FINAL FACE REPORT

CALIFORNIA DEPT. OF HEALTH SERVICES
FACE REPORT: 94CA00401
DATE: JUNE 15, 1995 (REVISED)

TO: Director, National Institute for Occupational Safety and Health

FROM: California Fatality Assessment and Control Evaluation (FACE) Program

SUBJECT: Laborer drowns in flooded pipeline after water main was ruptured by a backhoe in California

SUMMARY

A 28 year old, white, Hispanic male laborer (victim) drowned after the pipe in which he was working flooded when a water main was ruptured by a backhoe, releasing 5000 gallons of water into the pipeline. The victim was working with a welder inside a 27 inch pipeline which was under construction. The welder was welding inside the pipeline and the victim had been grouting the joints. A backhoe was operating a short distance away, and the operator was excavating the area when he struck a water line. The welder was able to escape before the water flooded the pipeline, but the victim was trapped inside the pipeline. The California FACE investigator concluded that in order to prevent future similar occurrences, employers should:

- develop a comprehensive safety program that clearly documents procedures for safe entry into confined spaces.
- provide lifelines and harnesses, and ensure that workers wear them before entering confined spaces where physical hazards such as drowning are present.
- position a trained standby person outside of confined spaces when a worker enters or works inside. The standby person should visually monitor the tasks being performed inside and should be able to communicate with the workers inside the confined space.
- not have a backhoe operating or excavation work being performed near workers in a sub-surface confined space when sub-surface structures and/or soil conditions are unknown.

INTRODUCTION

On June 10, 1992, at 7:15 a.m., a 28 year old, white, Hispanic, male laborer drowned when he was trapped inside a 27 inch pipeline. A backhoe operator was working in the vicinity performing excavation work when he hit a water main causing approximately 5000 gallons of water to be released into the pipeline. The California Occupational Safety and Health Administration (Cal/OSHA) report was obtained along with the Sheriff-Coroner's Autopsy Report and an internal investigation report from the employer. The Cal/OSHA report also contained several reports including that of the paramedics and the local police department.

The construction company employed 300 employees, with 20 employees at the incident site. The employees were union employees. The safety records and the Illness and Injury Prevention Plan (IIPP) were all present and in compliance with Title 8 of the California Code of Regulations (CCRs) section 1509 Injury and Illness Prevention Plan for construction. The employer also conducted regular safety meetings and had adequate safety training and employee participation.

Paramedics and the local police were contacted after the incident occurred. They responded to the scene and worked for one and a half hours to locate and retrieve the victim. When the victim was discovered and pulled from the pipeline, he was taken to the hospital and pronounced dead.

INVESTIGATION

The construction company in this incident had been hired by the city to complete a 27 inch pipeline. The construction of this pipeline demanded that there be an alteration in the original depth and direction in order to avoid existing lines under a freeway. A private company (consultant) was hired by the construction company to locate any underground lines, and blueprints from the local city water district were also utilized to locate existing lines. At the intersection of a freeway and a local street, the employer had potholed and located an existing eight inch water line. This line was not in the same location as it had been depicted on the blueprints. There was an indication by the consultant markings that there was also a second eight inch line that was not shown on the blueprints. The line included in the blueprints showed a straight north-south line. As a result of this, it was determined that the new line should be moved approximately six feet west of its intended location.

A laborer (victim) and a welder, both working for the construction company, entered the south opening of the pipeline and were welding and grouting a joint approximately 40 feet from

the opening. The depth of the line at this point was approximately three feet below grade.

A backhoe operator was excavating south of this point. The bucket on the backhoe struck an eight inch transit water line which was under pressure. The line ruptured and water forced its way into the excavation and the 27 inch line. The foreman yelled to the two co-workers in the pipeline and the welder was able to exit through the opening. The foreman attempted to stop the flow of water into the line by placing a sheet of plywood against the opening.

Paramedics, fire department personnel, and the local police department were all summoned. Attempts were made to remove the water from the excavation using the backhoe, and from the pipe using a small pump. The flow from the ruptured line was turned off by the local city workers.

Numerous excavations north of where the incident occurred were done in hope of finding the victim. Fire department personnel were able to enter the pipeline after the water had been pumped out and locate the victim. Fire department personnel found the victim 150 feet from the opening and face down in six inches of water. The victim was removed and noted by paramedics to be in cardiac arrest.

CAUSE OF DEATH

The Sheriff-Coroner's Autopsy Report stated the cause of death to be asphyxiation due to fresh water drowning.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should develop a comprehensive safety program that clearly documents procedures for safe entry into confined spaces.

Discussion: All employees who work in or around confined spaces should be aware of potential hazards, possible emergencies, and specific procedures to be followed prior to entering a confined space. These procedures should include, but not be limited to:

1) Air quality testing to determine adequate 0_2 level.

2) Ventilation of the space to remove air contaminants.

3) Monitoring of the space to determine a safe oxygen level is maintained.

4) Employee training in confined space entry, testing, and use of personal protective equipment (respirators, clothing, etc.).

5) Standby person outside the space for communication and visual monitoring.

6) Emergency rescue procedures.

Recommendation #2: Employers should provide lifelines and harnesses, and ensure that workers wear them before entering confined spaces where physical hazards such as drowning are present.

Discussion: In this situation, the flow of water prevented the victim from exiting the confined space. Before the water could be turned off, the victim was swept away. Had the victim been wearing a safety line or harness, co-workers may have been able to hoist him from the pipeline and this incident may have been prevented.

Recommendation #3: Employers should position a trained standby person outside of a confined space when a workers enters or works inside. The standby person should visually monitor the tasks being performed inside and should be able to communicate with the worker(s) inside the confined space.

Discussion: Had a person trained in emergency rescue procedures, assigned to remain outside of the confined space for communication and visual monitoring of the person(s) inside the pipeline, this fatality may have been prevented.

Recommendation #4: Employers should not have a backhoe operating or excavation work being performed near workers operating in a sub-surface confined space when sub-surface structures and/or soil conditions are unknown.

Discussion: The victim in this incident was working in a sub-surface confined space in an area where the location of some underground pipes was not accurately known. This lack of knowledge led to the rupture of a water supply with subsequent flooding of the confined space. A company standard operating procedure could address this situation by preventing sub-surface confined space work until excavations had been completed or the surrounding sub-surface structures and soil had been determined.

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FATALITY ASSESSMENT AND CONTROL EVALUATION PROGRAM

The California Department of Health Services, in cooperation with the California Public Health Foundation, and the National Institute for Occupational Safety and Health (NIOSH), conducts investigations on work-related fatalities. The goal of this program, known as the California Fatality Assessment and Control Evaluation (CA/FACE), is to prevent fatal work injuries in the future. CA/FACE aims to achieve this goal by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

NIOSH funded state-based FACE programs include: Alaska, California, Colorado, Georgia, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Missouri, Nebraska, New Jersey, Wisconsin, and Wyoming.

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Additional information regarding the CA/FACE program is available from:

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