The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Inspector Dies in a Gasoline Storage Tank in Ohio

FACE-8526

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, the FACE project will identify and rank factors that increase the risk of fatal injuries for selected employees.

On June 7, 1985, a father and son inspection team, under contract to a petroleum company, were inspecting the seals between the internal panels of a floating roof and the sides of a 150,000 barrel storage tank containing regular gasoline. At 12:30 p.m. the victim's father contacted the yard office and reported that his son was seven minutes overdue. At 2:30 p.m. the victim's body was located on the opposite side of the tank on top of the floating roof. By 4:30 p.m. a rescue team removed the victim from inside the tank. He was pronounced dead at the scene.

Contacts/Activities:

Officials of NIOSH in Cincinnati contacted DSR concerning this fatality. This case has been included in the FACE project. During the week of June 12, 1985, a DSR research team (two industrial hygienists) visited the accident site. Discussions were held with representatives of the Industrial Commission of Ohio, the father of the victim, and the yard supervisor for the petroleum company.

Synopsis of Events:

The petroleum company awarded a contract to perform scheduled inspections of gasoline storage tanks. The contractor selected to perform these inspections was from Louisiana. The contract was required because the petroleum company does not permit its employees to enter these tanks. Because of that policy, there were no respirators on site. The contract specified that the contractor would provide all necessary equipment and that at least two workers would be stationed outside the tank. Prior to the inspection of the l50,000 barrel storage tank, the victim had completed a similar inspection on a smaller tank (40,000 barrel). The inspection of the 150,000 barrel tank began at approximately noon on June 7, 1985. At the time of the inspection, the storage tank contained approximately 3 million gallons of gasoline (approximately half full). The victim entered the tank through the access hatch at the top of the tank and proceeded down the access ladder to the floating panel inside the tank. The victim then walked around the tank on top of the floating panel inspecting the rubber seals between the walls of the tank and the floating panel. The victim's father remained on the outside, on top of the tank.

At approximately 12:30 p.m. the victim's father contacted the yard office and requested that a rescue squad be called. He said his son was seven minutes overdue. Company officials and the rescue squad were called immediately. A rescue squad from a neighboring community arrived about 25 minutes later. Additionally, a local fire department and a medical transport helicopter responded. Two hours after the father reported the victim was overdue and after several unsuccessful attempts, the body was located on the opposite side of the tank, approximately 150 feet from the ladder. An additional two hours were required to remove the victim from the tank.

An open-circuit, self-contained breathing apparatus (SCBA) in the demand mode was available. However, when the victim was found, the face mask was on the top of his head, not over his face. A life line was found at the foot of the stairs outside the tank. Neither the victim nor the victim's father were wearing safety shoes or chemical protective clothing. Only one respirator was available (the one used by the victim). No other safety equipment was found at the accident site. A small tape recorder was found with the victim. The tape recorder was used to record the victim's remarks concerning the condition of the seals. The quality of the victim's voice on the tape indicated that the respirator face piece was not in the proper position at the time of the recording; also his voice "trails off" at the end of the recording. A small rock was used to tap on the outside wall of the tank; presumably the victim also carried a rock with which he was to tap on the inner wall of the tank in response. This was the only system of communication between the victim and the outside of the tank.

Recommendations/Discussion:

Recommendation #1: The employer should develop written procedures for working in confined spaces and provide training in these procedures to all employees.

Discussion: The employer should develop procedures for working in confined space, such as those outlined in the NIOSH document Working in Confined Space. These procedures should contain an outline of the following: permit system, testing and monitoring of the atmosphere, training of employees, safety equipment and clothing, safe work practices, rescue procedures, standby person requirements, and use of respiratory protection. Employees should receive extensive training in all of these procedures, once they are adopted. The employees should also be made fully aware of the hazards that may be encountered if these procedures are not followed. If the victim had followed instructions concerning the proper use of respiratory protection, he would not have removed the face mask to speak into the tape recorder. Additionally, if the victim had used a safety belt with a life line to the standby person, the time taken to locate and remove the victim from the tank would have been greatly reduced.

Recommendation #2: Constant communication and visual contact, if possible, should be maintained between the worker inside the confined space and the standby person.

Discussion: The possibility exists that a person might suddenly feel distressed and not be able to summon help. Therefore, it is of the utmost importance that constant communication be maintained between the worker inside the confined space and the standby person. The standby person In this incident failed to notify anyone, until the victim was seven minutes "overdue". Visual monitoring of the worker should be maintained whenever possible. If visual monitoring is not possible, a voice or alarm-activated explosion-proof type of communication system should be used.

Recommendation #3: Companies that contract various activities to outside contractors should assure that these activities are performed in accordance with the contract and that safety is maintained at all times.

Discussion: The petroleum company recognized the hazards associated with this activity and included requirements in the contract to address these hazards. Additionally, the company should have determined that the inspection company was complying with all of these requirements.

Recommendation #4: Personnel using respirators in an environment that is (or could be) immediately dangerous to life or health (IDLH) should use pressure-demand SCBA.

Discussion: The victim was wearing a demand SCBA in an environment that could have been IDLH. The environment was not tested (see Recommendation W.).

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Yes Partly No