

Iron Worker Dies From Fall From Structural Steel

DATE: December 7, 1993

SUMMARY

On August 5, 1993, a 47 year-old male iron worker fell 80 feet from a steel cross brace on an outdoor conveyor system to wooden timbers on the ground below. The victim fell as he walked across a section of 8 inch wide structural steel. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- **Workers should be trained and supervised in safe work practices;**
- **Fall protection should be utilized at all times.**
- **Employers should conduct a Job Hazard Evaluation when planning a project and review the plan with employees on a daily basis;**
- **Employers and employees should be aware of the dangers of abuse of alcohol and other substances that may impair judgment or alertness. Employers should strictly enforce a prohibition against the use of any substance that may affect a worker's physical or mental ability.**

INTRODUCTION

On August 18, 1993, NJDOH FACE personnel learned about this work-related fatality from a newspaper article. On August 23, we contacted the victim's employer, explained the FACE project, and requested permission to conduct a site visit. The employer then contacted the owner of the incident site. NJ FACE staff conducted the site visit on September 28, 1993, after receiving permission of the employer and site owner. Information for this report was derived from the OSHA file, medical examiner's report, police report, and interviews of the victim's employer and co-workers.

The victim's employer was a heavy construction contractor that has been in business for almost forty years and operated in New Jersey for six years. The number of employees varies, depending upon the work being done. At the time of this incident, there were eighteen employees in New Jersey, including twelve at the site: ten iron workers, a site superintendent, and a part-time safety officer. All of the iron workers were journeymen (completed a three-year union apprenticeship) and were hired through the union hall.

The company had a written safety program. The workers were issued pocket size safety manuals. Safety meetings were held weekly. Tool box meetings were held daily and issues for discussion were raised by either the safety officer, superintendent or workers. After this incident, a safety officer was assigned full time to the site.

The victim was a 47 year-old journeyman iron worker with 26 years experience who had been on this job for one month. He had not previously worked for this contractor but had worked with several of the iron workers on other projects.

INVESTIGATION

The site of this fatality was a construction site at a power generating plant. The company had been working at the site for almost two months. An 80-foot high elevated conveyor system used to transport coal was undergoing repairs because the two-legged triangular supports under the conveyor trusses (supporting framework) had sunk into the ground and bowed (see photo #1). The victim's employer contracted to raise the conveyor system by one foot and reinforce it with steel. This was done using a hydraulic jacking tower. The four legs of the jacking tower rested on steel beams that rested on four layers of timbers, creating a wooden mat on the ground. The work was to be done in stages. The first stage, which was on-going at the time of the fatality, included reinforcing the lifting areas; the next stage was to include reinforcing the steel in the main truss (support) line of the conveyor. During this first phase, most of the work was done while working on 24-inch wide, two-point suspension scaffolds known as "pics." While working on the pics, the iron workers wore safety harnesses with lanyards tied off to the structural steel.

On the day prior to the fall, safety personnel employed by the site owner conducted a safety audit of the area. The construction company was advised to add toe boards and railings to the pics. On the day of the fatal incident, the morning tool box meeting focused on the previous day's safety inspection. One of their plans for the day was installing toe boards on the pics and straightening up the area.

The crew started work at 7 a.m., worked through the morning, broke for lunch at noon and returned at 12:30 p.m.. It was a clear, sunny day with a slight wind at the height of the workers. Around 1 p.m., the victim, who was installing bolts while working on his suspended scaffold, ran out of washers. He disconnected his lanyard and harness and left his work station to obtain washers from his co-workers who were working on the next supportway, 80 feet away. To reach his co-workers, he walked on cross braces, up a ladder, and across a protected catwalk to reach the supportway where his co-workers were working on their pics, a procedure that took several minutes. This was the designated path that workers were to use to move from one area to another. His co-workers were unable to provide him with washers and he told them that he would then do some other job. To return to his work area, instead of re-tracing his path, he walked across horizontal cross beams that were located 10 feet under the designated safe catwalk, apparently as a short cut to save time. The victim crossed more than half of the 35 to 40 feet to return to his work station when co-workers observed him slip, possibly on a film of coal dust and lose his balance. He grabbed hold of a section of iron but was unable to maintain his grip and fell into the jacking tower. According to witnesses, he hit cross braces of the tower as he fell 80 feet to the wooden timbers below.

Workers immediately called in the emergency to the site owner's facility; their first aid team responded immediately. Rescuers and paramedics were unsuccessful in their attempts to treat the victim. He was pronounced dead at the scene.

At the time that the NJ FACE site visit was conducted, several changes had been made at the site by the contractor. Among them were the installation of wood planking to cover the structural steel of the conveyor trusses. Although wood planking reportedly would have been installed for the next phase of

the work, a larger amount of planking than planned apparently was requested by the site owner and completed by the contractor. Also, an engineering drawing of the conveyor area, kept on the wall in the construction trailer, was highlighted to indicate proper walkways and catwalks for workers to use. All workers were required to sign it to indicate they were aware of permitted areas.

CAUSE OF DEATH

The medical examiner determined that death was caused by multiple injuries sustained in a fall at work. According to the toxicology report, the victim had a significant level of alcohol in his blood.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Workers should be trained and supervised in safe work practices.

Discussion: Although the iron workers were all experienced journeymen, safety training must be a continuing process. Training should include explicit instructions on safe areas and unsafe areas in which to walk. Although the need for such instruction may seem obvious to some, and unnecessary to others, it is essential in creating a safe work environment. Although there was a designated safe access area on the structure, the workers were not specifically told that they should never walk in other areas. The employer has stated that he plans to issue specific instructions of "don't walk the iron" on future jobs. Fall and slip hazards should also be addressed in on-going tool box meetings.

Recommendation #2: Fall protection should be utilized at all times.

Discussion: Although fall protection in the form of safety harnesses, lanyards, and lifelines were utilized when the workers were on their scaffolds, there was no protection if a worker was away from the area in which he could tie off. Since iron workers have often regarded walking on structural steel as being without danger and fall protection as encumbering and even hazardous, some form of passive protection should be utilized. OSHA's standard 29 CFR 1926.105(a) requires the use of nets when working at a height of over 25 feet. Wooden planks installed after the fatality served as a substitute for nets.

Areas considered unsafe for walking should be clearly marked so there is no question about attempting to use such areas. In addition, a method such as the one initiated after the fatality, in which an engineering drawing was used to diagram the appropriate walkways, can be an effective safety reminder.

The employer's opinion was that, in a situation such as this, the process of installing nets would be hazardous for the workers to perform since the standard, 29 CFR 1926.105(c)(1), also requires that nets extend eight feet beyond the edge of the work surface. He also expressed the opinion that no nets were needed over the area where the victim fell because this was not a work area and the worker had failed to use the designated safe pathway. NJ FACE staff are of the opinion that nets, or an appropriate substitute, are necessary in working areas. They are not necessary in non-working areas only if those areas are clearly marked as restricted and those restrictions are enforced.

Recommendation #3: Employers should conduct a job hazard analysis when planning a project and review the plan with employees on a daily basis.

Discussion: The planning phase of the project is the optimal time to determine potential safety hazards and to plan methods of dealing with them. Worker education can also be planned during this phase, based upon the findings of the safety hazard evaluation. Appropriate parts of the evaluation can be used daily to assess the site for new or continued safety hazards and instruct workers in safe work practices.

A potential hazard on this job was a combination of "walking the steel," as iron workers are accustomed to do, and a fine coal dust on the structure. These could have been identified by the job hazard analysis and discussed in safety meetings.

Recommendation #4: Employers and employees should be aware of the dangers of substances that may impair judgment or alertness. Employers should strictly enforce a prohibition against use of any substance that may affect a worker's physical or mental ability.

Discussion: The NJ FACE investigation did not determine if the victim's blood alcohol level may have contributed to this incident. However, it is recommended that both employers and employees be aware of the dangers that alcohol and other drugs (including prescription, non-prescription, legal, and illegal) may present while working at heights or in potentially hazardous conditions. Training in safe work practices should include strong warnings about the use of any substances that may impair a worker's judgment, alertness, or coordination. Employers should strictly enforce a prohibition against use of any alcohol or drugs when working.

REFERENCES

29 CFR 1926.105 Code of Federal Regulations, Washington, D.C., U.S. Government Printing Office, Office of the Federal Register.

Job Hazard Analysis, U.S. Department of Labor, Occupational Safety and Health Administration, 1988.

ATTACHMENTS

Job Hazard Analysis, U.S. Department of Labor, Occupational Safety and Health Administration, 1988.

FATALITY ASSESSMENT AND CONTROL EVALUATION (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, electrocution, or confined

space death 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.