

OCCUPATIONAL HAZARD IDENTIFICATION AND RISK ASSESSMENT IN INDUSTRY

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Abstract - In most of the developing countries like India, focuses on industrial safety only little much. Work place safety is most important for both employee and employer to save the lives of human being from the accidents. If a workplace is full of safety, then there is negligible chance of happening for accidents. According to the report of International Labour Organization (ILO), everyday people met with an accident resulting in loss of human lives. This study mainly focuses on identifying various occupational hazards in brakes producing industry. The occupational hazards are identified and rectified by deep analysis. Once the hazards are identified and the associated risks are assessed, then it must be followed to prevent accidents and injuries. This study shows the subsequent risk assessment approach to a proactive path toward injury and illness prevention associated with the brakes production industry.

Key Words: Accidents, Hazards, Occupational Health & Safety, Risk Assessment.

OBJECTIVE OF THIS STUDY

- To identify high risk of hazards and reducing the cause of accidents
- Reducing health impacts due to hazards
- To prevent employee from the hazards
- To improve highly safe working environment
- To improve the safe pathways to increased production
- To prevent damages to the workplace and environment

1. INTRODUCTION

India is a developing country, where vehicles play an important role. In such a way the parts of vehicles are not produced by the same brand manufacturers, instead many industries supports by producing parts of a vehicle. Likewise this industry produces Brakes for various vehicles of various brands such as two wheelers, passenger vehicles, commercial vehicles etc. This industry is one of the largest producers of brakes in India and having an employee of more than five thousand. Occupational Health and Safety is an another aspect which plays an important role in this industry.

The manufacturing units of this industry use heavy machineries, material handling equipments, flammable fluids

as a part of support to the products. Working in unsafe procedure in machineries may lead to accidents, leads to injury of employee and even to the level of loosing lives. Also exposure of skin to the flammable liquids also creates various diseases to the employee leading to the health issues.

1.1 International Labour Organization (ILO) in Health and Safety

In peoples working in many industries of various nations suffers a lot due to accidents happened due to the lack of safety. In order to protect the lives of people working in industry, International Labour Organization took a step to eradicate and solve it. As a result of it, ILO introduced a program named "ILO Flagship Programme" with slogan "Safety + Health for All". The main motive of this program is to educate the employees and employers to implement the new strategies for resolving the lack of safety.



Fig -1: Slogan of ILO Flagship Programme

2. COMMON WORKPLACE HAZARDS FOUND IN VARIOUS UNITS

2.1 Employees Not wearing proper PPE

Most of the employees working in this industry, are not wearing proper Personal Protective Equipments; to safe guard themselves from the hazards. This may lead to the severe injuries if a hazard happens. The employees are not wearing hand gloves and noise protection ear plugs. Refusal

to wear hand gloves may lead to injuries leads to severe blood loss.

2.2 Over Crowding at Workplace

Overcrowding or crowding is the condition where more people are located within a given space than is considered tolerable from a safety and health perspective. Overcrowding at workplace is another major issue that happens at this industry. Most of the employees wandering here and there and crowding at single place near machines and activities like playing, talking, kidding etc., happens. This culture may lead to severe accidents and sometimes lead to deaths. Overcrowding must be avoided by maintaining minimum distance for each worker. Also avoid unnecessary talking, kidding, playing, etc at workplace.

2.3 Improper Material Storage.

Improper material storage is also another common hazards found in this industry. Materials and storage containers are stored improperly other than the places allotted. Materials and storage containers are stored near machines, on the machines, on the pathways etc. These type arrangements may lead to difficulties in emergency exits. Storage of materials and containers on or near machineries may lead to accidents. Material storage containers must be removed from work place when not in use and it should be located at a place actually where it is allotted.

2.4 Improper Material Handling

Improper material handling is another major issue in this industry. Material handling equipments like moving in an unsafe pathway. This type of movement may lead to falling of materials, machines etc which accounts in failure of safety.

2.5 Working at height without safety measures

Working at height is another major issue in this industry. Employees are working without proper safety precautions which may lead to fall of ladder or objects from height etc. This practice will lead to severe injury even sometimes to loss of life.

2.6 Working with flammable liquids

Working with flammable liquids without proper protective devices will lead to damage of skin. Exposing flammable liquids to high temperature will create pathway for fire accidents is also an another problem.

3. SAFETY AUDITING

Safety auditing is the way of assessing the working nature in which the industry involved whether in safe

working condition or not. Safety audit is to be done by the well trained expert. Safety audit will gives the report of hazardous area, where the safety is to be improved. As per the Indian standards IS 14489, Safety auditing is mandatory for all industries. Generally safety auditing will be questionnaire in nature and it is asked to the working employees of that particular company. For each and every questions asked by the safety expert, the employee may answer by giving appropriate rating.



Fig -2: Rating Scale

The table given below is the questions asked to the employees of various shifts of this industry, in order to check the safety level.

Sno	Questionnaire	Rating				
Training						
1	Is training provided for each person newly assigned to a job?	(1)	(2)	(3)	(4)	(5)
2	Does initial training includes a review of hazards and accidents associated in this job?	(1)	(2)	(3)	(4)	(5)
3	Is adequate instruction in the use of personal protective equipment provided?	(1)	(2)	(3)	(4)	(5)
Workplace & Environment						
4	Are resources available to deal with easily (drinking water, raw material etc)?	(1)	(2)	(3)	(4)	(5)
5	Is ventilation equipment working effectively?	(1)	(2)	(3)	(4)	(5)
6	Is the fume and dust collection hood working effectively?	(1)	(2)	(3)	(4)	(5)
7	Is the level of light adequate for safe and comfortable performance of work?	(1)	(2)	(3)	(4)	(5)
8	Does lighting produce glare on work surfaces, monitors, screens and keyboards?	(1)	(2)	(3)	(4)	(5)
9	Is proper room temperature is maintained?	(1)	(2)	(3)	(4)	(5)
10	Is the fume and dust collection hood working effectively?	(1)	(2)	(3)	(4)	(5)
11	Are all work areas clean and free of debris?	(1)	(2)	(3)	(4)	(5)
12	Are stored materials properly stacked and spaced?	(1)	(2)	(3)	(4)	(5)
13	Are tools kept in their proper	(1)	(2)	(3)	(4)	(5)

	place?					
14	Are floors free of oil spillage or leakage?	①	②	③	④	⑤
15	Is absorbent available for immediate cleaning of spills and leaks?	①	②	③	④	⑤
16	Are all flammable and combustible products stored appropriately?	①	②	③	④	⑤
Work Process						
17	Are repetitive motion tasks properly paced and kept to a minimum?	①	②	③	④	⑤
18	Are the material safety data sheets placed in locations accessible to all employees?	①	②	③	④	⑤
19	Is hazard signaled by sign tags?	①	②	③	④	⑤
20	Have all trucks, forklifts and other equipment been inspected and maintained?	①	②	③	④	⑤
Fire Emergency Procedures						
21	Is there a clear fire response plan posted in each work area?	①	②	③	④	⑤
22	Do all workers know the emergency exit plan?	①	②	③	④	⑤
23	Are mock drills held regularly?	①	②	③	④	⑤
24	Are fire extinguishers chosen for the type of fire most likely in that area?	①	②	③	④	⑤
25	Are there enough extinguishers present to do the job?	①	②	③	④	⑤
26	Are extinguishers properly mounted and easily accessible?	①	②	③	④	⑤
27	Are all extinguishers fully charged and operable?	①	②	③	④	⑤
Exit						
28	Are there enough exits to allow prompt escape?	①	②	③	④	⑤
29	Do employees have easy access to exits?	①	②	③	④	⑤
30	Is exits unlocked to allow egress?	①	②	③	④	⑤
31	Are exits clearly marked?	①	②	③	④	⑤
32	Are exits and exit routes equipped with emergency lighting?	①	②	③	④	⑤
Machine Guards						
33	Are all dangerous machine parts adequately guarded?	①	②	③	④	⑤
34	Do machine guards meet standards?	①	②	③	④	⑤
35	Are lockout procedures followed when performing maintenance with guards removed?	①	②	③	④	⑤
Electrical						
36	Are all machines properly grounded?	①	②	③	④	⑤
37	Are portable hand tools grounded or double insulated?	①	②	③	④	⑤
38	Are junction boxes or sockets closed?	①	②	③	④	⑤

39	Are extension cords out of the aisles where they can be abused by heavy traffic?	①	②	③	④	⑤
40	Is permanent wiring used instead of extension cords?	①	②	③	④	⑤
Sound Level/Noise						
41	Are regular noise surveys conducted?	①	②	③	④	⑤
42	Is hearing protection available and used properly?	①	②	③	④	⑤
Employee Facilities						
43	Are restrooms kept clean and sanitary?	①	②	③	④	⑤
44	Are restrooms in good repair?	①	②	③	④	⑤
45	Are cafeteria facilities provided away from toxic chemicals?	①	②	③	④	⑤
46	Is hand washing facilities available?	①	②	③	④	⑤
Medical and First Aid						
47	Do all employees know how to get first aid assistance when needed?	①	②	③	④	⑤
48	Are there employees trained as first-aid practitioners on each shift worked?	①	②	③	④	⑤
49	Are first-aid kits provided as per jurisdiction's first-aid regulations?	①	②	③	④	⑤
50	Are first-aid supplies replenished as they are used?	①	②	③	④	⑤
PPE						
51	Does necessity of wearing PPE was explained?	①	②	③	④	⑤
52	Is required protective equipment provided, maintained and used?	①	②	③	④	⑤
53	Does equipment meet requirements and reliable?	①	②	③	④	⑤
54	Are the areas requiring PPE usage properly identified by warning signs?	①	②	③	④	⑤

Table - 1: List of Questionnaire

4. Hazard Elimination methods

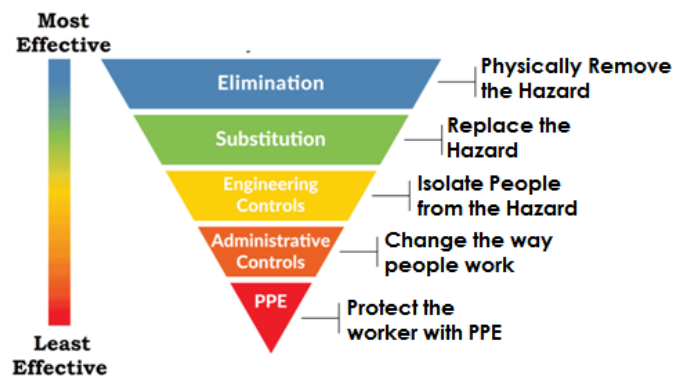


Fig -3: Hazard Control Hierarchy

Hazard elimination or removal is the only way to protect employees from the accidents. But eliminating of hazard is possible when the involvement of both employee and employer shows interest in it. By educating the employees and proper planning will surely help to eliminate the hazards involved in the process. Whenever the employee identifies the hazards and the same is to be analyzed and recognized by the employer and vice versa.

4.1. Safety and health program - Employer Guidelines

According to Occupational Safety and Health Administration (OSHA), the employer must give proper training programs in the aspect of safety at regular intervals. The effective management will focus on the hazards involved and gives the alternate way after measuring the effects of hazards involved. The guidelines on safety must be tagged with slogans and should be placed at the work are involved with hazards. The language used for slogans must be easy so that each and every people will understand.



Fig -4: Key Elements of Safety Management

4.2. Fire and Safety Mock Drill

A mock fire drill is a method of training workers, how to evacuate during the time of fire accidents in a safe manner. This training will help the workers to exit the company through the nearest exit. This mock drill varies from place to place i.e., type of working nature. It also gives the knowledge to employees about how to set off fire by means of water or fire extinguishers.



Fig -5: Fire Mock drill clipart

4.3. Conduct regular Safety Inspection

Conduct regular inspections of all operations, equipment, work areas, and facilities. Ensure all employees are participating on the inspection team and talking to them about hazards that they identify. Always record the statements by voice or written statement, so that later it maybe considered for corrective actions. Either take photos or video of hazardous areas that are identified for later discussions and brainstorm about how to eliminate them. Use checklists containing set of predefined questionnaire which highlights things to look for. The various hazards identified will fall into several major categories, such as work practice, electrical hazards, type of maintenance, type of employee (experienced or fresher) etc.



Fig -6: Safety Inspection Clipart

5. OBSERVATIONS AND RESULTS

Interpretation of respective Question No and its Rating Scale awarded by Worker					
Total Employees Participated (In Rotational Shifts) : 128					
Total Response = No. of Questions X Total Employee Participated = 54 X 128 = 6912					
Ques. No	Rating Scale				
	①	②	③	④	⑤
1	6	14	26	38	44
2	8	13	31	40	36
3	12	18	30	38	30
4	14	17	22	28	47
5	9	14	21	36	48
6	7	13	25	48	35
7	3	12	24	31	58
8	8	14	23	35	48
9	10	18	18	38	44
10	3	20	25	33	47
11	8	11	26	39	44

12	4	14	28	37	45
13	6	13	28	33	48
14	7	11	31	36	43
15	9	12	28	48	31
16	5	9	27	31	56
17	2	18	23	35	50
18	4	14	25	38	47
19	7	17	27	33	44
20	5	15	23	35	50
21	6	17	22	38	45
22	3	19	20	33	53
23	8	11	31	39	39
24	3	15	31	38	41
25	8	12	28	28	52
26	4	18	27	36	43
27	6	12	23	48	39
28	7	14	25	31	51
29	9	18	27	35	39
30	7	20	23	33	45
31	3	11	25	36	53
32	8	15	26	48	31
33	10	12	28	31	47
34	9	14	28	38	39
35	3	13	31	28	53
36	8	12	28	36	44
37	4	14	27	48	35
38	6	18	28	31	45
39	7	20	28	35	38
40	9	11	21	41	46
41	5	15	28	33	47
42	3	11	27	35	52
43	3	18	23	38	46
44	8	13	31	33	43
45	6	11	28	39	44
46	7	12	27	37	45
47	5	9	23	33	58
48	3	19	25	38	43
49	8	11	27	33	49
50	5	14	23	36	50
51	6	12	28	37	45

52	7	18	31	33	39
53	9	12	28	36	43
54	6	12	31	34	45
Total Response	6912	6912	6912	6912	6912
Per Rating Total	346	770	1418	1956	2422
Overall % per Rating	5.01	11.1	20.5	28.3	35.0

5.1 Interpretation of respective Question No and its Rating Scale awarded by Worker

Based on the responses received from the employees of various shifts, the following results are derived based on the opinion of the employees. This results indicates few process or activities or working environment involves hazards working environment along with the lack of employees negligence in maintaining safety.

S.No.	Rating		Percentage of Employee Awarded this grade scale in %	Impact of Hazard
	Grade	Scale		
1	Very Poor	①	5.01	Extreme
2	Poor	②	11.14	High
3	Average	③	20.52	Moderate
4	Good	④	28.29	Low
5	Excellent	⑤	35.04	Very Low
Grand Total			100.00 %	Level Moderate to Level Low

6. CONCLUSIONS

Thus this study of occupational health and safety analysis in this industry was analyzed carefully. Even though this industry is being awarded with ISO 14001 and OSHAS 18001 and following the procedures of IS 14489, there is some part of negligence is found in the safety procedures. From this study the total percentage of occurring accidents in the impact of hazards is below 20% (i.e., 16.15%) and the impact of hazards from average impact to low impact is about 83.85%. If this analysis is taken into account and the place having lack of safety is to be monitored and eliminate the occupational hazards.

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BIOGRAPHIES

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