Lean Office - Mistake Proofing & Poka Yoke

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Outline

- What is Mistake Proofing?
- Everyday Examples
- Effectiveness & ROI
- Error Proofing and SPC
- Inspection Techniques
- Types of Poka Yokes

What is Mistake Proofing?

- The use of process or design features to prevent errors or their negative impact.
- Also known as ***Poka yoke,*** Japanese slang for "avoiding inadvertent errors" which was formalized by Shigeo Shingo.
- Inexpensive.
- Very effective.
- Based on simplicity and ingenuity.

Everyday Examples

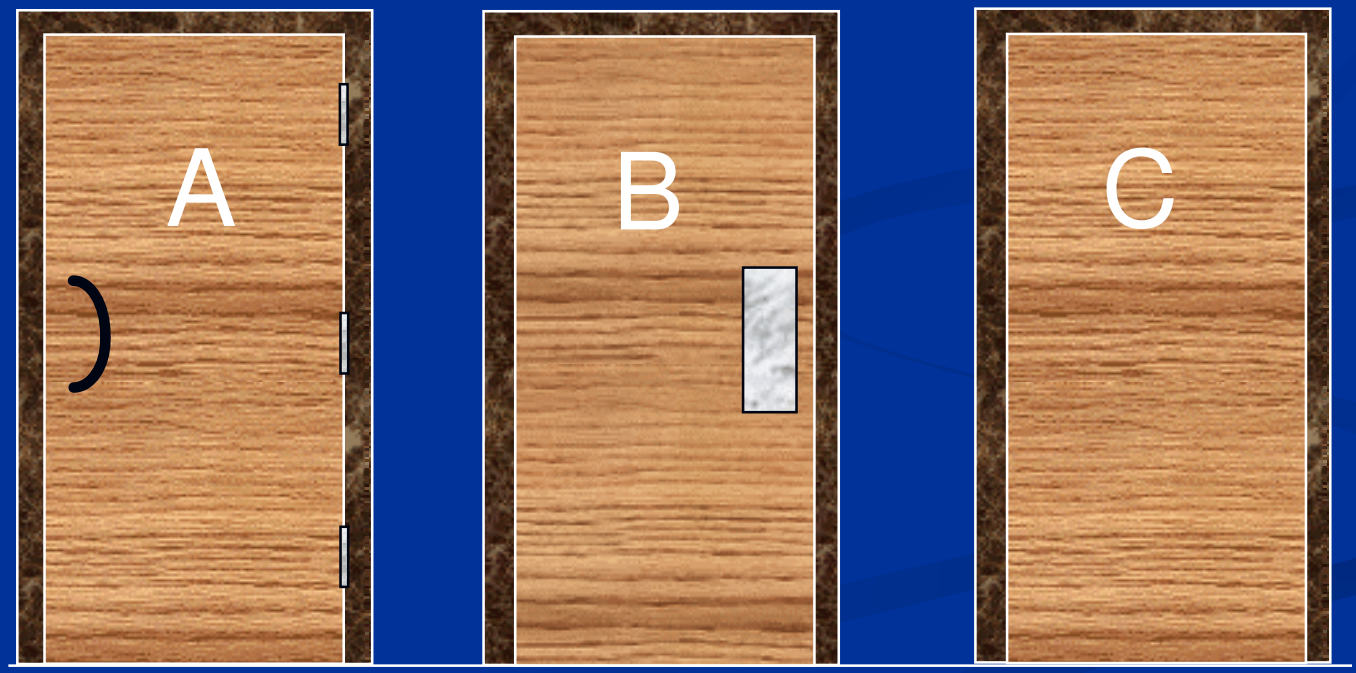
Which dial turns on the burner?

Stove A

Stove B

Everyday Examples
How would you operate these doors?

Push or pull? left side or right? How did you know?



Everyday Examples

3.5 inch diskettes cannot be inserted unless diskette is oriented correctly. This is as far as a disk can be inserted upside-down. The beveled corner of the diskette along with the fact that the diskette is not square, prohibit incorrect orientation.

Fueling area of car has three error-proofing devices:

1. insert keeps leaded-fuel nozzle from being inserted
2. tether does not allow loss of gas cap
3. gas cap has ratchet to signal proper tightness and prevent overtightening.

New lawn mowers are required to have a safety bar on the handle that must be pulled back in order to start the engine. If you let go of the safety bar, the mower blade stops in 3 seconds or less.

Everyday Examples
Whose signature is required?

Before:

AUTHORIZING SIGNATURES

Operations Engineering Manager: _____ Date : _____

EM/EQA Supervisor: _____ Date : _____

Manufacturing Engineer: _____ Date : _____

Other (As Required): _____ Date : _____

Operations Manager: _____ Date : _____
(MED. or HIGH RISK ONLY)

EQA Manager: _____ Date : _____
(MED. or HIGH RISK ONLY)

After:

Required Authorizing Signatures	Release/Audit update per SOP <or> Experiment Request	ECO Implementation	Part Reconditioning per SOP 12-FP-23-000	Non-ECO associated PCN RISK: VERY LOW, LOW (1.2)	Non-ECO associated PCN RISK: MODERATE, HIGH (3,4)	DATE
Originator						
CCB Eng. Rep.						
Ops. Supervisor*						
QA Supervisor*/QE						
Prod. Ops.Manager						
QA Manager						
Manuf. Eng or Other ex. CTS (as required)						

* *Supervisor of area affected by the change.*

Evidence of the Effectiveness

- **AT&T Power Systems** is first US manufacturer to win the Deming prize. Average outgoing defects reduced by 70%
- A washing machine drain pipe assembly line produced 180,000 units without a single defect (6 months).
- **TRW** reduced customer PPM's from 288 to 2.
- **Federal Mogul**: 99.6% less customer defects and 60% productivity increase
- **DE-STA-CO**: reduced omitted parts 800 to 10 ppm with a 15-30% productivity increase

Source: Productivity Inc. and Shingo prize profiles

Evidence of the Effectiveness

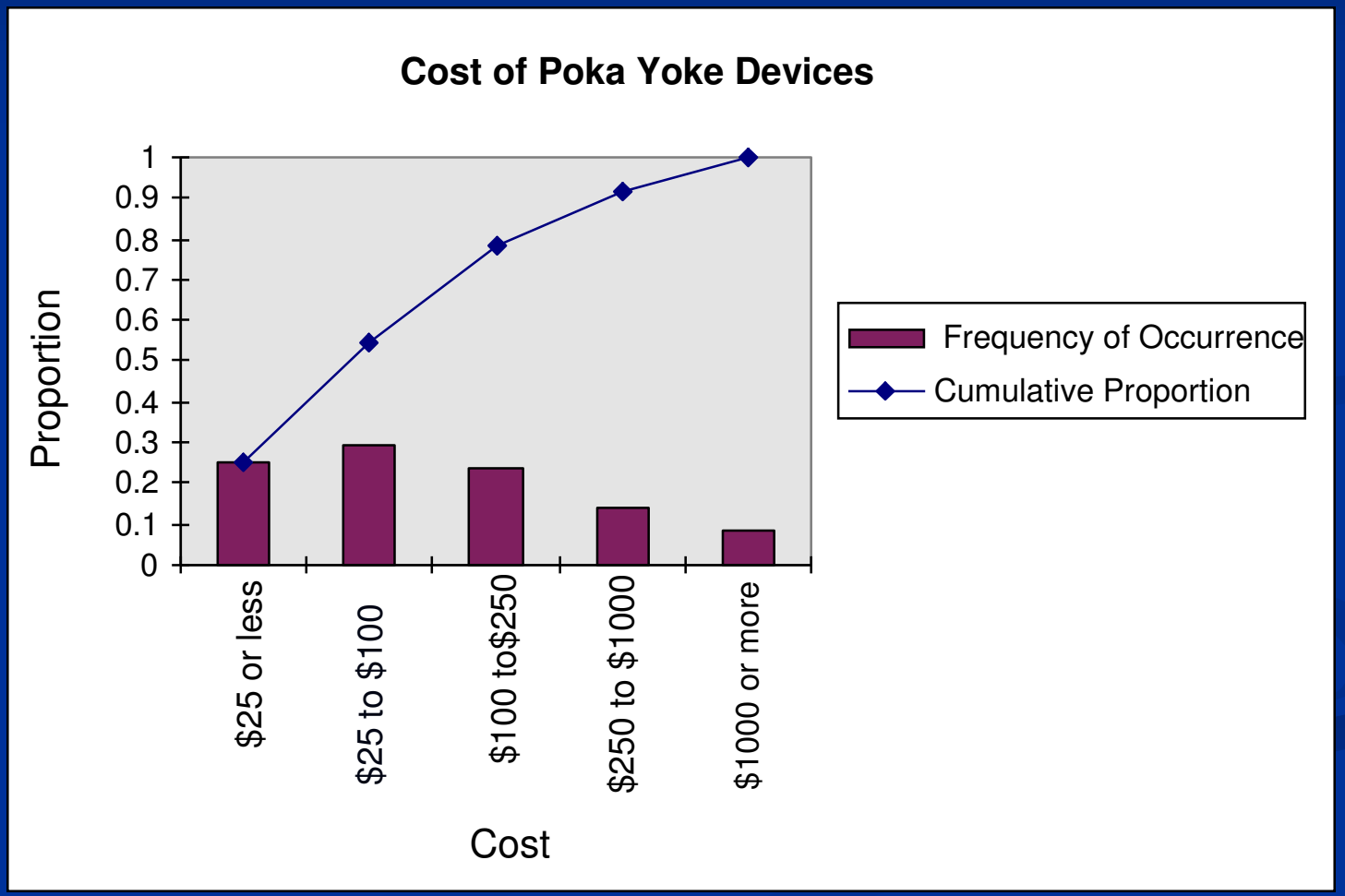
Cooper Automotive:

- 95% less defects than nearest competitor
- 75% less injuries
- 99.6% less customer defects (13 ppm)
- 88% in-plant defect reduction
- 70% less warranty cost
- 89% scrap reduction (0.7%)
- 60% productivity increase

Mistake Proofing ROI

- **Dana** corporation has reported a $500,000 savings resulting from a $6 device
- **Ortho-Clinical Diagnostics (Johnson & Johnson)** saved $75000 annually by discovering a new use of Post-It® notes
- **AT&T Power Systems** (Lucent Technologies) reported net saving of $2545 per device (3300 devices)
- **Weber Aircraft** reports saving $350,000 during their first year of implementation of approximately 300 devices.
- **GE Aircraft Engines** spends a minimum of $500,000 on any in-flight shut-down (IFSD). Spending $10,000 to stop one IFSD yields 50:1 benefit

Cost of Poka Yoke Devices



Costs of Defects

Does it cost more to make processes better ? NO

Making processes better leads to reduced

- Rework
- Scrap
- Warranty costs
- Inspection costs

1-10-100 Rule

The 1-10-100 rule states that as a product or service moves through the production system, the cost of correcting an error multiplies by 10.

Activity	Cost
Order entered correctly	$ 1
Error detected in billing	$ 10
Error detected by customer	$ 100

Dissatisfied customer shares the experience with others…

Mistake proofing Puts "Knowledge in the World" In addition to "Knowledge in the Head"

Head:

- "Improve" SOPs (increasing complexity?)
- Retrain
- Re-certify skills
- Manage & enhance attentiveness

World:

- Provide clues about what to do
- Change process design: embed the details in the process
- Frees mind to consider the "big picture"
- Facilitates "knowledge work"