

Hazard Identification Risk Assessment and Risk Control in A Wood Processing Industries

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ABSTRACT: An industrial activity is never separated from potential hazards and risks that can lead to workplace accidents. A small accident could bring a major impact on a company. Woodworking industry is the type of industry with the highest accident rate in manufacturing sector. This research is focused on a wood processing industry which take roles in selling furniture and building components made of high quality wood. In its practical history, Generally wood processing industry has never conducted risk assessment within the company, which makes the company is probably at high risk and can be easily exposed to various potential hazards. Risk assessment is a necessary step to create a safe working environment for the company and for the people involved in it. By conducting risk assessment, the workplace accidents which possibly occur within the company can be reduced or even eliminated. This project is conducted by identifying hazards as the initial stage. And then risk analysis is performed using risk matrix to determine risk ranking of the identified hazards and risks. Once the risk ranking of each risk is determined, the risk is prioritized based on its urgency to be managed. According to risk ranking, production machines are mainly the source of risk within the company with the highest severity rate. In order to mitigate the risk, Job Safety Analysis for company's production machines is organized so it can provide the most relevant output in the end. This research conduces recommendations for the company to reduce the potential hazards which possibly arise within the company.

Keywords : HM, API, RMs, NORSOK.

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I. INTRODUCTION:

Identifying hazards Risk Assessment (HIRA) is a procedure for identifying and describing risks by characterizing their likelihood, regularity, and severity and assessing their negative effects, including potential financial losses and casualties. Wood dust, sap, and the lichens that grow on wood can harm the skin, respiratory system (nose and lungs), eyes, and the entire body in addition to causing asthma Dermatitis, a condition where the skin might become red, itchy, or dry and blisters may form, can be brought on by chemicals found in many types of wood. Dermatitis can also be brought on by skin coming into close touch with wood particles. A worker who is exposed to the dust repeatedly may develop allergy dermatitis and grow sensitized to it. Risk assessment serves as the cornerstone for effective health and safety management and is essential to lowering the number of workplace accidents and illnesses, which not only enhances workplace health and safety but also boosts corporate performance. An estimation of the likelihood and anticipated effects of the indicated hazard is included in the risk assessment process. In the manufacturing sector, the woodworking industry, which is highly mechanized and labor-intensive and operates in high-volume production, has the highest accident rate. The exposed subjects could suffer substantial harm as a result of this. RMs are thought to be adaptable enough to be employed in a variety of scenarios to analyze and prioritize risks. The use of RMs in risk assessment is supported by a number of international standards, and many businesses view RMs as "best practices" [1]. In this paper discussed Define Risk Criteria, Define Risk Events, Consequence Estimation and Probability Assessment, Risk Profile, Rank and Prioritize [2]. Each of these standards' contributions to RM support are outlined in this section. For its risk-based inspection (RBI) technology, API. API RP 581(2008) generally suggests RMs. In order to prioritize the inspection of the appropriate equipment at the appropriate time, RBI creates a risk ranking for processes and equipment. This method helps to optimize inspection planning [3].

II. ENVIRONMENTAL MANAGEMENT RISK EVALUATION

Understanding the environmental risks associated with a property or across a portfolio and putting a strict control system in place are key components of managing environmental risk. It's critical that distinct roles are assigned for managing environmental risk, and that the necessary training is given. A particularly effective methodology to highlight important Risks and business units or companies under consideration is the application of HM in HSE.

➤ **HSE aims:**

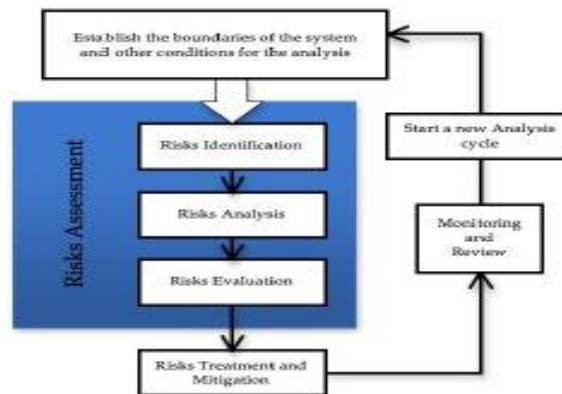
In any firm, occupational safety is a concern. HSE addresses this concern by anticipating and recognizing risks, analyzing, evaluating, treating, and communicating those risks, as well as by taking a broader or more thorough approach to the surrounding environments. HSE is becoming more crucial and expected in any company's efforts to be sustainable and legally adequate. It is increasingly becoming a component of routine business operations and is frequently demanded by clients, regulatory authorities, and society.

➤ **HSE risk management :**

An effective risk management program aids a business in taking into account all potential risks. The relationship between various business risks and the potential negative effects they could have on an organization's strategic goals is also examined by risk management.

➤ **Risk management process:**

The process of risk management and the distinct idea of system safety, the conventional method of dealing with risk was primarily based on a trial and error approach risk management is the combination of culture, procedures, and organizational frameworks aimed at maximizing opportunities while controlling risks. It is a complicated process in this context and can be viewed as the methodical implementation of management policies, methods, and processes.



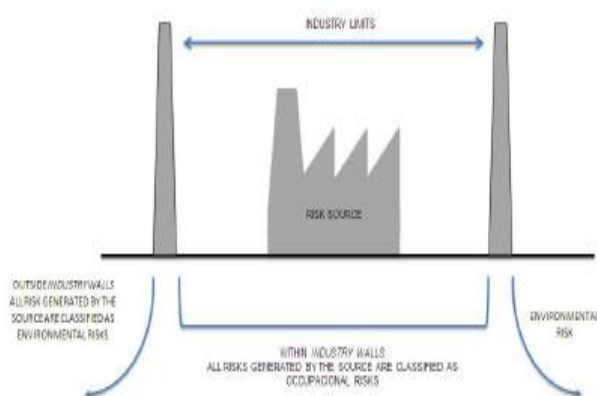
➤ **Risk evaluation schemes:**

The risk analysis, which is carried out using a specified methodology and is occasionally referred to as "risk assessment scheme," is a crucial step in the risk management process. A tool for risk assessment may be either qualitative or quantitative, and it may be presented as a tree or a spread sheet. Consequently, a classification matrix results.

	Analysis formatted as tree	Analysis formatted as Spread Sheet
Qualitative Results		
Quantitative Results		

The schemes of risk analysis under the tree concept focus on establishing a chain of events, as well as assess the risk occurrence likelihood. The risk assessment plans should be chosen taking into account each plan's advantages and disadvantages in relation to the scenario and output requirements: HazOP, FMEA, Tree Analysis, Matrix Schemes.

➤ **Environmental risk management:**



The approach for identifying risks is the same for both occupational and environmental risk management. The scope used to choose the scenario will be the key distinction between them. One is concerned with the impacts of the Risk inside the borders of the enterprise, firm, unit, or industry during an occupational risk management process. All decisions, including which approach to adopt and which implications to ignore, are guided by this scope.

➤ **The Risk matrix (HM) concept:**

The HM method is based on the previously mentioned idea that risk is a function of its seriousness and likelihood of occurring. As was previously observed, risk can be described as the product of its two variables in a simplified view. The number of workers exposed to the Risk in the HM serves as the probability element.

➤ **Risk Assessment and Matrix:**

Risk Assessment Code	Description
0	This hazard is NOT present in the sector evaluated
1	The exposure of this hazard occurs below the action level AND it is occasional
3	The exposure of this hazard occurs below the action level AND, continuously
6	The exposure level is between the action level and the Threshold Value Limit (TVL-TWA) or equivalent.
9	The exposure level is above Threshold Value Limit (TVL-TWA) or equivalent.

Sector	Hazards identified					
Description/ Name	Number of people working	H ₁	H ₂	H ₃	...	H _x
S ₁	W ₁	R _{1,1}	R _{1,2}	R _{1,3}	...	R _{1,x}
S ₂	W ₂	R _{2,1}	R _{2,2}	R _{2,3}	...	R _{2,x}
S ₃	W ₃	R _{3,1}	R _{3,2}	R _{3,3}	...	R _{3,x}
...
S _y	W _y	R _{y,1}	R _{y,2}	R _{y,3}	...	R _{y,x}

➤ **Risk frequency calculation:**

Most people have a good understanding of the equation's consequence part. It enables quantifying the physical impact of a leak or a complete pipeline rupture that will harm the company's reputation, its customers, its employees, and the environment. its Risk frequency of recurrence is determined by the following calculation:

$$fH_1 = W_1 * R_{1,1} + W_2 * R_{2,1} + W_3 * R_{3,1} + \dots + W_y * R_{y,1}$$

➤ **Exposure frequency calculation:**

Following the determination of all the Risk recurrence frequencies, comes the determination of the exposure frequencies.

$$fs_1 = W_1 * R_{1,1} + W_1 * R_{1,2} + \dots + W_1 * R_{1,x}$$

III. CONCLUSION

To ensure safety and health at work, products and work methods designed for workplace usage must adhere to all applicable laws and regulations. Assessing inevitable risks and hazards associated with suggested solutions under specific operational and user settings is part of this. evaluating the risks associated with its use and suggesting defenses against these threats and hazards. To detect risks and dangers, a thorough examination of work is required due to its diversity and complexity. A similar procedure is known as risk assessment. The protection of employees' health and safety is the primary goal of risk assessment at work. Risk assessment reduces potential work-related harm to the environment or to personnel. Based on hazard identification, risk assessment, and risk control processes, potential risks at the wood processing company were examined in this project. In a risk assessment matrix with 7 variables, the probable risks' risk rankings were assessed. As a result, the production area, where the majority of dangers may arise during machinery operation, has the greatest severity rate. The process of risk reduction was started in accordance with the control hierarchy. Personal protection equipment should only be used after all other risk-reduction measures have been exhausted. In this instance, administrative control and personnel training should be included to appropriately implement safe working procedures in the industry. To improve safety performance, human resource management procedures that guarantee a staff that can satisfy productivity and safety goals are important. It is necessary to regularly examine the evaluation because risk identification, risk assessment, and risk control are continual activities.

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