

m-209

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: July 13, 1983

Forwarded to:

Admiral James S. Gracey
Commandant
U.S. Coast Guard
Washington, D.C. 20593

SAFETY RECOMMENDATION(S)

M-83-38 through -41

About 0932 e.s.t. on February 26, 1982, while proceeding southbound in the East River of New York Harbor, the U.S. coastal tankship POLING BROS. NO. 9 exploded and burned. The tankship had discharged a cargo of gasoline a few hours before the accident, and its tanks were not free of gas fumes. The vessel was passing or had just passed underneath the Williamsburg Bridge when a fire followed by a series of explosions occurred. Workmen were reconstructing the south outer roadway on the bridge at the time of the accident, and there had been several previous reports of sparks, apparently slag from metal being cut with an oxyacetylene torch, falling from the bridge. In one reported instance about 2 weeks before the accident, hot slag landed on an oil barge passing under the bridge. After the explosions, the POLING BROS. NO. 9 immediately lost power and drifted to the Brooklyn side of the river a few hundred feet south of the bridge where it continued to burn, despite firefighting efforts, until it sank at about 1030. The force of the explosions hurled debris, including a cargo hatch cover and other pieces of metal, onto the bridge roadways and the electrified rail of one of the subway tracks on the bridge, shorting out the electrical system and stopping one subway train on the bridge. There were no injuries to persons on the bridge, and all commuters in the stalled train were transferred to another train without incident. One of the eight crewmembers of the POLING BROS. NO. 9 was killed by the explosion, and three others were injured. The damage to the tankship was estimated to be about \$2 million. 1/

Earlier, after the POLING BROS. NO. 9 cargo had been discharged at 0410, the chief mate witnessed the securing of all cargo valves, and noted that the fixed cargo spill containment boxes under the hose connections were dry, that the hatch covers for all cargo tanks were closed but not dogged, and that flame screens for all ullage holes were in place but that the ullage covers were open. The chief mate and master testified that it was the master's policy to operate with the hatch covers and ullage holes in this condition, unless weather or sea conditions required that more positive securing of the hatches and ullage holes be accomplished.

At the time of the accident, the outer roadway on the south side of the Williamsburg Bridge was undergoing extensive renovation by a construction firm under contract to New York City. The work involved use of an oxyacetylene torch to burn off old rivet heads in

1/ For more detailed information read Marine Accident Report--"Explosion and Fire On Board U.S. Coastal Tankship POLING BROS. NO. 9, East River, New York Harbor, February 26, 1982" (NTSB/MAR-83/92).

support beams that were being replaced. While one man, a burner, was using an oxyacetylene torch, another man, a fire watchman, was assigned to keep a watch for approaching vessels. However, the fire watchman had left the work area sometime prior to the approach of the POLING BROS. NO. 9. Meanwhile, the burner continued working with the oxyacetylene torch without a fire watchman present.

A deckhand on a nearby tugboat testified that he saw sparks falling from the Williamsburg Bridge as the POLING BROS. NO. 9 was passing under the bridge. The deckhand stated that he had welding experience and that it appeared to him that the sparks probably resulted from metal being cut with an oxyacetylene torch. He estimated that the sparks were slightly inshore of the vessel's track. He said that flames erupted from the tankship almost immediately thereafter.

Vapors emitted from the cargo tanks of the POLING BROS. NO. 9 via the open ullage holes or from the undogged hatches could have been ignited by sparks generated by debris falling from the bridge and striking the metal of the vessel. Calculations indicate that even after falling about 130 feet in 26° F air, a piece of slag as small as 1/8-inch spherical diameter still would be hot enough to ignite flammable vapors from gasoline by autoignition, based on an autoignition temperature for gasoline of 800° F. The flame from the ignited vapor could have propagated into the cargo tanks either through a damaged flame screen or through an unsecured hatch opening.

The facts that debris and sparks fell on a passing oil barge just 2 weeks before the accident involving the POLING BROS. NO. 9 and that sparks were seen falling from the bridge near the POLING BROS. NO. 9 immediately before the vessel exploded cause the Safety Board to conclude that the fire and explosion sustained by the POLING BROS. NO. 9 were initiated by debris, probably hot slag resulting from the cutting of metal with an oxyacetylene torch, falling from the Williamsburg Bridge onto the vessel.

The Safety Board believes that closing the ullage holes should be a standard practice on all tank vessels and should be accomplished as soon as the final ullages are taken after loading and as soon as the tanks are empty when discharging. The Safety Board believes that the policy followed by the master of the POLING BROS. NO. 9 of allowing the ullage holes to remain open while the vessel was underway was an unnecessary and dangerous practice, and that this accident might not have occurred if the ullage holes had been closed.

A number of tank vessel operating manuals are available for assisting merchant marine officers and tankermen to become aware of tank vessel operation and safety procedures. A Safety Board review of these publications revealed that there are references to vent systems, including the operation of pressure-vacuum relief valves and the function of flame arrestors and that there is adequate guidance, in most cases, regarding the importance of having flame screens in place in ullage holes when they are open. However, most manuals do not emphasize that ullage holes should be closed and dogged as soon as the final ullages have been taken during loading and as soon as the tanks are empty during discharging, except on those tanks being ballasted. None of the manuals stress that ullage holes should be closed and dogged when underway unless procedures such as tank cleaning require them to be open, nor is there any discussion of the enhanced safety that would result from having the ullage holes securely closed when underway.

The U.S. Coast Guard's publication CG-174, entitled "A Manual For The Safe Handling of Flammable and Combustible Liquids and Other Hazardous Products," a publication recommended for study by personnel preparing for tankerman certification, was found to be comprehensive and well organized; however, it did not emphasize that openings in tanks that are not gas free should be closed and dogged whenever possible to

enhance safety and to comply with pollution regulations while a vessel is underway or at anchor. Section 3.5.5 of the publication clearly states that after loading operations have been completed, all cargo hatch covers (tank top covers) must be checked for tightness and the ullage covers should be dogged. However, there is no emphatic guidance regarding closure conditions that should be observed after discharging cargo. Section 3.5.4, regarding final ullaging and sampling, mentions that after discharging, the tanks usually are inspected to be certain that all cargo has been discharged; however, this section does not mention closing the ullage openings after this inspection is completed. The sections on ballasting, while very informative, are similarly silent on the need to secure ullage openings after ballasting operations are completed.

Title 46 CFR (Subchapter D-Tank Vessels) Parts 30 to 40, which are generally regarded as comprising the primary safety regulations for U.S. tank vessels, require only that open ullage holes and cargo hatches be supervised by a senior member of the crew or be protected by flame screens unless the tank is gas free. The only stated requirement that cargo tank hatch covers and ullage hole covers be closed and dogged is found in 33 CFR (Subchapter O-Pollution) Section 155.815. Although the intent of this requirement is to prevent pollution, it also greatly contributes to safety aboard tank vessels; however, it may be overlooked by persons seeking guidance for safe operating procedures for tank vessels. Accordingly, the Safety Board concludes that precise language similar to that contained in 33 CFR Section 155.815 should be included in 46 CFR Parts 30 to 40 and in Coast Guard publication CG-174, since these are primary sources for guidance regarding safe operating procedures for tank vessels.

The New York City officials who were responsible for overseeing the contract for the repair work on the Williamsburg Bridge failed to take effective action to insure that debris, including hot slag from metal cutting operations, was prevented from falling from the bridge. The Coast Guard's telephone call and telegram to city officials, as a result of an incident on February 11, 1982, when hot slag from the bridge fell on an oil barge, resulted only in the passing of an oral message to the contractor to take steps to prevent further debris from falling from the bridge. The oral instructions to the contractor were not confirmed in writing until after the explosion of the POLING BROS. NO. 9, and there was no evidence that the city conducted any inquiry into what could be done to prevent debris from falling from the bridge. Even after the accident, no comprehensive program was implemented by the city or its contractor, and on March 4 and 5, 1982, less than 2 weeks after the destruction of the POLING BROS. NO. 9, there were more complaints about debris falling from the bridge. As a result of the March 4 and 5, 1982, incidents and the full recognition of the potential consequences as illustrated by the explosion of the POLING BROS. NO. 9, the Coast Guard was able to persuade the city and its contractor to adopt a comprehensive plan of action to curtail further debris from falling from the bridge.

The Safety Board believes that the Coast Guard should disseminate the circumstances of this accident to its Captains of the Port so that they can take measures, similar to those taken in New York City, to curtail debris from falling from bridges over navigable waters.

It appears that the Coast Guard relied primarily upon negotiation and persuasion to convince New York City to adopt procedures to prevent debris from falling from the bridge and endangering vessels navigating the waterway. The accident involving the POLING BROS. NO. 9 and instances of falling debris less than 2 weeks after this accident suggest that stronger initial measures should have been initiated by the Coast Guard. The Coast Guard, under the Ports and Waterways Safety Act (P.L. 92-340), regulates the safety of vessels on the navigable waters of the United States and the safety of United States ports in respect to the inherent hazard of handling petroleum and other hazardous cargoes, including the protection of cargo tanks aboard vessels from ignition sources that

may be present. Further, the Coast Guard has responsibility for administering the various statutes which apply to bridges over the navigable waters of the United States to insure that bridges do not present a hazard to or unreasonably obstruct navigation. The Safety Board believes that the Coast Guard should analyze its enabling legislation, particularly the Ports and Waterways Safety Act, to determine if it has authority to promulgate enforceable regulations prohibiting the dropping of debris from bridges over navigable waterways onto vessels passing underneath, particularly during bridge repairs and alterations. If the Coast Guard determines that it has the necessary authority, it should promulgate appropriate regulations and procedures for the enforcement of such regulations as expeditiously as possible. If the Coast Guard determines that it does not have the needed authority to promulgate appropriate regulations and enforcement procedures, the Coast Guard should seek legislation granting it such authority.

Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

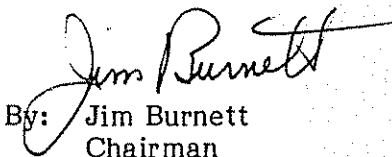
Amend 46 CFR Parts 30 to 40 to include specific requirements that hatch covers and ullage hole covers be closed and dogged at all times unless they are required to be open for cargo transfer operations, inspections, tank cleaning, or other essential operations, or unless the vessel is gas free. (Class II, Priority Action) (M-83-38)

Amend the next edition of Coast Guard publication CG-174, entitled "A Manual For the Safe Handling of Flammable and Combustible Liquids and Other Hazardous Products," to include a reference to the Pollution Regulations at 33 CFR Section 155.815 and to state clearly that hatch covers and ullage hole covers on tank vessels must be closed and dogged at all times unless they are required to be open for cargo transfer operations, inspections, tank cleaning, or other essential operations, or unless the vessel is gas free. (Class II, Priority Action) (M-83-39)

Disseminate the circumstances of this accident to all Captains of the Port so that they can take interim measures similar to those taken in New York City to protect vessels from debris falling from bridges during repairs and alterations. (Class II, Priority Action) (M-83-40)

Analyze the Coast Guard's enabling legislation, particularly the Ports and Waterways Safety Act, to determine if the Coast Guard has authority to promulgate enforceable regulations prohibiting the dropping of debris from bridges over navigable waterways onto vessels passing underneath, particularly during bridge repairs and alterations. If the Coast Guard determines that it has the necessary authority, promulgate appropriate regulations and procedures for the enforcement of such regulations as expeditiously as possible. If the Coast Guard determines that it does not have the needed authority to promulgate appropriate regulations and enforcement procedures, seek legislation granting it such authority. (Class II, Priority Action) (M-83-41)

BURNETT, Chairman, GOLDMAN, Vice Chairman, McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.


By: Jim Burnett
Chairman