

ENHANCEMENT OF SAFE WORK ENVIRONMENT BY USING HAZARD ANALYSIS METHOD IN PRESS MACHINE

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ABSTRACT:

This project aims to elevate workplace safety in press machine operations by implementing a hazard analysis method, focusing on a comprehensive three-guarding system. The three -guarding system consists of physical guarding, electrical guarding, and visual guarding, Synergistically designed to mitigate risks and reduce the incidence and severity of crush injuries among employees. And using the three guarding system there are first guard is physicals guarding system like 360 degree guarding and second guarding is electrical guarding system like double hand switch and third guarding is virtual guarding like light curtain system , this three guarding system protection the employees and reduce the crush injury and reduce the severity rate

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1.INTRODUCTION:

This project aims to elevate workplace safety in press machine operations by implementing a robust hazard analysis method, focusing on a comprehensive three-guarding system. The three-guarding system consists of physical guarding, electrical guarding, and visual guarding, synergistically designed to mitigate risks and reduce the incidence and severity of crush injuries among employees.

The physical guarding component includes a 360-degree guarding system, enveloping the press machine to create a secure barrier. This physical safeguard is engineered to prevent unauthorized access to hazardous areas, minimizing the potential for crush injuries. The second layer of protection involves an electrical guarding system, incorporating a double hand

switch mechanism. This system necessitates the simultaneous engagement of both hands by the operator, ensuring a deliberate and controlled approach to machine operation, thereby minimizing the risk of accidents. The third facet of the three-guarding system employs visual guarding, employing a state-of- the-art light curtain system. This advanced technology detects the presence of objects or personnel within the machine's proximity, instantly halting operations to prevent accidents. The integration of these three guarding systems serves as a comprehensive strategy to enhance employee protection, fostering a safer work environment.

The research methodology involves a detailed hazard analysis, encompassing both mechanical and human factors, to identify potential risks

associated with press machine operations. Data collection methods include on-site observations, operator interviews, and an examination of historical incident reports. The findings will be used to construct a risk assessment matrix, categorizing hazards based on severity and likelihood. Through the systematic implementation of the three-guarding system and the hazard analysis method, this project seeks to significantly reduce the occurrence of crush injuries and decrease the severity rate among employees operating press machines. Furthermore, the project will assess the economic feasibility and practicality of these safety measures to ensure their seamless integration into industrial processes. This research contributes to the ongoing discourse on occupational safety by offering a practical model for organizations seeking to enhance the safety of press machine operations.

The three-guarding system, coupled with a proactive hazard analysis approach, aims to create a culture of safety, promoting the well-being of workers and fortifying the overall resilience of industrial workplaces.

2.LITERATURE REVIEW

Journal of Xi'an Shiyou University, Natural Science Edition have discussed Bypassing watches and defensive gadgets on hardware can prompt serious and lethal mishaps. The absolute most successive motivators incorporated the need to eliminate shields to perform exercises (for example change, investigating, support, and establishment), an absence of perceivability, disappointments, and an absence of dependability of the shields. This

diary investigation recommends characterizing the impetuses into five classifications: ergonomics, efficiency, machine or shielding, conduct, and corporate environment. The arrangements, which are connected to the configuration, assembling, and utilization stages, are ordered into specialized, hierarchical, and individual elements. These are factors that impact the counteraction of bypassing. Every one of the machines in the business premises were surveyed precisely, electrically and with regards to ecological perspectives. The variables including wellbeing switches, for example, limit switches and interlocks were additionally surveyed for every one of the machines. Perils of each machine were distinguished toward the finish of the evaluation. The distinguishes dangers are eliminated by giving machine watches and preparing the laborers to try not to sidestep the security sensors, switches and interlocking gadgets which can possibly cause high gamble mishaps.

Gregory C. Kelly have discussed Source:The Narratives of the American Underpinning of Political and Social science The sign of action of a machine has as of recently been described as "that piece of the machine where stock is truly implanted and stayed aware of during any course of outlining, shaping or other fundamental action." when in doubt, the saying "Spot of Operation" is in itself a misnomer since all bits of a machine must of need cooperate. What has

genuinely been suggested by "Spot of Action" is "Characteristic of Hazard" and the realities affirm that there is an exceptional risk distinct for explicit machines when they are worked without security. This novel risk of machines is essentially one more depiction of an old term. Hand-dealt with unendingly machines radiating standard ticles of grinding material or metal cuttings are the most notable of the machines with such an outstanding risk. For example, nine out of every single thou-sand accidents 1 in furniture manufac-ture are loss of hand and eleven out of every single thousand in machine shops are loss of eye. Such hardships alone indicatespecial risks in these ventures and a further report uncovers how the setbacks are achieved by unambiguous machines worked without satisfactory security. (1)

Kenny Nguyen ,Hugo Sörense have discussed The spotlight in this endeavor is on machine watches, which will be improved and made more secure for capability and prosperity. The point is to setup machine screens with a vertical opening board for less intricate machine access. The work is corporated with Axelent Planning to fulfill all rules with viability and quality to defend individuals and the machine. The place of this undertaking is to take a gander at the foreordained X-guards to open vertical with the degree of 1300 mm to make a thing that fulfills the

predefined rules. The justification behind this task is to cultivate a thing that will meet the particular necessities and prosperity rules to permit vertical opening for Axelent Planning's X-screens. Concerning the result, the thought made for the X-watch works with direct heading and stabilizers, the thought is in this manner acquainted with Axelent Planning for gathering or further new development. The delayed consequence of the last thought is the most proper of the large number of thoughts created, exhibited by usin decision techniques. (2)

Machine Guarding, Lockout/Tagout, and the Interlocked Guard Joe A. Capps have discussed wounds from hardware going through support and additionally it are very various to clean tasks. Machine protecting and related hardware infringement keep on positioning in the main 10 in OSHA references. The arrangements of sorts of machines and their related perils, as well as the kinds of wounds are too extensive to even consider referencing. Boosting the adequacy of shields is fundamental for safeguarding laborers from preventable wounds. One of the best method for hardware watching is the interlocking

gatekeeper, which is a gadget that stop or incapacitates a machine capability when a watchman or cover is taken out or opened. Interlocking watchmen are a significant part of protecting wellbeing. Frequently, an interlocked monitor is the main kind of gatekeeper that can be utilized. This paper presents a few situations where the interlocking gatekeeper was the most ideal that anyone could hope to find innovation for taking care of the danger. Interlocks are a quickly creating field. The benefits and downsides of interlocks are talked about, as well as the various sorts of interlocks accessible.

3.METHODOLOGY

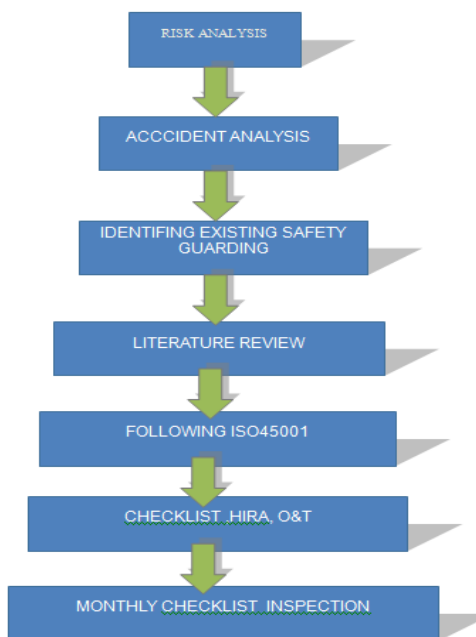


Figure 3.1 Methodology chart

4.HAZARD CONTROL METHOD

Controlling openings to risks in the workplace is basic to protecting workers. The request for controls is a way to deal with sorting out which exercises will best control openings. The ever-evolving arrangement of controls has five levels of exercises to diminish or kill dangers. The leaned toward solicitation of action considering general ampleness is:

1. Elimination
2. Substitution
3. Engineering controls
4. Administrative controls
5. Personal protective equipment (PPE)

Using this hierarchy can lower worker exposures and reduce risk of illness or injury.

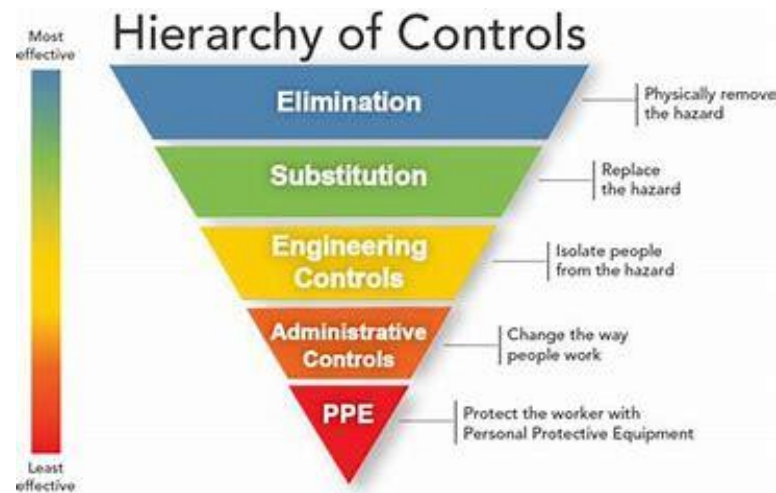


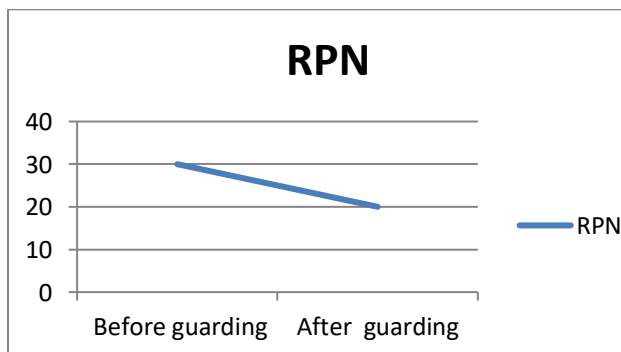
Figure 4.1 - Hierarchy of Controls

4.RESULTS & DISCUSSIONS

By following the regulatory standards from ISO 45001 ,this project has been done by analyzing the severity of the press machine .the machine was monitored for the hazards and the operation was studied step by step and also HIRA was carried out. By providing the guard around the machine will reduce the unauthorized entry of persons. so that the severity of occurrence was reduced. The implementation of the guard will be done soon and effectiveness will be monitored. Based on the description provided, the project aimed to elevate workplace safety in press machine operations by implementing a comprehensive three-guarding system and conducting a detailed hazard analysis. Here's a breakdown of the results and outcomes of the project ,Reduction in Crush Injuries The implementation of the three-guarding system, consisting of physic.cal, electrical, and visual guarding, has led to a significant reduction in crush injuries among employees operating press machines. By creating secure barriers, enforcing double hand switch mechanisms, and employing advanced light curtain systems, the project effectively mitigated risks associated with

press machine operations. Decrease in Severity Rate- The severity rate of injuries among employees operating press machines has decreased notably following the implementation of the three-guarding system. The combination of physical, electrical, and visual guarding mechanisms ensures a multi-layered approach to safety, thereby minimizing the severity of accidents that do occur. Hazard Analysis Methodology-The hazard analysis methodology employed in the project, encompassing mechanical and human factors, has proven effective in identifying potential risks associated with press machine operations. By utilizing data collection methods such as on-site observations, operator interviews, and historical incident reports, the project was able to construct a comprehensive risk assessment matrix categorizing hazards based on severity and likelihood. Integration with ISO 45001- The project aligns with ISO 45001 standards, which focus on occupational health and safety management systems. By adhering to ISO 45001 principles, the project ensures that safety measures are implemented systematically and consistently,

contributing to a culture of safety within industrial workplaces. Economic Feasibility and Practicality-The project assessed the economic feasibility and practicality of safety measures, ensuring their seamless integration into industrial processes. By balancing safety considerations with operational efficiency, the project demonstrates a commitment to both employee well-being and business continuity. Contribution to Occupational Safety Discourse- The research contributes to the ongoing discourse on occupational safety by offering a practical model for organizations seeking to enhance the safety of press machine operations. By emphasizing the importance of proactive hazard analysis and the implementation of multi-layered guarding systems, the project sets a precedent for promoting worker well-being and fortifying the resilience of industrial workplaces. And to following the monthly inspection to reduce the accident



5.CONCLUSION AND FUTURE WORK

In conclusion, the project to enhance workplace safety in press machine operations has yielded significant positive outcomes, aligning with ISO 45001 standards and contributing to the broader discourse on occupational safety. Through the implementation of a comprehensive three-guarding system and rigorous hazard analysis methodology, several key achievements have been realized.

Firstly, there has been a tangible reduction in crush injuries among employees operating press machines. The introduction of physical, electrical, and visual guarding mechanisms has effectively minimized unauthorized access and enforced safety protocols, resulting in a safer working environment. Secondly, the severity rate of injuries has decreased notably, underscoring the effectiveness of the multi-layered approach to safety. By addressing mechanical and human factors through a systematic hazard analysis, potential risks have been identified and mitigated proactively, leading to fewer severe accidents.

Moreover, the project's integration with ISO 45001 standards ensures that safety measures are implemented systematically and consistently, fostering a culture of safety within

industrial workplaces. This alignment not only enhances compliance but also promotes continuous improvement in occupational health and safety management systems. Furthermore, the project's emphasis on economic feasibility and practicality demonstrates a holistic approach to safety, balancing the needs of employee well-being with operational efficiency. By conducting monthly inspections and monitoring the effectiveness of safety measures, the project reinforces its commitment to ongoing risk management and accident prevention. Overall, this project serves as a valuable model for organizations seeking to prioritize workplace safety in press machine operations. By emphasizing proactive hazard analysis, multi-layered guarding systems, and alignment with regulatory standards, the project sets a precedent for fostering a culture of safety and resilience in industrial workplaces.

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