U. S. COAST GUARD
WASHINGTON, D. C.

MVI
16 September 1952
(HAROLD REINAUER - C-1 Rd)

From: Chief, Merchant Vessel Inspection Division
To: Commandant
Via: Chief, Office of Merchant Marine Safety

Subj: Marine Board of Investigation; explosion on MV tanker HAROLD REINAUER, Boston, Massachusetts, 7 May 1952

1. Pursuant to the provisions of Title 46 C.F.R. Part 136, the record of the Marine Board convened to investigate subject casualty, together with its Findings of Fact, Conclusions, Opinions and Recommendations, has been reviewed and is forwarded herewith.

2. On 7 May 1952, the motor tanker HAROLD REINAUER of 818 g.t. was moored alongside a work barge at Chelsea, Mass. Her No. 1, No. 2 and No. 3 cargo tanks were empty but not gas-free, and her No. 4 tank was flooded with water. The waist on the port side of the navigating bridge with two intervening vertical non-cargo spaces between it and the deck boundary of No. 4 tank was being repaired involving burning and welding operations. At 1500 an explosion of undetermined ignition origin occurred, which caused the vessel to sink. As a result of this casualty, 3 persons were injured. The weather conditions were fair with NW wind of between 25 and 35 miles velocity.

3. The Board made the following Findings of Fact:

"1. That at 3:00 p.m., 7 May 1952, the tankship HAROLD REINAUER while tied up alongside a work barge alongside the dock at 215 Marginal Street, Chelsea, Mass., suffered an explosion in cargo tanks Nos. 1, 2 and 3, resulting in the blowing open of these tanks, the sinking of the vessel alongside the dock and severe injury to three men, one of whom was the chief mate of the vessel, the others being a dock employee and a member of the crew of another company-owned vessel.

"2. That the tankship HAROLD REINAUER, official number 251600, gross 818 tons, net 556 tons, owner Reinauer Oil Transportation Corp. of 75 Federal Street, Boston, Mass., was built in Brooklyn, New York in 1947 and was last regularly inspected by the Coast Guard at Boston, Mass., on 26 February 1952.

"3. That the tankship HAROLD REINAUER was a conventional vessel of welded construction having four cargo tanks aft of the forecastle, each of these tanks being separated longitudinally by an oil-tight bulkhead, which in effect made a total of eight cargo tanks.

"4. That the tankship HAROLD REINAUER had her engine room aft, the pump room being just forward of the engine room and her pilot house was located on the superstructure deck above the pump room and the after half of No. 4 cargo tank.

"5. That the dimensions of the HAROLD REINAUER were: length, 192.5'; beam, 32'; depth, 15'.

"6. That the propulsion of the HAROLD REINAUER consisted of a single propeller driven by a 2-cycle, single-acting, 5-cylinder diesel diesel engine having direct drive.

"7. That the vessel had completed the discharge of a cargo of about 800 bbls. of 110/145 octane aviation gasoline at Quonset Point, Rhode Island, on the evening of 5 May 1952, at which time the vessel sailed for Boston, Mass.

"8. That en route Boston, Mass., beginning about 6:00 a.m., 6 May 1952, the cargo tanks and lines were washed only once with cold salt water about 3', but not filling the tank completely, and then pumping the tank out.

"9. That the sides of the cargo tanks were not washed down.

"10. That the vessel arrived in Boston about 10:25 a.m., 6 May 1952, and tied up, port side alongside the company's work barge, which was itself tied up alongside the dock at 215 Marginal St., Chelsea, Mass.

"11. That the master of the HAROLD REINAUER, John M. Pyre, was ordered on the morning of 7 May 1952, by the Marine Superintendent, an employee of the Reinauer Oil Transportation Corporation, [redacted], to completely fill No. 4 cargo tank with water in order that repair work could be accomplished.

"12. That No. 4 cargo tank was completely filled with water and run over and then secured and that all tank domes were dogged down hand tight and checked and all valves on pipe lines were secured.

"13. That the repair work consisted of removal of the damaged plate by burning and the installation of a new vertical plate by welding on the outboard port side and forward port wing of the bridge.

"14. That staging and ladders were set up on the port side of the bridge and complete oxy-acetylene burning and electric welding equipment were placed on the bridge on the morning of 7 May 1952.

"15. That the hoses for the oxy-acetylene cutting torch were led from the gas bottles on the barge to the torch on the port wing of the bridge.

"16. That the welding cable (hot wire) was led from the welding machine on the barge through a side door on the barge in the vicinity of No. 1 cargo tank across the vessel and connected to the electrode holder on the port wing of the bridge.

"17. That the welding cable (ground wire) from the welding machine on the barge was secured to a 1/4" x 4" continuous steel strap extending around the work barge.

"18. That the welding cable (ground wire) to the ship was secured to a stanchion holder near the after part of No. 2 port cargo tank, a good electrical connection being made by means of a C clamp, the other end of this ground wire being connected electrically with sufficient slack to the ground strap on the after end of the work barge.

"19. That the port wing of the bridge was wet down and a fresh water hose was kept running on the main deck in the vicinity of No. 4 tank.

"20. That the second engineer of the HAROLD REINAUER, [redacted], at about 10:30 a.m., 7 May 1952, cut out with a torch a vertical steel plate measuring about 3' x 3' on the port wing of the bridge.

"21. That the second engineer of the HAROLD REINAUER also had the welding machine in operation on the morning of 7 May 1952, but the machine was secured prior to noon.

"22. That the second engineer, [redacted], at about 1:30 p.m., on 7 May 1952, tack-welded a vertical piece of angle iron on the corner of the port wing of the bridge, using about one-third of an electrode.

"23. That the vessel was not gas-free, and a gas-free certificate was not obtained as required by 46 CFR 35.01-1.

"24. That the Officer in Charge, Marine Inspection, was not notified as required by 46 CFR 30.01-10.

"25. That wind was blowing from the northwest between 25 and 35 miles per hour.

"26. That the serviceable condition of the welding cable (hot wire) was questionable due to several places having been taped.

"27. That the galley range was cut at about 1:00 p.m., on the afternoon of 7 May 1952.

"28. That the vessel was secured by adequate lines to the dock and the barge and that there were three adequately spaced fenders between the ship and the barge.

"29. That four members of the crew were painting in the galley.

"30. That the paint locker of the HAROLD REINAUER contained no open containers of paint or turpentine or of rags outside of suitable containers, but that there was an open container near the forecastle door which contained some paint that had been thinned with turpentine and mixed on the morning of 7 May 1952.

"31. That smoking was allowed on the service barge.

"32. That just prior to the explosion, the master of the HAROLD REINAUER was on the barge observing the lathe operator and the chief mate, [redacted], and Mr. [redacted], a member of the crew of the LSD1, were in the office in the after end of the barge.

"33. That just prior to the explosion the second engineer, [redacted], and Mr. [redacted], an employee of the Reinauer Transportation Corp. were measuring a new plate on the wing of the bridge preliminary to fitting same in place.

"34. That at 3:00 p.m., there was a series of three loud explosions and the tank tops of No. 1 port cargo tank, No. 2 port and starboard tanks and No. 3 port tank were blown into the street and the harbor, the hull in the vicinity of the cargo tanks was pushed out and the vessel sank alongside the barge in shallow water.

"35. That the explosion occurred within the cargo tanks.

"36. That a length of 8" discharge line landed on the after end of the house on the barge and crushed it, seriously injuring the chief mate, Mr. [redacted], and Mr. [redacted]

"37. That the pilot house windows on the HAROLD HEINAUER were blown in.

"38. That the engine room and pump rooms remained watertight as did the forecastle bulkhead.

"39. That No. 4 cargo tank received minor damage.

"40. That Mr. [redacted] who was on the wing of the bridge was knocked down and received a badly lacerated face and was punctured about the face with flying scale.

"41. That there was no fire, but some smoke was seen coming from the forecastle after the explosion.

"42. That twelve short pieces of welding electrodes were picked up on the port wing of the HAROLD HEINAUER's bridge shortly after the accident.

"43. That the electrode holder in the port wing of the bridge contained a partially used electrode.

"44. That the oxy-acetylene torch was found on the port wing of the bridge with both the oxygen and acetylene valves in the open condition at about 9:00 a.m., on 8 May 1952.

"45. That Mr. [redacted], who was the helper for the second engineer, [redacted] stated that there was some oxy-acetylene burning being carried on about fifteen minutes prior to the explosion.

"46. That extensive welding on the pump room vent pipe and galley exhaust line on the port side of the well deck had been accomplished on 23 April 1952.

"47. That the repairs made to the vessel were made in accordance with instructions of the Marine Superintendent who was acting for the owner."

4. The Board made the following Conclusions and expressed the following Opinions:

"1. The actual cause of the casualty was indeterminate, however, the following sources of vapor igniting were present in the order of probability that they might have caused the accident:

a. Use of the oxy-acetylene cutting torch on the port wing of the bridge.

b. Use of the arc-welding equipment on the port wind of the bridge.

c. Grounding of the hot welding lead on the ship's structure since this wire had insulation breaks covered with electrician's tape and at least one of the insulated connectors on this wire was in poor condition.

d. The loosening of the ground lead of the welding machine where it was attached to the ship with a C clamp.

e. Smoking on the work barge which was alongside the ship and and abeam of the cargo tanks.

f. A carelessly tossed lighted cigarette from the sidewalk with the then prevailing wind could have landed on the ship.

g. Due to the vessel's surging in gusts of wind or the wake of passing vessels, a structural failure such as a gusset or other member carrying away in an empty tank created a spark to cause ignition.

"2. The method of 'washing out' cargo tanks as practiced on the HAROLD REINAUER was extremely inadequate, and in no case rendered the tanks gas-free.

"3. That the master and the owners of the HAROLD REINAUER neglected to carry out the requirements of Section 35.01-1, Tank Vessel Regulations, 1 July 1951....'Riveting, welding, burning or like fire producing operations shall not be undertaken within or on the boundaries of bulk cargo spaces or spaces adjacent thereto until an inspection is made to determine that such operations can be undertaken with safety.'

NOTE: By definition the word 'adjacent' means lying near, close or contiguous, neighboring or bordering on. Objects are adjacent when they lie close to each other but not necessarily in actual contact. - Webster's Dictionary, unabridged, 2nd Edition.

Adjacent—'Lying near or close to; sometimes contiguous. Adjacent implies that the two objects are not widely separated, though they may not actually touch, while adjoining imports that they are so joined or united to each other that no third object intervenes.' - Black's Law Dictionary - Third Edition.

"4. That the pressure vacuum relief valves were not regularly inspected by the ship's force.

"5. That No. 2 port and starboard cargo tanks blew up at the time of the second explosion and that either port No. 3 or port No. 1 cargo tank blew up at the time of the first explosion.

"6. That due to the weather conditions it was improbable that any vapors collected would have remained on deck.

"7. That cargo tanks Nos. 1, 2 and 3 were in an extremely gassy condition.

"8. That the filling of No. 4 cargo tank with water was not adequate and considering the extent and location of hot work that was to be accomplished the vessel should have been gas-free.

"9. That while this fuel (110/145 octane aviation gasoline) has been considered grade B, it has the reputation of being excessively gassy, and the Board therefore recommends that a study be made to determine whether a rearrangement of the venting system to extend the vents a greater distance above the tank tops would render tank vessels carrying this type of cargo safer from internal explosions."

5. The Board made the following Recommendations:

"1. That Section 35.01-1 of the Tank Vessel Regulations dated 1 July 1951, regarding inspection of tank vessels on which hot work is to be accomplished, would stipulate that the work should be accomplished under the direction of the Officer in Charge, Marine Inspection to bring this section in line with Section 30.01-10 pertaining to alterations and repair of tank vessels.

"2. That small tank vessels similar to the HAROLD REINAUER be equipped with a modified Butterworth system to insure against improperly washed-out cargo tanks.

"3. That tank hatch openings should be first dogged down hand tight and then set up with a non-sparking wrench.

"4. The Board directed the recorder to prepare charges against the master of the HAROLD REINAUER, John H. Pyre, license No. [redacted], for negligence in failing to comply with provisions of Title 46 CFR 30.01-10 and Title 46 CFR 35.01-1."

Chief, MSI Division to
Commandant

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(HAROLD REINAUER - C-1 Bs)

REMARKS

6. 46 CFR 35.01-1 provides that riveting, welding, burning or like fire-producing operations shall not be undertaken within or on the boundaries of bulk cargo spaces or in spaces adjacent thereto, until an inspection has been made to determine that such operations can be undertaken with safety. The hot work being performed was on the waist of the port side of the navigating bridge with two intervening vertical non-cargo spaces between it and the deck boundary of No. 4 tank which had been filled with water. Under the circumstances due to remoteness the space in which such hot work was being performed cannot be considered adjacent to the bulk cargo tank and hence hot work therein cannot be considered in contravention of 46 CFR 35.01-1.

7. 46 CFR 30.01-10 captioned "Application of Regulations Governing Alterations or Repairs - TB/ALL" provides - when minor alterations or minor repairs of tank vessels become necessary, such work shall be under the direction of the Officer in Charge, Marine Inspection, and shall be in accordance with the regulations in effect at the time the vessel was contracted for or built, or in accordance with the regulations in effect for new construction insofar as possible. 46 CFR 30.01-10 relates to major and minor alterations and repairs for which plans and specifications are required under the provisions of 46 CFR 31.10-25.

8. Any violation of the requirements of 46 CFR 35.01-1 and 46 CFR 30.01-10 by the HAROLD REINAUER at the time subject casualty occurred would have been technical in nature since the record does not indicate the violation of said sections in any way contribute to the cause of the casualty.

9. The Recommendations of the Board, Conclusions and Opinions, paragraph 9, and Recommendations, paragraphs 1 and 2 do not appear to be relevant since the cause for the casualty could not be determined. Such recommendations, however, will be referred to the Merchant Marine Council for consideration.

10. Subject to the foregoing remarks, it is recommended that the Findings of Fact, Conclusions, Opinions and Recommendations, of the Marine Board of Investigation be approved.

[redacted]

Chief, MVI Division to
Commandant

16 September 1952
(HAROLD REINAUER - C-1 Bd)

FIRST ENDORSEMENT to MVI memorandum of 16 September 1952 M

From: Chief, Office of Merchant Marine Safety
To: Commandant

Subj: Marine Board of Investigation; explosion on MT tanker HAROLD REINAUER, Boston, Massachusetts, 7 May 1952

Forwarded, recommending approval.

APPROVED: 24 September 1952

[redacted]

MERLIN O'NEILL
Vice Adm., U. S. Coast Guard
Commandant