardised work documentation is available at the workstation and Team Members are trained, a schedule for the frequent testing of the backups has been defined and is executed, trigger criteria for Backup mode exists. BP59526 (backup process) Losses due to failure of backup processes (e.g. extended change over time, lower than planned cycle time, etc..) must be immediately escalated, an action plan developed and validated by the unit manager within 24 hours.
Maintenance Maturity				The SPW Maintenance Domain self assessment of the Area Maintenance department has been completed the overall result is less than 1.3 The Preventive Maintenance compliance rate is greater than 95% Backlog hours <60h Equipment losses <2% OPE
Manage points of change				Points of change (Model launch, MCE, Line Speed, Shift model, sourcing) are managed by applying the SPW CI Domain Fundamental 17

Backup mode exist. They are identified, standardized, a training schedule is established and completed. There is a trigger criteria for each Backup process. The implementation of Backup mode according to defined criteria is monitored daily.

The maintenance maturity self-assessment must be complete by the plant.

The treatment of the OPE loses must be Proactive and start in the field, using the simplified problem solving as much as possible in real time. Breakdowns are dealt in real time by at least temporary measure subject to a definitive containment.

OPE Maturity Assessment Matrix (OMAM)

OPE Maturity Assessment Matrix – Control / Monitoring

Monitoring	Visualise the results				Weekly review of the OPE Results is managed by the Unit Manager at the OPE board, Production supervisors report their area results and action plans. Maintenance, Production and Logistic Managers report their results and strategic action plans, Review of the OPE Roadmap implementation plan. BP59535 (weekly meeting)
	Manage KPI's through Shop Floor Management at all plant levels				The OPE Management, results and associated KPI's are managed at all levels of the plant within the Gemba Tour & daily Shop Floor Management performance meetings, action plans are developed according the results The unit managers drive the results with their team through the daily performance reviews, attack OPE losses and offenders, and organize the improvement plan with the Weekly OPE meeting. BP59535 (weekly meeting) The shift managers have the details of the losses of each day and together with the maintenance and logistics managers, they present the actions in the daily meeting to the unit manager

Establish a standard of real time management:

- Make visible in the workplace the real-time management of problems.
- **Apply "Shop Floor Management" to OPE, from KPI Tree to GEMBA including OPE items to all concerned levels.**
- OPE Results and the OPE Management road map follow-up is part of the weekly meeting of each area OPE is calculated on each stream.
- Process KPI (examples: Preventive Maintenance, Technical Stop, TPM...) are monitored.

OPE Best Practices

OPE Best Practice #BP60153 - Standard Break Down of the Losses

Good practice

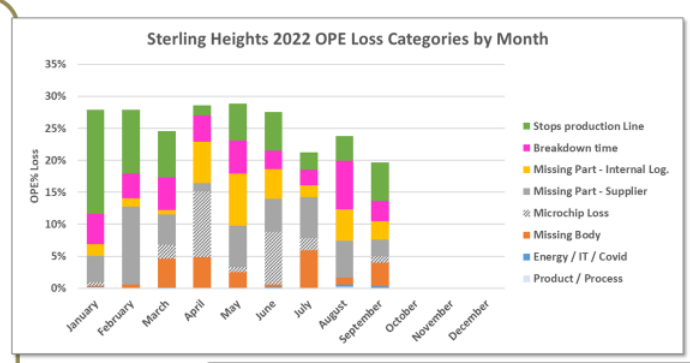
Breakdown the OPR losses according the standard

Where

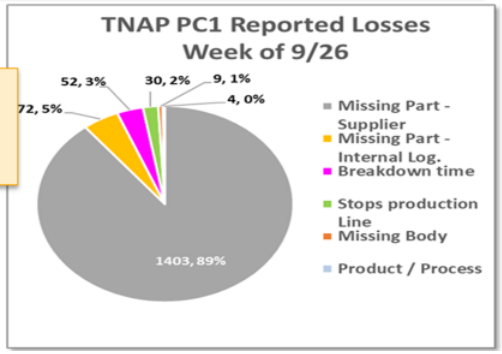
General Assembly Hordain

Who

- Philippe TIERSEN, Head of assembly (philippe.tiersen@mpsa.com)
- Laurent BERONI, Technical manager (laurent.beroni@mpsa.com)
- **Principles**
- **Each Supervisor/Area Manager must know the root causes of the losses of production.**
- To be able to manage it, a breaking-down standard and a common standard report file are used.
- To fill this report file, a "real time" data collection matrix is used by the "dispatching" workstation operator.



Completed for all plants by SPW Team



OPE Best Practice #BP60136 - Define an OPE Road map

Good practice:

Define center level OPE GAP assessment.

Where:

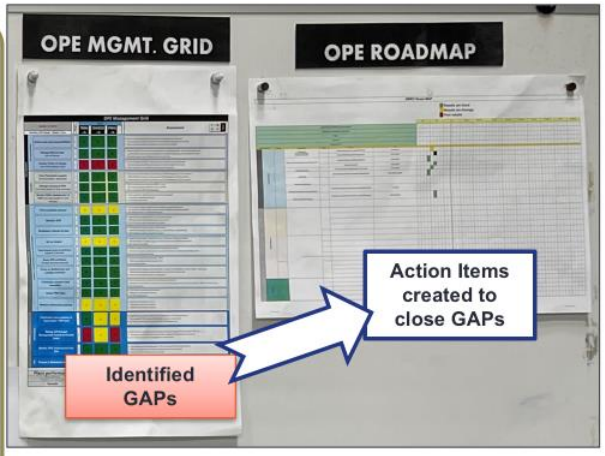
General Assembly

Who:

- **Shop manager, production manager, engineering manager, Area Managers. Center Manager leads these action items.**

Principles:

- Following the OMAM assessment, choose action to improve selected topic
- Define & Write a detailed action plan / road map (action, pilot, time slot, milestones.)
- Animate / manage this road map- This is a strategic tool to help attack the symptoms we are seeing on the shop floor.



The Gaps identified in the MGMT Grid are then illustrated onto the OPE Roadmap with details and dates for completion.

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OPE Best Practices

OPE Best Practice #BP59527 - Training organization on OPE for Team Leaders / Supervisors

Good Idea:

- To have a training tool for team leader skills improvement

Where (Plant of Sochaux, Assembly Shop):

- Near assembly line or process area so that Team leader can easily come and use the tools (self-training)

Who:

Production Team Leaders attend- Plant to generate training and support.

- **The Supervisor (group leader) to follow or monitor progression.**
- Kaizen team leader (referent) to check the quiz result and knowledge acquisition

Principles:

- Training modules on all the elementary topics that makes part of the team leader mission: management ctrl, escalade, totem de poste, post-it, quality management, aspect….
- Each training kit needs between 30 and 60 min. Max., Quiz
- Sample of a real TL 's tools desk with TOTEM, Andon…

Explanation

Improvement result:

- Global organization Efficiency that will benefit to Quality in WS and OPR

OPE Best Practice #BP59535 Establish the OPE management process

How the Production and Maintenance leadership teams properly implement the OPE management process:

- By establishing escalation rules and processes. **(Team leaders to support with hourly tracking)**
- By visualizing the OPE of the complete area and all sub areas within the management daily meetings.
- By measuring the OPE of each sub area and allocating the residual losses to the 6 major loss categories:
  - Induced downtimes: saturation, missing part, missing Team Member
  - Breakdowns and micro-stops
  - Functional downtimes: planned exchange of tools, campaigns
  - Cycle losses
  - Quality losses: scraps, reworks, etc…
  - Undetermined
- By establishing back up process and the regular validation. **(Team leaders and Maintenance work together with cadence and following proper procedures)**
- By establishing ownership of problem definition & resolution within the team.
- By implementing the Autonomous Maintenance activities to manage the equipment performance.

OPE Best Practices

OPE Best Practice #BP60137 OPE/ANDON target per area

Good practice:
Set an OPE Targets by Zone/Line/Team

Where:
General Assembly

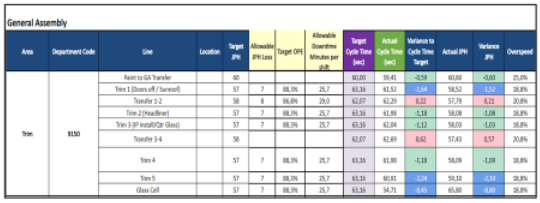
Who:

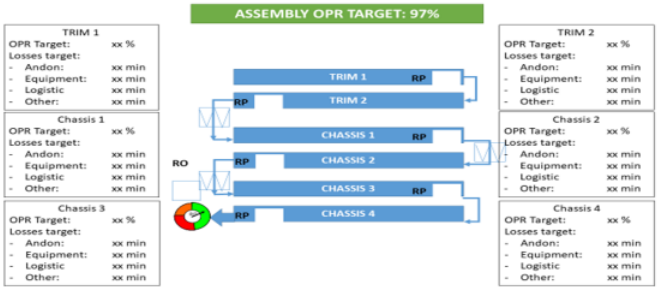
- **Shop manager, production manager, engineering manager, TL**

Principles:

- **Each Line/AREA/ZONE must know its OPE target. In%, # of car lost and number of minutes of stops.**
- **Every supervisor must manage the OPE in their Line/AREA/ZONE in order to reach the OPE target.** They need to have a clear target, include the minutes of stops "allowed"
- The purpose is for every supervisor to manage OPE at his level,and have a view on his contribution to reach the target at the end of the shop.
- It is possible to use a flow simulation to define / validate that if every area are at the target, then, we will be at the target at the end of the shop

Visible on shop floor OPE boards, Andon screens and Shop Floor Management boards.





Each area has its target, so every supervisor is able to manage and involve his team

Important: The defined target of each area / zone must be less than the value defined by simulation to achieve 95% OPE at the measurement point.

OPE Best Practice #BP59526 "Backup mode"

The following points are important for back-up facilities:

•Back-up process/Equipment should have Standardized work documentation.

•Back-up process/Equipment must be tested and practiced regularly (several cycles)

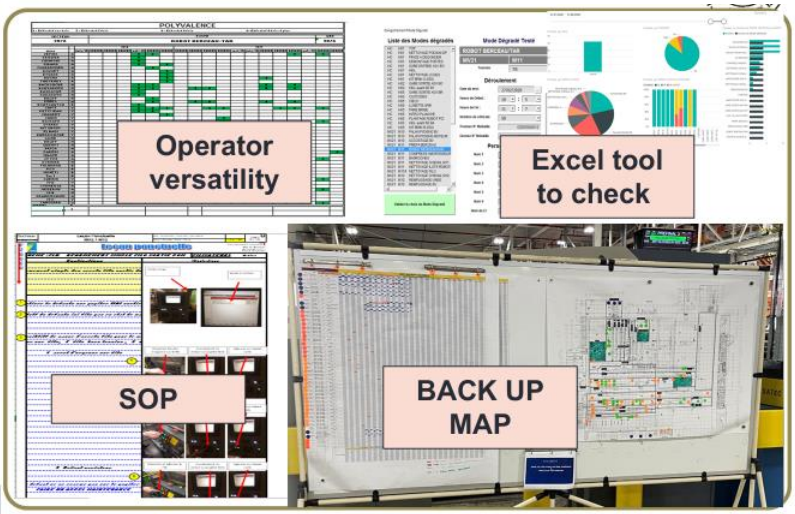
•Testing must be documented. (TMS/PM Board)

•The frequency of the test is determined by the management/OEM standards. (e.g. 5 cycles per week etc)

•Back-up tools (Ex. Drills/Impacts/DC Nut runners) must be avail. Fully Certified/validated for immediate use.

•The back-up operation / station is part of the Flex Sheet (Staff Qualification Certificate)

- **Area Managers:** Drive and Support Cadence Support Supervisors and Team Leaders.
- **Team Leaders:** Ensure process is followed and operators are trained/issues are noted and or escalated



Improvement result:

- OPR, OPE, Reduced MTTR, Improved Uptime
- Implement this organization has increased OPR by 3%

OPE Best Practices

OPE Best Practice #BP59534 - Real time animation (TOP3)

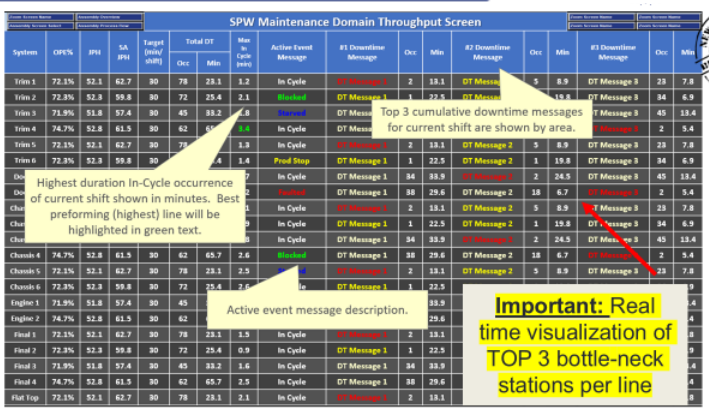
WHAT ?
- Shopfloor display allowing real-time management of ANDON stops and installations stops (TOP3) per area as well as BUFFERS visualization.

WHY?
- To quickly identify in real time which station is the bottleneck of the line
- To improve reactivity of all concerned operational stakeholders
- To get team members, leaders focused on the problem solving before it stops the line
- To identify the bottleneck stations (TOP3) during the shift
- To have all necessary information (ANDON, NR, Prod, DVx)

WHO ?
- Operational stakeholders of the workshop must use this display to trigger adapted actions (team members, team leaders, CI, group leader, supervisor, unit and plant manager)

WHERE ?
- Screens (55 inches) are arranged in the GA workshop so that they are visible from any workstation (ideally)
- The different screens are accessible on PC or Smartphone (MAC2)

WHEN ?
- This screen can be installed at any time
- In running life, during the production shift
- Screenshot available after the end of the shift for managers (reporting)



In real time:
- ANDON stations stops displayed, with duration of the current stop (in **RED**)
- Buffers status (number of vehicles), in **GREEN**(ok) / **RED**(short) / **ORANGE**(full)
- Display of breakdowns for each stations, conveyor or equipment (in **RED**)

Cumulative value for the shift :
- Production status of the supervisor with the target and the current value (shift and day)
- TOP 3 in duration of the ANDON stoppages
- NR screwing during the shift (all day shifts are displayed)
- DVx and DRR (Bon Direct)

OPE Best Practice #BP60147 OPE Daily report

WHAT ?
- To have a daily report breaking down total production and top failures/stops with explanations
- To have a weekly summary

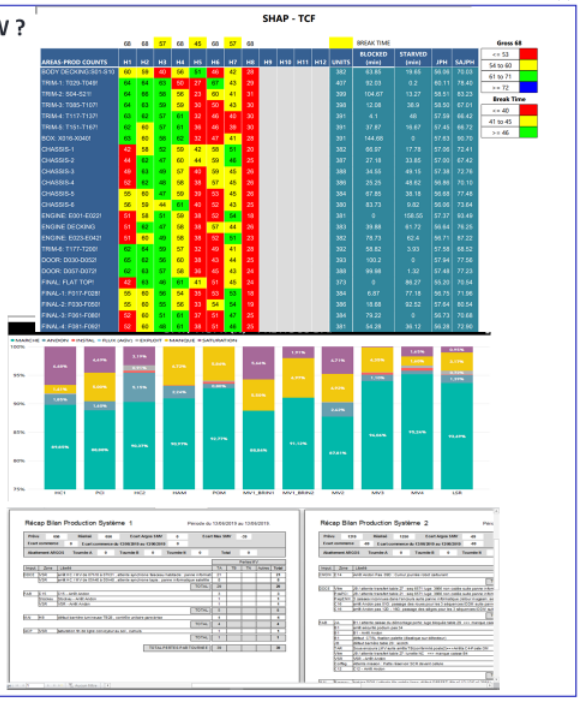
WHY?
- To quickly identify which station or equipment is the day-1 bottleneck of the line
- To improve reactivity of all concerned operational stakeholders
- To compare easily the performance between shifts.
- To ensure that we are working on the good topics
- To measure the improvement day per day and week per week

WHO ?
- **Supervisor/Area Manager/Shift OPS manager/Center Manager**

WHERE ?
- In each assembly shop.
- The report is emailed out to all levels of production management team and key support staff (ICT/EHS/SQA

WHEN ?
- After every shift

HOW ?



OPE Best Practices

OPE Best Practice #BP60148 Perform the animation of the OPE in the area

Good Idea:

- To have a daily OPE management review at the Area level

Where, When:

- On the shop floor. Once per day and in real time

Who:

. **Team leader, Supervisor, Area Manager**

Principles:

- **Team leader notes each stop on his module card (real time).**
- **Supervisor notes the total of the modules stops 4 times per shift.**
- **Define the TOP 3 of losses per module (agreed by all shifts).**
- **Define an action plan for each & monitor the evolution.**
- **Follow the number of stops and the improvement for each of the TOP 3 chosen.**

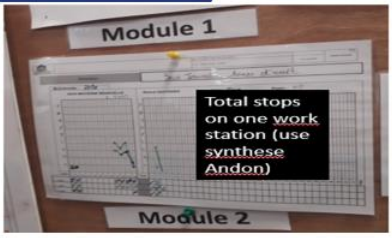
Explanation

Team leader « module Card at TL desk

Supervisor monitoring card at Supervisor board

Top 3 issues 4 times per shift

Top 3 down time monitoring



OPE Best Practice #BP60148 Continued-

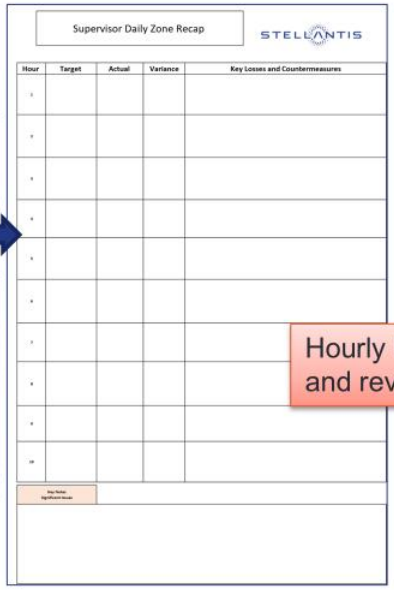
Important points:

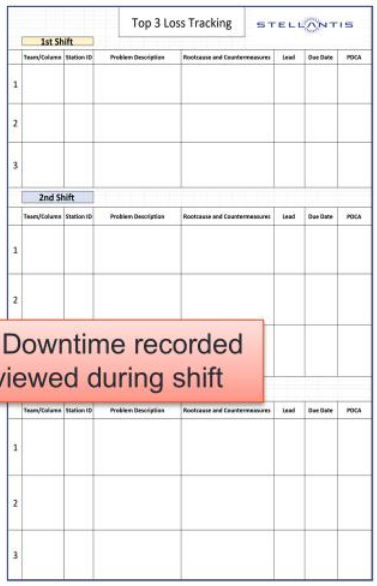
- **Each team leader must be assigned a downtime target for the team.**
- The sum of the targets of all teams within an area **must not exceed** the overall target set for the area (see best practice #4)
- The allocated downtime to the team should be divided throughout the shift into **2 hour intervals**, e.g. if the total downtime allocated to the team is 2 minutes per shift, then the allocation per 2 hours would be 30 seconds, and visualized.
- **Each team leader must record the actual amount of downtime in the area every 2 hours on the team leader totem** and apply the defined escalation process if the actual time in the 2 hour intervals exceeds the allocated target.
- **Supervisors** monitor the status of the downtime of each team leader throughout the shift, confirming the input of results, the application of the escalation process and the definition of actions at the supervisor board.

OPE Best Practices

OPE Management – Perform the animation of the OPE in the area - Supervisor Area Board

Supervisor board has a combination of chronic downtime data analysis along with daily real time issues and countermeasures

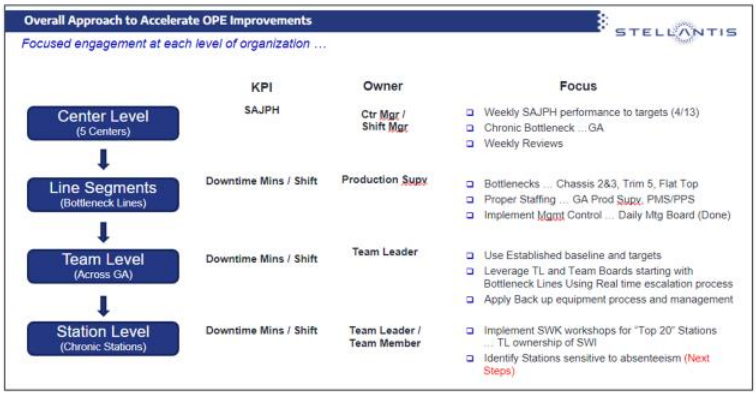


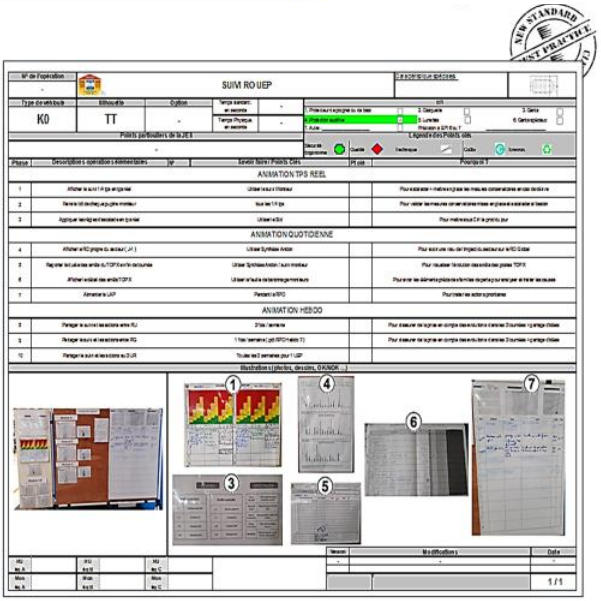


Hourly Downtime recorded and reviewed during shift

OPE Best Practice BP#59528 Define a leadership / coaching standard

- Leadership and Coaching standard is defined and implemented on the floor.
- Regular review cadence with teams working on top losses and performance improvement.
- Daily Real time escalation process to ensure downtime is being addressed and escalated properly.





OPE Best Practices

OPE Best Practice #BP59535 – Weekly Center Level Meeting

Good Idea:

- To have a weekly OPR management review at the shop level

Where, When

- On the shop floor. Once per week

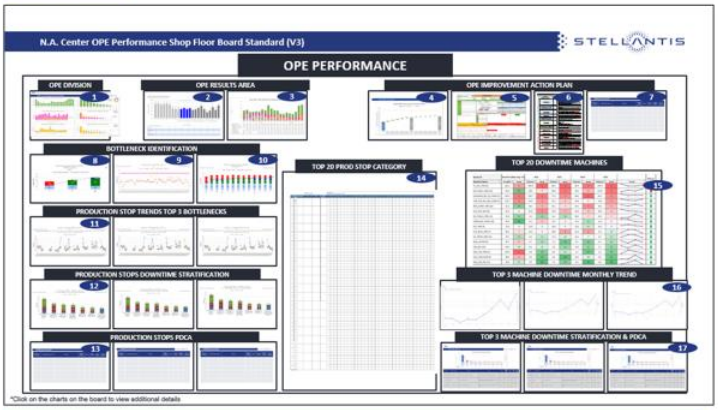
Who (Example of HORDAIN)

Shop manager, Production manager, Maintenance manager, Shift leaders and other if needed.

Principles

- Shift leaders comments the standardized breaking down of the losses in each area and the gaps to the targets
- Stratify the TOP X of losses per area (coming from the divisions)
- Share and lead action plan for the TOP X of losses (Andon, breakdowns…)
- Check the results improvement for each action

Explanation



Each manager (include maintenance) presents for his area : - the results, - the TOP X of losses, - the action plans on going with the associated results, and the actions for the next week.

OPE Best Practice - Weekly meeting Continued-

Important points:

- The Center Manager is the host of the meeting, Production Shift Manager, Maintenance Manager, Production Supervisors, Quality and Logistics representatives must be present.
- Each Production Supervisor should then present the OPE development of their own area, including the weekly development, the Top 3 downtime issues of the previous week and the defined action plans.
- The Shift Manager then presents the downtime progression related to Production Stoppages / Andon of the total unit, the Top 6 Andon Stations monitoring (6 weeks development) and the strategic plan associated with Production Stoppages / Andon improvement.
- The Maintenance Manager then presents the downtime progression related to all Breakdowns (Major breakdowns + Micro stoppages), the Top 3 breakdown monitoring (6 weeks development) and the strategic plan associated with breakdown reduction.

The purpose of the weekly meeting is to provide the Center Manager a status overview of the OPE performance of the area and to allow the area leadership team to develop / validate the strategic action plans.

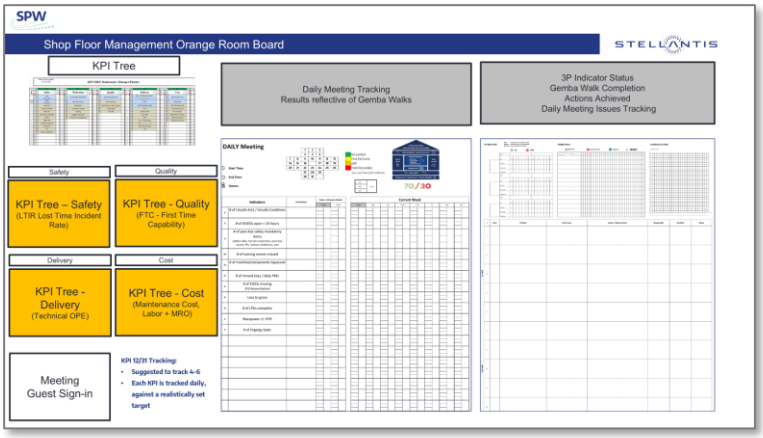
It is important that the Center Manager look to the "big picture" based on the data presented, e.g. rather than review in detail the major breakdowns of the previous week, ask "why do we have so many long breakdowns ? Is there a Maintenance Skills issue ? How robust is the preventive Maintenance Plan ?"

Center Level OPE Performance Shop Floor Board Standard:

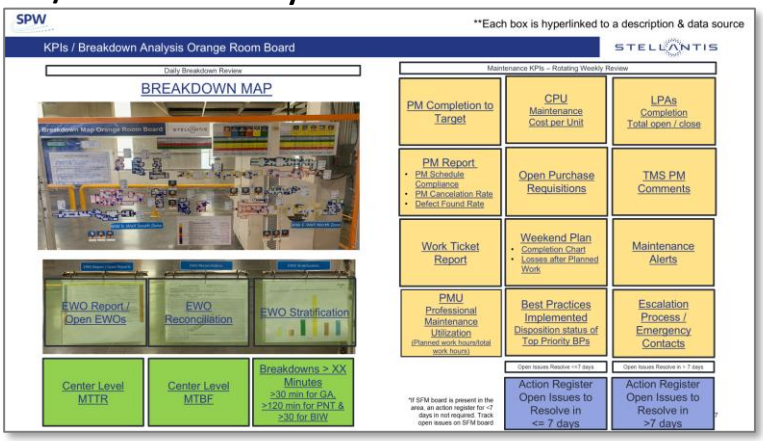
Orange Room Overview

Orange Room Methodology

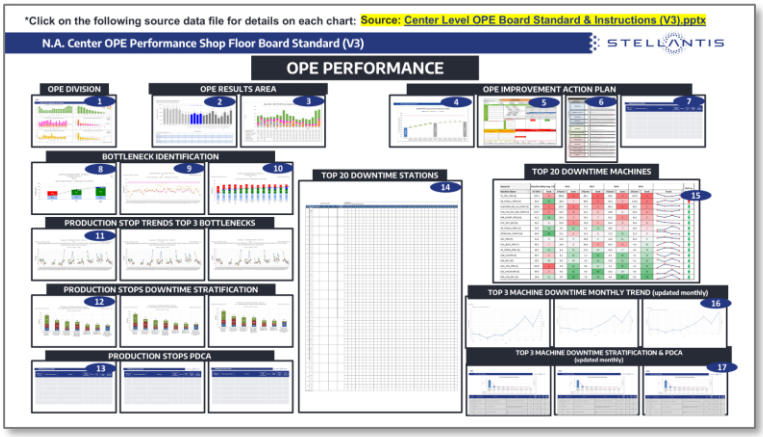
Shop Floor Management for Maintenance



KPI/Breakdown Analysis



Performance Board



What is the Orange Room?

- A visual COMMUNICATION TOOL
- Standardized approach to prioritize & manage Maintenance losses
- KPI tracking & impact of maintenance
- Focused project tracking
- Read-across implementation
- Application of Maintenance methodology

The Orange Room Process reinforces daily management of the business through Shop Floor Management, Breakdown Analysis, Weekly KPI tracking, and an understanding of maintenance losses, their impact on OPE (Overall Performance Efficiency) as well as focused projects to reduce these losses.

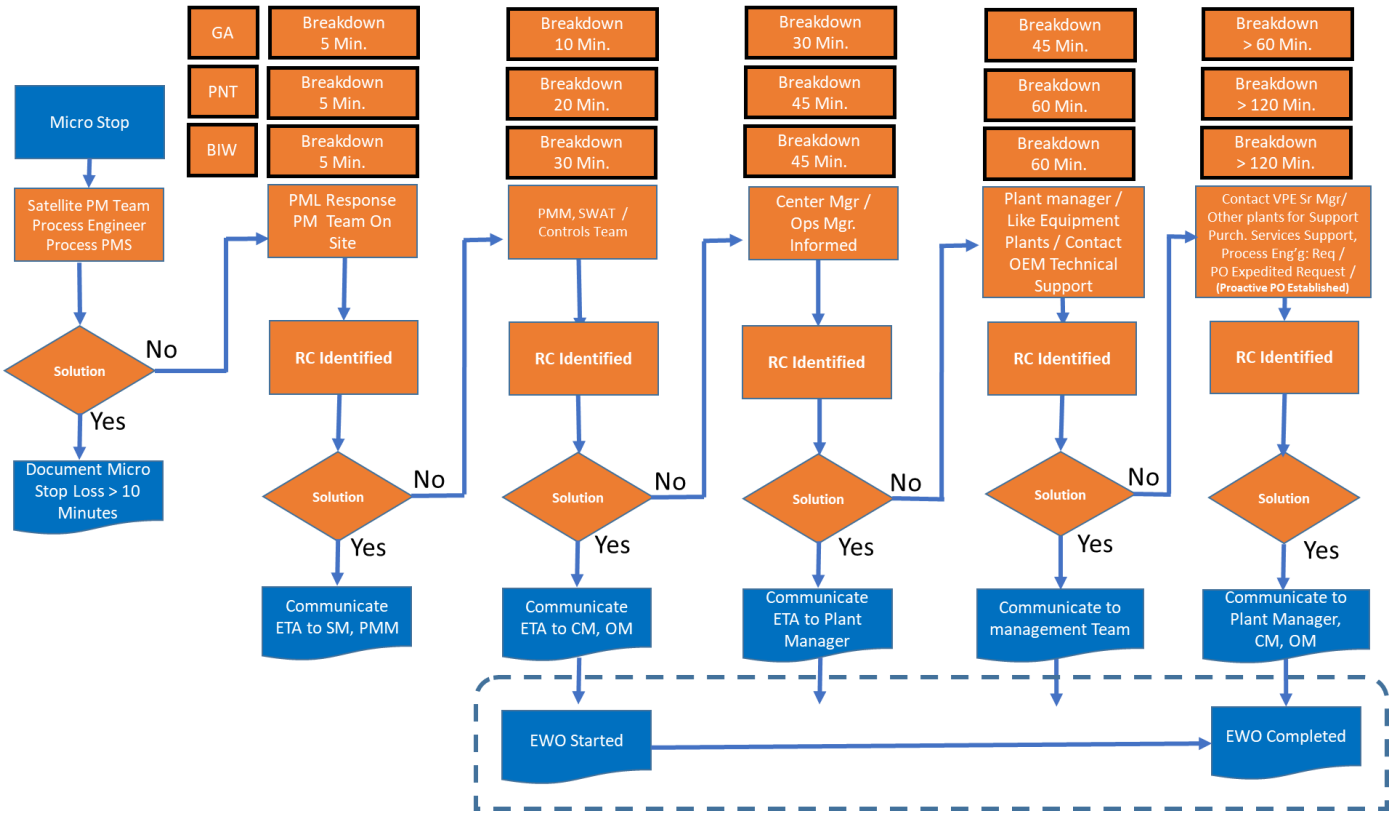
SPW – SFM & Orange Room Process:

Breakdown Escalation Process

Plant Overview of escalation process

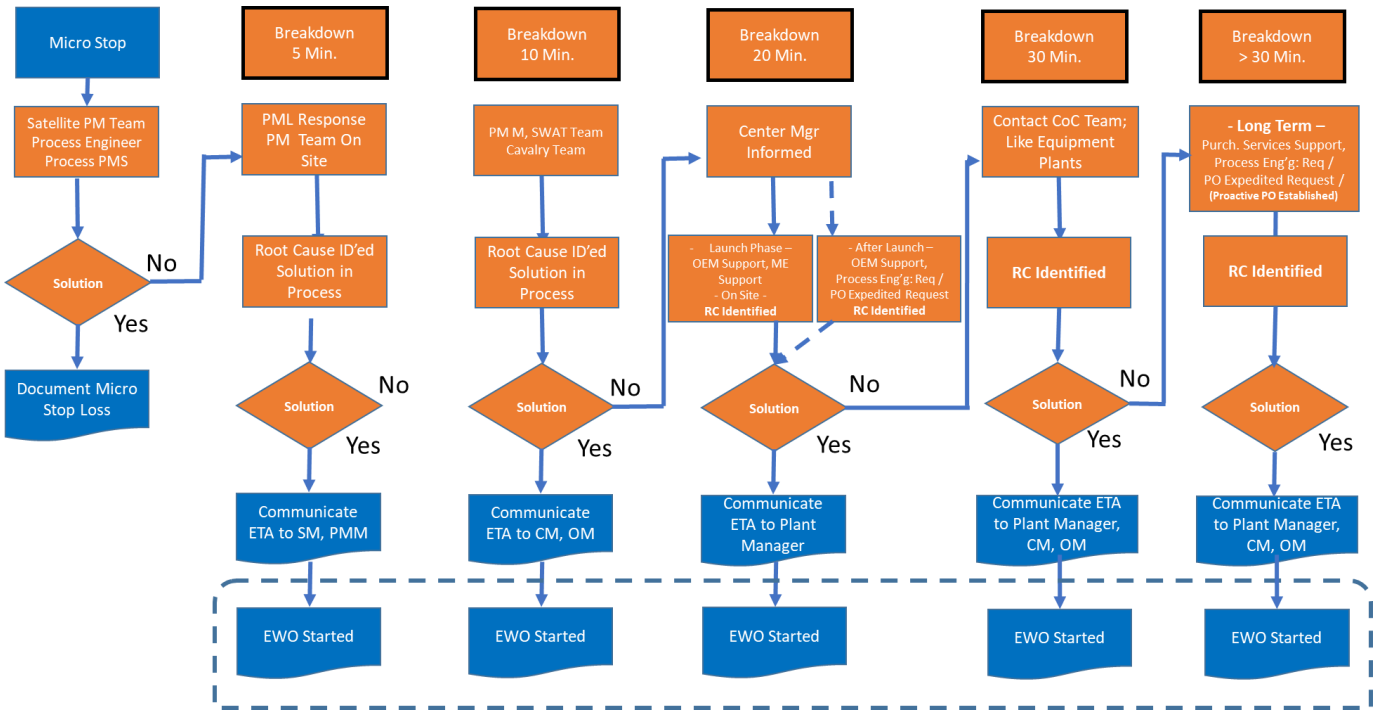
- Description: Breakdown process flow identifying the escalation process in the event of a breakdown. A list of Afterhours contacts and Hot line numbers should be listed in case of emergency assistance is needed.

- Update Frequency: As needed

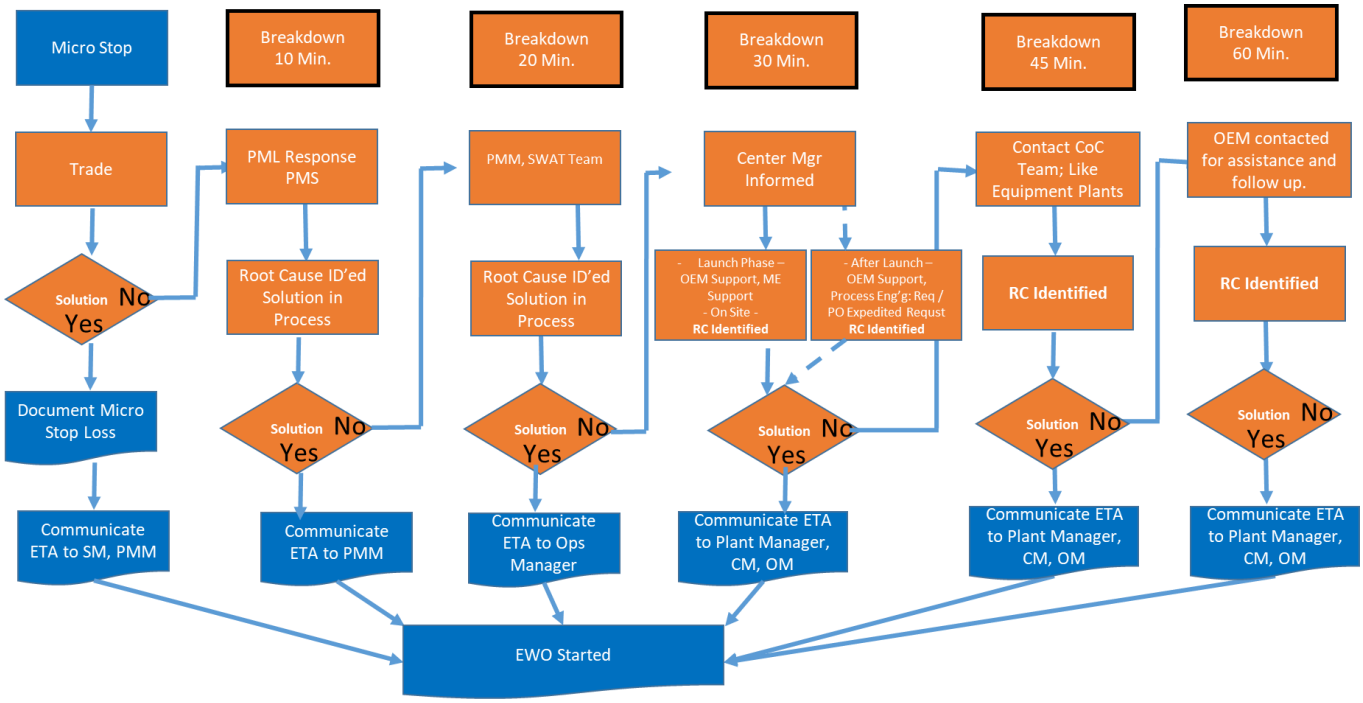


Maintenance Domain

GA Breakdown Escalation Process

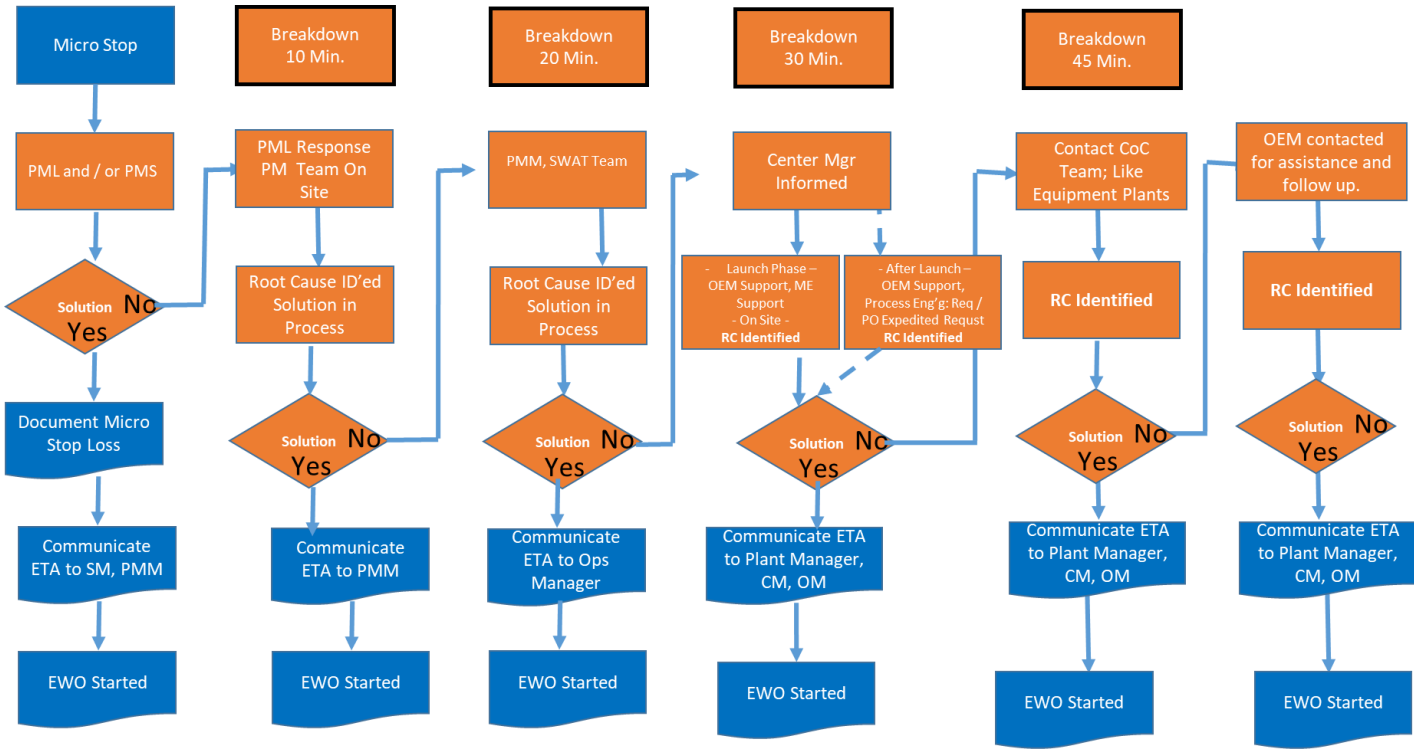


Paint Overview of Escalation Process



Maintenance Domain

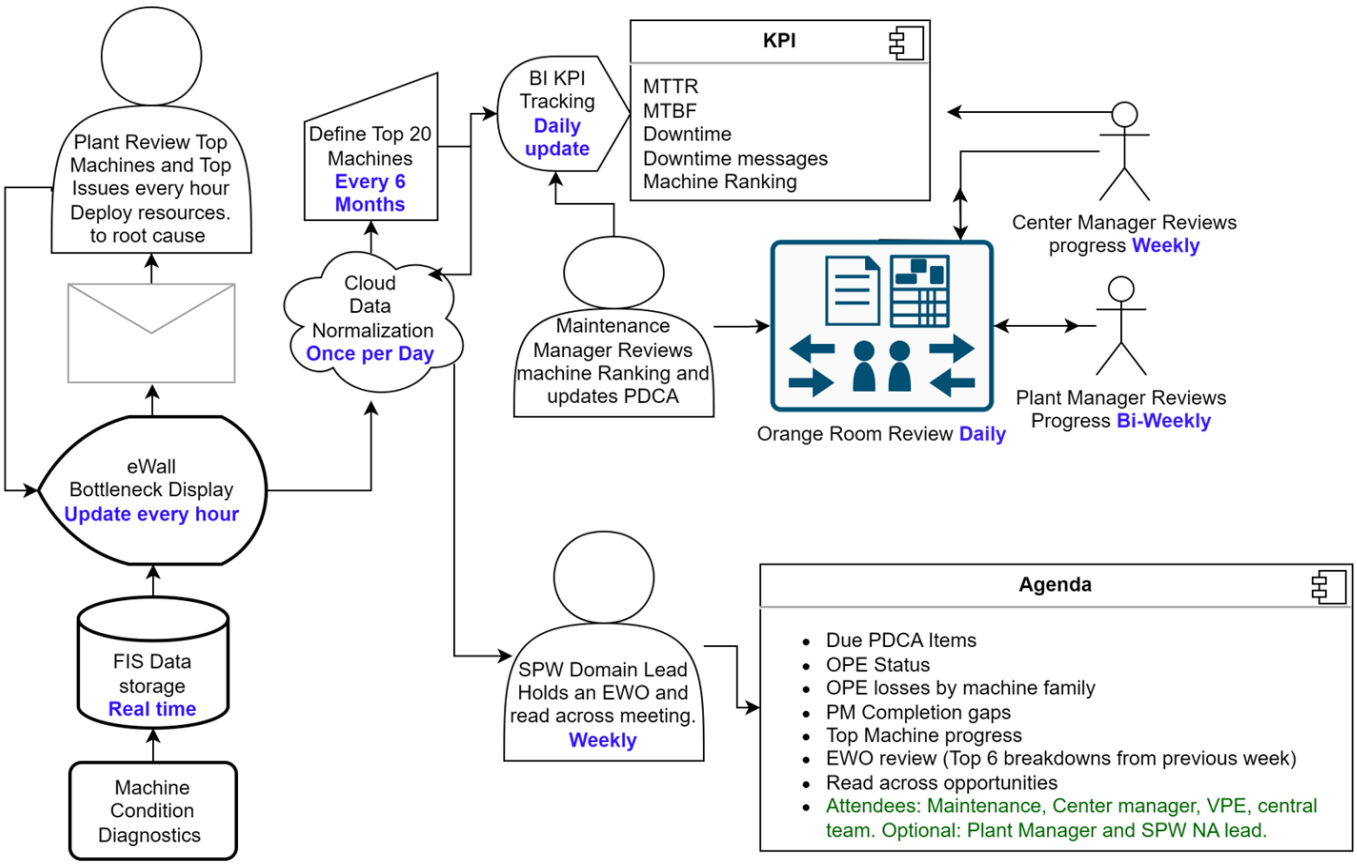
Body Overview of Escalation Process



Top 20 Machine Process

Maintenance Domain

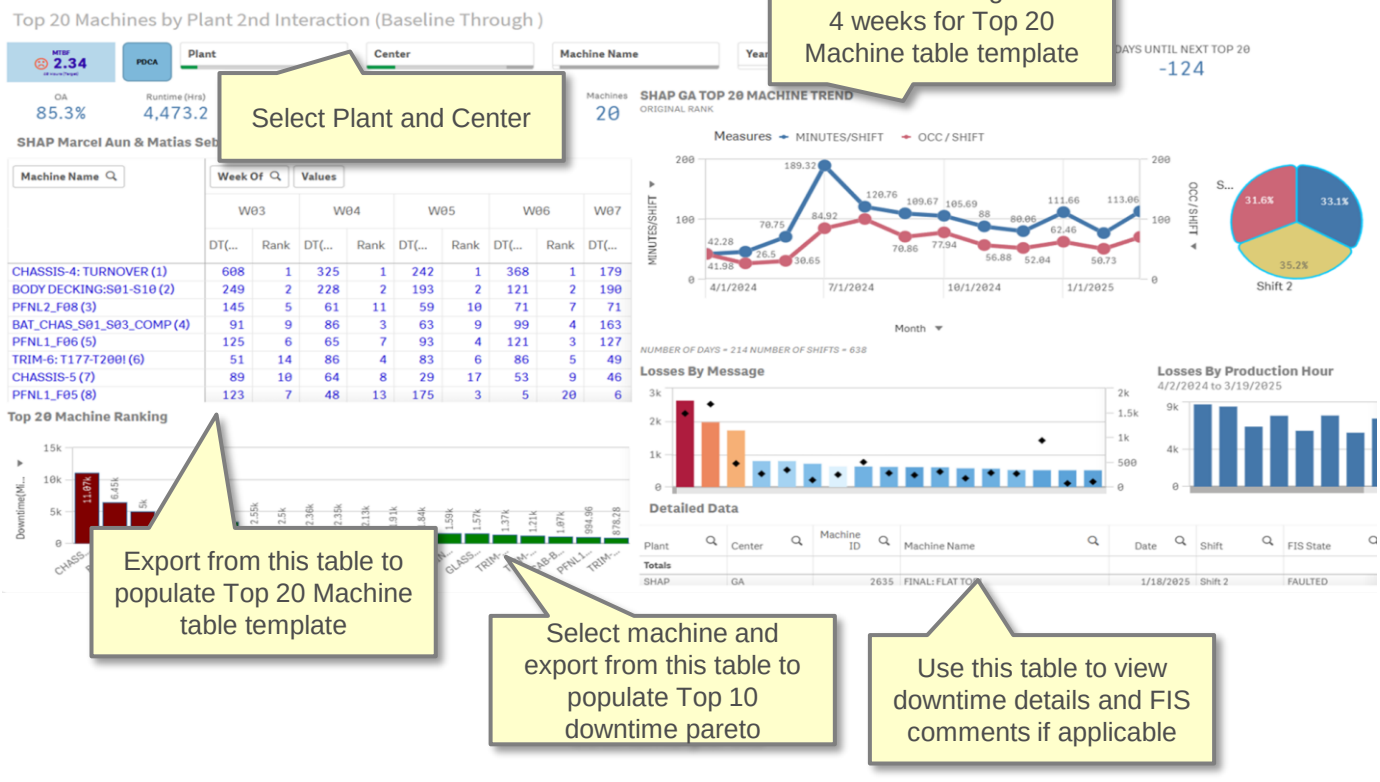
Top 20 Machine Process



Throughput Homepage (Top 20 Machine Report Posted Here):

Top 20 Machines BI Application:

Top 20 Machine Process



SHAP GA W51	Baseline (June - Aug '24)		W48		W49		W50		W51		Trendline	W51 vs. Baseline
Machine Name	DT (min) / Shift	Rank	DT (min) / Shift	Rank	DT (min) / Shift	Rank	DT (min) / Shift	Rank	DT (min) / Shift	Rank		
CHASSIS-4: TURNOVER	205	1	148	1	165	1	148	1	121	1		▼
PFNL2_F08	17	15	85	2	87	3	91	2	120	2		▲
BAT_CHAS_S01_S03_COM	100	2	77	3	30	9	39	7	96	3		▼
BODY DECKING:S01-S10	87	4	68	4	96	2	86	3	80	4		▼
TRIM-6: T177-T200!	27	11	36	8	52	5	50	5	66	5		▲
TRIM-1: T029-T049!	22	12	49	6	15	15	28	8	65	6		▲
PFNL1_F06	81	5	50	5	48	6	82	4	46	7		▼
TRIM-2: S04-S21!	30	10	31	9	30	10	42	6	27	8		▼
CHASSIS-2	32	9	12	16	25	11	23	10	25	9		▼
TRIM-3: T085-T107!	17	14	20	10	23	12	9	14	21	10		▲
CHASSIS-6	87	3	16	13	17	14	6	15	20	11		▼
FINAL: FLAT TOP!	39	8	14	14	38	7	10	11	16	12		▼
CHASSIS-5	40	7	44	7	38	8	50	5	15	13		▼
PFNL1_F05	11	17	18	11	67	4	25	9	13	14		▲
ENGINE: E023-E042!	18	13	13	15	3	17	9	12	13	15		▼
CHAS7_F02	6	19	0	18	0	20	5	16	3	16		▼
CHAS7_F03	13	16	0	18	0	18	0	18	0	17		▼
TRIM-3: S008-S010<>	68	6	18	12	11	16	9	13	0	17		▼
CHAS7_F01	8	18	0	18	19	13	4	17	0	17		▼
PFNL2_F12	4	20	2	17	0	19	0	18	0	17		▼

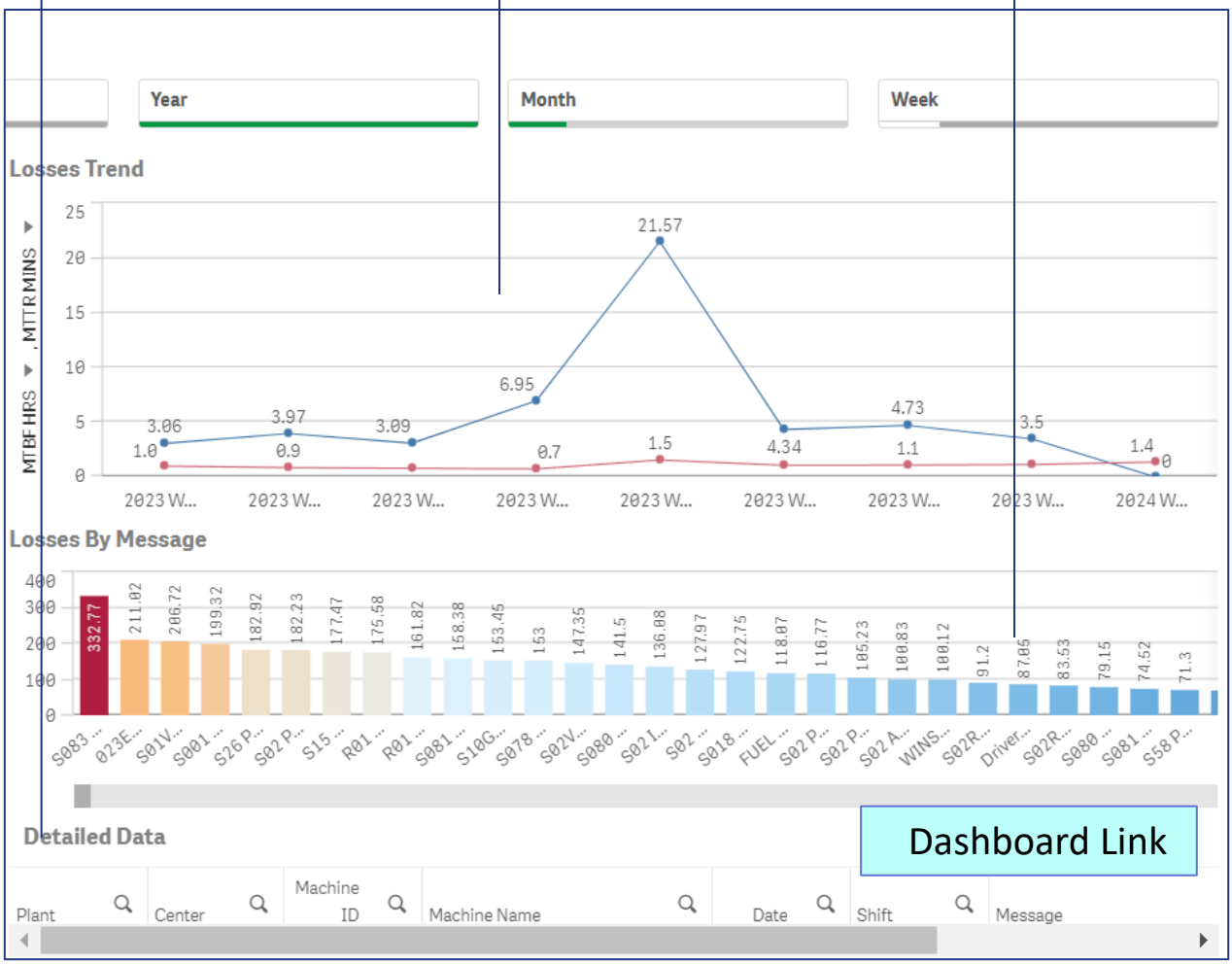
Top 20 Machine Process

STELLANTIS

Detailed data of stoppages, used for brainstorming and finding trends

Liner trend (MTTR, MTBF or Downtime) by week, month or day.

Top downtime message color coded based on downtime



Dashboard Link

OPE Analysis Tools

- Factory Information Systems (FIS)
- eWall (Bottleneck Identification)
- Business Intelligence Application

Factory Information Systems (FIS)

What is FIS?

What: The Factory Information System (FIS) is a plant monitoring system that provides for the automatic collection and display of current and historical process data.

How: FIS collects information from Programmable Logic Controllers (PLCs), archives this information in a database, and then displays the data on demand from desktop PCs, ProgrammableWorkstations (PWS), scrolling marquees, Andon boards, and Pagers. The primary focus of the FIS system is on the **performance of process machinery** and not on the characteristics or quality of the actual product being manufactured. Another important aspect of FIS is that it **serves strictly as a monitoring tool and does not control process machinery**. Performance data for process machinery is rendered through the use of real-time displays and analysis tools.

Why: The real-time displays permit plant floor personnel to quickly respond to critical process problems as they occur in order to maximize process uptime. The analysis tools allow plant and corporate personnel to analyze long-term performance measures through the generation of detailed and summarized reports, trend charts and graphs.

Purpose

The purpose of the FIS system is to assist plant and corporate personnel in the continuous improvement of the performance of manufacturing processes through the following:

- Real-time visualization of the operation of plant floor machinery which enables the rapid identification and resolution of process problems and bottlenecks.
- Trending of shift and daily production data to assist in day-to-day production scheduling decisions.
- Reporting of long-term machine efficiency indicators to measure the effectiveness of continuous improvement initiatives and to eliminate process bottlenecks.

Factory Information Systems (FIS)

Primary Features of FIS

Machine States - FIS reports on the "state" of each piece of plant floor machinery that is controlled from a PLC. The following are examples of commonly used machine states:

MACHINE STATE	TYPE
IN CYCLE	Normal Operation
FAULT	Machine Breakdown
OUT OF AUTO	Machine Breakdown
POWER OFF	Machine Breakdown
STARVED	Machine Stoppage
BLOCKED	Machine Stoppage
PROD STOP	Machine Stoppage
COMM FAULT	Data Collection Problem

Machine states are prioritized when presented in FIS displays. The displays show the current state and state history of monitored equipment including:

- Elapsed time of the current machine state

- Total time duration for a given state for the current shift

- Number of occurrences for a given state for the current shift

Primary Features of FIS

Machine Breakdowns – A basic feature of FIS is the immediate identification of machine breakdowns. A breakdown is a condition that prevents the machine from running normally and will usually require intervention by maintenance personnel in order to fix the problem. In FIS, each prohibitive I/O is identified and organized in a prioritized display. With the aid of this display, maintenance personnel can "clear" all prohibitive conditions and sequence the machine in order
to return it the IN CYCLE state. The original cause of the fault condition is archived in a database so that it is included in all FIS analysis functions.

Alarms – FIS has the ability to warn plant personnel of impending problems through the "alarm" feature. Alarms are essentially warnings that may occur while the machine is cycling normally. While they may not require immediate attention, Alarms identify conditions that may eventually result in a machine failure or stoppage. MATERIAL CALL, LOW LUBE LEVEL, and TOOL WARNING are examples of alarm conditions.

In Cycle Times - FIS keeps a detailed record of machine cycle times, allowing plant personnel to evaluate if the machinery is performing to design specifications. FIS records invalid cycle times (a cycle time that exceeds established high or low limits) based upon a previously determined standard. FIS also displays the number of times an invalid cycle time was detected, making it simpler to establish the probable impact on production.

Factory Information Systems (FIS)

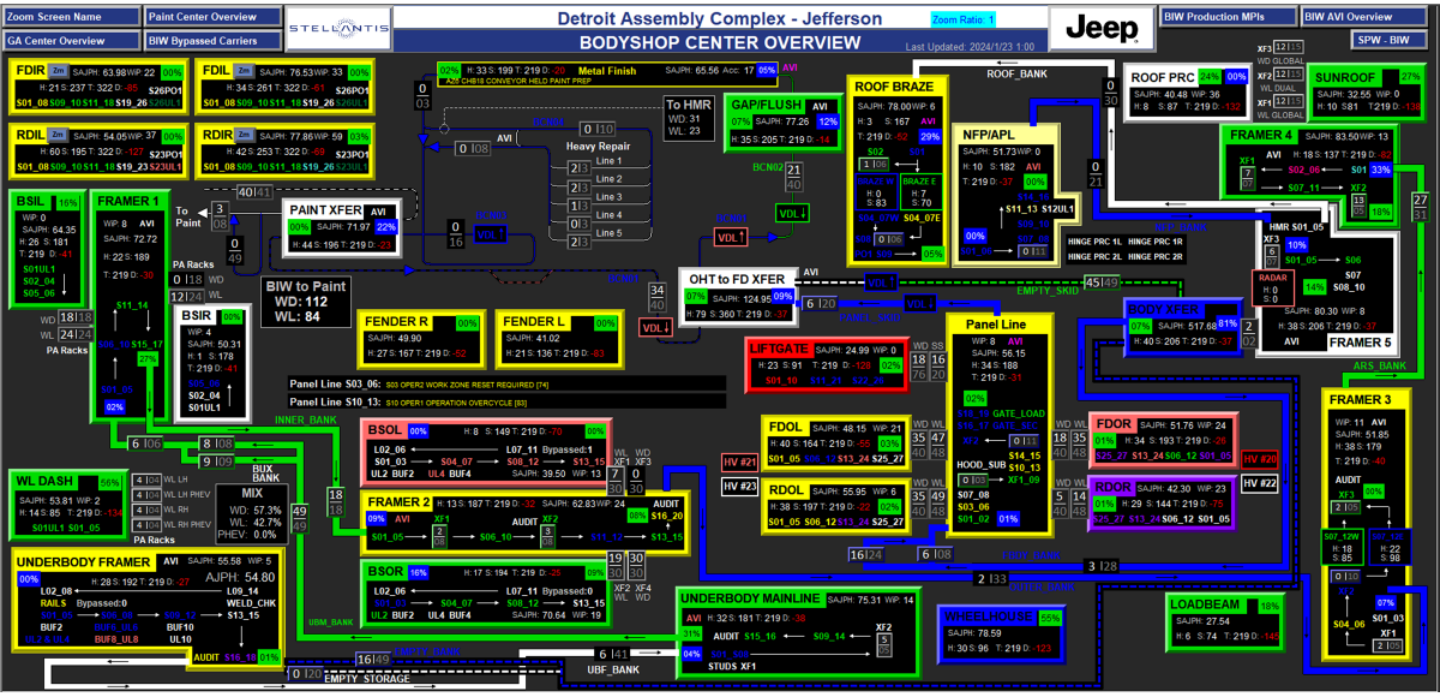
Primary Features of FIS

Production Counts - FIS displays a running total of the number of parts produced for the current hour and shift for any machine that has part counters associated with it. The system can show the variance between actual and target production counts.

Accumulator Counts - Accumulator counts are displayed in real-time as parts pass in and out of equipment zones. High and low accumulator thresholds can be set in order to signal conditions that may cause process blockages.

Process Variables – Although the FIS system is primarily concerned with discrete processes, continuous process conditions such as temperatures, pressures, humidity, and volume can be monitored and recorded through the use of “Process Variables”. Users can display the current readings for any process variable in real time, or launch a historical chart that shows long-term trends associated with such process points.

FIS Area Overview

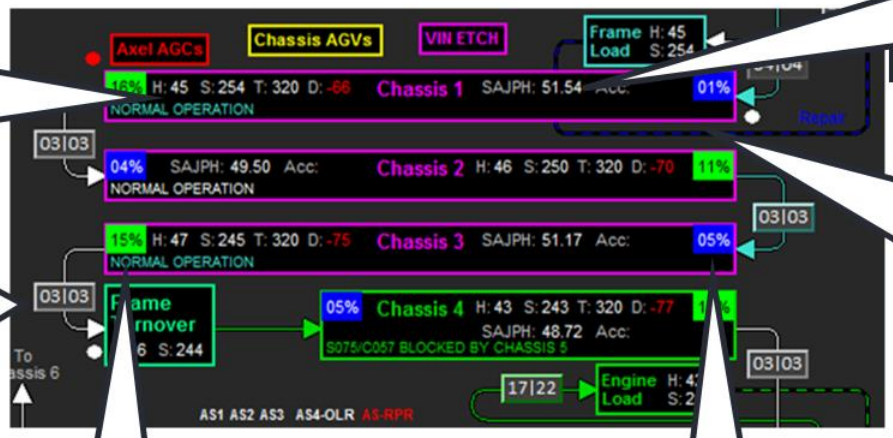


Factory Information Systems (FIS)

Line View

H: # of jobs this hour
S: Jobs on Shift
T: Target
D: Difference

SAJPH: Stand Alone Jobs per Hour. Total Parts Run/Net Available time- (Blocked Time + Starved Time)



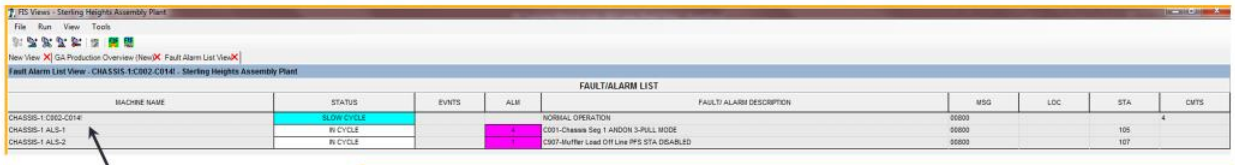
Color Code:
Blue - Starved
Green - Bank full ahead
Magenta/White - Running
Light Yellow - Hold QAS
Dark Yellow - Prod Stop
Red - Faulted

Actual /Capacity in Buffer

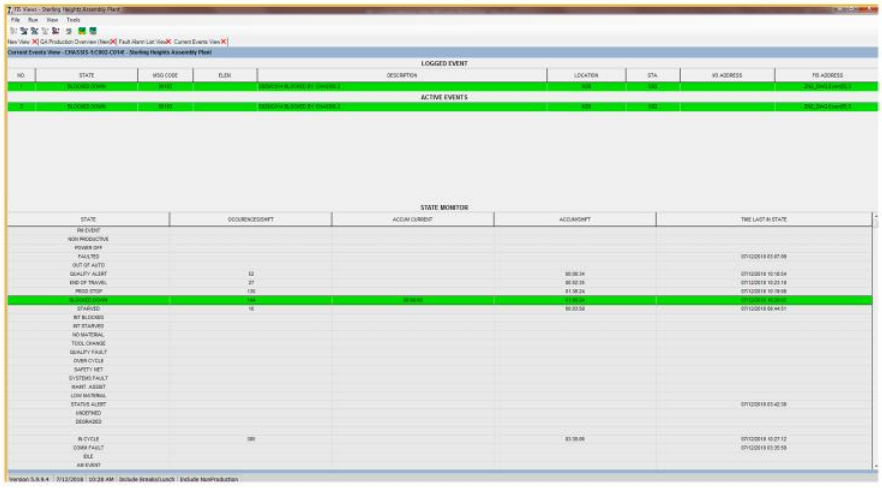
% of time Line is Blocked down (GREEN)

% of time Line is Starved (BLUE)

Fault Alarm List View



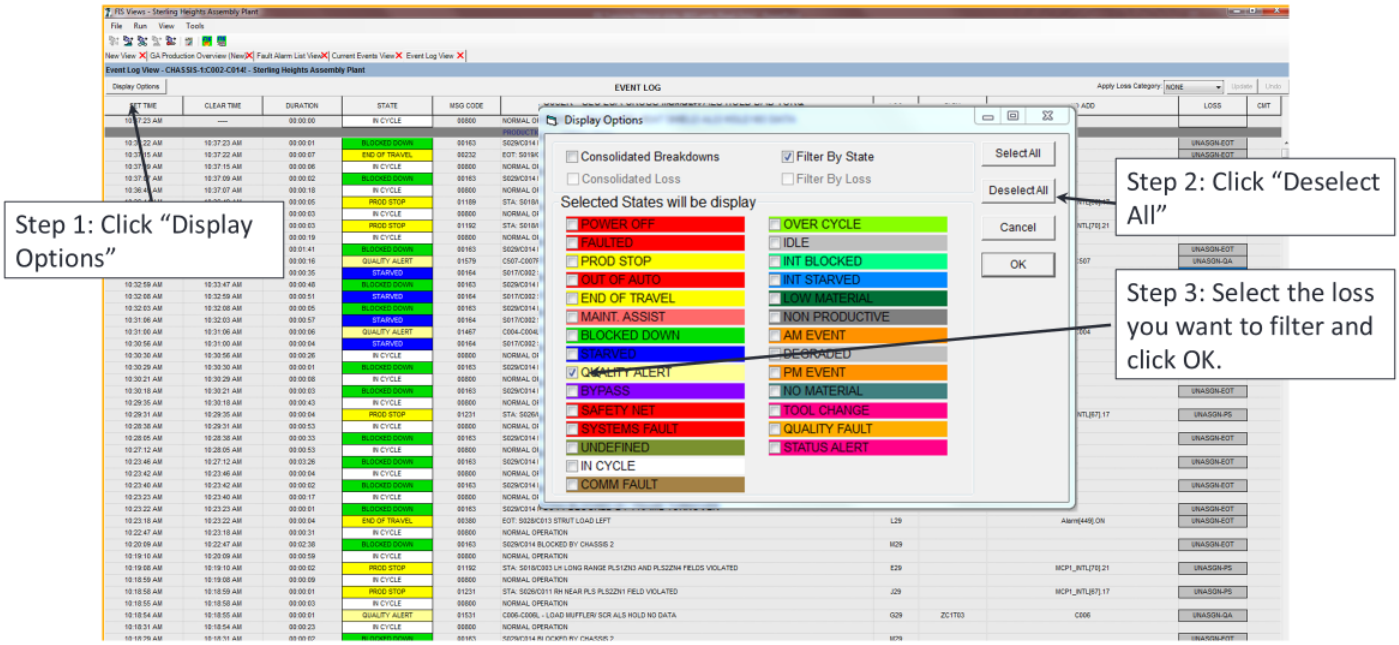
Step 1: Double Click on the top line



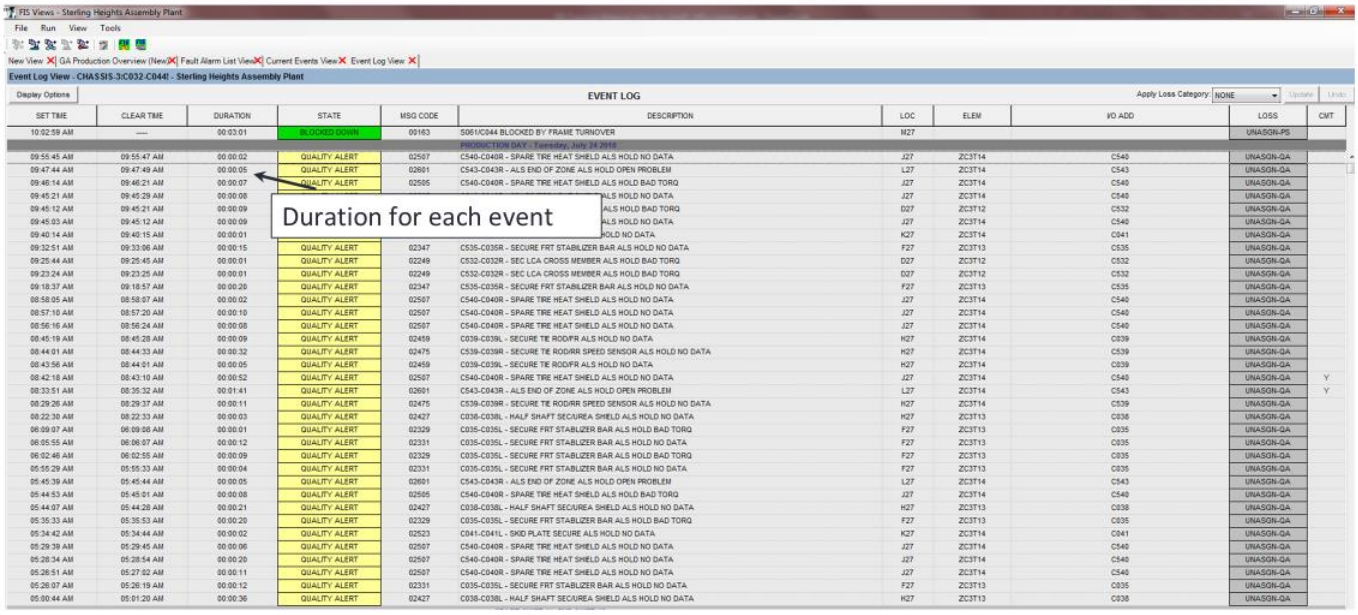
Step 2: Double Click any line item here

Factory Information Systems (FIS)

Event Log View

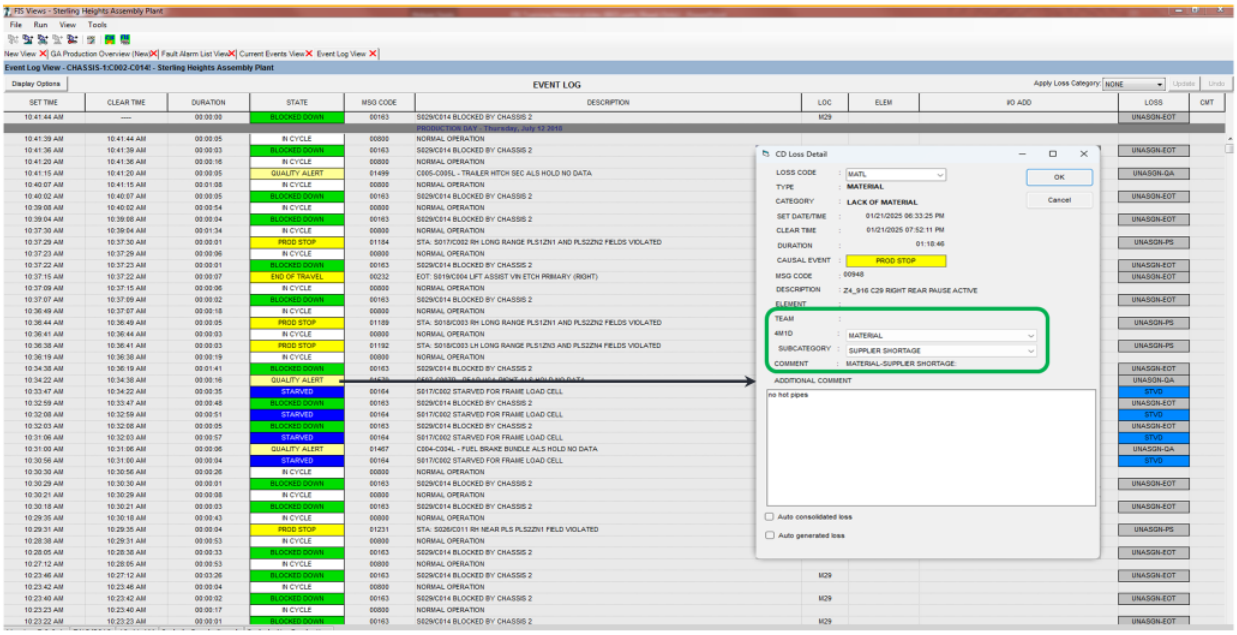


Event Log View- Filtered



Factory Information Systems (FIS)

Entering Comments for downtime



Guidelines for entering comments for downtime

- **Be specific as possible.**
- **Use the drop down to select one of the 4M's (Man, Method, Material, Machine) as the root cause at the beginning of the note. Use the subcategory drop down to select the type of loss.**
- **Ex: [MACHINE] [TOOLING – DC TOOL ISSUES] Torque tool stopped working, using backup, called maintenance**
- **Why do we need specific comments? To accurately categorize losses so the right resources can be deployed to the right areas to improve throughput.**

Ambiguous Comments

(No 4M1D or Subcategory drop down used)

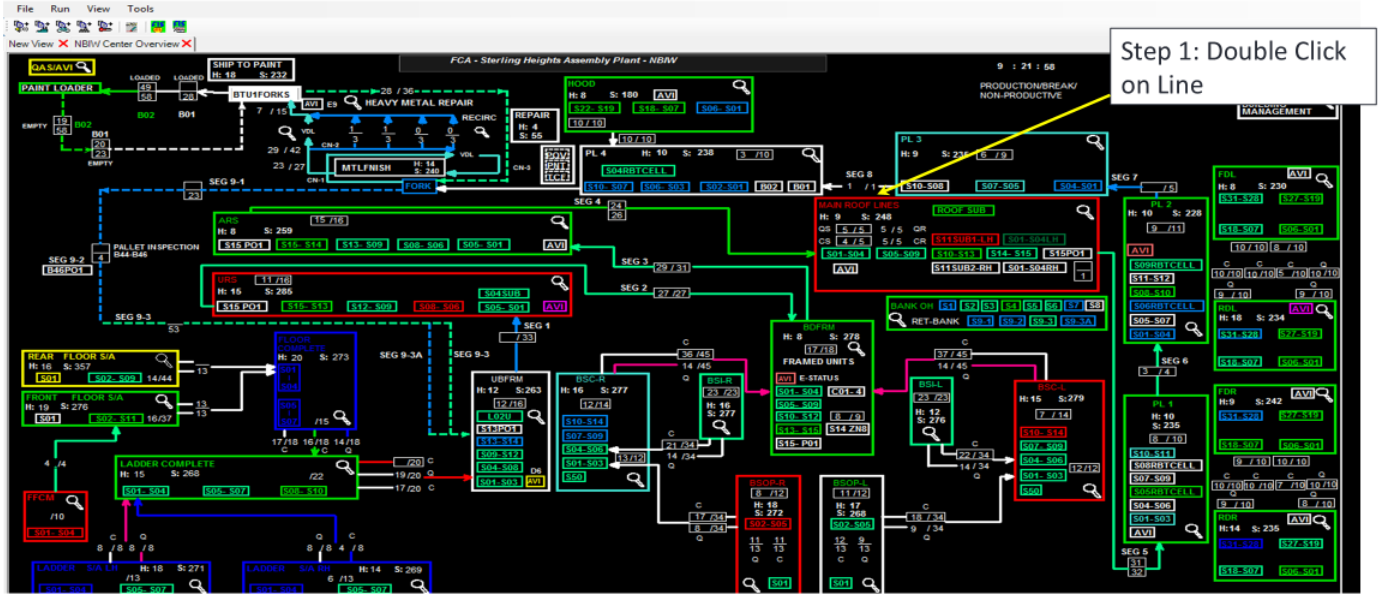
- Subassembly table down, unit 5 solved the issue
- No IP's
- HVAC install due to wrong dash pad

Specific Comments

- **[MACHINE] [CARRIER WOULD NOT RELEASE]** Subassembly table down due to elevator is stuck
- **[MATERIAL] [LATE TO THE LINE]** Lack of IP due to late delivery
- **[MANPOWER] [SPEED LOSS – WRONG PART LOADED]** HVAC installation issue due to wrong dash pad installed at trim-1

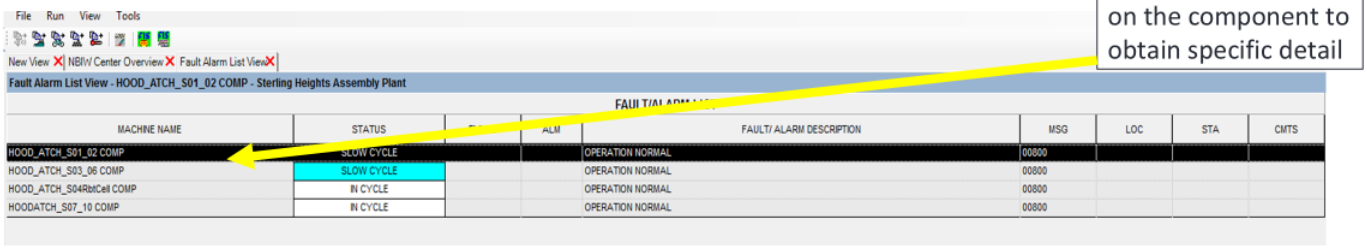
Factory Information Systems (FIS)

View event pareto



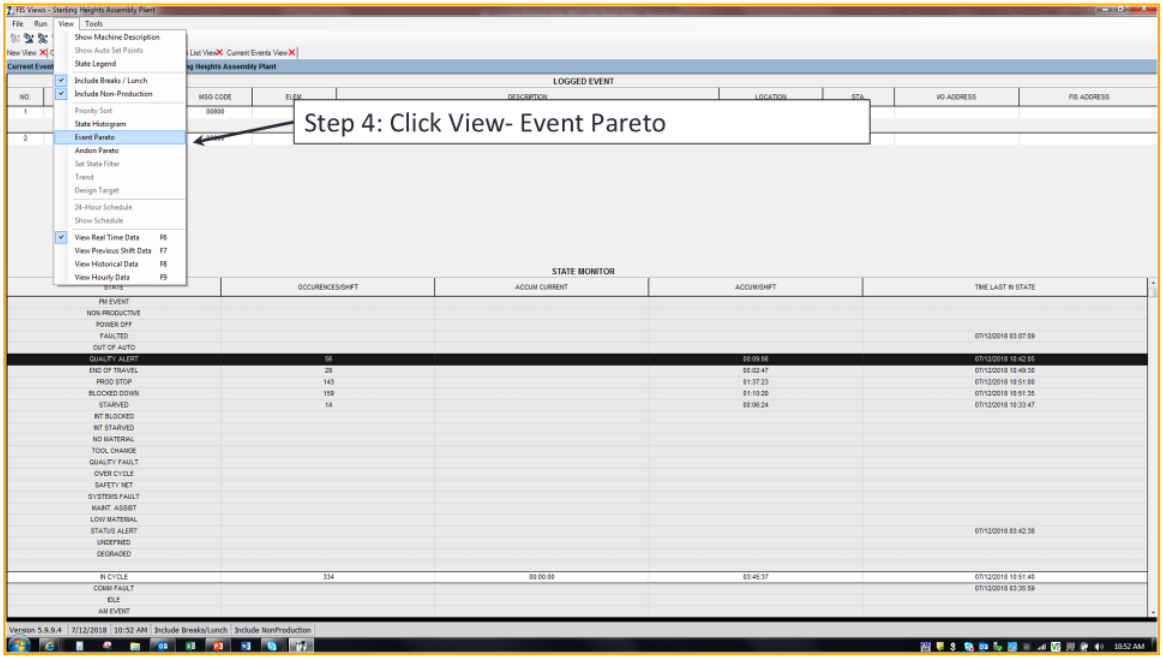
View event pareto

After double clicking the area , you will then see the Component station with in the cell selected. (see below)

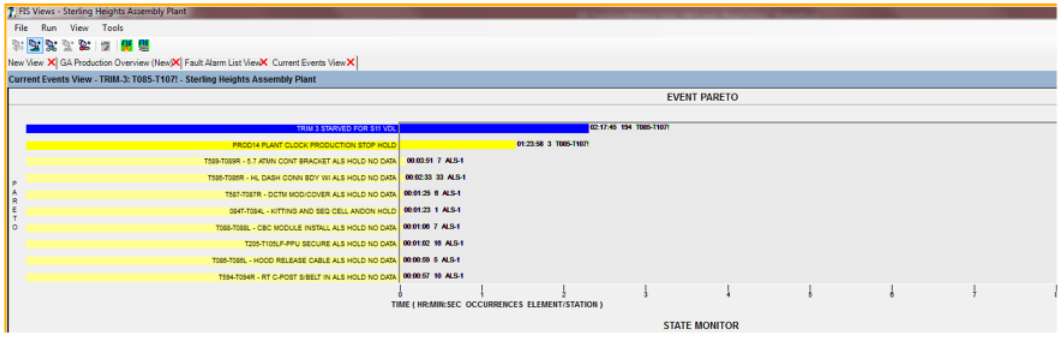


Factory Information Systems (FIS)

View event pareto



View event pareto



Keep open during the day to see your top losses.
Rolling top 10.

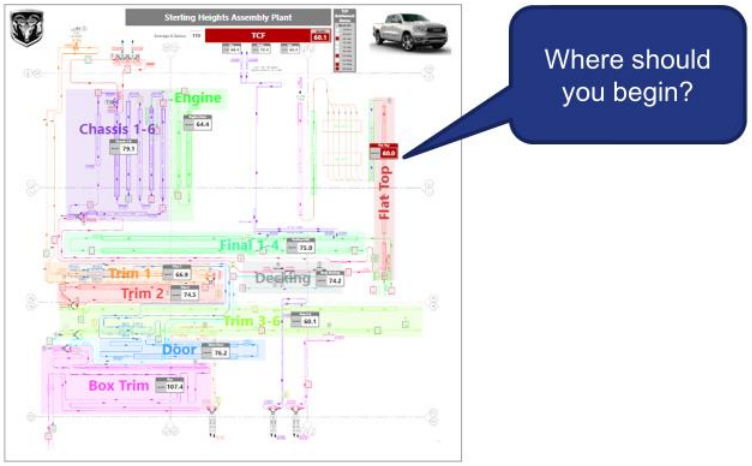
Blue - Starved
Bright Yellow - Prod Stop
Light Yellow - Quality Alert Stop
Green - Blocked Ahead
Red - Faulted

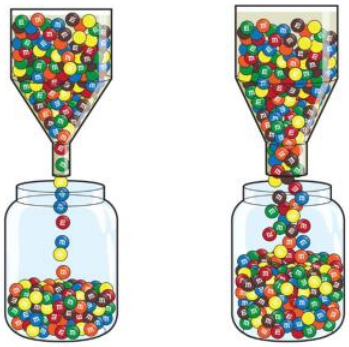
eWall Bottleneck Identification

What is a Bottleneck?

Constraints are anything that prevents an organization from making progress towards its goal. In a manufacturing processes, constraints are often referred to as the **BOTTLENECK**

*If we spend time and resources working on non-bottleneck lines, the overall system may not improve regardless of the effort.



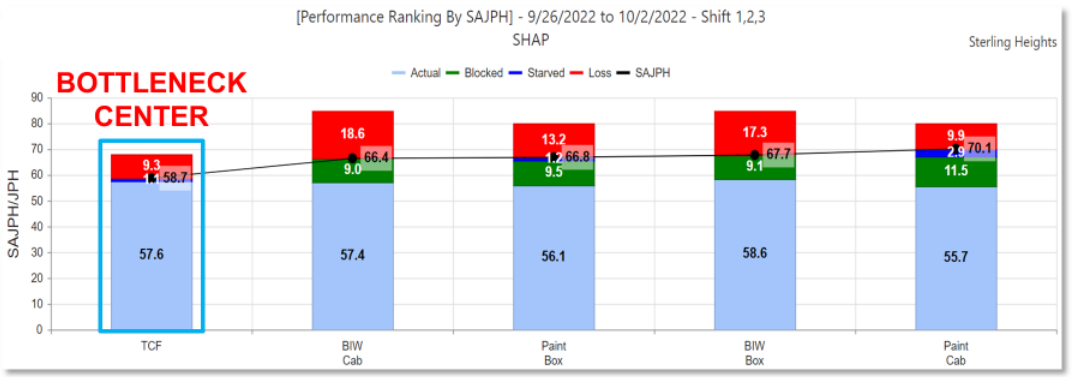


Identifying the Bottleneck Using SAJPH

The bottleneck of any process is the machine/area with the lowest Stand-Alone Jobs Per Hour (SAJPH). In other words, SAJPH is what you "could" have run if you were not blocked/starved by another process

$$SAJPH = \frac{Total\ Production\ Counts}{Run\ Time - Blocked\ Time - Starved\ Time}$$

Starting with the center level SAJPH ranking, In this example, TCF (GA) is the bottleneck

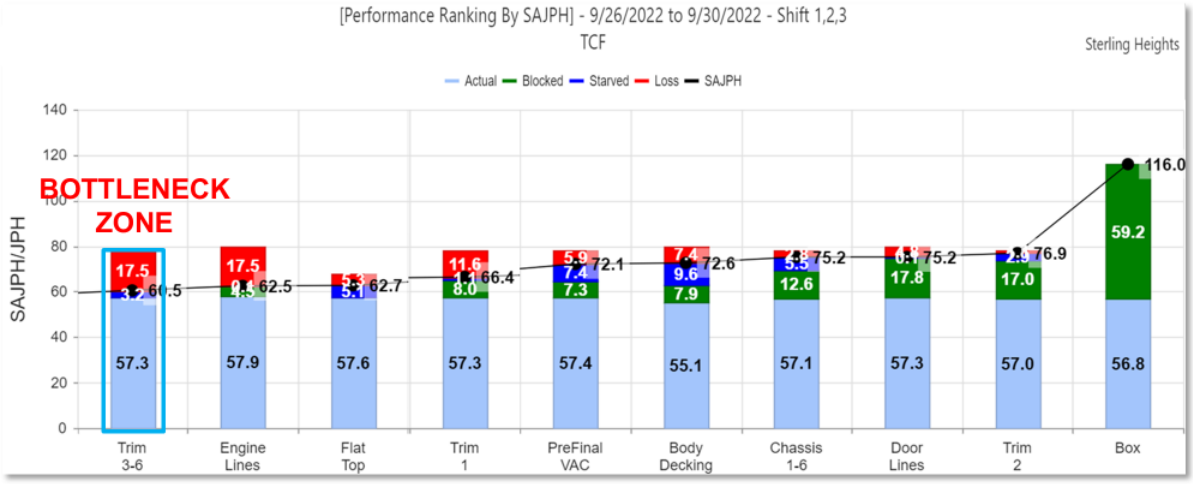


eWall Bottleneck Identification

Identifying the Bottleneck Using SAJPH

Within TCF, ranking the production zones SAJPH, Trim 3-6 is the bottleneck zone

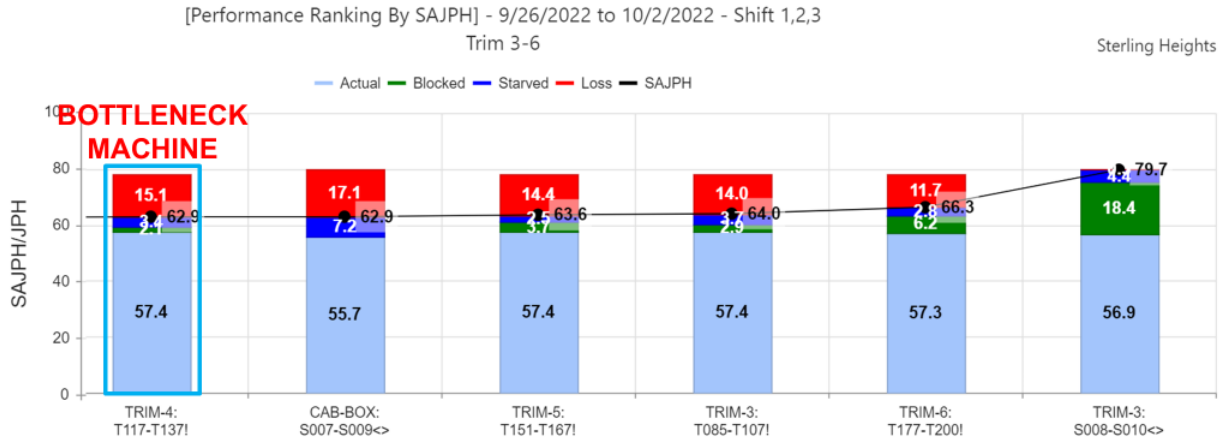
$$SAJPH = \frac{Total\ Production\ Counts}{Run\ Time - Blocked\ Time - Starved\ Time}$$



Identifying the Bottleneck Using SAJPH

Within the Trim 3-6 zone, the bottleneck machine (line) is Trim 4

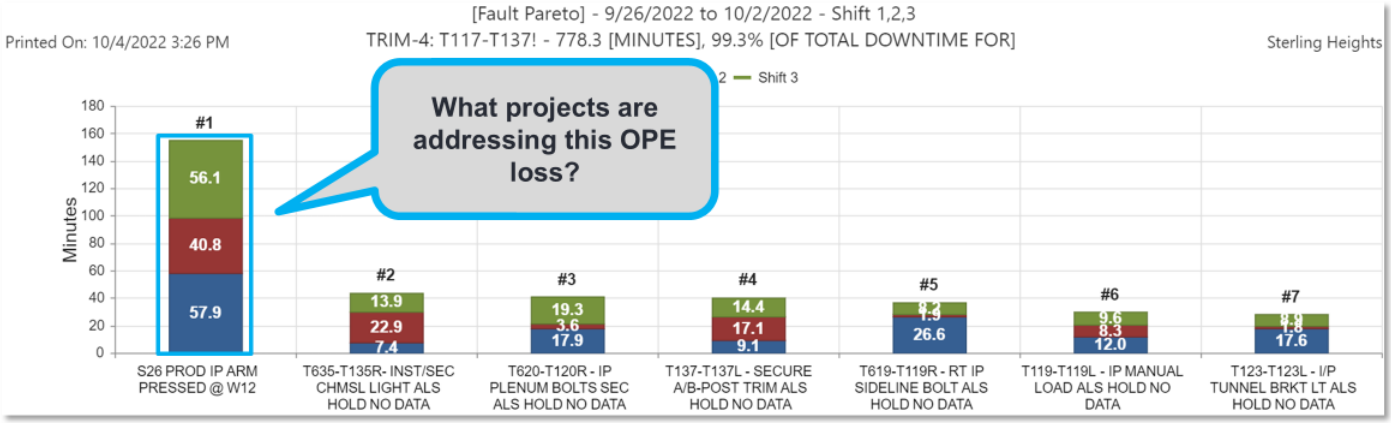
$$SAJPH = \frac{Total\ Production\ Counts}{Run\ Time - Blocked\ Time - Starved\ Time}$$



eWall Bottleneck Identification

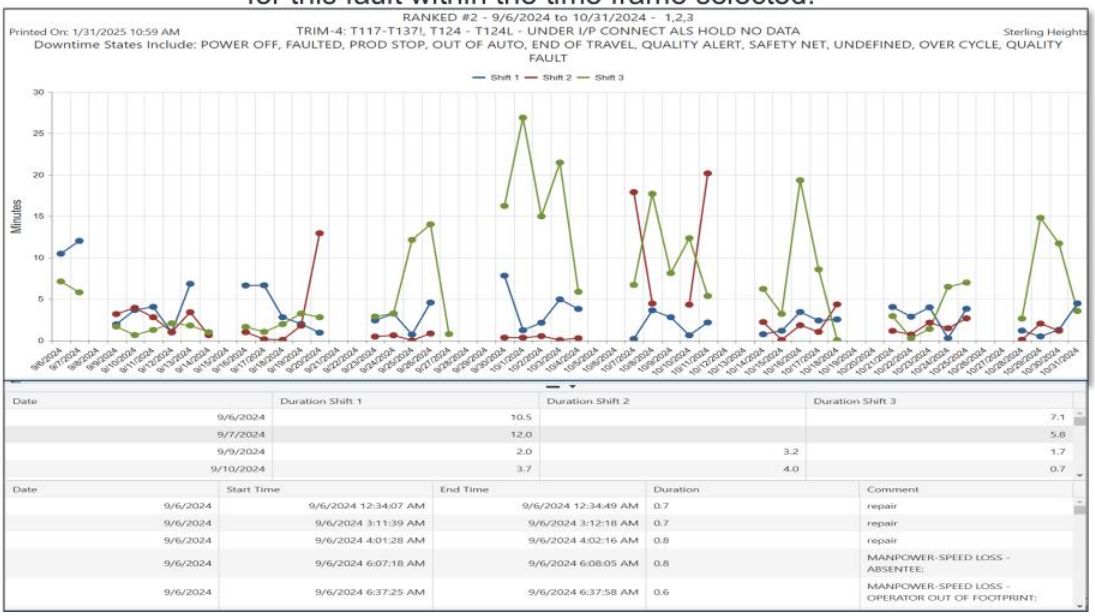
Identifying the Top Losses Impacting OPE

Now that we have identified the targeted Center, Zone, & Line, you can use the Top N Fault Pareto to analyze the losses that are affecting the OPE.



Identifying the Top Losses Impacting OPE

Each Faulted Bar can also be clicked to show a day over day line chart that compares the daily down time by shift. This page will also show if any FIS comments were entered for this fault within the time frame selected.

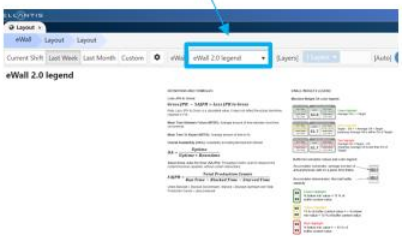


eWall Bottleneck Identification

eWall Legend Definitions and Formulas

Take a moment to familiarize with the definition and formulas shown

These can be found under every eWall 2.0 plant in the layout filter titled “eWall 2.0 legend”



DEFINITIONS AND FORMULAS:

Loss JPH to Gross:

$$Gross\,JPH - SAJPH = Loss\,JPH\,to\,Gross$$

Note: Loss JPH to Gross is a calculated value, it does not reflect the actual downtime reported in FIS.

Mean Time Between Failure (MTBF): Average amount of time between downtime occurrences.

Mean Time To Repair (MTTR): Average amount of time to fix.

Overall Availability (OA%): Availability excluding blocked and starved.

$$OA = \frac{Uptime}{Uptime + Downtime}$$

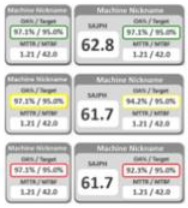
Stand Alone Jobs Per Hour (SAJPH): Throughput metric used to measure the system/machine capability without system interactions.

$$SAJPH = \frac{Total\ Production\ Counts}{Run\ Time - Blocked\ Time - Starved\ Time}$$

where Blocked = Blocked Downstream, Starved = Blocked Upstream and Total Production Counts = jobs produced

EWALL WIDGETS LEGEND:

Machine Widget OA color legend:



Green Highlight
Average OA > = Target

Yellow Highlight
Target – 2% < = Average OA < Target
(meaning, Average OA is within 2% of Target)

Red Highlight
Average OA < Target – 2%
(meaning, Average OA is less than 2% of Target)

Buffer/Accumulator values and color legend:

Accumulator numerator: average number of actual physical units on a given time frame

Accumulator denominator: the total buffer capacity

XX / XX — Green Highlight
% below min value < 11 % of buffer content value

XX / XX — Yellow Highlight
11 % of buffer content value < = % below min value < 15 % of buffer content value

XX / XX — Red Highlight
% below min value > = 15 % of buffer content value

Anatomy of an Ewall

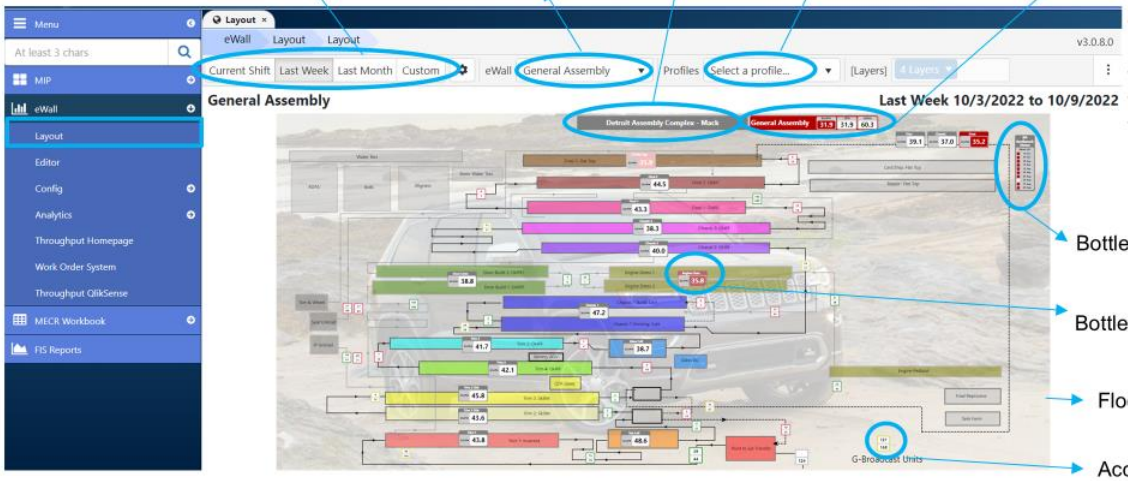
Select date range: Current Shift, Last Week, Last Month, & Custom

Center Level SAJPH Ranking

Downtime Profile

Center Layout Selection

Center SAJPH Trend
Performance Ranking by SAJPH
Minutes Event Report
Top Best Cycle Time
Top Worst Cycle Time
OPE% Trend
Top 25 Occurrences > 10 Min
Top 25 Cumulative DT > 10 Min
Top 25 DT Messages > 10 Min
Export



Bottleneck Tracking

Bottleneck Zone Highlighted Red

Floor Layout From FIS

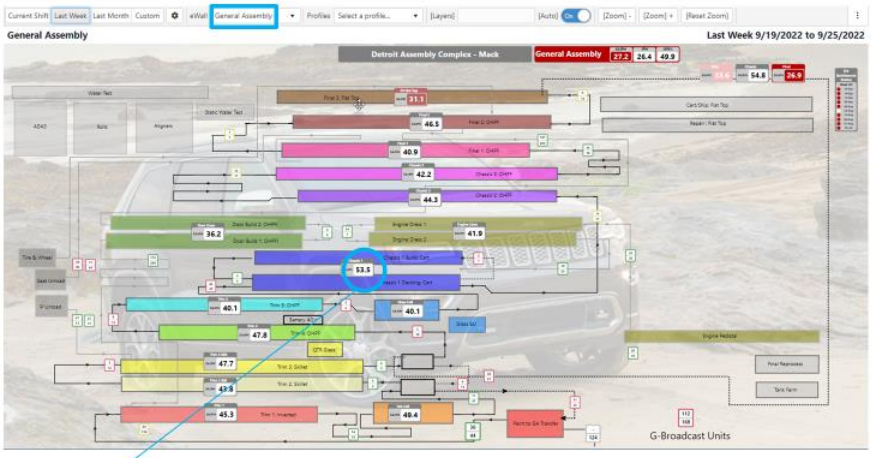
Accumulator

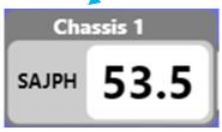
After access the eWall Link, expand the “Menu” bar and select “Layout” from the eWall tab

eWall Bottleneck Identification

Anatomy of an Ewall

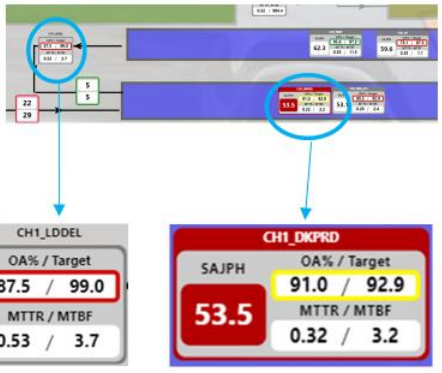
Zoomed out layout displays zone level widgets





SAJPH Trend
Performance Ranking by SAJPH
Downtime Trend
Top Fault Pareto
OPE% Trend
EWO Report
AM & PM Event Trend
Export

Zoomed in shows Machine level Widgets



Downtime Trend
Top Fault Pareto

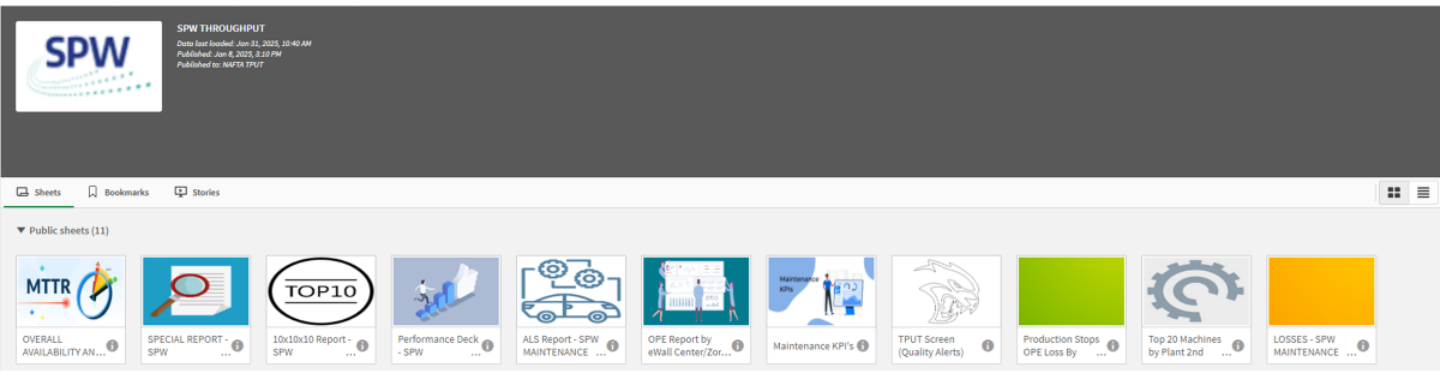
SAPH Trend
Downtime Trend
Top Fault Pareto
OPE% Trend
EWO Report
AM & PM Event Trend
Export

Link to Throughput SharePoint Site

SPW Throughput Business Intelligence Application

STELLANTIS

SPW Throughput Qlik Sense Dashboard



SPW Throughput Qlik sense is used to analyze FIS machine status data effectively and efficiently. A few tips when navigating:

- In each Tab, the tables are exportable: right click on the information you want to export and select “Export” then select ”Export Data”
- All filters are linked between the NAFTA Throughput sheets. For example, any filters selected in the “Top Issues Selection Page” will stay selected when you switch to “10x10x10”

SPW Throughput Dashboard

SPW Throughput Qlik Sense: Top Issues Selection Page

List of filters to select from

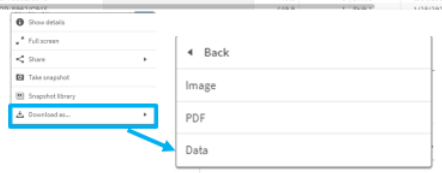
Pareto of downtime/occurrences of top machines & messages for selected filters

Pie chart shows % of total downtime comparing shift to shift

Bar chart shows total downtime by shift hour

Magnifying glass can be used to filter column fields in the table by using left click function.

To export data to excel, right click, select “Download as...”, and then select “Data”.

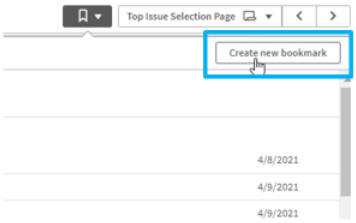


SPW Throughput Business Intelligence Application

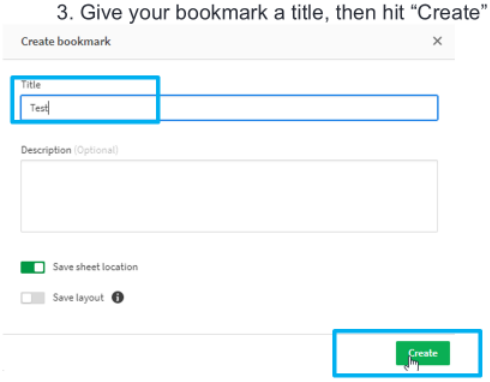
SPW Throughput Qlik Sense: How to Make a Bookmark in Qlik Sense

1. Once you've selected your filters, click on the bookmarks drop down in the upper right-hand corner

2. Click on "Create new bookmark

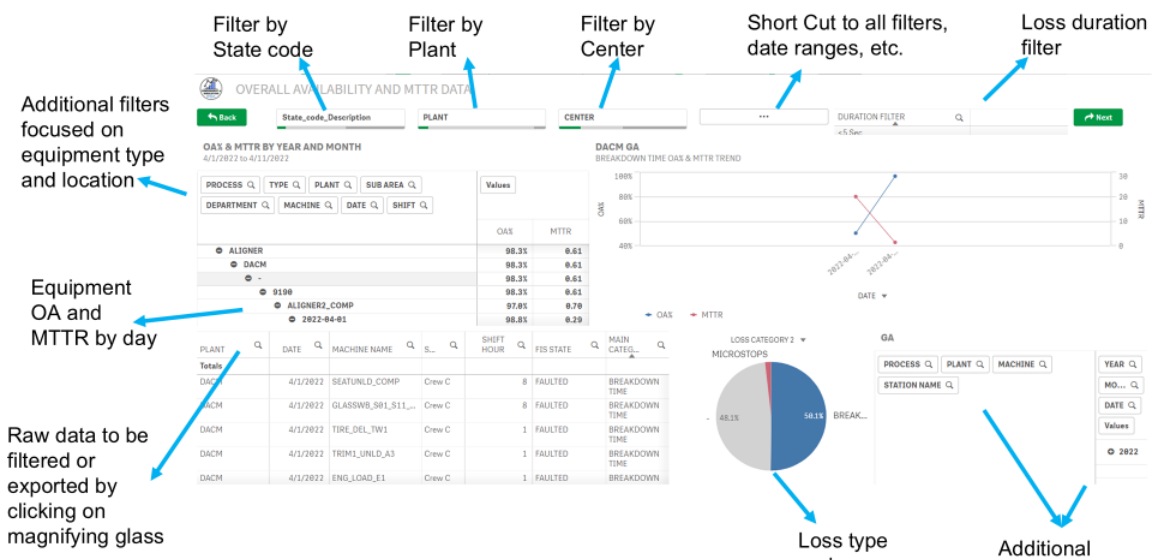


3. Give your bookmark a title, then hit "Create"



4. Save your bookmark by hitting the green check. To view or use the saved bookmarks, refer to the drop down in step 1

SPW Throughput Qlik Sense: Overall Availability (OA)



Key Observations:

- The purpose of this page is to identify equipment deficiencies via Overall Availability.

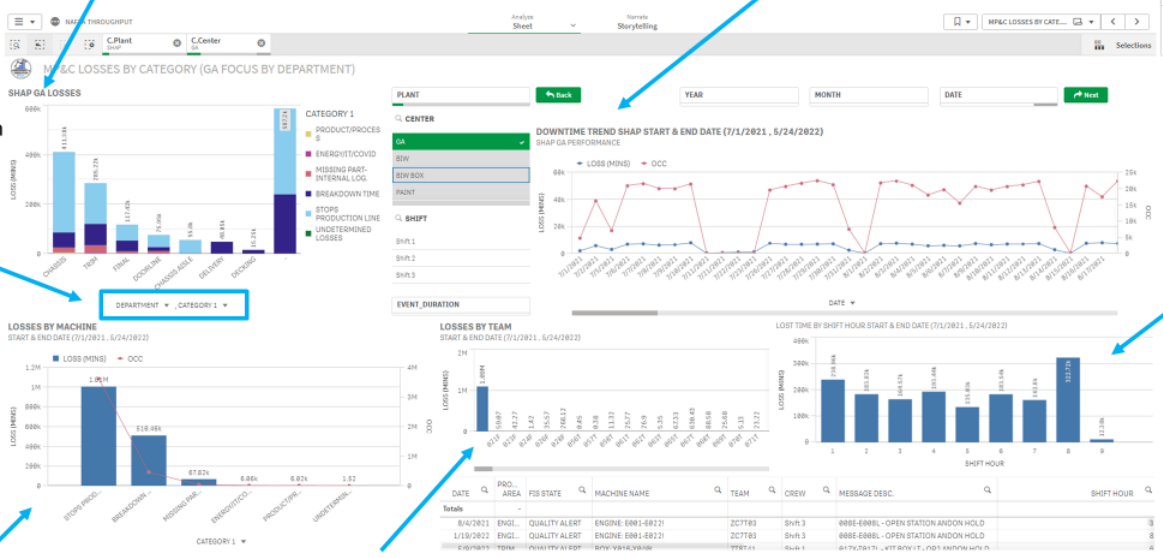
$$\text{Overall Availability \%} = \frac{\text{Uptime}}{\text{Uptime + Downtime}}$$

SPW Throughput Business Intelligence Application

SPW Throughput Qlik Sense: SPW Losses by Category

Bar Chart display's downtime by loss category for each department

Trend chart display's downtime loss for selected filters



Each graph has filter to display a different x-axis

Bar chart shows total downtime by shift hour

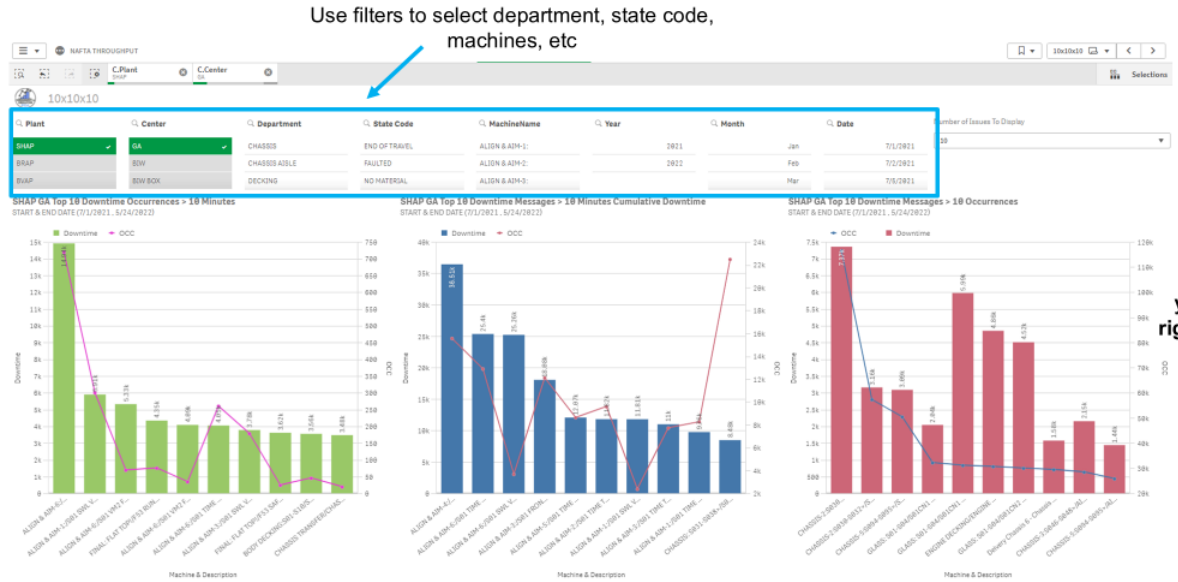
Bar chart shows total downtime by category (x-axis drop down available)

Bar chart shows total downtime by team

To export data to excel, right click, select "Download as...", and then select "Data"

SPW Throughput Qlik Sense: 10x10x10

Use filters to select department, state code, machines, etc



Once you have applied your filters or bookmark, right click on any graph and export the data to excel

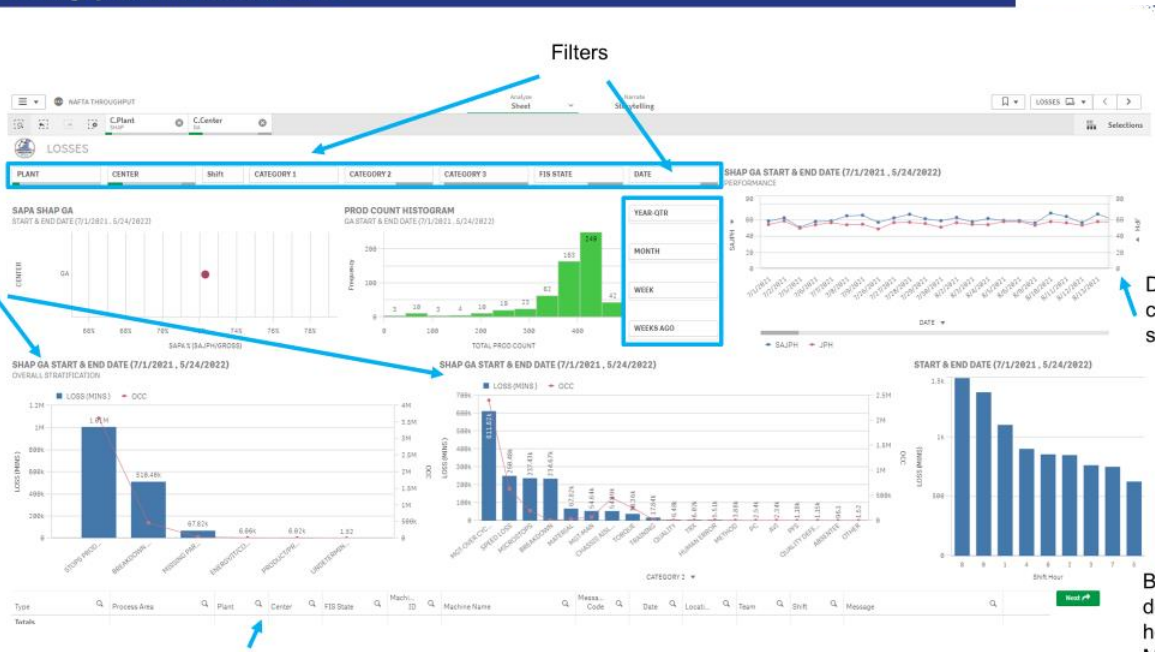
Green Chart: Top 10 Downtime events with single occurrences greater than 10 mins (ex: GA breakdown)

Blue Chart: Top 10 Downtime events with cumulative events greater than 10 mins (ex: minor stops or micro stops)

Red Chart: Top 10 Downtime events with greater than 10 occurrences (ex: nuisance faults)

SPW Throughput Business Intelligence Application

SPW Throughput Qlik Sense: Losses



These bar charts are losses by category (same as MP&C losses by category sheet

Downtime trend chart for selected filters

Bar chart of downtime by shift hour (same as MP&C losses by category sheet)

To export data to excel, right click on the table, select "Download as...", and then select "Data".

How to Improve OPE by Attacking Loss Scenarios

Machine Speed Loss (Cycle Time)

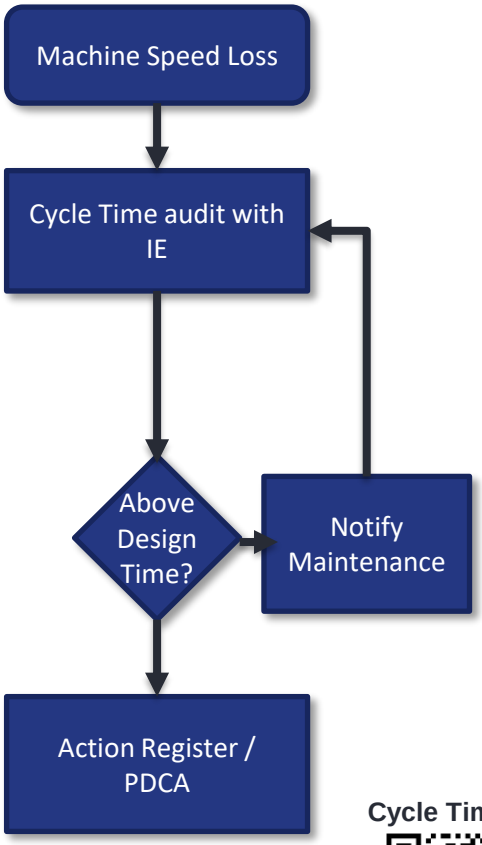


Figure 1. Machine Speed Loss Process Flow

Machine cycle time is the total time it takes for a machine to complete all of its operations to one part. Machine speed loss (SL) occurs when the equipment causes a loss in OPE. A process flow is shown in Figure 1 for how to effectively attack a machine speed loss.

The Industrial Engineers publish a weekly report of machine speeds/cycle times, stratifying the losses in terms of jobs per hour (JPH) shown in Figure 2. This is done by comparing the amount of time each element should take based on the Original Equipment Manufacturer (OEM) provided machine design time, to the amount of time current production takes. The Cycle Time Audit shows the Target or Designed cycle time for each Machine in the left-hand column. The right side is the time documented by the IE. The data collected is then compared to the target and the difference is entered between them in the Var JPH column. The delta, or gap between them is the attackable machine speed loss. This will be colored green for at or below speed target, or red if it is above target and must be addressed.

Cycle Time Training Video:

Cycle Time Reporting:

SHAP Cycle Time Audits -

Week of: 5/5

Area	Department Code	Line	Target Cycle Time (sec)	Comments	Var JPH	Cycle Time Readings (sec)				Avg CT (sec)	Var CT (sec)	Comments	Var JPH
Chassis	9170	Frame Load Robot	45.70	changed 1/30 not 72 JPH	6.0%	47.87	48.55	49.01	49.43			ot 72 JPH	5.7%
		Pre-Flip Chassis 1	50.00	changed 1/30 not 72 JPH	0.2%	49.99	50.54	49.99	49.99			ot 72 JPH	0.2%
		Pre-Flip Chassis 2	51.43	changed 1/30 not 72 JPH	-3.0%	49.65	50.00	48.88	49			ot 72 JPH	-3.2%
		Pre-Flip Chassis 3	51.43	changed 1/30 not 72 JPH	-2.5%	50.45	51.89	5				ot 72 JPH	-1.2%
		Frame Turnover	50.00	changed 1/30 not 72 JPH	2.4%	50.55		50.33	51.34	50.55	50.80	0.80 changed 1/30 not 72 JPH	1.6%
		Post-Flip Chassis 4	51.43	changed 1/30 not 72 JPH	-1.4%	50.33	50.99	49.43	48.88			not 72 JPH	-4.1%
		Post-Flip Chassis 5	51.43	changed 1/30 not 72 JPH	-0.6%	51.89	50.22	50.43	50.33			not 72 JPH	-1.6%
		Post-Flip Chassis 6	51.43	changed 1/30 not 72 JPH	-1.7%	49.43	50.43	48.32	48.43			not 72 JPH	-4.1%
		AGV Unload	50.00	changed 1/30 not 72 JPH	3.3%							not 72 JPH	2.1%

This element is at the standard and does not require any changes

This element is over the designed time by a significant amount

Figure 2. Example of Man-Machine Chart

Breakdown Time (Faulted Condition)

Breakdown

A breakdown with a low occurrence and high downtime is considered in this scenario. When this happens an EWO needs to be completed. The EWO would identify the phenomena, losses, and countermeasures with dates for completion. An example of this phenomenon is shown below.

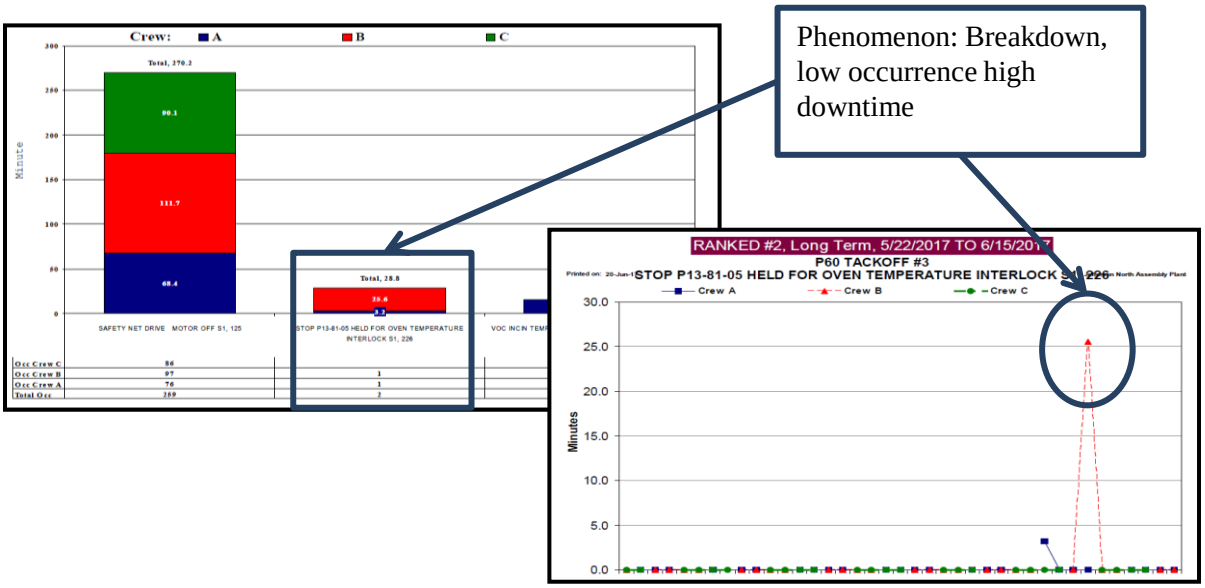


Figure 35. Example data indicating an internal breakdown.

Microstop

.

A breakdown with a high occurrence and low downtime per event is considered in this scenario. When this happens an EWO may be needed to properly root cause the issue, but this would be tracked longer term as part of the Top 20 Machine process.

Manual Speed Loss

Manual Speed Loss occurs at load points in a manufacturing process where manual, human intervention is required to continue production. These points are designed to have zero speed loss. The difference between the Original Equipment Manufacturer (OEM) design capability time and the actual operator time is the speed loss *Note: because of how FIS document losses, it is possible to have speed losses that are related to a tool or a machine. In the Factory Information System (FIS) the following state codes are considered speed loss: production stop, end of travel, quality alert, no material, and over cycle. Mutually Exclusive Collectively Exhaustive (MECE) is required for the loss when more than one independent root cause results in a common speed loss downtime event.

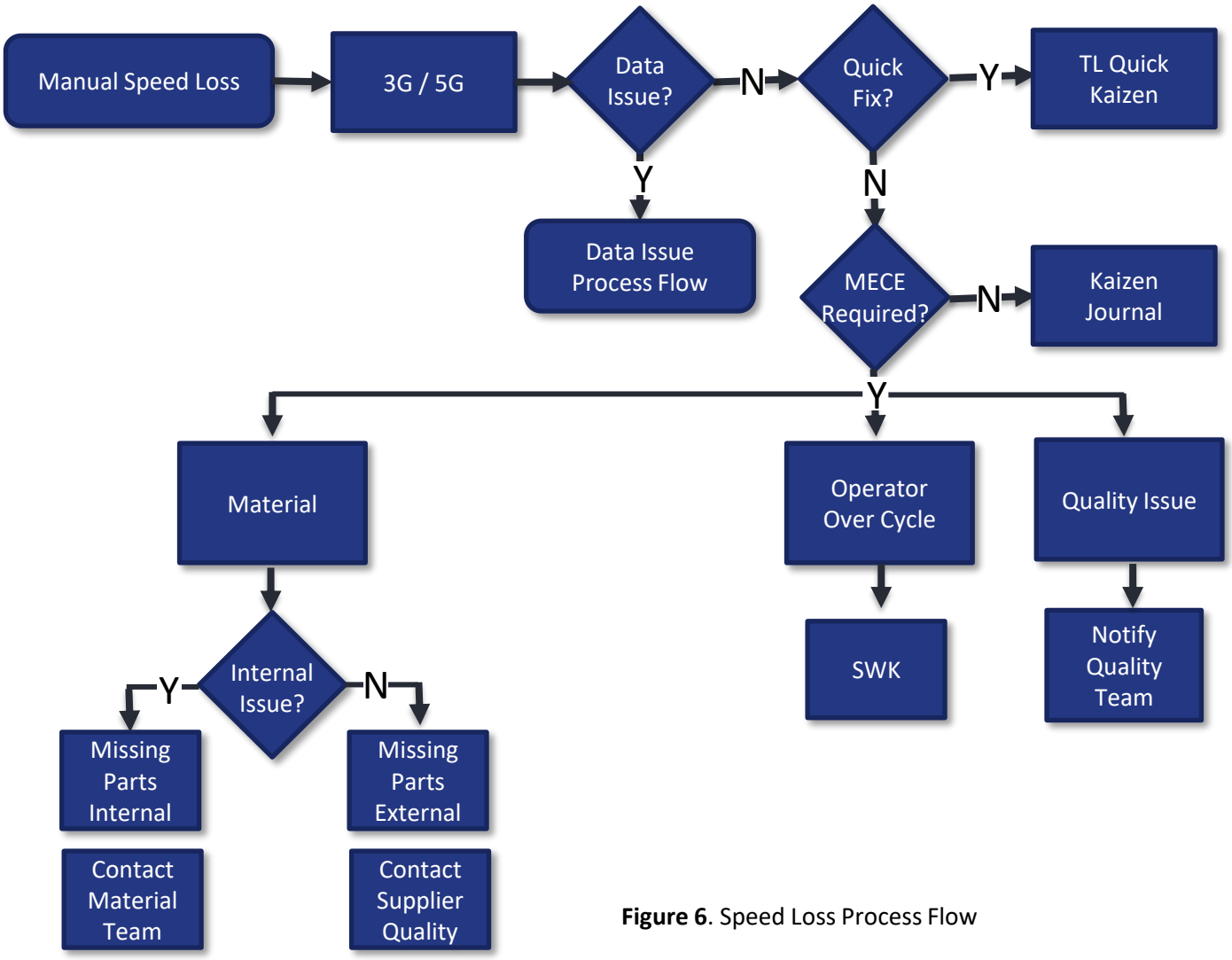


Figure 6. Speed Loss Process Flow

Stops Production Line

If the speed loss is identified as a man or method issue, then it is categorized as Stops Production Line. This loss could potentially be a quick fix and can be attacked with a quick kaizen. An example of a potential phenomenon like this is below:

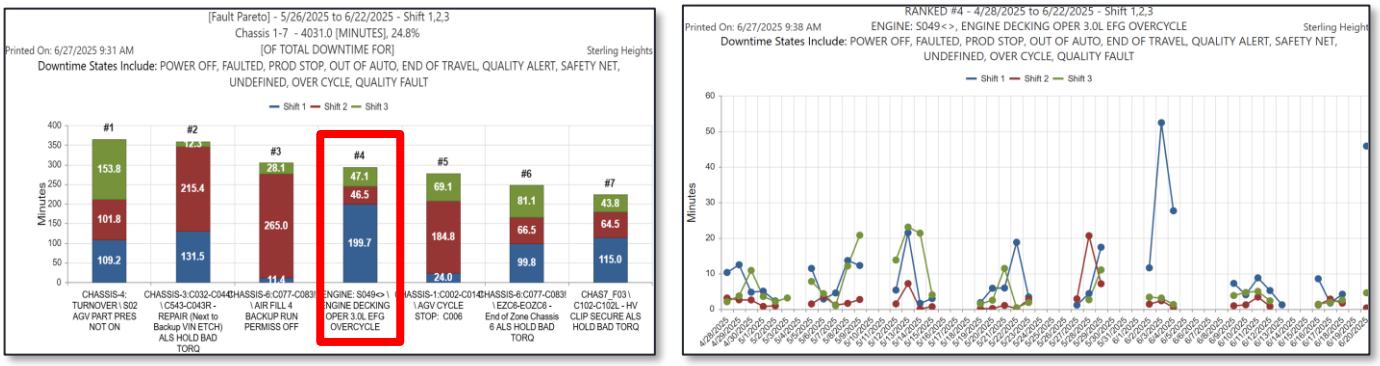
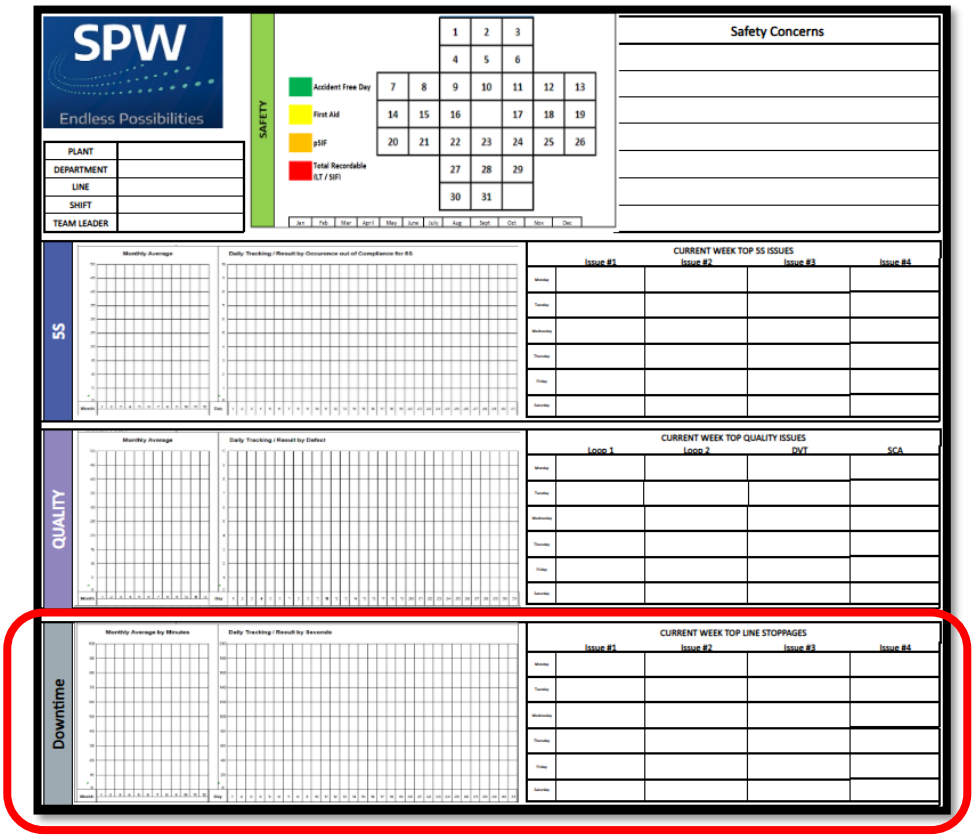


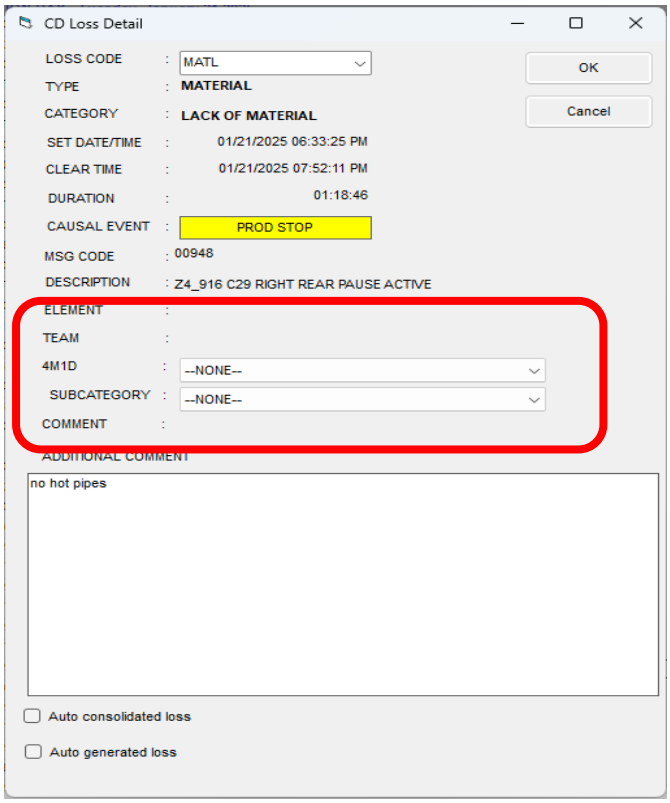
Figure 7. A speed loss issue that can be resolved fast using the shop floor management process

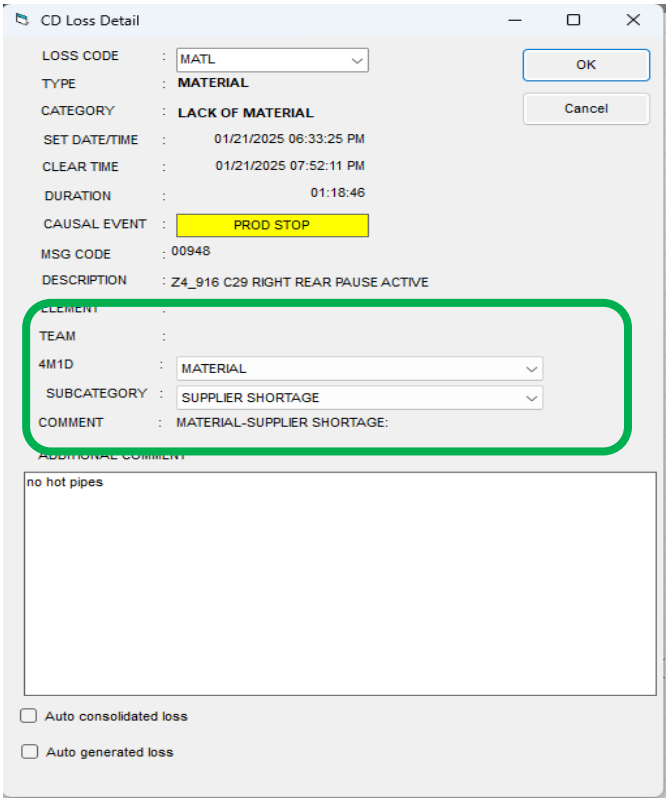
If the speed loss is not a quick fix, and is a top loss within the team, the station and issue should be tracked on the Team Leader Totem. The downtime section of the totem has a top issues section, and the loss should be tracked here.



Stops Production Line (cont.)

The reasons for the line stoppage should also be documented in FIS with the comment feature. Below is an example of an FIS comment pop-up screen. The example on the left is the incorrect method. The example on the right shows the use of the 4M1D drop downs which should be used for every comment.





FIS Comments to OPE Loss

FIS comments are critical for understanding the exact reason a line or machine stopped at a specific time. These comments also ensure downtime is linked to the correct OPE loss category. The BI Application database scans for keywords in the comments to help recategorize downtime, but the use of the 4M1D dropdown menus simplifies this process by providing the keywords needed to properly classify each minute of downtime.

Shift Specific Downtime

When a significant difference in downtime trends is seen between shifts this is an indication that there is a phenomenon occurring on one shift that is not occurring on any of the others. The tool needed for this is to conduct a **Standardized Work Audit (SWA)**. This will identify any deviations that are occurring within the process from one shift to the others.

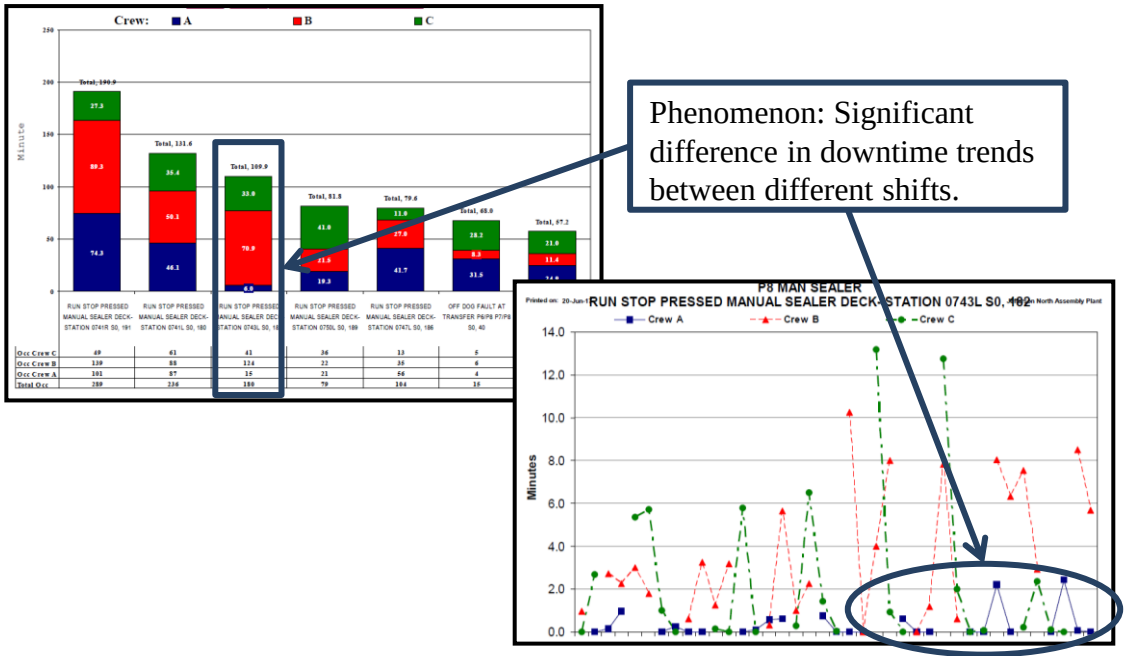


Figure 36. Example data indicating a shift differential.

Non-Shift Specific Downtime

It can also be found that there is downtime occurring, but it isn't specific to one shift. An example of this can be seen below, with impacts to all shifts. When this type of downtime occurs, there could be many different causes that need to be addresses. It is best to start the kaizen process to begin identifying the potential root causes to the issues. There also may be issues with the standard as mentioned before so the use of **Standard Work and Kaizen (SWK)** is a good tool to begin improving the current standard allowing the downtime.

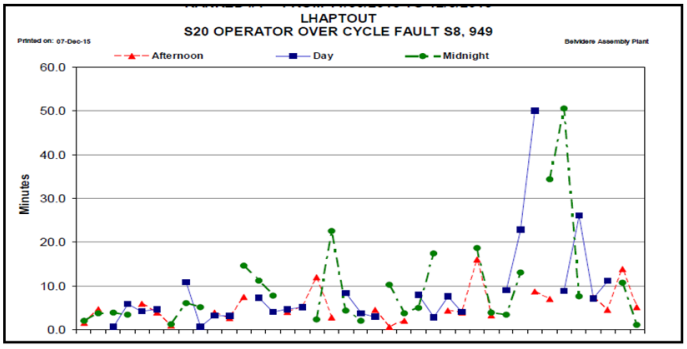
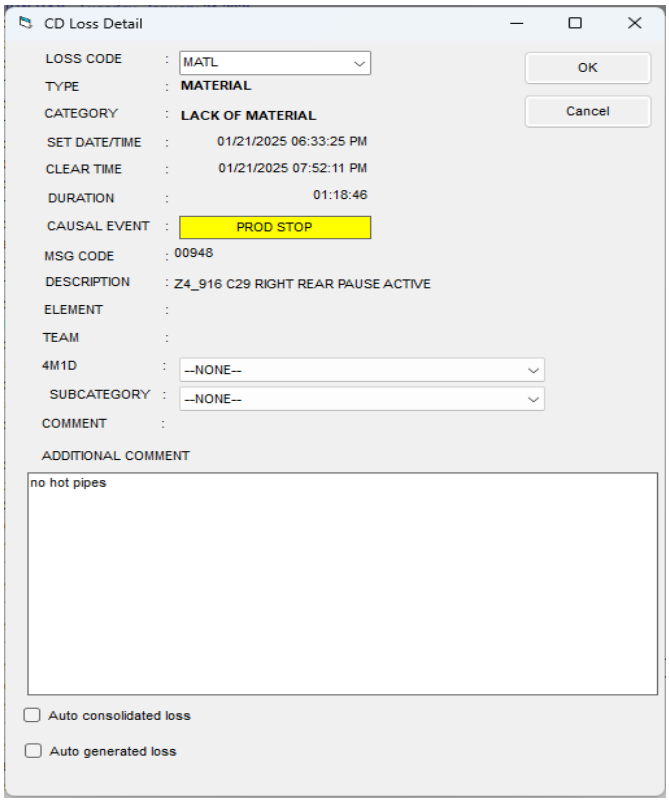


Figure 14. Non-shift specific operator over cycle.

Internal / External Material

Internal Material Downtime

If the reason for the line speed loss is identified as an internal material loss, this should first and foremost be documented as so in the FIS comments section. In the 4M1D section of the FIS comment pop up material should be selected. On the secondary drop down the reason behind the material stoppage should selected to properly bin the loss. The plant logistics team should also be notified so they can properly document and begin corrective measures for the loss.



External Supplier Downtime

If the reason for the speed loss is identified as a material issue but is now seen to be caused by the external supplier, this needs to be notated in the secondary drop down of the 4M1D. There are drop down options that begin with supplier, and these should be selected to properly categorize this loss. The internal material team should also be contacted to begin corrective actions with the supplier.

Reoccurring / FIS Scheduler Issue

Reoccurring Issue

A recurring issue is one that happens repeatedly without being linked to a specific shift. The example below shows this type of problem. If a kaizen has already been initiated for this fault, the 4M1D section of the kaizen must be revisited to identify the correct potential root cause.

Phenomenon: Reoccurring issue without any shift correlation

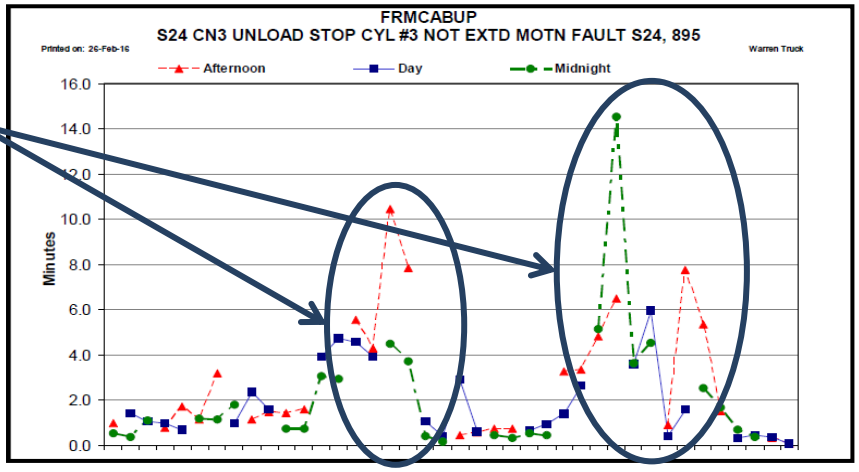
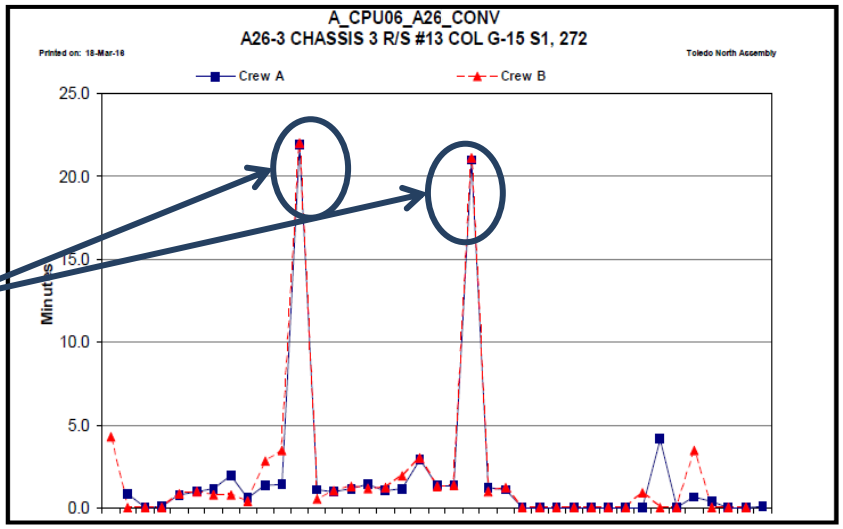


Figure 39. Example of data indicating a reoccurring issue without a shift differential.

Scheduler Issue

Each center must update its scheduled runtime in the FIS scheduler, including all breaks and lunch periods. If this is not done, the system may record false data spikes that distort downtime reporting. For example, the chart below shows how downtime can appear inflated if the system counts breaks, lunches, or shortened shifts as machine downtime instead of planned unproductive time.

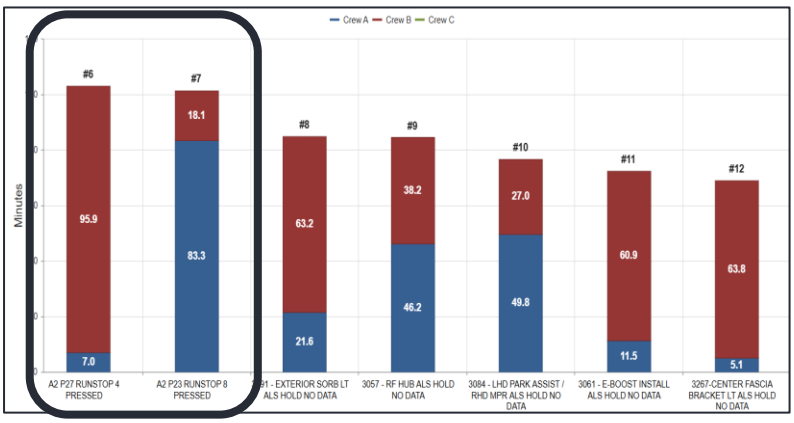
Phenomenon: Failure to update FIS scheduler shows as downtime in E-wall.



Shift Differential

False Shift Differential

A false shift differential occurs when each shift is using a different stop for the same issue. As show below, this would make the same problem show up in two different places under different identifications seemingly indicating a shift differential. When this occurs the downtime from both stops must be included when tracking the resulting impact of implemented countermeasures.



Cross Path Shift Differential

This phenomenon occurs when two shifts alternate as the top downtime contributor. It is most common when a plant has an operator schedule in place where an entire production crew regularly rotate between day and night shifts. Since FIS tracks downtime by time of day rather than by operator, the data does not transfer with the team when their shift changes.

Phenomenon: Two shifts crossed paths in terms of being the top downtime contributor consistently

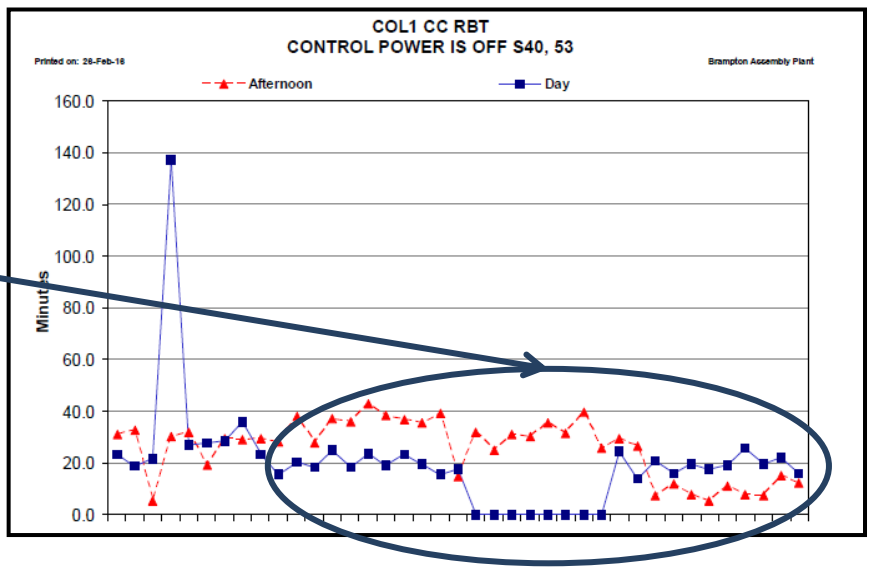


Figure 42. Example of data indicating a cross path shift differential.

Data Issue

E-Wall Drill Down Data Issue

Shown below is the process that should be taken, both internally within the OPE Team and externally at the plant, if an issue is found in the data for the E-Wall. Communications should include the OPE Manager and OPE Coordinator assigned to the respective plant.

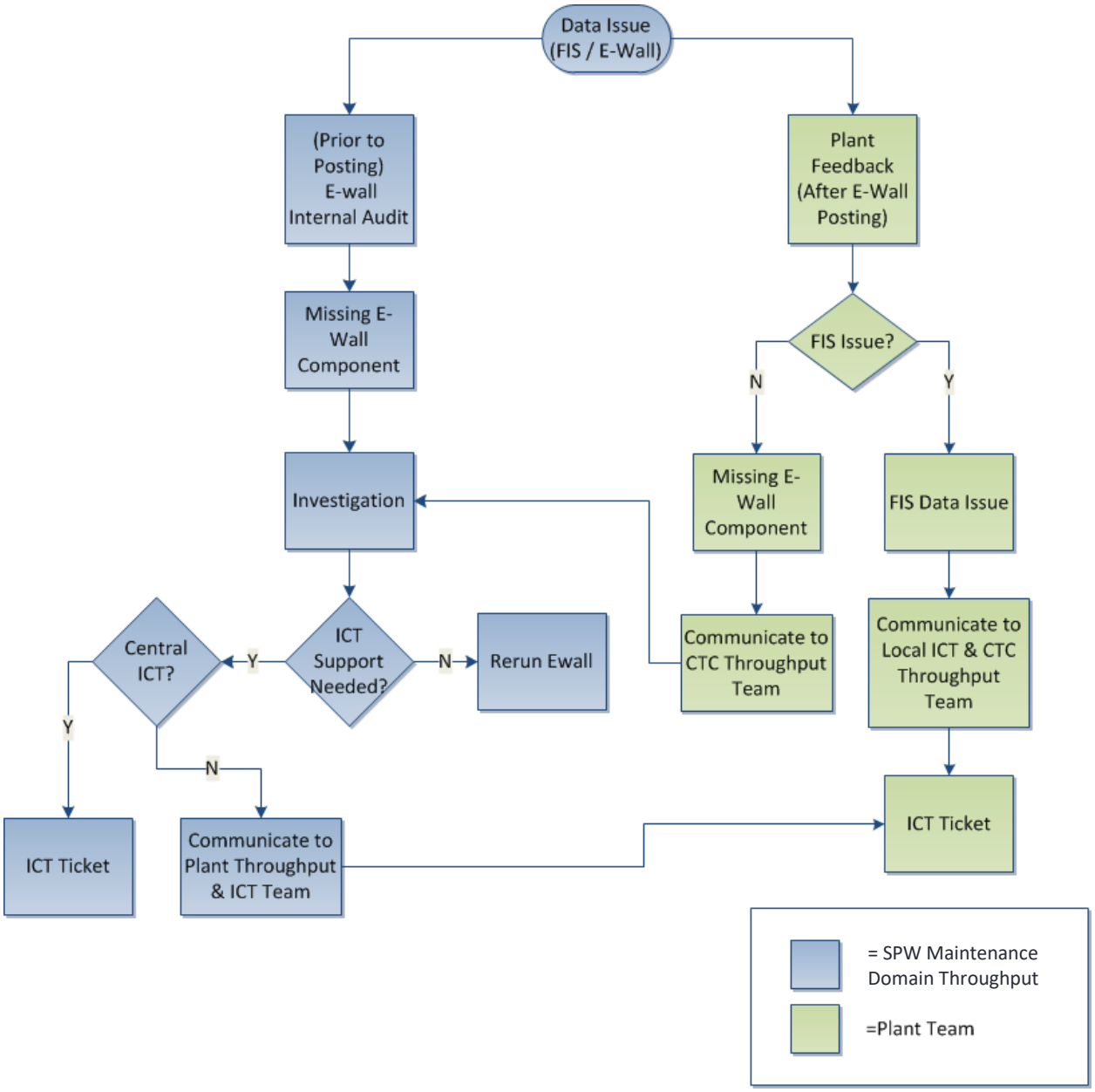
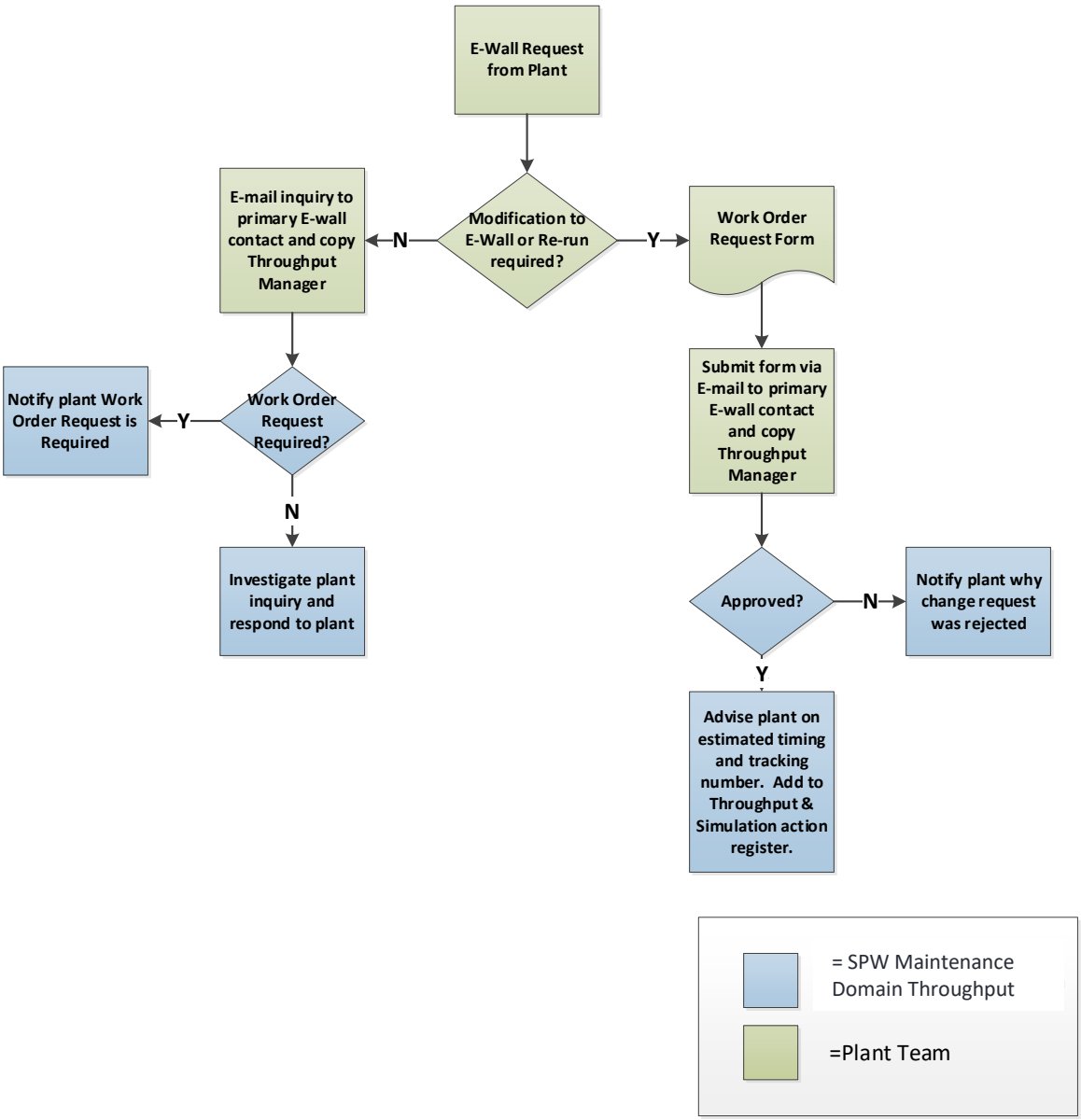


Figure 45. Flow chart for drilling down into a data issue with an E-Wall.

Maintenance Domain

E-Wall Change Requests



SPW Maintenance Domain Work Order System:

Maintenance Domain

FIS Change Request Process

STELLANTIS

Identify the issue

Investigate the Impact

PLC Impact

FIS Configurator Impact

Contact Maintenance Controls Specialist

Submit FIS change request through JARS System

Follow-up on progress, escalate as needed

Follow-up on progress, escalate as needed

Validate completion through FIS and/or eWall

N

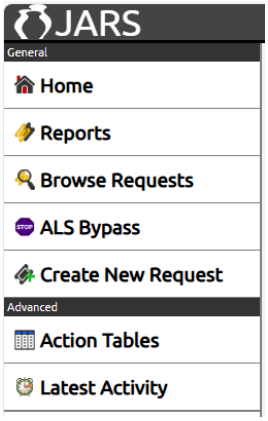
Notify Controls Specialist to reopen issue

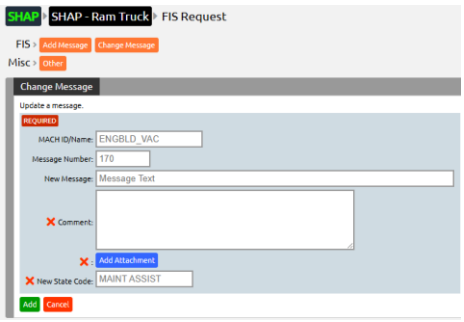
N

Reopen JARS Request

Y

Issue Closed





JARS:

SPW Problem Solving Tools

- Emergency Work Order (EWO)
- TTR Reduction Analysis
- 5W1H
- 4M1D
- 5 Why
- TWTTP / HERCA
- Kaizen
- Kaizen Journal / PDCA
- Standardized Work Audit (SWA)

Emergency Work Order

STELLANTIS

This section includes how to:

- Recognize the importance of the EWO process and your participation in it.
- Write an accurate and complete EWO with support.
- Apply the 5 Why tool appropriately.
- Evaluate Root Cause effectively.
- Explain the EWO closure process.

Roles and responsibilities

- **UAW Skilled Trades**
- Analyze Breakdowns using the Emergency Work Order form
- Report Breakdown data (with input from the operators) as accurately as possible on EWO form
- Assist with EWO closure
- Provide expertise to make EWO closures successful

- **Management**
- Coach the EWO process
- Stratify the EWO data to prioritize maintenance issues
- Create work plans which allow tradesman to address the EWO issues for closure
- Verify the closure of EWOs to improve machine performance

EWO Training Module:

Maintenance Domain

Emergency Work Order

STELLANTIS

WHAT IS IT

The Emergency Work Order (EWO) is a problem solving tool for root cause analysis where breakdowns are documented, analyzed, classified, and corrected.

WHEN TO USE IT

EWOs shall be developed for **all** breakdowns, and for any micro-stops that last longer than 10 minutes:

- EWOs are to be completed within 48 hours of all breakdowns
- EWOs are to be completed within 48 hours of micro-stops lasting longer than 10 minutes

WHERE TO USE IT

The EWO process should be conducted on the shop floor, at the site of the breakdown.

WHO SHOULD USE IT

Maintenance personnel are responsible for the EWO process with input from operators regarding specific breakdown information. Skilled Trades are responsible to complete the EWO

WHAT IS THE AIM

Ensure breakdowns are thoroughly documented and analyzed in order achieve:

- True root cause
- Elimination of recurrence
- Read across
- Avoid performance loss
- Attain goal of zero breakdowns

HOW TO USE IT

As the Maintenance team experiences breakdowns the development and use of the EWO is crucial to the maintenance plan. The Maintenance Specialists need to identify the true root cause of every breakdown, develop robust countermeasures, and prevent the same breakdown from reoccurring. (See next page for EWO content and format)

Train the target team on the content and use of the EWO (Team Members, Maintenance Supervisor, etc.)

EWOs must be readily available to the Maintenance Team Members (documents located by the equipment to be hand written) for development anytime breakdowns or qualifying micro-stops occur

Maintenance Specialists must ensure EWOs are tracked and closed in a timely manner

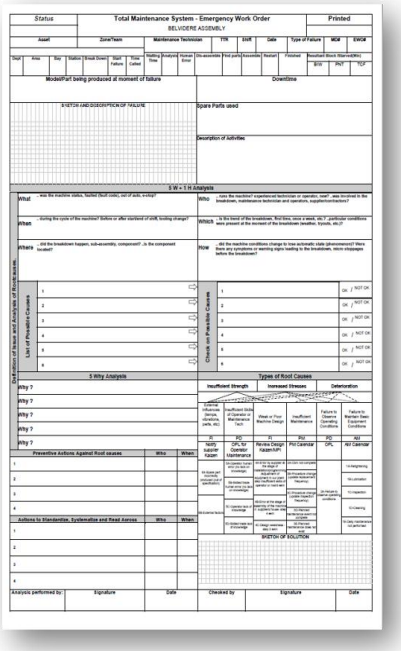
Once the EWOs are closed, they need to be uploaded into their relative CMMS with supporting documentation

Important: Maintenance Team Members must be involved in the development of the EWOs, Skilled Trade personnel are responsible for writing EWOs for breakdowns they are involved with

EWO Requirements

An EWO is required to be completed for EVERY breakdown, AND when a micro-stop exceeds 10 minutes.

EWO's need to be completed within 24-48hrs after the breakdown occurs



What is a breakdown?

A Breakdown is:

A breakdown is:

A machine stoppage due to a break or malfunction of a component or software that must be replaced, restored or updated

A component is considered failed when it no longer performs its function as designed

To restore the normal condition or function of the machine usually a maintenance crew is required to update or modify the software and/or to replace/calibrate/restore/fix a component

What is a Micro - stop?

A Micro - stop is:

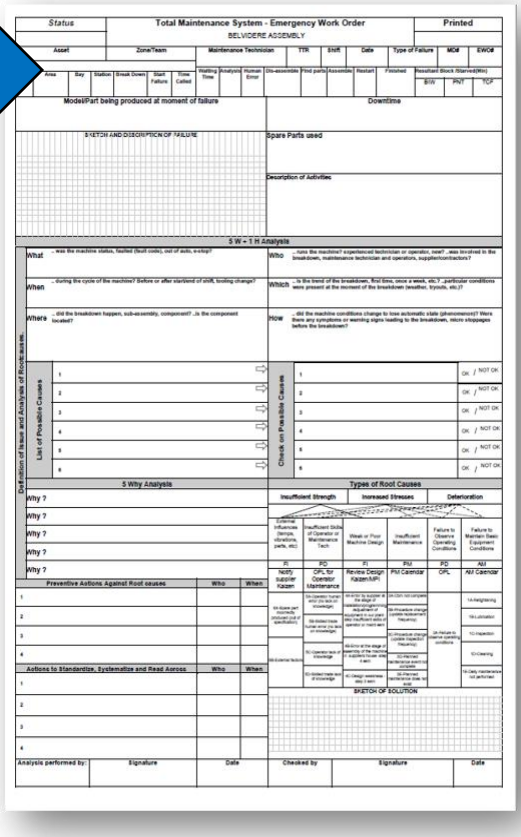
Micro-stops are minor stoppage losses that occur when a machine stops for a short time as a result of a temporary problem.

A component is considered failed when it no larger performs its function as designed

As soon as someone such as an operator resolves the problem, the machine quickly returns to normal operation

EWO

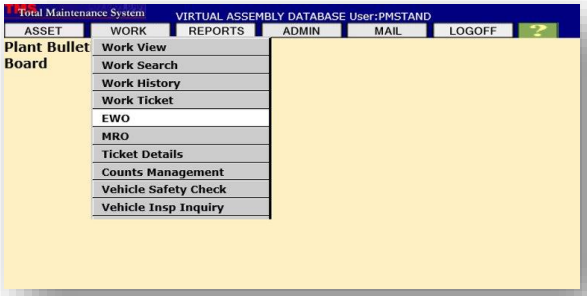
STANDARIZED EWO FORM

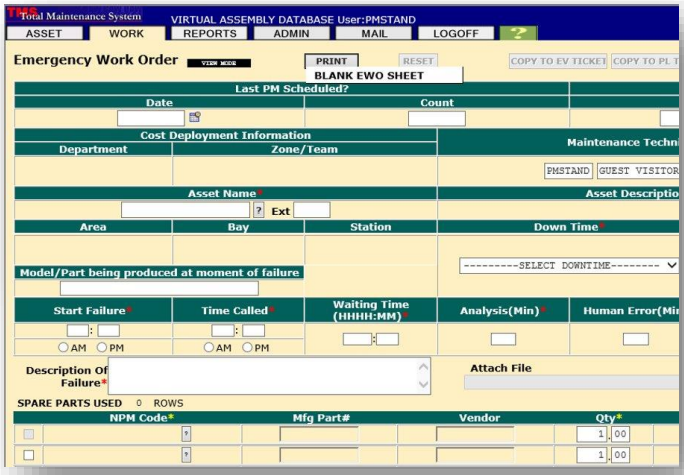


EWO's are used to document breakdowns by collecting and reviewing all relevant data

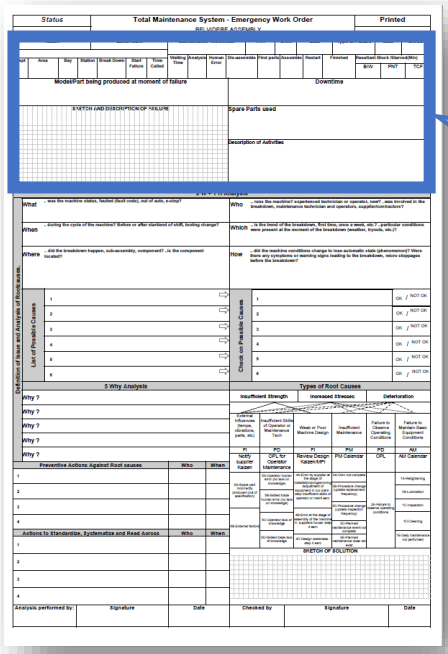
It is a group activity that should include the entire maintenance team

WHERE CAN I FIND THE STANDARD EWO FORM?

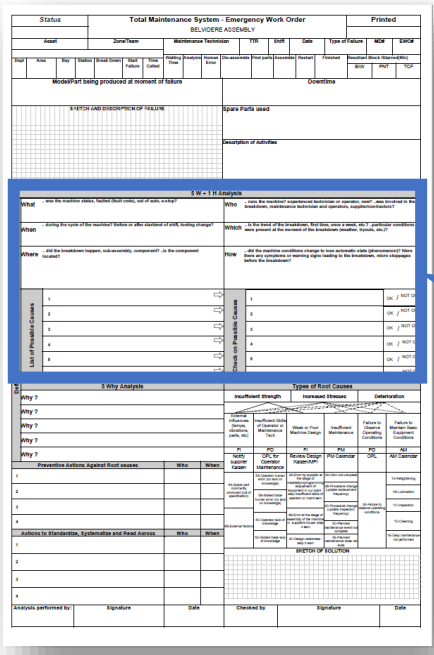




Filling Out an EWO



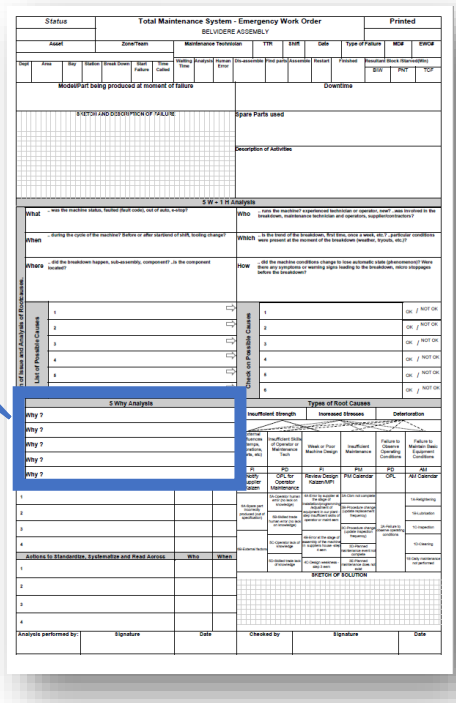
General information about the breakdown



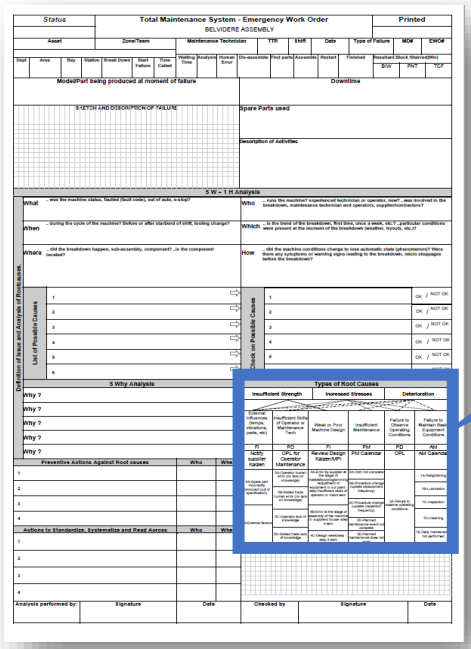
5W+1H Analysis:

What
When
Where
Who
Which
+
How

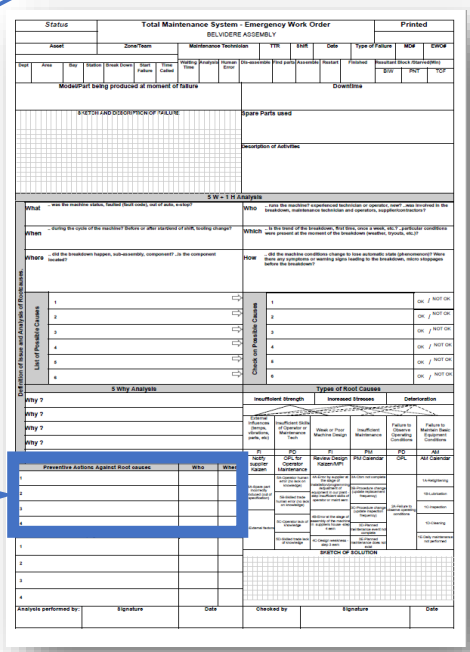
5 Why analysis



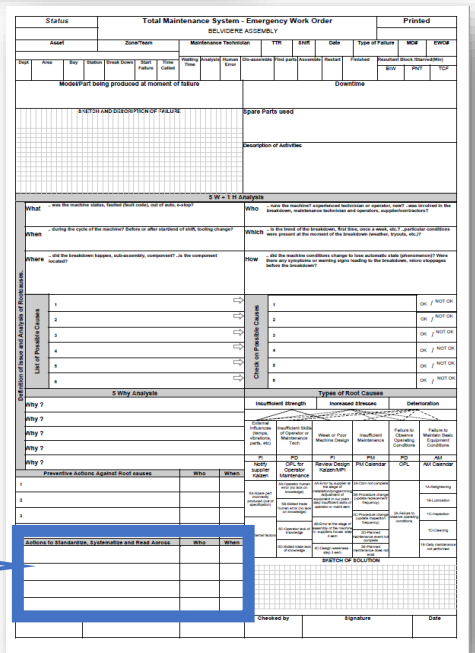
Filling Out an EWO


Status | Total Maintenance System - Emergency Work Order | Printed
BELVIDERE ASSEMBLY
Asset | Zone/Team | Maintenance Technician | TTR | Shift | Date | Type of Failure | MD# | EW0#
Model/Part being produced at moment of failure | Downtime
SKETCH AND DESCRIPTION OF FAILURE | Spare Parts used | Description of Activities
5 W + 1 H Analysis
What ... was the machine status, faulted (fault code), out of auto, e-stop?
Who ... runs the machine? experienced technician or operator, new? ...was involved in the breakdown, maintenance technician and operators, supplier/contractors?
When ... during the cycle of the machine? Before or after start/end of shift, tooling change?
Which ... is the trend of the breakdown, first time, once a week, etc.? ...particular conditions were present at the moment of the breakdown (weather, tryouts, etc.)?
Where ... did the breakdown happen, sub-assembly, component? ...is the component located?
How ... did the machine conditions change to lose automatic state (phenomenon)? Were there any symptoms or warning signs leading to the breakdown, micro stoppages before the breakdown?
Definition of Issue and Analysis of Root Causes
List of Possible Causes | Check on Possible Causes
5 Why Analysis | Types of Root Causes
Why ? / Why ? / Why ? / Why ? / Why ?
Insufficient Strength | Increased Stresses | Deterioration
Preventive Actions Against Root causes | Who | When
Actions to Standardize, Systematize and Read Across | Who | When
Analysis performed by: | Signature | Date | Checked by | Signature | Date

Root cause selection

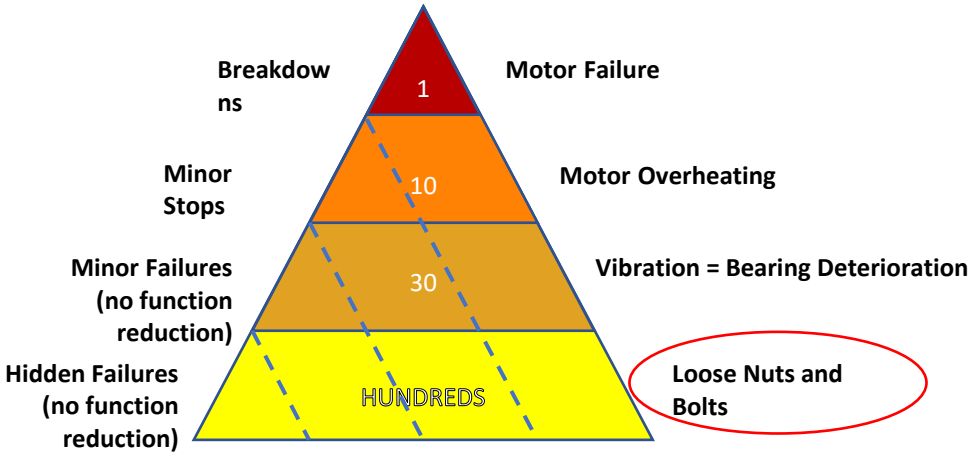

Status | Total Maintenance System - Emergency Work Order | Printed
BELVIDERE ASSEMBLY
Model/Part being produced at moment of failure | Downtime
SKETCH AND DESCRIPTION OF FAILURE | Spare Parts used | Description of Activities
5 W + 1 H Analysis
Definition of Issue and Analysis of Root Causes
5 Why Analysis | Types of Root Causes
Preventive Actions Against Root causes | Who | When
SKETCH OF SOLUTION
Analysis performed by: | Signature | Date | Checked by | Signature | Date

Actions against root cause


Status | Total Maintenance System - Emergency Work Order | Printed
BELVIDERE ASSEMBLY
Model/Part being produced at moment of failure | Downtime
SKETCH AND DESCRIPTION OF FAILURE | Spare Parts used | Description of Activities
5 W + 1 H Analysis
Definition of Issue and Analysis of Root Causes
5 Why Analysis | Types of Root Causes
Preventive Actions Against Root causes | Who | When
Actions to Standardize, Systematize and Read Across | Who | When
SKETCH OF SOLUTION
Checked by | Signature | Date

Actions to sustain / read across

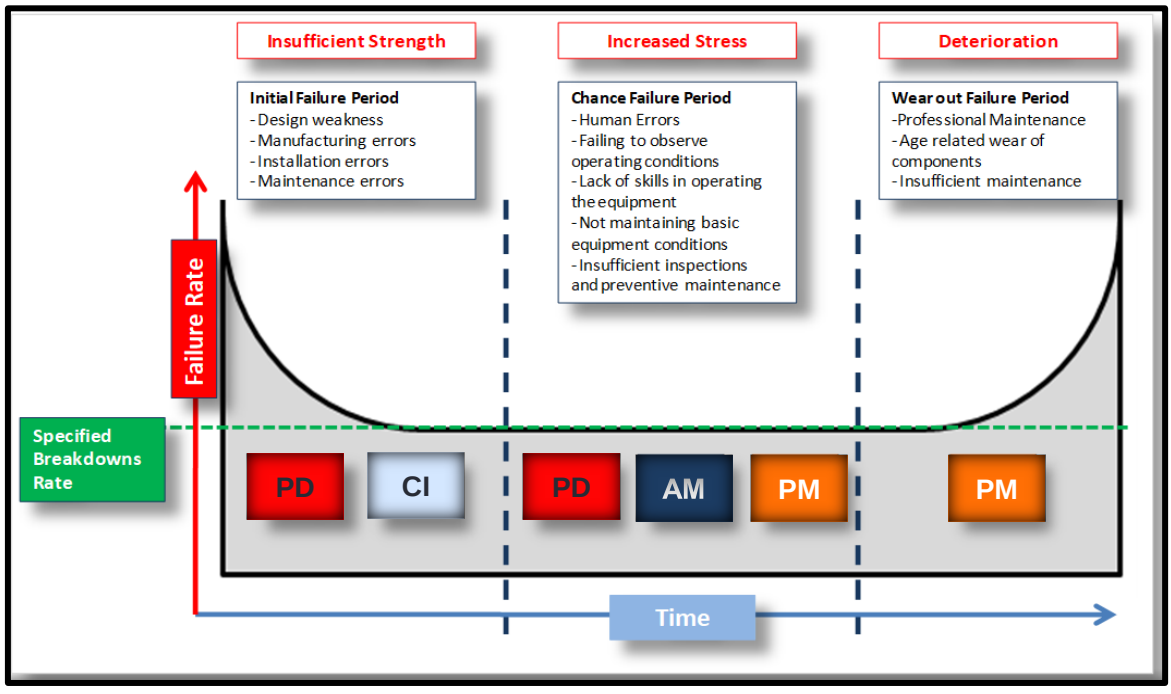
Minor equipment defects are considered to be the root cause of almost all machine failures.



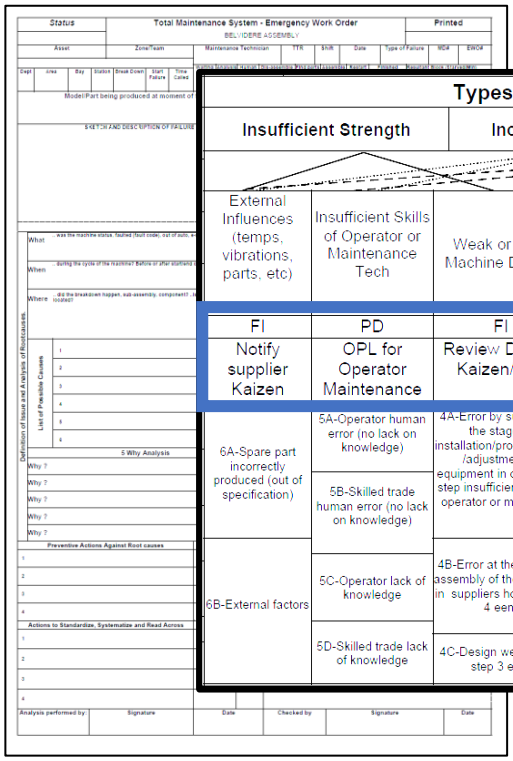
By not attacking the *root causes* of equipment failures, *reactive* organizations are doomed to a cycle of permanent *breakdown maintenance.*

EWO & 3 reasons why machines fail

Bathtub curve



EWO and Root Cause: Types



Types of Root Causes

Insufficient Strength		Increased Stresses		Deterioration	
External Influences (temps, vibrations, parts, etc)	Insufficient Skills of Operator or Maintenance Tech	Weak or Poor Machine Design	Insufficient Maintenance	Failure to Observe Operating Conditions	Failure to Maintain Basic Equipment Conditions
FI	PD	FI	PM	PD	AM
Notify supplier Kaizen	OPL for Operator Maintenance	Review Design Kaizen/MPI	PM Calendar	OPL	AM Calendar
6A-Spare part incorrectly produced (out of specification)	5A-Operator human error (no lack on knowledge)	4A-Error by supplier at the stage of installation/programming /adjustment of equipment in our plant - step insufficient skills of operator or maint eem	3A-Cbm not complete	2A-Failure to observe operating conditions	1A-Retightening
	5B-Skilled trade human error (no lack on knowledge)		3B-Procedure change (update replacement frequency)		1B-Lubrication
6B-External factors	5C-Operator lack of knowledge	4B-Error at the stage of assembly of the machine in suppliers house -step 4 eem	3C-Procedure change (update inspection frequency)		1C-Inspection
	5D-Skilled trade lack of knowledge	4C-Design weakness - step 3 eem	3D-Planned maintenance event not complete		1D-Cleaning
			3E-Planned maintenance does not exist		1E-Daily maintenance not performed

Machine Failure, Root Cause, and Domain Methodology all flow together to develop the proper Counter Measures

Countermeasures

Each countermeasure is tied to specific root cause.

EWO Closure

EWO can be closed when:

- All countermeasures on the machine that broke down have been implemented.
- Countermeasures have been validated (no more occurrences for 10 days).

- If there is opportunity for read across, and countermeasure on machine that broke have been implemented and validated, EWO can be closed and read across needs to be tracked using a read across matrix.

TTR Reduction Analysis

TOOL	Change / Notes
TTR Reduction Analysis	1) The TTR reduction analysis is required for any breakdown > 30 minutes. Input the times from the EWO sections in the before section. Input the resultant times after improvements. Total time to repair, TTR reduction and chart are calculated automatically. If there is potential read across, write the details in the appropriate section.

NUMBER OF THE EWO THAT STARTED THE PROJECT

TTR REDUCTION ANALYSIS - PROJECT TITLE

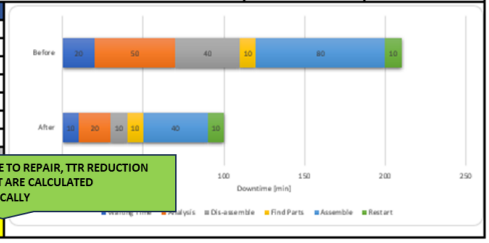
EWO NUMBER		ROOT CAUSE ANALYSIS	PLANT
PICTURE OF PROBLEM		DESCRIPTION OF PROBLEM	
		5W1H	CENTER
		WHAT:	
		WHEN:	PROJECT OWNER
		WHERE:	
		WHO:	TEAM MEMBERS
		WHICH:	
		HOW	
		5WHY	IF THERE IS POTENTIAL READ ACROSS, WRITE THE DETAILS ON EACH SECTION
		1ST WHY:	POTENTIAL READ ACRO
PICTURE OF SOLUTION		2ND WHY:	MACHINE FAMILY
		3RD WHY:	CENTER
		4TH WHY:	PLANT
			OTHER FACILITIES

INPUT THE TIMES FROM THE EWO IN THE BEFORE SECTION

INPUT THE RESULTANT TIMES AFTER IMPROVEMENTS

TTR analysis

Before		After	
Waiting Time	20	Waiting Time	10
Analysis	50	Analysis	20
Dis-assemble	40	Dis-assemble	10
Find Parts	10	Find Parts	10
Assemble	80	Assemble	40
Restart	10	Restart	10
Total Time To Repair	210	Total Time To Repa	



TOTAL TIME TO REPAIR, TTR REDUCTION AND CHART ARE CALCULATED AUTOMATICALLY

DESCRIPTION OF SOLUTION	
TTR Reduction (min)	110

5W1H

TOOL	Change / Notes
5W1H	1) Who: WHO can influence or cause the problem (not in a fault way). The word "affect" is eliminated due to confusion. Here we are looking for correlation to see if the problem changes depending on the OPERATOR on the job ("who" does not mean supplier, maintenance, etc if you are doing a production kaizen – those possible causes go on the 4M) 2) The word Phenomenon has been replaced with "initial cause". For purposes of problem solving phenomenon = initial cause, they are the same.

5W1H Analysis Sheet

Initial Description of the Problem:

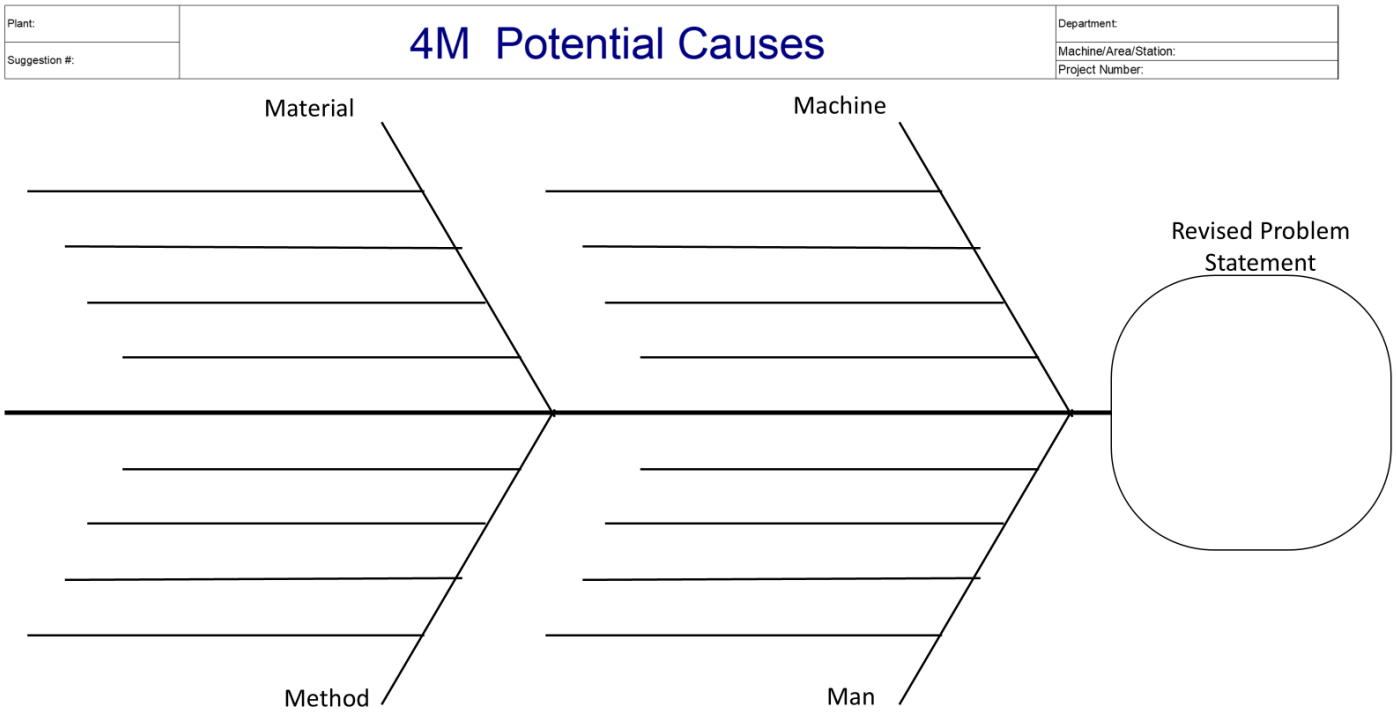
What	* **What** article is the problem happening on and what exact loss is happening ?	
When	* **When** did the problem occur? When time and date? When in the process? (before/ after/during?)	
Where	* **Where** did you see the problem? Where do I walk? Where do I look on the part or process?	
Who	***Who** could influence or cause the problem? Is the problem skill related? Is there a "knack"? Does the problem happen for some operators and not for others?	
Which	*Is there a trend or pattern for the problem ?	
How	*When you did 5G - **How** was the process different from what it was supposed to be?	

Revised Problem or initial cause:

2022/03/30

4M

TOOL	Change / Notes
4M	The update for this document is that we will be leaving off the “1D” for most shop floor kaizens. We should begin with the exploration of the 4M’s and if design (or any other fishbone category) is needed it can be added. Any category added should prompt the inclusion of a team member with expertise and influence within that category. For example, if using a 4M*1D* for problem solving, the kaizen should include a team member with knowledge of and influence on the design process. To eliminate potential causes on the 4M we should use a slash mark.



2022/03/30

Maintenance Domain

5 Why

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TOOL	Change / Notes
5Why	Problem statement now goes at the top (better for visual management of the space on the form) 5th why is labeled as "last why- root cause", to remind problem solvers that sometimes it takes more than 5 and we don't stop until we get to the systems and procedures that would have prevented the cause(s) and the problem. The OK/NOK columns between the "why's" have been removed. For maintenance Kaizens or teams that utilize that column we will have an alternate form available (not yet published)

Problem Description

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Initial Cause/ Abnormal Condition (NOK from 4M)	1st Why	2nd Why	3rd Why	4th Why	Last Why Root Cause	Countermeasure

Maintenance Domain

TWTTP / HERCA

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REGION/COMPANY/BU LOGO — **QUALITY TWTTP + HERCA (After completion circle the root cause and appropriate countermeasure) (The Way To Teach People)(Operator Assist Root Cause Analysis)**

PROBLEM :	**Operation (i.e. Code, Description, Operation Sheet, Standard Work Instruction):**	**Plant**	
		Center / Unit	
		Department	
		Zone/ETU	
		Area/Team/Domain	
		Station	
		Shift / Crew	

Date Defect Identified (inc time)		**Operator:**	**Name:**	**Interviewer:**	**Name:**
Tracking TWTTP#			**Team:**		**Role:**
Tracking HERCA#		**1st TWTTP Completed**		**Date HERCA Completed**	**Date 2nd TWTTP Completed**

Defect Mode			**Where Defect / Problem Found**		**Required Team for Analysis**	
Missed Operation			Quality Gate		ETU Leader / Unit Leader	
Wrong Part Selected			QA Network (paid production inspection)		Team Leader	
Wrong Position			Zone Quality Check Point		Process Improvement Leader / Engineer (E: WO/QC)	
Partial Assembly			Final Line Quality Check Point (Bollino Verde)		Team Member	
Other (describe):	Do Multiple Operators	YES	Product Audit (CFA)		Other (Describe):	
	Generate Same Defect	No	Other (Describe):			

INTERVIEW: TWTTP (The Way to Teach People)				**1ST INTERVIEW / TWTTP (Explanation / Operator answer)**	**Evaluation**	**2ND INTERVIEW/FOLLOW-UP TWTTP**	**Evaluation**
1	**Specific to the problem: describe how you do that portion of the activity?** Do you understand the activities that you are performing? (Explain what, how and why)				1 "x"		1 "x"
	A	Yes	**Lack of Knowledge**		A		A
	B	Not completely			B		B
	C	No			C		C
2	**Specific to the problem: How do you know you are doing the activity correctly?** How can you verify that you're working correctly? (Explain what, how and why)				2 "x"		2 "x"
	A	I follow the work instruction and posted standard	**Lack of Knowledge**		A		A
	B	I know by intuition/personal judgment.			B		B
	C	Other (describe)			C		C
3	How does the operator know they're not releasing Defects "How do you know that the outcome is free of defects?"				3 "x"		3 "x"
	A	There is a way to know, and the operator knows it	**Lack of Knowledge**		A		A
	B	There is a way to know, and the operator does not know it			B		B
	C	Other (describe)			C		C
4	**Regarding the step that caused the defect what do you do if you have a problem?** What do you do in case of problems?				4 "x"		4 "x"
	A	I follow the reaction plan defined in the work instructions or if not described I alert my team leader / Supervisor	**Lack of Knowledge**		A		A
	B	I only talk to team leader/supervisor when asked a question			B		B
	C	Other (describe)			C		C

DETAILED ANALYSIS to be completed by the Interviewer

LACK OF KNOWLEDGE / SKILL that lead to the problem (Note: K= Knowledge; S = Skill)						**Notes / Comments**	**POTENTIAL COUNTERMEASURES** On Job Training	Coaching	Training	Work Instructions	MTA	Job Change	Other	**Notes / Timing**	**Responsible**
1	Is the problem a result of incomplete training? (Management)	YES	NO	K											
2	Is the problem a result of incomplete knowledge (Correct training occured but operator did not retain the information)?	YES	NO	K											
3	Is the operator new to this job < one week)?	YES	NO	K											
4	Is the problem related to an extended gap since the operator did the job and they have forgotten the job?	YES	NO	K											
5	Is the problem related to an extended gap of time since the operator performed the job and the skill is lacking?	YES	NO		S										
6	Is **this** employee unable to perform the job to the standard and within cycle time?	YES	NO		S										

Human Error Root Cause Analysis (HERCA) Completed with the team member

1 - PROCESS WEAKNESS (Activity) that lead to the problem			**POTENTIAL COUNTERMEASURES (Note: Shaded = not most recommended)** On Job Training	Coaching	OPL	SOP/WOP	Work Instructions	AAP WO LO Materials	Kaizen	Error Proof	Mistake Proof	Other	**Notes / Timing**	**Responsible**
1.1	Did an ergonomic issue lead to the problem?	YES	NO											
1.2	Did an unclear view (partial or blind operation) lead to the problem?	YES	NO											
1.3	The problem is tied to a skill or craftsmanship that can be hard to sustain during the work day?	YES	NO											
2 - PROCEDURE WEAKNESS (Documentation) that lead to the problem														
2.1	Did an unclear procedure lead to the problem?	YES	NO											
2.2	Is there something missing/wrong in the work instructions/SOP that lead to the problem?	YES	NO											
2.3	The problem was related to the visual aspects of the procedure, include: missing / location / view angle.	YES	NO											
3 - PRODUCT WEAKNESS that lead to the problem														
3.1	Did a lack of sensory feedback from the part (hear, feel, sight) when installing lead to the defect (a part that is hard to know when installed properly (visual, touch, audible, etc.)	YES	NO											
3.2	Can the problem be tied to a hard part to assemble?	YES	NO											
3.3	Is the problem related to parts that look alike, or an option based part?	YES	NO											
4 - TOOLS AND EQUIPMENT that lead to the problem														
4.1	Is the problem related to a lack of basic conditions/maintenance/organization for tools/equipment?	YES	NO											
4.2	Is the problem related to information not easily seen (Example station terminal, track sheet location)?	YES	NO											
4.3	Is the problem tied to an inadequate, missing or inoperative tool assigned to the work station?	YES	NO											
4.4	Did similar looking tools cause or lead to the problem?	YES	NO											
5 - WORKPLACE/ WORKING ENVIRONMENT that lead to the problem														
5.1	Was the problem connected to a high or low saturation in the build configuration?	YES	NO											
5.2	Was the problem connected to the job before/**preceding** the defect that put the operator behind?	YES	NO											
5.3	Was the problem caused by a disorganized work station? (e.g. layout, not compliant containers...)	YES	NO											
5.4	Was the problem caused by line side material disorganized or not clearly labeled?	YES	NO											
5.5	Unfavorable station cond, such as: lighting, high/low temperature, excessive noise, etc. lead to problem?	YES	NO											
5.6	Was the problem related to operators working in close proximity?	YES	NO											
6 - LACK OF MOTIVATION lead to the problem														
6.1	Are there issues in the area causing the problem? Example: Poor relationship dynamics in the team	YES	NO											
6.2	Is the problem related to operator being overconfident: Not attentive or took a procedure shortcut?	YES	NO											
6.3	Does the operator lack interest in being involved?	YES	NO											
6.4	Was the problem related to the operator distracted by an activity not related to the job (example texting/telephone)?	YES	NO											
7 - INATTENTIVENESS OR FORGETFULNESS that lead to the problem														
7.1	Was the problem associated to a distraction in the job area? (Undesignated people in the work area, material problems, maintenance being performed, etc.)	YES	NO											
7.2	The problem was related to memorization?	YES	NO											
7.3	During the interview did the operator describe being distracted due to an external issue (example issue at home) ?	YES	NO											

Overall Notes, Comments and Suggestions		Legend		Countermeasure is not the most recommended
				Possible Countermeasure

Processing Team Sign-Off — **Has QA network been updated?** Not applicable | YES | NO

ETU Leader / Unit Leader	**Team Leader**	**Process Improvement Leader / Engineer**		**Team Member**	**Other (Describe)**	**Other (Describe)**
Date:	Date:	Date:		Date:	Date:	Date:
Signature:	Signature:	Signature:		Signature:	Signature:	Signature:

Maintenance Domain

A3 KAIZEN

STELLANTIS

STELLANTIS	A3 KAIZEN *PDCA (Plan-Do-Check-Act)*	Machine/Area/Station:		SPW
		Project Number:		

Project Name:			
DOMAIN		CONTAINMENT ACTION IMPLEMENTED:	N/A

PLAN

1) Clarify the problem

exxcxwv

2) Breakdown of the problem with 5W1H

(Does not give you the root cause of the problem)

Initial Problem Statement:	
What:	
When:	
Where:	
Who:	
Which:	
How:	
Revised Problem Description:	

3) SMART Target *(Quantitative in Graph or Chart Form)*

DO

5) Develop Countermeasures

6) Implement Countermeasures

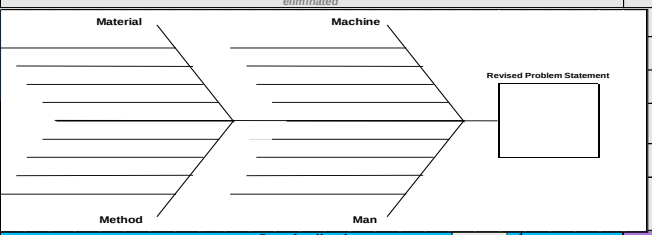
6.1) Team Members & Responsibilities

Name	Responsibilities

6.2) Action Plan (Task and Date Completion Date)

Action/Task	Date

4.1) 4M - Potential Initial Cause - *Test potential causes, mark NOK with an X and slash through if eliminated*



4.2) 5 Why - Root Cause

Why 1		
Why 2		
Why 3		
Why 4		
Why 5		
Action		

ACT

Standardization

What are the Read Across opportunities? *(Other stations, machines, lines, plants, etc?) (Mandatory)*	Sustainment *(What tools have been implemented or changed to maintain the improvement, i.e. SMP's, JES, SWI's, 5 Questions for Zero Defects, MPI's or Best Practice, etc.?)*

CHECK

7) Verify Target

Results Tracking to Zero in Graph or Chart Form	Benefit (In terms of a Main KPI)

Project Leader:	Starting Date:	Completion Date:		Benefit ($):	Cost ($):	Savings ($):	Benefit/Cost Ratio:	Verifier & Date:

Maintenance Domain

KAIZEN JOURNAL

STELLANTIS

Kaizen Journal

Reset Filter | New Line | Auto Row Height

SPW Continuous Improvement (2022)

9/29/2025

< RYG Status

Based on Dates

RED	0
YELLOW	0
GREEN	0
TOTAL	

Set Days to Yellow > 7

< PDCA Status

PLAN	0
DO	0
CHECK	0
ACT	0

0

SPWA

ID	Activity	PLANT	Category Set within "Validation" worksheet	Name Set within "Validation" worksheet	Start	Target	Complete	PDCA	Detail	RYG
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
12										
13										
14										
15										
16										
18										

Maintenance Domain

Standardized Work Audit (SWA)

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Classic SWA- Standard Type 1&2
Mastering Important Points / Standardized Work Audit

SPW

Reason: (**S**: Safety, **Q**: Quality, **P**: Planned, **C**: certification) **B:**Changing point							**KEY POINTS of the workstation**: (write below)
Workstation :	**Date**						
Operator Name							

X Non-Conformity; O Conformity

Respect of the PPE & Safety Key Points:							**MURI**	The workstation is overburden, caused by ergonomic or safety issues.
Respect of 5S								
Basic Skills and JES Key Points are respected (safety/regulatory, quality, ergonomics, etc)								
Respect of the Sequence								
Respect of the start/end marking of ws								
Use of the right tools (Dolly, pocket belt, box,…)								
Correct use of ANDON							**MURA**	The work is irregular, caused by difference of time to achieve a task
Respect of standard stock quantity and FIFO								
Respect of the footprinting (2 cycles reviewed)								
Nber of Observed Cycles (beteween 5-10 cycles)								
Result of the SWA *Use the GOR Legend**								
Legend **Green (G) :** Standard respected **Orange (O) :** Standard not applicable or does not guarantee the result **Red (R) :** Standard not respected	Operator Initial						**MUDA**	All the work that is not necessary. (excessive walk, waiting…)
	Auditor Initial							
If we are certifying through SWA. Keep in the certification file	SV Initial							

Deviation & Containment actions (not conformities for quality or safety) and Corrective actions

Date	Deviation description & Containment action	Corrective action	Owner

Date	Suggestions for improvement & other remarks	Owner

Standardized Work Kaizen (SWK)

STELLANTIS

SWK Workshop Checklist				
General Information		Total		
Observed Workstation		4		
2 people observing per station		12		
Participants: Supervisor,Team Leader				
Participants both shifts				
Workshop Timing				
	Tuesday 8am- 4pm (8 am - 10am training)			
	Wednesday 8am- 4pm (8am - 8:30 briefing)			
	Thursday 8am- 4pm (8am - 8:30) + debriefing			
Preparation Checklist for SW&K Workshop		**Owner**	**When**	**Done**
	Define Workshop Participants	Shop Manager		
	Choose the Workstation (bottleneck, quality efficiency, ...)	Shop Manager		
	Define the target for the workshop	Shop Manager		
	Reserve a meeting room as close to the line as possible	Shop Manager		
	Organize a debrief workshop with the manager	Workshop Leader + Plant		
	Notify all the participants one week before the workshop	SPW leader		
	Invite to the Plant Manager to the debrief session on Thursday	SPW leader		
	Organize a meeting with the documents to use one week before	Leader workshop		
	KAIZEN TEAM available to consider proposed improvement ideas	Shop Manager		
Material needed for each station observed:		**Owner**	**When**	**Done**
	1 ACTIVITY BOARD / WORKSTATION			
	Blackboard (optional)			
	Scotch tape, markers, pens, A4 and A3 sheets			
	Stopwatch or smartphone with stopwatch			
	1 A0 KAIZEN for Station (alternative A3) This file (10) o (12)			
	Workshop Poster 1 A0 o A3 This file (14)			
	Workshop Brochure This file (15)			
	Print documents for station analysis. This File (1,2,3,4,6,9,10,11,12,Board) if necessary, the others.			
	Print area drawing			
	Prepare documents (operation sheet, saturation, ...)			

Appendix A – Acronyms

3G/5G – Gemba, Gembutsu, Genjitsu, Genri, Gensoku (Go to the spot, examine the object, check the facts/figures, refer to the theory and follow the operating standards)

BIW – Body in White

E-Wall – Electronic Wall

EWO – Emergency Work Order

5W1H- Five W's (What, Where, When, Who, Which), One How (How); A problem description tool

FIS – Factory Information System

4M1D- Four M's (Man, Machine, Material, Method), One D (Design)

GA – General Assembly

HERCA – Human Error Root Cause Analysis

JPD – Jobs Per Day

JPH- Jobs Per Hour

MECE – Mutually Exclusive Collectively Exhaustive

MEWO – Material Emergency Work Order

MPI – Maintenance Prevention Information

SL – Speed Loss

NCT – Non-Conformance Ticket

OEM- Original Equipment Manufacturer

OPL – One Point Lesson

PM- Professional Maintenance

SA – Schedule Attainment

SMP – Standard Maintenance Procedures

SOP – Standard Operating Procedures

TCF – Trim, Chassis, Final

TSB – Technical Service Bulletin

TWTTP – The Way to Teach People

USOT – Unscheduled Overtime