

SHEET METAL MANUFACTURING

Press Brake Monitoring in Sheet Metal Manufacturing: Case Study

Making productive bending and hidden losses visible across 36 monitored press brakes within a 136-machine production environment.



CNC press brake in sheet-metal manufacturing.

36

Monitored press brakes

2 shifts

Modeled operating schedule

2012-2022

Machine generations

THE CHALLENGE

Where was productive bending time being lost?

Order start and completion were visible, but the machine time between them could include setup, tool changes, handling, waiting, short interruptions and downtime.

THE SOLUTION

One view of the existing press-brake fleet

Novo AI external retrofit sensors create a common machine-state view. WatchMen makes productive bending and hidden losses comparable across the monitored scope.

Quality remained the acceptance criterion. Higher productive bending counted as an improvement only when finished parts remained within specification.

Figures combine the customer-reported +28.76% productivity result with clearly labeled model calculations. pp = percentage points.

RESULTS AT A GLANCE

+20,707.2 h

Additional productive capacity

Approximate annual 36-machine estimate

+28.76%

Productivity improvement

Customer-reported result

-42.86%

Less idle time

Modeled relative reduction

THE PRODUCTION CHALLENGE

A four-hour bending job can occupy the process much longer

A bending order can occupy the press brake longer than its planned processing window because setup, tool changes, part handling, inspection, waiting, microstops and downtime are embedded in elapsed time.

4.0 h	5.2 h	+1.2 h
Planned bending order	Elapsed order window	Gap to explain
Illustrative plan	Illustrative example	Setup, handling, waiting and stops

The capacity model uses two 8-hour shifts across 250 production days: 4,000 scheduled hours per monitored press brake and 144,000 hours across the 36-machine monitored scope.

What became visible

Production question	Before monitoring	With WatchMen
Is the press brake productively bending?	Local observation / existing machine status	Validated machine-state timeline
Where did scheduled time go?	Losses reconstructed later	Productive, setup, idle and downtime periods
How much time went to setup and tool changes?	Difficult to compare consistently	Comparable event durations and trends
What about short interruptions?	Microstops were easy to miss	Continuous visibility and history
Why did an order take longer?	Order context without physical timeline	Order context plus machine behavior
When should the team react?	Retrospective review	Configurable deviation alerts

Improve the process

When the target is realistic, investigate waiting, setup, tool changes, part handling, microstops and machine behavior.

Check the planning assumption

When geometry, material, tooling or quality limits performance, review the planned value and production master data.

Read the figures correctly: the +28.76% productivity improvement is the supplied project result. The 4.0-to-5.2-hour order example is illustrative; the annual capacity model translates the reported result into a consistent time scenario.

IMPLEMENTATION

One monitoring layer across the existing press-brake fleet

External Novo AI sensors create a common machine-state layer without PLC access. WatchMen makes productive bending, idle periods and interruptions visible.



Novo AI retrofit sensor on existing press-brake equipment.

15 min

Installation per machine

No PLC intervention.

36 x 15 min = 540 min / 9 h cumulative mounting time.

This is not 9 hours of production downtime.

01

Sense

External sensors capture physical machine behavior.

02

Interpret

Edge processing and validation support bending-event and state detection.

03

Add context

WatchMen links machine states with order and production context.

From installation to operational use

Stage	Project milestone
Day 0	Sensors installed on 36 press brakes.
Days 1-3	Signal collection and classification.
Weeks 1-2	State, bend and setup validation.
Weeks 3-6	Baseline and recurring-loss review.
Weeks 7-12	Improvement actions and evaluation.

The 15-minute installation value is supplied; validation and evaluation timing is modeled.

36 monitored press brakes

All 36 press brakes are included in the monitored scope. Project environment: 136 production machines; build years 2012-2022.

FINDINGS AND ACTIONS

Turn the timeline into a production response

Monitoring supplies the machine evidence. The production team can then focus on the largest recurring losses and verify whether process changes release usable bending capacity.

01 Reduce hidden idle time

Modeled idle time falls from 420 to 240 hours per press brake/year, releasing 180 hours per machine.

Response: Improve material readiness, next-order preparation and response to extended waiting.

02 Shorten setup and tool changes

Average modeled setup/changeover falls from 32.5 to 24.4 minutes, a 25.00% reduction.

Response: Stage tools, programs and next-job material before the machine becomes available.

03 Reduce between-bend waiting

The modeled interval between productive bends falls from 48 to 31 seconds, a 35.42% reduction.

Response: Improve part staging, handling flow, workplace layout and standardized work for recurring part families.

04 Reduce downtime and microstops

Downtime falls from 240 to 190 hours and microstops from 160 to 130 hours per machine/year in the model.

Response: Investigate recurring short interruptions and longer faults, then verify the same metrics after action.

Use comparable production conditions

Compare machines and orders with geometry, material, tooling, batch size, automation and quality requirements in view. More bending events alone do not establish better production.

A REPEATABLE IMPROVEMENT CYCLE

1 Measure

Record machine states.

2 Investigate

Review events and causes.

3 Act

Change the relevant process.

4 Verify

Compare the same metrics.

RESULTS

More scheduled time became productive

+20,707.2 h

Productive bending capacity per year

Approximate annual 36-machine estimate

The model estimates additional productive bending capacity across the 36 monitored press brakes after reducing nonproductive time. This is annualized capacity, not a full year of directly observed extra output.

Measure	Before	After	Change
Productive bending	72,000 h	92,707.2 h	+20,707.2 h
Idle time	15,120 h	8,640 h	-42.86%
Downtime	8,640 h	6,840 h	-20.83%
Microstops	5,760 h	4,680 h	-18.75%
Setup / changeover	32.5 min	24.4 min	-25.00%
Between-bend interval	48 s	31 s	-35.42%
Scheduled machine time	144,000 h	144,000 h	Unchanged

Across 36 machines, productive bending rises from 72,000 to 92,707.2 modeled hours per year.

What the improvement means at machine and fleet level

MODELED BEFORE / AFTER COMPARISON / 36 MONITORED PRESS BRAKES

Selected operating measures before and after improvement.

Annual capacity	Per machine	36-machine scope
Scheduled time	4,000 h	144,000 h
Productive before	2,000 h	72,000 h
Productive after	2,575.2 h	92,707.2 h
Additional capacity	+575.2 h	+20,707.2 h

Capacity gains and loss reductions describe the same released time and must not be added together.

Keep the measures distinct

Productivity, productive-time share, OEE, order duration and output are different KPIs. The figures above describe the same modeled improvement from different perspectives.

APPLYING THE FINDINGS

What to review in your own bending 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	Compare technically similar equipment and bending families before interpreting performance.
Product-specific targets	Check what bending performance is realistic for each geometry and material.
Quality acceptance criteria	Define dimensional and surface requirements that productivity improvements must respect.
Order / program information	Connect planned machine, program, order duration and expected production context.
Shift and stop-reason context	Separate waiting, setup, handling, maintenance and faults when investigating a loss.

What the sensor can tell you

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

What needs context

Why the event happened. Order data, tooling context, operator input and investigation provide the organizational cause.

A useful daily review

Start with the largest recurring losses. Check the affected order, material and tooling context, agree an action, then compare the same indicators after the change.

CALCULATION BASIS AND KPI INTERPRETATION

Project inputs: 136 total production machines, 36 monitored press brakes, build years 2012-2022 and a customer-reported 28.76% productivity increase. **Operating model:** 2 x 8-hour shifts x 250 days = 4,000 scheduled hours per monitored press brake, or 144,000 monitored-scope hours. A 50.00% productive baseline x 1.2876 gives 64.38% after improvement. The annual gain is $144,000 \times 14.38\% = 20,707.2$ hours.

Annual hours and individual loss reductions are illustrative model outputs. OEE, productive-time share, order duration and output are separate KPIs. Capacity gains and reduced losses represent the same released machine time.

See what your press brakes actually deliver

Discuss your bending machines, recurring losses and a suitable pilot with Novo AI.

[Request a WatchMen demo →](#)