

ABSTRACT

Air pollutants of steel making operations have historically been associated with environmental and health hazards. These pollutants (such as sulphur oxide, nitrogen oxide, nitrogen dioxide, hydrogen sulphide, carbon monoxide and particulate matter) are produced during steel manufacturing process, when scrap metal is melt in furnaces to produce T-iron, billets and iron rods of different diameters.

A cross-sectional study of three re-rolling mills and their workers was carried out to measure the metal fumes and respirable particulate matter (RPM) emitted from the furnaces and to determine its effects on the health of the workers. Questionnaire was used to elicit information regarding the health status of the workers.

Alarming in all the three mills, the concentrations of CO, NO and NO₂ within the working area was much higher than the standard limits allowed by American Society for Testing and Materials (ASTM). In all the three steel re-rolling mills, 8 hours average, concentration of particulate matter ranged from 4.21-48.69 mg/m³, much higher than ASTM limit of 3 mg/m³. Similarly concentration of CO ranged from 212-261 µg/m³ in comparison of standard limit of 10 µg/m³. The same pattern was also found as far as concentrations of NO and SO₂ was concerned, the concentration of these two gases ranged from 179-224 µg/m³ (ASTM limit-80 µg/m³) and 68-136 µg/m³ (ASTM limit-100 µg/m³) respectively. However concentration of H₂S (ranged from 10-16 ppm) was less in comparison to standard limit of 20 ppm. Temperature, noise and light intensity levels also exceeded the permissible limits. The 8 hours average temperature recorded in side the mill ranged the form 38.1-45.3° (ASTM limit –37.4°C) while noise and light intensity in side the mill ranged from 86-102 dB(A) NOHSC Permissible limit –85 dB(A) and 850-950 Lux (NOHSC permissible limit is 800 Lux) respectively.

On average basis 83%, 77%, 73% and 70% of workers suffered from fatigue, skin problems, cough and shortness of breath, respectively. 25% to 45% of workers complained of dizziness, bronchitis, wheezing, depression and headache.

In view of the very large emission of Toxic gases in the steel manufacturing Process it is recommended that dust emission at furnaces could be reduced by covering iron runway, enclosing conveyor belts and by erecting wind barriers, before initiating the process of re-rolling, dust from scrap should be removed with same volatile compounds. Above all antipollution devices should be installed over the furnaces and self monitoring and reporting program encouraged.

As evaluation of health status of the workers is also related to their nutritional and socio-economic condition, an extensive survey should be carried out to obtain a complete picture.