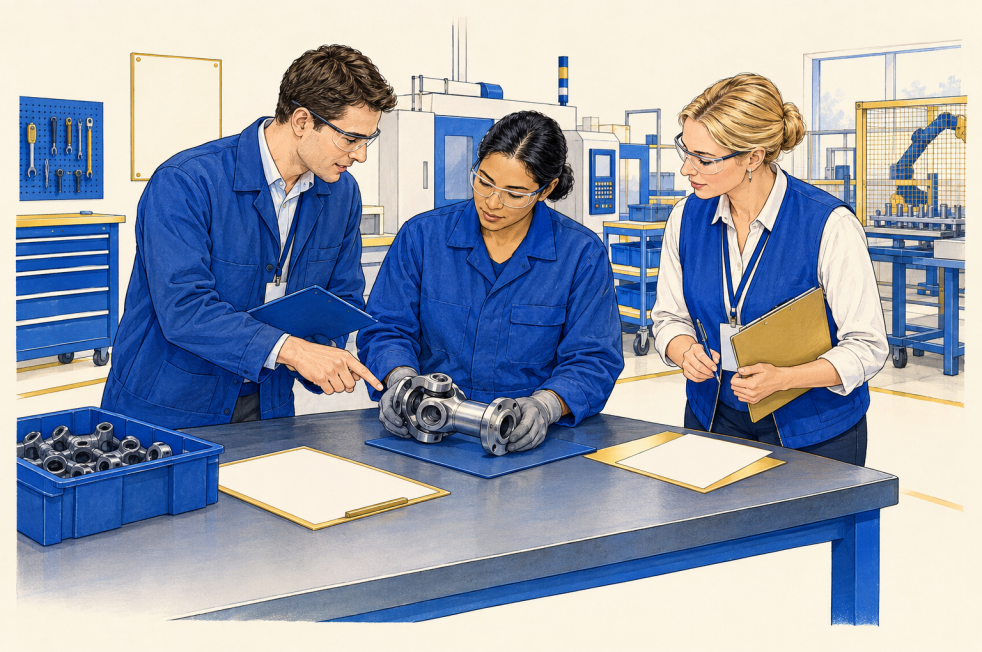
Build PFMEA from a failure chain to verified action

Build a coherent cause-mode-effect chain, distinguish prevention from detection, and connect a proposed risk action to verification and controlled documents.



Do not put the same phrase in every failure column

Fictional case: joint assembly can use the wrong program. The potential process failure is an under-tightened joint; the downstream effect is loss of joint function. Those distinctions remain in the core lesson. Facilitator Dev reviews a draft that repeats "wrong torque" in cause, mode and effect, with an invented risk number and a training action marked complete.

Your role and the reference condition

Cross-functional process-risk team with engineering and quality owners
Normal: Process structure and intended functions lead to specific failure chains, existing controls, applicable risk evaluation and verified actions.
Gap: The worksheet looks populated but cannot explain what fails, why it might happen or how an action would change the risk.

Work within these conditions

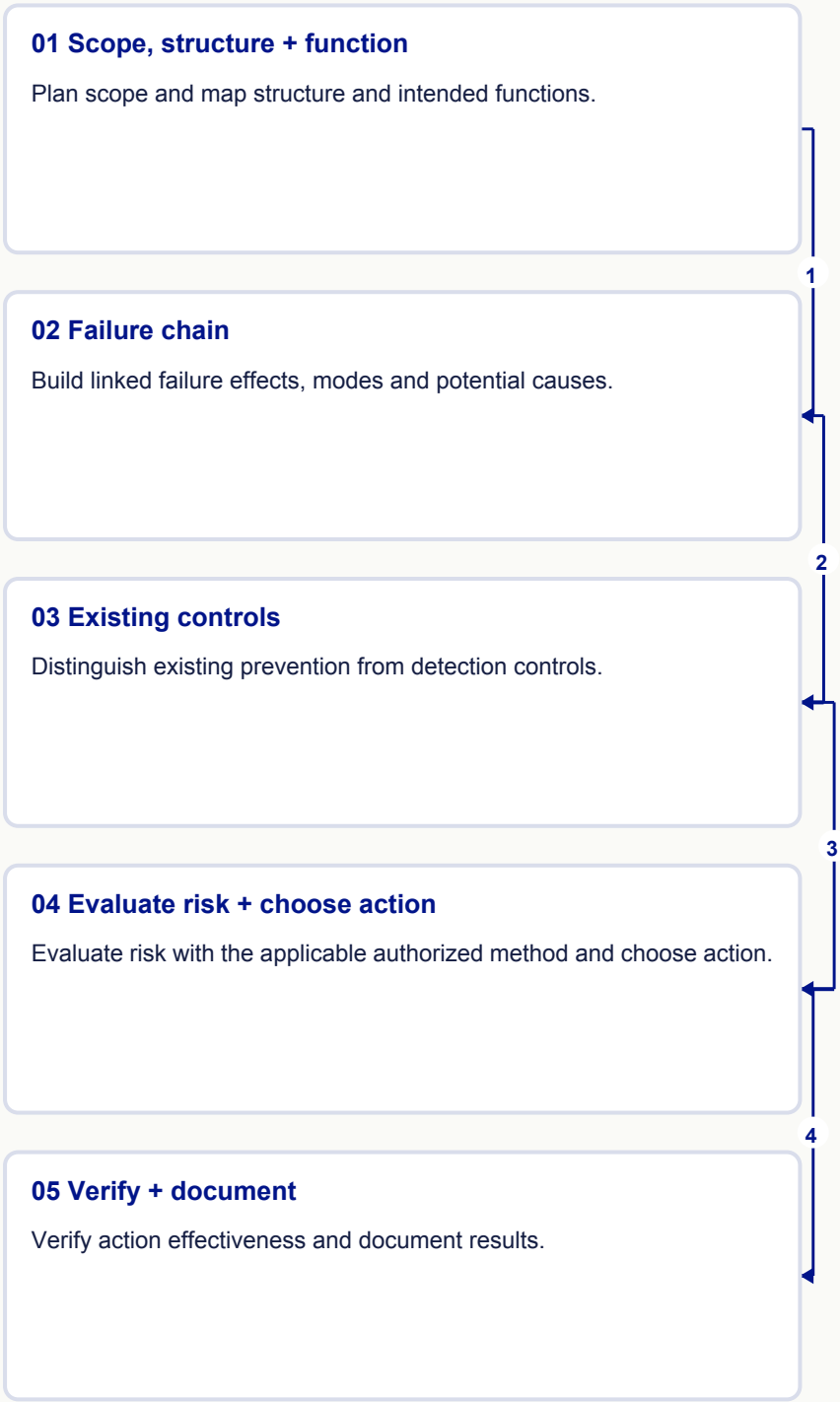
1. Use the applicable customer-authorized FMEA method and licensed criteria.

2. No proprietary severity/occurrence/detection or Action Priority tables are reproduced or inferred.

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

See how the method works

Process FMEA considers how a process could fail before relying on failures to teach the lesson. Start with scope, structure and intended functions. Connect the failure effect, failure mode and potential cause at the appropriate levels. Keep prevention controls separate from detection controls: stopping the wrong selection differs from finding an under-tightened joint afterwards. Evaluate risk with the applicable authorized method, choose actions, verify their implementation and effectiveness, and document the results. The seven-step approach organizes that work; it is not a reason to invent ratings or reproduce proprietary tables. A predicted cause in risk analysis is also not proof of the cause of a past incident.



Read every connection

1. Step 1 > 2
Continue with the next action

2. Step 2 > 3
Continue with the next action

3. Step 3 > 4
Continue with the next action

4. Step 4 > 5
Continue with the next action

Method exhibit: Scope, structure + function, Failure chain, Existing controls, Evaluate risk + choose action, Verify + document.

Follow the evidence and decisions

Inspect the supplied case inputs

Chain element	Fictional entry
Intended function	Produce the specified joint condition
Potential cause	Wrong program selected
Failure mode	Under-tightened joint
Effect	Joint function lost
Current proposal	Train operator; no verification evidence supplied

01 / Start from scope and function

Dev identifies the assembly operation, interfaces and required joint function before writing failure statements. He asks who receives the output and what the receiving process depends on.

Why: A failure chain needs a defined function and level of analysis. Without that context, a phrase may be mistaken for cause, mode or effect.

Evidence / check: The reviewed scope connects operation and receiving function.

02 / Separate the linked failure statements

The team records wrong-program selection as a potential cause, under-tightening as the mode and loss of joint function as the effect. It checks the causal direction rather than merely filling columns.

Why: The mode describes the process failing its function; cause explains how it could arise; effect describes its consequence at the relevant next level.

Evidence / check: The three statements differ and form a coherent chain.

03 / Distinguish existing controls

A suitable program-selection prevention control would address the cause. A suitable joint-condition inspection would detect a resulting condition. The team records what actually exists, not what it hopes to add.

Why: A proposed control is not an existing control, and detection does not necessarily prevent occurrence. This distinction affects the risk discussion and action choice.

Evidence / check: Each control is marked existing or proposed and prevention or detection.

04 / Evaluate and choose action through the applicable method

Dev uses the authorized evaluation criteria and ownership process. In the AIAG/VDA approach the seven-step structure and Action Priority are not replaced by an invented RPN threshold.

Why: Risk labels must come from the applicable method and evidence, not a convenient score. A public training example cannot supply a customer's ratings or approval.

Evidence / check: The record identifies the evaluation authority and keeps unsupported ratings blank.

05 / Verify the action and update the connected controls

The team proposes a controlled program-identity check or other engineered solution for specialist review, defines an authorized challenge and records evidence before changing residual-risk status. It aligns the control plan and instruction.

Why: Completing a training session is an activity, not proof of effective prevention. Verification must test the intended failure mechanism and preserve the outcome.

Evidence / check: The action has an owner, verification criterion and linked-document updates.

Completed failure-chain action record

Risk-chain item	Proposed action/evidence	Status
Wrong-program cause	Review prevention of incorrect program identity	Proposed; not verified
Under-tightened mode	Review suitable detection of joint condition	Actual capability to establish
Lost-function effect	Retain relevant consequence in evaluation	Do not reduce by assertion
Action verification	Authorized challenge and retained result	Not yet performed
Connected control	Control plan and instruction revisions	Update after approved change

The proposed interlock is bypassable

During design review, the team finds a maintenance override that can bypass the proposed program check.

Decision

Include authorized override conditions, access and return-to-normal verification in the risk/action review before calling prevention effective.

Reasoning

A control that works only in the normal demonstration may leave a relevant failure path open. Do not remove the path from the FMEA because it is inconvenient.

What would change the decision?

The verification plan includes the permitted override scenario and its responsibility.

Practise with a changed case

A different process failure chain

New fictional packing process can select the wrong label file, apply a wrong product label and cause a customer to receive misidentified contents. A final scan is proposed but not installed.

Fact or proposal	State
Wrong label file	Potential cause
Final scan	Proposed detection/control concept
Verification	Not performed

Your task

1. Write distinct cause, mode and effect statements.
2. Separate a prevention action from detection of the resulting label condition.
3. Define verification and document updates without inventing ratings.

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

Your practice worksheet

A different process failure chain

Function and receiver

Cause/mode/effect

Existing/proposed control

Action owner

Verification evidence

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

Check your reasoning and transfer it

1. Cause: wrong label file selected; mode: incorrect label applied; effect: misidentified contents at the customer. A file/product identity control may prevent selection; a suitable scan may detect a mismatch, depending on what it actually checks.

2. The scan cannot be listed as an effective existing control before installation and verification. Use authorized mismatch challenges and update connected instructions/control-plan records after approved changes.

Suggested completed record

Element	Correct statement	Evidence status
Cause	Wrong file selected	Potential
Mode	Incorrect label applied	Potential failure
Effect	Customer receives misidentified contents	Relevant consequence
Proposed scan	Detection depends on design	Unverified

Plausible wrong turns

1. An action marked complete is not automatically effective.

2. Do not infer Action Priority from a made-up RPN threshold.

Evidence of a sound answer

1. Keep the failure chain coherent.

2. Distinguish proposed and existing controls.

3. Name evidence that tests the action.

Take the learning back to work

Commitment	Agreed follow-through
Owner	Process-risk owner and cross-functional team
Record	Failure chain, authorized evaluation, action evidence and controlled revisions
Review	At design/process changes and after relevant failures
Verification evidence	Verified control performance and aligned operational documents
If unresolved	Reopen the risk/action review when evidence exposes an unaddressed path or ineffective control.

Help someone else apply the method

Prepare

1. Blank failure-chain record
2. Control cards
3. No rating tables in this exercise

Minutes	Activity and coaching prompt
5	Define the function Who relies on the output?
8	Separate the chain Which phrase is the mode?
10	Review the label action What does the scan actually detect?
5	Debrief bypass Which path might the demonstration miss?

Debrief

1. Require mechanism-specific verification rather than "train and monitor".
2. Accept different controls when the function and authority are explicit.

Individual or remote practice

Draw the chain first, then connect each control to the cause or condition it addresses.

Connect the method and check its boundaries

Before application

1. Defined process structure and functions
2. An applicable authorized risk-assessment method

Outside this lesson

1. Copied severity or action-priority tables
2. Proof of a historical incident cause

AIAG/VDA FMEA release

AIAG/VDA FMEA release

The harmonized method uses seven steps and Action Priority instead of RPN-based prioritization.

Do not copy rating/AP tables or invent AP from RPN. Confirm the method required by the customer.

Open this lesson and its visual aids