

TREASURY DEPARTMENT  
UNITED STATES COAST GUARD

ADDRESS REPLY TO:  
COMMANDANT  
U.S. COAST GUARD  
HEADQUARTERS  
WASHINGTON 25, D.C.



MVI-3  
(BEREAN -  
UNION RELIANCE  
a-8 Bd)  
8 APR 1963

Commandant's Action

on

Marine Board of Investigation; collision between  
M/V UNION RELIANCE, Chinese flag, and M/V BEREAN,  
Norwegian flag, in Houston Ship Channel on  
7 November 1961 with loss of life

1. The record of Marine Board of Investigation convened to investigate subject casualty, together with its findings of fact, conclusions and recommendations has been reviewed.

2. The M/V BEREAN, a Norwegian tank vessel of 9003 gross tons, loaded with various oils and chemicals, including a cargo of acrylonitrile contained in Number 1 tank across, arrived off Galveston Bar, Texas, on the evening of 7 November 1961. At 2115, upon receiving a pilot on board, the vessel, with a draft of approximately 19 feet forward and 25 feet aft, proceeded up the Houston Ship Channel at an approximate speed of 14 knots, reducing speed as necessary when meeting or passing other vessels. On reaching the vicinity of Morgan Point, an outbound vessel was observed ahead. As the BEREAN approached Beacons 71 and 72 the outbound vessel, later identified as the UNION RELIANCE, was observed entering the bend at "Five Mile Cut" near Beacon 75. The BEREAN, then on the inbound channel range at full speed, reduced speed to half ahead and then slow ahead. The outbound UNION RELIANCE was observed to negotiate the slight turn in the channel at Beacon 75 while close aboard the starboard or West side of the channel. At this point, with the two vessels approximately 1 mile apart, the pilot of the BEREAN ordered one blast of the whistle for a port to port passing. Immediately thereafter the UNION RELIANCE was observed to sheer cross channel and the BEREAN's pilot heard the vessel sound three blasts and drop her anchor. The BEREAN's pilot immediately ordered right rudder, full astern, three blasts on the whistle and the mate on the bridge was instructed to proceed forward and drop the anchors. At this moment the master of the BEREAN appeared on the bridge and, observing the situation, jingled the engine room telegraph for emergency full astern and, upon instructions from the pilot, sounded the danger signal on the ship's whistle.

Approximately 2 minutes following the full astern bell, the BEREAN was felt to ground gently on the east channel bank. Immediately following the grounding the bow of the UNION RELIANCE made contact with the port bow of the BEREAN at an angle of approximately 50 to 60 degrees between centerlines. After raking the BEREAN's side, the bow of the UNION RELIANCE penetrated the BEREAN at Number 1 cargo tank just aft of the break in the forecastle. The area of penetration was immediately engulfed in flames which spread rapidly throughout the length of the UNION RELIANCE.


3. The UNION RELIANCE (ex-MORMACLAND), a Chinese freighter of 7638 gross tons laden with general cargo including a forward deck cargo of approximately 200 drums of citronella departed Long Reach Dock, Houston, Texas, at 1830 on 7 November 1961, with a Houston Ship Channel Pilot on board, bound for New Orleans, Louisiana. Approximately 2 hours following departure, while in the vicinity of Adams Terminal, the vessel experienced a steering casualty which necessitated anchoring to effect repairs. Upon discovering that one brush holder in the starboard steering engine motor was grounded, control was shifted to the port steering motor and, after several tests of the steering mechanism, the trip down channel was resumed. Speed was set at full ahead (maneuvering speed) which is estimated to have been approximately 9 knots. Upon approaching the slight bend in the channel in the vicinity of Beacon 75 the pilot ordered port rudder followed by "ease to 10 degrees port" and then amidships. When the rudder angle indicator reached 5 degrees port the helmsman reported that the wheel was jammed and would not move in either direction. Upon shifting to gyro-electric it was found that, although the gyro-electric steering wheel would turn, the rudder would not respond. The main engines were immediately put to slow ahead, stop and then full astern and the danger signal was sounded on the ship's whistle. As the engines commenced astern motion the pilot ordered the starboard anchor dropped and approximately 2 minutes thereafter ordered the port anchor dropped with instructions to hold both anchors. The Chief Engineer, in company with the Second Assistant, proceeded to the steering flats moments before impact, but failed to observe any malfunctioning.

4. The UNION RELIANCE continued to sheer cross channel to port with both anchors down and, at 2315, her bow made contact with the port side of the BEREAN penetrating the BEREAN's Number 1 cargo hold to a depth of approximately 10 feet. The acrylonitrile cargo in the BEREAN's Number 1 tank sprayed over the forward half of the UNION RELIANCE and the resultant flames rapidly engulfed the forward portion of the vessel up to and including the deckhouse area. The intensity of the fire and smoke caused the crewmembers to flee to the after living quarters and also forced evacuation of the engine room. The fire continued to spread to the after portion of the vessel prohibiting the launching of all but the after starboard lifeboat.

5. As the result of this casualty twelve persons aboard the UNION RELIANCE including the pilot lost their lives and two others suffered burn injuries. There were no personnel injuries nor lives lost aboard the BEREAN although the vessel sustained extensive hull damage. The UNION RELIANCE, in addition to damage resulting from impact, suffered extensive hull damage as the result of the fire which continued to burn for about three days following the collision. Due to the intensity of the fire in the area of the pilot house, the steering mechanism within that portion of the vessel was completely destroyed. Later examination revealed no malfunctioning of the steering components in the after steering engine room.

#### REMARKS

1. Concurring with the Board, it is considered that this casualty was caused by a steering gear failure aboard the UNION RELIANCE, confined to that portion of the steering mechanism which was destroyed by fire.
2. The Board's conclusion that no toxic effects were felt by the crew of either vessel is not fully concurred in. Acrylonitrile appears to act similarly to cyanide, inhibiting the utilization of oxygen. Small vapor concentrations may cause symptoms upon prolonged exposure while concentrations in greater degrees may be dangerous to life on short single exposures. If exposure to the vapors is great enough, loss of consciousness will ensue followed by cessation of respiration (asphyxia) and finally death. Therefore, considering its toxicological data, and since autopsies were not performed on those persons who lost their lives in this casualty, the part played by acrylonitrile vapors, if any, is not determinable.
3. Concerning the Board's recommendation to amend 46 CFR 92.07 to require Class B bulkheads within all public spaces and crew's sleeping quarters, this subpart already provides that all joiner work within accommodation spaces be of incombustible materials. This requirement, a recent amendment to the regulations for cargo vessels, exceeds the requirements of the 1960 SOLAS Convention and is felt to provide adequate fire protection for a new cargo vessel. U. S. flag cargo ships of this size already comply with this requirement since it has been the practice in this country for many years for owners to specify incombustible joiner work for new cargo ship construction. Therefore, any further amendment at this time is not warranted.
4. Where not in conflict to the foregoing, the record of the Marine Board of Investigation is approved.



D. MCG. MORRISON  
Vice Admiral, U. S. Coast Guard  
Acting Commandant

UNITED STATES COAST GUARD

ADDRESS REPLY TO  
 Commander  
 Eighth CG District  
 New Orleans, Louisiana



2 February 1962

From: Marine Board of Investigation  
 To: Commandant (MVI)  
 Via: Commander, Eighth Coast Guard District

Subj: MV UNION RELIANCE and MV BEREAN; collision and fire in Houston Ship Channel, 7 November 1961, with loss of life

Findings of Fact:

1. The Chinese dry cargo motor vessel UNION RELIANCE and the Norwegian motor tank vessel BEREAN collided at 2315 CST, 7 November 1961, in the vicinity of Houston Ship Channel Buoy #73 (ACLL Page 896). Fire and explosion followed the collision. As a result of this casualty ten crew members and the Pilot of the MV UNION RELIANCE lost their lives. Three other crew members were hospitalized because of burns received, and one of these men later died from his injuries. Both vessels incurred extensive hull damage. In addition to the collision, the hull of the MV UNION RELIANCE suffered extensive fire damage. The cargo of the UNION RELIANCE in No. 1 and 2 and 3 holds was a total loss.

2. Name	BEREAN	UNION RELIANCE (ex-MORMACSUN)
Call sign	JXNG	BKBF
Service	bulk oil and chemicals (all cargo tanks equipped to carry Grade-A cargo)	general dry cargo
Built	1961	1940
Gross tons	9003	7638
Net tons	5029	4571
Length over-all	508' 06"	492' 00"
Breadth	65' 00"	69' 08"
Depth	35' 06"	
Propulsion	One AB Gotaverken super-charged diesel engine. Two-cycle acting direct reversible.	Four Busch Sulzer diesels, each with seven cylinders, with electromagnetic slip couplings and straight reduction gear.

Home port	Oslo, Norway	Keelung, Formosa
Owner/operator	A/S A.O. Anderson & Co. Eftf, Oslo, Norway	China Union Lines, Ltd., Formosa
Local agents	Texas Transport & Terminal Co. Cotton Exchange Bldg. Houston, Texas	Abaunza SS Agency Corp. Marine Building Houston, Texas
Master	Olav Steen LARSEN	Hsu WEN-TSAI

3. The following named seamen died as a result of this casualty:

<u>Name</u>	<u>Passport No.</u>	<u>Position</u>	<u>Birth date</u>
Chen TEH-YAO	TF-102568	Second Mate	17-6-29
Hsai LIANG-KAN	TK-189323	Ordinary Seaman	23-1-27
Hu AH-WANG	TF-104947	Carpenter	1-12-20
Huang A-TANG	TK-180557	Able Seaman	20-8-25
Koo KUANG-YAN	TF-101887	Oiler	8-9-28
Lan JUNG-CHAU	TF-103737	Chief Mate	26-11-27
Pao FUH-GEN	TK-189412	Boatswain	10-12-21
Ting CHEA-FAH	TK-189316	Quartermaster	24-1-12
Wu HSING-REI	TF-104243	Second Ast. Engr.	27-1-34
Wu SHIH-MING	TF-103300	Radio Operator	20-4-25
Yuan SING-WANG	TF-104954	Quartermaster	12-5-15
David O. DUNCAN	6415 Pinehurst Houston, Tex.	Pilot USCG License Serial #212329, Z-242029	23-7-03

4. At the time of the casualty the wind was E'ly, force 4, air temperature 58°, visibility good, tide flooding and a slight sea. The weather remained about the same for the next four hours.

5. Both ships were equipped with radar, but neither set was being used, and radar played no part in the casualty.

6. The Norwegian motor tankship BEREAN arrived off the Galveston Bar on 7 November 1961. The vessel was partially loaded with various oils and chemicals, including in No. 1 tank across, a cargo of acrylonitrile. Acrylonitrile is a vinyl cyanide classed as a red label, flammable Grade-C liquid, with toxic characteristics. At 2115 Houston Ship Channel Pilot C. C. Lary, Jr., boarded the vessel. The draft at this time was approximately nineteen feet forward and twenty-five feet aft. The vessel proceeded up the channel without incident, slowing speed as necessary to meet or pass various other ships and tows. Full speed ahead under the then existing conditions was about 14 knots.

7. At approximately 2300 an outbound ship in the vicinity of Morgan Point was observed by the Pilot. As the BEREAN approached Beacon #71 and #72, the outbound vessel, later identified as the UNION RELIANCE, started in to the bend at "five mile" near Beacon #75. The BEREAN, underway at full speed since 2240, and on the inbound channel range, slowed to half ahead and then slow ahead at 2310. The outbound UNION RELIANCE negotiated the slight turn in the channel at Beacon #75 and appeared to be hugging her starboard or west side of the channel. At this point Pilot Lary ordered one blast of the whistle for a port-to-port meeting. The estimated distance between the two ships was then one mile and the BEREAN had just passed Beacons #71 and #72. The UNION RELIANCE appeared to make the slight turn to the left at Beacon #75, but as Pilot Lary watched, she seemed to be sheering across the channel.

8. At the same time the UNION RELIANCE appeared to sheer cross channel, Pilot Lary heard the ship blow three blasts and drop her anchor. The BEREAN's wheel was immediately put to starboard, engines full astern, three blasts sounded on the whistle, and the Mate on the bridge instructed to go to drop the anchors. The full astern bell was logged at 2311. About this time the Master of the BEREAN returned to the bridge, having left it for a few minutes. Pilot Lary instructed the Master to sound the danger signal, and at the same time the Master "pumped" the telegraph to signal maximum speed astern. The bell book shows this happened at 2313.

9. At about this same time witnesses aboard the BEREAN testified that their ship seemed to ground gently on the east channel bank. At 2315, almost immediately after grounding, the bow of the UNION RELIANCE came in contact with the port bow of the BEREAN at about a fifty to sixty degree angle, raking the BEREAN's side and penetrating No. 1 cargo tank just aft of the break in the foc'sle. Immediately that area was in flames which blew onto the UNION RELIANCE, engulfing it in flames from stem to stern. Two small explosions also occurred forward on the BEREAN. The collision

occurred just after the BERREAN had passed Buoy #73, and while she was on the extreme east or starboard bank of the dredged channel. Although a lookout had been posted on the bow of the BERREAN most of the time, he had left the bow to relieve the wheel and his relief had not yet appeared, having gone after some coffee for the Pilot.

10. After the collision and fire, the Master of the BERREAN ordered all but sixteen of his crew to leave the burning vessel in three lifeboats. Pilot Lary maneuvered the BERREAN cross channel so that the stern was also grounded in order to prevent the two ships swinging broadside to each other. The Master flooded the forward pumprooms and some of the empty cargo tanks forward. The crew made a feeble effort to fight the fire with fire hoses. However, no effective fire fighting was done until approximately 0330 when a Coast Guard fire fighting party boarded the foredeck of the burning tanker and poured foam directly into the burning cargo tanks. The Houston Fireboat CAPTAIN CROTTY also assisted materially in extinguishing the fire forward, using streams of water and fog from its monitor stations. The fire on the tanker was under control by 0430. At 0500 tugs made fast to the BERREAN pulled it away from the UNION RELIANCE which was still burning in No. 1, 2 and 3 holds forward of the midships house.

11. The UNION RELIANCE departed from Long Reach Docks in Houston on 7 November 1961 at approximately 1830. The vessel was almost fully laden with general cargo, including a forward deck cargo of about two hundred drums of citronella. Conning the ship was Houston Ship Channel Pilot Dave Duncan. At approximately 2030, while in the vicinity of Adams Terminal, the ship experienced her first steering failure. The main engines were reversed and both anchors dropped in order to avoid collision with the dock. Testimony indicates that it was difficult to hear over the ship's telephone system, and that it was necessary to use messengers from the bridge to relay any emergency messages to the engine room or steering engine room. Examination by the ship's chief electrician revealed that one brush holder in the starboard steering engine motor was grounded. Control was shifted to the port steering engine and after several tests of the steering gear, the trip down-channel was resumed. The Master of the UNION RELIANCE, Hsu Wen-Tsai, stated that the Pilot was aware that one steering engine was inoperative thereafter. The trip downriver was uneventful prior to the collision, and the ship proceeded on full speed ahead at approximately nine knots.

12. This ship is equipped with four diesel engines fitted with magnetic couplings to one shaft. Generally, when maneuvering, two engines are used to go ahead and two engines are used to go astern. Engineers of the vessel stated that it would take about one minute to put all four engines ahead or astern, but to their knowledge the ship had never used four engines to go astern. Testimony was not clear as to whether the ship was proceeding on two or four engines ahead when it approached Houston Ship Channel Beacon #15

at full speed ahead.

13. The UNION RELIANCE made the slight turn to port in the channel, the Pilot ordering port rudder, then ease to ten degrees port, and then to amidships. When the rudder angle indicator reached five degrees port, while returning to amidships, the steering wheel jammed. According to witnesses the quartermaster was unable to turn the wheel in either direction. According to the Master, an attempt was made to switch the steering to gyro electric, but although the gyro electric steering wheel turned, the rudder did not respond. When the steering failed, the main engines were put slow ahead, stop, and then full astern. At the same time, the danger signal was sounded on the whistle. The engine room bell book which survived the fire indicates that the slow ahead bell occurred at 2208; stop at 2208-1/2, and full astern at 2309-1/2. The First Assistant Engineer testified that the first two above bells were in error, being one hour slow. A bell book entry also indicates that No. 3 and No. 4 main engines were reversed for astern movement at 2308-1/2. As the engines started astern, the Pilot ordered the starboard anchor dropped and about two minutes later he ordered the port anchor dropped, and then to "hold" both anchors. Testimony is conflicting as to whether the starboard anchor was ever held, as some witnesses indicate chain was still paying out easy at the time of the collision.

14. When the steering gear failed, one of the Mates on the bridge was sent below to notify the engineers. When notified, the Chief and Second Engineers, in turn, went aft to the steering flats, and although the collision occurred moments after they arrived there, they heard and observed nothing wrong with the steering gear. In fact the Chief Engineer testified he heard the steering engine operate while he was there. An assistant electrician stationed in the steering engine room stated that he observed nothing unusual when the gear was supposedly frozen.

15. The UNION RELIANCE continued to sheer cross channel to her port until she collided with the BEREAN. As the bow of the UNION RELIANCE penetrated the BEREAN's hull, the liquid cargo was sprayed over the UNION RELIANCE and almost at the same time it caught fire, engulfing the ship in a ball of fire. The resulting smoke and fire caused the crew members to flee to the after living quarters. Clouds of heavy, black smoke also forced evacuation of the engine room. The wooden lifeboats amidships were afire and the Manila falls on the after port lifeboat were afire. Hence, only the after starboard lifeboat could be launched, and it left the ship with twenty-three crew men, including two who were seriously burned. After the boat was in the water they picked up the Master who had jumped off the bridge and was swimming in the water.

16. The remaining crew members then organized a fire fighting party and used fire hoses, portable extinguishers, and buckets to successfully



extinguish the many small fires aft. They were unsuccessful in attempts to extinguish the fire in the amidships interior quarters because of the intense heat and flames. Attempts to take a fire hose forward and fight the fire at No. 3 hold were equally unsuccessful because the hoses would not reach from aft to forward. There was also some testimony that the fire hose couplings were of different threads and would not fit all hydrants.

17. The UNION RELIANCE continued to burn for several days in No. 1, 2 and 3 holds, and was towed to an explosives anchorage in Bolivar Roads, Galveston, where the fire was allowed to burn itself out. Charred bodies of five crew members and the Pilot were then removed from the ship. Two of these bodies were found on the foc'sle head, evidently killed by the initial flash fire. The Pilot's body was found inside the midship house on the cabin deck. The remainder of the bodies were found in various locations in the midships section. The bodies of five other crew members were recovered from the ship channel several days after the collision. None of the bodies recovered from the water had on life jackets.

18. After the fire was extinguished, the UNION RELIANCE was boarded. The interior of the midships house was gutted by fire. The bridge area and other upper decks were only shells. Even the heavy glass windows in the saloon and bridge were melted. The hull forward of the amidships house was buckled between frames, and the foredeck by the cargo holds was also deeply buckled. The after portion of the hull, engine room and stern appeared unharmed by fire. Examination of the steering engine room gear and rudder after the fire did not reveal anything, although prior to removal of the ship from the scene of the collision a photo was taken of the rudder, which indicated it to be slightly to starboard. Later at the dock the rudder was found to be hard to starboard. Witnesses stated the UNION RELIANCE had never suffered a steering failure prior to this night and were unable to account for the one just prior to the collision.

19. Captain Starkweather, Master of the Tug RAZORBACK, stated that while underway in the Houston Ship Channel on 7 November 1961, he was overhauled by the UNION RELIANCE near Houston Ship Channel Beacon #77. After the UNION RELIANCE had passed, and while the RAZORBACK and tow were making the bend at Houston Ship Channel Beacon #75, Capt. Starkweather noticed an inbound ship ahead, later identified as the BEREAN. This ship appeared to be heading into her starboard channel bank. He determined this primarily by observing the position of the inbound ship's masthead and range lights. Alarmed at this unusual maneuver, he then observed the outbound UNION RELIANCE to see what she would do. As Starkweather watched, the UNION RELIANCE sheered to her port and towards the BEREAN. According to Starkweather, the collision occurred on the inbound vessel's starboard hand of the channel near the edge, about fifteen minutes after the UNION RELIANCE passed the RAZORBACK and tow. The only whistle signal he recalls

hearing prior to the collision was one whistle blast, at which time the tug and tow were about 100 feet past Houston Ship Channel Beacon #75. Which vessel blew the signal he did not know. The place of collision was estimated as being just above Houston Ship Channel Buoy #73. After the collision occurred and fire ensued, Starkweather called the U. S. Coast Guard by voice radio and then, because he was pushing a gasoline barge, proceeded back up channel.

Conclusions:

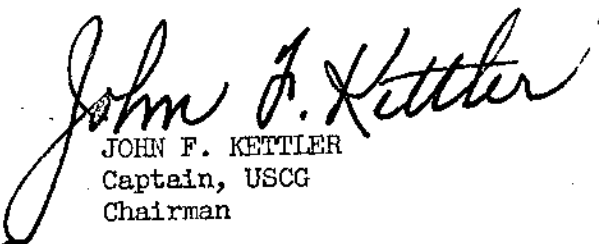
1. From the above facts it is concluded:
  - a. That the primary cause of this casualty was a steering gear failure aboard the UNION RELIANCE.
  - b. That this steering gear failure caused the UNION RELIANCE to sheer across channel, out of control, and collide with the BEREAN.
  - c. That under the existing conditions the BEREAN took the only action possible to avoid the collision.
  - d. That the steering gear system failure was apparently confined to that portion of the vessel which was gutted by fire, inasmuch as the remaining portion of the steering system failed to reveal any defects.
  - e. That the flammable cargo of acrylonitrile carried aboard the BEREAN immediately engulfed the UNION RELIANCE in flames, but no toxic effects were felt by the crew of either vessel.
  - f. That the absence of the lookout from the foc'sle head of the BEREAN prior to the collision, although not a good practice, did not contribute to the casualty and, in fact, probably prevented the loss of additional life.
  - g. That poor performance of the communication system, e.g., telephones, aboard the UNION RELIANCE did not materially contribute to the casualty.
  - h. That the BEREAN was properly equipped to carry Grade-C flammable liquids.
  - i. That both Pilots were serving under authority of their state pilotage license, and no other personnel licensed or certificated by the U. S. Coast Guard were involved.
  - j. That there was no negligence on the part of either pilot; any possible errors being ones of judgment.
  - k. That there was no violation of any law enforced by the Coast Guard.
  - l. That Coast Guard fire fighting assistance rendered was adequate, consistent with its operational capabilities.
  - m. That no Coast Guard personnel or employees of any other Government agency caused or contributed to the casualty.
  - n. That the only apparent way the casualty might have been prevented or the effects of the collision minimized would have been action by the

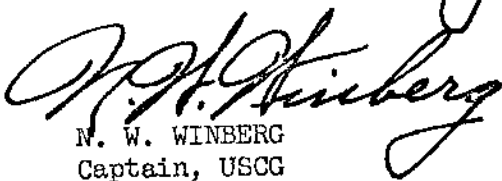
UNION RELIANCE, such as backing full and letting go both anchors immediately after steering gear failure. The testimony indicates that there was probably a time lag of several minutes before taking such action.


o. That had the living quarters amidships been constructed of, and furnished with, fire retardant or fireproof materials, that the persons who lost their life in the midships house might have survived.

Recommendations:

1. That consideration be given to amending 46 CFR 92.07 to require Class-B bulkheads within all public spaces and crew sleeping quarters.
2. It is recommended that the case be closed.

  
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Captain, USCG  
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