



The Strategic Frame Work of Risk Management and Failure Mode and Effect Analysis for Manufacturing Industry

* Ramesh Chandra Dube ** Nitin Aher

* Assistant Professor, PIES,Indore

** Assistant Professor, PIES,Indore

ABSTRACT

In Indian scenario the existing risk management methods have a tendency to be focuses on the threats rather than opportunities and technology risk rather than operations risk processes. A system modeling method was used to develop a conceptual model for prophylactic risk management in these situations. The resulting model is of conjectural nature but it is starting towards a theory of strategic risk management. . While the methodology has been threatened by application to the risk management in manufacturing units, it has the potential to be used in other situation in response of threats and opportunities than threats for the long-term viability of the manufacturing units. Now-a-days the manual machining systems are replaced by automated systems the requirements of trained manpower; improved machining systems and new design of products cultivate the need of newer materials. The time limit of orders fulfillment, cost reduction, quality has made the more conscious to customers, owners and other stakeholders and thus their role in decision making. Metal machining processes along with the forming, fastening (sub-assembly) the various failures, faults and defects are players of the occasions, events and happenings of Hazards. The PFM&EA play an important role in the occupational environment and physical safety with material economy.

Keywords:

INTRODUCTION

It is under stood that Risk Management is entire set of activities and measures that are aimed at dealing with risks in order to maintain control a manufacturing system Risk management provides support for attempts to gain better control A one off identification of risk though a risk analysis is however, not enough..A cyclic nature as shown in fig.1 Risk management is a tool which with in the framework of the decision and control based approach in the area time, cost, quality, information and organization, control over the system may be executed via these elements. Risk analysis has domain of all threats and opportunity is risk process capability. It is appropriate to think all threats which appear in the form of failures, faults and defects in the operational processes of the manufacturing system The Effect analysis control the occurrences of the system failures repetitiveness and reduce the effect and determine the redetection techniques. Failure mode and Effect analysis is as A Risk Management Tool is giving better control on cost and time the failure occurrence and measurements

costs. An attempt is made to respond a decision tool for integration of technology, Organization and people in manufacturing automation decision making process has been developed and maintained. Risk Management and Failure Mode and Effect Analysis at different stages of Operational processes design and implementation, in further development and overall satisfaction of stakeholder's. Risk management risks are I-Fire security Natural disasters, third party, motor fleet and environment II People related risk – Healthy, Safety, and human resource key persons III Operational Risk Business interruption, Industry Information Technology. Communications Product and processes service liability, Catastrophic recovery and Regulatory compliance IV commercial Risk-Industry risk, market risk, purchasing risk manufacturing risk service risk, Delivery risk distribution risk financial risk political risk and corporate reputation risk Operations are more than the BRICKS and MORTORS decision the amount of production capacity, the kind of production equipment and location of equipment. The management policies and system determine, How well the bricks and mortars perform and therefore, how competitive, operational excellence is in three blocks I. Assets Productivity II .Capital Effectiveness and III. Operations Risk Management. Managing risk with costs several times below industry averages. 1. Brain Trust of Engineering and Technology.2.Maintenancer.3.Mechanical system.4.Process Equipments.5Material selection and specification. 6. Materials non distinctive evaluation.7. Corrosion and wear testing 8. Fitness for service evaluation 9 Equipment physical failure analysis. 10 Environmental Energy. 11. Product Stewardship 12. Explosion and Hazards.13.Pollution prevention. 14. Hazards Remediation. 15. Process Safety and fire protection 16. Occupational health and Industrial Hygiene. 17. Explosion Energy. Operational Risk Management is more concern with manufacturing operations and a part of operation managements basically all operations are in relation to resources like man machine and materials. Measuring risk of an operation depending on the availability of data base for qualitative and quantitative risk measurement. In certain operations in manufacturing probable figure for unwanted or unsuccessful events have been

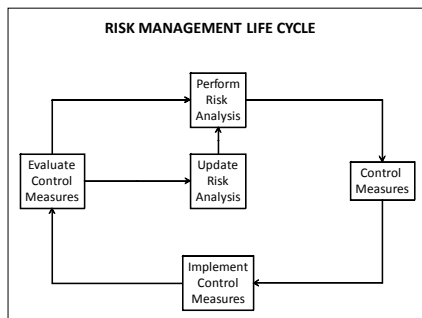


Figure:-1 Risk Management Life Cycle

GENERAL MANUFACTURING UNIT

The man, machine and material system's interface in shifting their emphasis towards human factor's particularly these three Ms interaction and considering all as assets in place of

collected for sufficient periods like loading and unloading, material operations etc. A risk assessment and measurements will use either cause or effect and quantification methodology unwanted events to happen from data base. Operational risk is defined for the system in study characteristics risks as the risk of loss resulting from inadequate or failed processes of the system, human performance or external events focusing on seven point integrated risk management system model to encompass Process Safety Management (PSM):-Technical and Facility safety system-Electrical and utility safety system-Fire and Explosion safety system-Environmental safety system -Product and material stewardship safety system-Overall distribution safety system -Occupational health and industrial hygiene safety system

RISK TOOL AND TECHNIQUE:-

Failure Mode And Effect Analysis Failure Mode:- Failure modes are sometimes described categories of failure. A potential failure mode describes the ways in which product or process could fail to perform its desirable function like design intent or performance requirement as per the described needs, wants and expectations of the internal and external customers. **Failure Effect:** An effect is an adverse consequence that the customer might experience. The customer could be the next operation, subsequent operations or the end user **Failure Cause:** A cause is the means by which a particular element of the design or process results in a failure mode. **Potential failure mode-How could a failure occur?** **Potential Effect of failure- What is the consequence of failures?** **Potential causes-What would be the cause of failures?** **Process controls- What controls are in place to defect or prevent failures?** The risk potential with extended use in reliability engineering for the automotive manufacturing fields as well as complicated parts components and sub-assemblies. The main purpose to reveal system weakness and their any minimizing risk of failures occurrences The FMEA as a methodology for the Risk Management or a technique is used to design manufacturing Processes. Currently the implementation of quality conscious FMEA. areas:1Customerfocus.2.Leadership.3People interest.4Process approach. 5. Organization suppliers 6.Contractual improvements. **Failure Mode Failure Mode** means the ways or modes in which some things might fail, failures are any ERRORS or DEFECTS especially once that affect the customers and can be POTENTIAL or ACTUAL. It refers to cause of failures or failures occurrence or probability **Effect Analysis Effect** refers to studying the consequences of these failures. Failures are prioritized according to how serious their consequences are? How frequently they occur and how easily they can be detected. The purpose of the FMEA is to take actions to eliminate or reduce failures, starting with the highest priority ones .FMEA is used during design to prevent failure for letter used for control .FMEA Process chart shown in fig.2

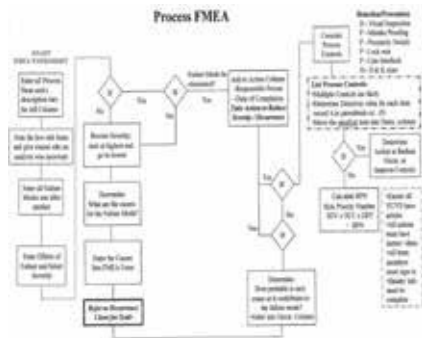


Figure:- 2 FMEA Process chart

The following mfg. Process is considered as an example for FMEA flow process as shown in table no.1.

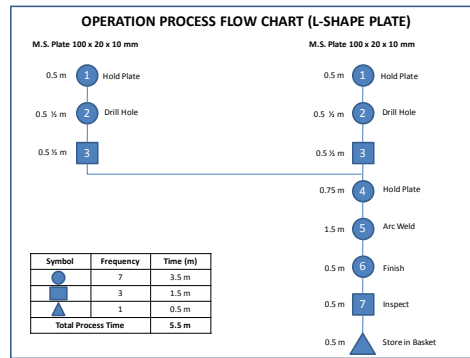


Figure:3 Operation Process Flow Chart (Drilling and Welding)

Table No. 1 PFMEA RISK RANKING TABLE MAINTENANCE AND MANUFACTURING PROCESSES

Sr. No.	Risk Event	Symptoms	Likeli-hood	Impact	Risk Score	Dete-ction	Risk Priority Number	Risk Rank	Rev. RPN	Rev. Rank
1	Key does not match keyway	Wrong key delivered	3	2	6	9	54	R7	18	R7
2	Wrong grease	Machine wear	4	3	12	7	84	R5	42	R6
3	Pulley crown broken	Transmission fails	4	4	16	8	128	R2	48	R5
4	Hole diameter over size / under size	Fitment problem (client)	3	8	24	5	120	R3	90	R2
5	Dimension variation	Fitment problem in successive operations	2	8	16	4	64	R6	56	R4
6	Burrs on the hole	Causes injury to operator / client	1	8	8	3	24	R8	12	R8
7	Improper welding	Part fails in use / client dissatisfaction	3	8	24	6	144	R1	108	R1
8	Penetration / dimension variation	Fitment problem / part fails / client dissatisfaction	3	8	24	4	96	R4	90	R3

RESULT AND CONCLUSION-

The risk management for the manufacturing process of example indicate that the risky operations the risk ranking shows that the variable risk of OSD. The process FMEA also indicate for the combined effect of Manufacturing and Maintenance indicates that the 7 processes of risk example are variant only the detection controls the RPN of the process the other wise the Occurrence and severity in second phase of risk control indicate that process design may be modified with application of PDCA cycle

REFERENCES

1. "The Basic of FMEA"- 2nd Edition by 'Robin E Dermott.' | 2. "Failure Risk Management" by , Dow alas W. Nub bard | 3."Strategic Risk Management: Application to manufacturing" 'The open Industrial | Engineering Journal',2010, 3, 12-29 by 'D.J.Pons.' | 4."Project Risk Management using the project Risk FMEA" 'Thomas Carbon & Donald D. Tippelt, Fatrchild,'Semiconductor Corporation , The University of Alabama in Huntsville--Engineering Management Journal Vol.-16, No.4,Dec.-2004". |