

Line balancing and Yamazumi study

All records

STATIONS
4
Pump assembly line 1 · current state · 204 s of work content

LONGEST STATION
63 s
Station 2 · 8 s over takt 55 s — this is the line's rate

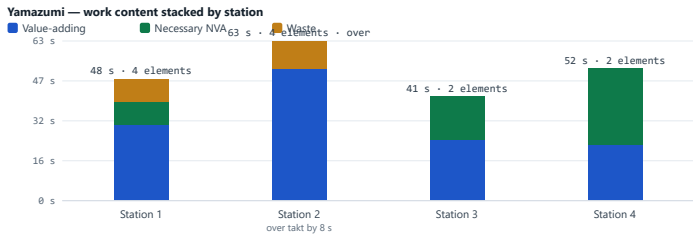
LINE EFFICIENCY
81.0 %
4.0 points below your target of 85 %

STATIONS OVER TAKT
1
Station 2 — the line cannot meet demand

WASTE SHARE
9.8 %
20 s of 204 s is non-value-adding

THEORETICAL MINIMUM STATIONS
4
you are running 4 — the work fits, so rebalance rather than add

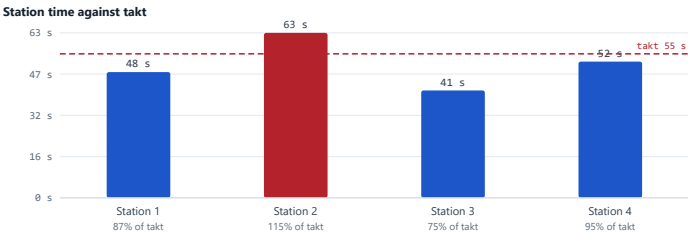
12 of 12 record(s) included. All records. Amounts in USD.



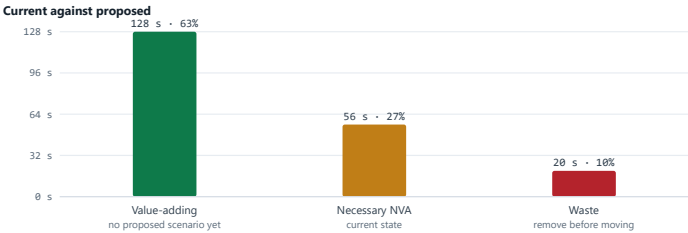
Read two things at once. The height differences between bars are the imbalance — every second a shorter bar sits below the tallest one is waiting. The waste band inside each bar is work that should be removed rather than moved. Stations taller than takt are marked; takt is shown beneath the chart title in the tiles. Read two things at once. The height differences between bars are the imbalance — every second a shorter bar sits below the tallest one is waiting. The waste band inside each bar is work that should be removed rather than moved. Stations taller than takt are marked; takt is shown beneath the chart title in the tiles.



This is the slack you actually have. A station over takt whose time is nearly all fixed cannot be unloaded by moving work — it needs the element shortened, the equipment duplicated or another station added. Elements marked “can be split” are counted as movable here, but only part of them will really move. This is the slack you actually have. A station over takt whose time is nearly all fixed cannot be unloaded by moving work — it needs the element shortened, the equipment duplicated or another station added. Elements marked “can be split” are counted as movable here, but only part of them will really move.



Any bar above the dashed takt line is a station that cannot keep up with demand, and the tallest bar sets the rate of the whole line. Bars well below the line are not good news either — that gap is idle operator time you are paying for. Any bar above the dashed takt line is a station that cannot keep up with demand, and the tallest bar sets the rate of the whole line. Bars well below the line are not good news either — that gap is idle operator time you are paying for.



The chosen comparison is current against proposed: each station appears twice, once as it runs today and once as you propose to run it. With no proposed scenario recorded the same chart falls back to the value split of the current state, so the waste you should remove before rebalancing is still in front of you. The chosen comparison is current against proposed: each station appears twice, once as it runs today and once as you propose to run it. With no proposed scenario recorded the same chart falls back to the value split of the current state, so the waste you should remove before rebalancing is still in front of you.

Station loading

STATION	ELEMENTS	TOTAL S	VALUE-ADDING S	NECESSARY NVA S	WASTE S	VS TAKT	MOVABLE S	FIXED S	VERDICT
Station 1	4	48	30	9	9	-7	48	0	Balanced
Station 2	4	63	52	0	11	+8	41	22	Over takt
Station 3	2	41	24	17	0	-14	41	0	Under-loaded
Station 4	2	52	22	30	0	-3	22	30	Balanced
Line total	12	204	128	56	20	-16	152	52	4 stations

Rebalancing candidates

WORK ELEMENT	NOW AT	SECONDS	WORK TYPE	MOVABLE	WHERE IT COULD GO
Fit cover plate and six screws	Station 2	16	Value-adding	Can move	No station has room — the line needs another station or the work removed
Apply sealant bead to cover face	Station 2	14	Value-adding	Can move	Move to Station 3 — 41 s now, 55 s after, still inside takt 55 s
Wait for sealant flash-off before handling	Station 2	11	Waste	Can be split	Remove it rather than move it — it is waste, and moving waste balances nothing

Work elements by station

LINE	SCENARIO	STATION	ORDER	ELEMENT	SECONDS	TYPE	MOVABLE	CONSTRAINT	OPERATOR	WORK CLASS	FIXED?
Pump assembly line 1	Current	Station 1	1	Load housing into fixture and clamp	12.00	Value-adding	Can move	—	A. Bekele	Value-adding	—
Pump assembly line 1	Current	Station 1	1	Fit and torque four base bolts	18.00	Value-adding	Can move	—	A. Bekele	Value-adding	—
Pump assembly line 1	Current	Station 1	1	Walk to rack and fetch bolt kit	9.00	Waste	Can move	—	A. Bekele	Waste	—
Pump assembly line 1	Current	Station 1	1	Scan serial number and log build record	9.00	Necessary NVA	Can move	—	A. Bekele	Necessary NVA	—
Pump assembly line 1	Current	Station 2	2	Press bearing into housing	22.00	Value-adding	Fixed	Arbor press is bolted to the floor at this station	M. Duarte	Value-adding	Fixed
Pump assembly line 1	Current	Station 2	2	Apply sealant bead to cover face	14.00	Value-adding	Can move	—	M. Duarte	Value-adding	—
Pump assembly line 1	Current	Station 2	2	Fit cover plate and six screws	16.00	Value-adding	Can move	—	M. Duarte	Value-adding	—
Pump assembly line 1	Current	Station 2	2	Wait for sealant flash-off before handling	11.00	Waste	Can split	—	M. Duarte	Waste	—
Pump assembly line 1	Current	Station 3	3	Fit wiring harness and connectors	24.00	Value-adding	Can move	—	S. Kowalczyk	Value-adding	—
Pump assembly line 1	Current	Station 3	3	Route cable and fit three tie wraps	17.00	Necessary NVA	Can move	—	S. Kowalczyk	Necessary NVA	—
Pump assembly line 1	Current	Station 4	4	Functional test on rig	30.00	Necessary NVA	Fixed	Test rig is calibrated and certified at this station only	R. Ncube	Necessary NVA	Fixed
Pump assembly line 1	Current	Station 4	4	Label, pack and place on despatch conveyor	22.00	Value-adding	Can move	—	R. Ncube	Value-adding	—

Notes

Sample study — a four-station pump assembly line running against a takt of 55 seconds. Station 2 is the constraint at 63 seconds, so the line runs at 63 seconds per unit no matter how quickly the other three work. The 204 seconds of work content fits inside four stations, so the answer here is to remove the nine seconds of fetching, then move the sealant bead to station 3, not to add a station. Replace every element and every time with your own before relying on any of it.

A balanced chart is not a balanced line. Nothing here has been proved until the operators have run the new arrangement for a full shift and the output has been counted — bars on a screen do not account for reach, handling, fatigue, learning time or the awkwardness of a station nobody has worked before. Element times taken from a single observation carry all the uncertainty of a single observation: one operator, one part, one day. Time several cycles before you move work, and treat every figure here as the arithmetic of the numbers you entered rather than a prediction of what the line will do.

