

Industrial Painter Dies After a 24 Foot Fall From an Elevated Pipeline

DATE: May 11, 1992

SUMMARY

A 24-year-old male industrial painter died on July 23, 1991, one day after he received injuries in a 24 foot fall from an elevated pipeline. The victim and his co-worker were painting elevated pipelines at a tank farm when he apparently lost his balance and fell to the asphalt below. NJDOH FACE personnel concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- *A job hazard analysis of each job site should be performed by the employer with the participation of employees;*
- *Employers must train employees in safe work practices and use of safety equipment and should require consistent use of the equipment;*
- *Engineering modifications should be made to the pipeline structure by the owner of the tank farm to facilitate the use of fall protection devices;*
- *The fall protection and process systems should be separate and distinct.*

INTRODUCTION

An OSHA area safety supervisor informed NJDOH FACE personnel of this work-related fall on July 25, 1991 and a joint investigation was conducted by FACE personnel and an OSHA compliance officer on that day. At that time, we photographed the scene and spoke with the employer and the site owner's representatives. Further information was derived from the medical examiners and police reports. Because the victim's co-worker spoke almost no English, he was interviewed at a later date by a NJDOH employee who relayed translated questions to him by telephone.

In response to a request for technical assistance, two NIOSH FACE engineers visited the incident site with NJDOH FACE personnel on August 15, 1992.

The site of the fatality was a petroleum product tank farm comprised of many miles of elevated pipelines. The pipelines were arranged in two parallel tiers and supported by perpendicular steel girders. The top tier is 23 feet 6 inches above the ground. Some pipes are painted and some are insulated, depending upon the substances that flow through them. Pipes range in size from 3 to 6 inches in diameter, with the space between the pipes ranging from 4 to 10 inches.

The employer, a painting contractor, had a written contract with the tank farm to clean and paint the elevated pipelines, a project which was to take five years. The contract also contained an agreement that the contractor would adhere to all OSHA safety requirements. The painting company had been in

business for more than twenty years but was owned by the present owners for four years. The victim and his co-worker, both union members, had worked for the painting contractor for approximately two years and had been on this job for three months. Although the painting contractor considered the two workers to be sub-contractors (as per an oral agreement), OSHA determined that the contractor was their employer because he supplied their equipment, gave them instructions, and controlled their work. The owners of the incident site also considered the workers to be employees of the painting contractor.

INVESTIGATION

On July 22, 1991, a very hot and humid day, the two painters and one visitor were on the job since early morning. After lunch, which consisted of a soda by the victim (his usual lunch), the two painters worked on the top tier of elevated pipes 24 feet above the ground. The visitor remained on the ground. Both workers knelt in a bent-over position on an unpainted, insulated pipe, painting the pipe at the edge of the tier. According to his co-worker, the victim mentioned the poor quality of the sand blasting on the area and that he was going to use a wire brush and sand paper to clean the pipe before painting it. As he was working, the co-worker heard a gasp and, when he glanced up, saw the victim fall. He turned and saw him in the air with his arms flailing. The victim tried to stop his fall but there was nothing to grab onto.

The workers summoned help from employees working in the area. Emergency medical services were called and arrived nine minutes later. An ambulance removed the injured worker 14 minutes later; he was driven to a nearby location from which he was airlifted by helicopter to the regional trauma center. He died at the trauma center later the next day.

The co-worker speculated that the deceased, while still on his knees, may have straightened up in order to reach the sandpaper in his pocket and may have lost his balance. No safety belts were worn by the painters. According to the co-worker, their employer had told them that morning to put them on but they did not do so because of the very hot weather. It is unknown if they used safety belts at any other time.

CAUSE OF DEATH

According to the medical examiner, death was caused by multiple rib fractures and extensive cranio-cerebral injuries. Death occurred 27 hours after the injury.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: A job hazard analysis of each job site should be performed by the employer with the participation of the employees.

Discussion: Unless a fresh appraisal of a situation is made, there is a tendency to continue to perform a job in the same manner. It is necessary to specifically look for any potential hazards which may exist and plan work with them in mind. Doing this with employee participation fosters greater appreciation of the need for safe work practices.

Recommendation #2: Employers must train employees in safe work practices and use of safety equipment and should require consistent use of the equipment.

Discussion: In this situation, the workers were given safety belts by their employer about one year prior to the incident and were told by him to wear them on the day of the fall. They did not do so because of the oppressive heat. The painters received a one-day course on safety but it is not known who gave it or where it was given. It is recommended that employers provide regular training in the proper and consistent use of safety equipment.

Recommendation #3: Engineering modifications should be made to the pipeline structure by the owner of the tank farm to facilitate the use of fall protection devices.

Discussion: In order to prevent incidents of a similar nature, several options for providing effective fall protection are provided. Being general in nature, these recommendations are meant to apply to other similar situations as well. As with any unusual engineering control, the strategy chosen should be discussed with the local OSHA compliance officer to insure that it meets the requirements of the applicable OSHA standards. A company engineer or other qualified person should determine that the structure and lifeline system complies with the load requirements set forth in 29 CFR 1926.104 for safety belts, lifelines, and lanyards.

The following options can be implemented to connect fall protection devices to the present pipe installation:

Option #1: Vertical steel members should be installed at the center of the pipe rack. The steel members should be spaced so that a steel cable could be run between them to serve as an employee tie-off line.

Discussion: Figure 1 is a diagram of the pipeline as it existed at the time of the incident. It demonstrates two views: lateral and overhead. Figure 2 shows the vertical steel members bolted to supporting steel in the center of the rack. A steel cable would then be pulled tight between the steel members to serve as a static line for the worker to hook onto. This would allow the workers greater mobility before having to change their tie-off point.

Option #2: Install eyebolts in the supporting steel at the center of the pipe rack. These should be spaced appropriately so that an employee can use them as tie-off points.

Discussion: Figure 3 illustrates the use of eyebolts at locations similar to those of the vertical steel members (option #1). The eyebolts can be installed in holes drilled in the flange part of the supporting I beams. Lifelines could then be attached to these eyebolts which would provide a circular area of coverage. The spacing between the eyebolts must allow proper area overlap and provide fall protection in all directions.

Option #3: Drill holes in the supporting steel at the center of the pipe rack. Lifelines can then be attached to the steel without the addition of an eyebolt.

Discussion: Figure 4 shows an arrangement similar to that of Figure 3, except that the eyebolts are omitted.

Option #4: If the pipe rack is not going to be horizontally expanded, then the feasibility of a perimeter guarding system should be considered.

Discussion: If piping completely covers the rack horizontally, and there is no intention of adding piping to the racks, a perimeter guarding system should be considered. This would provide a system of either permanent or temporary guard rails along the edge of the pipe racks.

Recommendation #4: The fall protection and process systems should be separate and distinct.

Discussion: Any fall protection system for employee safety should not be directly connected to the process system, i.e., the employee tie-off points should not be to a pipe carrying a process fluid, a conduit for electrical wires, or any other component of the process system. Connection to the supporting structure of the pipeline is not considered a direct connection to the system itself.

FATAL ACCIDENT CIRCUMSTANCES AND EPIDEMIOLOGY (FACE) PROJECT

Staff members of the FACE project of the New Jersey Department of Health, Occupational Health Service, perform FACE investigations when there is a work-related fatal fall or electrocution reported. The goal of these investigations is to prevent fatal work injuries in the future by studying: the working 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.

To contact [New Jersey State FACE program personnel](#) regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact [In-house FACE program personnel](#) regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.