

AMR Fleet Sizing

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

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AMR Fleet Sizing

Size an AMR or AGV fleet from your routes: loads per shift, loads per trip and trip cycle time give the vehicles each route needs and the fleet the plant needs, on average and in the peak hour.

For: Industrial and manufacturing engineers, intralogistics and automation project leads, and plant managers comparing AMR or AGV fleet quotes.

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Quick start

1. On Setup, type the site name, the minutes each vehicle is scheduled per shift, fleet availability, mission success rate, your planning utilisation limit and the peak-hour factor.
2. On Routes, add one row per route or mission type: loads per shift, loads carried per trip and the measured cycle time of one complete trip.
3. Fix anything the Check column names.
4. Open the Dashboard: the planned fleet, the minimum and peak-hour fleets, each route's share of the work, and the fleet as demand grows.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Site name, the shift each vehicle is scheduled for, fleet availability and mission success, and your planning limits.
Routes	One row per route or mission type: loads, trip size and cycle time give the vehicle time each route takes.
Dashboard	How many vehicles the routes need: planned, minimum and peak-hour fleets, and where the vehicle time goes.
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
Trips per shift	Loads per shift / loads per trip / mission success rate (failed missions are attempted again).	trips
Vehicle minutes	Trips per shift x cycle time of one complete trip.	min/shift
Available minutes per vehicle	Scheduled minutes x fleet availability.	min/shift

Quantity	How it is calculated	Units
Vehicles (per route)	Vehicle minutes / available minutes per vehicle.	vehicles
Dedicated vehicles	Vehicles rounded up: the whole vehicles the route needs on its own.	vehicles
Minimum shared fleet	All routes' vehicle minutes / available minutes, rounded up: every vehicle busy all the time it is available. Excel: =ROUNDUP(ROUND(total / available, 9), 0)	vehicles
Planned fleet	All routes' vehicle minutes / (available minutes x planning utilisation limit), rounded up.	vehicles
Peak-hour fleet	Average vehicle minutes per hour x peak-hour factor / (60 x availability), rounded up.	vehicles
Planned fleet utilisation	All routes' vehicle minutes / (planned fleet x available minutes).	%
Fleet as demand grows	The planned and peak-hour fleets with every route's loads scaled by 80% to 150%.	vehicles

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 Brightwater Appliances, 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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How many vehicles the routes need: planned, minimum and peak-hour fleets, and where the vehicle time goes.

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Brightwater Appliances (example): 8 routes, 450 scheduled minutes per vehicle, 88% availability, 96% mission success.

PLANNED FLEET	PEAK-HOUR FLEET	MINIMUM FLEET	PLANNED FLEET UTILISATION
9	10	8	81.0%
At a 85% utilisation limit	At 1.3 x the average hour	Every vehicle busy all available time	Limit 85.0%
			On target

