Tugboat Deckhand Drowns After Falling Off Barge into River

DATE: December 1, 1993
Amended May 23, 1994

SUMMARY

On the evening of January 27, 1993, a 29-year-old tugboat deckhand fell from a barge into a large river that divided two states. He was on one of two barges being moved by a tugboat to a pier when he apparently fell into the water and drowned. His body was recovered on April 4, 1993, several months after the incident. NJDOH FACE investigators concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- **Employers and employees must ensure that personal protective gear such as life vests are worn at all times when working near water. Strict enforcement of company policies with regard to this equipment must be maintained by company supervisors.**
- **Employers and employees should conduct a job hazard analysis to identify potential safety hazards. Employers should then implement appropriate control measures and employee training to correct the identified hazards.**
- **Employers should explore engineering or equipment changes to prevent workers from falling overboard.**
- **Employers should routinely conduct scheduled and unscheduled worksite safety inspections**

INTRODUCTION

On July 30, 1993, NJDOH FACE personnel learned about this work-related fall from an OSHA compliance officer. A site-visit to interview management representatives and photograph the scene was conducted concurrently with the OSHA inspection on August 3, 1993. Additional information for this report was derived from the OSHA file, Coast Guard and police reports, and the medical examiner's report.

The employer was a moderate sized marine contractor and equipment rental agent who specialized in dredging, tug boat, and barge operations. The company owns two marine terminals and employs approximately 350 workers, 20 of whom work at the incident site. The company also owns about 200 barges, dredges, and other vessels, including twelve 700+ horsepower tugboats. The company's unionized employees operate in both United States and international (primarily South American) waters.

The victim was a 29 year-old male tugboat deckhand who had worked for the company for two years. He had five to six years of experience with another company and was hired by the marine terminal when

he was laid off (due to lack of work) from the other company. The victim had no prior history of falling overboard and was working towards a promotion to tugboat engineer.

INVESTIGATION

The incident occurred at the company's shipyard located on a large river that divides two states. The river is a center for commercial shipping in the area and home to a variety of shipyards and industrial sites. Docked at the company piers were a number of barges and dredges. The barges were mostly "sand scows", flat barges that are semi-enclosed with four to six foot high steel walls (or combing) running along the sides of the barge, and simple flat deck barges. Most of the barges and dredges are unpowered and must be towed and shifted with tugboats. Each tugboat carries a crew of five men: the captain, one mate, one engineer, and two deckhands. This crew is divided into two watches of a captain, a deckhand, and the engineer (who works staggered hours). Each crew works six hours on and six hours off, and all personnel live on the tug for the duration of their tour, usually two weeks for deckhands and four weeks for captains. As part of coast guard regulations, tugboat crews are subject to random drug and alcohol testing.

The night of the incident was clear, cold (30° F), and windy (20-25 knots). The river waters were calm, with currents of one knot. At about 9:30 p.m., the victim's tugboat returned to the company shipyard after a sea voyage of towing vessels. (Management officials described this type of duty as relatively light and restful work). After arriving, the tugboat watch crew was assigned to shifting (moving) barges docked at the company piers. As their tugboat was too large for the shallow water, the captain and the victim switched to a smaller tugboat with a shallower draft that could navigate around the docks.

At about 11 p.m. the crew started to shift the barges, using the tugboat's floodlights to illuminate the dimly lit area. Most of the barges were tied together side-by-side at the pier, creating stacks of barges up to five deep (see figure). One of the crew's tasks was to move a barge located in a stack of four barges. The crew first separated and moved the two barges at the end of the stack, freeing the third barge. They then moved the third barge away, leaving a fourth barge tied to the pier. The crew then returned to the first two barges (which were still tied together), planning to move them back against the fourth barge at the pier.

The bow of the tugboat was tied to a cleat (attachment point) located midway along the side of the first barge, a 30 by 90 foot sand scow that was partly loaded with construction debris. The sand scow was tied to the second barge, a larger empty deck barge. The captain was on the bridge of the tugboat and had a clear view of the barges except for a blind area created by the sand scow's combing. The victim was on the bow (facing west) of the sand scow, presumably using the barge's combing to shelter himself from the cold winds (see Figure 1). As the tugboat slowly moved the barges towards the pier, the captain noticed that the line tying the tug to the barges was coming loose and called for the victim to secure it. The victim (who was not wearing a life vest) moved along the side of the barge, re-secured the line, and was last seen moving back to the blind area at the scow's bow. About two minutes later the captain called for him to prepare to tie off the barges but the victim did not answer. He called again on a "loud hailer" (a two-way public address system) but got no response. The captain left the tugboat but could not find the victim after searching the barges. He then searched his tugboat before requesting assistance from another tugboat in the area.

At 11:25 p.m., the captain radioed the Marine Police and Coast Guard and reported that the victim was feared overboard. A thorough search of the area was conducted by the Coast Guard and local agencies, including an air search by helicopter. Despite this, the victim was not found and the search was later suspended. On April 6, 1993, the victim's body was recovered in the waters of the neighboring state.

CAUSE OF DEATH

The medical examiner determined that death was caused by drowning.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: Employers and employees must ensure that personal protective gear such as life vests are worn at all times when working near water. Strict enforcement of company policies with regard to this equipment must be maintained by company supervisors.

Discussion: The victim was described as a person who always wore his life vest but apparently was not wearing it when the incident occurred. This is a violation of written company policy which requires the use of life vests near water. To prevent incidents such as this, the FACE Project recommends that workers should always wear a life vest when working near water (e.g., on a barge or a pier). In the event of a worker falling overboard, a coast guard approved life vest would keep the worker afloat and with his face out of the water should he become unconscious. Company policy regarding life vests must be strictly enforced by the tugboat captains and other company supervisors. In conjunction with the life vest, the use of a device that emits a bright light and loud siren or horn would also aid in locating an overboard worker.

Recommendation #2: Employers and employees should conduct a job hazard analysis to identify potential safety hazards. Employers should then implement appropriate control measures and employee training to correct the identified hazards.

Discussion: The employer representative stated during the interviews that most overboard incidents occur due to inattention or employees over-extending themselves (e.g., jumping too far). To increase awareness of potential safety hazards, it is recommended that employers and employees should conduct a joint job hazard analysis of the worksite. This is done by conducting a walkthrough to assess each job, its environment, and any potential safety hazards. After the analysis, appropriate controls and safety training can be used to eliminate the hazards.

Recommendation #3: Employers should explore engineering or equipment changes to prevent workers from falling overboard.

Discussion: There are several engineering controls that may help to prevent workers from falling overboard from the barges. A example may be to increase lighting on the pier to supplement the tugboat

floodlights. It may be useful to have the barges and dock area evaluated by a professional safety engineer who is familiar with this type of work environment.

Recommendation #4: Employers should routinely conduct scheduled and unscheduled worksite safety inspections.

Discussion: To help ensure that all company and legal regulations are being followed, the employer should routinely conduct scheduled and unscheduled worksite safety inspections. Although this will not guarantee the elimination of occupational injuries, it will demonstrate the employers commitment to an established safety program.

ADDENDUM TO FACE INVESTIGATION #93-NJ-058-01

(Formerly 93-NJ-094-01)

On January 25, 1994, NJDOH FACE investigators received additional information on this incident in the form of confidential written witness statements provided by an attorney. These statements provided further detail into the background of the incident and prompted the FACE Project to review and update the original FACE investigation report. To ensure an accurate update, a FACE investigator obtained a copy of the final US Coast Guard investigation report and contacted the OSHA compliance officers involved in the case.

It should be noted that the NJFACE program did not further investigate this incident and is amending this report based on information from the Coast Guard investigation report and the witness statements. It should also be noted that the statements were from witnesses who were not on site at the time of the incident. The witnesses were apparently present when the crews switched tugboats and were aware of some of the circumstances that preceded the incident. In reviewing the witness statements, FACE investigators found it difficult to separate first hand information from hearsay information.

The following are additions and corrections to the original FACE report:

Investigation Background: Shortly after the OSHA/FACE site visit on August 8, 1994, it was determined that the US Coast Guard had primary jurisdiction over this case. OSHA discontinued its investigation and did not issue a report. The Coast Guard continued its investigation and released a report dated March 25, 1994.

Personal Floatation Devices (PFD): The victim was not wearing a work vest or other PFD at the time of the incident. The victim did own his own PFD, which was apparently left behind when he switched tugboats. The Coast Guard report quotes the tugboat captain and a second employee as saying that life jackets were available on the tug, although they were greasy and dirty. The Coast Guard also states that the company did have a PFD policy but that it was generally not enforced, and notes that 5 work vests were ordered the day after the incident. The witness statement reports that work vests were not on the tugboat, and that the witness requested 6 new vests prior to the incident.

Tugboat Lighting: The area around the docks was dark, requiring the use of the tugboat's lights while shifting the barges. The Coast Guard reports the tug captain as saying that the tugboat's floodlights were on during the barge shifting. The witness states that the tugboat's floodlights were burnt out and that he ordered new bulbs before the incident. The witness concluded that the Captain must have used the tug's spotlight to light the area.

Barge Shifting: When shifting the barges, the tugboat crew used a single line to tie the tug to the barge. The witness states that he knew that three lines should be used while moving the barges and alluded that this was difficult for one man to do. The Coast Guard report states that using one line was not unusual for the company and that it was common practice by the company to use a single bow line in tying small barges or in sheltered and calm locations.

Environmental Conditions: The Coast Guard personnel responding to the incident reported that the bow of the barge was free of ice and snow. The witness states that there was snow covering the barges and ice was all over everything. FACE investigators noted that the barge deck was constructed of unpainted raised-lug steel plating that provided good footing when dry.

Crew Watches and Shifts: The Coast Guard reports there were two crewman on board the tugboat at the time of the incident: the captain and the victim. The witness states that a tug's full crew usually consists of five persons: a captain, a second (relief) captain, two deckhands, and an engineer. This crew is divided into two watches, and each watch works alternating six hour shifts, or two shifts every 24 hours. The witness stated that the incident occurred during the second master's watch where a captain, a deckhand, and the engineer were scheduled to be on duty.

Conclusion: The Coast Guard concluded that "the cause of the fatality is unknown, however, it is likely that the change from the bright spotlights of the tug to the darkness behind the forward bulwarks caused (the victim) to loose sight of the deck and misstep on the narrow bow of the (barge), which caused him to fall into the water."

Recommendations: In response to this new information, the FACE Project is modifying and expanding the discussions for following recommendations from the original report:

Recommendation #2: Employers and employees should conduct a job hazard analysis to identify potential safety hazards. Employers should then implement appropriate control measures and employee training to correct the identified hazards.

Amended Discussion: The witness statements included a number of factors that may have contributed to the incident. Some of these include the captain's limited visibility from the wheel house, tying off the barge with one line instead of three, the crew size of the tug, and the lack of hand-held radios. Many of these factors may be identified in advance by conducting a job hazard analysis. This analysis is done by having the employer and employees assessing each job on the tug for potential safety hazards. Appropriate controls, procedures, and safety training are then used to correct the hazards. A job hazard analysis should take into account any changing environmental factors (such as weather) that may affect safety.

Recommendation #3: Employers should explore engineering or equipment changes to prevent workers from falling overboard.

Amended Discussion: There are several engineering controls that may help to prevent workers from falling overboard from the barges. One example is to increase the lighting on the pier to supplement the tugboat floodlights. Another is to mark the edges of the barge decks with a contrasting paint that can be seen in poor light. If practical, guard rails and/or handrails can also be considered for the barges. We recommend that the barges and other vessels be evaluated by a professional safety engineer who is knowledgeable about this type of industry and familiar with coast guard, OSHA, and other related regulations.

The following new recommendation is also being added:

Recommendation #5: Employers should develop and implement a regularly scheduled program of maintenance and inspection for tugboats and other vessels.

Discussion: The witness statement describes a tugboat with burnt-out lights, damaged and missing life jackets, and a number other equipment and maintenance problems. To prevent incidents related to mechanical failures or missing equipment, we recommend that a program of regular maintenance be implemented for tugboats and other vessels. This should be supplemented by regular inspections to identify maintenance problems and ensure that needed repairs are done.

May 23, 1994

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