Log M-331

National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: October 13, 1987

In reply refer to: M-87-70 through -74

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On the morning of October 7, 1986, the Panamanian tank ship SHOUN VANGUARD was discharging a cargo of acetone at the Intercontinental Terminals Company (ITC) in Deer Park, Texas. At the same time, the U.S. tank barges HOLLYWOOD 3013 and HOLLYWOOD 3003 were discharging a cargo of methyl tertiary butyl ether, a gasoline additive, on the other side of the same dock structure. About 0350, persons on the dock, some crewmembers on the main deck of the SHOUN VANGUARD, and the tankerman on the deck of the HOLLYWOOD 3003 noticed a white vapor cloud that enveloped the dock and then spread to the ship and to the HOLLYWOOD 3013. Moments later, the cloud ignited and the dock, the ship, and the HOLLYWOOD 3013 were engulfed in flames. Within minutes, terminal employees arrived on scene with firefighting gear and began fighting the fire on the dock. Meanwhile, the ship's crew had begun fighting the fire on the deck of the ship. Soon after, the fires on the dock and the ship were extinguished, but the fire on the HOLLYWOOD 3013 continued to burn. The HOLLYWOOD 3003 was removed from the scene of the fire and received only superficial damage in the accident. Efforts by shoreside firefighters to extinguish the fire on the HOLLYWOOD 3013 were not successful, and the fire continued to burn for 5 days until it burned itself out at 2343 on October 11, 1986.

As a result of the fire, the HOLLYWOOD 3013, valued at approximately $1.3 million, sustained damages estimated to be in excess of $920,000. In addition, about 10,000 barrels of the barge's cargo, valued at approximately $500,000, were consumed by the fire. The ITC terminal was extensively damaged and total repair costs to the facility were estimated at $960,000. In addition, firefighting expenses to ITC were about $1.5 million, $1.25 million of which was for firefighting foam. Damage to the SHOUN VANGUARD was estimated at $1.2 million. Two persons, the second officer aboard the SHOUN VANGUARD and the dock watchman, lost their lives in connection with this accident, and seven shoreside firefighters were injured during the firefighting operations. 1/

1/ For more detailed information, read Marine Accident Report--"Fires On Board the Panamanian Tank Ship SHOUN VANGUARD and the U.S. Tank Barge HOLLYWOOD 3013, Deer Park, Texas, October 7, 1986," (NTSB/MAR-87/08).

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Separate Coast Guard regulations describe the qualifications of the waterfront facility personnel who are to be in charge of transfer operations, depending on whether the operation is regulated under the hazardous materials regulations or under the oil pollution prevention regulations. The descriptions contained in the Code of Federal Regulations of the qualifications of the "person in charge" of facility oil transfer operations and of facility hazardous materials transfer operations are very broad. Under both sets of regulations, it is the responsibility of the facility owner or operator to designate an individual as the "person in charge" and to determine that the individual so designated has been properly trained and has the necessary experience to execute his duties competently. The U.S. Coast Guard does not have specified testing or certification requirements for "persons in charge" at the waterfront facility and does not verify that the person so designated actually possesses the required training and experience. However, the person on the vessel who is his counterpart is required to obtain certification from the Coast Guard or to possess the equivalent certification from a recognized national authority in the case of foreign tank ships.

On-the-job training is the primary method used to qualify dockmen at the ITC Deer Park terminal and is probably representative of dockman training throughout the industry. The on-the-job training program at ITC is essentially undocumented. There are neither defined goals to be attained by trainees nor standards by which supervisors may judge the successful completion of goals. Thus, there was no record of the training that a workman received before his assignment to the duties of dockman. The National Transportation Safety Board believes that the current system of "qualifying" a workman to become a dockman and to serve as the "person in charge" at waterfront facilities by the facility operator is subject to wide variation and does not adequately ensure that all persons who are assigned to these duties are properly trained to handle hazardous materials at waterfront facilities. The transfer of hazardous materials at U.S. waterfront facilities presents dangers to the persons involved in the transfer operations and to the general populace residing in the area immediately surrounding the transfer site. The dangers of accidental release of hazardous materials which are inherent in these operations demand that all "persons in charge" be properly qualified to act in this capacity. It is just as important for the person in charge of the dockside portion of the transfer operations to be properly qualified as it is for the person in charge of the vessel portion of the operation. The Safety Board, therefore, believes that the Coast Guard, which is responsible for regulating hazardous materials transfer operations at U.S. waterfront facilities, should take action to require testing and certification of the person in charge of the dockside portion of hazardous materials transfer operations at U.S. waterfront facilities.

The requirements of 33 CFR 156.120 concerning hose and hose reinforcement defects are clear and explicit in describing those conditions that would render a hose unfit for use in the transfer of oil. However, this regulation applies only to the transfer of oil as defined in the oil pollution prevention regulations and does not apply to hazardous materials that do not meet the definition of "oil." The Safety Board believes that it is equally important to specify hose and hose reinforcement defect criteria for hoses used in the transfer of hazardous materials as it is for hoses used in the transfer of "oil," and that 33 CFR Part 126 should be appropriately amended to include similar requirements for cargo hoses used to transfer hazardous materials.

The second officer on board the SHOUN VANGUARD was supposed to be stationed in the vessel's cargo control room at the time the fire erupted. There were no witnesses who could verify that he was, in fact, at his assigned duty station at the time, but there is no reason to believe that he was not there. The master of the SHOUN VANGUARD testified that the second officer was a sober and competent individual, and that during the time the second officer had served on board the SHOUN VANGUARD, his service had

been satisfactory. Assuming that the second officer was at his station in the cargo control room when the fire broke out, he obviously did not remain there for long because he did not answer the telephone call when the master called from the pilothouse, and he was not found in the room when the first officer arrived shortly after the master sounded the general alarm bell.

Since his shoes were found on the deck near the port side door leading to the passageway from the cargo control room, the second officer probably exited the deckhouse through this door. No one was found who could testify that they had seen the second officer on deck after the fire broke out.

There is no evidence to support a finding that the second officer was blown out of his shoes by the force of a shipboard explosion. The autopsy report on the remains of the second officer established that he had died as a result of drowning and not as a result of physical trauma caused by fire or explosion. Additionally, there were no signs of explosive damage to the deckhouse near where the second officer's shoes were found. Finally, the fact that one of the shoes was found lying on the deck inside the doorway tends to support a finding that the second officer purposely kicked off his shoes, perhaps in anticipation of entering the water and to facilitate swimming.

One of the ITC employees who arrived on the dock shortly after the fire broke out stated that when he arrived on the scene, he noticed a number of crewmen from the SHOUN VANGUARD running around the stern of the vessel and climbing down mooring lines in an attempt to gain access to the dock. The Safety Board believes that the second officer went to the stern of the vessel where he either jumped overboard or fell into the water while attempting to climb down a mooring line to escape the fire on the ship.

The crewmembers who abandoned the SHOUN VANGUARD by climbing down mooring lines to the dock did so on their own initiative. Neither the master nor any of the officers at the master's direction ordered abandon ship. The action of these crewmen was premature and indicated that at least part of the crew panicked when the fire broke out. In this instance, the vessel was moored alongside a pier, and the pier probably presented an illusion of safety from the fire that the crew could not resist in their first moments of panic. They did not recognize the dangers inherent in attempting to reach the shore by jumping overboard or by climbing down mooring lines to the dock.

The tankerman on board the Hollywood barges was standing on the stern of the HOLLYWOOD 3003 at the time that he heard the sound of a loud pop and saw the white vapor cloud form over the dock and spread to the HOLLYWOOD 3013. He probably could have escaped from the flames when the cloud ignited by jumping onto the deck of the towboat FRED C. HAMILTON which was moored to the stern of the barges. Instead, he attempted to shut down the diesel engine on the deck of the HOLLYWOOD 3003. Although his efforts to shut down this engine were unsuccessful, it demonstrated that this tankerman's first thoughts were not of self-preservation, but were of protecting the vessels that were left in his charge. When the vapor cloud exploded in flames, the force of the explosion knocked the tankerman off his feet. When he recovered, he jumped overboard into the water to escape the fire. Had there been burning liquid on the water when he jumped overboard, as there was later in the fire sequence, he may well have perished.

Although no one could testify as to the position of the ITC dockman at the time the fire erupted, witness testimony indicated that he had spent most of his time in the dockhouse at the landward end of the no. 2 and no. 3 dock, and he was last seen near the dockhouse. This dockhouse, which was constructed of wood, and was destroyed in the fire, could not have provided a safe refuge from the fire.

The dockman, stationed as he was between the SHOUN VANGUARD and the HOLLYWOOD 3013, was in a very vulnerable position in the event of a fire or explosion on board either vessel. His only recourse to escape a fire on the dock would have been to jump into the water where he may have been drowned, crushed between a vessel and the dock, or burned by any liquid cargo burning on the water.

The Safety Board has addressed the need for an alternate escape route from tank vessels moored to waterfront facilities in a number of past accident reports. 2/ As a result of the Safety Board's investigation of the explosion and fire involving the Greek tank ship ELIAS, the Safety Board recommended that the Coast Guard:

M-78-39

Study the positioning of shipborne gangways and shoreplaced brows to determine ways to provide for rapid personnel escape from vessels during emergencies.

M-78-41

Study the feasibility of providing safer means of escape from tankers across piers to safe terminal locations, to improve chances of survival for shipboard personnel when lifeboats cannot be used and swimming ashore is not possible.

In a May 4, 1982 response to these recommendations, the Coast Guard commandant stated that the Coast Guard has studied the problem of providing means of escape from tankers by means of gangways and brows and has concluded that the matter is more properly related to vessel configuration than to general facility requirements. The commandant further stated that the Coast Guard did not believe that it is feasible to draft national facility standards to be applied to a wide variety of vessels. Since these recommendations called for the Coast Guard to study the problem and since the Coast Guard conducted the recommended study, on June 30, 1982, the Safety Board classified Safety Recommendations M-78-39 and M-78-41 as "Closed--Acceptable Action."

As a result of its investigation of the explosion and fire on board the U.S. tank ship CHEVRON HAWAII, the Safety Board made the following recommendations to the Coast Guard:

M-80-90

Include in Coast Guard and terminal operator fire contingency plans emergency procedures which provide for the removal of barges from threatened berths and the safe evacuation of personnel from vessels when normal ship-to-shore transit routes are severed or hazardous.

2/ For more detailed information, read Marine Accident Report - "M/T ELIAS, Explosion and Fire at the Atlantic Richfield Company Fort Mifflin Terminal, Delaware River, Pennsylvania, April 9, 1974," (NTSB-MAR-78-4); "Liberian Tank Vessel M/V SEATIGER, Explosion and Fire, Sun Oil Terminal, Nederland, Texas, April 19, 1979," (NTSB-MAR-80-12); and "Explosion and Fire on Board the SS CHEVRON HAWAII with Damages to Barges and to the Deer Park Shell Oil Company Terminal, Houston Ship Channel, September 1, 1979," (NTSB-MAR-80-18).

M-80-91

Require that waterway terminal operators provide a gangway or brow between vessel accommodations and the terminal facility which does not require crewmembers to cross vessel cargo tanks or decks.

In an April 27, 1981, response to Safety Recommendation M-80-90, the Coast Guard commandant stated that the Coast Guard partially concurred with the recommendation. He said that the Coast Guard would issue guidelines to Coast Guard Captain of the Port to upgrade and standardize port contingency plans for coordinating multijurisdictional planning for various port disasters, and Safety Recommendation M-80-90 would be taken into account when these contingency plans are developed in the field. However, the response indicated that the Coast Guard would not pursue the problem of providing for the safe evacuation of personnel from vessels when normal ship-to-shore transit routes are severed or hazardous.

Based on this response, on August 11, 1981, the Safety Board classified Safety Recommendation M-80-90 as "Open—Unacceptable Action." An April 13, 1987, update from the Coast Guard noted that the new Coast Guard Marine Safety Manual contains a requirement that Coast Guard personnel contact all vessels both in and out of a fire area and advise the deck watch of the situation and of the possible need to get underway. This satisfies the first part of the recommendation and the Safety Board has now classifed that part of Safety Recommendation M-80-90 as "Closed—Acceptable Action." The second part of the safety recommendation deals with the safe evacuation of personnel from vessels and is now classified as "Closed—Unacceptable Action/Superseded."

In a May 4, 1982, response to Safety Recommendation M-80-91, the Coast Guard commandant stated, "The Coast Guard will propose no changes to the regulations for waterfront facilities or for vessels in response to these recommendations." Based upon this response, on January 30, 1982, the Safety Board classified Safety Recommendation M-80-91 as "Closed--Unacceptable Action."

Despite the Coast Guard's negative response to these recommendations, the Safety Board still believes that there is a need for the development of alternate escape routes from tank ships and tank barges which are moored to waterfront facilities. Although, it may not be feasible, as the Coast Guard maintains, to develop national standards for specific alternative escape routes due to the wide variety of tank ship configurations, it is certainly feasible to require each tank ship to develop its own evacuation plan for situations involving fire or explosion while it is moored at a waterfront facility, and it is feasible for facilities to provide an alternate means of escape from tank barges, which do not have a wide variety of configurations. A cargo tank is most liable to explosion when it is empty or partially filled, and cargo tanks on tank ships and tank barges are regularly empty or partially filled while they are loading and discharging cargo at waterfront facilities. At such times, the atmosphere in the empty or partially filled tank often reaches the explosive range and may be accidentally ignited.

It is conceivable that a fire and explosion on board a tank ship moored to a facility could be so severe that immediate evacuation of the vessel is necessary and the crews of tank ships should be prepared for such an eventuality. In order for such an evacuation to take place with a minimum of danger to the ship's crew, shipboard contingency plans should be developed, and the crew should be instructed in how to carry them out. The Safety Board believes that tank ships carrying highly flammable products should have a contingency plan that sets forth the procedures for the crew to follow in the event of fire

Amend appropriate regulations to prohibit the transfer of any hazardous material cargo using a cargo transfer hose with visible hose or hose reinforcement defects. (Class II, Priority Action) (M-87-74)

Also as a result of its investigation, the Safey Board issued Safety Recommendations M-87-75 through -78 to the Intercontinental Terminals Company and M-87-79 through -83 to the Independent Liquid Terminals Association.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and NALL and KOLSTAD, Members, concurred in these recommendations. LAUBER, Member, did not participate.

By: Jim Burnett
Chairman

or explosion while the vessel is moored to a waterfront facility. Additionally, the crews of these tank ships should be drilled on a regular basis so that they can execute the contingency plan if necessary. This contingency plan should contain a description of primary and secondary avenues of escape from the vessel and should describe those circumstances under which vessel abandonment action should be taken.

In the event of fire or explosion tankermen working on unmanned barges that are moored to waterfront facilities are placed in a much more vulnerable position than are the crewmen on board tank ships in such a situation. Unmanned tank barges do not carry lifeboats or liferafts and are not even fitted with any type of gangway. It is common practice for a towboat to leave a tank barge at a waterfront facility while it proceeds to another location to perform other towing assignments so that the tankerman on the barge would not have the option of boarding the towboat to escape from a fire or explosion on the barge or on the dock. Under these conditions, the tankerman's only avenue of escaping a fire on the barge is to jump into the water--an action that could have dangerous consequences. The Safety Board believes that in the event of a fire or explosion, waterfront facilities accommodating barges carrying highly flammable products should be required to provide the tankermen on board these barges with some means of escape to a safe location on shore.

The ITC dockman was required by company policy and by Coast Guard regulation to remain on the dock throughout the cargo transfer operations, however, neither company policy nor Coast Guard regulations properly provided for his safety in the event of an emergency. When the fire broke out, his only option was to run away from it, and the fire spread so rapidly that this probably was not possible. The Safety Board believes that, since regulations require dockmen at waterfront facilities who handle highly flammable and hazardous materials to remain in a hazardous environment, they should be protected from exposure to potential hazards of that environment. The Safety Board, therefore, believes that the Coast Guard should develop regulations to require waterfront facilities to provide dockmen either with a means of protection or escape from fire.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the U.S. Coast Guard:

> Establish a testing and certification program for persons in charge of oil or hazardous materials transfer operations at U.S. waterfront facilities. (Class II, Priority Action) (M-87-70)
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> Require operators of U.S. waterfront facilities that handle highly flammable products to provide the person in charge of oil or hazardous materials transfer operations with a means of protection or escape from fire. (Class II, Priority Action) (M-87-71)
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> Require all tank ships that intend to transfer highly flammable products at U.S. waterfront facilities to develop emergency contingency plans which set forth the procedures to be followed by the crew in the event of fire or explosion and which describe primary and secondary avenues of escape from the vessel and the conditions under which vessel abandonment action should be taken while the vessel is moored at such a facility. (Class II, Priority Action) (M-87-72)
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> Require U.S. waterfront facilities that load or discharge highly flammable cargoes on barges to provide the tankermen on board such barges with some means of escape from the barges to a safe location on shore in event of fire or explosion while such barges are moored at such facilities. (Class II, Priority Action) (M- 87-73)