



Health Hazards in Refractory Work

By

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AS the number of heavy industries in India is increasing year after year, it is becoming necessary to look after the health of workers. This responsibility falls entirely on the management of industries. However, in some States, the Employees State Insurance Scheme is introduced and all the workers are given medical care under this scheme. Where there is no E.S.I.S., the management has taken up this responsibility. In recent years, all the heavy industries, Government undertakings in particular, are employing both Industrial Medical Officers and Industrial Nurses. Their job in industries is manifold. Space is limited to discuss here of their jobs as the same warrants a separate article under a separate heading.

The Foundry Forge Project under the Heavy Engineering Corporation Limited is a very big complex in this part of the world. Here the refractory work both in construction and production stages is a must. Before the health hazards of the refractory workers are discussed, I shall give below a detailed account of the refractory work carried out in our factory, which I believe will give a clear picture of the health hazards faced by the workers.

Refractory materials or bricks are those bricks which can withstand the high temperature under various odd conditions in the furnaces. The high temperature, in some cases up to 3000 degree centigrade, is required to melt the materials in the furnaces and this enormous temperature will deform the structure of the furnaces. To produce this high temperature, so many methods are used; such as

coal, producer gas, electric current, oil etc. In order to prevent this temperature having effect on the furnaces, various types of refractory bricks are used for lining the furnaces. Binding materials of these bricks should be of the same quality. The type of bricks to be used in the furnaces is determined depending on the type of work and the amount of heat required etc.

The following are the common types of materials used in factories :

1. Acid Types : Silica bricks which contain 95 per cent. silica.
2. Basic Types : Magnesite, chrome and Dolomite. These type of bricks contain less than 6 per cent. silica.
3. Neutral Types : Chromite and Chromagnesite. These contain less than 5 per cent. silica.

To line the furnaces, the refractory workers, usually known as Masons and Brick layers, will cut the bricks to the required sizes. After laying the bricks, in the furnaces, they will grind the bricks with the grinding stones to give a smooth surface. The cutting and grinding are done both by hand and by machine. Cutting and grinding are done by wet method and dry method. In wet method, the water is fed constantly to the brick. In this method, the dust is not thrown to the atmosphere. But in some cases the wetting of the bricks is not allowed. In such cases the dry method is adopted.

The following are the health hazards usually met with in the refractory works :

1. Silicosis

Silicosis is a pathological condition of the lungs due to the inhalation of the dust containing silicone-di-oxide.

Pathology : When the dust containing silicone-dioxide is inhaled, it lodges in the nasal, pharyngeal and tracheal mucous membrane. Due to the continuous inhalation of the dust, saturation of these membranes takes place. The inhaled dust is held by phagocytes from the mucous surface of the bronchial tubes. These, in time, get saturated and find their way to bronchioles and alveoli, from where they pass through lymphatic vessels to the lymphatic glands which drain the lungs. These inflammatory changes result in the formation of fibrous tissues, which sooner or later block the lymphatics. As an individual inhales more and more dust, the lung tissue itself become fibrosed. These changes are progressive, but the time taken to affect varies from a short period of two years to as much as 15 years.

Those who are employed in breaking, crushing, grinding and polishing of any material containing silica are normally affected. The workers employed in metal buffing, marble and granite workers, pottery workers and those engaged in the manufacture of optical lenses are also affected.

Symptoms. Dyspnoea and cough are the two earliest symptoms. One eminent Industrial Medical Officer has done an extensive study on the occurrence of silicosis and has argued that the earliest symptoms are digestive troubles including nausea, flatulence, gastric discomfort after meals and troublesome

constipation. However, the silicosis cases I came across had all these symptoms. There is subacute bronchitis with expectoration. As time goes on, there is repeated attack of bronchitis and dyspnoea becomes a marked feature of the case. This is believed to be due to the development of emphysema and commencement of the formation of fibrous tissue in the lungs. Weakness and loss of appetite with a certain degree of secondary anaemia are also marked feature at this stage. By this time the worker becomes more and more unfit for his work.

The temperature may be rarely raised and if it is raised it will be only to a slight extent. Pain in the chest may be completely absent in uncomplicated cases of silicosis.

Complications: Bronchiectasis, Pulmonary Tuberculosis and Heart involvement which is detected by the onset of cyanosis. Cancer of the lung is a rare complication.

Diagnosis: Diagnosis can be made by the history and symptoms. The ultimate diagnosis, of course, depends on the X-Ray examination of the chest.

The occurrence of the silicosis is said to be due to the saturation of the dust containing silica in the atmosphere. In a closed shed or in a restricted space when the cutting, grinding and polishing of the silica materials are done, the dust spreads thick everywhere. In some cases the workers keep their meals inside the sheds on which the dust settles and they are also in the habit of drinking tea etc. in the shed itself.

As a preventive measure to avoid the occurrence of silicosis among the refractory workers, the use of respirators is strongly advocated. In addition to this, the workers should have good diet in time with plenty of protein and calcium. Good ventilation of the

sheds, where cutting of the bricks is done, is absolutely necessary. As far as possible wet cutting method should be adopted as this will not throw the dust in the atmosphere. In the work spot they should not keep their meals nor should they drink tea etc. They should be provided with individual lockers where they can store their personal things. Before leaving the factory and before changing their personal clothings, they should have good bath. Their living conditions should be improved by providing spacious and airy accommodation. Their social activities should be encouraged and a healthy atmosphere should be created among them.

Pre-employment examination is always advisable. Before employment, this kind of medical examination will eliminate the workers suffering from silicosis or any other diseases. In the interest of the management, this should be done in a strict manner so that a worker who had been already suffering from the hazard should not be incapacitated in a short period after employment and claim for compensation. Recently we conducted a pre-employment medical examination for about 10 candidates for employment as bricklayers. Out of them 4 candidates had shown some or other form of lung troubles. Two of them had shown even the infiltration with denser shadows.

Periodical medical examination (Statutory Medical Examination) is also advisable. This is being done in our factory and a certifying Surgeon from Bihar Government is deputed for this purpose. He examines all the workers and certifies their state of health. As per his advice the investigations and treatments are carried out to ensure good health of the workers. This medical examination is carried out periodically and the time is decided by the certifying Surgeon himself.

2. Accidental Injuries

Abrasions and cut injuries are the common occurrence when the workers cut and grind the bricks. As far as possible the workers should be careful to avoid the accidental injuries. However, it will be advisable to protect them against Tetanus by giving Tetanus Toxoid inoculation as a protection which is normally effective for five years. Nevertheless booster dose (1 cc.) should be given in a year after an injury.

3. Eye Injuries

Accidental fall of a particle while cutting or polishing the bricks is also common in the refractory work. The eyes should be protected against such hazards by using goggles. An ideal goggle for such purpose is one with a respirator.

4. Strains and Back Ache

These are experienced by the workers when they are to lift heavy bricks which weigh sometimes even 24 kilograms. Strains of legs and knees are experienced by the workers when they have to work in closed chambers by squatting for a long period. These hazards can be avoided when they do the lifting in a proper way as per safety methods.

5. Electric Shock

This is a rare occurrence and is entirely due to faulty electrification. When the worker has to work in closed chamber the place has to be illuminated with electric bulbs. Hence good electrification should be ensured. The ideal way is to step down the voltage from 220 volts to 24 volts.

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Reference

Industrial Medicine and Hygiene by Merewether.

The Sublimity of Modern Nursing — (Contd. from page 141)

controls the emotional well-being of her little ones, the nurse's care controls the weight that tips the balance towards optimum condition for recovery or towards black despair. Besides, being a member of a medical team, a nurse holds

intimate relation with her patient. By virtue of her profession she stands before the public as a symbol of health and its preservation. She knows principles underlying good health and she works incessantly to build up health appre-

ciation in others. As an educator, the nurse has challenging opportunity to build up health responsibility in the family, community and in the world at large. In a sense a nurse's maternal heart should embrace all people in a changing world.