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Analysis of Risk and occupational Hazards in Foundry

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***Abstract*- Foundry business is taken into account to be a high risk space since it contains the venturous operations. manu factory operation use extraordinarily hot temperature method and enormous quantity of nephrotoxic mud and warmth square measure discharged. The processes utilized in metal casting square measure terribly uproarious. inexperienced sand manufactory manufacture endless pollutants within the surroundings – each operating and close surroundings. throughout the operations, staff might doubtless scraped and plagued by unhealthiness issues. Assessing and dominant the chance is completed in step with the aspects of activity health and safety in manufactory. HIRA study was done to spot the hazard in manufactory business. it had been found that Heat, Dust, Noise and activity square measure the main hazards. Heat stress calculation was done. it's finished with appropriate management live to scale back major hazards found.**

***Keywords* – Heat, Dust, Noise, HIRA etc.**

I.INTRODUCTION

1.Introduction About The Company

Ps Cam Shaft Pvt Ltd is a part of PS GROUP an ISO/TS 16949:2009 certified company with 15 years of experience in the automobile industry. The Group manufactures the entire range of camshafts under the brand name of "PS COMPONENT"PS GROUP has 3 units in 2 locations with a manufacturing capacity of 300 Came Shaft sets a day. The group has one captive automated foundries forferrous castings, and one machining plant for CNC work centers, over 15 CNC machines and the latest laboratory instruments & testing facilities.

2. Introduction about Foundry

Foundry work is the process of producing metal castings by melting the metal into a liquid state then pouring the metal into a mould which contains a hollow cavity of desired shape. A pattern is used to make the mould of the required article. Sometimes, the core inside the mould determines the internal cavity's dimension. Foundries are of two types. Ferrous foundries produce steel and iron castings. Non ferrous foundries produce copper based alloys casting, aluminum-based alloys casting and other alloys.

3. Introduction about the Project

The purpose of this project is to spot the hazards and risk by analyzing every steps concerned in numerous activity within the metal works and to convey suggestion so as to eliminate or scale back the chance victimization the tool Hazard Identification and Risk Assessment (HIRA). Business becomes sure-fire by not solely meeting the assembly needs however conjointly ought to have high worker satisfaction by providing the security needs within the geographic point. The hazards and risk assessment ought to be done and actions to be taken to convert the chance to a tolerable level on regular basis. Metal works operation being a venturous operation has wide safety risk to metal works. Unsafe conditions and practices in metal works because variety of accidents and causes loss and injury to human lives, damages the property, interrupt production etc. By considering high noise, mud and warmth level throughout the assembly method appropriate preventive measures are urged.

4. Heat Stress Index

In casting industries employee two-faced with numerous physical and chemical hazard like noise, heat, fumes, dirt and etc. Employees at manufactory because of nature of method square measure two-faced with an excessive amount of heat stress and noise. Operating as regards to chamber and melting platform high level of warmth stress and noise.

These two risky agents have damaging result of health and work performance. Employees United Nations agency square measure exposed to extreme heat or add hot environments could also be in danger of warmth stress. Exposure to extreme heat may result in activity diseases and injuries. Heat stress may result in heat stroke, prostration, heat cramps, or heat rashes. Heat can even increase the chance of injuries in employees because it could end in perspiring palms, fogged-up safety glasses, and lightheadedness. Burns may additionally occur as a results of accidental contact with hot surfaces or steam. employees in danger of warmth stress embody outside

employees and employees in hot environments like fireplace fighters, store employees, farmers, construction employees, miners, boiler area employees, industrial plant employees, and others.

Employees at bigger risk of warmth stress embody people who square measure sixty five years archaic or older, square measure overweight, have cardiopathy or high force per unit area, or take medications that will be stricken by extreme heat. Interference of warmth stress in employees is very important. Employers ought to offer coaching to employees in order that they perceive what heat stress is, however it affects their health and safety, and the way it is prevented.

II.DRAWBACK OF HEAT STRESS

1.Heat Stroke is the most serious heat related disorder and occurs when the body's temperature regulation fails and body temperature rises to critical levels. The condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency that may result in death. The primary signs and symptoms of heat stroke are confusion. irrational behavior.

Loss of consciousness. Convulsions. a lack of sweating (usually); hot, dry skin; and an abnormally high body temperature, e.g. a rectal temperature of 41°C (105.8°F). The elevated metabolic temperatures caused by a combination of work load and environmental heat, both of which contribute to heat stroke, are also highly variable and difficult to predict.

2.Heat Exhaustion signs and symptoms are headache, nausea, vertigo,weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly. Fainting or heat collapse which is often associated with heat exhaustion. In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness.

3.Heat Cramps are usually caused by performing hard physical labour in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution (±0.3% NaCl), excess salt can build up in the body if the water lost through sweating is not replaced.Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

4.Heat Rashes are the most common problem in hot work environments where the skin is persistently wetted by unelaborated sweat. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

5.Heat Fatigue is often caused by a lack of acclimatization. A program of acclimatization and training for work in hot environments is advisable. The signs and symptoms of heat fatigue include impaired performance of skilled manual, mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

III.DETERMINATION OF HEAT STRESS INDEX

The heat stress index is defined as the relation of the amount of evaporation (or perspiration) required as related to the maximum ability of the average person to perspire (or evaporate fluids from the body in order to cool themselves). When the heat stress index is high, humans can experience heat stress, which can lead to particularly dangerous conditions in which people can actually die from being too warm and unable to cool them properly. Severe dehydration and even death can result from overexposure when the heat stress index is high.

IV.OBJECTIVE

The objectives of this project are

- To identify safety and health hazard and assess risk at the casting plant.
- To propose improvements.
- To provide the safe working atmosphere.
- To calculate heat stress index.
- To measure noise level in the working area.
- Suggesting control measures.

V.METHODOLOGY

- Literature Review.
- Walk around Audit.
- Identification of Occupational Hazards and Risk to Health.
- Evaluation of Occupational Hazards & Associated Risks to Health.
- Calculation of heat stress and measurement of noise level.
- Assessment of health hazards.
- Suggestion of control measures.

VI.HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

Hazard Identification Risk Assessment (HIRA) involves a important sequence of collection info and application of method} process. It assists find what may presumably cause a significant accident, and also the consequences, and what choices there to stop and mitigate the danger.

It conjointly assists in reducing the prevalence of incidents and close to misses.

It's a method of shaping hazards by decisive their likelihood, frequency and severity and evaluating the danger, as well as injuries and potential loses. A risk assessment that has the factual basis for activities projected within the strategy to cut back losses from known hazards. Risk assessments should give spare info to alter the authority to spot and place applicable mitigation actions to cut back losses from known hazards.

1. Hazard Identification

Hazard Identification is "the process of identifying hazards, which forms the essential first step of a risk assessment. There are two possible purposes in identifying hazards:

- To obtain a list of hazards for subsequent evaluation using other risk assessment techniques. This is sometimes known as "failure case selection".
- To perform a qualitative evaluation of the significance of the hazards and the measures for reducing the risks from them. This is sometimes known as "hazard assessment"

The outcomes of the hazard identification process are to:

- Identify all major incidents which could occur at the facility (irrespective of existing control measures).
- Provide the employer and worker with sufficient knowledge, awareness and understanding of the causes of major incidents to be able to prevent and deal with them.
- Provide a basis for identifying, evaluating, defining and justifying the selection (or rejection) of control measures for eliminating or reducing risk.
- Show clear links between hazards, causes and potential major incidents.
- Provide a systematic record of all identified hazards and major incidents, together with any assumptions.

2. Risk Assessment aaarea

Identification of hazards present in any undertaking and evaluation and the extent of the risks involved, taking into account whatever precautions are being undertaken. There are certain logical steps to take when carrying out a risk assessment.

- Look for the hazard.
- Decide who might be harmed and how.
- Evaluate the risks arising from the hazards and decide whether existing precautions are adequate or more should be done.
- Record the findings.
- Inform colleagues of your findings.
- Review your assessment from time to time and revise it if necessary.

There are two types of risk assessments:

- Qualitative Object probability estimate based upon known risk information applied the circumstances being considered.

VII.SIMULATION AND RESULT NOISE LEVEL MEASUREMENT

1. Measurement of noise level in Furnace area

Table 1 Measurement noise level in furnace area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	72	69	65	68.66
2.	59	62	60	60.33
3.	71	68	64	67.66

Total Average=66DB

Measurement of noise level in Compressor area

Table2 Measurement noise level in Compressor area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	106	98	109	104.33
2.	98	104	100	100.66
3.	98	92	88	88.66

Total Average=98DB

Measurement of noise level in Moulding machine area

Table 3 Measurement noise level in Moulding machine

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	70	65	68	67.66
2.	66	59	69	64.66
3.	55	48	44	49.00

Total Average=61DB

Measurement of noise level in Convey or area

Table 4 Measurement noise level in Convey or area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	75	69	67	70.33
2.	82	77	75	78.00
3.	70	78	81	76.33

Total Averarage =75DB

Measurement of noise level in Shakeout area

Table5 Measurement noise level in Shakeout area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	93	89	95	92.33
2.	99	95	98	97.33
3.	105	106	100	103.66

Total average =98 DB

Measurement of noise level in Cutting and grinding area.

Table 6 Measurement noise level in Cutting and grinding area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	102	97	110	103.00
2.	99	107	95	100.33
3.	105	96	97	99.33

Total Average=101DB

Measurement of noise level in cooling tower area

Table 7 Measurement noise level in Cooling area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	66	65	69	66.66
2.	69	74	71	71.33
3.	72	73	77	74.00

Total Average=71DB

Measurement of noise level in Genset area

Table 8 Measurement noise level in Genset area

S.No.	Noise Level in DB			Average
	L1	L2	L3	
1.	100	109	112	107.00
2.	101	112	108	107.33
3.	103	113	106	107.00

Total Average=108DB

Total average =98 dB

2. Comparison of Noise level in various process sections

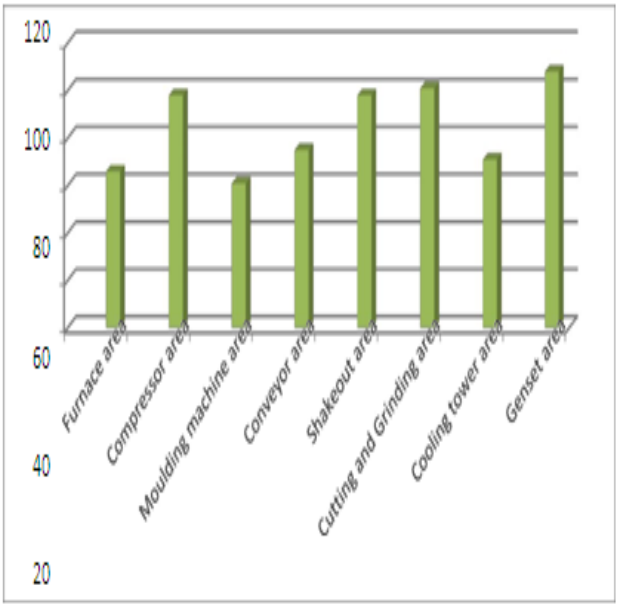

Fig.1 Compare noise level in various process section

3. Control measure

Effective use of ear plug and ear muff can reduce Noise level for foundry workers.

VIII.CONCLUSION

Hazard Identification and Risk Assessment (HIRA) study were made on the foundry and various hazards of different process and their associated equipments were found. Recommendations are provided to reduce high level risk to low level. Noise level is measured in various areas of the industry and suitable control measures are suggested. In casting industries the working environment is high in temperature and hence heat stress index is calculated for the workers working in the furnace area and suitable preventive measures are given. Health hazards associated with each process are found and

Total average =71 dB

suitable mitigation measures are given for safe handling of the chemicals.

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