

Capacity Planning

How-to guide: what the workbook does, how to use it and what every number means.

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Capacity Planning

See, week by week, whether each work centre can make the demand plan, where the bottleneck is and how many machines it would take.

For: Production planners, operations and plant managers, and S&OP teams in discrete manufacturing.

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Quick start

1. On Setup, set the plan start date (a Monday) and your thresholds, then list your work centres with machines, shifts, hours per shift, uptime and yield.
2. On Demand Plan, set the working days of each week (holidays) and type each part's weekly demand in good units.
3. On Routing, give each part one row per work centre it visits, with the minutes per unit.
4. Open the Dashboard: utilisation by work centre and week, the bottleneck, hours short and machines to add.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Plan start, thresholds and the work centres with their machines, shifts, hours, uptime and yield.
Demand Plan	Working days per week, and the good units each part must ship each week.
Routing	Each part's operations: work centre and minutes per unit. Hours per week follow from the demand plan.
Dashboard	Utilisation by work centre and week, the bottleneck, hours short and machines to add.
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.

What each number means

Quantity	How it is calculated	Units
Scheduled hours per day	Machines x shifts per day x hours per shift (Setup).	h/day
Effective hours per day	Scheduled hours per day x uptime.	h/day
Working days	Typed per week on Demand Plan (5 normally, fewer in holiday weeks).	days
Available hours	Effective hours per day x working days of the week.	h

Quantity	How it is calculated	Units
Routing hours	For each routing row and week: the part's demand that week x minutes per unit / 60 / the work centre's yield (good output needs more starts). Excel: =INDEX(tblDemand[Wk k], MATCH([@Part], tblDemand[Part], 0)) x [@Minutes per unit] / 60 / [@Yield]	h
Required hours	SUMIFS of the routing hours for the work centre and week.	h
Utilisation	Required hours / available hours (blank when nothing is available).	%
Average utilisation	Plan total required hours / plan total available hours for the work centre.	%
Peak week utilisation	The highest weekly utilisation of the work centre, and the week it occurs.	%
Hours short	Sum over weeks of (required - available) where required exceeds available.	h
Machines needed at peak	Peak utilisation x machines = required hours / available hours per machine in the peak week (the live calculator's 'required machines').	machines
Machines to add	MAX(0, CEILING(machines needed at peak) - machines), as in the live calculator.	machines
Status and action	Status at the peak week: Under capacity below the Near-capacity threshold, Near capacity up to the Over-capacity threshold, Over capacity above it. Action: 'None needed' under the threshold; 'Watch: little slack' when near; 'Overtime or level peak' when only peak weeks are over and the plan average is not (overtime, outsourcing or moving work between weeks); 'Add shift or machines' when the plan average is over too.	-
Bottleneck	The work centre with the highest average utilisation over the plan.	-

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Calder Engineering, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

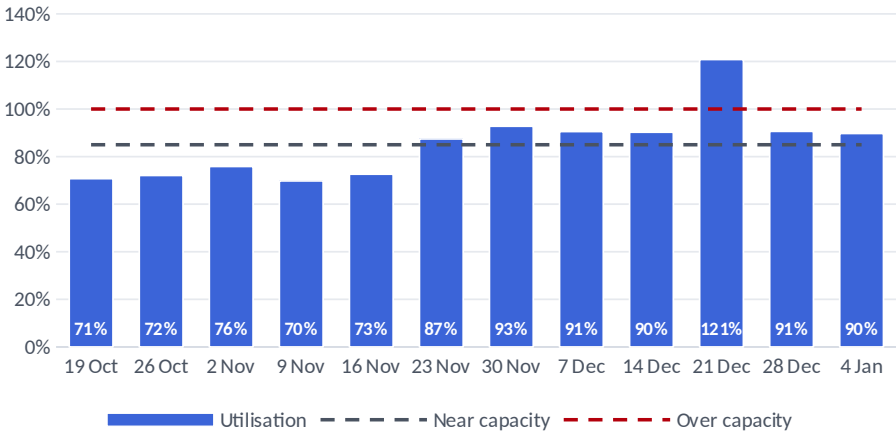
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Utilisation by work centre and week, the bottleneck, hours short and machines to add.

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BOTTLENECK WORK CENTRE	PEAK WEEKLY UTILISATION	HOURS SHORT OVER THE PLAN	MACHINES TO ADD
CNC mill	121%	32.0	1
Highest average utilisation	Limit 100% Over capacity	Overloaded weeks only	To cover each peak week

Bottleneck utilisation by week



Required vs available hours over the plan

