The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Tractor-Trailer Repairman Dies while Welding Interior Wall of a Tanker in Indiana

FACE 8750

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. The purpose of the FACE program is to identify and rank factors that influence the risk of fatal injuries for selected employees.

On June 9, 1987, a tractor-trailer repairman (the victim) for a trailer repair company entered an 8500 gallon cargo tank to weld a leak on the interior wall of the tanker. when the victim began welding, an explosion occurred killing the victim.

Contacts/Activities

Officials of the Occupational Safety and Health program for the State of Indiana notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) concerning the fatality and requested technical assistance. This case has been included in the FACE Project. On July 7, 1987, a DSR research team (a safety specialist and a statistician) met with the owner of the company. A comparison employee was interviewed. No photographs were taken because the tanker involved had been reclaimed by the owner, and was not available. A surrogate interview has not been conducted at this time.

Overview of Employer's Safety Program

The employer in this incident is a trailer service company that has nine employees: six trailer repairmen and three secretarial staff members. The company is family operated and has one shop. The company has a written safety program, with the majority of the safety procedures given as part of on-the-job training. Specific safety regulations for confined spaces were in place at the time of the incident that, if followed, would have prevented the accident. As a result of this incident, the company has decided to stop servicing tanker-trailers.

Synopsis of Events

On June 9, 1987, a 34 year-old welder (the victim) and an assistant began preparing a tanker-trailer for repairs. The victim was the shop foreman and had been performing tanker repairs for approximately 15 years (seven years with this company). The tanker was a multi-compartment type with four compartments of different sizes (see Figure 1) with a leak in an interior wall that required welding. A small baffle area is located between the compartments to prevent chemicals from mixing together if a leak in an interior wall occurs.

The tanker compartments were steam cleaned for 1 to 1-1/2 hours to remove trapped chemicals and vapors from the tanker. The chemical in this instance was lacquer-thinner. Drain plugs were opened the entire time steaming was conducted to allow proper drainage of the compartments and baffles. Opening the drain holes is a standard safety procedure for the company when doing tanker repairs. The victim and his assistant left the tanker to do other tasks while the steam cleaning progressed. Because of this, they were not aware that the drain hole in the second baffle area had clogged (See B, Figure 1).

The victim and the assistant returned after allowing sufficient time for the steaming operation to clean the compartments and baffles. They discovered the clogged drain and cleaned it, which allowed the trapped liquid to drain from the baffle. At that time, the victim decided not to re-steam the baffle, despite the strong fumes. Instead, the tanker was moved into the shop area and the victim instructed the assistant to shoot compressed air into the baffle drain hole to dissipate the vapors. This was done for approximately ten minutes.

After air-blowing the baffle, the victim and assistant entered the tanker compartment to do pre-treatment work to the leak (See A, Figure 1) before welding. The assistant remarked about the “strong fumes” in the compartment; however, the victim decided to continue the repair operations. When the pre-treatment was completed, the victim instructed the assistant to leave the compartment, pass in the welding equipment and to stay on top of the tanker to attach the lids to the other compartments. Upon leaving the compartment, the assistant again mentioned the “strong fumes.” The written company safety policy required that an explosion meter was to be used at this point. The explosion meter was available and was in working condition. However, the victim did not follow the safety policy and requested the assistant to pass in the welding equipment. After passing in the equipment, the assistant began replacing the compartment lids as instructed. An explosion, which apparently occurred as the victim began welding the leak, broke the weld of the compartment wall along approximately six feet of the seam line.

The assistant was the first to reach the compartment and saw the victim against the compartment wall opposite the leak (See C, Figure 1). The owner of the company immediately notified the local fire department and emergency medical service. The fire department responded within three to five minutes. An ambulance responded after ten to twelve minutes, by which time the victim had been removed from the tanker by co-workers. The emergency medical team began CPR at the scene and continued CPR while enroute to the hospital. The victim was rushed to a nearby hospital, approximately ten minutes away, where he was pronounced dead by the attending physician. The time between the incident and arrival at the hospital was approximately thirty minutes.

Cause of Death

The autopsy report lists the cause of death as “multiple blunt force injuries”.

Recommendations/Discussion

Recommendation #1: The employer should initiate a comprehensive enforcement and safety review program for confined space entry procedures.

Discussion: All employees who repair tankers should be aware of the importance of stated company safety procedures including confined entry policies. The employer should reinforce employee awareness of the potential hazards associated with confined spaces. The employer- did have a policy that was to prevent the incident if it had been followed; however, this policy should be communicated and enforced. This should include:

1. Posting of confined space procedures;

2. Regularly scheduled safety policy meetings (bi-weekly or monthly) to re-enforce company safety codes;

3. Review process for allowing employees to make recommendations or improving written company safety codes;

4. Employer' monitoring of tasks assigned to employees to assure the implementation of safety policies;

5. Emergency rescue procedures;

6. Availability, storage and maintenance of emergency rescue equipment.

Recommendation #2: The employer should expand confined space policies to address hazards due to oxygen deficient, flammable/explosive, or toxic environments.

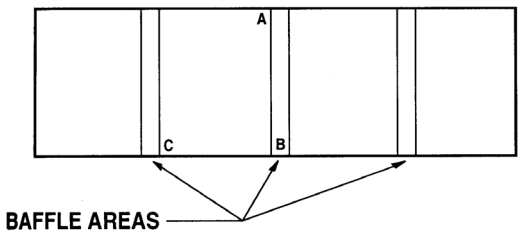
Discussion: This incident emphasizes the need to address all of the potential hazards in confined spaces. Locating the clogged baffle drain before entering the tanker compartment allowed the baffle to be drained of trapped chemicals. However, if the clogged drain had not been located, the concentration of chemical vapors in the tanker compartment may have been sufficient to place both the victim and the assistant in an oxygen deficient or toxic environment. The need to inform employees about the hazards of confined spaces in all respects should be a priority of the employer. Information concerning confined space entry procedures is available from various NIOSH documents including:

1) "Criteria for a Recommended Standard ... Working in Confined Spaces" – DHEW (NIOSH) Publication No. 80-106, and

2) "A Guide to Safety in Confined Spaces" – DHHS (NIOSH) Publication No. 87-113.

These publications are available from:

Publications Dissemination DSDTT, NIOSH 4676 Columbia Parkway Cincinnati, Ohio 49226 Phone: (513) 841-4287



A. Location of leak.

B. Baffle area with clogged drain.

C. Location of victim after explosion.

Figure 1 (87-50). Lateral view of the tanker-trailer in which fatality occurred.

Figure 1. Lateral view of the tanker-trailer in which fatality occurred.

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Last Reviewed: November 18, 2015