Continuous Improvement Toolkit

Mistake Proofing

Managing Risk

PDPC
FMEA
RAID Logs
Fault Tree Analysis
Risk Assessment*
Traffic Light Assessment
Decision Tree

Deciding & Selecting

Pros and Cons
Importance-Urgency Mapping
Break-even Analysis
Cost -Benefit Analysis
Force Field Analysis
Voting
SWOT
Pugh Matrix
QFD
Matrix Diagram
TPN Analysis
Kano Analysis
Prioritization Matrix
Critical-to Tree
Paired Comparison

Planning & Project Management*

RACI Matrix
Stakeholders Analysis
PEST
PERT/CPM
Activity Diagram
Roadmaps
Project Charter
Gantt Chart
PDCA
Control Planning
Gap Analysis
Hoshin Kanri
Kaizen
How-How Diagram
Tree Diagram**
Standard work

Understanding Performance

Lean Measures
KPIs
OEE
Capability Indices
MSA
RTY
Descriptive Statistics
Cost of Quality
Reliability Analysis
Graphical Analysis
Run Charts
Control Charts
Benchmarking
Sampling

Understanding Cause & Effect

Cause & Effect Matrix
Pareto Analysis
Confidence Intervals
Probability Distributions
ANOVA
Hypothesis Testing
Design of Experiments
Scatter Plot
Correlation
Regression
5 Whys
Chi-Square Test
Multi-Vari Charts
Fishbone Diagram
Relations Mapping*

Identifying & Implementing Solutions***

Simulation
TPM
Mistake Proofing
Pull Systems
JIT
Ergonomics
Work Balancing
Automation
Bottleneck Analysis
Visual Management
Flow
5S
Value Analysis
Wastes Analysis
SMED
Time Value Map
Process Redesign

Data Collection

Focus groups
Interviews
Photography
Check Sheets
Measles Charts
Surveys
Critical Incident Technique
Observations

Creating Ideas**

Brainstorming
TRIZ***
Analogy
SCAMPER***
Nominal Group Technique
Mind Mapping*
Affinity Diagram
Attribute Analysis
Lateral Thinking
Visioning
IDEF0

Designing & Analyzing Processes

Value Stream Mapping
SIPOC
Flow Process Chart
Process Mapping
Flowcharting
Service Blueprints

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- Mistake Proofing

❑ Consistently meeting expectations of the customer (internal or external) is an important characteristic of lean systems.

❑ One way to achieve this is by adhering to a practice called **quality at the source**.

❑ One way is using **mistake proofing** that aims to design fail-safe systems that attack and minimize errors as possible.

❑ It is a mechanism that helps an operator/user **avoid** mistakes.

❑ It is also a way to **detect** and correct an error where it occurs and avoid passing the error to the next worker / operation.

- Mistake Proofing

❑ Even the most conscientious person will make mistakes.
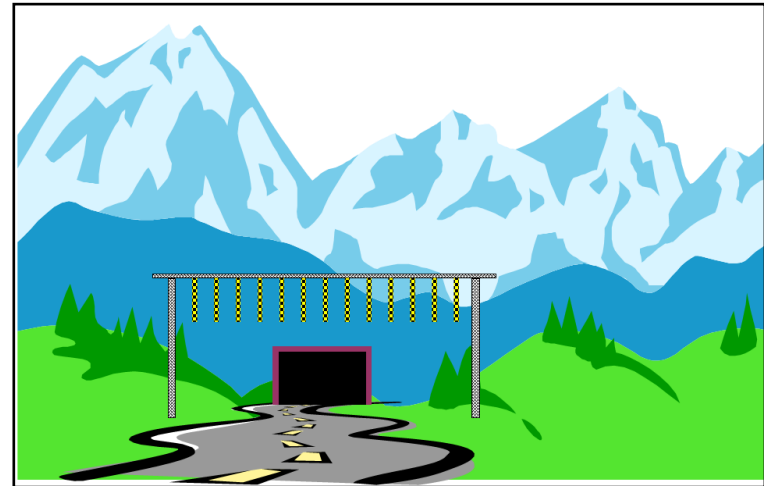
- Mistake Proofing

❏ A technique of changing the process/product to prevent mistakes from occurring (or detect them as soon as possible).

❏ This is a valuable tool during the control phase of the project.

❏ Used to remove the opportunity for an error before it happens.

❏ Used to keep the error from becoming a defect in the process/product.

❏ Improve the quality of products and services by having employees act as their own quality inspectors.
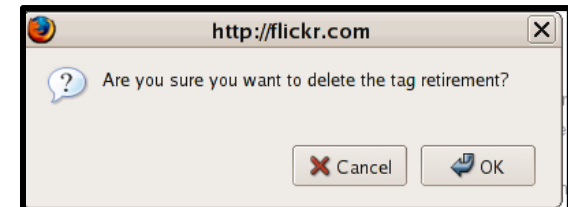
- Mistake Proofing

When It Is Used?

❑ When a process step has been identified where human error can cause mistakes or defects.

❑ When a minor error early in the process causes major problems later in the process.

❑ When the consequences of an error are expensive or dangerous.

❑ In a service process, where the customer or employee can make an error which affects the output.

❑ At a hand-off step in a process, when output or the customer is transferred to another worker.
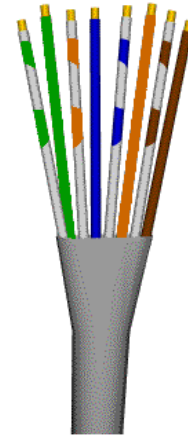
- Mistake Proofing

Examples:

- ❑ A product that could be assembled in only one way.
- ❑ The **spell-check** feature on a word-processing program.
- ❑ The **engine control module** on vehicles to controls top-end speed.
- ❑ The uses of different size **fuel pipes and nozzles** on vehicles in order to prevent the wrong fuel Bing used.
- ❑ **Color-coding of components** that otherwise look similar.
- ❑ When closing the file, the operating system may ask if you want to save your work first.
- ❑ Washing machines will not start if the door is opened.
- ❑ Irons and coffeepots that turn off automatically.

http://flickr.com

Are you sure you want to delete the tag retirement?

Cancel   OK

- Mistake Proofing

Common Mistake Proofing Devices:

❑ **Contact devices:** Guide pins, limit switches, stoppers & gates.

❑ **Non-contact devices:** Sensors, cameras, bar code readers, blinking lights and alarms.

❑ **Gauges and meters:** Thermometers, weighting scales.

❑ **Counters and timers:** Automatic counters, time switches.

❑ **Others:**
   - Critical condition indicators.
   - Lockouts.
   - Checklists and templates.
   - Color coding.
   - Computer controls.

- Mistake Proofing

❑ What machines or equipment you have at workplace that help operators to detect the occurrence of any abnormal condition?

❑ **Consider Solutions Such As:**

- Shutdown the process.
- Control the process to prevent a mistake from happening.
- Provide a warning of a mistake before
- happening.
- Provide a warning of a mistake after happening.

- Mistake Proofing

❑ Mistake Proofing is the use of an automatic device / method that:

|		
Makes it impossible for an error to occur (or reduce its risk)	**Prevention /** reducing	**Childproof cabs**
Alerts the operator when a mistake is about to be made	**Detection**	**Computer alert**
Makes the error immediately obvious once it has occurred	**Detection**	**Car speed alarm**

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Sources of Errors:

- ❑ Forgetfulness.
- ❑ Tiredness/ loss of concentration.
- ❑ Rushing/under pressure.
- ❑ Misunderstanding / misinterpretation.
- ❑ Lack of standards / procedures.
- ❑ Lack of training and experience.
- ❑ Lack of maintenance.
- ❑ Inadvertent errors.
- ❑ Willful errors (e.g. ignore warning light).
- ❑ Sabotage.
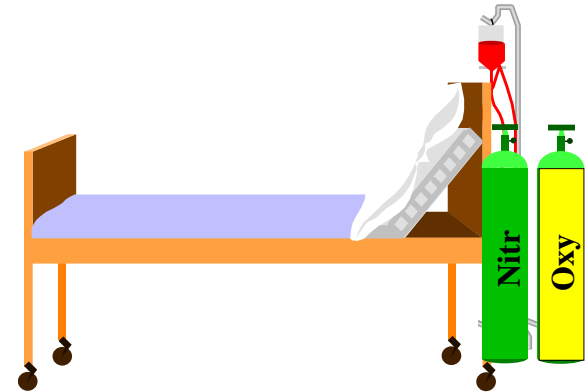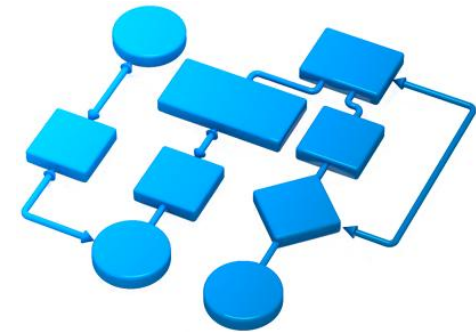
- Mistake Proofing

Key Areas for Mistake Proofing:

❑ Process steps where human intervention is required.

❑ Points in processes where adjustments can be made.

❑ Decision points in the process.

❑ Repetitive tasks where physical manipulation of objects is required.

❑ Steps where errors are known to occur.

❑ Opportunities for predictable errors to occur.
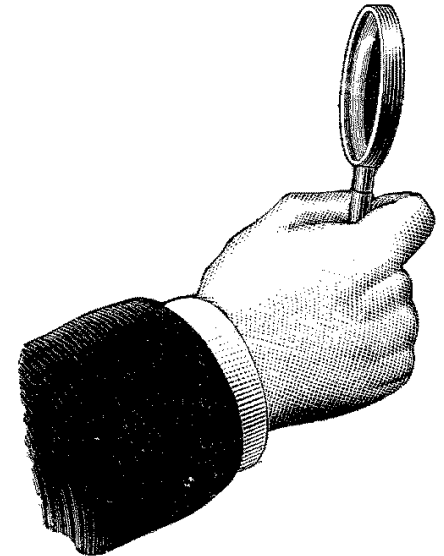
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Approach:

❑ Obtain or create a process map.

❑ Think of where and when human errors are likely to occur.

❑ For each potential error, work back to find its source.

❑ For each error, think of potential ways to make it impossible for the error to occur. Consider:

- Eliminating the step that causes the error.
- Replacing the step with an error-proof one.
- Making the correct action far easier than the error.

❑ Otherwise, think of ways to detect the error and minimize its effects.

❑ Choose the best mistake-proofing method or device (per error).

❑ Test then Implement.

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Example:

Sensors are placed on the floor between the shelves & will not allow the shelves to be closed when activated

- Mistake Proofing

Further Information:

❑ **Useful tools:**

- Brainstorming to generate ideas.
- FMEA to identify and prioritize potential errors.
- Fishbone Diagram to find the source of the potential errors.

❑ Error Proofing solutions are particularly suited to repetitive manual tasks that rely on constant vigilance or adjustments.