

Hazard Identification and Risk Assessment in Windows Plant

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Abstract: In industrial sector, the pioneer industries have to conduct their operations in safe, reliable, and sustainable ways. To prevent accidents, unwanted, undesired events happening in their industries, they have to identify the root problems and assess the associated risks and to bring the risks to tolerable level. Most of the accidents are caused by direct or indirect, known or unknown, detectable or undetectable, intentional or unintentional unsafe acts, conditions and consequential events leading to accident. They explain rather the cause or reason and not just the circumstance. Therefore, industries should research the root cause of accident and to develop control measures for prevention. The zero-incident vision is a mandatory goal for every industry and each organisation must achieve it by implementing all safety management systems in their organisation. In real world, an industry and incidents are co-related and every industry is subjected the accident problem, the type, percentage and severity may differ. These accidents or undesired are root causes which develops the need for safety management in industrial sector. Dangerous occurrences, Lost time accidents and injuries are its direct results. Accident Compensation, production-down time, direct costs and various indirect-losses are the undesired results of accidents. Accidents not only affecting the individuals but also the family, community, state and nation at large. Accidents not ending up in human injuries, but also causing property damage or asset-loss are also creating direct and indirect problems to the organizations. It is clear that, accidents or undesired events are always unacceptable. This is why the Risk Assessment is the vital part of safety management systems worldwide. Industries are rapidly growing and contributing to full fil the fast-growing economy. This creates so many occupational safety and health related hazards and illness and also significant environment pollution. Effective control measures like Engineering controls helps safe guarding workers from workplace hazards, occupational illness & injuries, and accidents, control or eliminate occupational safety and health risks and help organization to obtain incident free safe working environment. Only Risk Assessment can do it.

Key Words: — Hazard, Risk, Incident, Risk Assessment, Risk Evaluation.

I. INTRODUCTION

To manage risks associated with the industrial process, the organization should first identify the hazards, and risks in those industrial process to be minimized to an accepted level. It is vital to any organization to conduct risk assessment at earlier stage of Life Cycle of the product or process, and it benefits in achieving most safer and healthy working environment.

The Risk mapping originated from Risk Assessment helps in creating the base for achieving safer work environment and effective establishment of safety management throughout the operations taken by any organization. Risk assessment not done or not conducted thoroughly or wrong assumption of risks could result in accepting of risks of higher or danger in nature and is a true treat to any organization. Hazard Identification and Risk Assessment (HIRA) is conducted for realizing of unwanted events that can create to a hazard, the level of risk involved in each step of the organization's operations and the magnitude of risk and their consequence towards of undesired events or accidents. Risk Assessment Techniques are globally accepted platform for understanding the risks and their consequences.

Hazard Identification and Risk analysis is a systematic way to understandings various hazards associated in each step of the industrial process and in creating the most effective control

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measures to achieve incident – free organization in all the levels of management structure and in complexity of the organization’s operations.

The aim of this work is to check and find hazards and analyse risks and events rooted to hazardous and dangerous events. HIRA studies can be conducted at all the stages in a Product’s life cycle and conceptual design, prototype design, design detail, starting stage, ongoing operation, end work or shut down operations.

In common, more advance a hazard is identified, the more efficiently it can be avoided or removed.

1.1 Problem Identification

- Hazard identification is the method of the process used to identify if any particular factor, parameter, action, condition may have the potential to cause harm. Hazard Identification is done at various areas and in all machines of window manufacturing plant.
- Risk is assigned in every activity performed at in each functional area. Risk is formulated as the combination of Probability and Severity of hazard associated in each task. Risk is categorized as
 - High Risk – Red Risk
 - Medium Risk – Orange Risk
 - Low Risk – Green Risk
- Red Risk activities which are serious in nature are identified work should not be started or continued until the impact has been reduced. If it is not possible to reduce risk at higher numbers, it is often advised to not perform those red risk activities.
- Orange Risk Activities have moderate risk can be controlled by Considerable resources may have to be allocated to reduce the impact where the impact involves work in progress, urgent action should be taken.
- Green Risk Activities are low risk activities in which general procedures are enough to control the risk. No additional controls are required. Most cost-effective methods to be implemented. Periodical monitoring of control measures to be done.

II. METHODOLOGY



III. EXPERIMENTAL SETUP AND PROCEDURE

3.1 Hazard Identification

Identification of tasks carried out at the workplace (to identify all tasks so that they are all included in risk assessment). Consideration of tasks carried out at the workplace (evaluation of risks from the different tasks). Observation of work in progress (check that procedures are as laid down or predicted, and that there are no other risks arising). Consideration of patterns of work (to assess exposure to hazards). Consideration of external factors that could affect the workplace (e.g., weather consideration for outdoor workers). Review of psychological, social and physical factors which might contribute to stress at work, how they interact together and with other factors in the workplace organization and environment. Consideration of organization to maintain conditions, including safeguards (e.g., that systems are in place to assess risks from new plant, materials and so on to update information on risks).

3.2 Risk Assessment

It is the quantitative evaluation of the likelihood of undesired events and their consequences being caused together and a value judgement concerning the significance of the results after comparing with set, legal or accepted values or standards. It is a judgement of significance or acceptability of risk identified by risk analysis and comparing against social, political or legal criteria, e.g., comparison of measured or calculated risk with the permissible safe limits and judgement regarding safety (whether the risk level is within or exceeding the safety limit) gives risk assessment.

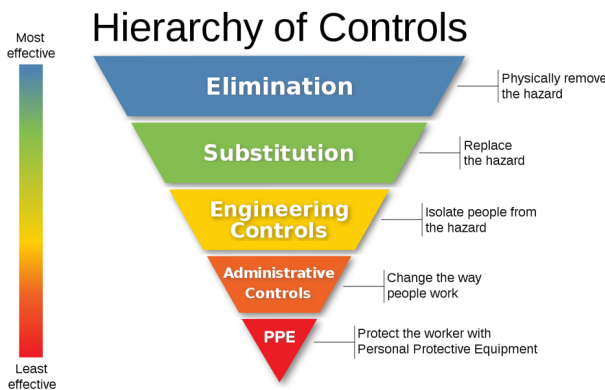
Objective of risk assessment are: 1. Identification of vulnerable zones (losses of persons and property) of the premises. 2. Estimation of hazard distances for the maximum credible accident (MCA) scenarios. 3. Suggestions for risk mitigation measures a delineation of approach to disaster management plan (DMP).

3.3 Risk Rating

Risk Rating is to find out probability of a hazard occurring and then an estimation of its consequence or effect and its severity. It is quantitative. For example, estimation of probability or frequency of possible explosion and its effect on persons and property in terms of deaths, injuries, house breakages.

Severity	Probability				
	10	8	6	4	1
100	1000	800	600	400	100
40	400	320	240	160	40
21	210	168	126	84	21
8	80	64	48	32	8
2	20	16	12	8	2

3.4 Risk Control



3.4.1 Elimination and Substitution

Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process. If the process is still at the design or development stage, elimination and substitution of hazards may be inexpensive and simple to implement. For an existing process, major changes in equipment and procedures may be required to eliminate or substitute for a hazard.

3.4.2 Engineering Controls

Engineering controls are favored over administrative and personal protective equipment (PPE) for controlling existing worker exposures in the workplace because they are designed to remove the hazard at the source, before it comes in contact with the worker. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The initial cost of engineering controls can be higher than the cost of administrative controls or PPE, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process.

3.4.3 Administrative Controls and PPE

Administrative controls and PPE are frequently used with existing processes where hazards are not particularly well controlled. Administrative controls and PPE programs may be relatively inexpensive to establish but, over the long term, can be very costly to sustain. These methods for protecting workers have also proven to be less effective than other measures, requiring significant effort by the affected workers.

IV. CONCLUSION

On the basis of Hazard Identification and Risk Assessment conducted on Windows plant revealed the risks associated with each of the task performed at the unit. Risks are classified as High, Medium, Low categories. Risk Control Measures are derived and mitigation plan with target date and responsibility of each risk is prepared and circulated to inter departments. Red Risk register is prepared based on high-risk activities and special focus is given to those activities. Review meetings are conducted based on this Hazard Identification and Risk Assessment report and roles and responsibilities are assigned to concerned department team faculties for implementing the risk control measures. Periodic review of risk control measures taken and its effectiveness should be monitored.

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