AMPERON

Technologies

Simplifying manufacturing excellence

Amperon's Autonomous Production for Machining Industry

Discover your first steps in Autonomous Manufacturing using **Amperon'** innovative **FactoryOps®** which drive quick & deep improvements in your machining processes, from your oldest manual lathe to your newest 5 axis CNC machining.

Challenges Faced by Machining Manufacturers

Lack of visibility into operations

Inability to pinpoint in Real-time and with accuracy job status and why/where downtime was occurring. This results in unhappy customers and ineffective improvement actions.

Complex Machines / tools

machining equipment and their tools require dedicated care since they affect productivity and quality. Managers have no idea in Real-time about tools anomalies or non-realized hour-based service operations

Quality Control Challenges

Ensuring consistent product quality across production runs is critical but difficult to achieve. Delayed detection of non quality in costly pieces generates a lot of subsequent unnecessary costs.

Energy Consumption Constraints

Ensuring that energy consumption is controlled for each part manufactured is a critical challenge. Managers still pay for unnecessary energy related to auxiliary systems while machining is off.

AI powered FactoryOps® smart solution delivers you in just One Week

Real-Time Visibility

Provides real-time data on machines, operations execution and all issues.

Automatic Anomalies detection

Anticipates equipment issues to minimize downtime and disruptions. Track execution of auto-maintenance actions.

Tracking KPIs & Operations

Tracks and analyzes key performance indicators (OEE, Energy Intensity,...) and operations.

Optimization Insights

Identifies opportunities to improve efficiency and productivity.

3 steps to reach sustainable peak performance

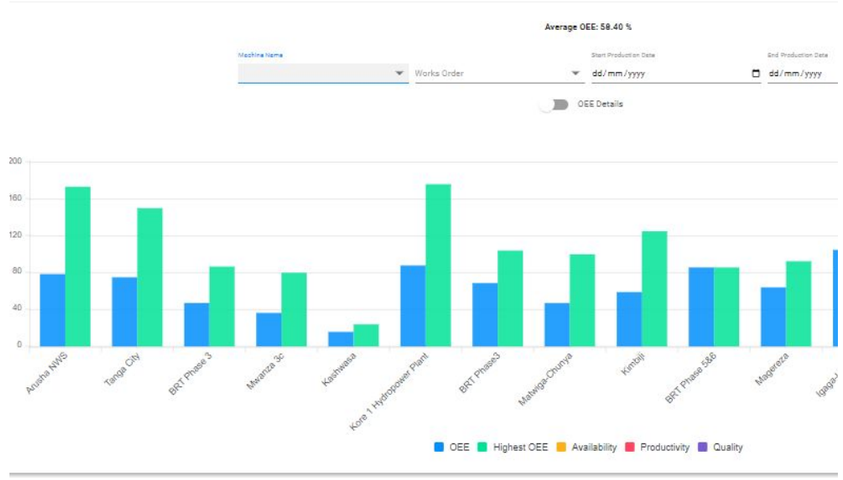
Clamp

Connect to any machine through **low cost, non intrusive** sensors

See

Empowers your operators with RT machine status and AI powered predictive alerts

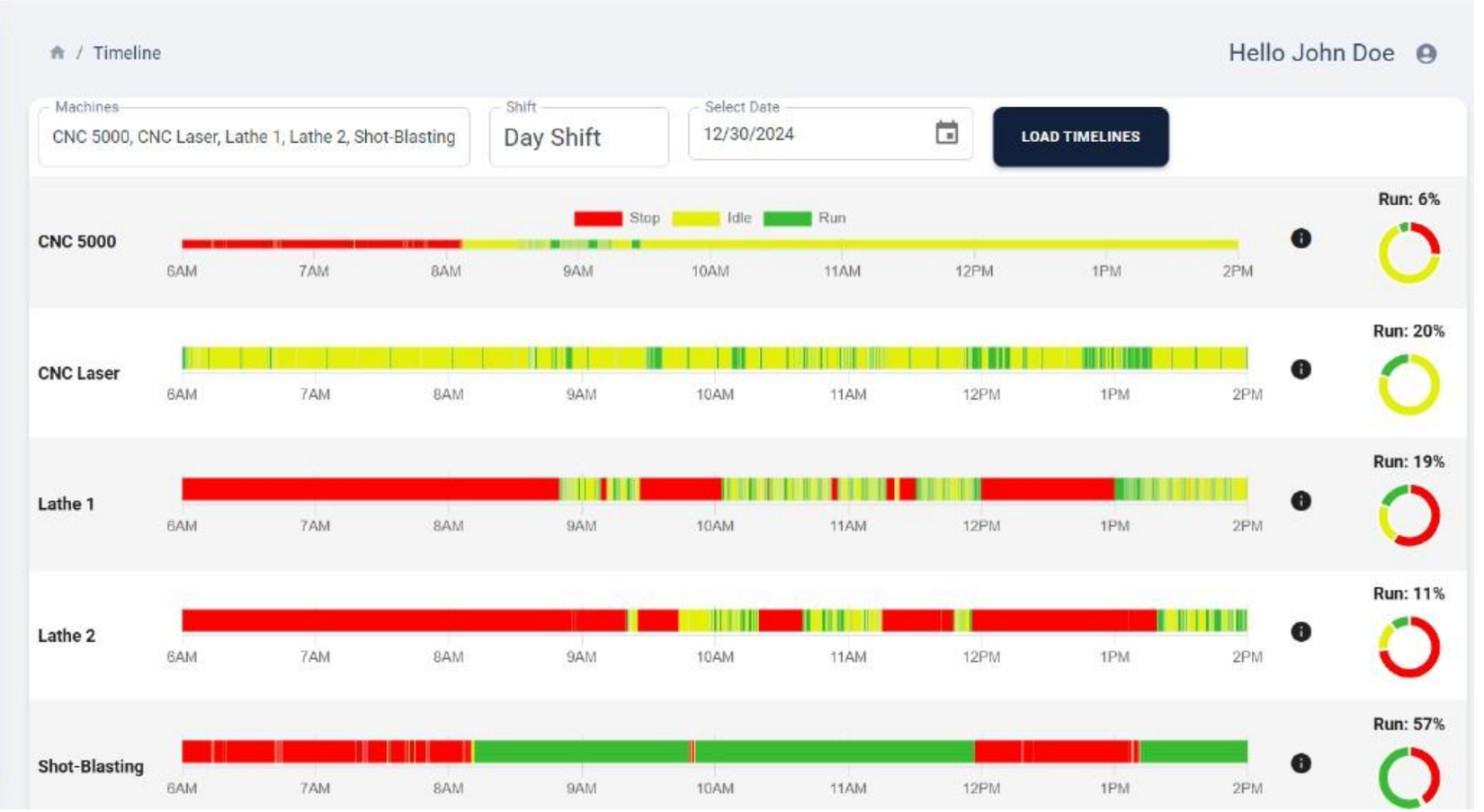
Understand



Track and improve manufacturing and energy efficiency KPI through traceability and losses root causes analyses

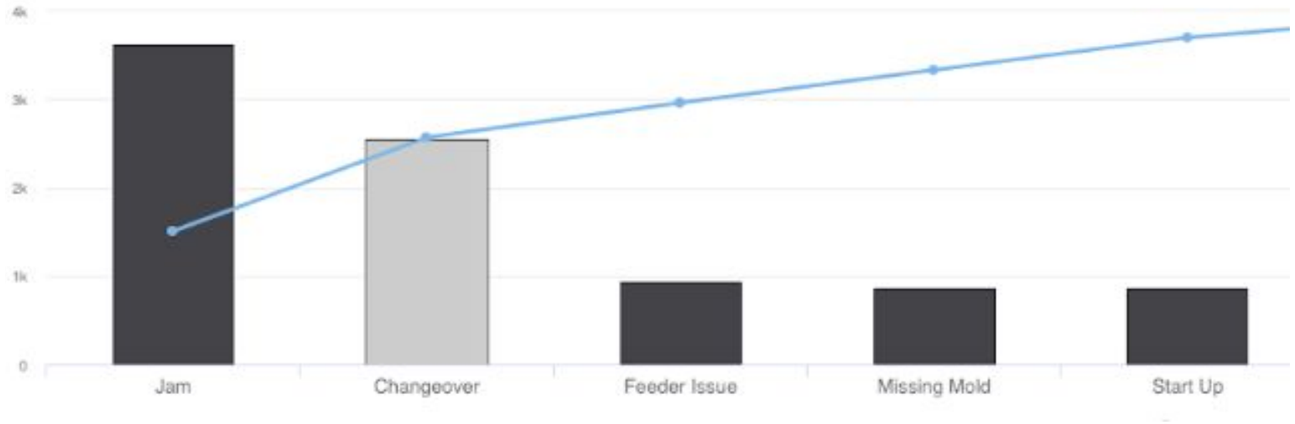
Real Time Machine status

- **Low-cost data capture**, with high reliability and immediacy, which, processed with digital intelligence, allows knowing **the real machine status** and the elaboration of **patterns** for each machine/operator.
- Evaluation by the end of shift of the **real duration of machining and the lost production time**.
- Start **unlocking the "hidden factory"** by identifying current machine utilization.
- Make informed CapEx investment through knowing current utilization

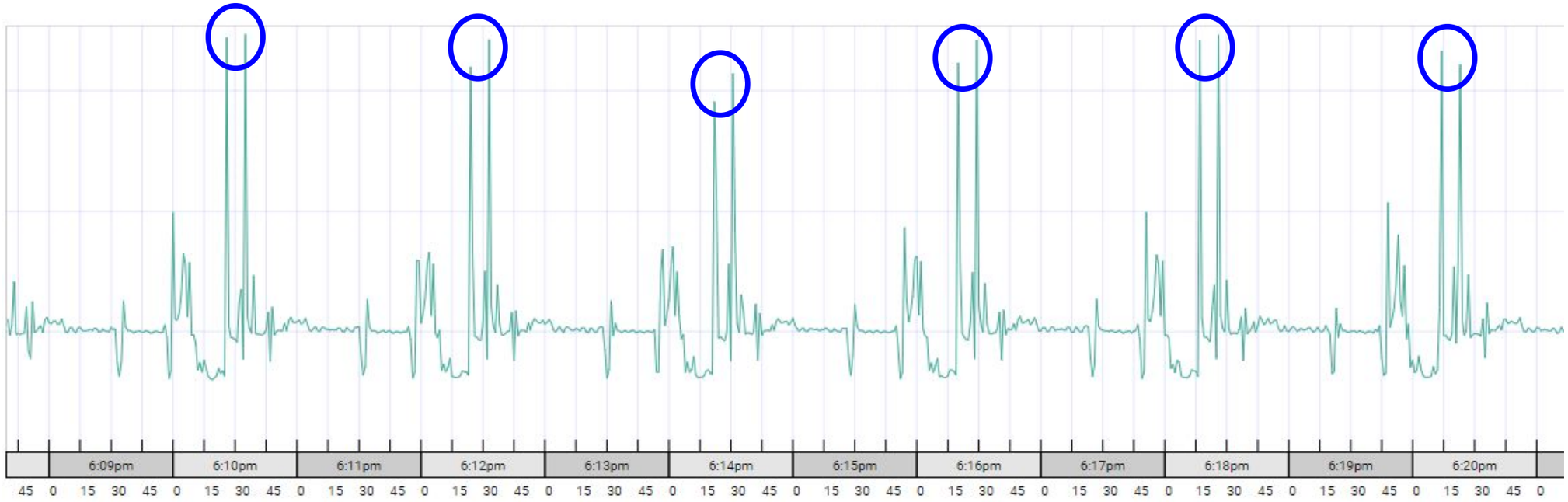


Reduce downtime due to changeover / cleaning / no operator...

Through providing context to **automatically detected downtime durations** (no human intervention), Changeover, Cleaning and other operations can be improved by identifying abnormal durations related **to a specific machine, a specific operator , a specific tool and a specific article**.

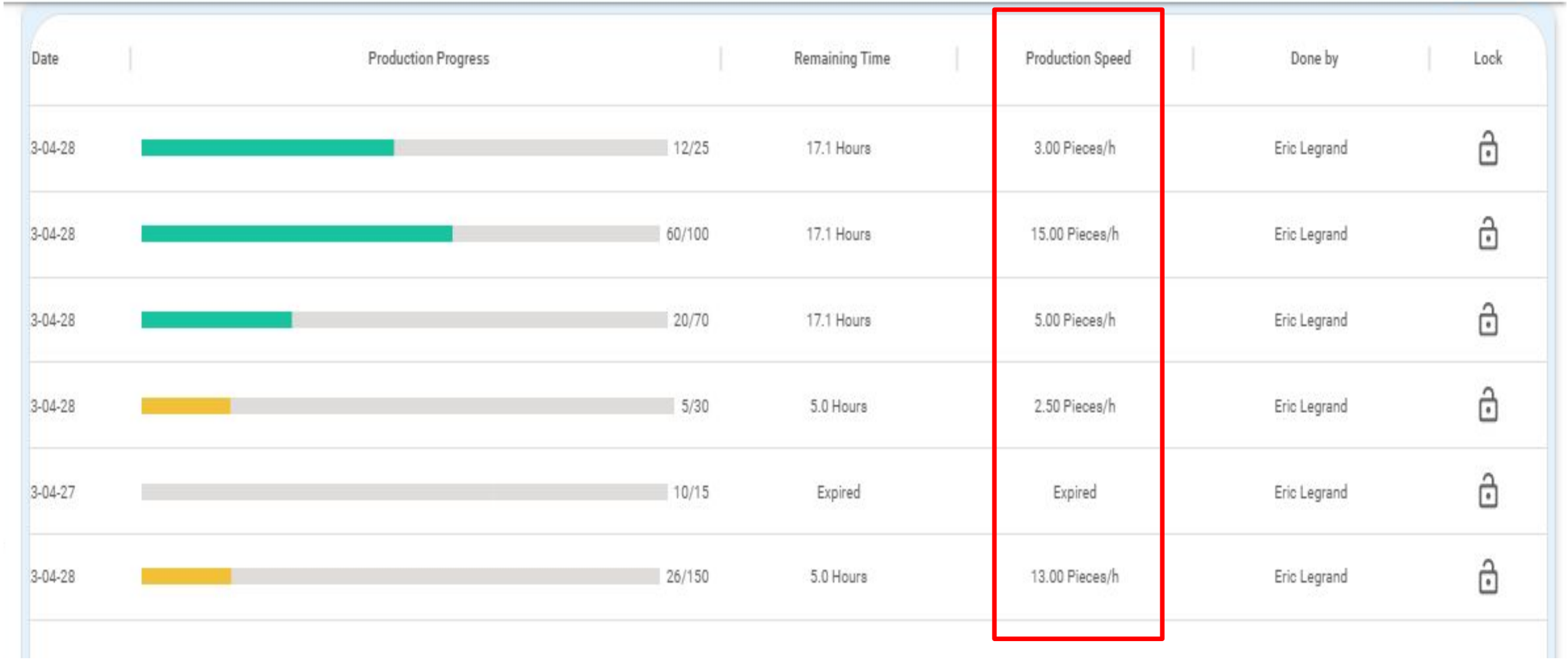


RT automatic Parts /Cycle time tracking



- Automate your cycle count data collection. **no PLC integration needed**. **No human input required**. Every created part / cycle (or phase transition in A/B pallet) can be seen through the power profile or through electrical actuators status in machine panel.
- Detection and alerts of **deviations** in manufacturing cycle times. .

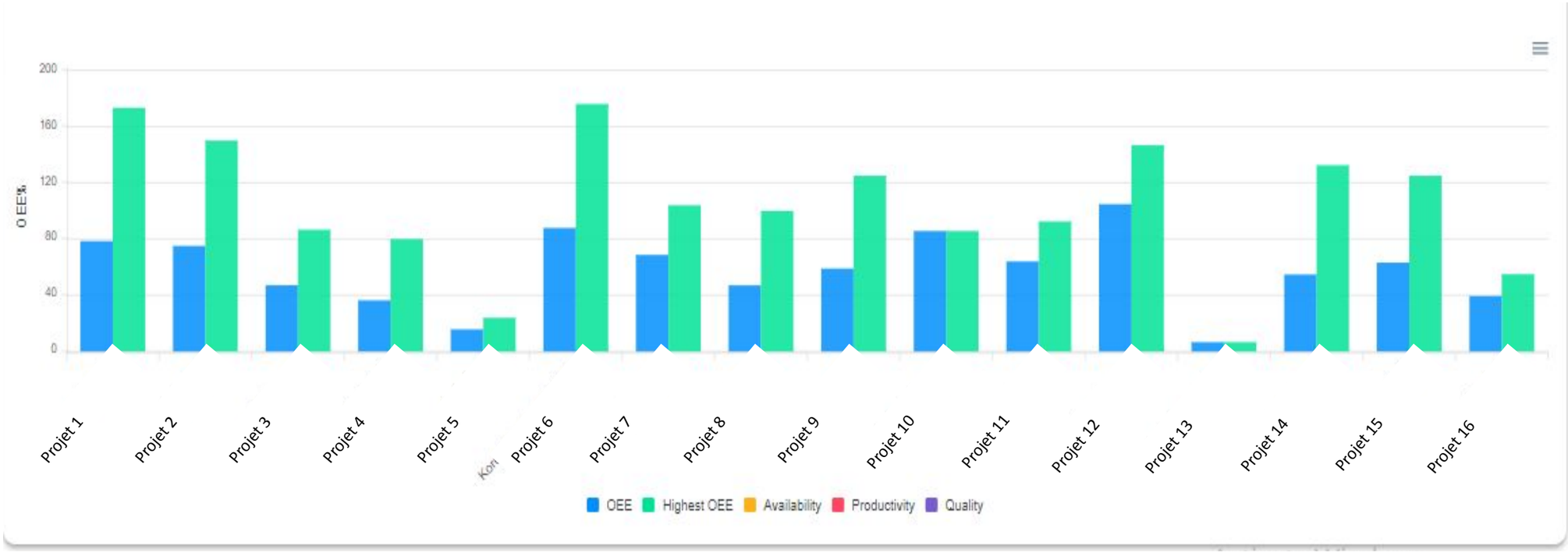
Improve jobs scheduling



Date	Production Progress	Remaining Time	Production Speed	Done by	Lock
3-04-28	12/25	17.1 Hours	3.00 Pieces/h	Eric Legrand	
3-04-28	60/100	17.1 Hours	15.00 Pieces/h	Eric Legrand	
3-04-28	20/70	17.1 Hours	5.00 Pieces/h	Eric Legrand	
3-04-28	5/30	5.0 Hours	2.50 Pieces/h	Eric Legrand	
3-04-27	10/15	Expired	Expired	Eric Legrand	
3-04-28	26/150	5.0 Hours	13.00 Pieces/h	Eric Legrand	

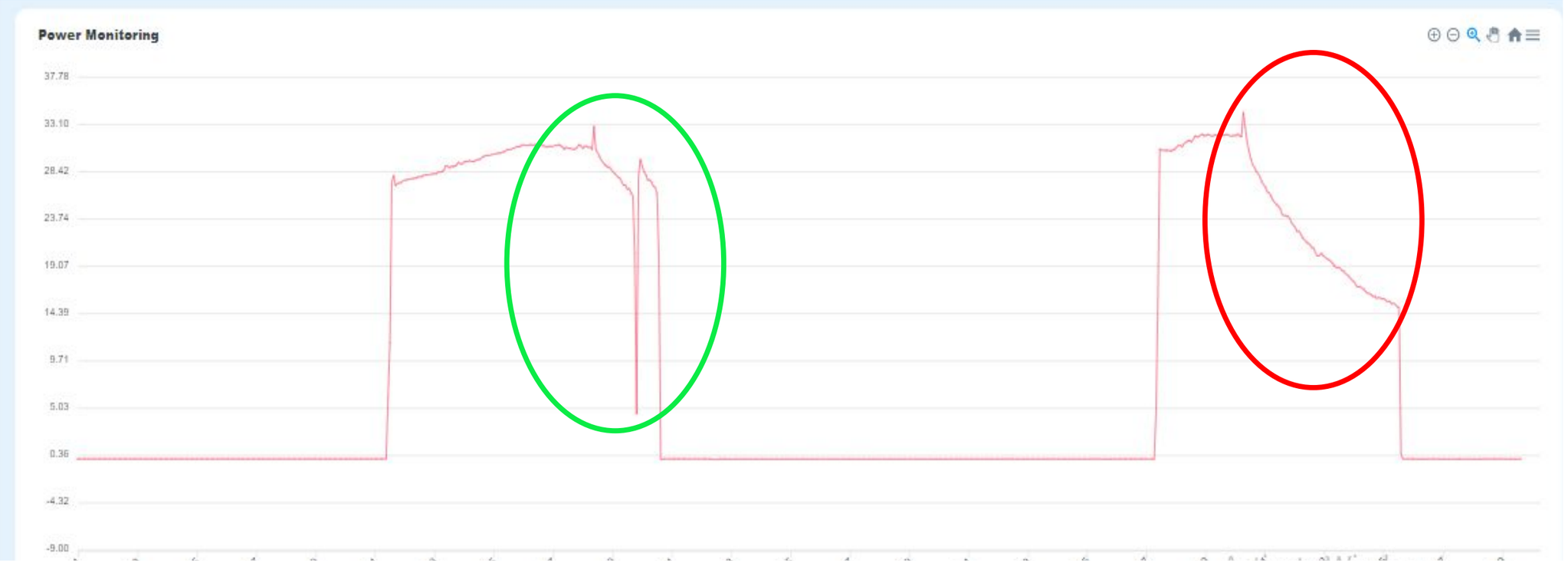
- RT Job progress allows managing **the sequencing and planning** for better machine utilization, taking into account resource constraints.

Identify inefficiencies in Cells



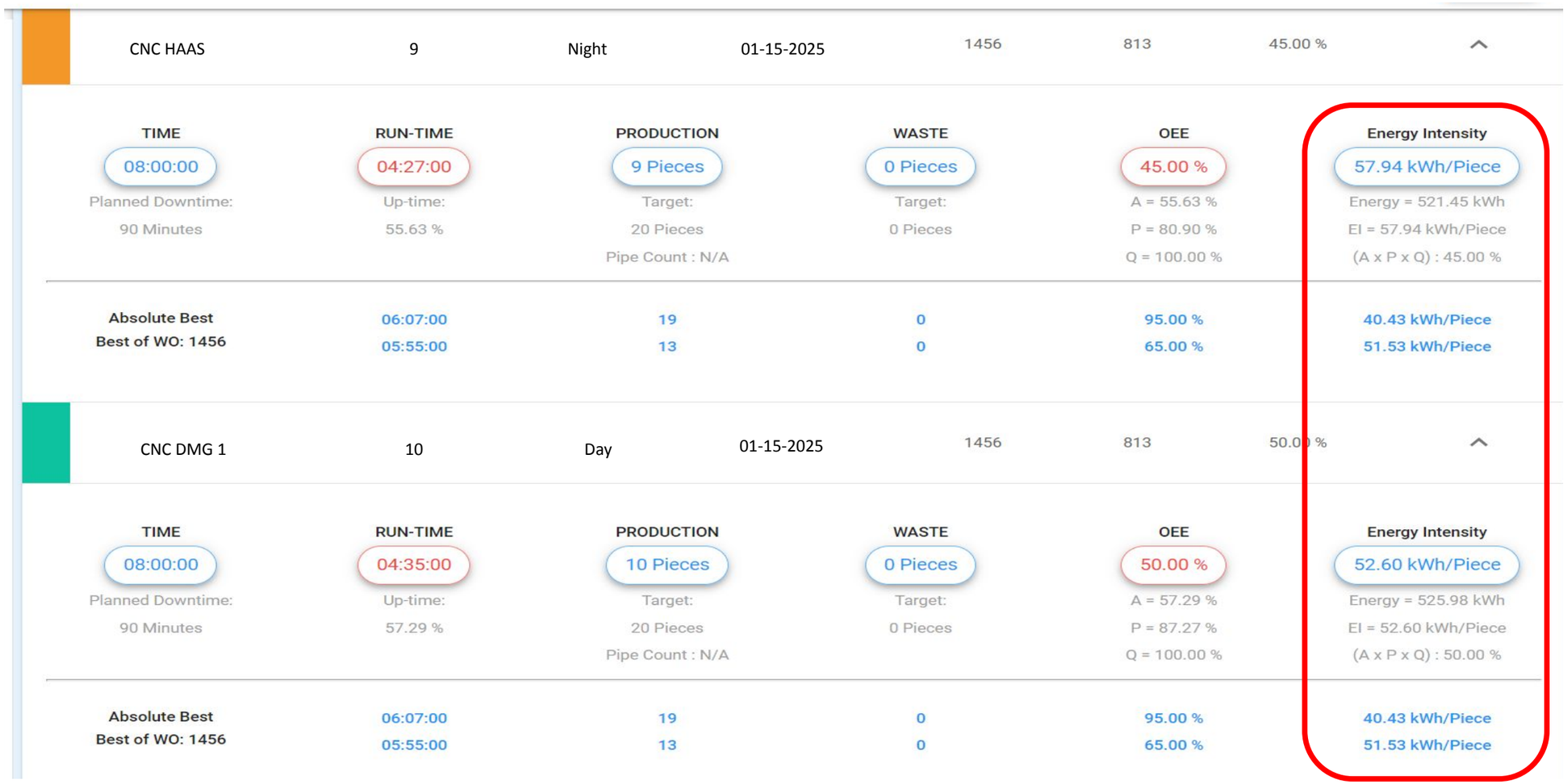
- Tracking KPIs in long lines where we have different cells or machines connected to understand who originates the highest inefficiencies in the overall line.

Identify anomalies during machining in RT



- Anomalies in Spindle and tool are reflected into the **power profiles** during the machining. Operators can detect in time issues related **to a malfunction of the actuator or a wear in the tool**.

Master energy consumption per part



CNC HAAS	9	Night	01-15-2025	1456	813	45.00 %	

TIME	RUN-TIME	PRODUCTION	WASTE	OEE	Energy Intensity
08:00:00	04:27:00	9 Pieces	0 Pieces	45.00 %	57.94 kWh/Piece
Planned Downtime: 90 Minutes	Up-time: 55.63 %	Target: 20 Pieces Pipe Count : N/A	Target: 0 Pieces	A = 55.63 % P = 80.90 % Q = 100.00 %	Energy = 521.45 kWh EI = 57.94 kWh/Piece (A x P x Q) : 45.00 %

Absolute Best	06:07:00	19	0	95.00 %	40.43 kWh/Piece
Best of WO: 1456	05:55:00	13	0	65.00 %	51.53 kWh/Piece

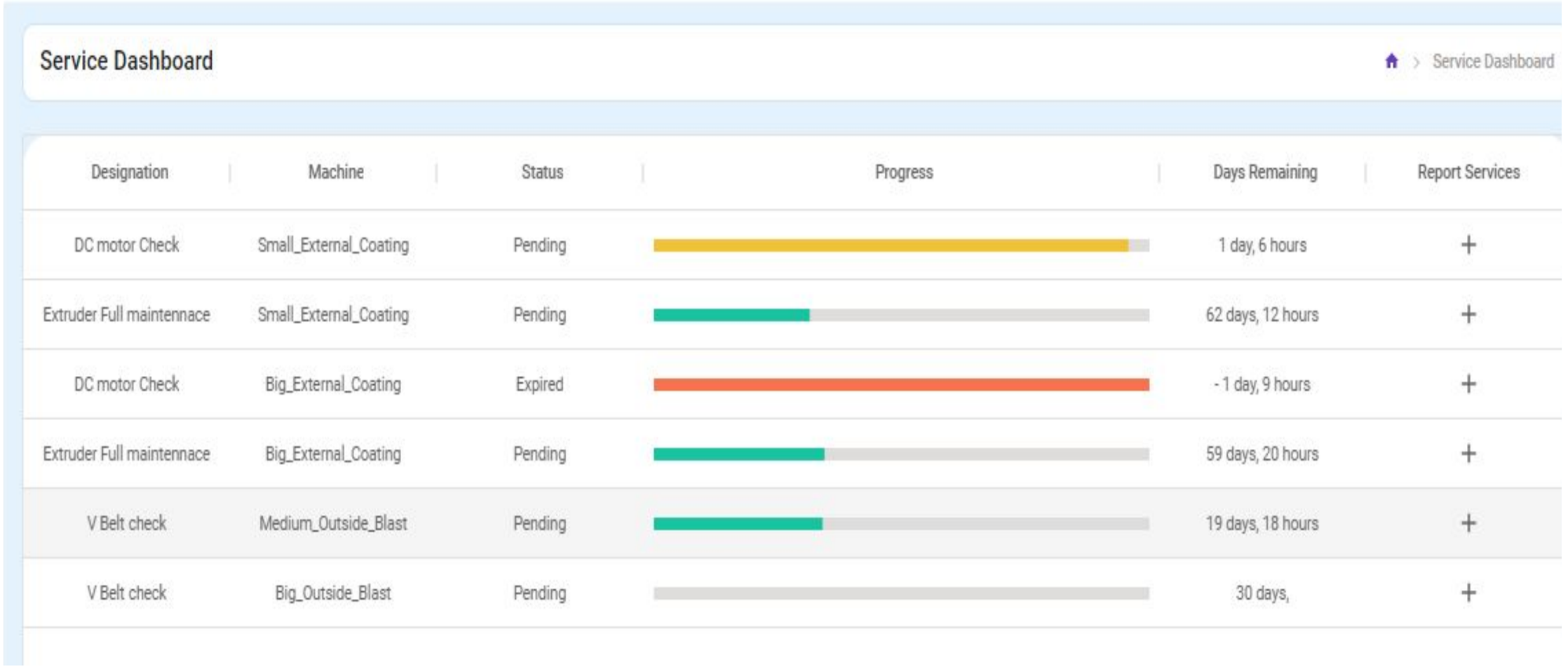
CNC DMG 1	10	Day	01-15-2025	1456	813	50.00 %	

TIME	RUN-TIME	PRODUCTION	WASTE	OEE	Energy Intensity
08:00:00	04:35:00	10 Pieces	0 Pieces	50.00 %	52.60 kWh/Piece
Planned Downtime: 90 Minutes	Up-time: 57.29 %	Target: 20 Pieces Pipe Count : N/A	Target: 0 Pieces	A = 57.29 % P = 87.27 % Q = 100.00 %	Energy = 525.98 kWh EI = 52.60 kWh/Piece (A x P x Q) : 50.00 %

Absolute Best	06:07:00	19	0	95.00 %	40.43 kWh/Piece
Best of WO: 1456	05:55:00	13	0	65.00 %	51.53 kWh/Piece

- Ensure that energy consumption is controlled **for each part manufactured**.
- Identify specific **article / operators / machines** that generates **abnormal** energy consumptions.

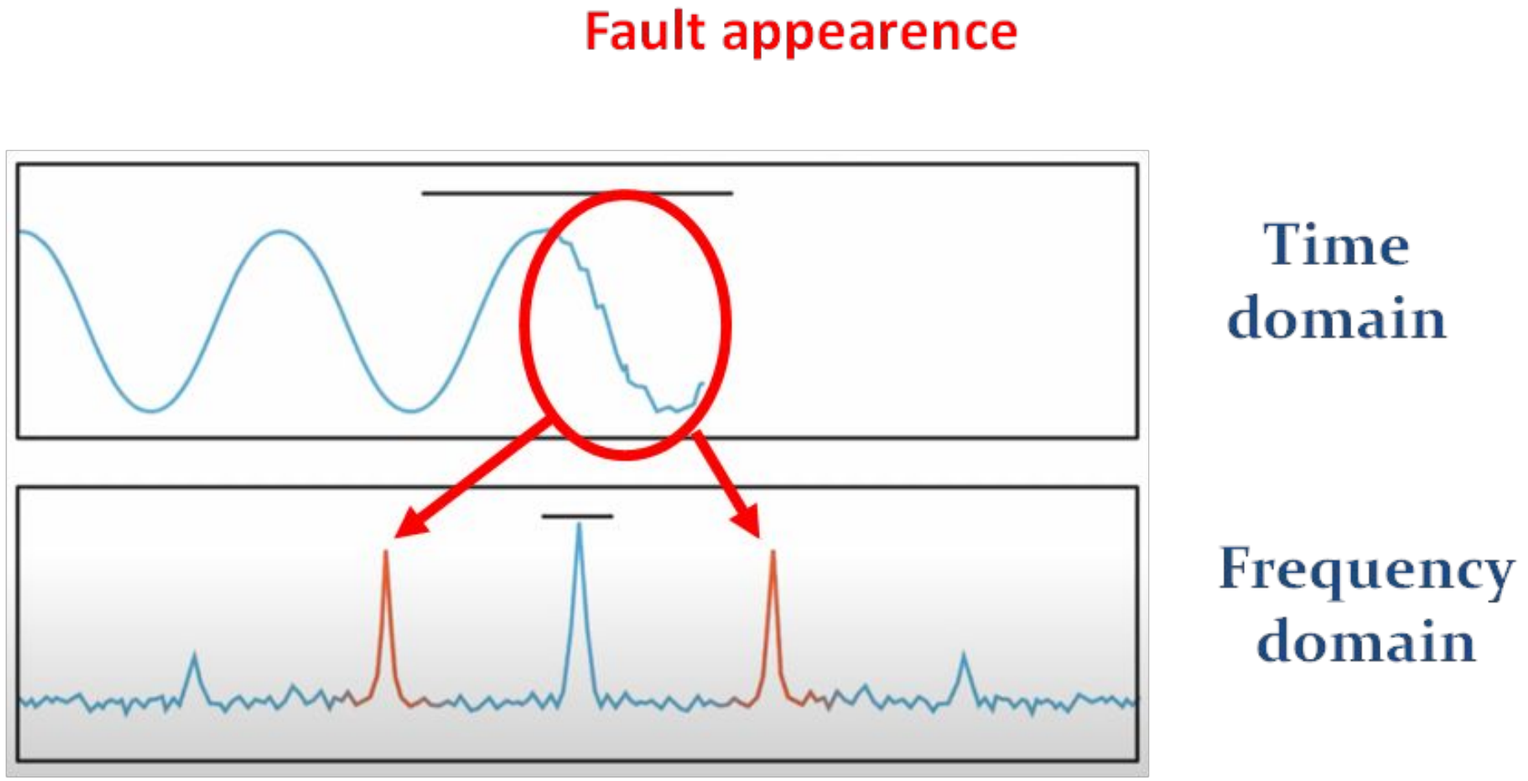
Machine / Tool maintenance tracking



Designation	Machine	Status	Progress	Days Remaining	Report Services
DC motor Check	Small_External_Coating	Pending		1 day, 6 hours	+
Extruder Full maintennace	Small_External_Coating	Pending		62 days, 12 hours	+
DC motor Check	Big_External_Coating	Expired		- 1 day, 9 hours	+
Extruder Full maintennace	Big_External_Coating	Pending		59 days, 20 hours	+
V Belt check	Medium_Outside_Blast	Pending		19 days, 18 hours	+
V Belt check	Big_Outside_Blast	Pending		30 days,	+

- Ensure that cleaning operations, autonomous maintenance by operators are **done at time**.
- Improve **scheduling of machine / tool maintenance** tasks through the **knowledge of the exact day** based on **automatic cycles count.**.

Avoid Hydraulic units / Electric drives breakdown

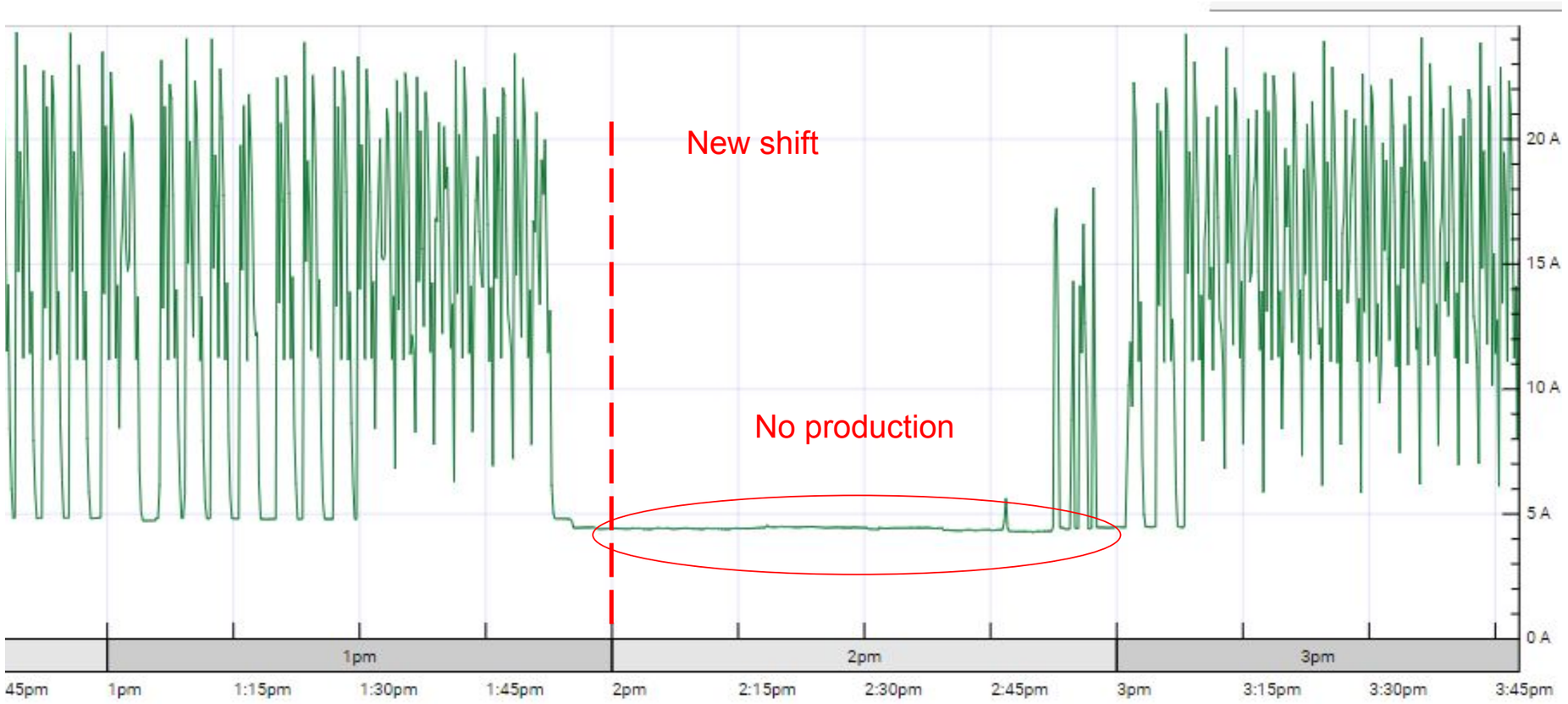


- Identify early signs of fault within Hydraulic units / Electric drives (even Spindle).

Use case from High precision machining manufacturer in Aeronautic sector

- Uses Just **machine status RT visibility** (Essential Pack)
- Hardware installation for **8 machines in 2 days**
- Solution configured and deployed **next Monday**
- **Heterogenous CNC machines** (Legacy and brand new)
- Average Utilization rate at the beginning **45% with 20% of the time in Idle status** (wasted energy and no production)
- **After 2 months:** shopfloor utilization rate at **55% and 5% idle**

Use case 1 : Long check procedure detection and energy wastage



- Detect (from the second day after Amperon's FactoryOps installation) late start coupled with long procedure of quality check between shifts for the same article. This pattern was confirmed over the week.
- Quality procedure takes between **30min to 1h (approx 12.5% of the shift**)
- The same downtime shows an big wastage in energy (5A during 1 hour each shift) due to auxiliary units.
- Improvement actions was taken to optimize the check duration without affecting quality resulting in a **5% gains in utilization. Shutting down machines during checks reduced energy bill by 9%.**

Use case 2 : Micro-stops between cycles

- Detect unplanned micro-stops between each article for a specific CNC lathe type.
- The quantified micro-stps costs the customer between **30 min and 45 min per shift** .
- Investigations highlight that the lack of operator training leads to the non use of article recovery system which causes these micro-stops.
- Required training actions was taken, resulting in regaining of **6% of utilization for all Lathes in the shop-floor in just one week.**

Use case 3 : Improper productivity identified

- Detect strange production behaviour in the last hour of each shift for several CNCs. This pattern was confirmed for a specific operator.
- The quantified low performance revealed a **waste of 30% of productivity performance** each shift for this operator.
- Required actions was taken, resulting in improved productivity by **15% for this operator.**

Key Takeaways

- RT machine data visibility at the lowest costs creates many opportunities for quick wins and ROI under 1 month.
- Tiny micro-stops are quantified to reveal need for operator training.
- Automatic item count and Cycle determination are key informations to avoid delivery delays.
- Significant Cost Savings are possible by identifying wasted energy
- Inefficiencies are easily linked to tools / machines / operators.
- Machine breakdowns are avoided with Digitized Maintenance

Wondering if Amperon' FactoryOps Platform will work for you ?

Book a 30 min Free Demo

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