

Role of Poka-Yoke in the productivity of a manufacturing industry

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Abstract

Poka-Yoke is a lean manufacturing technique that helps in preventing errors and defects from arising in the first place. It can be applied to any manufacturing environment and produces significant improvements in the efficiency of the system. It recognizes that in any production process it is natural for people to make mistakes and possibilities of machines to deviate from the standard. It works on the principle that the mistake or error should not arise in the system or it should be made obvious immediately as it occurs so that necessary actions can be taken in time to safeguard the efficiency of the system. This paper highlights the important features of the Poka-Yoke technique that may help the authors to use the concept more efficiently in their case studies.

Keywords Poka-Yoke, Waste minimization, Error-proofing, Lean manufacturing

1 Introduction

Poka-Yoke is an effective work standardization technique to improve the efficiency of the system through error-proofing or mistake-proofing. It is based on the concept that the system should be designed in such a way that the errors or defects should be impossible to happen or if an error happens then it should be brought to surface level immediately so that timely action can be taken in order to guard the whole system against a major breakdown. It ensures that before the process is executed; all the right methods or conditions should be in place beforehand in order to avoid inadvertent mistakes. It also ensures continuous monitoring of the system so as to report the errors immediately in case they arise.

This technique is very helpful in safeguarding the efficiency of the system. The optimization of the available resources is ensured as it makes the defects in the system either impossible to occur or immediate reporting of the errors in case they occur. This results in improving the quality and the reliability of the products manufactured which in turn helps the industry to achieve the satisfaction of its customers, lower the manufacturing costs due to no waste involved in the form of defects or rework and thus helps to grow its market share.

2 Literature review

Poka-Yoke is an effective tool to keep a check on the efficiency of the system and it helps in improving productivity by eliminating the defects. The conditions where this technique must be applied are given below:

- a) When the results of an error are costly and harmful for the system.

- b) When the process has a lot of human involvement and the working depends upon the skill and attention level of the worker and there are chances of human error in the process.
- c) When there is a chance of snowball effect that is a minor error can result in major defects in the future.

For any industry, it is very important to optimize the use of the resources for lowering the cost of manufacturing and it will happen only when the whole production process is scrutinized carefully regarding its working so as to block the possibility of the defect in every section of the manufacturing. The defects in the system can arise from various conditions and some are given below:

- a) The operations performed in the process are not as per the guidelines of standard operating procedures.
- b) The non-standard changeover procedures followed in the production process.
- c) The errors in the machine tool, equipment, and measuring instruments used in the process.
- d) Improper specifications of the parts used in the production process.

The methodology or the steps involved in the process of Poka-Yoke implementation are given below:

- a) Process mapping: In this step, the complete process under study is mapped with the help of some recording tool. It includes the preparation of the detailed flowchart of the process which shows all the steps involved in the process.
- b) Identification of human error possibility: After the process mapping, the detailed analysis of each step of the process is done with the aim of finding the areas where there are chances of human error and when the changes may occur.
- c) Source of the potential error: After the identification of the potential errors, it is necessary to identify their source in order to start the error-proofing process.
- d) Brainstorm the ways that can make errors impossible to occur: In this step, the motive is to think of the ways that can make it impossible for the error to occur in the first place. It may include the elimination of the steps in the process that may result in errors during the process or replacement of such steps with other error-proof steps.
- e) Development of error detection technique: In case it is not possible to make errors impossible to occur in the first place, then it is necessary that one should think about the techniques or methods which can detect the defects as soon as they arise in the process and it also includes the development of the ways which may correct or minimize the effect of the error identified.
- f) Implementation of the best error-proof method: In this step, depending upon the situation in hand, the best error-proof method is identified for all the potential errors of the process, tested and then implemented.

3 Conclusion

The productivity of any industry depends upon the optimization of the production processes. The presence of defects or errors in the production system directly results in the waste of the resources which further affect the industry in terms of high manufacturing cost, low customer satisfaction, and decreased market share. It is thus very important that the production processes must be reviewed with the aim of implementing the principles of error-proofing which safeguards the efficiency of the industry. Poka-Yoke not only helps the industry to prevent the errors from happening in the first place but also provides means to detect the errors as soon as they arise in the system. The implementation process of Poka-Yoke can be done in any industry and provides significant improvements in productivity.

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