

# HAZARD IDENTIFICATION AND RISK ANALYSIS IN FURNACE AND PANIT SHOP

SUNDARAPANDIAN D <sup>1</sup>, Dr MUTHUKUMAR K <sup>2</sup>

<sup>1</sup>PG Student (M.E. Industrial Safety Engineering), Dept. of Mechanical Engineering, Bannari Amman Institute of Technology, TamilNadu, India

<sup>2</sup>Professor, Dept. of Fashion Technology, Bannari Amman Institute Of Technology, TamilNadu, India

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**Abstract** - Hazard Identification and Risk Assessment is a procedure that comprises of various consecutive advances. It is a chance of estimation depends on the current controls and suggestions to lessen those dangers which are not under adequate points of confinement. It also suggests additional control measures to reduce the risk to an acceptable level. The hazard identification process improves the efficiency of occupational and health safety. It used to predict the severity rate and probability of the risk in the hazard process. According to the HIRA process, we can improve the work efficiency. The HIRA process in the furnace and paint shop alert the people. We can eliminate the hazard with the help of HIRA by calculating the risk factors

**Key Words:** Hazard, Control Measures, Hazard Identification process, Risk Factors, Furnace shops, Spray painting.

## 1. INTRODUCTION

Safety plays an important role in human beings life. Occupational health and safety become a vital part in every Industry. The background of this project is to condense the cause and effects in health and safety. The main objective of this paper is to identify the hazards in paint shop and furnace which may affect the employer and the environment. To assess the safety means, it needs to reduce the risk everywhere, so that Hazard Identification and Risk Assessment (HIRA) can be done for paint shop and furnace in automobile industry. To find the hazards means, then risk can be accessed from the hazards and then to analyze the severity rating for the hazards. Calculating the Risk priority number (RPN) depends on severity and probability of occurrence and suggesting the hazards are acceptable or not acceptable. By using checklist & HIRA we can identify risk, danger and hazardous chemicals. Paint shop focus on the chemical exposure limit, using more number of flammable liquids and chemicals. The working condition in paint booth liquids using in the paint shop cause more incidents, hazardous to human health and sometimes it leads to fatal. So, we have to reduce and control the hazards by using HIRA. The thesis work focuses on using the HIRA technique on improvement of health and safety in the workplace.

An industrial furnace is electro heat equipment used to provide heat in heat processing. Industrial furnaces are able to handle a wide range of temperatures, which depend on the purpose of the heating process and subsequent operations. Heat in electro heat furnaces is generated to raise above the temperature required for the process, and could be divided to resistance heating equipment, induction and conduction heating installations, arc furnace installations, microwave heating equipment and high-frequency dielectric heating installations.

The automobile industries are one of the growing sectors in the world. The automobile industries are manufacturing the material with different chemical composition. They are using different dangerous chemicals for manufacturing goods. The resulted in several health hazards and environmental damages. Each country has different techniques to solve the environmental problem. The automobile industries should follow the standards to resolve the degradation. if the environment damaging is more, we cannot live on the planet because all living organisms depend upon one another.

The automobile industries paint look within the one in every of the vital space concern as a result of thousands of chemical compounds area unit employed in paint product as pigments, extenders, binders, solvents and additives. Painters are unit frequently exposed by inhalation to solvents and alternative volatile paint components; inhalation of less volatile and non-volatile components is frequent throughout the painting.

## 2. Hazard identification and risk assessment

Hazard identification and risk assessment is a systematic approach to protect health and minimize danger to life, property, and environment. The main motto of hazard identification is to identify & evaluate the hazards & the unintended events, which could cause an accident. In hazard identification & quantification of the probability of occurrence, it is assumed that they perform as designed in the absence of unintended event (component & material failure, human errors, external event, a process unknown) which may affect the process behaviour.

The purpose of HIRA is to provide a systematic and objective approach to assessing hazards and their associated risks that will provide an objective measure of an identified hazard as well as provide a method to control the risk. It is one of the general duties as prescribed for the employer to provide a safe workplace to their employees and another related person.

## 3. Methodology

Hazard Identification and Risk Assessment (HIRA) is a process that consists of a number of sequential steps such as hazard identification, consequence & frequency assessment, risk estimation based on the existing controls and recommendations to reduce those risks which are not under acceptable limits to be effective, the organization procedures for HIRA should take account of the hazard, risk, controls and documentation.

1. Initial status review
2. Work activity classification
3. Process classification
4. Site visit
5. Risk assessment
6. Risk matrix
7. Determination of significant risk.

## 4. Occupational Health Hazards

Individual wellbeing is related to the occupation. Occupational health and safety is a whole part of the conventional notion of health that is a part of socio-economic development. Occupation health affects everyone directly or indirectly. Depending on their occupation, industrial workers may be affected.

Each paint industry has its machines that may create hazards — recognising risks related to the activities and select most pessimistic scenario situations for the estimation of outcomes. It will use presumed programming models for outcome estimation. Because of the tested recurrence of the event, it will recommend hazard decrease estimates to the administration for robust execution.

The presence of heavy metals sulfur, naphthol and nitrates mercury soap chemicals all are making the effluent more toxic. It will change the ph level in the water. If we send it out to an environment, it may alter the ph level in the groundwater. These chemicals may go to the ocean through floods and other natural disasters. It may increase the temperature in an ocean environment so that the many organisms may not survive within this region. These organisms may go to another ecosystem; it may affect the natural breeds in those fields. It may create amensalism to other organisms. in that many organisms have died during this stage.

The government should restrict the wastewater coming out from the automobile industries with appropriate standards. The car paint outlets hazards related to paints and solvents area unit toxicity and flammability. Solvents contained in paints usually have acute effects on the central systema nervosum, initially causing giddiness and so, with any exposure, unconsciousness.

## 5. Determination of Occupational Hazards:

Activity / hazard & risk analysis is showed for all activities.

- Study of process in the company.
- Involved skilled workers for their activities.

- Whenever newly process/modify the system altered workers then impact of the changes to study before incorporating the change.
- Identify Occupational hazards and risk following issue to be considered.
- All regular and non-regular activities.
- Legal necessities related to activities completed and related controls.

#### 6. Risk calculating and evaluation of OHS risk matrix:

Risk is combination of like hood and consequence of specific hazards even may occurring

Risk = probability \* severity.

**Table 1.0: Risk Rating Levels**

Description	Risk Rating
Almost certain	5
Likely	4
Possible	3
Unlikely	2
Rare	1

**Table 1.1: Probability of Occurrence**

Rating	Injury
1	First aid cases
2	Minor injury
3	Crush/severe injury
4	Permanent disorder
5	Fatal death

**Result and discussion:**

**TABLE 2: Furnace shop.**

SL.NO	ACTIVITIES	HAZARD	CONSEQUENCES	CONTROL MEASURES	RISK LEVEL		
					P	S	R
1	The material stored in the path way	Chances of slippage and fall	Body injury unnecessarily, time loss	Maintenance and good housekeeping needed	2	2	4
2	The workers are not wearing the apron	Chances of accumulation of coating powder on the skin	Skin irritation may happen.	he safety apron should use while handling the job	2	2	4
3	The congested valves exist behind the machine.	Chances of misuse of the valve while doing maintenance work.	The wrong connection may be given to the machine	The tubes are arranged in a proper manner	3	2	6
4	The dust accumulation on the hydrogen valve.	Chances of disrupting the correct usage of valve.	Valves may not work freely.	Frequently clean the valves.	3	3	9
5	The motor shafts exist without a guard.	Chances of the touching shaft will lead to injuries.	Body injuries, unnecessarily time loss	Set the guard to the motor shaft	2	3	6
6	The air cooler wastewater is stored near the motor.	Probability of entering air cooler wastewater into the motor.	It may damage the motor because of water entering into the motor. The electric shock may occur.	Store the wastewater to the other area.	3	2	6
7	The maintenance operator storing the unwanted parts behind the motor.	Chances of hitting with the motor.	Body injuries, unnecessarily time loss	Remove the unwanted materials storing near the motor	3	2	6
8	The air cooler waster water stored near nitrogen cylinder. There is a leakage of the waste water collecting bucket.	Probability of entering air cooler wastewater into the motor.	It may damage the motor because of water entering into the motor. The electric shock may occur.	Remove the damaged bucket. Provide waste water collecting tank.	2	3	6
9	The possibilities of leakage in the nitrogen valve because of corrosion.	Possibilities of releasing the nitrogen gas to the plant	It may create fire hazards.	Remove the unwanted materials storing near the motor	3	3	9
10	There is no sign in the valve for the nitrogen and hydrogen cylinder.	Chances of disrupting the correct usage of valve.	The worker may confuse which leads to giving the wrong connection to the cylinder.	Provide any indicator or signboard to the valve.	3	2	6
11	The air cooler produces heat which has released straightway to the nitrogen buffer storage tank.	Oppournity to increase the temperature in the nitrogen gas tank.	It may increase the additional temperature to the nitrogen buffer cylinder.	Change the air cooler location.	2	2	4
12	The finished goods are stored near the nitrogen buffer storage tank.	Chances of hitting with the	Body injuries, unnecessarily time loss	The finished goods should be stored in a given place.	2	2	4
13	The empty cylinders are storing near the machine without chained	ances of slippage of a nitrogen cylind	Body injuries, unnecessarily time loss	The empty cylinder should not keep in the production area.	1	2	2
14	While transferring the nitrogen cylinder, they do not tighten the valves perfectly.	It may release the nitrogen gases.	It may create fire hazards.	The training awareness should be given to the workers.	3	4	12
15	The worker is using a glass broken pressure regulator.	Chances of dust accumulation	It may show error reading because of dust accumulation	Replace the pressure gauge.	1	3	3

**Table 3: Paint shop.**

SL.NO	ACTIVITIES	HAZARD	CONSEQUENCES	CONTROL MEASURES	RISK LEVEL		
					P	S	R
1	The workers are feeding the components into the trolley without using safety gloves	Chances of getting skin contact.	Protruding of sharp edges of materials may create injuries	The management should insist on wearing safety gloves.	2	2	4
2	The corroded hooks are used for lifting the materials.	Chances of damaging the hook.	The corroded hooks may drop which create slippage of material.	Replace the corroded hook with a new one.	3	3	9
3	The jib crane remote wires are struck with lifting hooks.	Chances of disrupting the correct usage of remote. Chances of damaging the wire due to sharp edges of materials.	It may damage the insulation of wires when contact with sharp edges.	Give extra provision to hold the wires	2	1	2
4	Using jib cranes very fastly for loading the material in curing oven.	Chances of hitting with the materials. Chances of falling of objects	It may damage the insulation of wires when contact with sharp edges.	The management should insist on the safety culture.	2	3	6
5	The packing materials are stored near to the loading station.	It creates an opportunity for the wastage of materials.	Body injuries, unnecessarily time loss.	The workers should not store packing materials near the loading station.	2	2	4
6	The safety mask is not wearing while doing the job.	Changes of inhaling of coating powder	It may create occupational asthma and skin irritation.	The operator must follow the safe operating procedure	3	3	9
7	The waste paints are accumulated in the primer booth room.	The exposure of workers to the paints continuously.	Body injuries, unnecessarily time loss.	The paint waste should remove with suitable provision.	1	3	3
8	The spray paint gun is placing on the floor which stuck with paint waste.	Opportunity to damage the spray gun.	It may damage the spray gun unnecessarily.	The operator should place the spray gun with its spray holder. The management should insist on the safety culture.	2	1	2
9	The paints are pouring into the paint storage tank without knowing the level of paint in a spray booth tank.	It may creates an opportunity for the wastage of materials.	unnecessary wasting of paint	The operator should ensure the level of paints while pouring the paint.	2	3	6
10	The broken knob is used in a connecting valve.	It may creates an opportunity for the leakage of paints.	may create the splashing of paint	The maintenance person should change the knob.	3	3	9
11	The over all control panel exits with out barrier	It may create fire hazard	Electric burn injury	The barrier should provide to the control panel.	3	1	3

### Conclusion:

Conclusively, a safety plan is necessary and its comprises of certain steps that would develop a safer workplace. Organizations should make sure that everyone else in the workplace is aware of the core problem. People should notify their respective supervisors and they should file any reports if there is a problem. An important aspect is that people should realize that there is a problem as sitting back and holding the problem for a long time would not solve the problem.

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