Heijunka mix and pitch release

Build and reconcile a leveled mix pattern from demand and pack size, while distinguishing a mathematically balanced release plan from a feasible production method.

A release box is a plan, not proof of capability

Fictional A/B line: 400 net minutes must serve demand for 180 A and 120 B. Each authorized pack holds six units. Planner Celia proposes the repeating pattern A, A, B, A, B and asks the team to check its quantities, timing and operating assumptions.

Your role and the reference condition

Production planner with operators, quality and changeover owner.
Normal: The release pattern represents wanted mix within the available period, with feasible capacity and quality controls.
Gap: A neat sequence can conceal infeasible changeovers or obsolete demand.

Work within these conditions

1. Takt is 80 seconds per required unit.

2. No measured changeover or cycle capability is supplied; the release plan remains a teaching proposal.

Fictional teaching case. Supplied observations support the exercise; proposed actions are not verified customer results.

See how the method works

Level both volume and mix over a useful planning horizon. The exercise has 400 available minutes and demand for 300 units, giving an 80-second takt. Six units make an eight-minute pitch. Fifty packs therefore fill the horizon. Repeating AABAB ten times releases 30 A packs and 20 B packs: 180 A units and 120 B units. The box makes the next release and any missed interval visible. Before trialing this pattern, verify changeover time, capacity and actual demand. A tidy repeating schedule is not permission to produce items that are no longer needed.

80 s takt x 6 units = 8 min pitch

Read each row left to right: one complete A A B A B pattern.

0-40 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
40-80 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
80-120 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
120-160 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
160-200 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
200-240 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
240-280 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
280-320 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
320-360 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**
360-400 min	**A / 6**	**A / 6**	**B / 6**	**A / 6**	**B / 6**

10 repeats: A 180 + B 120 = 300 units in 400 min

Each cell is one six-unit release. Mix remains wanted; changeover, capacity and quality feasibility must be checked.

Method exhibit: Daily mix, Pitch, A A B A B, Repeat ten times.

Follow the evidence and decisions

Inspect the supplied case inputs

Input	Declared value
Demand	180 A + 120 B = 300 units
Available time	400 net min
Pack size	6 units
Pattern	A, A, B, A, B
Proposed repeats	10

01 / Establish takt and pitch

Celia divides 400 x 60 by 300 to obtain 80 seconds per unit. She multiplies by six units per pack and converts 480 seconds to eight minutes per release interval.

Why: Takt is per unit; pitch groups that rhythm into a practical pack-level interval. Confusing the units would make the board impossible to reconcile.

Evidence / check: 80 sec/unit x 6 units = 480 sec = 8 min per pitch.

02 / Read one complete pattern

Mark five consecutive eight-minute slots A, A, B, A, B. Three A packs give 18 A; two B packs give 12 B. The pattern spans 40 minutes.

Why: One complete repeat exposes both mix and volume. Counting colored slots without pack quantities could confuse packs with finished units.

Evidence / check: One pattern: 30 units, comprising 18 A and 12 B.

03 / Reconcile the whole planning period

Repeat the pattern ten times. The plan contains 50 pitches, 30 A packs and 20 B packs. Compare both product totals with demand.

Why: A total of 300 is insufficient if it contains the wrong product mix. Time and each product quantity must agree independently.

Evidence / check: 50 x 8 = 400 min; A = 30 x 6 = 180; B = 20 x 6 = 120.

04 / Check whether the release can be performed

The team checks changeovers, equipment response, staffing, material readiness and first-piece acceptance against the proposed sequence. It records missing capability data instead of assuming eight minutes is available for any amount of work.

Why: Leveling depends on operating conditions. A visually level board does not absorb unmeasured setup losses or make unavailable material eligible.

Evidence / check: Feasibility review names the changeover owner and required timing/quality evidence.

05 / Respond to actual demand and abnormality

Record plan versus eligible completion by pitch and make exceptions visible. Review the pattern when demand or pack size changes; preserve the approved quality response when a pack cannot be completed.

Why: Heijunka is not permission to make an obsolete mix simply to fill every box. The pattern serves customer demand.

Evidence / check: A missed pitch has a cause and response; it is not silently filled with another unwanted product.

Completed first-pattern and daily reconciliation

Item	Packs	Units / time
Slots 1-5	A, A, B, A, B	18 A + 12 B; 40 min
Ten patterns	50 packs	300 units; 400 min
Daily A	30 packs	180 units
Daily B	20 packs	120 units
Capability	Not demonstrated	Observe changeovers and quality

The requested mix changes

Confirmed demand becomes 150 A and 150 B, still totaling 300.

Decision

Rebuild the mix pattern; retaining the old pattern would make 30 excess A and leave 30 B short.

Reasoning

The unchanged total and takt do not make the old product sequence correct.

What would change the decision?

New plan reconciles each product separately before release.

Practise with a changed case

An A/B pattern with another pack size

Separate fictional line: 360 net minutes, demand for 80 A and 160 B, four units per pack. Test the repeated pattern A, B, B.

Input	Value
Net time / demand	360 min / 240 units
Pack size	4 units
Proposed pattern	A, B, B

Your task

1. Calculate takt and pitch.
2. Calculate the required repeats and each product total.
3. Name the operating evidence required before approving the sequence.

Use the next page to record your reasoning before reading the answer.

Your practice worksheet

An A/B pattern with another pack size

Takt with units

Pitch with units

Pattern quantity and repeats

A/B reconciliation

Feasibility evidence

Complete your reasoning before turning to the answer. Use the separate learner workbook for group practice.

Check your reasoning and transfer it

1. Takt is 90 sec/unit and pitch is 360 seconds, or six minutes, per four-unit pack.

2. One A/B/B repeat produces 4 A and 8 B. Twenty repeats produce 80 A and 160 B, using 60 pitches x 6 = 360 minutes.

3. The calculation does not verify changeovers, material readiness or achievable quality at this mix.

Suggested completed record

Calculation	Intermediate result	Checked result
Takt / pitch	90 sec/unit	6 min/pack
One repeat	3 packs	4 A + 8 B
Twenty repeats	60 packs	80 A + 160 B; 360 min

Plausible wrong turns

1. Pitch is not the unit takt.

2. Meeting total volume does not establish correct product mix.

Evidence of a sound answer

1. Reconcile time, pack count and each product.

2. State what the supplied inputs cannot prove.

Take the learning back to work

Commitment	Agreed follow-through
Owner	Planning owner with line and changeover representatives
Record	Mix/pitch plan, feasibility evidence and pitch exceptions
Review	At each planning-basis change and during the controlled trial
Verification evidence	Wanted units completed with valid quality status and feasible changeover conditions
If unresolved	Revise the release pattern or enabling conditions; do not use overproduction to make the board look complete.

Help someone else apply the method

Prepare

1. Two colors of blank pack tokens and a pitch grid
2. Calculator; separate changed-demand card

Minutes	Activity and coaching prompt
4	Translate demand to packs Which units belong on the release interval?
7	Fill one five-slot pattern Where do 18 A and 12 B come from?
9	Solve the A/B/B variant Can both mix and time be reconciled?
5	Challenge feasibility What could make a correct calculation impossible to run?

Debrief

1. Ask what changes when mix changes but total demand does not.
2. Distinguish leveling from suppressing a quality signal.

Individual or remote practice

Build one repeat first, then multiply and audit the total against each input.

Connect the method and check its boundaries

Before application

1. Stable enough demand horizon
2. Approved changeover capacity

Outside this lesson

1. A fixed pattern must not manufacture unwanted stock
2. Pitch is not an individual cycle time

LEI: Heijunka Box

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Mix/volume leveling, pitch = takt x pack quantity

Method reference; original OPEX scenario and diagram are synthetic teaching content, not source case results.

Open this lesson and its visual aids