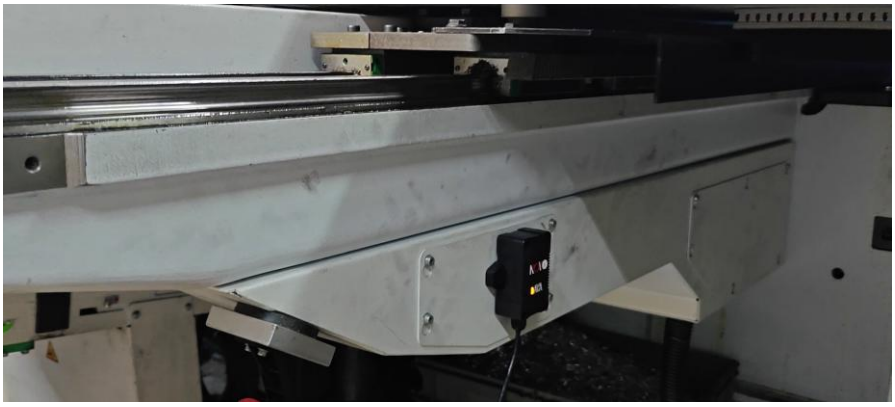
EXPANDED METAL MANUFACTURING

Stretching Machine Monitoring in Expanded Metal Manufacturing: Case Study

Making stroke performance and hidden losses visible across **15 machines**.



Retrofit in practice: an external Novo AI sensor on an existing production machine.

15

Production machines connected

3 shifts

Mixed, make-to-order production

1980s–2010

Machine generations

THE CHALLENGE

Where was productive time being lost?

The production plan set the expectation. Between order start and completion, slower stroke output, waiting, brief interruptions and downtime were harder to see.

THE SOLUTION

One view of the existing machine fleet

Novo AI connected all 15 machines through **external retrofit sensors**. WatchMen combined machine behavior with ERP/BDE information so the team could investigate losses and improve daily routines.

RESULTS AT A GLANCE

+2,823 h

Additional productive capacity

Approximate annual fleet estimate

–32.8%

Less nonproductive time

Approximate relative reduction

+29.3 pp

OEE improvement

Approx. 30.4% to 59.7%

Quality remained the acceptance criterion. Higher stroke output counted as an improvement only when finished expanded metal remained within specification.

Figures describe this individual project. pp = percentage points. Estimation and measurement notes on pages 5–6.

THE PRODUCTION CHALLENGE

A running machine can still miss the plan

Expanded metal is made through repeated cutting, stretching and material feed. Materials, mesh geometry, tooling and settings vary by order, so performance needs production context.

1,800
Strokes per shift
Common planning reference

1,397
Strokes per shift
Approximate baseline average

22.4%
Below the reference
About 403 strokes per shift

Typical orders ran for **6–20 hours**; longer runs could reach **40–50 hours**. Small performance differences therefore accumulated over extended production runs.

What became visible

Production question	Before monitoring	With WatchMen
Is the machine producing?	Local observation and manual checks	Central live view across 15 machines
Are we meeting the stroke target?	Local or retrospective assessment	Actual performance in order context
Where did machine time go?	Losses had to be reconstructed	Productive, idle and downtime periods
What about short interruptions?	Microstops were mostly unrecorded	Continuous visibility and history
Why did an order take longer?	ERP/BDE showed order context	Order data with the machine timeline
When should the team react?	No automated real-time notification	Configurable deviation alerts

Improve the process

When the target is achievable, investigate waiting, interruptions, setup, shift conditions and machine behavior.

Check the planning assumption

When the article, material, mesh geometry or quality requirement limits performance, review the target and production master data.

Read the reference correctly: 1,800 strokes per shift is the common reference in this case, not a universal target for every machine or article.

IMPLEMENTATION

One monitoring layer across the existing fleet

The manufacturer kept its stretching and cutting machines in service. External sensors captured physical signals; edge processing and WatchMen provided the machine-state view.

Novo AI retrofit sensor.

15–20 min

Approximate installation per machine

No PLC access or machine-control intervention.
No additional shutdown for sensor installation.
ERP + BDE directly integrated with WatchMen.

01 Sense

External sensors capture physical machine behavior.

02 Interpret

Edge processing and validation support state detection.

03 Add context

WatchMen connects machine states, orders and BDE data.

From installation to operational use

Stage	Project milestone
Day 0	Sensors installed; approximately 15–20 minutes per machine.
Days 1–3	Signal collection and learning; first classification around day 3.
Weeks 1–2	State and performance validation; baseline around week 2.
Months 1–2	Loss reviews, improvement routines, ERP/BDE use and onboarding.
Month 3	Results evaluated against the project baseline.

Installation and onboarding are different milestones. Full employee and operational onboarding took approximately two months.

Every production machine connected

All 15 stretching and cutting machines were included, spanning equipment built from the 1980s through 2010.

FINDINGS AND ACTIONS

Turn the timeline into a production response

Monitoring supplied the evidence. The production team used it to investigate recurring losses and change how it responded.

01 Investigate low stroke performance

Baseline output averaged **1,397 strokes per shift** against the 1,800 reference. The night shift became a priority for investigation.

Response: Review stroke output and machine states by shift, then check the production conditions behind sustained deviations.

02 Reduce waiting and extended stops

Nearly half of monitored machine time was initially nonproductive. Material, order, tool and operator-related waiting needed context.

Response: Use the timeline to identify long losses and react earlier. Combine BDE and shopfloor information before assigning a cause.

03 Make recurring microstops actionable

Brief interruptions during long runs and shift transitions had been easy to miss in manual reporting.

Response: Review recurring patterns, material readiness and preparation. Check whether the same interruptions decline after a change.

04 Improve planning as well as production

A target miss can reflect an avoidable process loss or an unrealistic assumption for the product and machine.

Response: Use ERP/BDE context to review target achievement, elapsed time and recurring deviations. Correct master data where needed.

Use comparable production conditions

Compare shifts and machine groups with their article, material and mesh requirements in view. More strokes alone do not establish better production.

A REPEATABLE IMPROVEMENT CYCLE

1 Measure	2 Investigate	3 Act	4 Verify
Record machine states	Review events and causes.	Change the relevant process.	Compare the same metrics.

RESULTS

More available time became productive

+2,823 h

Productive capacity per year

Approximate annual fleet estimate

The project estimates additional productive capacity across the fleet after reducing nonproductive time. This is **not a full year of directly observed additional output**.

Measure	Baseline	After improvement	Change
OEE	Approx. 30.4%	Approx. 59.7%	**+29.3 pp**
Nonproductive time	Approx. 49.7%	Approx. 33.4%	**−32.8% relative**
Productive-time share	50.3%	66.6%	**+16.3 pp**
Microstops	Mostly unrecorded	Continuously visible	**Traceable losses**

Nonproductive time fell by **16.3 percentage points**. Relative to the 49.7% baseline, this is approximately **32.8%**. Productive share is the complementary share of monitored time.

What a performance gap can mean for an order

ILLUSTRATIVE CALCULATION / NOT AN OBSERVED ORDER

For a volume planned to take **20 hours** at the 1,800-stroke reference, the table illustrates the required time. The Month-3 stroke level is a **modeled value**.

Scenario	Strokes per shift	Calculated time
Planning reference	1,800	**20.00 h**
At baseline performance	1,397	**25.77 h**
Month-3 model	1,709	**21.06 h**

Calculation: 20 h × 1,800 ÷ stroke level. The modeled difference is about **4.7 hours per order**. It is not an additional measured saving and should not be added to the annual capacity estimate.

Keep the measures distinct

OEE, productive-time share, stroke output and order duration describe different parts of performance. Quality remains the condition for any improvement.

pp = percentage points. Project scope and measurement notes on page 6.

APPLYING THE FINDINGS

What to review in your own production

Repeated losses become actionable when machine behavior, order expectations and production context are reviewed together. Prepare these inputs for a practical pilot review.

Bring to a pilot review	Why it matters
Machine and product groups	Identify comparable equipment, materials and mesh geometries before comparing performance.
Article-specific targets	Check what stroke output is realistic for each order and its required quality.
Quality acceptance criteria	Define the mesh, dimensional and other specifications that speed improvements must respect.
ERP/BDE order information	Connect planned machine, order duration, expected performance and recorded production context.
Shift and stop-reason context	Separate waiting, setup, quality checks, maintenance and faults when investigating a loss.

What the sensor can tell you

When physical machine behavior changed, when productive operation stopped and whether a pattern recurred.

What needs context

Why the event happened. ERP/BDE records, operator input and investigation provide the organizational cause.

A useful daily review

Start with the largest recurring losses. Check the affected order and production conditions, agree an action, then compare the same indicators after the change. Group technically different machines appropriately.

MEASUREMENT AND INTERPRETATION

Scope: one anonymized expanded-metal manufacturer, **15 production machines**, three shifts and a three-month improvement period. Novo AI sensing and WatchMen were combined with directly integrated ERP/BDE context. Planned nonproduction and maintenance periods were excluded where applicable.

The before-and-after KPIs are reported project findings. The order-duration example on page 5 is modeled. The additional **2,823 hours per year** is an approximate fleet estimate; the underlying annualization calculation is not documented in the project summary.

Overall equipment effectiveness (OEE) combines availability, performance and quality. These results are specific to this environment; achievable performance varies with machinery, material, mesh geometry, product mix and implementation.

See what your stretching machines actually deliver

Discuss your machine groups, recurring losses and a suitable pilot with Novo AI.

Request a WatchMen demo →