Quality control and dependable evidence

25 workplace cases and method lessons / 12 pages. Select a chapter or use PDF bookmarks. Online links open the related lesson.

Quality control and dependable evidence

Quality control connects a requirement to an executable routine. Define the characteristic and risk, then establish whether the measurement method can support the intended decision. A control plan names how evidence is collected and who reacts. Time-ordered data may support statistical monitoring, but chart limits do not replace engineering or customer specifications. A signal requires the agreed response, containment where appropriate and verification of restoration. Feed learning into the risk analysis, control plan and training. The map is an introductory relationship model, not a licensed control-plan form or authority to approve product.

What this system is for

Understand how the methods relate before selecting a detailed lesson.

Use the chapter to

1. Connect requirements, measurement, process controls and verified response.
2. Choose trustworthy data and a suitable monitoring method before interpreting signals.
3. Trace a failure risk into prevention, detection, reaction and verified effectiveness.

A route through the chapter

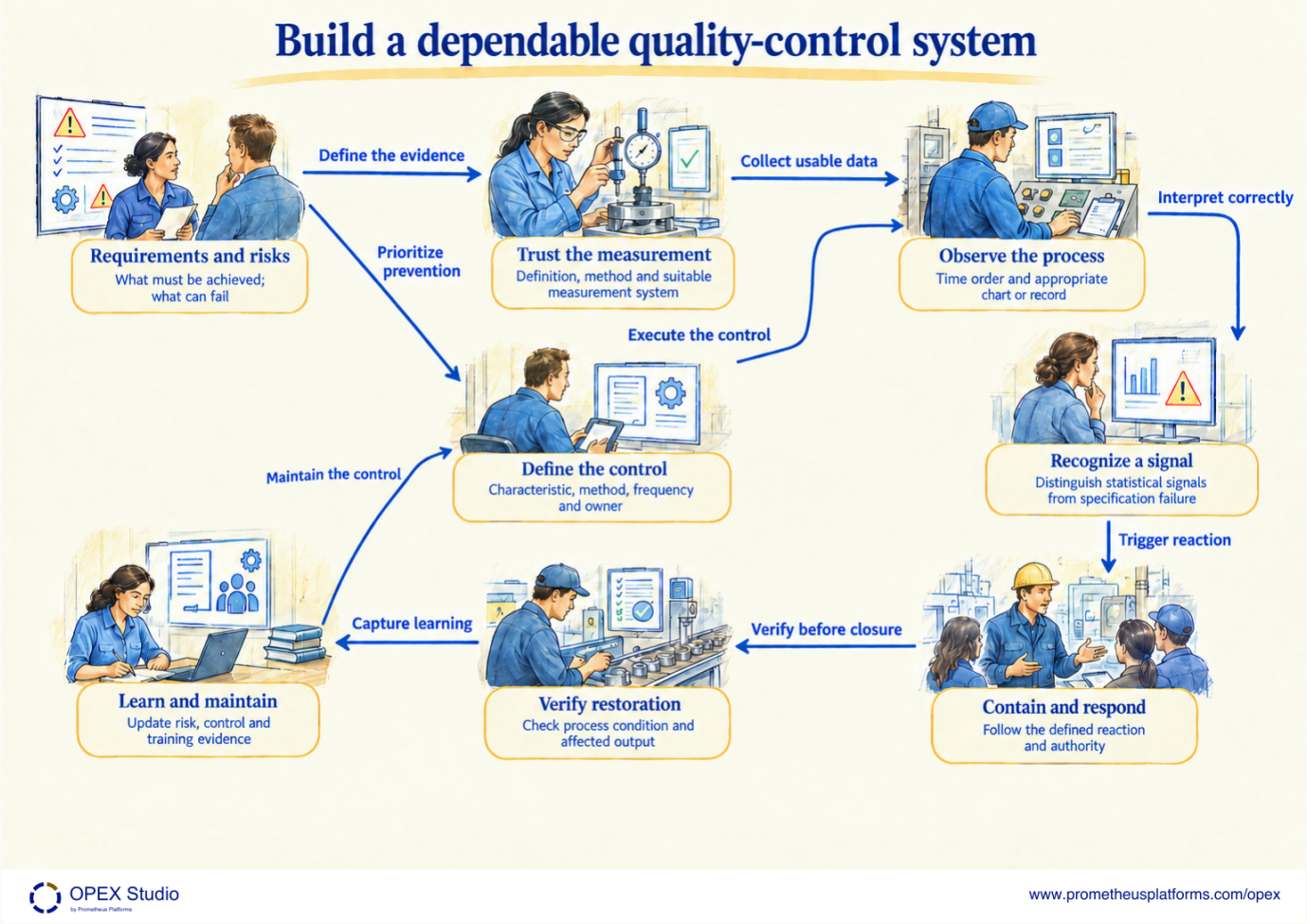
Begin with the three illustrated system maps. Read their connections and decisions, then use the original workplace teaching cards. The supporting lesson index links to the native method packs for worked inputs, practice, reasoned answers and facilitation.

25 mapped cases and method lessons. Illustrations teach the concepts; they are not records of achieved workplace results.

Open this chapter online

Build a dependable quality-control system

Connect requirements, measurement, process controls and verified response.



GENERATED CONCEPT ILLUSTRATION / FICTIONAL WORKPLACE

Read the connections

Quality control connects a requirement to an executable routine. Define the characteristic and risk, then establish whether the measurement method can support the intended decision. A control plan names how evidence is collected and who reacts. Time-ordered data may support statistical monitoring, but chart limits do not replace engineering or customer specifications. A signal requires the agreed response, containment where appropriate and verification of restoration. Feed learning into the risk analysis, control plan and training. The map is an introductory relationship model, not a licensed control-plan form or authority to approve product.

Check the boundaries

Control limits describe process behavior; specification limits express requirements.

Choose a chart from data type and sampling structure.

Containment, correction and verified recurrence prevention are different decisions.

Read and apply the system / continued

Try it / discuss

A chart is stable but measurements exceed a specification. Can the team release the product because the chart is in control?

Check your reasoning

No. Statistical stability and conformity answer different questions. Follow product disposition and the control-plan reaction while investigating capability and relevant causes.

Method sources

AIAG/Plexus: APQP and control plan overview

NIST: Control chart families

NIST: Attributes charts

NIST: What are control charts?

NIST: Stable but unacceptable processes

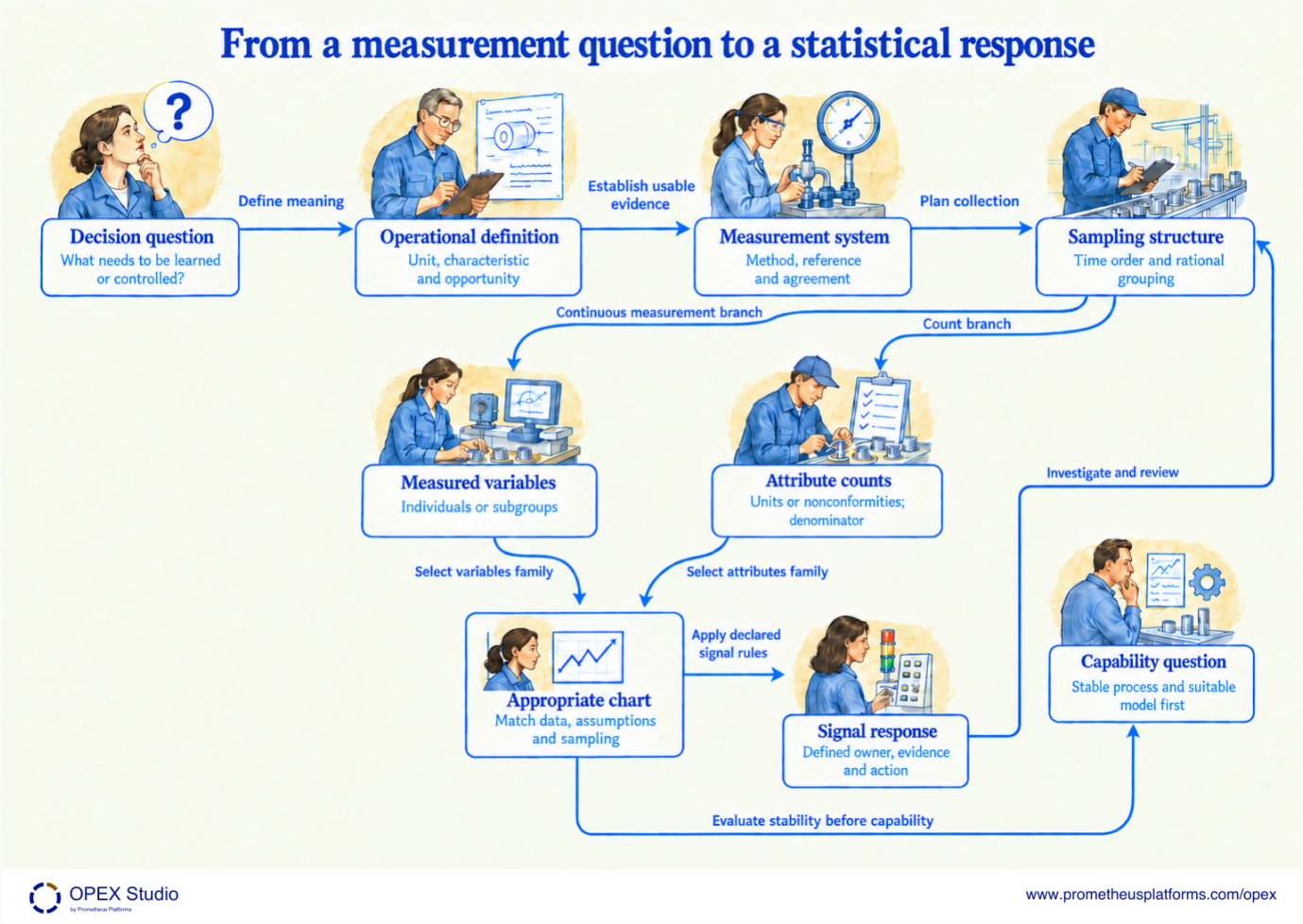
NIST: Out-of-control response

NIST: Gauge R&R

NIST: Gauge study design

From a measurement question to a statistical response

Choose trustworthy data and a suitable monitoring method before interpreting signals.



GENERATED CONCEPT ILLUSTRATION / FICTIONAL WORKPLACE

Read the connections

A statistical routine starts with a decision question, not with a favorite chart. Define what is measured, what constitutes a unit or defect and which denominator is relevant. Check the measurement system and preserve collection order and sampling structure. Measured variables and attribute counts require different chart families; even within counts, nonconforming units and nonconformities are different data. Match the chart to these definitions and its assumptions. Agree the signal rules and reaction owner before using it. Capability asks whether a stable process can meet requirements under a suitable model. A chart does not establish conformity, capability or a cause merely by being drawn.

Check the boundaries

Nonconforming units differ from numbers of nonconformities.

Subgroup structure and time order matter to interpretation.

Capability interpretation requires stability and an appropriate distribution/model; a histogram alone is insufficient.

Read and apply the system / continued

Try it / discuss

The same unit can contain several scratches, and inspected surface area varies. Why is a fixed-size defective-unit chart not automatically appropriate?

Check your reasoning

Clarify whether the decision counts scratched units or individual scratches. For nonconformities, preserve the exposure denominator and evaluate a suitable rate chart and assumptions. Do not select a chart from the word defect alone.

Method sources

NIST: Control chart families

NIST: Attributes charts

NIST: Gauge R&R

NIST: Gauge study design

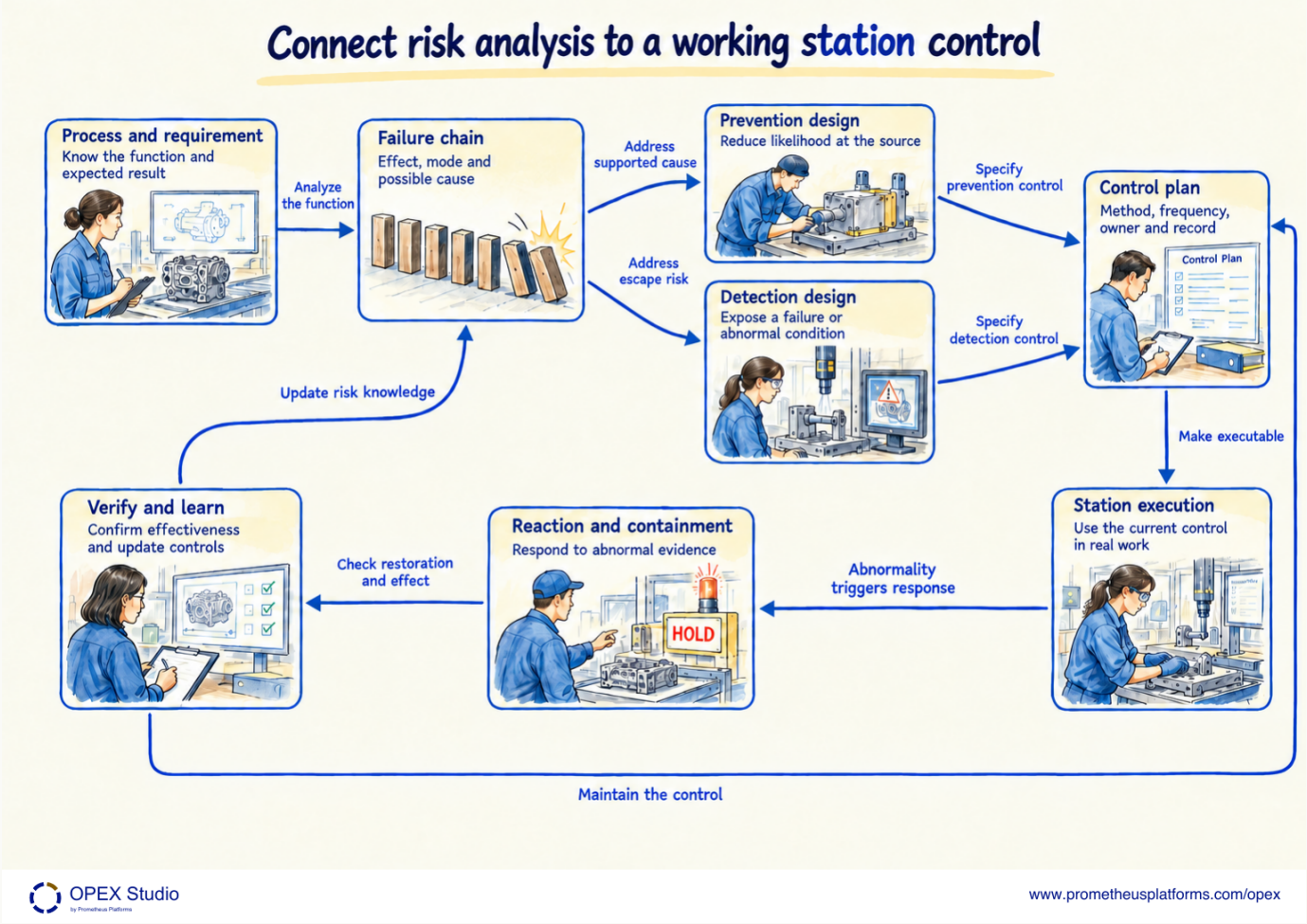
ASQ: Attribute agreement analysis scope

NIST: Process capability

NIST: Out-of-control response

Connect risk analysis to a working station control

Trace a failure risk into prevention, detection, reaction and verified effectiveness.



GENERATED CONCEPT ILLUSTRATION / FICTIONAL WORKPLACE

Read the connections

Risk analysis should connect the process function to plausible failure modes, effects and causes. Prevention and detection have different roles: preventing incorrect assembly differs from detecting it and stopping release. Translate the selected controls into an executable plan with a method, frequency, owner, record and reaction. Then observe whether the station actually uses the current control. A layered process audit checks execution of critical controls; it does not replace product verification. When an abnormality occurs, protect affected output, restore the process under the defined authority and verify the effect. Feed evidence back to both the risk analysis and the control plan.

Check the boundaries

A detection-and-stop device is not the same as error prevention.

FMEA prioritization depends on the required method; no rating or Action Priority tables are reproduced.

An audit completion mark is not product-release evidence.

Read and apply the system / continued

Try it / discuss

A sensor detects reversed parts but the line continues and no owner handles the alert. Which link is missing?

Check your reasoning

The detection is not connected to an effective reaction and release boundary. Define the stop or hold response, responsible owner, restoration verification and record; then test the complete control, not only the sensor.

Method sources

AIAG/VDA FMEA release

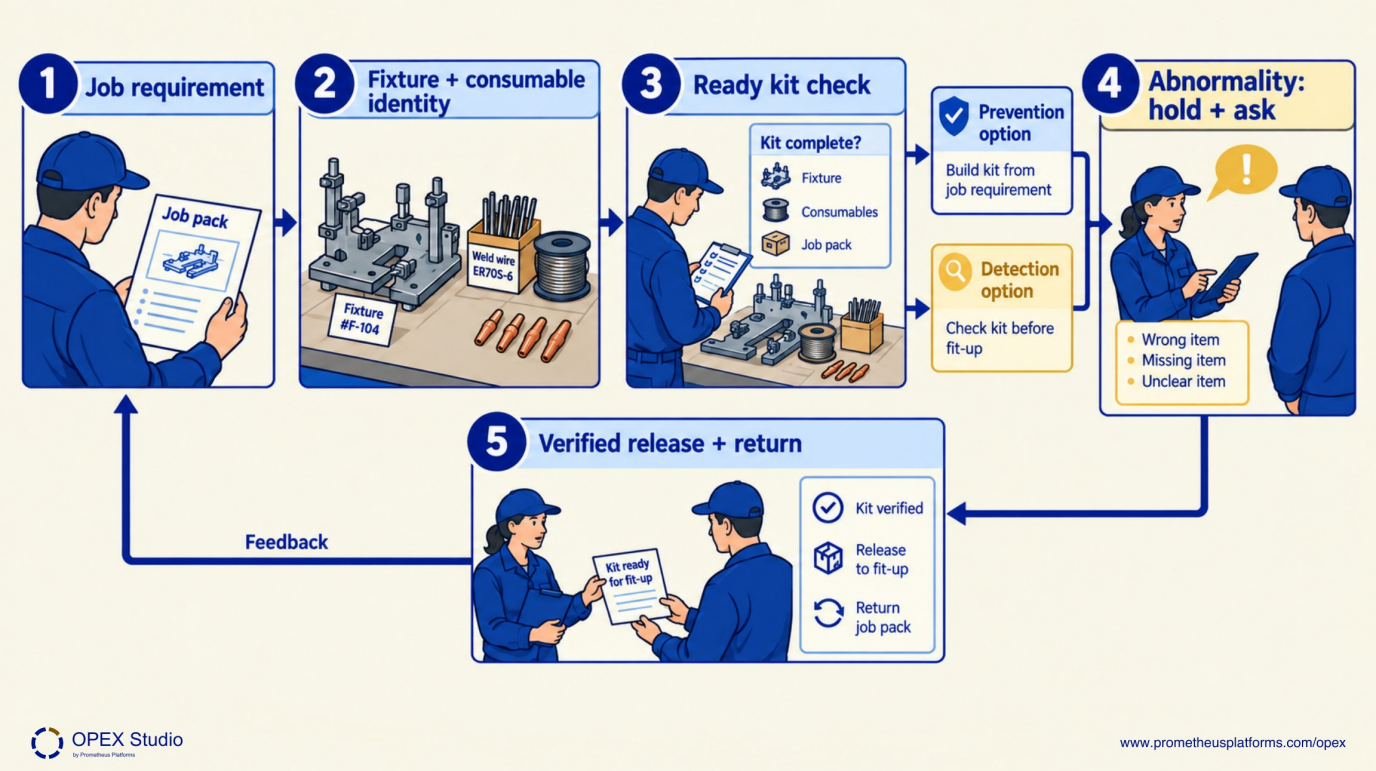
AIAG/Plexus: APQP and control plan overview

LEI: Error-Proofing

AIAG: Layered process audits CQI-8

Build the correct kit before fit-up

Make the welding bay ready to work



GENERATED TEACHING ILLUSTRATION / FICTIONAL WORKPLACE

01	02	03	04	05
Job requirement	Fixture + consumable identity	Ready kit check	Abnormality: hold + ask	Verified release + return

Retained kit-preparation search: 12 observations, median 8 minutes; proposed goal 3 minutes. Start with the approved job pack and finish with correct verified fixtures and consumables at fit-up.

The retained twelve preparation-search observations have an 8-minute median and 3-minute goal. A kit standard must make the right item easier to select, not merely make all items look organized. Teach quality at source through visible identity, readiness and abnormality response. A proposed physical cue may prevent selection error; a check may detect one. Each needs verification. Welding parameters, extraction and other technical controls remain with approved practice.

TRY IT / DISCUSS

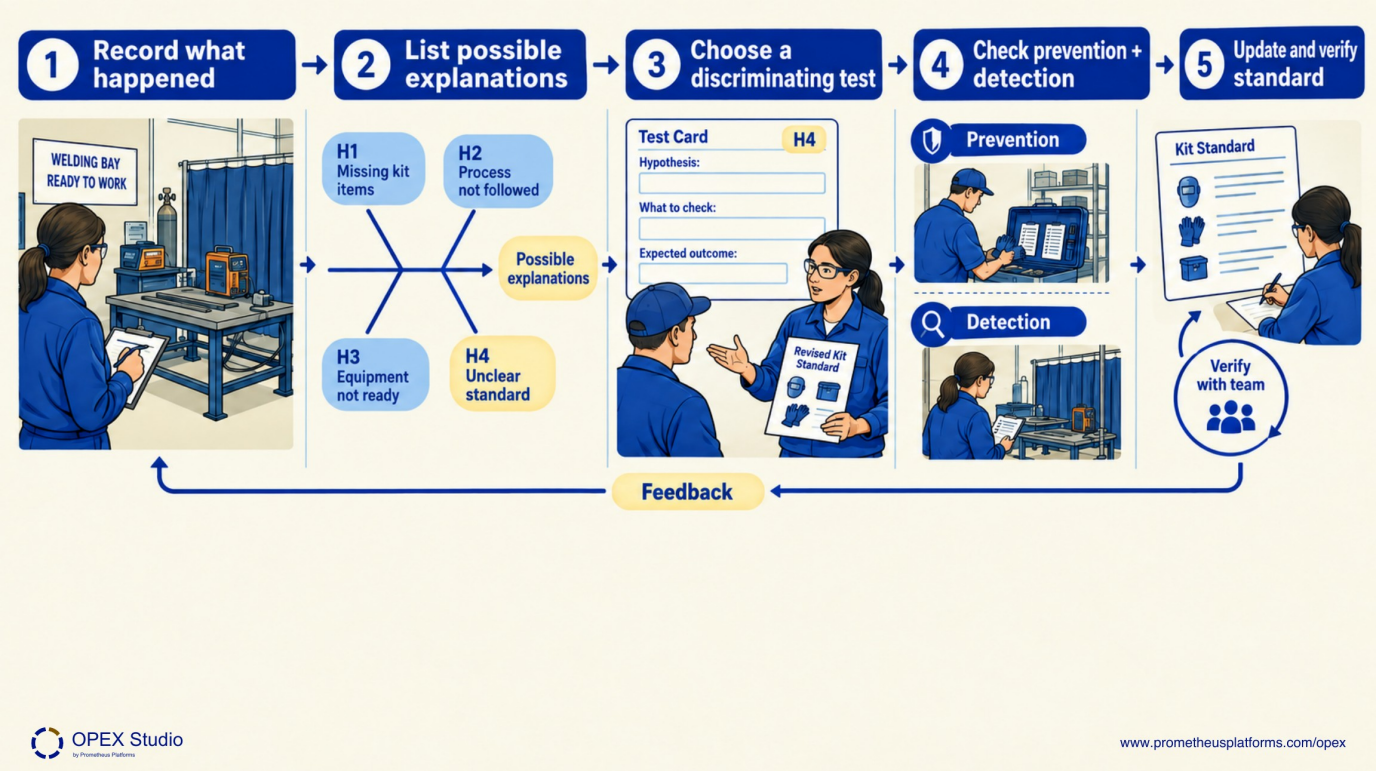
How does a shaped fixture location differ from a final visual inspection?

Check your reasoning: It may prevent an incorrect selection; inspection detects a condition. Neither should be claimed effective without a test.

METHOD SOURCES / Q09: Jidoka | Q10: Fishbone Diagram | Q07: Gemba | F10: Standardized Work

Observe the condition before choosing the fix

Make the welding bay ready to work



GENERATED TEACHING ILLUSTRATION / FICTIONAL WORKPLACE

01	02	03	04	05
Record what happened	List possible explanations	Choose a discriminating test	Check prevention + detection	Update and verify standard

Record the exact wrong or missing item, job context and consequence. Ask the people doing the work how the kit is prepared. Use a cause diagram to organize possible explanations, then test the useful ones. Check both whether the proposed change prevents the error and whether remaining errors are detected. Repeated exposure after implementation is needed before claiming recurrence prevention.

TRY IT / DISCUSS

Is Operator careless an adequate causal statement?

Check your reasoning: No. Investigate the conditions, information, standard and system that shaped the action.

METHOD SOURCES / Q09: Jidoka | Q10: Fishbone Diagram | Q07: Gemba | F10: Standardized Work

Supporting lessons and worked methods

Choose a lesson to inspect a worked example, practise a changed case, check the reasoning or plan a facilitated session.

Jidoka and andon: detect, respond, verify restart

Poka-yoke: prevention versus detection

Select a chart from the data and sampling plan

Separate control limits from specifications

Read spread before the subgroup average

Monitor one reading at a time

Chart nonconforming units with the right denominator

Chart nonconformities per exposure

Respond to a signal with a defined owner

Check stability before capability

Separate part variation from measurement variation

Check inspection agreement and escape risk

Link a process risk to an executable control plan

Make the station check and reaction inseparable

Build PFMEA from a failure chain to verified action

Use APQP gates to expose launch risk early

Distinguish PPAP evidence from production authorization

Trace one suspect lot through split, merge and rework

Audit whether critical controls are actually followed

Control special processes through qualified conditions and records

Prepare a Nadcap audit with scope-linked evidence

Locate the applicable automotive requirements

Distinguish a feedback controller from statistical monitoring

Supporting lessons / continued

Connect calibration to a defensible measurement result

Make the welding bay ready to work

Open the complete learning library