WORKER DEATHS IN CONFINED SPACES

A Summary of NIOSH Surveillance and Investigative Findings

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INTRODUCTION

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This monograph contains summary data and investigative reports of fatal incidents involving workers who entered confined spaces. These investigations were undertaken as part of the Fatality Assessment and Control Evaluation (FACE) program conducted by the National Institute for Occupational Safety and Health (NIOSH). The FACE program was initiated in 1982 and directed from its inception by the NIOSH Division of Safety Research.

The program which was originally known as the Fatal Accident Circumstances and Epidemiology program was given its new name in 1992. FACE is a surveillance program for the identification and investigation of fatal occupational injuries. Currently, the investigations are conducted in four categories—falls from elevations, contact with electrical energy, entry into confined spaces, and machine-related incidents. These categories represent frequent causes of nonmotor vehicle-related, fatal occupational injuries.

The NIOSH Division of Safety Research conducts the FACE investigations to gather information on factors that may have contributed to traumatic occupational fatalities. The circumstances of a particular fatal injury can initially appear to be the result of random, or unpredictable, events. However, each incident can be determined to be the product of certain factors, which when analyzed may reveal the causal connection between a chain of events and the fatal outcome.

Derived from the research conducted by William Haddon, Jr. (the Haddon model), this approach reflects the public health perception that the etiology of injuries is multifactorial and largely preventable.[1] For each case, factors associated with the agent (mode of energy exchange), the host (the worker who died) and the environment are identified during the pre-event, event, and post-event time phases. These contributory factors are investigated in detail in each FACE incident, and are summarized in each FACE summary report, along with recommendations for preventing future incidents of a similar nature.

From December 1983, through September 1993, the deaths of 480 workers in 423 incidents were investigated. Seventy of these investigations involved confined spaces where 109 persons died. In 25 of the confined-space incidents, there were multiple fatalities, including those deaths which involved persons attempting rescue.

In addition to the individual FACE reports, a summary of information on the national incidence of fatal occupational injury within confined spaces, over the 10-year period, 1980 through 1989, is provided. This information is taken from the National Traumatic Occupational Fatalities (NTOF) surveillance system also maintained by our Division. It provides a comprehensive view of the national toll of fatal injuries from this cause, by industry, reason for entry, and other epidemiologically significant categorizations.

This document is intended to become a resource and case study manual for safety and public health professionals, safety and health instructors, research personnel, and public safety personnel. It joins various NIOSH Alerts,[2-5] and the NIOSH document Criteria for a Recommended Standard: Working in Confined Spaces,[6] and related publications,[7-11] developed to prevent the deaths of those who must work in confined spaces.