

Nebraska FACE Investigation 96NE043

**SUBJECT:**

Crane Tips Over on Barge

**SUMMARY:**

A 39-year-old crane operator was killed when the crawler crane he was operating on a barge tipped over. The crane impacted a piece of equipment on the barge and he was crushed in the crane's cab. At the time of the incident the victim was lifting a diesel piledriver weighing approximately 15,500 pounds and he apparently overboomed for that weight and the crane tipped over. The crane was not positively secured to the barge at the time of the incident.

The Nebraska Department of Labor investigator concluded that to prevent future similar occurrences:

- \* Employers and employees must ensure that correct crane load charts are used and that they are never exceeded.
- \* Employers must ensure that cranes are positively secured to barges prior to use.
- \* Employers should consider implementing a spot inspection program to ensure all employees are complying with safety requirements and enforce consequences for noncompliance.

**PROGRAM OBJECTIVE:**

The goal of the Fatality Assessment and Control Evaluation (FACE) workplace investigation is to prevent work-related deaths or injuries in the future by a study of the working environment, the worker, the task the worker was performing, the tools the worker was using, and the role of management in controlling how these factors interact.

This report is generated and distributed **solely** for the purpose of providing current, relevant education to employers, their employees and the community on methods to prevent occupational fatalities and injuries.

## **INTRODUCTION:**

On November 4, 1996, at approximately 2:00 p.m., a 39-year-old crane operator was killed when the crawler crane he was operating on a barge tipped over. The Nebraska Department of Labor was notified of this fatality by OSHA on November 6, 1996. The Nebraska FACE investigator met a regional OSHA investigator at the incident site on November 6, 1996. The site investigation was conducted on November 6-7, 1996. Interviews were conducted with the company regional safety director, project superintendent and employees.

The employer is a construction company that primarily does bridge construction and has been in business for more than 50 years. The company employs 20 people at this job site and approximately 700 worldwide. This was not the first fatality in the history of the company. The company has a full-time safety director. The company has a written safety program and conducts regular safety training for all employees.

## **INVESTIGATION:**

The victim, who had been employed with this company for two months, had been working approximately seven hours when the 2:00 p.m. incident occurred. The company was in the process of building a bridge across a river and at the time of the incident they were constructing a cofferdam. The victim (crane operator), lifted a B300 Berminghammer piledriver with a set of 70' leads (combined total weight approximately 15,500 lbs) from the aft port side of the barge, (figure 1). He then rotated the load clockwise (figure 2). He continued rotating and lowering the boom to set the piledriver in the cofferdam (figure 3). When he had rotated past the starboard bow of the barge the crane began tipping, raising the left track off the barge (figure 4). The crane continued tipping and turned on its side impacting an MKT Pile Installation Machine which was located on the starboard side of the barge (figure 5). The operator was crushed in the cab of the crane. Two other individuals, who were on the barge at the time of the incident, escaped serious injury. One of the individuals on the barge ran over to the victim immediately

after the incident and detected no pulse. EMTs responded to the scene in approximately 30 minutes and confirmed the victim was dead. The victim was not extricated from the cab of the crane for more than 24 hours. This was because of the onset of darkness and the difficulty and danger involved in righting the tipped crane.

The American 5299 crane involved in this incident was equipped with a 90-foot boom (no jib was attached), and a 33,500 pound counterweight. A witness said it appeared the boom was at 45 degrees or a little more during the time the crane was turning with the piledriver. Assuming a conservative angle of 52 degrees, the maximum load (with side frames extended, which was the case), according to the load chart in the crane at the time of the incident, is 10,550 lbs. The load being lifted was approximately one and one-half times the maximum allowed. We do not know the exact angle of the boom at the time of the incident but by witnesses' accounts we can safely assume the crane was boomed down too far for the weight it was lifting. This allowed the crane to tip past the point of no return and impact the pile installation machine on the barge. The boom angle indicator, located on the butt of the boom, was inspected after the incident and it appeared to be working properly. One witness said it appeared the crane operator cut the load loose when the boom and crane started tipping, however the crane had already tipped past the point of no return. The piledriver sank into the river. The crawler crane was not positively secured to the barge at the time of the incident.

Figure 6 shows the dimensions of the barge and the location of the crane and equipment on the barge at the time of the incident.

#### **CAUSE OF DEATH:**

The cause of death as stated on the death certificate was crushing chest injuries.

#### **RECOMMENDATIONS/DISCUSSION:**

Recommendation #1: **Employers and employees must ensure that the correct crane load charts are used and that they are never exceeded.**

Discussion: Cranes are rated on their ability to lift and balance loads. These ratings must be

followed to avoid tipping. Even though a load chart for the crane was posted in the cab at the time of the incident it appears it was exceeded. It should be noted that the load chart in the crane was for land-based use. According to CFR 1926.550(f)(1)(iii) and the crane manufacturer, another load chart should have been in the crane which accounted for the list of the barge. All crane operators should receive adequate training which addresses load charts and other operating procedures. The victim had no training certification on the incident crane and it appears he had limited experience in crane operation.

**Recommendation #2: Employers must ensure that cranes are positively secured to barges prior to use.**

Discussion: The crawler crane in this incident was not secured to the barge. CFR 1926.550(f)(1)(iv) states "Mobile cranes on barges shall be positively secured." Had this crane been positively secured it could have prevented this fatality. If the crane was positively secured and the crane tipped over, tipping the barge with it, the machine which the crane impacted would probably have fallen off the barge into the water. Even with the crane tipping, the operator might have been able to get out of the cab and get to safety.

**Recommendation #3: Employers should consider implementing a spot inspection program to ensure all employees are complying with safety requirements and enforce consequences for noncompliance.**

Discussion: To ensure safety program compliance, spot inspections by supervisors and management should be conducted regularly to verify proper procedures, such as never exceeding load charts, are always followed. These spot inspections should be documented and deterrent consequences enforced when violations to procedures are detected. An effective Injury Prevention Program should instill an attitude in everyone that safety will never be compromised.

## **REFERENCES:**

Office of the Federal Register, National Archives and Records Administration, Code of Federal Regulations, Labor, 29 CFR 1926.550(f)(1) 1995.

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