

Principles of Poka-Yoke

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Abstract: Poka-Yoke is a method of quality management which is related to prevent faults from arising during production processes. It deals with "fail-safeing" or "mistake-proofing". The Poka-Yoke concept was generated and developed by Shigeo Shingo for the Toyota Production System. Poka Yoke is used in many fields, especially in monitoring production processes. In many cases, identifying faults in a production process involves a higher cost than necessary cost of disposal. Poka-yoke or error-proofing techniques are part of the collection of Kaizen techniques. Kaizen refers to continuous improvement in performance, cost/effectiveness, and quality. The use of this Poka-Yoke approach is influential in preventing human error and can increase machine utilization and efficiency levels, to reduce breakdowns and product defects. The fundamental principle of the successful implementation of Poka Yoke is when everyone in the organization places quality attributes as important.

Keywords: Poka-Yoke, kaizen, Toyota Production system

I. INTRODUCTION

In the any industry, one of the efforts to increase productivity and quality is to prevent error and detect error. To achieve an optimal level of productivity, it is necessary to make a multidisciplinary approach that involves all efforts, skills, expertise, capital, technology, management, information, and other resources in an integrated manner to make improvements to improve the quality of human life. Actually, the initial term was baka-yoke, meaning 'fool-proofing'/'Idiot Proof', but this put the focus on the person, not the operation. It also caused one employee to burst into tears and declare "I am not an idiot!" according to an article in the Harvard Business Review (HBR) titled, "Poka-Yoke is Not a Joke."

Thus, Shingo changed the name from the harsher "idiot-proof" to the milder "mistake-proof," because his goal for Poka-yoke was for it to help eliminate mistakes as simply and cost-effectively as possible. Poka-Yoke means 'mistake-proofing' or more literally – avoiding (Yokeru) inadvertent errors (Poka). Poka-Yoke ensures that the right conditions exist before a process step is executed and thus preventing defects from occurring in the first place. Where this is not possible, Poka-Yoke performs a detective function, eliminating defects in the process as early as possible. Its idea to prevent errors and defects from appearing in the first place is universally applicable and has proven to be a true efficiency booster.

Poka-Yoke is any mechanism in a Lean manufacturing process that helps to avoid mistakes.

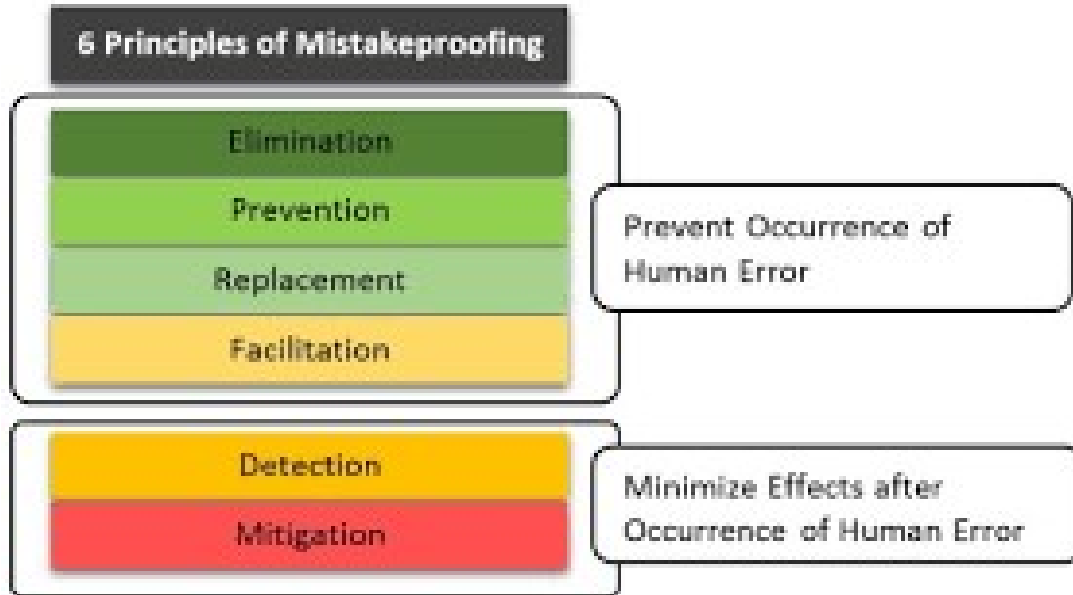
II. IMPLEMENTING POKA-YOKE

Poka-Yoke techniques can be classified into three categories: physical, operational and philosophical. Physical techniques involve installing components, such as fixtures or sensors, to eliminate conditions that may lead to errors. Operational techniques involve modifying or installing devices to reinforce correct assembly procedures. Philosophical techniques involve identifying situations that cause defects and doing something about them.

TYPES OF ERROR: GENERAL MANUFACTURING

1. **Processing Error:** Process operation missed or not performed per the standard operating procedure.
2. **Setup Error:** Using the wrong tooling or setting machine adjustments incorrectly.
3. **Missing part:** Not all parts are included in the assembly, welding, or other processes.

4. **Improper Part/Item:** Wrong part used in the process.
5. **Operations Error:** Carrying out an operation incorrectly; having the incorrect version of the specification.
6. **Measurement Error:** Errors in machine adjustment, test measurement, or dimensions of a part coming in from a supplier.



Poka Yoke is based on 6 principles:

1. **Elimination:** “Don’t do it Anymore” is to eliminate the possibility of error by redesigning the product or process so that the task or part is no longer necessary.
2. **Prevention:** “Make sure it can never be done wrong” is to design and engineer the product or process so that it is impossible to make a mistake at all.
3. **Replacement:** “Use something Better” is to substitute a more reliable process to improve consistency.
4. **Facilitation:** “Make tasks easier to Perform” is to employ techniques and to combine steps to make work easier to perform.
5. **Detection:** “Notice what is going Wrong and Stop it” is to identify an error before further processing occurs so that the user can quickly correct the problem.
6. **Mitigation:** “Don’t let the situation Get too Bad” is to seek to minimize the effects of errors.

III. SETTING AND REGULATORY FUNCTIONS

- a. **Setting functions** are the methods by which a process parameter or product attribute is

Inspected for errors.

1. The contact or physical method checks a physical characteristic such as diameter or temperature, often using a sensor.
 2. The motion-step or sequencing method checks the process sequence to make sure steps are done in order.
 3. The fixed-value or grouping and counting method counts repetitions or parts, or it weighs an item to ensure completeness.
 4. A fourth setting function is sometimes added, information enhancement, which makes sure information is available and perceivable when and where required.
- b. **Regulatory functions** are signals that alert the workers that an error has occurred:
1. Warning functions are bells, buzzers, lights, and other sensory signals. Consider using color-coding, shapes, symbols, and distinctive sounds.

2. Control functions prevent the process from proceeding until the error is corrected (if the error has already taken place) or conditions are correct (if the inspection was a source inspection and the error has not yet occurred).

IV. CONCLUSION

By applying some of the Poka-Yoke concepts in the hospital industry there can be reduction of error and work procedure can be simplified. Before implementation of Poka-Yoke concepts it is necessary to understand the concepts and procedure of implementation. Firstly, there should do the through supervision of workplace where Poka-Yoke need be implemented identification of error is very much required then , by using Poka-Yoke principles and approaches it can be done systematically .