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Hazard Identification and Risk Assessment in Jewel Manufacturing Industry

Thanaraj D[1], Dr. M. Sasi kumar[2],

Department of Industrial Safety Engineering, K S Rangasamy College of Technology, India

Department of Mechatronics Engineering, Assistant Professor, K S Rangasamy College of Technology, India

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Abstract - This composition contains the subtleties on the dangers and hazard level present in one of India's driving Roll's fabricating industry. This investigation additionally briefs about the need, strategy and consequence of the HIRA procedure. The HIRA procedure is embraced in the Utility, workshop, designing store, go down and security office to evaluate the danger levels regarding measured qualities. The control measures were likewise produced for every space and exercises related to potential security issues. It is tracked down that the recognized risks significantly classified under Physical, synthetic, ergonomics, material dealing with, wellbeing and electrical perils. The danger level is measured for all the above office by duplicating the upsides of seriousness and likelihood. Word related wellbeing and medical conditions of the food business have not been by and large apparent as a difficult issue similarly as different ventures like Assembling, transportation, mining, and development areas. Measurements from different nations show that OSH issues from the food area have one of the most noticeably awful records in the assembling businesses. In this setting of extension and strengthened rivalry, the working environment has encountered defence, rebuilding, and a significant degree of automation, in both the industrialized and agricultural nations. The appraisal of the perils in the work environment is a significant errand to assess and discover the reasons for the mishaps. This will likewise prompt be discovering the answer for the risks and to make a protected working spot for the representatives. This undertaking work outlines the perils in the work place, their evaluation and proposals to decrease the risks in the work environment

***Key Words*:** Health hazards, Worker's exposure, heat stress, Rotating parts, Noise, HIRA

1.INTRODUCTION

The Biscuit manufacturing industries are silently playing major role in industrial sector and N number biscuits manufacturing company are in India. So, I had done my HIRA project in one of the leading biscuit manufacturing company in India. The Biscuits manufacturing industry can be further divided into different functional units as listed below, Utility, Production, Maintenance, Raw material storeroom, go down, and safety. In this above each department have various sub departments, in this study I had done some most hazardous departments. Carryout a systematic, critical appraisal of all potential hazards involving personnel, plant, services and operation methods.

- Identify the existing safeguards available to control the risks due to the hazards.
- Suggest additional control measures to reduce the risk to acceptable level.
- Prepare a Risk register that will help in continuously monitoring these risks, detect any changes and ensure the controls are effective.

Word related Wellbeing and Security is a precondition to ensure the specialists' wellbeing and assist them with working in fair, protected and sound way that the owners of organizations satisfy the primary targets of social obligation. It is an irreversible pattern to affirm the benefits of partnerships, workers, and climate naturally, to satisfy individuals situated, nature-economy-local area agreement and reasonable turn of events. As the human factor has exceptionally basic job in work environment mishaps, it ought to be given due importance in mishap avoidance systems. Word related Wellbeing and Security should be underlying in every one of the associations choices and activities to accomplish the objective of protected and helpful working environment.

Because of dangerous work space, representatives may lose inspiration and at last leave the association. It is frequently hard for the association to supplant such gifted and qualified workers since they had explicit information. Incidental or continuous work environment mishaps can likewise obliterate the associations notoriety and picture on the lookout. This won't just stoppage creation and postpone conveyance, likewise prompts the serious crumbling in the advertising of the association. Consequently, forestalling word related mishaps is a vital factor in business the board in consistence with fundamental key ramifications for the association

2. Scope of this study

The extent of this report incorporates the investigation of proposed activities, stockpiling and treatment of dangerous materials concerning Peril Distinguishing proof, Hazard Appraisal and refreshing existing HIRA work. In light of the Peril Distinguishing proof and investigation, the serious fiasco situations would be worked out to assess the outcome of disappointment and the equivalent would be developed to likewise meet the crisis circumstances because of the proposed extension cum modernization project.

The HIRA cycle is a progressing and nonstop interaction for existing units and are embraced on periodical reason for guaranteeing great work environment wellbeing at the plant. It additionally includes an occasional survey of equivalent to well as scattering of data to different workers through guidance and alongside satisfactory documentation and record-keeping. This data basically incorporates:

- Hazard distinguishing proof
- Assessment of dangers related with the recognized peril

- Control measures to deal with the openness to the dangers
- Monitoring and audit of the viability of the controls.

Fig -1: HIRA Process

3. METHODOLOGY

The description for rating of SEVERITY OF RISK (SEV), PROBABILITY OF OCCURRENCE (POC), PRESENT CONTROL (PC) is provided as follows:

3.1 SEVERITY OF RISKS

SEVERITY OF RISKS		
Effect	Injuries / illness	Examples of Injuries/Illnesses
Slightly harmful 1	first aid one time treatment with subsequent observation no oral medicine minor injuries,	1o burn, minor cut, abrasion, skin and eye irritation, bruises, head ache, discomfort
Harmful 2	medical treatment must be treated illness	2o burn, lacerations required stitches, skin and eye irritation required medical treatment,
Very harmful 3	lost workday - LTI cases	3o burn, dislocations, fractures, partial loss of hearing/sight
Extremely harmful 4	Permanent disability or internal injury or occupational illness / death	loss of limbs, permanent loss of hearing/sight, cancer

Table -1: Rating for Severity of Risk

3.2. PROBABILITY OF OCCURANCE

PROBABILITY OF OCCURANCE	
1- Highly unlikely	More than once a year and above
2 - unlikely	Once a month to Year
3 - Likely	Once a week to month
4 - Very Likely	Multiple times a day to week

Table -2: Probability of Occurrence

3.3. EXISTING CONTROLS

EXISTING CONTROLS	
0	No control
1	Engineering control
2	Procedures / work instructions
3	Competence enhancement and Training
4	Industrial Hygiene review
5	Medical plan
6	Performance Monitoring & Measurement
7	Work permits / compliance to rules
8	Administrative controls
9	PPE

Table -3: Existing Controls

3.4. CLASSIFICATION OF RISK CATEGORY

	Slightly harmful	Harmful	Very harmful	Extremely harmful
Highly unlikely	Negligible Risk (1)	Trivial Risk (2)	Tolerable Risk (3)	Tolerable Risk (4)
unlikely	Trivial Risk (2)	Tolerable Risk (4)	Moderate Risk (6)	Substantial Risk (8)
Likely	Tolerable Risk (3)	Moderate Risk (6)	High Risk (9)	High Risk (12)
Very Likely	Tolerable Risk (4)	Substantial Risk (8)	High Risk (12)	Extreme

Table -4: Classification of Risk Category

CRITERIA FOR SIGNIFICANCE
1. Risk score equal to 8 and greater than 8
2. Legal Applicability
3. Severity equal to 3 and existing control equal to 0
4. Severity 4
5. All Emergencies

3. HIRA CHART

Activity	Hazard	Risk	Evolution		Product	Condition
			SEV	POC		
Sheet Drawing machine work	Physical	Exposure to moving parts	4	4	16	High
		Sharp Edges	2	3	6	Medium
Gold melting operation	Physical	Potential contact during gold filling	3	3	9	High
		Molten metal falling	3	4	12	High
		Sharp Edges	2	3	6	Medium
Pressing machine operation	Physical	Hit Injury	3	4	12	High
	Chemical	Exposure to used oil	2	3	6	Medium
	Ergonomics	Continuous siting, Ak ward posture	3	2	6	Medium
	Physical	Sharp Edges	2	3	6	Medium
		Electrocution	3	3	9	High
		Hearing Impact	2	3	6	Medium
		Recitative task	3	3	9	Medium
		Entanglement of hand into the machine	4	4	16	High
Sheet metal cutting operation	Physical	Entanglement inside the sharp blades	3	3	9	Medium
	Ergonomics	Body inclination	2	3	6	Medium
Lathe operations	Physical	Exposure to moving parts	4	3	12	High
		Repetitive task	2	3	6	Medium
	Chemical	Spillage of chemical	2	2	4	Low
Gold Screw machine	Physical	Hit injury during machining operation	3	3	6	Medium
	Chemical	spillage of chemical (Coolant oil)	2	3	6	Medium
Electron Beam welding	Other	Ionizing radiation	3	3	9	Medium
Chakka Process	Chemical	Substance Inhalation	3	4	12	High
		Exposure To chemical	3	3	9	High

3. CONCLUSIONS

During my visit to the plant, I have noticed mostly all safety measures have been take according the company OCP and SOP. I was astonished to see the workers Participation and eagerness to adopt the safe practices. This type of safety culture is only possible by management's commitment and motivation towards safety. And in some packing machine only needs some fixed guards and more signage want to be fixed in biomass area and heat resistance jacket want to be provide who are working in the furnace area, protect them from heat stress.

Apart from this think some minor improvements brought out in the HIRA study may be considered for implement.

REFERENCES

1. Standard operating procedure for HIRA, Britannia industries limited, Perundurai.
2. Neupane, S., Virtanen, P., Luukkaala, T., Siukola, A., & Nygård, C. H. (2014). A four-year follow-up study of physical working conditions and perceived mental and physical strain among food industry workers. Applied ergonomics, 45(3), 586-591.
3. Mengoni, M., Matteucci, M., & Raponi, D. (2017). A Multipath Methodology to Link Ergonomics, Safety and Efficiency in Factories. Procedia Manufacturing, 11, 1311- 1318.
4. Djapan, M., Macuzic, I., Tadic, D., & Baldissone, G. (2018). An innovative prognosticrisk assessment tool for manufacturing sector based on the management of the human, organizational and technical/technological factors. Safety Science.
5. Thetkathuek, A., Yingratanasuk, T., Jaidee, W., & Ekburanawat, W. (2015). Cold exposure and health effects among frozen food processing workers in eastern Thailand. Safety and health at work, 6(1), 56-61.
6. Xia, N., Wang, X., Griffin, M. A., Wu, C., & Liu, B. (2017). Do we see how they perceive risk? An integrated analysis of risk perception and its effect on workplace safety behavior. Accident Analysis & Prevention, 106, 234-242.
7. Lee, K. S., & Jung, M. C. (2015). Ergonomic evaluation of biomechanical hand function. Safety and health at work, 6(1), 9-17.
8. Okun, A. H., Guerin, R. J., & Schulte, P. A. (2016). Foundational workplace safety andhealth competencies for the emerging workforce. Journal of safety research, 59, 43-51.
9. d'Ettorre, G., & Greco, M. (2015). Healthcare work and organizational interventions to prevent work-related stress in Brindisi, Italy. Safety and health at work, 6(1), 35-38.
10. Fox, M. A., Spicer, K., Chosewood, L. C., Susi, P., Johns, D. O., & Dotson, G.
S. (2018). Implications of applying cumulative risk assessment to the workplace. Environment international, 115, 230-238.
11. Woodcock, K. (2014). Model of safety inspection. Safety science, 62, 145- 156.
12. Burgess-Limerick, R. (2018). Participatory ergonomics: Evidence and implementation lessons. Applied ergonomics, 68, 289-293.
13. Oakman, J., & Chan, S. (2015). Risk management: Where should we target strategies to reduce work-related musculoskeletal disorders?. Safety science, 73, 99-105.