Operations Management

Curated undergraduate study track (not accredited, no external exam). Original explanations and practice only, following the reviewed course handout.

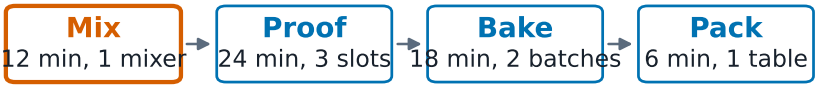
One line, one contract, one habit

- The second site runs the festival contract: 120-bun batches, 480 an hour, 19,200 a week.
- The habit - **find the constraint, measure the error, state the boundary**.

Processes and capacity: the slowest station

The bake line: the slowest station sets the pace

BOTTLENECK: cycle time 12 min



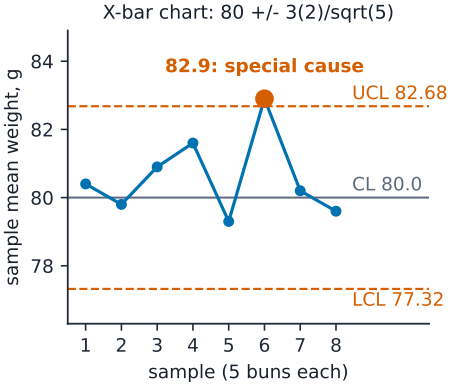
utilisation at the festival demand of 4 batches an hour

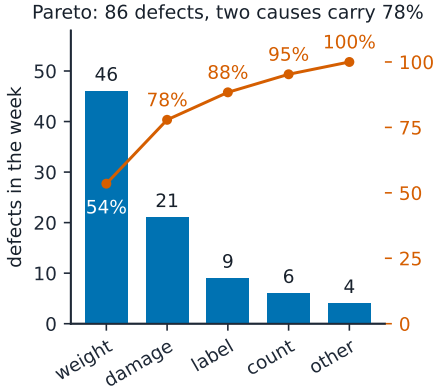
80%	53%	60%	40%

Little: WIP = TH x FT = 4 per hour x 1 hour = 4 batches in the line | 480 buns an hour

Mixing is the **bottleneck**: a 12-minute cycle sets 600 buns an hour.

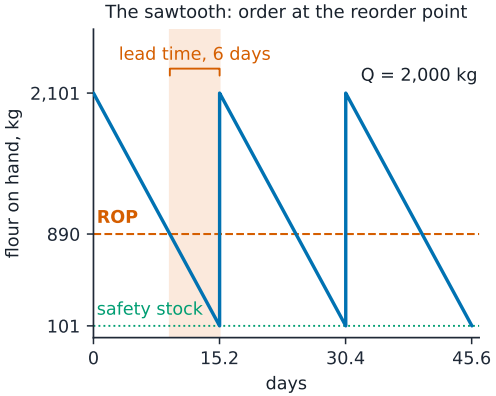
Quality: steer the process, do not nudge it

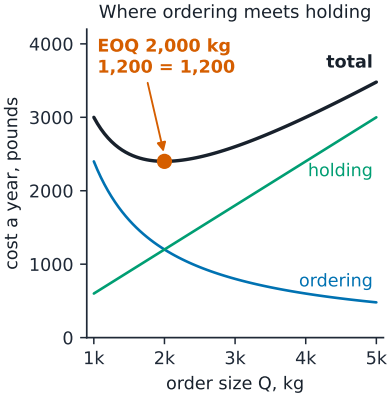




82.9 breaks the 82.68 limit; two causes carry 78% of defects.

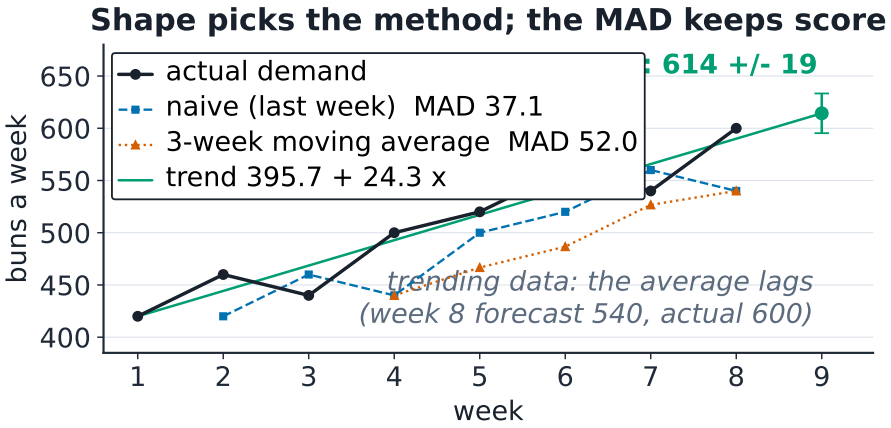
Inventory: where ordering meets holding





EOQ 2,000 kg; reorder at 890 with 101 kg of **safety stock**.

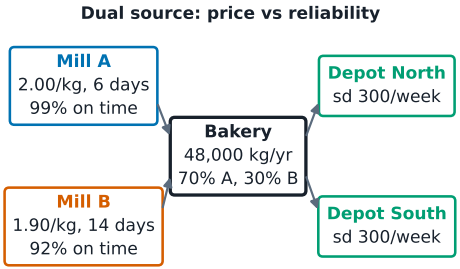
Forecasting: shape picks the method

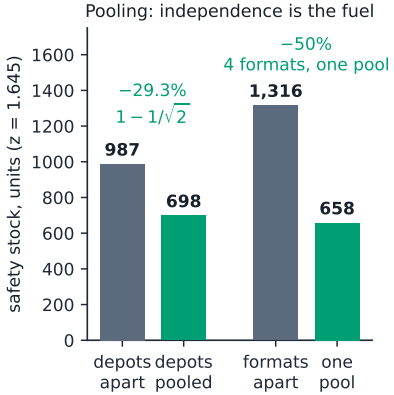


The trend line beats the averages: week 9 forecast 614 +/- 19.

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Supply chains: independence is the fuel

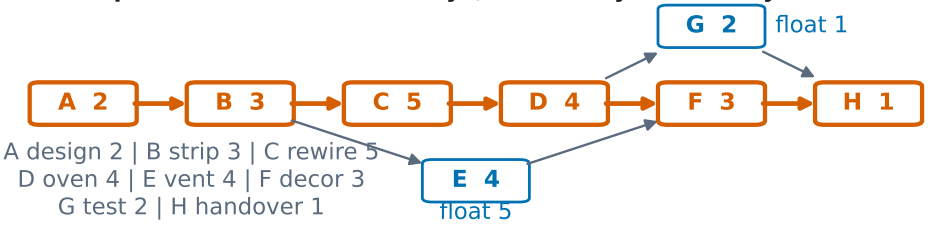


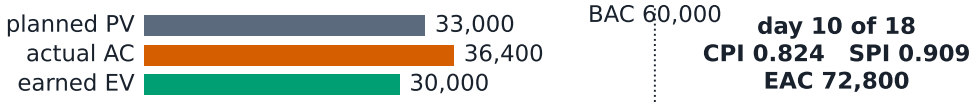


Split supply 70/30; pooling cuts **safety stock** by 29.3%.

Project management: the critical path is the project

Critical path A-B-C-D-F-H = 18 days; crash C by 2 and D by 1 to reach 15



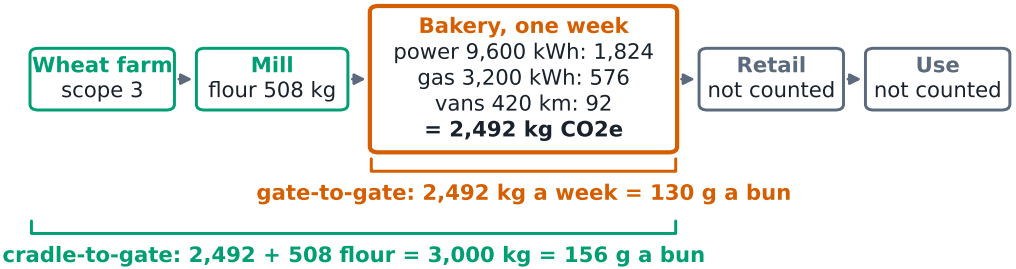


Critical path 18 days; at day 10, CPI 0.824 and EAC 72,800.

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Sustainability in operations: the boundary is the claim

Same bun, two footprints: the boundary is the claim



renewable tariff at 0.06 kg/kWh cuts electricity 1,824 to 576: the site week halves to 1,244; the flour does not move

2,492 kg a week gate-to-gate; 3,000 kg with the flour counted.

Processes and capacity in action: the Saturday surge

1. **Gap** One batch short every hour: 8 batches over the day.
2. **Buy** A second mixer: bake then clears the 6 at 6.67 - capital for one day a week.
3. **Bake ahead** Two Friday hours at 5 an hour: 5 x 2 = 10 batches, covering the 8 with two spare.

Quality in action: the 19,000-pound week

1. **Rank** 67 of 86 - 77.9% - sit in two causes.
2. **Trace** Underweight traces to one filler head; the rebuild costs 800.
3. **Pay** Prevention 1,200 and appraisal 2,400 are 19% of the bill; failure is 81% - fix it at the front.

Inventory in action: the discount check

1. **EOQ** Purchase 96,000 + ordering 1,200 + holding 1,200 = 98,400.
2. **4,000** Purchase 94,080 + ordering 600 + holding 2,400 = 97,080: saves 1,320.
3. **Breakeven** Extra logistics are exactly 600, so any discount above 0.625% pays - below it, cheap flour costs more.

Forecasting in action: the recorded uplift

1. **Adjust** 614 x 1.10 = 675, written as: judgemental uplift +10%, second stage, sales lead, dated.
2. **Actual** 700 - the adjusted number was 25 low; the bare 614 would have been 86 low.
3. **Learn** Because it is written down, next year the base gets a better prior - a forecast you cannot audit is a rumour with decimals.

Supply chains in action: the postponed bun

1. **Pool** Generic buns carry one forecast: **safety stock** 1,316 to 658.
2. **Cost** A depot packing line at 18,000.
3. **Payback** Write-offs fall with the stock - about 300 a week, 15,600 a year: 14 months.

Project management in action: the earned-value audit

1. **Ratios** CPI = 30,000 / 36,400 = 0.824; SPI = 30,000 / 33,000 = 0.909.
2. **Forecast** EAC = 60,000 / 0.824 = 72,800 - a 12,800 overrun.
3. **Early** The naive read - 61% of the money gone - hides that only 50% of the value is earned.

Sustainability in action: the tray that comes back

1. **98%** 840 lost + 42,000 washes = 6,090 a year: saves 3,150, payback 2.8 years, emissions 2.4 t.
2. **95%** Losses alone 11,550: the scheme loses 3,780 a year.
3. **Breakeven** 96.6% returns - the whole decision is the loss rate, inside the boundary.

The project sheet, reproducible

1. **Line** Capacities 5.00 / 7.50 / 6.67 / 10.00; **bottleneck** mix; WIP 4 = 4 x 1.
2. **Numbers** Limits 80 +/- 2.68; EOQ 2,000, ROP 890; week 9 614; pooled 698; path 18 days, EAC 72,800; 2,492 kg.
3. **Standard** A reader with a calculator can check any number - that is the bar.

Check yourself

- The **bottleneck** and the **cycle time**? (Mix at 5.00; 12 minutes.)
- The X-bar limits and the EOQ? (77.32 to 82.68; 2,000 kg.)
- Week 9 and the **critical path**? (614 plus or minus 19; 18 days.)
- Gate-to-gate and cradle-to-gate? (2,492 and 3,000 kg a week.)