

Abstract Book

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CS-118-07

Dust Explosions: The Nature of the Problem and Practical Measures for Its Control—Including the Requirements of the New NFPA 652 for “Dust Hazard Assessment”

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Situation/Problem: Many powders will burn slowly or with difficulty as a layer on a surface, but can explode if dispersed as a cloud. In fact, the vast majority of powders can form explosible dust clouds if the particle size is small, moisture content is low, and the dust cloud concentration (measured in g/m³) is above the Minimum Explosible Concentration (MEC).

Resolution: The size of the dust particle is a property which influences the explosibility of the dust cloud. The finer the particles, the greater the surface area per unit mass and thus, the more explosible a given dust is likely to be. The ease of ignition and the severity of the resulting explosion increases with a decrease in particle size. The moisture content of a product will also affect the explosion risk.

Results: A systematic approach to identifying dust cloud explosion hazards and taking measures to ensure safety against their consequences generally involves: 1. Understanding of the explosion characteristics of the dust(s); 2. Identification of locations where combustible dust cloud atmospheres could be present; 3. Identification of potential ignition sources that could be present under normal and abnormal conditions; 4. Proper process and facility design to eliminate and/or minimize the occurrence of dust explosions; and 5. Adequate maintenance of facilities to prevent ignition sources and minimize dust release

Lessons learned: This presentation will discuss a well-trying approach to identify, assess, and eliminate/control dust explosion hazards in facilities. Attendees will be provided information to screen the materials that they handle and aid in determining the precautions that should be taken in handling, processing, and storing combustible powders. This will include sensitivity to various types of ignition hazards (such as electrical arcs and electrostatic discharges) and the severity of combustion incidents (such as explosions and flash-fires). This presentation will also include the Dust Hazard Assessment (DHA) requirements of the New National Fire Protection Association (NFPA) 652: Standard on Fundamentals of Combustible Dusts. Attendees can expect to leave this presentation better equipped to respond to questions concerning the equipment and environment in which combustible dusts are handled and how to meet the requirements of the new NFPA 652.

P0119

IH Data: Tools for Exposure Assessment and Epidemiology

Wednesday, May 25, 2016, 1:30 PM - 4:10 PM

SR-119-01

Epidemiology of Hearing Impairment and Injuries in the U.S. Military

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Objective: To provide an epidemiologic analysis of hearing impairment and injury among U.S. military personnel.

Methods: For the main epidemiological analysis, we included 15-64 year old Active Duty Armed Forces serving during fiscal years (FY) 2008 to 2012, and who have at least one clinical encounter with select hearing related ICD-9 diagnoses. Cases were identified from records from direct care (CAPER: Comprehensive Ambulatory/Professional Encounter Record, and SIDR: Standard Inpatient Data Record) and paid provider (TED-I: TRICARE Encounter Data-Institutional and TED-NI: TRICARE Encounter Data-Noninstitutional) data sources. We also identified cases using the Defense Occupational and Environmental Health Readiness System-Hearing Conservation database (DOEHRS-HC), which maintains hearing conservation and audiometric data across the DoD. The Defense Manpower Data Center provided data on at-risk denominators by the demographic and job-related characteristics.

Results: Demographics of the sample appeared stable over the study period, with an average annual population of approximately 1.4 million Service Members. The initial unadjusted overall incidence rate increased from 27 cases per 1000 persons to 27.6 cases per 1000 persons over the study period. The tinnitus incidence rate increased from 9.3 cases per 1000 persons in FY 2008 to 12.3 cases per 1000 persons in FY 2012. The rate of sensorineural hearing loss slightly decreased from 11.4 cases per 1000 persons to 10.7 cases per 1000 persons at the end of the study period. In general, rates of injury were highest in males, in the Army, in senior officers and in older service members. Rates will be presented for all analyzed ICD codes.

Conclusions: This study will lay the groundwork for comprehensive epidemiologic studies of hearing outcomes among U.S. military personnel. Results from this project will draw much needed attention to this critical issue, encouraging initiatives to improve the auditory health and wellbeing of Service Members and aiding in the development and implementation of prevention measures.