

THE 3-PHASE CNC GROWTH BLUEPRINT

Map upgrades, set targets, and calculate payback. Three worksheets to take your shop from wherever you are to where you want to be.

WORKSHEET 1

The bottleneck finder

WORKSHEET 2

The three-phase upgrade planner

WORKSHEET 3

The ROI calculator

HOW TO USE THESE WORKSHEETS

1. Rate every line or cell in **Worksheet 1** to find your biggest sources of lost capacity.
2. Turn your top bottlenecks into phased projects in **Worksheet 2** — one page per upgrade.
3. Justify the spend in **Worksheet 3** using your own machine rates and downtime hours.
4. Execute in stages, measuring, standardizing, and scaling new capabilities.

Spindles only cut at their best when everything around them operates correctly. Plan upgrades as part of an overall system, not as individual bolt-on components.

SHOP DETAILS

SHOP / FACILITY

COMPLETED BY

ROLE

LINE OR CELL IN SCOPE

DATE

THE BOTTLENECK FINDER

Rate the last three months for one line or cell. Use one sheet per line.

GOAL

Quickly identify your biggest sources of lost capacity in the last three months.

RATING SCALE

1 = no issue · 5 = frequent stoppages or quality hits.

CATEGORY	RATING 1–5	EVIDENCE / NOTES
Chip and coolant management Jams, manual interventions, conveyor or tank leaks, filter serviceability, coolant depletion, pump performance, splash or overflow, chip bin handling	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Workholding foundations & systems Rigidity, repeatability, setup and changeover time, tolerance drift	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Machine protection reliability Way covers, bellows, air or oil leaks, sensors and alarms, other motion component protection	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Tooling performance Tool preset accuracy, tool life, tool breakage, offset errors, surface finish, chatter or vibration	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Information flow, programming, and CAM Print revisions, setup sheets, CAM and post reliability, feeds and speeds issues, on-floor toolpath changes, digital or live monitoring	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Air quality & mist management Coolant mist, smoke or fumes, mist collector serviceability	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Operator & machine time lost Setups, rework, alarms, error corrections, cycle gaps, part flow bottlenecks, spindle idle time	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Shop flow Blank or part prep issues, stock and material availability delays, part handling and traceability	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____
Automation readiness Reliable chip evacuation, reliable coolant management, repeatable workholding and tolerance hold, automated pallet or part loading, operator training, spindle reliability, stable air pressure and power supply	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	_____

YOUR TOP THREE BOTTLENECKS

Rank the three highest-rated categories. These carry into Worksheet 2. Where two categories tie, prioritize the one that blocks unattended running.

#	CATEGORY	RATING	EST. HOURS LOST PER WEEK
01			
02			
03			

WHICH PHASE DOES YOUR SHOP START IN?

PHASE 1 · STABILIZING FOUNDATIONS

Highest ratings sit in chip and coolant management or machine protection. Fix stability first.

PHASE 2 · THROUGHPUT DRIVERS

Stability is solid; setups, changeovers, rigidity, and tooling performance are the pain.

PHASE 3 · AUTOMATION & MONITORING

Processes repeat reliably; labor and machine utilization are what limit output.

OUR STARTING PHASE

THE THREE-PHASE UPGRADE PLANNER

One page per upgrade. Each page is a mini project plan for a single machine or cell.

MACHINE / CELL

Which machine or production cell needs the upgrade

BOTTLENECK

The specific problem you are solving, from Worksheet 1

SOLUTION DETAILS

SOLUTION

The equipment or system you will add or improve

EXPECTED IMPACT

More capacity, less scrap, shorter setups, fewer stoppages — quantify where possible

DEPENDENCIES

Power, floor space, software, covers — what must be in place first

BUDGET

Rough cost

OWNER

Who is responsible for delivery

PHASE & PRIORITY

Phase 1–3, and rank against your other upgrades

WHY NOW

The main reason this upgrade matters, in one sentence

RISKS

Any other issues that might get in the way

TIMELINE / LEAD TIMES

Completion commitment, and supplier lead times

DUE DATE

When completion is expected

SUCCESS MEASURE DETAILS

SUCCESS MEASURE

How you will track whether it worked

ACTUAL IMPACT

Measured impact of the change once it is in place

OWNER

Who reports the result

REVIEW DATE

When you will check the measure

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THE ROI CALCULATOR

Fill this in by hand, or run your numbers in the online calculator at hennigworldwide.com/roi-calculator.

Once you have established reliably repeatable processes, labor becomes your primary bottleneck. With added equipment upgrades, you need to justify your investment to leadership and prove its effectiveness.

YOUR INPUTS

Machine rate per hour

Fully burdened, \$ / hr

Number of machines affected

Downtime hours per week, per machine

Downtime hours you expect to recover

Per week, per machine

Scrap or rework from instability

Percent of parts or hours

Shifts per week

Unattended hours per week

Upgrade cost

Installation time

Hours of planned downtime

YOUR RESULTS

WEEKLY COST OF DOWNTIME

—

ANNUAL COST OF DOWNTIME

—

WEEKLY SAVINGS RECOVERED

—

PAYBACK PERIOD

—

FILLING THIS IN BY HAND

Weekly cost = machine rate × downtime hours × machines

Annual cost = weekly cost × 50

Payback in months = upgrade cost ÷ (weekly savings × 4.33)



FULL ROI CALCULATOR

Scan to run a complete analysis with tooling, scrap, and utilization inputs.

ILLUSTRATIVE EXAMPLE — REPLACE WITH YOUR OWN NUMBERS

Machine rate	Downtime saved	Weekly savings	Investment	Payback
\$150/hr	2 hrs/wk	\$300	\$8,000	~6 mo

These savings do not include gains like longer tool life, better surface finishes, or reduced rework.

CONTEXT FROM THE FIELD FOR YOUR BUSINESS CASE

- Catastrophic conveyor failures can idle production for weeks or even months if replacement or redesign is required.
- Responsive service, such as same-day engagement or two-day turnaround, dramatically shortens outage duration compared with multi-week waits.
- Differences in lifespan between brands can add up — some conveyors run three to four years versus two to three years for others in demanding environments.
- Service-friendly filtration, such as disc designs, avoids draining tanks during maintenance and reduces indirect labor.

YOUR BUSINESS CASE, IN ONE LINE

Write the sentence you will take to leadership.

APPROVED BY

DATE
