A SHOPFLOOROPS FIELD BOOK

One Comeback. The Repeat Defect Trail.

A field book for the defect that came back after the fix: from the old 8D to proof that the second fix holds.

8 STEPS · 12 TOOLS



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FIELD BOOK 05

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The part, the die, the lots and every number in this book are a made-up example. The tool sidebars show ShopFloorOps tools, which I make and sell. Every chapter teaches the step itself, so you can use your own forms. New to a term? See the quality glossary.

CHAPTER 1

Review the Last Fix

STEP 1 OF 8 | THE OLD 8D IS EVIDENCE

Monday, week 16. The customer's quality contact calls about sensor bracket BK-6139. Lot 6471, 120 pieces, and 7 of them have the two mounting holes too far apart. The bracket will not seat on the sensor. It is the same defect you closed 11 weeks ago.

Before anyone walks out to the floor, go to the filing cabinet and pull the old 8D. The theory people are about to offer is usually in there, and it is the same one that did not hold.

Read it as evidence

The old report records what the team believed at the time. Nobody wrote it to mislead you. Read it the way you would read a witness statement, and ask five things:

1. **Was the root cause proven or only stated?** Proven means someone turned the cause on and off and watched the defect follow it. This one says "operator did not check the first piece". Nobody ran a test.
2. **Did the action change the process or the person?** The action was to retrain the operators and add a first piece reminder. Six people sat through a session. The die, the press and the gage stayed as they were.
3. **Did anyone look at detection?** The report asks why the defect happened. It never asks why nobody caught it.
4. **What did the effectiveness check actually test?** It says no complaints for 30 days. Hold that thought until step 8.
5. **When did it close?** It closed in week 5, on the day the training ended. A fix that is closed the day it goes in has not been tested by anything.

Write each answer next to the old text in two words: proven, stated, missing. Most repeat defects show the same pattern. The cause was stated, the fix depended on people remembering, and the check was too short to see the failure come back.

Keep the old 8D open, not closed

Do not start a clean sheet and do not edit the old report. The old one stays exactly as it was, because it is part of the evidence. Open a new corrective action, link it to the old one by number, and say in the first line that this is a repeat. Your corrective action log should show the two as a pair. If it does not, that is a finding too, because nobody searching the log next year will know there was a first one.

Read more: how to write an 8D report. The old report is also a good test for the free 8D report checker. If the checker flags a missing verification, that is the same gap you just found by hand.

The mistake to avoid

Starting from the old root cause. It is tempting to say the operator missed the check again and go straight to a stronger reminder. If the first answer had been right, the defect would not be back. Treat the stated cause as a guess until you have seen it proven.

TOOL SIDEBAR

The tools: CAR Tracker Excel Spreadsheet (QA-F-375) and 8D Corrective Action Excel Form (QA-F-355)

Use the tracker to see the first action and the second side by side, with the old closing date and the new opening date in view. Use the 8D form for the new report, and put the old report number in the first field so the pair stays linked. If you already have your own log and form, the same rule applies: link the repeat to the original.

ON THE FLOOR MONDAY

- Pull the last closed action that came back.
- Mark each cause proven, stated or missing.
- Link the repeat to the original this week.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 2

Restate the Problem

STEP 2 OF 8 | BOTH OCCURRENCES SIDE BY SIDE

Tuesday morning, a small conference table with two folders on it. Left folder: lot 5208, the first complaint. Right folder: lot 6471, this one. You are about to find out whether this is one problem that came back or two problems that look alike.

The difference matters. The same failure means the old investigation was incomplete and you reopen it. A new failure is a separate problem with its own corrective action. Either way, write the problem statement again from the evidence.

Put the facts in two columns

Take each fact from the paperwork, not from memory. The same rows for both:

1. **The part and the characteristic.** Both: BK-6139, hole to hole spacing, 38.00 plus or minus 0.20 mm.
2. **The defect.** Both: spacing over the upper limit of 38.20 mm. The first lot read 38.23 to 38.31. This one reads 38.22 to 38.30.
3. **The count.** First: 9 of 150, which is 6.0 percent. Now: 7 of 120, which is 5.8 percent. The rate barely moved in 11 weeks.
4. **Where it was found.** Both at the customer's assembly station, not by us.
5. **When it was made.** The traveler for each lot shows the pieces came from the end of a long run, the last stretch before the die came out of the press.

Now list what changed

This is the half people skip. The two lots were made on different presses: press 4 the first time, press 2 this time. Different shifts, the second shift then and the first shift now. Different operators. Different coil lots.

That list already damages the old root cause. If the operator was the cause, the defect should have followed one operator or one shift. It did not. The things that did not change are the die, D-3082, and the position in the run. Write those two at the top of the page. They are your first real lead.

Write the new statement

One or two sentences, no cause, no opinion. For this case: "Hole to hole spacing on BK-6139 is over the upper limit on pieces from the end of long runs of die D-3082. Found at the customer on lot 6471, 7 of 120 pieces, and previously on lot 5208." It names the part, the characteristic, the direction, the die, the count and the earlier lot. A reader can check every word of it.

Read more: how to write a problem statement.

The mistake to avoid

Writing the new statement to match the old one. Copying "operator error on the first piece check" forward carries the old guess into the new report. Write from the two sets of facts.

TOOL SIDEBAR

The tool: A3 Problem Solving Template (QA-F-360)

An A3 puts the problem, the two occurrences and the current condition on one page, which is where you want them while you compare. Fill in the left side first and leave the cause blank. Keep the two columns in your own format.

ON THE FLOOR MONDAY

- Pull the paperwork for both occurrences.
- Write what is the same and what changed.
- Rewrite the statement without the old cause.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 3

Contain It

STEP 3 OF 8 | TREAT WHAT IS MADE AS SUSPECT

Tuesday afternoon, finished goods. Two lots are packed and waiting for a truck. Nobody has checked them for hole spacing, because nobody checks hole spacing at packing. It is back, so everything made on die D-3082 since the last good check is suspect until you have looked at it.

The same four places apply as the first time, with less patience from the customer. Do them in order and write down what each holds.

1. **At the customer.** Ask how many pieces they have, and whether they will sort or send back. Here the customer sorted lot 6471 and found 7 bad of 120.
2. **In transit.** Nothing was on a truck this time. Write 0, because a blank looks like you forgot.
3. **In finished goods.** 240 pieces in two lots. Sort every piece on hole spacing with a fixture gage. Found 14 bad.
4. **In work in process.** 310 pieces on the floor and in the die. Stop the press, sort what is made, and tag what is left. Found 18 bad.

The total sorted is 670 pieces. The total bad is 39. Those two numbers go on the report and they do not change unless someone sorts more.

Do not trust the old check

The first piece check is the one the old 8D leaned on. In this case it passed on every run, including the run that made the bad lot. A check that passes while the defect is being made cannot be your containment. Sort with a gage that reads the characteristic, and sort 100 percent.

Mark the first clean lot

Containment ends at a point you can name. Here it is the first lot built after the die gets a corrected setup, which becomes lot 6475. Put that lot number on the report and on the packing label, so the customer can tell which pieces to trust. Until it exists, everything before it is held or sorted.

Tell the customer what you found and what you will do before they have to ask twice. The report should not be the first they hear of the numbers.

Read more: containment vs correction vs corrective action, the red tag guide and the free containment checklist builder. Book 1 has the full walk through in Contain It.

The mistake to avoid

Containing only what the customer reported. They found one lot. You found 32 more bad pieces that never left the building, and the next complaint would have been the next lot.

TOOL SIDEBAR

The tools: NCM Red Tag Log Excel (QA-F-215) and Quality Alert Form Excel (QA-F-200)

Log every tagged piece and every location in the red tag log, so the sort counts match the report. Use the quality alert to tell the floor and the shipping desk, on one page, what is held and what the first clean lot will be. Use your own forms if you have them; the four places stay the same.

ON THE FLOOR MONDAY

- Look at what your last containment checked.
- Check all four places have a number, even 0.
- Name the first clean lot before you need it.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 4

5-Why

STEP 4 OF 8 | OCCURRENCE, ESCAPE AND SYSTEM

Wednesday, 7:30, the die room. Die D-3082 is on the bench. A tooling lead and a quality technician stand at the bench with the old 8D, which says the cause was the operator. Nobody in the room believes that any more.

A repeat defect needs three questions, not one. Why did it happen. Why was it not caught. Why did the system let the first answer close. Run each as its own chain. Book 1 covers the basics in Find the Cause; this chapter is about the legs that were skipped.

Leg one: occurrence

1. Why was the second hole too far from the first? The strip moved in the die before the hole was pierced.
2. Why did it move? The pilot that locates the strip was worn. It measures 3.940 mm. New is 4.000 mm.
3. Why was it worn that far? It stayed in the die past its life. Nobody could say when it was last changed.
4. Why was there no record? The preventive maintenance list covers the press and the die as a whole. The pilot is not on it.
5. Why is it not on it? Nobody owns wear parts inside a die. That is a cause you can control.

Prove it by turning it on and off

This is the test the old 8D never ran. Put three pilots in the same die, one at a time: 4.000 mm, 3.970 mm and the worn 3.940 mm. Run 2,400 pieces each. Read the hole spacing at pieces 1, 600, 1,200, 1,800, 2,400.

All three read 38.03 on the first piece. That is why the first piece check passes. By piece 2,400 the new pilot has moved 0.02 mm. The 3.970 mm pilot has moved 0.08 mm. The worn pilot has moved 0.21 mm and reads 38.24, which is 0.04 mm over the limit. Turn the cause on and the defect appears. Turn it off and it goes away. Now the cause is proven, not stated.

Leg two: escape

1. Why did the defect reach the customer? Nobody checked spacing late in the run.
2. Why not? The control plan has one spacing check, on the first piece. The final sample uses a plug gage on hole size.
3. Why does that miss it? A plug gage reads the diameter of a hole. It cannot read how far apart two holes are. Both holes pass.
4. Why was it chosen? It was already at the station. Nobody asked what it measured.

Leg three: system

Why did a root cause that was never proven get approved and closed? The 8D form had no field for a test. The closing review checked that every box was filled. It did not check that the cause was true. And the effectiveness check, no complaints for 30 days, was shorter than the 8 weeks between long runs, so it could never have seen the failure. That is a system cause, and it is the one that will let the next repeat through.

Read more: how to do a 5 Why, a worked 5 Why example and the free 5 Why helper.

The mistake to avoid

Stopping at the first leg. You can prove the occurrence cause perfectly and still ship the next defect, because the gage that missed it is still at the station. Run all three, even when the first one feels finished.

TOOL SIDEBAR

The tool: 3-Legged 5 Why Analysis (QA-F-310)

The three legs match the three chains above: occurrence, escape and system. Fill in each leg separately, and write next to every answer how you know it, a measurement or a record. An answer with no evidence is a guess. If you use your own layout, keep the legs apart.

ON THE FLOOR MONDAY

- Ask the escape question on a blank page.
- Write what each check can and cannot read.
- Add to your root cause step: how was it proven?

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 5

Fishbone

STEP 5 OF 8 | THE CATEGORIES SKIPPED LAST TIME

Wednesday, after lunch. The old fishbone is taped to the wall. It has branches for People and for Method. The other four, Machine, Material, Measurement and Environment, are empty. The team filled in 2 of 6 categories and wrote the cause the first time one of them looked likely.

The 5-Why gave you a proven cause and a proven escape. The fishbone has a different job on a repeat. It checks that you did not stop looking too soon, and it makes you say what you ruled out and why. Do the four skipped categories first.

Go through every category

For each cause on the board, put one of three marks on it: confirmed, ruled out or unknown. Then write the evidence beside the mark. A mark with no evidence does not count.

1. **Machine.** Pilot worn below its limit: confirmed, by the three pilot runs. Press 4 against press 2: ruled out, because the defect appeared on both.
2. **Material.** Different coil lots in the two occurrences: ruled out. The two lots came from different coils and the defect was the same.
3. **Measurement.** The plug gage reads hole size, not spacing: confirmed. It is the reason the defect escaped.
4. **Method.** First piece is the only spacing check in a run: confirmed. It passes before the defect starts.
5. **People.** Operator error: ruled out. Different operators, different shifts, same defect, and both first pieces were good.

6 **Environment.** Shop temperature: unknown. No temperature record was kept.

That is 3 confirmed, 3 ruled out and 1 unknown. Say the unknown out loud in the report. Here the three pilot runs held everything else the same, so temperature is unlikely to matter, but unlikely is not ruled out.

Test it against both occurrences

A cause belongs on the confirmed list only if it explains both lots. The worn pilot does: both lots came from the end of long runs of the same die. The gage does: neither lot was caught. The first piece check does: both first pieces passed. The old cause, the operator, fails the test, because it explains neither the different people nor the end of the run.

If a cause explains only one of the two, it is probably a contributor or a coincidence. Keep it on the board, mark it, and do not build the fix around it.

What the fishbone is for

At this point the board makes the argument for you. Two confirmed causes and a confirmed method gap point at the same place: the process around the die, not the person at the press. The fishbone does not find that. The 5-Why already found it. The fishbone is what lets you show anyone reading the report that you looked everywhere else first.

Read more: how to make a fishbone diagram. Book 1 shows the full method in Find the Cause.

The mistake to avoid

Filling the branches that feel likely and leaving the rest blank. A blank branch tells the next reader that you did not look, and the next reader may be the customer. Write ruled out or unknown on every branch, with the reason.

TOOL SIDEBAR

The tool: Fishbone Diagram Excel Template (QA-F-365)

Use the six categories as a checklist, not as a drawing. Every cause gets a mark and a line of evidence. Keep the old fishbone next to the new one so the skipped branches are visible, then retire the old one only when the new one explains both occurrences.

ON THE FLOOR MONDAY

- Count the empty branches on your last fishbone.
- Mark each confirmed, ruled out or unknown.
- Write the evidence beside every mark.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 6

Corrective Action

STEP 6 OF 8 | CHANGE THE PROCESS, NOT THE PERSON

Thursday, week 16. The action meeting. The last meeting like this ended with a list that began with the word retrain. Today the list starts somewhere else.

You have a proven cause, a proven escape and a system gap. Each needs the strongest action available. Rank them, strongest first:

1. **Remove the possibility.** Change the design or the tool so the failure cannot happen.
2. **Error proof it.** Add something physical that stops the mistake or flags it, so nobody has to remember.
3. **Detect it.** Add a check that reads the characteristic where the failure shows up.
4. **Train or remind.** Useful as support. Never enough alone, and never a root cause fix.

Match an action to each cause

The worn pilot is the occurrence cause. Removing the possibility is not on the table, because the die works. Error proofing is. The team hangs a go/no-go pin at 3.970 mm on the die. The pin goes in the pilot hole at every setup, and the die is not released to the press until the setup sheet carries a signed result. The limit comes from the test. The 3.970 mm pilot finished the 2,400 piece run at 38.11, 0.09 mm inside the upper limit. The worn pilot finished over.

The escape needs detection. A fixture gage that reads hole spacing replaces the plug gage on this characteristic. It is used on the first piece, every 600 pieces and on the last piece, which is 5 readings in a 2,400 piece run. The worn pilot read 38.19 at

piece 1,800, only 0.01 mm inside the limit, and 38.24 at piece 2,400. The last reading catches it, and the reaction plan sorts back to the 1,800 reading.

The system gap needs a system change. The pilot goes on the preventive maintenance list with a named owner. The 8D form gets a required field, how was the cause proven, and a report with it empty does not close.

Put an owner and a date on each

1. Pilot pin check on the die setup sheet, go/no-go pin at the limit. Owner: tooling lead. Due: week 17.
2. Fixture gage spacing check, first piece, every 600 and the last piece. Owner: quality technician. Due: week 17.
3. Add the die pilot to the preventive maintenance list. Owner: maintenance lead. Due: week 18.

Retraining stays off the list, because as an action it would repeat the first report.

Read more: corrective vs preventive action and the free 8D report checker.

The mistake to avoid

Picking the action because it is easy to close. Ask of each action: if someone forgets, does the defect still get stopped? If not, find a stronger one.

TOOL SIDEBAR

The tool: 8D Corrective Action Excel Form (QA-F-355)

Use the form to hold the three actions with their owners and dates, and use the cause proof field for the pilot test. It is the same form as step 1, so the new report and the old one stay linked.

ON THE FLOOR MONDAY

- Read the actions on your last corrective action.
- Mark each: remove, error proof, detect or train.
- Replace any that is only training.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 7

Lock It In

STEP 7 OF 8 | PFMEA, CONTROL PLAN, INSTRUCTION, AUDIT

Thursday, week 17, the quality office. The pin gage is on the die and the fixture gage is at the press. Neither is in a controlled record yet. If it stays that way, the fix lives in a few people's memory, which is where the last one lived.

Four records change, and they must end up saying the same thing.

The PFMEA

Find the row for hole spacing. In this case it was there. The failure mode was right, but the cause read "operator misload" and the only control was the first piece check. Change the cause to pilot wear. Raise the occurrence rating, because the die has no wear control until today. Add the pin check as a prevention control and the fixture gage as a detection control. Then rate it again with the new controls. If the failure mode was not on the PFMEA at all, that is the bigger finding: say so in the report. Book 1 covers the step in Fix the Risk.

The control plan

The spacing row currently says first piece, one piece per run, plug gage. Change it to fixture gage, first piece, every 600 pieces and the last piece. The reaction plan matters most. Write it as steps: stop the press, sort back to the last good reading, never more than 600 pieces, and tell the supervisor. "Notify supervisor" alone is not a reaction plan. The free control plan blank has a column for it. See Lock It In in Book 1 for the full method.

The work instruction

The die setup instruction gets a new step before release: pilot pin check, sign the setup sheet. Name the pin gage and write the limit on the step. Issue the new revision and pull the old one from the press the same day. See Change the Work.

The layered process audit

Add one yes or no question: is the pilot pin check signed on the current setup sheet for the die running on this press? That keeps the fix under review after the people who built it move on. See Check the Floor.

Then check all four agree on the characteristic, the gage, the 600 piece interval and the limit. Where one differs, someone will follow the wrong one.

Read more: how to write a PFMEA, how to write a control plan, how to write a work instruction and how to run a layered process audit.

The mistake to avoid

Updating the work instruction and leaving the PFMEA alone. The next person to open it starts from the old cause.

TOOL SIDEBAR

The tools: Process FMEA Template (QA-F-340), Control Plan Template (QA-F-350), Work Instruction & Change Release (QA-F-390) and Layered Process Audit (QA-F-205)

The first two hold the risk and the control for hole spacing, and they should be edited together. The change release logs the new instruction revision and who has seen it. The audit template holds the one new question.

ON THE FLOOR MONDAY

- Find one closed repeat on your PFMEA.
- Check the control plan and instruction agree.
- Add one audit question for it this week.

All 12 tools in this book: Repeat Defect Trail Bundle

CHAPTER 8

Effectiveness Check

STEP 8 OF 8 | SET THE PROOF BEFORE THE FIX GOES IN

Friday, week 17, before the next run starts. You are about to do the one thing the first 8D skipped: decide what proof will count, before you know the result.

The first effectiveness check said no complaints for 30 days. It could not fail. Long runs of this die happen about every 8 weeks. A 30 day window passes without a single long run in it.

Write the check first

Write it before the fix goes in, and write it so it can fail. Five parts:

1. **The measure.** Customer returns for hole spacing, and our own spacing readings at the press.
2. **The window.** Long enough to include the failure cycle. Here it is two long runs, 8 weeks each, plus 2 weeks for the customer to report. That is 18 weeks.
3. **The pass line.** No returns for spacing. Every end of run reading inside 37.80 to 38.20 mm. The pin check signed on every setup.
4. **The owner and the review date.** One person, and a date in the calendar: week 35.
5. **What happens on a fail.** The corrective action reopens. It does not get a new number and it does not get quietly extended.

Collect proof as you go

Do not wait until week 35 to start looking. Pull the end of run readings after each long run and attach them. Count the signatures on the setup sheets. By the review, the file should hold nearly everything, and the review is a decision.

A return reported in week 34 still fails the check, even with the window nearly closed. Say that in the plan so nobody argues about it later.

Close it on evidence

At the review, read the readings, the signatures and the customer record. If all of it meets the pass line, close the action and write what you saw. If not, reopen it and name the line it missed. The old report, the new report and the check stay linked as one file.

The old report closed the day the training ended. This one stays open for 18 weeks after the fix goes in.

Read more: how to run an effectiveness check. Book 1 covers the same step in Prove It Worked.

The mistake to avoid

Setting a window shorter than the failure cycle. If the defect only shows up on a long run, a short window can pass every time. Find out how often the failure can happen and cover at least two of them.

TOOL SIDEBAR

The tool: Effectiveness Verification Tracker (QA-F-393)

Set up the tracker before the fix goes in: the measure, the window, the pass line, the owner and the review date. Add the proof as it arrives and leave the close box empty until the review. It works with whichever corrective action log you already use.

ON THE FLOOR MONDAY

- Open the check on your last closed action.
- Compare its window with the failure cycle.
- Lengthen the window if it is shorter.

All 12 tools in this book: Repeat Defect Trail Bundle

Monday Board

One action per step. Pick one and do it this week.

1	Pull your last corrective action for a defect that came back and mark each cause proven, stated or missing.	☐
2	Write both occurrences side by side: what is the same, what changed.	☐
3	Check that all four containment places have a number, even if it is 0, and name the first clean lot.	☐
4	Ask why the defect was not caught, and check what your current gage can and cannot read.	☐
5	Count the empty branches on your last fishbone and mark each confirmed, ruled out or unknown.	☐
6	Mark each action on your last corrective action remove, error proof, detect or train. Replace any that is only training.	☐
7	Check that the PFMEA, control plan and work instruction say the same thing about one closed repeat.	☐
8	Compare the window on your last effectiveness check with how often the failure can happen.	☐