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HAZARD IDENTIFICATION AND RISK ASSESSMENT IN AUTOMOTIVE INDUSTRY

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ABSTRACT: Hazard identification and risk assessment or HIRA system can aa a risk assessment tool which will assist user in identifying hazard and estimating risk involved in each identified hazard. This risk assessment tool will identify possible hazard involved in each task in departments. Once the hazard has been identified, risks involved will be estimated and categorized. If the estimated risk falls in a category, which is higher than the low risk category, then possible control measures will be recommended. At the same time, the user can add new work plan, task, and control measures into the system to update existing information system.

1. INTRODUCTION

1.1 About the company

With over 50 years of history and rich experience behind it breaks India Private Limited as part of the six billion dollar TVS group is getting future ready for the opportunities ahead. Established joint venture between the TVS Group and Lucas industries Limited UK (100 % subsidiary of ZF TRW), Brakes India own to become the largest Brake system supplier in India today.

Headquartered in Chennai, Brakes India Private Limited has three main divisions: Brake division, Foundry division and Polymer division. Brakes India Private Limited is the largest component manufacturing company within the TVS group. The comprehensive product portfolio includes calipers , actuation , drum brakes , valves , hose ABS and brake fluid for passenger vehicles , S - cam , Hydraulic drum brakes , Disk brakes and Electro Magnetic Retarders for commercial vehicles and Dry and Wet multiple plate disk brakes for agricultural tractors . The foundry division manufactures permanent mould ferrous castings, Grey iron and SG iron castings using the diametric process. As a system supplier catering to the light vehicle, commercial vehicle and the off highway segment , Brakes India Private Limited , with over 7000 dedicated employees supplying systems and components to global OEM's such as Suzuki , Toyota , Honda , VW , Ford , Nissan Volvo , Daimler , MAN and Indian OEMS such as TATA and Mahindra , is all set to make its mark as a world class player in a very competitive market .

Supporting this large infrastructure is Brakes India Private Limited's world class foundry producing over 75,000 tons of iron castings in India and additionally another 36,000 tons in Oman created to support the expanding expert requirement. Being at the forefront of casting technology, our foundry endeavours to achieve customer satisfaction by business Excellence through technological leadership. Equipped with a Permanent Mould facility, four diametric lines, Kunkel Wagner line and an in-house Patter and Die Shop with CAD / CAM / CAE de fonds specializes in the manufacture of Ductile Iron castings in the Sand Foundries. Exports thrust areas being Germany, France Sweden Japan, South Africa and U.S.A. The product mix focuses on safety critical parts such as Brake Callipers, Master cylinder, Wheel Cylinders, Steering Knuckles, Toque Plates, Turbo Charger components, Power Train components and Compressor parts.

Apart from being certified to TS 16949, ISO 14001, OSHAS 18001 and EN 16001 standards, the foundry is the first ever in the world to receive the prestigious Deming Application Prize as well as the TPM Excellence Award - First Category in the same year 2003. In addition, they have won the Award for Excellence in Consistent TPM commitment - First category in the year 2006 and Special Award for TPM Achievement in the year 2007. Committed to the safeguard of the environment, the foundry is a zero discharge industry of pollutants, water and solid waste and 25 % of the energy consumed is so power from Wind Turbines. In recognition of our efforts, our foundry has received numerous awards such as Best Foundry: Green Foundry: National Awards for Energy conservation; Leadership and Excellence Award in Safety, Health and Environment.

The hallmark of Brakes India Private Limited's success has been built on three basic foundations; Technology Leadership, Operational Excellence and Superior Service. 520 chemicals has been used for various process. If a chemical exist in a place definitely hazards also there then that should be reduced or eliminated that can be achieved by different methods.

2. HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)

2.1. Introduction

Hazard Identification and Risk Analysis (HIRA) is a collective term that encompasses all activities involved in identifying hazards and evaluating risk at facilities, throughout their life cycle, to make certain that rises to employees, the public, or the environment are consistently controlled within the organization's risk tolerance. These studies typically address three main risk questions to a level of detail commensurate with analysis objectives, life cycle stage, available information, and resources.

The three main risk questions are:

Hazard - What can go wrong?

Consequences - How bad could it be?

Likelihood - How often might it happen?

Objective of HIRA study is to:

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 an acceptable level.

Prepare a Risk Register that will help in continuously monitoring these risks, detect any changes and ensure the controls are effective.

Scope of the Heard Identification and Risk Assessment Study

The areas of focus would be Study of the plant operations .

Identification of the individual tasks involved in carrying out the bave operations.

Identification of potential health and safety hazards in these task.

Determination of the level of risk by combining the likelihood of a hazard occurring with its severity using the Risk matrix

Analyzing the existing control measures available to control these risks Provide recommendations for additional risk control measures to bring the risk to acceptable level.

Why Is It Important?

To manage risk, hazards must first be identified, and then the risks should be evaluated and determined to be tolerable or not. The earlier in the life cycle that effective risk analysis is performed, the more cost effective the future safe operation of the process or activity is likely to be. The risk understanding g developed from these studies forms the basis for establishing most of the other process safety management activities undertaken by the facility. An incorrect perception of risk at any point could lead to either inefficient use of limited resources or unknowing acceptance of risks exceeding the true tolerance of the company or the community.

Where\When Is It Done ?

HIRA reviews may be performed at any stage in a project's life cycle conceptual design, preliminary design, detailed design, construction ongoing operation, decommissioning, or demolition. In general, the earlier that a hazard is identified (e.g., during conceptual design) the more cost - effectively it can be eliminated or managed. Studies performed during the early design stages are typically done at corporate or engineering offices. Studies performed once a process is near start up, during operation, or before decommissioning are typically done in a plant environment.

3. METHODOLOGY

HIRA methodology can be divided into steps

AREA OF INVESTIGATION

Construction activity

Contractor shed

Medical centre

Canteen

3.1 Construction activity

In that company for development purpose construction activities as been taking place as there as possible to occurrence of accident to prevent that hazard identification as been taken part

3.2 Contractor shed

The contractor shed has been created for welding works. As to avoid the accidents in the industry they provide a separate shed for welding works. In that shed nearly 10 contract persons are working in the shift bases.

3.3 Canteen

In that company nearly 2000 workers (including contract workers and management staffs) are working there. Company as providing them three time newly prepared food for them.

3.4 Medical centre

In that company more than 2000 workers are working. For them company as provided occupational health centre with certified doctors. And they providing treatment for all external and internal injuries and health issues.

IDENTIFYING HAZARDS BY DIFFERENT METHODS

HAZOP, FMEA,HIRA etc here I have adopted HA-hazard analysis to visually inspect and cross verification to the operator and learned about process flow.

Evaluating and analysing the risk

Risk = severity x occurrence

Control measures to reduce the risk and if possible eliminate the hazards

By applicable control methods elimination, substitution, engineering administrative, PPE.

Our ultimate aim to reduce the possibility of risk and safe the human

4. RESULT

Risk assessment has been conducted as per BRAKES INDIA standards.

Sl No	Hazards	Existing Control measures	Risk Level			Additional Control Measures	Residual		
			P	S	R		P	S	R
WELDING SHED									
1	Noise	Provided PPE but not wearing	5	3	15	Creat and educate about ppe importance	5	1	5
2	Contact with welding steel	PPE	5	3	15	Training	5	1	5
3	Welding with naked eye	PPE	5	3	15	Training	5	1	5
4	Inheleation of paint fumes	No control	5	3	15	PPE	1	1	1
5	Damaged wire	No control	5	3	15	Wire should be	1	1	1

						changed imediately			
CONSTRUCTION AREA									
1	Noise	No control	5	3	15	PPE	1	1	1
2	Vibration	No control	5	3	15	PPE	1	1	1
3	Dust	No control	5	3	15	PPE	1	1	1
4	Ergonimical hazard	No control	5	3	15	Manual material handling	1	1	1
5	Damaged wire	No control	5	3	15	Wire should be changeed imediately	1	1	1

Sl No	Activies	Hazards	Risk Level			Additional Control Measures	Residual		
			P	S	R		P	S	R
MEDICAL CENTER									
1	Contact with bleeding person	Blood, Born disease	4	3	12	Use proper PPE	1	1	1
2	Slip of sharp objects	Cut injuries	4	1	4	PPE	1	1	1

3	Improper disposal of BMW	Health Problem	5	2	10	Need more care in BMW	1	1	1
4	Exposure of odour	Irritation & Headache	4	3	12	PPE	1	1	1
5	Imporper washing of hands after treatment	Skin disease	4	2	8	PPE	1	1	1
CANTEEN									
1	Handling of sharp edges	Cut injures	5	2	10	PPE	1	1	1
2	Slippery floor	Falling	5	3	15	Proper 5s	1	1	1
3	Dealing with hot vessels	Heat burns	5	3	15	PPE	1	1	1
4	Ergonomical hazard	Ergonomic issues	5	3	15	Manual material handling	1	1	1
5	Fire hazards	Fire	2	5	10	More fire extinguisher provided	1	1	1

7. RECOMMENDATIONS

- The various hazards that can be present Brakes India Ltd.-Contractor press shop & construction activity:
- Contact with Moving vehicle - Fork lift
- Fire due to direct exposure of welding spatters to cylinder in contractor shed
- Chemical hazard leads to health effects and environmental also
- Physical hazards - Noise, fumes, dust.
- Electrical hazard (electrocution)
- Ergonomic hazards-during transportation(MSD,CTD)

The HIRA study shows some of the following areas that needs attention

- Proper SOP to be followed to use trolley.
- Create about PPE awareness to workers and awareness about chemical also.
- Give proper material handling training to workers
- Every worker who are all expose to chemicals they must knew MSDS and spill containment and training for handling and sage of chemical,
- Check list to be followed during maintenance work time.
- Don't operate without safety guard and give proper training every month.
- Wear proper PPE's (Goggles, Gloves, mask, gumboot and Apron) to be used while handling chemicals.
- Discipliner action to be taken against the workers who are all not using PPE's properly.

8. CONCLUSION

During my visit to the plant I have noticed mostly all safety Measures have been taken however there is scope for improving in the area of ergonomics. I was astonished to see the workers participation and awareness to adopt safe practices. This type of Safety culture is only possible by management's commitment and motivation towards safety. Apart from Ergonomics some minor improvements brought out in the HIRA study may be considered for implementation.

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