Section C
Occupational Injury

Mining

Occupational Accidents in the Swedish Mining Industry, 1986-1990
Blank VLG, Andersson R, Karolinska Institute, Sweden (C01)

Objectives: To study the pattern of occupational accidents in the iron ore- and nonferrous ore-mining industry.

Methods: This cross-sectional study used data from the Information System on Occupational Injuries at the National Board of Occupational Safety and Health. All accidents reported were analyzed according to: place where the accident occurred, activity undertaken at the time of the accident, kind and nature of injury, injury event, bodily location of injury, main event, and main external agencies.

Results: The analysis, which covered a five-year period, showed variations in accident frequencies according to type of mine (iron ore or nonferrous), activity undertaken, and place of occurrence. Sprains and strains were the most frequent injuries. The majority of accidents occurred among mining company employees. Underground accidents were the most common.

Conclusions: Information on and the identification of hazards and causal factors surrounding the accidents enable strategies to be developed to improve the work environment and prevent accidental injuries.

Study on Work Conditions at Underground Railway Tunnels Construction
Herman H, Ferstreru C, Negru M, Institute of Hygiene and Public Health, Romania (C02)

Objectives: To determine the risk factors and the level of human strain; to establish preventive measures.

Methods: This was a work-target analysis. Environmental factors and the organism's physical effort were assessed.

Results: Conditions of the working environment included: limited work space, moisture, air relative humidity of 80-93%, permanent artificial lighting with great differences of illumination and luminance, acoustic level of 96-100 dB (A), air-dust concentration under TLV, accident risk. Strain is measured by the worker's posture, upper limbs' large movements, and manual holding on weights. The neurophysical strain is sensorial and of most importance.

Conclusions: This study points to the necessity of technical, organizational, individual, medical, and educational preventive measures.

Construction

Heat Stress Among Construction Waste-Abatement Workers: An Emerging Problem
Bélard JL, Stanevich RL, Centers for Disease Control and Prevention, United States (C03)

Objectives: To determine the extent of heat stress conditions among hazardous-waste-abatement workers.

Methods: A literature search was conducted and health surveillance data obtained through the Bureau of Labor Statistics, US Army Medical Corps, and the Occupational Safety and

Health Administration. These sources were reviewed for cases of heat stress and heat stroke. Contacts with the Environmental Protection Agency and labor unions and a visit to the Hazardous Waste Abatement Training Center operated by the International Union of Operating Engineers provided additional information that heat stress is an emerging problem in this growing national effort.

Results: These workers, who belong to the construction industry, perform physically demanding tasks, often in hot environments, while wearing complete encapsulating chemical protective clothing and respiratory protection. The number of workers employed in hazardous waste management has grown from 80,000 in 1980 to >1,000,000 in 1990. Between 1975-1985, heat stroke was the tenth most frequent type of construction-worker illness reported into workers' compensation. It has been estimated that for each heat stroke case, more than 10 heat exhaustion cases occur. However, heat exhaustion, a major stage of heat stress, was not a classified category within the compensable cases. If it were, then heat exhaustion would rank as the leading reported worker illness in Heavy Construction (Standard Industrial Classification [SIC] 16) and be second in Residential (SIC 15) and Special Trades (SIC 17) Construction. Heat stress is a common hazard to construction waste-abatement workers because of four factors: mandatory use of vapor-barrier clothing, outdoor exposure to hot environments, high level of energy expenditure, and lack of specific work-and-rest strategies.

Conclusions: Heat stress is a major health concern in this fast-growing population. Hazardous-waste-abatement work must be evaluated to determine variation of the body core temperature with workload. This should lead to the development of work-and-rest cycles as well as state-of-the-art engineering controls and monitoring devices to warn of impending heat stress to workers.

A National Overview of Occupational Falls in the United States' Construction Industry: 1980-1988

Cattledge GH, Hendricks S, Stanevich R, Centers for Disease Control and Prevention, United States (C04)

Objectives: To identify construction workers at high risk for occupational falls (E880-E888).

Methods: National death-certificate analyses were conducted on all fatal occupational falls in the construction industry via the National Traumatic Occupational Fatality database at NIOSH, DSR. Fatality rates were calculated by geographic location (state and region) and Standard Industrial Classification (SIC) categories.

Results: From 1980-1988, occupational falls in construction represented 48.3% of fatal occupational falls across all industries. Within the construction industry, there were 2,498 deaths due to occupational falls. Most of these incidents occurred among young white males. By geographical location, fatality rates were higher within the South region of the United States. Sixty-six percent of the fall victims died on the same day as the injury. By SIC codes, employees of special trade contractors (SIC 17) were at highest risk of having an occupational fall (86.5/100,000 workers). The three categories within SIC 17 with the highest fatality rates (per 100,000 workers) were: roofing, siding, and sheetmetal work (112.4); structural steel erection (105.9), and glass and glazing work (699.6). People employed as roofers

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