

A3 Problem Solving

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

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Work one problem through on one sheet, from background to follow-up, with the data that proves the countermeasures worked and what the fix is worth.

For: Team leaders, continuous-improvement and quality engineers, supervisors and managers who coach problem solving.

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Quick start

1. On Setup, type your organisation, currency label and the status date for the countermeasures.
2. On the A3 sheet, fill the header and boxes 1 to 3: background, current condition (the metric, its unit and which direction is better) and the goal.
3. Type the weekly measurements in the data box, marking each week Baseline, Trial or After.
4. Work boxes 4 and 5: the five whys and root cause, then the countermeasures with owners and dates.
5. Read box 6 (effect against the target) and the benefit estimate, then write the follow-up in box 7 and print the sheet.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Organisation, currency label and the status date the countermeasures are judged at.
A3	One problem on one sheet: background, current condition, goal, root cause, countermeasures, effect and follow-up.
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
Baseline average	Average of the data-box weeks marked Baseline.	metric unit
After average	Average of the weeks marked After (Trial weeks count in neither average).	metric unit
Improvement	Baseline - after when lower is better; after - baseline when higher is better.	metric unit
Improvement on the baseline	Improvement / baseline average.	%

Quantity	How it is calculated	Units
Still to go to the target	After - target (lower is better) or target - after (higher is better); 0 or less means the target is met.	metric unit
Result against the target	On target when the after average meets the target; Near target within 5% of it; otherwise Above target (lower is better) or Below target.	-
Countermeasure status	Complete when done; Overdue when due < status date; Due soon within the warning days; Check with no due date.	-
Annual benefit (est.)	Improvement x occurrences per year x value of one unit of the metric.	currency/year
Net annual benefit and payback	Annual benefit - ongoing cost; payback = investment / net annual benefit x 12 (No payback when the net benefit is 0 or less).	currency, months

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 A3 sheet with the example data for Brookfield Plastics, 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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One problem on one sheet: background, current condition, goal, root cause, countermeasures, effect and follow-up.

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Example A3 for Brookfield Plastics (fictional). Overwrite the yellow cells with your own problem; blue cells calculate. Print this sheet or save it as PDF to share it.

Title	Cut mould changeover time on Press 7	Area or process	Moulding hall, Press 7 (350 t)
Owner	M. Ferreira, process technician	Started	27 Jul 2026
Sponsor	K. Adeyemi, plant manager	Last revised	9 Oct 2026

1. Background: why this problem matters

Background	Press 7 runs 14 moulds in small batches, with about two changeovers a day. Every minute of changeover is a minute the press makes nothing, and long changeovers push planners into bigger batches and more stock. Customer lead times for the clip and housing families are being cut from 10 to 5 days next quarter.
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2. Current condition: what is happening, in numbers

What we see	Changeovers averaged 74 minutes over five weeks of timing, from the last good part to the first good part. Video of three changeovers showed the press standing while the next mould heated, 16 clamp bolts were undone and refitted, and tools and fittings were fetched.
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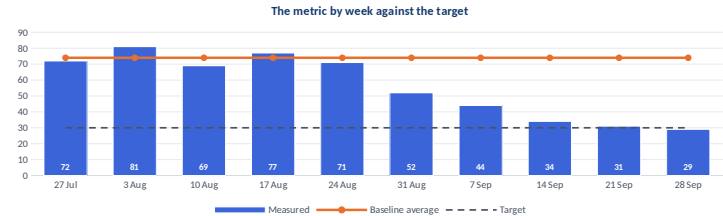
Metric	Changeover time, last good p	Better when the metric is	Lower
Unit of the metric	min	First week of data (week starting)	27 Jul 2026

Data box: the metric by week

Week starting	27 Jul	3 Aug	10 Aug	17 Aug	24 Aug	31 Aug	7 Sep	14 Sep	21 Sep	28 Sep
Phase	Baseline	Baseline	Baseline	Baseline	Baseline	Trial	Trial	After	After	After
Measured	72.0	81.0	69.0	77.0	71.0	52.0	44.0	34.0	31.0	29.0
Target	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Baseline average	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0

3. Goal and 6. Effect confirmation

Target	30.0min	Improvement	42.7min
Target date	30 Oct 2026	Improvement on the baseline	57.7%
Baseline average	74.0min	Still to go to the target	1.3min
After average	31.3min	Result against the target	Near target



4. Root cause analysis: ask why until you reach a cause you can act on

Why 1	Changeovers take 74 min because the press stands idle while the next mould is heated and clamped.
Why 2	Heating and clamping are done inside the press: all of the changeover is internal setup.
Why 3	There is no pre-heat station and no list of what can be prepared before the press stops.
Why 4	Changeovers were never studied; each shift does them its own way.
Why 5	Changeover time was not measured or targeted, so nobody owned it.
Root cause	No separation of internal and external setup and no standard changeover method (confirmed on video: 61% of changeover time was work that can be done with the press running).

5. Countermeasures: what, who and when

No.	Countermeasure	Owner	Due	Done	Status
1	Pre-heat the next mould on a heated cart before the press	M. Ferreira	4 Sep 2026	2 Sep 2026	Complete
2	Standard changeover cart with every tool and fitting need	M. Ferreira	11 Sep 2026	10 Sep 2026	Complete
3	Quick mould clamps in place of 16 bolted clamps	T. Walsh	25 Sep 2026	28 Sep 2026	Complete
4	Water quick-connect manifold for the 8 cooling circuits	T. Walsh	2 Oct 2026		Overdue
5	Standard work and training for both shifts	R. Iqbal	16 Oct 2026		Due soon
6					

Benefit estimate (what the improvement is worth)

Occurrences per year	480per year	Annual benefit (est.)	51,200USD per year
Value of one unit of the metric	2.50USD per min	Net annual benefit (est.)	49,200USD per year
Ongoing cost per year	2,000USD per year	Payback	3.7months
One-off investment	15,000USD	Basis	Improvement x occurrences

7. Follow-up: standardise, share, and what is still open

Follow-up	Write the new changeover as standard work and train both shifts (action 5). Finish the water manifold (action 4), then re-measure for four weeks to confirm 30 minutes. Copy the heated cart and quick clamps to Presses 5 and 6. Planning to review batch sizes once the time is stable.
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