Hazard Identification And Safety Control In Hot Rolling Mill

Sankar.E, Suresh balaji. S, Dheenathayalan T, PSS. Srinivasan, K. Visagavel, D. Sakthivel

ABSTRACT

Steel is a major influence on our lives, such as machine tools, pipe lines, weapons, electricity power line towers. Steel is far most important and multi-functional, most adaptable of materials. The fire explosion, dust, heat radiation produced by steel manufacturing units is considered one of the most hazardous pollutants which affect the surrounding environment and the occupants. Controlling those hazards in steel plants is very important. Select the suitable material for the insulation shield and controlling the hazards and accident involved in hot rolling mill process.

KEYWORDS: Hot rolling mill, Hazard identification, Hazards control

INTRODUCTION

Principles of Safety are universal, but how much action is depends on activity of the hazard that and size of the organization, the characteristics of the organization, products or services, and the adequacy of existing arrangements. Many features of the effective safety and health management are analogous to the sound management practices advocated by quality management, environmental protection, and business excellence. Due to expertise in safety and health as to all other aspects of the successful commercial companies often excel at safety and health management in their operations. While the quality of management products or services and environmental protection principally protect physical phenomena, workplace safety involves in awaring of people and improves in safety culture between employers and employees. There are certain similarities between the approaches to safety and health described (ISO 9000 series of standards) or environmental protection (ISO 14000 series).

Ex., quality management systems promote continuous improvement in all aspects of an organizations activity. They are founded on a continuous process of:

1. Identifying The Key Processes;
2. Setting Performance Standards;
3. Measuring Achievement Against these standards
4. Taking Corrective Action;
5. Identifying Opportunities for Improvement.

The quality management success depends on development of supportive organizational cultures. A quality management system also stresses the importance of the active involvement of all employees in the quality process. Organizations that manage safety and health successfully invariably have a positive safety culture and active safety consultation programs in place. Safety culture helps the organizations as successful by establish and maintain a safety. Practical methods of designing, building, operating, and maintaining the appropriate systems.
are outlined in this guidance. In the following sections the similarities and strong links between total quality management, environmental protection and effective safety and health management will become increasing apparently.

_**Hot Rolling Process:**_

Steel rolling mills is a well managed unit. Two furnaces are present in this unit having their outlets in the opposite direction. Readymade steel blocks (billet) are transported to this unit through trolleys. Then these steel blocks melted to moltenphase in furnaces. To make steel bars, from molten steel blocks it pass through the rolling devices and rolled into steel bars are in different diameter and strength. Workers do the Manual cutting of these bars is carried out and after that the bars are ready to dispatch in market. Although the unit is working well and producing a considerable amount of products but there are a number of occupational health and safety problems in this unit which can be easily figured out. Management has a contract with some contractor about the production deal and dealing of workers. The only thing which is important for contractor is to faces the deadline of workload assigned and gets the monitory benefit. The contractor provides some facilities to the workers but only to certain extent that their business does not suffer. A restroom for the workers functions in the unit.

![Fig. 1: Hot Rolling Mill Process](image)

**Methodology:**

This methodology describes overall process involved in the project.

- Hazard description
- Hazards in rolling mills
- Hazard control

![Fig. 2: Methodology](image)
Process In Hazard Control Of Hot Rolling Mill:

Fig. 3: Process of hazard in hazard control of hot rolling mill

Hazard description in Hot Rolling Mills:

Physical agents that can cause risk which include noise, vibration, heat and cold stress and lighting. All these types of risks can be found in steel re-rolling mills.

1. **Slips, trips and falls:**
   Potential sources of slip and trip in steel industry includes, wet, greasy and slippery surfaces and in some cases messy walkways are also become a source of fall. In construction fall from height might be with and repair of steel re-rolling operations as well as with some of the processes.

2. **Overhead cranes:**
   Overhead cranes form an integral part of operating and maintenance practice throughout a steel mill. Several hazards are associated with their use, including overhead loads, hot metal splash, equipment failure, lack of communication, and the fact that crane operators may not be aware of construction workers in unexpected locations.

3. **Manual handling of heavy load:**
   Workers have to handle and uplift the heavy metallic objects and steel blocks manually without the aid of mechanical equipment had Steel Mills re-rolling unit. As the steel blocks vary in weight from 60-90 Kg, workers are manually lifting up them and placing them at the inlet of furnace.

4. **Machines are without guards and safety devices:**
   Automatic machines and steel rollers are without safety guards. No heat insulating guard is placed near the hot areas of process. These automatic machines can cause injuries such as cuts, sprains, broken bones, amputation and in severe cases death can be occur due to crushing and entrapment. Workers those are working around and maintaining conveyor belts need to be appropriately trained. Moving parts of the automatic machines must be properly guarded and emergency stop buttons should be present to shut down the machines in emergency. Lockout/Tag out procedures are required during maintenance of such machines.

5. **Cooling fans:**
   Heating furnace is creating high degrees of heat. The temperature of heating furnace is ranges from 1000-1300°C. The only measure present here to reduce the heat and temperature around the furnace and at working place is the fans. These fans are adequately placed at different places in the unit. But the structure of these fans is painting a horrible picture. These fans are without safety guards. Anyone can get injured adversely by these fans due to his little mistake.

6. **Electrical and fire hazards:**
   Usually electrical and fire hazards exists in all workplace environments and are of prior importance for safety concern. A few factors are present in steel re-rolling mills than can boost the hazards regarding electrical and fire appliances.
The re-rolling unit has its electricity meters in grid station. Only the panel box of electricity is installed in the unit. Grid station is providing 800 KBA load to the unit. In case of any accident as the load fluctuates, panel box trips automatically and electricity supply is disconnected to avoid hazards. But the electric boards are unattended and without any cover. Use of power boards and extension cords is pretty much high.

7. **Bad housekeeping:**
   Overall layout of unit is representing bad housekeeping. No health and hygiene measures have been taken here. Different waste materials are placed on floors and walkways inattentively. Walkways are not free to move.

8. **Excessive noise:**
   Excessive noise exposure is one of the likely physical hazards present in steel industry. Occupationally-induced hearing loss has a very vast history in many industries. To avoid both short-term and long-term hearing loss and mental fatigue in some jobs auditory safety precautions are very important.
   Noise level is very high at workplace in Itched Steel Mills re-rolling unit. Workers are not provided with ear mugs/plugs. It is difficult to hear a normal voice within 1 meter distance. Highly disturbing and disrupting noises are present here. No noise insulating system exists to reduce the noise.

9. **Extreme heat hazard:**
   In steel re-rolling mills heat is generated and used on high levels. Hot rolling furnace has a temperature of 1000-1300oC which is quite a high temperature. Area surrounding the furnace has very high temperature. No insulating material is present around the furnace and in the working shed so that to reduce the heat. Workers those are working near the furnace and on rolling machines can suffer from heat stroke and eye irritation.

10. **Explosion and burn hazards:**
    A lot of explosive materials are present at the workplace and they can catch fire very easily. Workers are working very close to furnace without wearing personal protective equipments and are facing regular burn hazards.

**Conclusion:**
Many Steel industries not having a insulation shield due to this lot of accidents occurs in steel plant. The accidents including fires and explosions, lighting, dusts and fibers, carbon monoxide poisoning, steam explosion, Slips, trips and falls, Extreme heat hazard, Explosion and burn hazards. To select the suitable material for insulation shield and design & implement the insulation shield for hot rolling mill.

**REFERENCES**