Bottleneck analysis — hydraulic manifold cell

All records

CAPSULEM8
CM8-288 · Bottleneck Analyser
August 9, 2026

STEPS IN THE CHAIN
6
Hydraulic manifold — machined and packed

THE BOTTLENECK
CNC turning
Machine · 1,133.6 units/week effective · 104.1% utilised

LINE CAPACITY PER WEEK
1,133.6
everything downstream of CNC turning can only run this fast, however quick it is

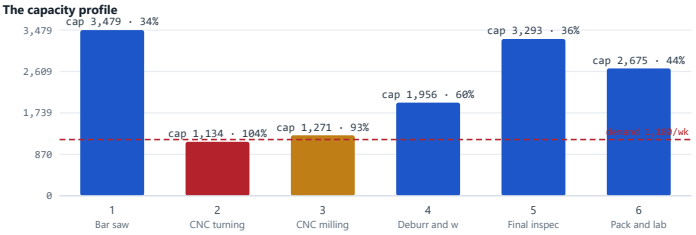
DEMAND VS CAPACITY
short 46.4
demand 1,180.0 against 1,133.6 units/week

STEPS OVER 90% UTILISATION
2
the next constraint takes over the moment the first is fixed

VALUE OF CLOSING THE GAP
$41,231.62
46.4 units × $18.50 × 48 weeks — only if you can sell them

6 of 6 record(s) included. All records. Amounts in USD.

The capacity profile

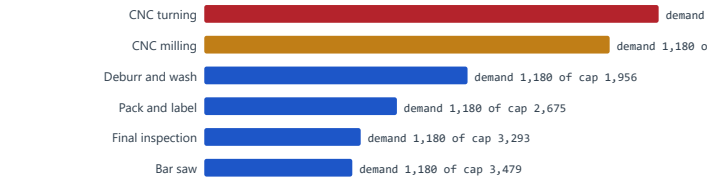


One bar per step, in the order the work flows, showing what each step can really produce in a week after downtime and scrap. The dashed line is demand. The red bar is the constraint — the shortest bar sets the output of the whole chain, no matter how tall the others are. Amber bars are at 90% utilisation or more and will become the constraint as soon as the red one is lifted. One bar per step, in the order the work flows, showing what each step can really produce in a week after downtime and scrap. The dashed line is demand. The red bar is the constraint — the shortest bar sets the output of the whole chain, no matter how tall the others are. Amber bars are at 90% utilisation or more and will become the constraint as soon as the red one is lifted.

Where each step's nameplate capacity goes

Each bar is the step's nameplate capacity — rate multiplied by available hours — split three ways: what it actually delivers, what breakdowns and changeovers take, and what scrap and rework take. Two steps with the same effective capacity can be short for entirely different reasons, and the fix is different for each: a slow step needs a faster process, an unreliable step needs maintenance and setup work, a wasteful step needs a quality fix. Each bar is the step's nameplate capacity — rate multiplied by available hours — split three ways: what it actually delivers, what breakdowns and changeovers take, and what scrap and rework take. Two steps with the same effective capacity can be short for entirely different reasons, and the fix is different for each: a slow step needs a faster process, an unreliable step needs maintenance and setup work, a wasteful step needs a quality fix.

Utilisation by step



Anything at or above 100% (red) cannot meet demand on its own; anything from 90% (amber) has almost no room to absorb a bad week. Steps low down the chart are not idle — they are protecting the constraint, which is exactly what they are for. Anything at or above 100% (red) cannot meet demand on its own; anything from 90% (amber) has almost no room to absorb a bad week. Steps low down the chart are not idle — they are protecting the constraint, which is exactly what they are for.

A mix, not a total: the segments show which kinds of resource hold the capacity in this chain, which usually says where the money and the flexibility are. Capacities of steps in series do not add up — the chain can only run at the rate in the centre, which is the bottleneck's effective capacity. A mix, not a total: the segments show which kinds of resource hold the capacity in this chain, which usually says where the money and the flexibility are. Capacities of steps in series do not add up — the chain can only run at the rate in the centre, which is the bottleneck's effective capacity.

Capacity analysis

STEP	TYPE	UNITS/HR	HOURS/WK	UPTIME %	YIELD %	EFFECTIVE CAP/WK	DEMAND/WK	UTILISATION %	SPARE/WK	OPERATORS	CAP/OPERATOR
Bar saw	Machine	95.00	40.0	92.0	99.5	3,478.5	1,180.0	33.9	2,298.5	1.0	3,478.5
▶ CNC turning	Machine	36.00	40.0	82.0	96.0	1,133.6	1,180.0	104.1	-46.4	1.0	1,133.6
CNC milling	Machine	38.00	40.0	88.0	95.0	1,270.7	1,180.0	92.9	90.7	1.0	1,270.7
Deburr and wash	Labour / skill	26.00	80.0	95.0	99.0	1,956.2	1,180.0	60.3	776.2	2.0	978.1
Final inspection	Inspection	120.00	40.0	70.0	98.0	3,292.8	1,180.0	35.8	2,112.8	1.0	3,292.8
Pack and label	Cell or line	70.00	40.0	96.0	99.5	2,674.6	1,180.0	44.1	1,494.6	2.0	1,337.3
Constraint	**CNC turning — the whole chain runs at this rate**					**1,133.6**	**1,180.0**	**104.1**	**-46.4**		

Constraint and next constraints

RANK	STEP	EFFECTIVE CAP/WK	UTILISATION %	GAP TO DEMAND	IMPROVEMENT IDEA	TO STOP BEING THE CONSTRAINT
Constraint	CNC turning	1,133.6	104.1	short 46.4	Move setup work off the machine so only the changeover itself is internal — wort...	Lift above 1,270.7 — needs 137.2 more units/wk (+12.1%)
#2	CNC milling	1,270.7	92.9	+90.7	Cutter-life monitoring and a revised fixture would recover most of the 5% scrap....	Next in line — 137.2 units/wk above the step below it
#3	Deburr and wash	1,956.2	60.3	+776.2	No action needed. If turning is lifted, an extra part-shift here covers the addi...	Next in line — 685.5 units/wk above the step below it
#4	Pack and label	2,674.6	44.1	+1,494.6	No capacity action. A later cut-off would smooth the afternoon but would not add...	Next in line — 718.3 units/wk above the step below it
#5	Final inspection	3,292.8	35.8	+2,112.8	The 70% uptime looks alarming and is not worth chasing — there is so much head-r...	Next in line — 618.2 units/wk above the step below it
#6	Bar saw	3,478.5	33.9	+2,298.5	Nothing to do. The saw already produces three times what the chain can take — ex...	Next in line — 185.7 units/wk above the step below it

Process chain

STREAM	#	STEP	TYPE	UNITS/HR	HOURS/WK	UPTIME %	YIELD %	OPERATORS	DEMAND/WK	CONTRIB/UNIT	EFFECTIVE CAPACITY /WK	UTILISATION %	SPARE CAPACITY /W
Hydraulic manifold — machined and packed	1	Bar saw	Machine	95.00	40.0	92.0	99.5	1.0	1,180.0	18.50	3,478.5	33.9	2,29
Hydraulic manifold — machined and packed	2	CNC turning	Machine	36.00	40.0	82.0	96.0	1.0	1,180.0	18.50	1,133.6	104.1	-4

STREAM	#	STEP	TYPE	UNITS/HR	HOURS/WK	UPTIME %	YIELD %	OPERATORS	DEMAND/WK	CONTRIB/UNIT	EFFECTIVE CAPACITY /WK	UTILISATION %	SPARE CAPACITY /V
Hydraulic manifold — machined and packed	3	CNC milling	Machine	38.00	40.0	88.0	95.0	1.0	1,180.0	18.50	1,270.7	92.9	9(
Hydraulic manifold — machined and packed	4	Deburr and wash	Labour / skill	26.00	80.0	95.0	99.0	2.0	1,180.0	18.50	1,956.2	60.3	77(
Hydraulic manifold — machined and packed	5	Final inspection	Inspection	120.00	40.0	70.0	98.0	1.0	1,180.0	18.50	3,292.8	35.8	2,11
Hydraulic manifold — machined and packed	6	Pack and label	Cell or line	70.00	40.0	96.0	99.5	2.0	1,180.0	18.50	2,674.6	44.1	1,49

Notes

Sample chain built from one week of observed rates, downtime and scrap. Replace every step with your own measured figures before relying on it or circulating it. The turning cell is the constraint on these numbers; re-run the analysis after the setup and jaw-change work, because the constraint is expected to move to milling.

Every capacity here is built from averages — an average rate, an average uptime, an average yield — and averages hide variability. A step that comfortably exceeds the bottleneck on paper can still starve it on a bad Tuesday, because what protects a constraint is not average spare capacity but spare capacity available at the moment it is needed. Treat the ranking as a guide to where to look and what to protect, not as a promise of what any given week will produce, and re-measure after every change: the constraint moves.