University of Rochester
Simon Business School

Project Boost

Using Data to Increase Plant Output

Perry's Ice Cream

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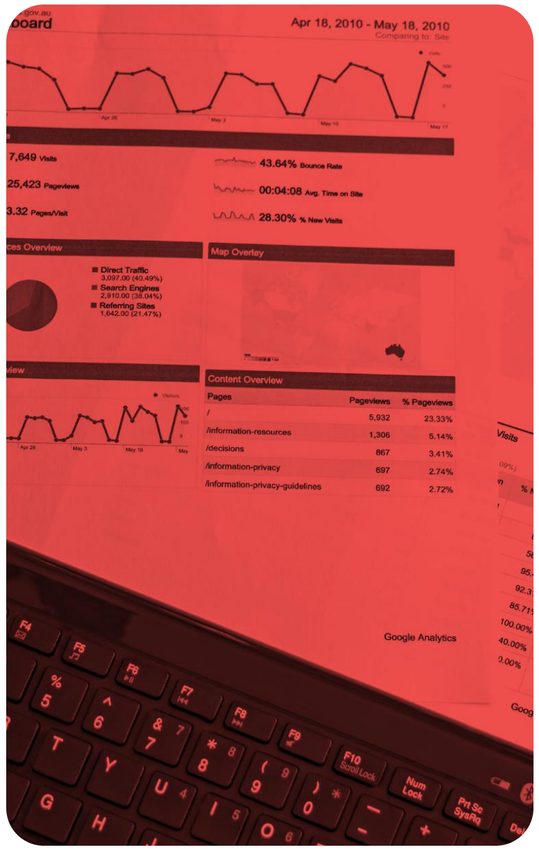


CHALLENGE:

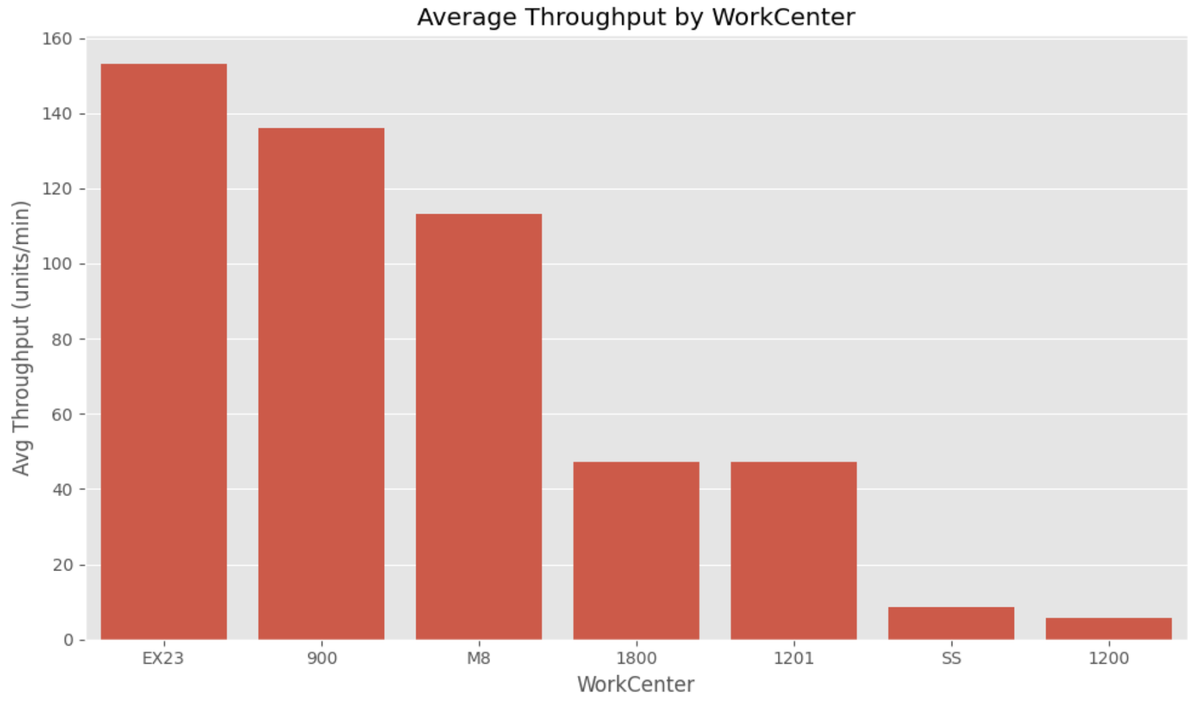
How can we safely increase line speeds and boost plant throughput?

KEY QUESTIONS:

- Where are we losing time?
- Which lines can run faster?
- What actions will boost output?

One Size Does Not Fit All

Three Distinct Performance Tiers

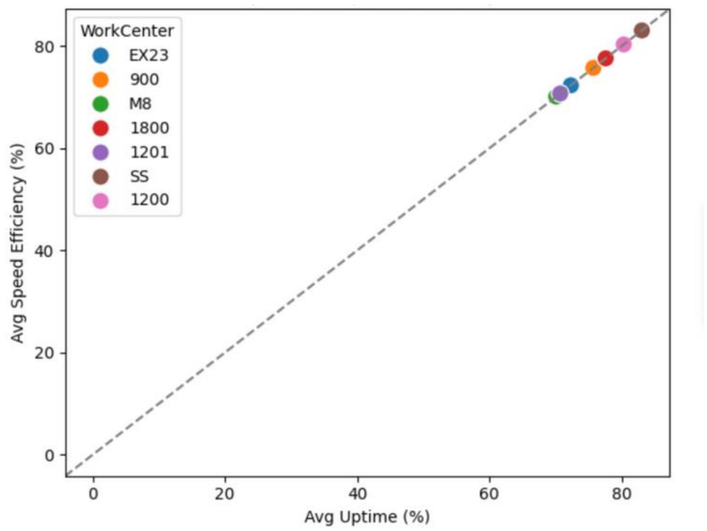


High Capacity	EX23, 900
Standard	M8, 1201, 1200, 1800
Low Capacity	SS

We see 1200 is grouped in the Standard tier even though it shows the lowest throughput?

Downtime
The Real Throughput Killer

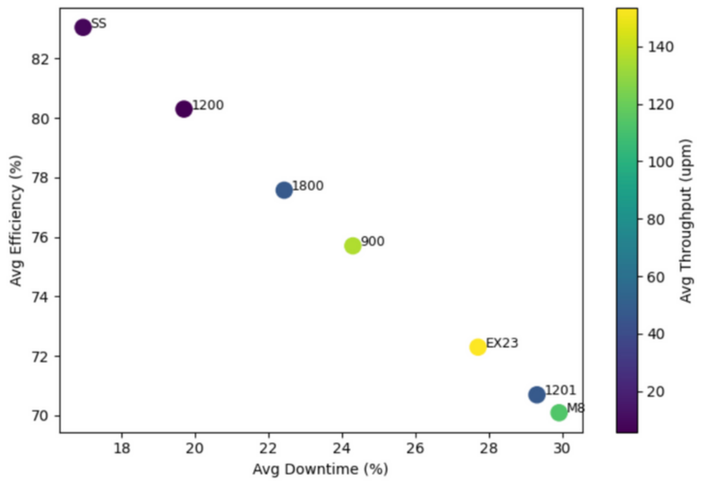
Uptime VS Speed Efficiency



UPTIME AND EFFICIENCY MOVE IDENTICALLY

Efficiency VS Downtime

By Workcenter



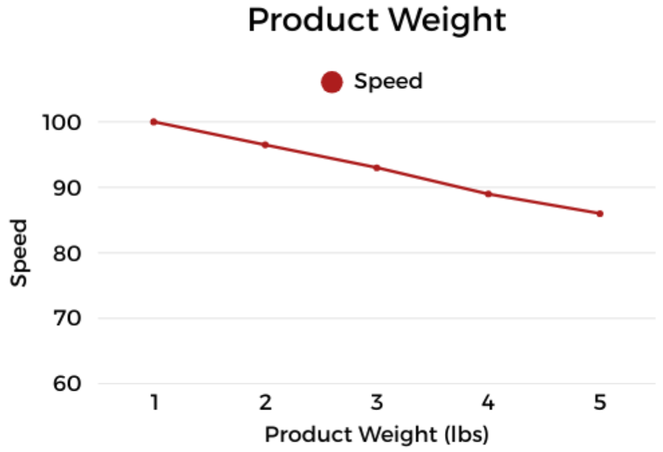
SHIFT FOCUS FROM "SPEED TUNING" TO "STOP ELIMINATION."

Summary Table

Rank	Line	Status	Uptime %	Primary Downtime Cause
1	**SS**	✅ Best	**~83%**	Minimal (Mechanical speed limit)
2	**1200**	✅ Good	**~80%**	Slow Start-up (SOP Issue)
3	**1800**	🔸 Avg	**~78%**	Micro-stoppages (41 events)
4	**900**	🔸 Avg	**~76%**	Rare Catastrophic Failure
5	**EX23**	🔻 Poor	**~72%**	Frequent Stops / Instability
6	**M8 / 1201**	❌ Worst	**~70%**	Chronic Faults & Fatigue

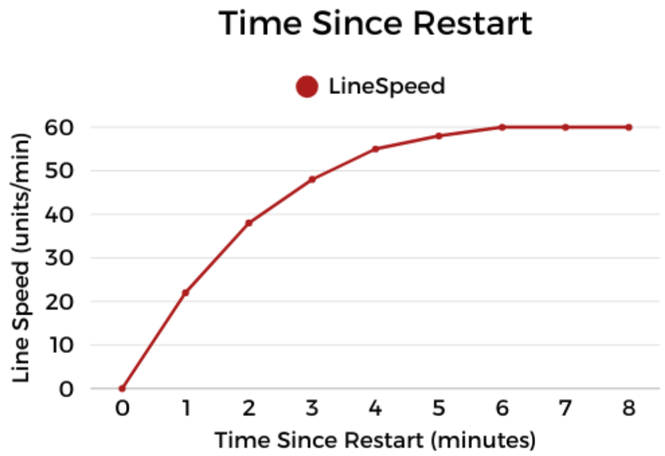
THE LOWEST-PERFORMING LINES AREN'T SLOW THEY'RE UNSTABLE

Our “Speed Limiters”



HEAVIER PRODUCTS SIGNIFICANTLY REDUCE LINE SPEED, WITH APPROXIMATELY A 3.5 UNITS/MIN DROP FOR EVERY ADDITIONAL POUND.

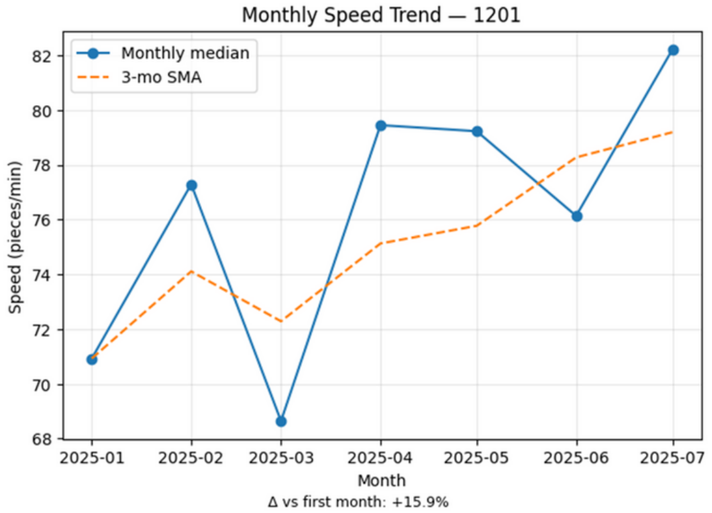
THROUGHPUT GENERALLY DECLINES WITH LONGER RUN TIMES DUE TO ACCUMULATED FATIGUE AND PROCESS DRIFT.



STOP–START EVENTS FORCE THE LINE TO REBUILD MOMENTUM, WITH LINE 1200 OPERATING BELOW PEAK SPEED DURING THE FIRST FEW MINUTES.

Time Series Analysis

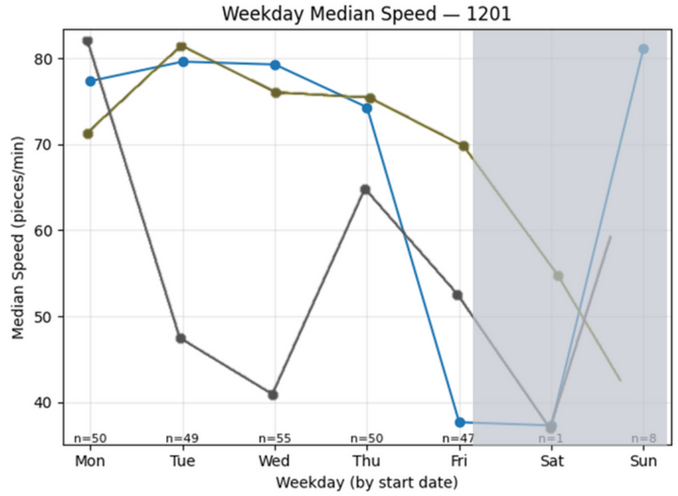
Monthly Trends



1201 SHOWS +15.9% SPEED INCREASE VS. FIRST MONTH. HOWEVER, MONTHLY AVERAGES HIDE SEVERE VOLATILITY

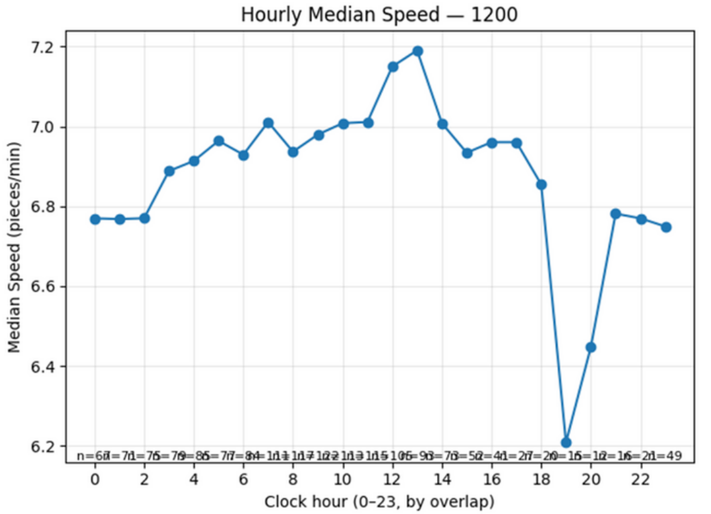
"GOOD MONTHS" CAN MASK FAILED SHIFTS.

Weekly Patterns



1200 MAINTAINS FLAT, CONSISTENT PERFORMANCE. 1201 AND 1801 DEGRADE SIGNIFICANTLY INTO THURSDAY/FRIDAY, SUGGESTING STAFFING FATIGUE OR PRE-WEEKEND DRIFT.

Hourly Dynamics



MOST WORKCENTERS PEAK AROUND NOON, WITH SPEED DROPPING AFTER 6 PM. THIS HOURLY HEARTBEAT REVEALS OPERATIONAL RHYTHMS INVISIBLE IN DAILY REPORTS.

Throughput Speed
Day vs. Night

DAY SPEED

60.2

Units per minute during daytime operations

06:01 to 18:00

NIGHT SPEED

53.7

Units per minute during night time operations

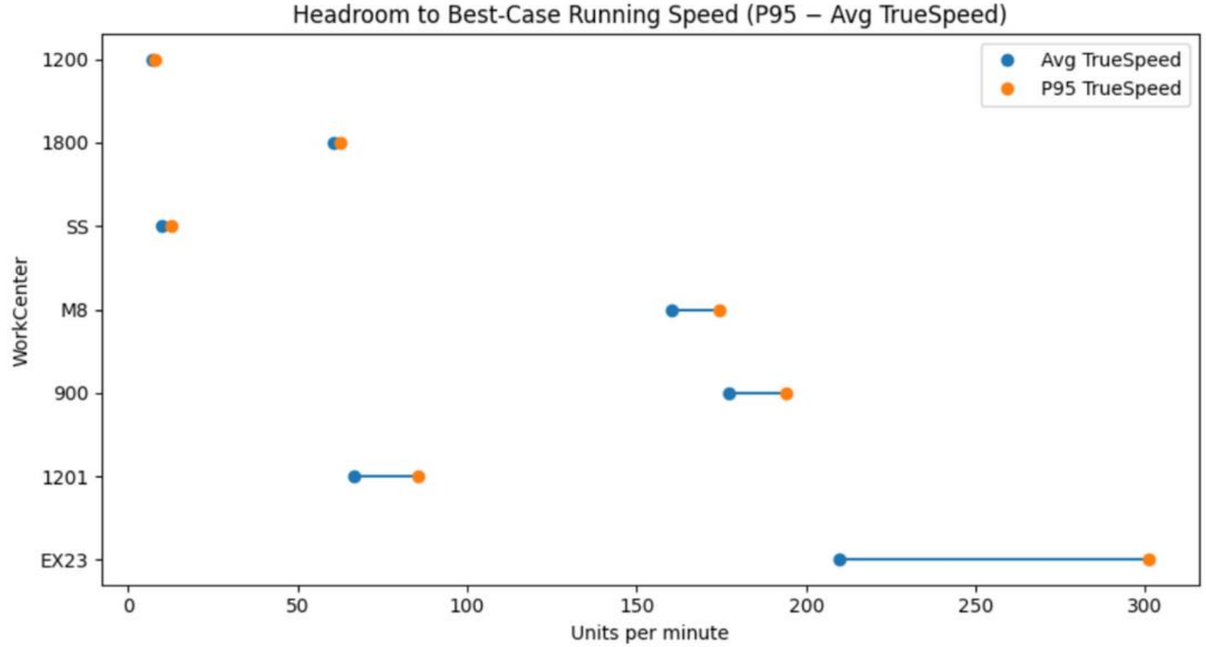
18:01 to 06:00

NIGHT RUNS ARE

11%

SLOWER

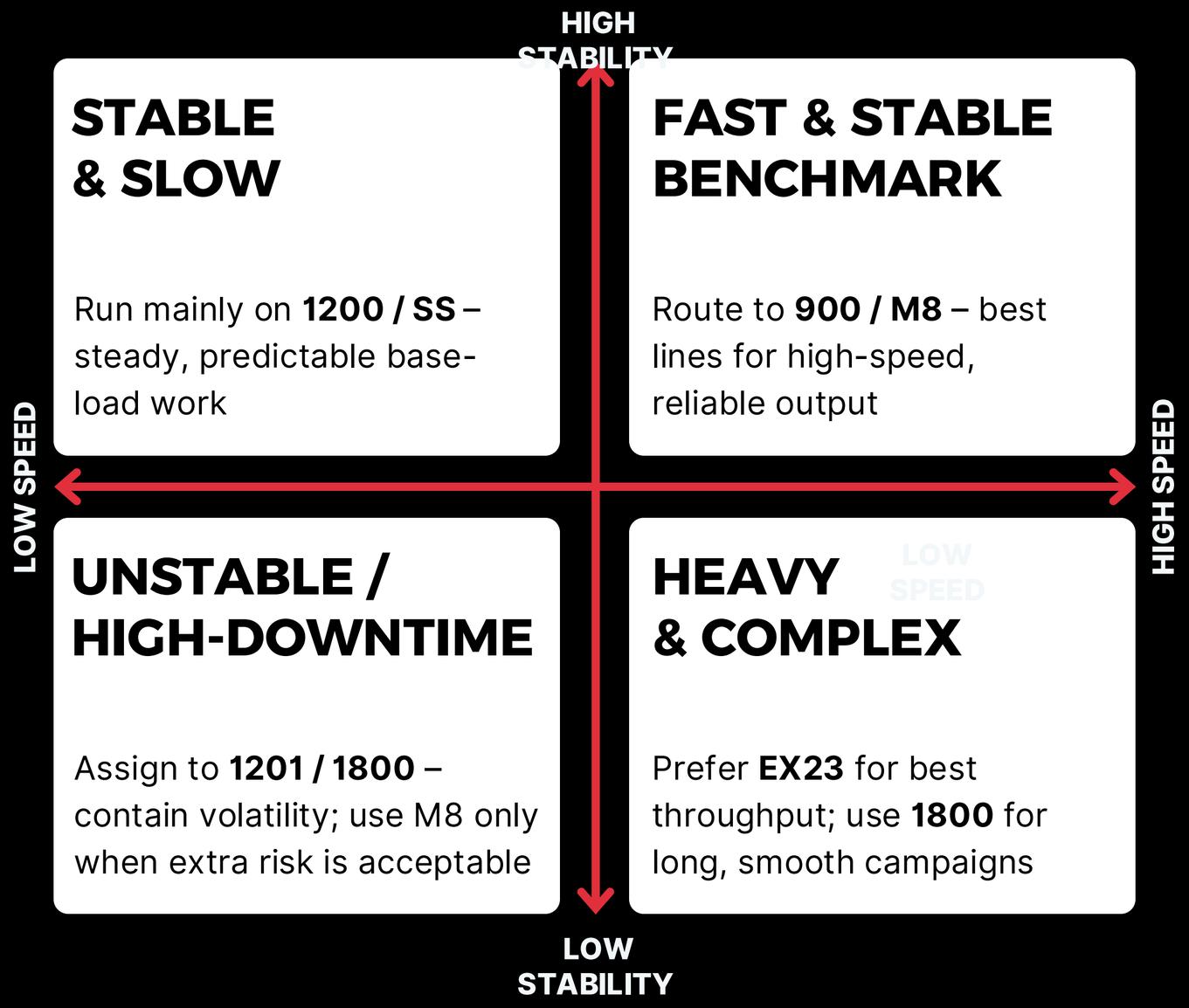
1 Running Smarter
Which lines have “room” to run faster?



Performance on lines EX23, 900 and 1201 can be improved by closing the current operational gaps

- Each line shows small but recurring pauses in cycle flow
- These gaps suggest untapped efficiency headroom
- Targeted optimization could deliver modest but measurable speed gains

2 Running Smarter
Which Lines Fit Each SKU Group?



SKU performance clusters reveal a clear path to more efficient line routing and stronger daily execution.

- SKUs naturally group into a few repeatable speed and stability profiles
- Routing by these profiles reduces volatility and lifts average throughput
- Heavy, slow and unstable items can be contained by placing them on the lines built to absorb their behavior

CLICK HERE FOR CLUSTER DETAILS

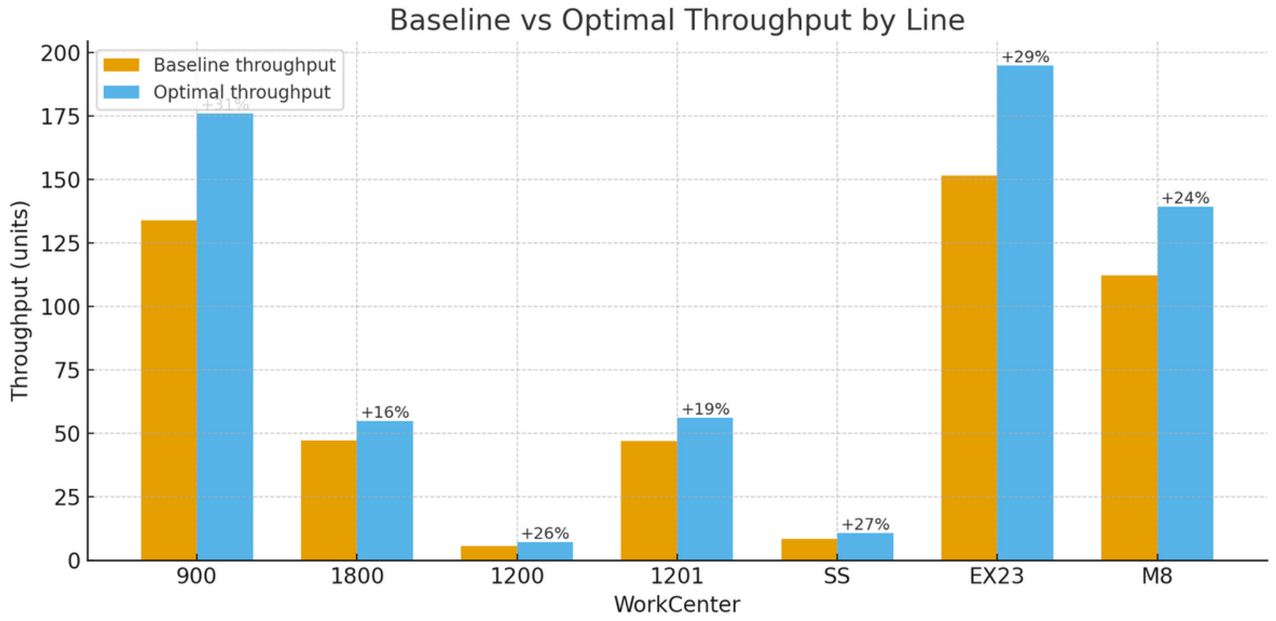
3 Running Smarter
At What Speed Do Lines Produce the Most?

WHAT THE DATA SHOWS:

- Each line has a higher speed point where throughput peaks
- Uptime stays stable around these modeled sweet spots
- Gains range from **+16% (1800)** to **+31% (900)**
- **EX23**, **M8** and **900** show the biggest headroom

WHAT THIS MEANS:

- Lines are currently running below their maximum efficient speeds
- Increasing speed slightly can unlock meaningful output gains without increasing downtime risk



EACH LINE IS OPERATING BELOW THE SPEED WHERE IT COULD DELIVER THE MOST UNITS

At their modeled optimal speeds, lines deliver 16–31% more throughput with no major drop in predicted uptime.

Simulated Speed Uplift

+7.4M Units on the Same Assets

CURRENT OUTPUT

34.3

Million Units

+7.4M

SIMULATED OUTPUT

41.7

Million Units

A 30% speed uplift on targeted runs is modeled to lift total output by 22% while raising downtime by only 0.1 percentage points

Summary & Priority Actions

Where to Act First

EX23

- **Strength**: Fastest line with highest capacity.
- **Issue**: High variability driven by calibration drift.
- **Action**: Resolve calibration issues and route heavy or long campaigns here.

900

- **Strength**: High-speed, stable benchmark.
- **Issue**: Acute breakdown spikes.
- **Action**: Pilot a +10% speed increase and review breakdown patterns.

M8

- **Strength**: Strong endurance over long runs.
- **Issue**: Downtime accumulates during extended campaigns.
- **Action**: Break long runs into smaller batches to reset uptime.

1200

- **Strength**: Solid potential but underperforming.
- **Issue**: Start-up loss at 6.7%.
- **Action**: Adopt Line 1201's start-up SOP immediately.

1201

- **Strength**: Best-in-class start-up performance.
- **Issue**: 14 recurring sudden drops.
- **Action**: Targeted maintenance to remove repeated root causes.

1800

- **Strength**: Consistent operational profile.
- **Issue**: High micro-stoppages (41 events).
- **Action**: Review material feed and staffing patterns to reduce interruptions.

SS

- **Strength**: Highly stable.
- **Issue**: Mechanical speed ceiling.
- **Action**: Assign slow, complex or sensitive SKUs to maximize reliability.

Thank You
Questions & Discussion

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MELIORA

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