

FACE 92-04

Steel Connector Dies After Falling 19 Feet From a Bridge Under Construction to the Highway Below in Indiana

SUMMARY

A 28-year-old male steel connector (victim) died of injuries sustained from a 19-foot fall from a bridge under construction. The victim was a member of a crew setting steel beams onto two concrete bridge pillars of a highway overpass. After the steel beams were positioned on the pillars by a crane, the victim and a second steel connector bolted the beams to flange plates incorporated into the design of the bridge pillars. Each connector was working from a platform placed between two beams, on top of the beams' lower flanges. The crew was setting the third beam across the pillars when the incident occurred. As the beam was being lowered, the victim attempted to push it into place. The platform on which the victim was standing gave way, causing the victim to fall to the highway below. The victim was transported to the hospital where he died the next day. NIOSH investigators concluded that, in order to prevent similar occurrences, employers should:

- require the use of safety belts, lifelines, and lanyards when working from elevations
- always secure temporary flooring from displacement during steel erection
- develop, implement, and enforce a comprehensive safety program
- consider and address worker safety in the planning phase of construction projects
- routinely conduct scheduled and unscheduled worksite safety inspections.

INTRODUCTION

On September 11, 1991, a 28-year-old male steel connector died after having fallen, the previous day, from a bridge under construction. On November 14, 1991, officials of the Indiana Occupational Safety and Health Administration (INOSHA) notified the Division of Safety Research (DSR) of the incident, and requested technical assistance. On December 19, 1991, a DSR safety specialist traveled to the incident site to conduct an investigation. The incident was reviewed with the INOSHA compliance officer, county coroner, medical examiner, and the police. Photographs of the site were obtained during the investigation.

The employer was a steel erection contractor that had been in operation for 3 years. The contractor employed 85 workers and hired additional personnel as necessary from the local union hall. The employer had no safety program or designated safety officer. The victim had worked for the employer for two years.

INVESTIGATION

The employer had been contracted to set steel beams and lay the metal decking for a bridge overpass that would span an existing state highway. The beams were to be set across two concrete pillars, one on each side of the highway. Because of the degree of bank of the overpass, the pillars were stepped so that each beam would be set 6 inches higher than the previous beam.

A 5-man crew consisting of a foreman, a crane operator, a laborer, and two connectors (one of whom was the victim), and an employee of the state department of highways were at the scene.

At the time of the incident, the crew was setting the third beam across the pillars. Each connector was standing on a plywood platform measuring 6-feet 3-inches long by 1-foot wide. Two-inch by 4-inch boards were nailed underneath the entire length of each side of the platforms to serve as braces. The platforms were positioned between two beams, on top of the beams' lower flanges.

The two connectors and the laborer (guiding the beams with a tagline) were working near one pillar, while the supervisor and the state employee were standing in the vicinity of the other pillar. The crane operator was receiving hand signals from the supervisor (Figure).

As the beam was lowered into position, the victim attempted to push it toward the flange plate on the pillar. As he pushed against the beam, the platform on which he was standing kicked out from under him. The victim fell 19 feet to the highway below, striking his head and shoulders on the concrete berm, and his lower back on the 8-inch-high curb at the edge of the highway. Co-workers ran to the victim and found that he was not breathing. Emergency medical service (EMS) personnel passing the scene stopped, initiated cardiopulmonary resuscitation (CPR), and restored the victim's breathing. The victim was transported to the hospital where he died 13 hours after the incident.

Investigation revealed that bolts protruding upward from a flange plate (connecting two sections of beam) on the beam's lower flange limited the platform's bearing surface (overlap) to 2 inches. As the victim pushed against the beam, the platform slid away from him and off the flange, causing the fall.

CAUSE OF DEATH

The medical examiner listed the cause death as closed head trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Employers should require the use of safety belts, lifelines, and lanyards when working from elevations.

Discussion: When working from elevations, employers should provide personal protective equipment (PPE) (i.e., safety belt, lifeline, and lanyard) to employees exposed to fall hazards. Employers should provide and enforce the use of PPE in accordance with 29 CFR 1926.104.

Recommendation #2: Employers should always secure temporary flooring from displacement during steel erection.

Discussion: During bolting, riveting, fitting up, or plumbing up operations, 29 CFR 1926.752 (i) requires that provisions be made to secure temporary flooring from displacement. In this instance, this requirement was not satisfied.

Recommendation #3: Employers should develop, implement, and enforce a comprehensive safety program.

Discussion: Employers should emphasize safety to their employees by developing, implementing, and enforcing a comprehensive safety program. The safety program should include, but not be limited to, training workers in the proper selection and use of PPE, along with the recognition and avoidance of fall hazards.

Recommendation #4: Employers should consider and address worker safety in the planning stages of construction projects.

Discussion: Providing workers with the safest work environment, and with procedures that will allow them to perform tasks in the safest manner, should be a concern addressed during the planning stages of a construction project. Project engineers, design engineers, architects, and safety professionals should evaluate the tasks to be performed by workers, and the types of machinery to be used during the completion of the project. Safe work procedures should be developed for the different tasks to be performed. These procedures should include, but not be limited to, recognition of fall hazards, the use of personal protective or fall arresting equipment, access to the work area, type of work platform to be used, temporary flooring, and methods to secure temporary flooring. In this instance,

the temporary flooring was not secured. Elevated work platforms could have been positioned on the concrete berm on the sides of the highway for access to the work areas, or safety nets could have been suspended under the connectors to lessen the exposure to the fall hazard.

Recommendation #5: Employers should routinely conduct scheduled and unscheduled worksite safety inspections.

Discussion: Scheduled and unscheduled safety inspections should be conducted by a qualified safety professional. No matter how comprehensive, a safety program cannot be effective unless implemented in the workplace. Even though these inspections do not guarantee the elimination of occupational injury, they do demonstrate the employer's commitment to the enforcement of the safety program.

REFERENCES

1. 29 CFR 1926.104. Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register
2. 29 CFR 1926.752 (i). Code of Federal Regulations, Washington, D.C.: U.S. Government Printing Office, Office of the Federal Register

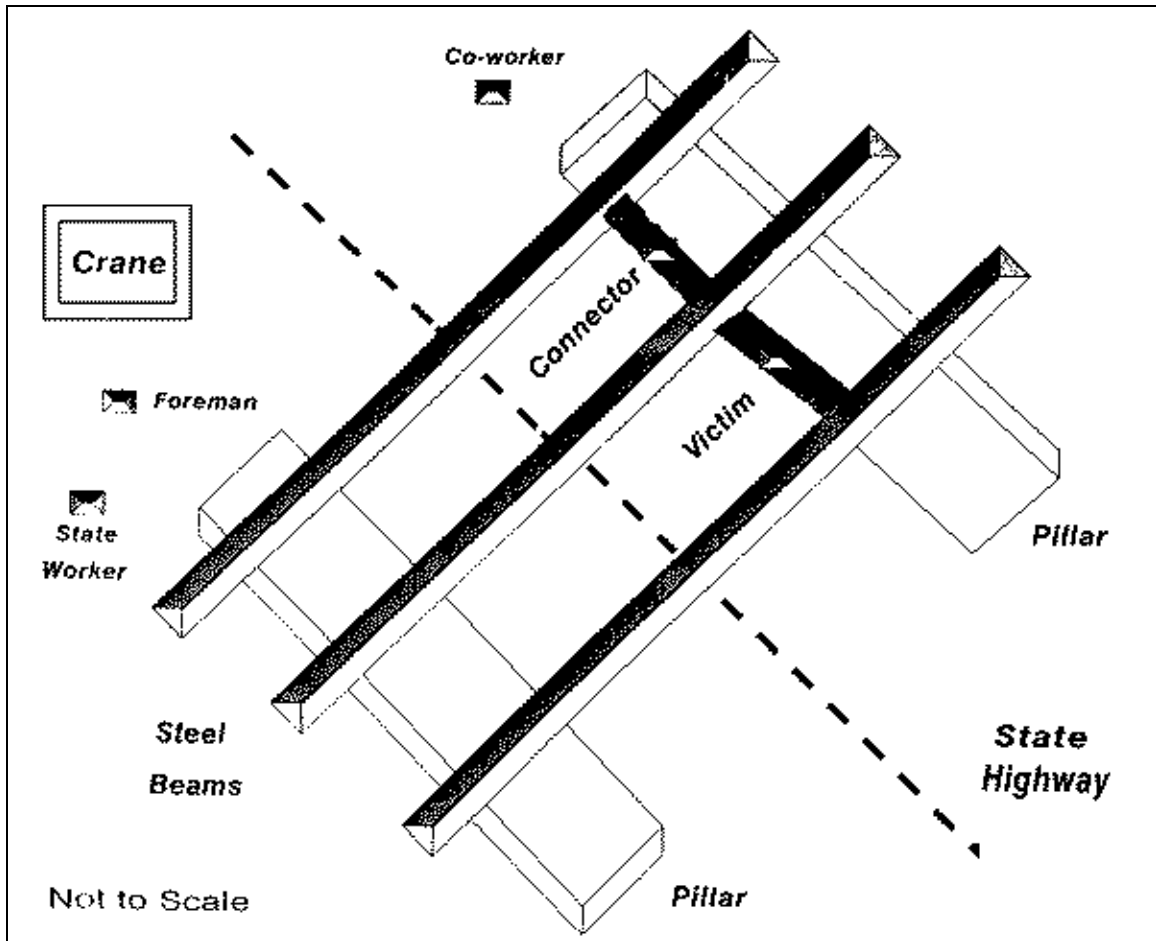


Figure.