Mistake Proofing

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June 26, 2013

Description: Mistake Proofing is a process that can be done at any step or series of steps in a process where there is a possibility of something going wrong which would result in an error or defect being made. Mistake Proofing is building in countermeasures where a mistake or defect could occur. By building in countermeasures we can improve levels of productivity by reducing the need for rework and the negative impact of errors. Mistake Proofing sometimes called "poka-yoke" was developed by Shigeo Shingo[3] in the 1960s for use in industrial processes to prevent human errors.

Counter measures can be either ones that alert the user an error is about to be made (antivirus software warning you about a potential threat if you enter a site) or prevents the error from becoming a defect (not allowing an intake form to be submitted if a required field is missing).

When to Use: A good process measurement system will show where and what types of errors and defects are occurring in a process. Once we understand where and what types of errors and defects are occurring, improvements can be made to reduce or eliminate them. Listed below are some common areas in any process to investigate for mistake proofing:

- Process data show the step is not being performed correctly
- Repetitive or manual tasks where human error can cause mistakes or defects to occur
- Hands-off in a process – communication issues
- Tasks that require high skills and attentiveness be accomplished properly – mental lapses
- Safety issues that could be dangerous to the worker
- Lack of documented policies and procedures on how to do the process
- Work area is dirty and unorganized
- Waste is being produced
- Different people doing the same process step at different times with no standardization
- Customer can make an error which affects the output working properly

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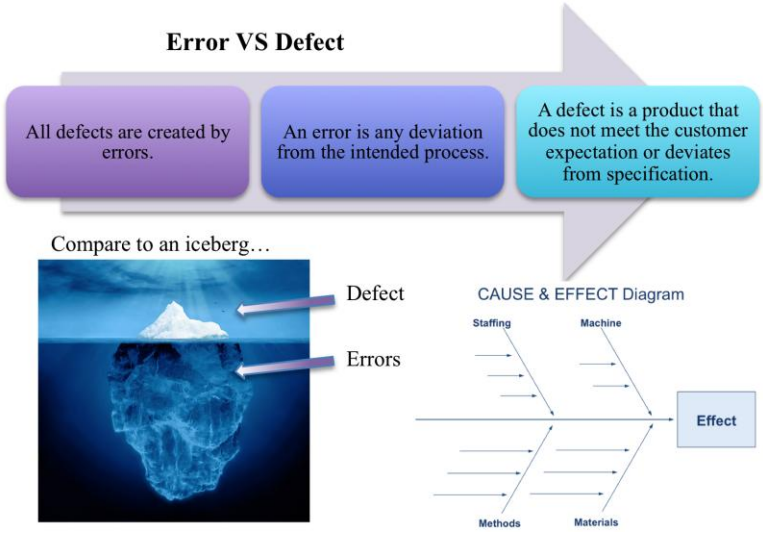
[3] Shingo, S. (1986). *Zero quality control: source inspection and the poka-yoke system*. Stamford, CT: Productivity Press.

Construction Steps:

1. Flowchart the process in detail; determine whether it is correct by walking through the process.
2. Apply process data to each step or series of steps (activity) and determine where errors and/or defects are happening. An error is something that is not correct such as, getting the wrong patient intake form and a defect would be using the form which prevents a patient from being entered into the system or where a patient receives the wrong treatment. This step is similar to a Cause and Effect Diagram analysis as shown in the figure below.[4]
3. List out the errors and defects and investigate why they are happening (causes), the impact, and what controls are currently in place to prevent them. Ask key questions as shown in the table below:[5]



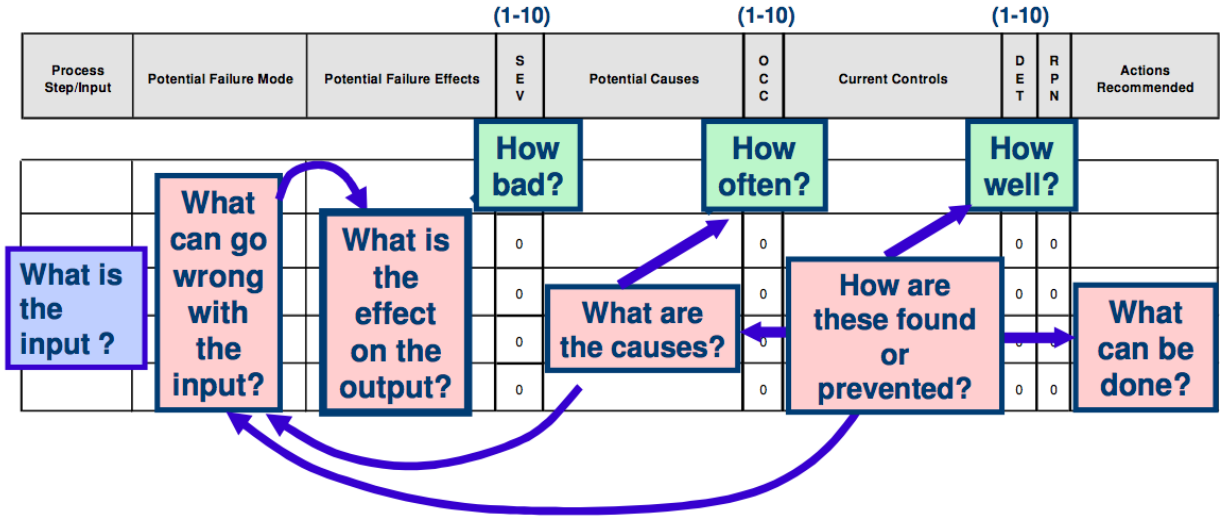
Key Questions to Implement Proper Error-Proofing	
What steps/processes are important?	Function, requirements
What can go wrong?	Potential failure mode
How could the failure affect the customer (internal, external)?	Effects of failure
How serious is the effect of the failure mode on the customer?	Severity (rating 1-10; 10 = most severe)
Why would failure occur?	Cause of failure
How often will it happen?	Occurrence (rating 1-10; 10= highest probable rating)
What are the controls used by the process?	Recommend Action(s)→Error-Proofing
What is the probability that current process control will detect a problem?	Detection→Error-Proofing (ranks 1-10; 1=certain; 10 = absolute uncertainty)
What can be done to improve the process?	Recommend Action(s)→ Error-Proofing
What is the Risk Priority Number (RPN)?	RPN=Occurrence x Severity x Effectiveness - Detection

[4] http://www.beyondlean.com/poka-yoke.html
[5] http://forgingmagazine.com/feature/lean-error-proofing-productivity-improvement

At this step an improvement team could use a FMEA Form (as shown in the example section) to document their findings.

4. Prioritize the best improvements or counter measures to the process to prevent errors or defects from happening in the future. The Electronic Prioritization Matrix[6] can be used to help find the best improvements. Techniques like the SCAMPER,[7] 5 S Technique,[8] and the Process Decision Program Chart (PDPC)[9] could be used to help the improvement team to develop alternatives to be trialed. These counter measures can be Visual (colors, posters, labels, training aides, etc.). Control (eliminates the possibility of a mistake to occur, e.g. automatic shutdown), or Warning (signals that a mistake can occur, e.g. blinking light, virus alarm, etc.).
5. Implement the improvements and track the results to see if they are successful. If not, the team needs to develop more alternative improvements and trial them.

Example: Completing an FMEA (Failure Mode and Effects Analysis)[10]



[6] http://www.phf.org/resourcestools/Pages/Electronic_Prioritization_Matrix.aspx
[7] http://www.phf.org/resourcestools/Pages/SCAMPER_Technique_Tool.aspx
[8] *Public Health Quality Improvement Encyclopedia*, Public Health Foundation, 2012, pp. 33.
[9] *Public Health Quality Improvement Encyclopedia*, Public Health Foundation, 2012, pp. 97.
[10] https://workspace.imperial.ac.uk/insolex/Public/19%20Mistake%20Proofing%20Techniques.pdf