

Barriers of Poka-Yoke in Indian Manufacturing Industries

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Abstract

Poka-Yoke has been identified with significant role in the Indian manufacturing industries. The requirement of Poka-Yoke has been found important due to accidents, defects and customer complaints. Ten barriers have been identified from literature review and subsequent discussions with experts from academia and industry. Clear understanding of barriers may help organizations to understand and manage these barriers more effectively and efficiently to implement Poka-Yoke in industries. Through this paper we contribute to identify the barriers to implement Poka-Yoke in manufacturing industries and prioritize them on the basis of experts' opinion.

Keywords: Indian Manufacturing Industries, Poka-Yoke, Quality, Improvements, Literature Review, Experts' Opinion

1. Introduction

Poka-Yoke is comprised in the techniques of preventing the faults, being in fact a quality management system and which may be translated by "avoiding the accidental errors", "eliminating the errors" or "self-protecting operations". The human errors come especially from tired, troubled, Absent-minded or unmotivated persons. The main objective of Poka-Yoke techniques is that of obtaining zero faults products, by using simple devices of fixing, assembling, warning and other related devices, which prevent people to make mistakes, even if they wanted to (Chase & Stewart, 1994).

2. Literature review

In the era of quality and use of such methodology as implementation, zero defects, continuous improvement, six sigma and method of quality. FMEA, QFD, SPC. It is worth set of general measure to prevent defect (Patel et al., 2001). Poka-Yoke are designed to make life easier and improve the performance of the work without implement; they are closer to the philosophy of universal design than to accessible

design and offer an easy way of making work more accessible for all kind of workers (Miralles Insa et al., 2011). The Poka-Yoke is a technique for avoiding human error at work. A defect exists in either of two states; the defect either has already occurred calling for defect detection, or is about to occur, calling for defect prediction (Dudek-Burlikowska, 2006).

Shingo, a main manager of the Toyota Production System, introduced the concept of 'Poka-Yoke' in Japan, translated as 'mistake proofing' in English. Although many preventing and control techniques were developed, they are rather inefficient. Effectively removing errors cannot be achieved without a good understanding of their real characteristics. The mistake appears when a necessary action is not accomplished or is inappropriately accomplished, a forbidden action is performed or essential information is not available or is incorrectly understood.

The objective of implementing Poka-Yoke in Indian industries is to remove errors before they present rejection. Some simple examples of mistake-proofing devices exist in everyday life (for instance, the tethered gas cap which prevents you from leaving it behind, or a 3.5 inch diskette which can only be inserted if oriented correctly). In production, mistake-proofing is implemented using simple objects like fixture, jigs, warning devices, color coding (Sadri & Ghavam, 2011). Poka-Yoke allows processes to run smoothly as they are fail-safe solutions (Kumar & Steinebach, 2008). Although the immediate result is that defects are identified and prevented from programming, the real aim is to modify the process so that the future defects are designed out (Shiryo s., 1986, 1987). Chase and Stewart (1994) state that Poka-Yoke involves a three steps process of :

- a) Initially identifying an error
- b) Tracing the error to its source
- c) Then developing and implementing the related safe.

In the era of quality and use of such methodology as implementation, zero defects, continuous improvement, six sigma and method of quality: FMEA, QFD, and SPC. It is the worth set of general measure to prevent (Karkoszka & Honorowicz, 2009). One cannot prevent all mistakes, but can make it easier to do the job right, although mistake will still happen. Instead of allowing processes to continue after a mistake has been made, Poka-Yoke could be used to stop them (Shahin & Ghasemaghahi, 2010).

The aim of Poka-Yoke method is to eliminate or minimize human errors in manufacturing processes and management as a result of mental and physical human imperfections. In the described organizations Poka-Yoke method in connecting with the quality methods ensure of high quality of produced engine elements, as well as by the continuous monitoring process all allow to minimize cost, and sharing not great effort to improve. Such behavior organization calls for effective implementation of the objectives which are compatible with the system both by the highest quality management and management as well as all workers. Use of Poka-Yoke requires strong basis in the overall quality management. Necessary are clear indications to distinguish between a defective and correct product and therefore company regularly carry out training

crew. It should not be forgotten that the method Poka-Yoke requires an immediate reaction and the correction as well as a result in the operation. Errors arise from various reasons, but most of them can be prevented if only people are able to identify the problem at the time of formation, define the causes and make appropriate corrective steps. Prevention of defects in the process before their appearance is the best way of defects reduction and thus reduces the costs (Dudek-Burlikowska & Szewieczek, 2009).

3. Identification of barriers in implementation of Poka-Yoke in automobile industries

The factors which oppose implementation of Poka- Yoke in automobile industries are identified from the literature review and expert opinions. Literature was reviewed to identify factors opposing to implement Poka- Yoke in Indian industries.

3.1 Difficulty in Change

Changes are not easily accepted in the entire system and are opposed in implementation of Poka-Yoke serves as a barrier (Patel et al., 2001).

3.2 Hostility

To be hostile is to be against the ideas and to oppose it. Hostility is also a factor contributing towards barrier of implementation of Poka – Yoke (Patel et al., 2001).

3.3 Fear of Job Loss

Employee feel of fear to lose their job that Poka – Yoke may not be successfully implemented in the system, which guide them to oppose Poka – Yoke and implementation becomes complex in such cases (Reichheld & Sasser, 1996).

3.4 Old Ideology

Operators and engineers make fun of the word “Poka-Yoke” by expressing the comment “doing the Poka-Yoke”. Some of the managers and employees might express the view that they do not need to use these methods to reduce errors and they prefer to stick with what they regard as the tried and tested methods (e.g. work study) and intuition (Chase & Stewart, 1994).

3.5 Inappropriate and Ineffective Methods

The methods used for Poka-Yoke may be inappropriate and ineffective, so a new alternative has to be found, which consumes more time and effort and sets back the implementation plan. The facts imply that if you do not succeed at first, learn from the mistakes, persevere and plan improvements from failures (Miralles Insa et al., 2011).

3.6 Traditional Way of Working

Even when Poka-Yoke methods are implemented in the organization, people do not respect them and carry on with the traditional way of working (Reichheld & Sasser, 1996).

3.7 Complexity in Planning

Carrying out planning and evaluation tasks is considered difficult for companies where processes are running constantly which may serve as a barrier in implementing Poka-Yoke (Shingo, 1986).

3.8 Too Expensive

Justifying investment relating to mistake proofing is sometimes difficult as it often considered as too expensive (Shingo, 2017).

3.9 Reluctant Top Management

A lack of management interest in pursuing these types of improvement is yet another barrier to implement the Poka- Yoke (Shingo, 2017).

3.10 Limited Feedback

Actual feedback which comes through various sources is a barrier in implementing Poka – Yoke in actual practice as the picture is not very clear in manufacturing and automobile units through feedback (Karkoszka & Honorowicz, 2009).

Table 1: Prioritization of Barriers on the basis of Experts' Opinion

S.No	Barriers	Very Relevant	Relevant	Less Relevant
1	Difficulty in Change	√		
2	Hostility		√	
3	Fear of Job Loss		√	
4	Old Ideology		√	
5	Inappropriate and Ineffective Methods		√	
6	Traditional Way of Working	√		
7	Complexity in Planning	√		
8	Too Expensive		√	
9	Reluctant Top Management		√	

10	Limited Feedback			√
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4. Conclusions

Poka- Yoke has been increasingly gaining importance to improve quality of products and services. We have identified Poka-Yoke as an important research area. We have identified 10 important barriers to implement Poka-Yoke in Indian manufacturing industries. Experts' opinion on the issue has helped to classify these barriers into 3 categories: very relevant; relevant; less relevant. 3barriers have been identified as very relevant whereas 6barriers have been identified as relevant. This paper may help to manage Poka-Yoke implementation process. The scope of paper has been kept limited to identification and classification (on the basis of relevance) of barriersof Poka-Yoke implementation. Various techniques like Interpretive Structural Modeling, Analytical Hierarchy Process and Interpretive Ranking Process may be further utilized to model and rank these barriers.

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