

PRECISION CONTRACT MANUFACTURING

CNC and Sheet Metal Monitoring: Customer Case Study

30% higher productivity with Novo AI WatchMen. Making hidden losses visible across a mixed fleet of 20 production machines.



Representative CNC machining photograph supplied for this case study.

20

Production machines · 3 shifts

2005–2026

Machine build years

AVA + WatchMen

Sensors and platform

THE CHALLENGE

The job was recorded.
The waiting was harder to see.

The manufacturer already used digital work information and recorded setup and part times. But components move through turning, milling, cutting, bending and joining. Those records alone did not explain every gap between operations.

THE NOVO AI APPROACH

Connect machine behavior
to daily production decisions

WatchMen adds a timeline of productive, idle and stopped time. Combined with job and shop-floor context, that view helps the team locate recurring losses, investigate causes and decide where to act.

The value is more than a dashboard: a shared basis for preparing work, responding to interruptions and checking whether changes improve production.

RESULTS AT A GLANCE**+21,600 h**

Additional productive capacity¹

Calculated annual fleet increase

-45%

Less nonproductive time¹

Within the same annual schedule

+15.88 pp

Calculated OEE improvement²

52.92% to 68.80%

Customer outcome: 30% higher productivity. ¹ Capacity and loss figures follow the supplied operating model. ² OEE is a separate calculation scenario. Basis and assumptions on page 6.

THE PRODUCTION CHALLENGE

A ready machine can still spend too much time waiting

In mixed CNC and sheet-metal production, a finished operation is only one part of the route. The next machine also needs the right material, program, tooling and release. A delay between those steps can consume capacity without appearing as a machine fault.

20 machines

Different processes. One production flow.

The customer's existing digital work information and setup and part times provided a starting point. **WatchMen adds the physical machine timeline** needed to examine what happened between recorded milestones.

What Novo AI adds to the picture

Production question

Existing information

Added machine-state view

Where did the time go?

Recorded setup and part times

Productive, idle and stopped periods along a timeline

Was the machine waiting?

Order status and shop-floor context

When waiting began, how long it lasted and how often it recurred

Were short stops accumulating?

Individual events can be difficult to reconstruct

A history of interruptions to review by machine and period

Why do shifts differ?

Shift and job context

A common time basis for comparing equivalent work

Did a process change help?

The action taken and its timing

The same loss measures before and after the change

See when a loss occurs

Machine states locate the interruption. A recurring pause before the next job suggests a different investigation from a stop during an active operation.

Understand why it occurs

Orders, material readiness, operator input and setup requirements explain the context. The machine signal is the starting point for a conversation about the process.

The objective: make avoidable waiting and recurring interruptions visible enough to assign a practical response, while keeping necessary setup, handling and inspection distinct.

THE NOVO AI IMPLEMENTATION APPROACH

One monitoring layer across the existing fleet

Novo AI combines external AVA sensing with the WatchMen platform. The approach brings machines from different generations into a common view without relying on access to each machine’s PLC.



Novo AI AVA retrofit sensor.
Representative product photograph.

2005–2026

Machine build years in this fleet

External sensing: capture physical operating signals at the machine.

WatchMen: turn those signals into a machine-state timeline.

Production context: review that timeline alongside work information, setup and part times.

01

Sense

AVA sensors capture physical operating signals such as vibration and acoustics.

02

Interpret

Machine-state interpretation distinguishes productive, idle and stopped periods.

03

Add context

Job information and shop-floor observations help explain the events shown in WatchMen.

From visibility to an operating routine

Step

What the team establishes

Define the comparison	Choose machine groups, scheduled periods and consistent state definitions.
Check the interpretation	Compare machine states with actual production, setup and necessary handling.
Build a useful baseline	Review waiting, interruptions and shift patterns under comparable conditions.
Put the evidence to work	Choose a recurring loss, agree on a response and compare the same measures after the change.

This workflow describes the Novo AI approach. Existing work records remain valuable: the additional machine timeline makes them easier to interpret in the context of real production.

FROM MACHINE VISIBILITY TO ACTION

Turn a recurring loss into a practical production response

Monitoring helps the team find where to investigate. Production improvements come from changing the routines behind the loss. These response priorities connect WatchMen's visibility to the CNC and sheet-metal workflow.

01 Prepare the next job before the machine is ready

An idle period between jobs can mean that material, programs, fixtures or an approval are still missing.

Practical response: Review the preceding job and the waiting period. Prepare the next operation earlier and give unresolved readiness issues a clear owner.

02 Make shift handovers part of production readiness

Different starting conditions can create different results across three shifts, even on the same equipment.

Practical response: Use the timeline to locate repeated losses around handovers. Check job readiness, material availability and outstanding issues with the incoming shift.

03 Treat small interruptions as a recurring pattern

A single short interruption may seem minor. Repetition across machines and shifts can absorb useful production time.

Practical response: Group events by machine, operation and product. Investigate recurring causes, agree on a response and check whether the interruptions decline.

04 Separate necessary setup from avoidable delay

Setup, handling and inspection are part of manufacturing. Waiting within or around them needs a different response.

Practical response: Compare recorded setup and part times with the machine timeline. Improve preparation and escalation while preserving the work needed to meet specification.

Focus the review on production conditions. Compare shifts with their product mix, operating conditions and necessary process steps in view.

A REPEATABLE IMPROVEMENT CYCLE

1 Measure

Record machine states and losses.

2 Investigate

Review events and their context.

3 Act

Change the relevant routine.

4 Verify

Compare the same metrics.

RESULTS AND BUSINESS VALUE

Less waiting. More productive use of the same fleet.

+30%

Customer-reported productivity increase

The precision contract manufacturer achieved **30% higher productivity after using Novo AI WatchMen**. The operating model below shows how reduced losses can translate that gain into additional productive capacity.

Where productive capacity is recovered

Annual machine-time measure ¹	Before	After	Change
Productive time	72,000 h	93,600 h	+21,600 h
Idle time	24,000 h	12,000 h	-50.0%
Unexpected downtime	9,600 h	6,000 h	-37.5%
Microstop losses	4,800 h	3,000 h	-37.5%
Setup-related losses	7,200 h	4,200 h	-41.7%
Other losses	2,400 h	1,200 h	-50.0%
Total nonproductive time	48,000 h	26,400 h	-45.0%

¹ Annual operating-model values. Total nonproductive time comprises the five loss categories above; it is not an additional loss. Calculation basis on page 6.

-48 min

Idle time per machine and shift

Average idle time falls from 96 to 48 minutes. Less waiting contributes 12,000 hours, about 56% of the calculated annual capacity gain.

+15.88 pp

Calculated OEE improvement

The separate OEE scenario rises from 52.92% to 68.80%. Its fixed performance and quality assumptions are shown on page 6.

What changes for production management

A common timeline changes the daily discussion from “Why did this job take longer?” to “**Where did we wait, what caused it and which routine should we change?**” That makes the next improvement easier to define and review.

The benefit is capacity within the existing schedule. Turning released time into useful output still depends on ready work, material and downstream flow. **WatchMen provides the visibility; the production response puts it to use.**

SHIFT PERFORMANCE AND PRACTICAL TAKEAWAYS

Make the improvement repeatable across all three shifts

The shift comparison shows where the starting conditions differ and where the largest opportunity lies. Use it to investigate readiness and recurring interruptions under comparable production conditions.

Per machine, per 8-hour shift ¹	Shift 1 Before → After	Shift 2 Before → After	Shift 3 Before → After
Productive time	5.12 → 6.40 h	4.80 → 6.24 h	4.48 → 6.08 h
Idle time	76.8 → 38.4 min	96.0 → 48.0 min	115.2 → 57.6 min
Additional productive time	+76.8 min	+86.4 min	+96.0 min
Relative productivity gain	+25.0%	+30.0%	+35.7%

¹ Supplied shift model. Shift 3 has the largest calculated gain. The useful follow-up is to examine the operating conditions behind the gap, then compare the same work after a change.

What to bring to your own production review

Bring to the review	Why it matters
A comparable machine or product group	Start with similar operations, materials and quality requirements.
Job, setup and part-time information	Connect a machine event to the work being performed.
Shift context and stop reasons	Distinguish waiting, setup, inspection and machine faults.
One recurring loss and an action owner	Agree on a response and a date to review the same measures.

A useful daily conversation

Pick one repeated loss. Review its timeline with the people who know the process. Agree on one practical change, then check the same indicators after the change. This keeps monitoring connected to production decisions.

CALCULATION BASIS

Customer outcome: 30% higher productivity. **Time model:** 20 machines × 3 shifts × 8 hours × 250 days = 120,000 scheduled hours. Productive share rises from 60% to 78%, giving 72,000 → 93,600 hours. Detailed annual losses and shift changes are illustrative outputs of the supplied operating model, with unchanged processing rate and quality.

OEE scenario: 60% → 78% availability input × 90% performance × 98% quality = 52.92% → 68.80%. It uses productive-time share as the availability input and fixed performance and quality assumptions; it is a separate scenario, not a measured OEE result. pp = percentage points. Released time and additional capacity describe the same gain and are not added together.

Find the waiting hidden in your machine fleet.

Discuss a focused WatchMen production review with Novo AI.

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