

SMED: externalize safely, verify first good output

Separate work that genuinely requires a stopped process from preparation that can occur externally, and preserve first-good-output verification when proposing a changeover trial.



Fetch the kit before the stop, if it is truly ready

Fictional packaging changeover: the team currently stops, fetches an approved kit, performs the controlled internal change and verifies first good output. Leader Nina proposes preparing the approved kit while the preceding run is still operating. No step durations or achieved reduction are supplied.

Your role and the reference condition

Changeover team with equipment, quality and operating representatives.

Normal: The next configuration is correct, safe and producing accepted output before the changeover is considered complete.

Gap: The machine is stopped while the approved kit is located, but nobody has confirmed which preparation can safely occur during production.

Work within these conditions

1. Internal work requires the process stopped; external preparation can occur while it operates only under approved conditions.

2. No target time justifies bypassing isolation, safeguards or acceptance checks.

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

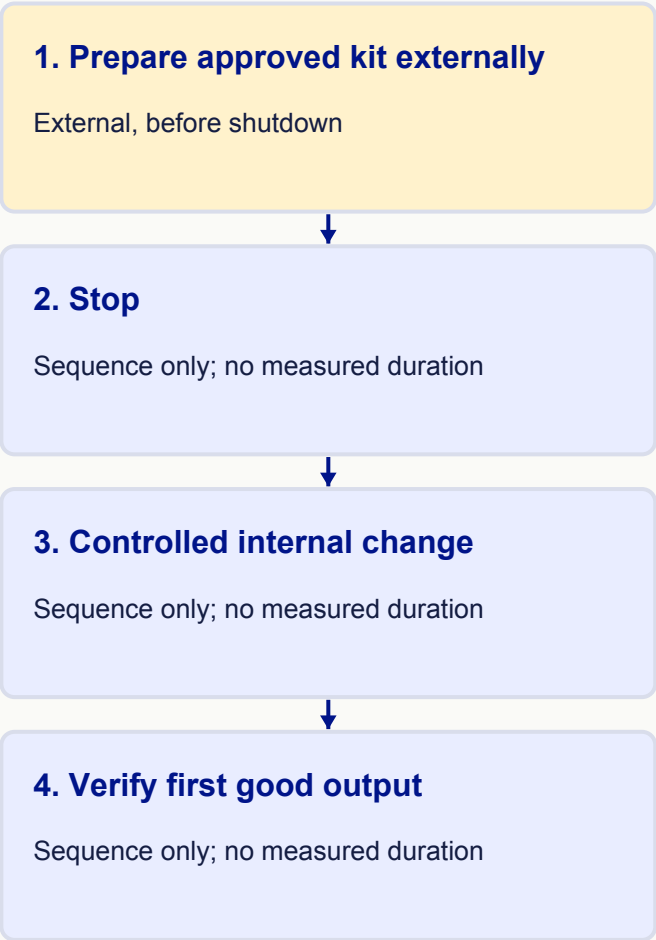
See how the method works

Observe the complete changeover boundary, including the point at which acceptable output is restored. Separate activities that require stopped equipment from preparation that can safely occur beforehand or elsewhere. Improve preparation first, then ask whether any internal activity can be redesigned as external work. Simplify the remaining steps without bypassing isolation, technical settings or quality checks. Keep the first-good-output verification in the new method. Record measured timing rather than treating reduced searching as the entire changeover gain. SMED names an ambition for single-digit minutes; it does not promise every process can change in one minute.

Before



Proposed



No duration or achieved reduction is claimed. Equipment isolation and first-good verification remain required.

Method exhibit: Before, External preparation, Internal work, First good output.

Follow the evidence and decisions

Inspect the supplied case inputs

Current event	Known condition
Stop	Preceding run ends under approved procedure
Fetch approved kit	Kit identity and completeness need checking
Controlled internal change	Requires approved stopped condition
Verify first good output	Acceptance evidence required
Durations	Not supplied; no reduction claim

01 / Define the changeover boundary

Nina states the start and finish events before observing: the agreed last good output of the prior configuration and first accepted output of the next, with the exact local time convention recorded.

Why: A reported saving can be manufactured by stopping the clock before quality verification or moving the start.

Evidence / check: Boundary includes transition and accepted restart; actual timestamps are still required.

02 / Classify by operating condition

List kit preparation as a candidate for external work and retain the controlled configuration change as internal. Ask the equipment and quality owners to verify what may occur while the preceding run operates.

Why: The distinction is about whether the process must stop, not whether a task seems easy or quick.

Evidence / check: Candidate external preparation is explicitly provisional; internal access controls remain intact.

03 / Make readiness visible before the stop

Propose a checked kit at the defined preparation point: correct identity, complete approved contents and known next configuration. Record who verifies readiness and what happens if anything is missing.

Why: Fetching an unchecked kit earlier could move the delay or create a wrong-configuration risk rather than improve the changeover.

Evidence / check: A readiness record replaces the assumption that "kit nearby" means "kit ready."

04 / Preserve the controlled restart

Retain internal work, restoration checks and first-good-output acceptance in the proposed sequence. If a check fails, use the existing hold/response process.

Why: Changing preparation timing does not remove the requirements for a correct process and suitable output.

Evidence / check: Proposed sequence: prepare approved kit > stop > controlled internal change > verify first good output.

05 / Measure before claiming a gain

Observe representative before and trial changeovers using the same boundary, noting mix, staffing, missing items, adjustments and quality results.

Why: SMED is an improvement method; its name does not establish a measured result for this unmeasured example.

Evidence / check: No duration or percentage saving is reported until comparable records exist.

Completed before/proposed sequence review

Activity	Before	Proposed decision
Approved-kit preparation	After stop	Candidate external work before stop
Internal change	Stopped condition	Retain approved controls
First-good verification	After internal change	Retain acceptance evidence
Elapsed improvement	Unknown	Measure comparable runs
Missing kit item	Delay risk	Expose before stopping where feasible

The kit is incomplete at the readiness check

A required approved component is absent before the planned stop.

Decision

Escalate the readiness failure to the changeover owner and follow the approved production plan; do not substitute an unapproved component to protect a time target.

Reasoning

The earlier check has made the problem visible. It has not created authority to change the configuration requirements.

What would change the decision?

Missing item, owner, decision and revised plan are recorded.

Practise with a changed case

A print configuration change

Separate fictional printer changeover has five steps: stop, obtain verified job artwork, perform the approved stopped setup, produce a proof and obtain proof acceptance. The team proposes obtaining artwork before the stop and removing proof acceptance.

Proposal	Evidence
Artwork preparation before stop	May be feasible; verification required
Stopped setup	Approved stopped condition required
Proof acceptance removed	No authority supplied
Measured durations	Not available

Your task

1. Classify the candidate external preparation and retained internal work.
2. Correct the proposed sequence without deleting the acceptance boundary.
3. Write what must be measured to support an improvement claim.

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

Your practice worksheet

A print configuration change

Start/finish definition

Internal/external classification

Readiness evidence

Accepted first output

Comparable timing record

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

Check your reasoning and transfer it

1. Verified artwork is a candidate for external preparation; the stopped setup remains internal under the declared method.
2. The corrected sequence is prepare verified artwork, stop, approved setup, produce proof, obtain acceptance. Removing proof acceptance changes the completion criterion.
3. Observe before and trial runs using the same boundary and record adjustments, mix and proof outcome. No numerical reduction follows from the supplied information.

Suggested completed record

Work element	Decision	Status
Artwork	Prepare and verify externally if approved	Candidate
Setup	Retain approved stopped condition	Internal
Proof/acceptance	Retain both	Completion evidence
Savings	No times supplied	Do not quantify

Plausible wrong turns

1. External does not mean uncontrolled or unverified.
2. An improvement name is not evidence that a setup meets a particular time.

Evidence of a sound answer

1. Preserve the acceptance boundary.
2. Separate a preparation proposal from a validated change.
3. Name comparable observations needed.

Take the learning back to work

Commitment	Agreed follow-through
Owner	Changeover process owner with quality and equipment representatives
Record	Element classification, readiness check and comparable timing/quality record
Review	At the controlled trial and before approving revised standard work
Verification evidence	Correct first output, unchanged necessary controls and measured elapsed performance
If unresolved	Retain the approved method and address readiness or technical constraints through their owners.

Help someone else apply the method

Prepare

1. Before/proposed sequence cards and a readiness checklist
2. A missing-kit exception card

Minutes	Activity and coaching prompt
4	Define completion Does the clock stop before or after acceptance?
8	Classify the original steps What evidence makes preparation genuinely external?
8	Repair the printing proposal Which shortcut changes quality authority?
5	Plan measurement How will you compare unlike changeovers honestly?

Debrief

1. Challenge unsupported savings figures.
2. Use the incomplete kit to discuss early visibility rather than blame.

Individual or remote practice

Write the two sequences and annotate approval, readiness and acceptance conditions before reading the solution.

Connect the method and check its boundaries

Before application

1. Technical owner and safe procedure
2. Defined last-good/first-good boundary

Outside this lesson

1. SMED does not promise one minute
2. Externalization never overrides isolation rules

LEI: Single Minute Exchange of Die

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Separate internal/external setup then convert and improve

Method reference; original OPEX scenario and diagram are synthetic teaching content, not source case results.

[Open this lesson and its visual aids](#)