

**RECORD OF PROCEEDINGS
OF
BOARD OF INVESTIGATION
INQUIRING INTO LOSSES BY FIRES AND EXPLOSIONS
OF THE
FRENCH STEAMSHIP GRANDCAMP
AND
U. S. STEAMSHIPS HIGHFLYER AND WILSON B. KEENE
AT
TEXAS CITY, TEXAS
16 and 17 April 1947**

(Commonly called Texas City Disaster)

(PART 1)

(Pages 1 - 364)



RECORD OF PROCEEDINGS

of a

BOARD OF INVESTIGATION

Convened at

GALVESTON, TEXAS

To inquire into and investigate explosion and fire on
SS GRANDCAMP, Texas City, Texas, 16 April, 1947.

The investigation was finished and the parties withdrawing.

* * * * *

After full and mature deliberation, the board finds as follows:

FINDINGS OF FACT

1. On April 16th at about 9:15 A.M. an explosion occurred in cargo on board the S.S. GRAND CAMP while moored to pier "O" Texas City, Texas. Subsequently the piers, warehouses, industrial plants, tank farms and two other ocean going vessels became involved. The characteristics of the three vessels are as follows:

S.S. GRAND CAMP (French) Formerly S.S. BENJAMIN R. CURTIS
Official No. 243513

Inspected at Galveston, Texas 17 May 1946
Liberty type vessel
Length 422.8', breadth 57', depth 34.8'
Gross tons 7176, net tons 4380
Built at Los Angeles, Calif. 1942
2,500 horsepower
5 cargo hatches (3 forward of 'Midship house and 2 aft.)
This is a flush-deck type vessel.

The S.S. GRAND CAMP was owned by the Republic of France and operated by the Compagnie Generale Atlantique commonly known as the French Line of Paris, France.

S.S. HIGH FLYER Official No. 245681

Inspected at New Orleans, Louisiana 17 July 1946

C-2 type vessel
Length 438', breadth 63.1', depth 27.7'
Gross tons 6,214 Net tons 3,508
Built at Oakland, Calif. in 1944
6,000 horsepower
5 cargo hatches (3 forward of 'Midship house and two aft.)

This is a well-deck type vessel, the forecastle head and poop decks being only slightly raised.

The HIGH FLYER was owned and operated by the Lykes Bros. Steamship Company, Inc. of New Orleans, La.

S.S. WILSON B. KEENE Official No. 246689

Inspected at New Orleans, Louisiana 17 February 1947

Liberty type vessel
Length 422.8', breadth 57', depth 34.8'
Gross tons 7176, net tons 4380
Built at South Portland, Maine, 1944
2,500 horsepower
5 cargo hatches, (3 forward of 'Midship house and two aft.)
This is a flush-deck type vessel.

The S.S. WILSON B. KEENE was owned by the U.S. Maritime Commission and operated by the Lykes Bros. Steamship Company, Inc. of New Orleans, La. under bare boat charter.

2. Shipments of the material involved in the explosion on board the S.S. GRAND CAMP originated at three ordnance plants of the U. S. Army as follows:

Iowa Ordnance Plant
West Burlington, Iowa
Shipper: Transportation Officer

Shipped described as: "Fertilizing Compounds (manufactured fertilizer) NOIBN, dry in paper bags."

Cornhusker Ordnance Plant
Coplant, Nebraska
Shipper: Commanding Officer

Shipped Described as : "Fertilizer Compound (Mfg. Fert.) NOIBN in 100-lb. bags."

Nebraska Ordnance Plant
Firestone, Nebraska
Shipper: Commanding Officer

Shipped described as: "Fertilizer Compound (Manufactured fertilizer), NOIBN, Dry, in paper bags (Fertilizer grade Ammonium Nitrate)"

3. All shipments moved by rail on Government Bills of Lading. Photostatic copies of one B/L from each of the above plant shipments and a record of B/L numbers of all shipments are shown in the exhibits.

4. The material was packed in moisture-proof multi-ply paper bags. Interstate Commerce Commission regulations for transportation of ammonium nitrate do not require specification type bags.

5. The shipping bags were marked as follows:

"Fertilizer
Ammonium Nitrate
Nitrogen 32.5%

Net weight 100 lbs.
Gross weight 101.5 lbs.
Cubic Feet 1.42
Lot No. _____ (blank)"

6. The bills of lading gave consignee as:

"French Supply Council Transit Division
c/o J.D. Latta
Texas City Terminals"

7. destination as:

"Texas City, Texas"

7. J.D. Latta of Galveston, Texas was acting as the freight forwarder handling subsequent transportation of the material.
8. The shipments were delivered to the Texas City Terminal Railway Co. Subsequent to receipt the terminal company unloaded the material and stored it in sections 2 and 3 of their warehouse "O" located on pier "O" Texas City. The French Supply Council were stockpiling material at this facility.
9. The S.S. HIGH FLYER of the Lykes Bros. S.S. Co., Inc. moored alongside the warehouse on Pier "O" had accepted a part cargo of 961 tons of this fertilizer and stowed same in lower hold #3. Upon completion of loading the HIGH FLYER was moved to Pier "A" which is about 700 to 800 feet south of Pier "O" to receive additional cargo consisting principally of "knocked down" railroad freight cars. At the time the HIGH FLYER received its cargo of fertilizer it had on board in lower hold #2 1050 tons of sulphur which had been loaded in the vessel prior to its arrival at Texas City. There was also 950 tons of sulphur in lower hold #4.
10. The S.S. GRAND CAMP of the French Line arrived at Texas City from Houston on the morning of 11 April and moored to Pier "O", bow out, starboard side to the pier.
11. Upon arrival the principal cargo on board was 59000 bales of pure sisal binder twine, stowed in #1 starboard deep tank, #2 tween deck, #4 tween deck and #5 lower hold. 2501 bales of tobacco and 2501 bales of tobacco in leaf, stowed in #1 tween deck and #5 lower hold. 9334 bags of shelled peanuts in #2 tween decks. 16 cases of munitions described as small arms ammunition in #5 tween deck. 380 bales of H D compressed cotton in #5 lower hold. Approximately 200 boxes of Oil Well and Agricultural machinery in #4 tween deck. 18 pieces and 10 boxes of Drill collars and substitutes stowed in #5 tween deck. Miscellaneous items not pertinent to this investigation were stowed in various holds.
12. #2 and #4 lower holds were in proper condition to receive the cargo. At about 1 P.M. on 11 April 1947 the loading of fertilizer cargo commenced. Stevedoring operations which included handling from the warehouse to stowage in the holds was performed by employees of the Suderman Stevedores, Inc., Galveston, Texas. The loading continued until about 8:20 A.M. on the morning of 16 April 1947. At this time there were approximately 2341 tons of fertilizer stowed as follows: 882 tons in lower hold #4 and 1459 tons in lower hold #2.
13. No specific instructions to longshoremen were issued with respect to smoking on the GRAND CAMP during loading operations at Texas City. There was general understanding among the longshoremen that no smoking on deck or in the holds was permitted, but was not respected. Prohibitions against smoking were painted in the French language on various parts of the exterior of the ship. No such signs in English were posted. Control of smoking on deck and in the holds was lax. Smoking on the main deck near #4 hatch during loading was committed.

14. No specific instructions on the stowage of the ammonium nitrate were issued to the longshoremen but stowage was in accordance with the customary practice of the port, at which this material had been loaded on ships at Texas City for a period of more than a year. Bags, containing ammonium nitrate, which were broken or torn during loading into the GRAND CAMP were not refilled or repaired but were stowed in the holds in violation of Section 146.02-14 of the Coast Guard "Regulations Governing Explosives or Other Dangerous Articles on Board Vessels".

15. Hardly without exception all persons concerned with the handling, stowage and transportation of the cargo displayed a lack of knowledge of the provisions of regulations governing the safety of the operations either by land or water.

16. At 5:00 P.M. 15 April 1947, #4 main hatch was closed when loading through that hatch was secured for the night. The tween deck hatch was left open at this time.

17. The longshoremen gangs working #4 hatch reported for resumption of loading at 8:00 A.M. on Wednesday 16 April uncovered the hatch and entered the hold. There were two gangs working at stowage of cargo in #4 lower hold, one starboard and one port. At quitting time the previous evening a draft of bags was lowered into the hold too late to be stowed and this draft rested upon cargo already stowed in the square of the hatch, when the morning shift entered the hold. The port side gang began to stow the bags constituting this draft while the other gang on the starboard side sat down awaiting a draft from the deck. Between 8:15 and 8:20 A.M. one of the members of the idle gang noted smoke on the starboard side of the hold about opposite the center of the square of the hatch and appearing to come up to the top of the cargo from below and in the space between the shell of the vessel and the cargo battens. No flames were visible at this time. The Longshoremen called attention to smoke in the hold and four portable fire extinguishers were reported lowered into the hold. How many were used and their type could not be definitely established. Several members of the crew entered the hold and assisted the longshoremen in applying the contents of the extinguishers to the cargo in the area of the smoke. The smoke did cease temporarily, but immediately thereafter appeared again and at this time small flames showed. After applying the contents of four extinguishers with doubtful effect, flames and smoke made their appearance at other points forward and aft along the shell of the vessel. An alarm was sounded on the ship's whistle. A ship's fire hose was partially lowered into the hatch but at no time was water turned on into this hose. The Second Captain (First Officer) ordered that no water be used although other ship's hose was available and the ship's fire pump was operating at full working pressure. Upon orders from the Captain all persons came up out of the hold, the hatch was covered and tarpaulin put in place and wet down. It is indicated steam was introduced into the hold through the steam smothering system, although this fact is not clearly established. Vent cowls were sealed off using canvas for this purpose. Ammunition stowed in #5 tween deck was moved away from the forward bulkhead and three cases were moved up deck and deposited aft of the deck house. The contents of the boxes that were moved to the deck were small arms ammunition. The contents

of the remaining boxes are not yet identified. No smoke or heat was observed in #5 hold during the removal operations.

18. After battening down the hatch, the tarpaulin began to billow and later ripped in the area of a corner of the hatch displacing several hatch covers. These covers were not replaced. The fire apparently continued to spread and the volume of smoke, described as orange in color, increased. Up to this time no water was applied directly upon the burning cargo. The crew left the vessel on orders passed by word of mouth and assembled at the outer end of Pier "O". Of the forty-one members of the crew including officers of the GRAND CAMP only seven survived. Of these, five are known to have left the pier prior to the explosion. In response to the alarm fire apparatus and personnel arrived at the scene. Several pictures of the fire department preparing for action, the ship burning, and the firemen applying water form part of the record. It is not determined how many hoses were eventually brought to bear. How effective those efforts were or how effective they ever would be, with the greater portion of #4 hatch covers in place is doubtful.

19. All personnel of the Texas City Fire Department that responded were lost (27 in number) and only portions of four bodies have been recovered and identified. Four pieces of fire apparatus were destroyed to the extent that only parts of one piece could be identified. The Texas City Fire Department was a volunteer organization having only two or three paid personnel. The terminal does not have a manually operated fire alarm system. There are no fire alarm boxes on Pier "O". There was an 8" water main to the pier with risers at intervals along the pier. Water was supplied from tower tanks and a pump of the Texas City Terminal Railway Co. The water supply system of Texas City could be "cut into" the companies fire line.

20. About 9:15 A.M. approximately fifty-five (55) minutes after the discovery of the fire the eight hundred and eighty two (882) tons of fertilizer in #4 lower hold detonated and in close sequence caused the fourteen hundred (1400) tons in #2 lower hold to detonate, resulting in the complete destruction of the SS GRAND CAMP.

21. The explosion generated tremendous pressure but appears to have lacked the shattering destructive characteristics of an equivalent amount of a nitro-high explosive. The board's observations at the scene, were that within a radius of one-half mile from Pier "O" the missile pattern was a missile to every 2 square feet. Missiles ranged in size from a rivet head to a portion of ships' structure estimated to weigh 60 tons. Missiles indicated a shearing tearing type of rupture to the vessels' structure and equipment. Missile travel indicates excessive force at point of origin. The location of identifiable missiles indicated high trajectory. 60% of Pier "O" was demolished. The remaining 40% was damaged beyond repair. The nitrate in the warehouse on Pier "O" may have detonated. However an undetermined amount remained intact in the debris. All of the above indicates an explosion of high order.

22. The explosion on the GRAND CAMP initiated a series of incidents. Fire broke out at various points in the marine terminal including

houses "O", "A", "C", "D" and "E". Fire in the plant of the
anto Chemical Co. caused a dense black smoke to be carried over and
blanket the pier area throughout the day and night. The fires in ware-
house "O" and "A" carried fumes of burning sulphur stored in warehouse
"A" across the SS HIGH FLYER and SS WILSON B. KEENE.

23. On the morning of 16 April, 1947, and prior to the explosion of
the GRAND CAMP, the S.S. HIGH FLYER was moored at pier "A" with its
star-anchor underfoot. The vessel was portside to the pier, bow out,
its stern close up to the bulkhead. The HIGH FLYER was a "dead ship"
its turbine casing being lifted for purpose of inspection. Twenty
four to thirty hours would be required to make the engine operable.
With knowledge of the fire on the GRAND CAMP, loading of the HIGH
FLYER was suspended, hatches were closed and tarpaulins laid, assumed
fire stations in response to the vessels alarm, water pressure was put
on the fire mains, firehose was led out and tarpaulins and other parts
of the ship wet down.

24. Similar action with reference to security was taken on board the
SS WILSON B. KEENE which was moored to Pier "B" on the south side of
the slip in which the HIGH FLYER was berthed. The KEENE was berthed
"bow in" with her bow approximately opposite the bow of the HIGH
FLYER. The vessel had been loading a cargo consisting only of flour
and had on board 445 tons. In an extreme emergency it would have been
possible for this vessel to get under way in thirty minutes but would
require assistance of tugs to get clear of the harbor.

25. The blast of the GRAND CAMP explosion caused the mooring lines
of the KEENE to part leaving the vessel adrift. The port anchor was
dropped and that brought the bow in toward the dock. A bow and a
stern line were then run to the pier. Considerable damage occurred
to the light structural parts of the vessel especially throughout
the quarters. Decks were buckled, hatch covers blown off, steam
lines ruptured and engine room filled with steam making entrance
hazardous if not impossible and preventing determination of extent
of damage therein. Personnel in engine room made their escape by
shaft tunnel and escape trunk reported line shaft bearings and
pedestals dislodged.

26. The blast the GRAND CAMP explosion caused some of the mooring
lines of the HIGH FLYER to part and the vessel to drift away from the
pier. The mooring lines remaining were let go and the vessel fetched
up alongside the KEENE with her #3 hatch about opposite hatch #4 of
the KEENE. Both vessels remained in this position until the second
explosion occurred.

27. The HIGH FLYER sustained damage as a result of the explosion on
the GRAND CAMP. Electric power was lost by reason of circuit breakers
tripping. Generators stopped dead. Light steel bulkheads in living
quarters were split, ripped open and projected into the passageways.
were jammed. Furniture was dislodged. Cargo in holds #3 and #4 was
mashed and mixed together. Hatch covers of the pontoon type were blown

28. After the explosion considerable confusion naturally existed on
both the HIGH FLYER and the KEENE. Effort was made to locate and
the injured crew members. The power plant of the HIGH FLYER was

secured. Necessity of medical attention for the injured, the shock and dazed condition of many of the crew, and the presence of smoke together with fumes of burning sulphur made it mandatory that all personnel leave the ships. By 10:30 A.M. all of the crews had departed. There was no evidence of fire on board either ship at this time.

29. Prior to the explosion, the steel barge LONGHORN II was moored at the bulkhead end of pier "O" at a slight angle to the straight line of the pier. This barge is a bulk hydrochloric acid carrier having four unfired pressure vessel type of tanks in her hold. The barge is 150' long x 28' beam x 8' depth. After the explosion the barge was found on shore about 100 feet from its berth with its long axis at approximately right angle to the line of Pier "O", inshore of a railroad track bumper which stood about four feet high. The side of the barge rested against the bumper. Damage to the barge appeared negligible. Against the opposite side of the barge and in line with the railroad track bumper a section of the stern of a vessel, (presumably that of the GRAND CAMP) estimated to weigh fifty tons, was resting.

30. As of 8:00 A.M. April 24, 1947 out of a crew of forty in the SS WILSON B. KEENE two are dead namely:

Walter R. Ferguson, Ordinary Seaman, Z-522912-D1
8 Braddock St., Braddock, Pennsylvania.

Patrick Ezekiel, Ordinary Seaman, Z-334821-D1
Harbor Me. Conception, Newfoundland; and

five missing, namely:

C. J. Post, 3rd Mate, Z-94591
3308 Nashville Ave., New Orleans, La.

Thomas Carthy, Ordinary Seaman, Z-577968
229-11 Columbus Dearborn, Michigan

Donald Norris, Messman, Z-523162
146 West Marin Port Jarvis, N. Y.

R. Vego, 2nd Cook, Z-93216
(address not given)

P. J. Bouterie, Utility, Z-80701
638 South Mirs St., New Orleans, La.

31. As of 8:00 A.M. April 24, 1947 out of a crew of thirty-nine in the SS HIGH FLYER one is dead, namely:

H. Vallee, 2nd Cook, Z-862521
1312 Dauphine St., New Orleans, La.; and

one is missing, namely:

Oderico C. Chaves, Oiler, Z-763753
Manila, P. I.

32. In response to a phone call from Texas City, by an unidentified person, the G and H Towing Co. dispatched tugs ALBATROSS and PROPELLER which tugs departed Galveston 8:50 A.M. 16 April 1947 for Texas City.

Prior to arrival an explosion was heard. Upon arrival at approximately 9:50 A.M. found it impossible to enter the harbor; sighted and removed survivors from the soil bank forming east bank of turning basin. Both tugs took survivors aboard some being severely injured and returned to Galveston with these survivors. This was the only activity at Texas City by commercial tugs until late that evening.

33. At about 8:00 P.M. that evening the Vice-President of the Texas City Terminal Railway Co. called Mr. J. G. Tompkins of Lykes Bros. Steamship Co. explaining that rumors of another explosion likely to occur because of the presence of the HIGH FLYER had caused rescue workers to leave the pier area and requested that tugs be sent to remove the vessel from the slip. Tompkins called the G & H Towing Co. Difficulty was experienced in securing immediate dispatch of tugs. The manning of the tugs, men to go aboard and handle lines on the HIGH FLYER, gas masks, oxy-acetylene burning equipment and other conditions required many telephone conferences and final assembly of all hands at Pier 10, Galveston, where agreement to proceed was reached and four tugs departed for Texas City at about 10:15 P.M. Two representatives of Lykes Bros. Steamship Co. were aboard one of the tugs to supervise the operation.

34. Tugs arrived at slip A Texas City from 11:00 to 11:20 P. M. Sparks and burning embers were observed coming from one of the forward holds of the HIGH FLYER. No fire was observed on this vessel earlier than 6:00 P.M. at which time fire in the vicinity of #4 hatch was seen by rescue workers that were searching the vessel. Securing a tow line to the stb'd anchor chain two tugs in tandem attempted to tow the HIGH FLYER out of the slip resulting in parting of tow line without moving the ship. One tug then went alongside the vessel and Lykes representatives, the pilot and men to man the lines boarded the vessel. Another tug moored up to the starboard bow and the oxy-acetylene crew burned off the anchor chain. A ten-inch hawser was passed from the ship to one of the tugs. In tandem another attempt was made to tow the HIGH FLYER from the slip. The work-crew on board the vessel had cut all lines forward and all lines abaft #4 hatch, smoke and fumes preventing examination or access to the midship portion of the starboard side of the vessel. At this time cargo in #2 and #4 hatches was on fire. A white smoke was issuing from #3 hatch.

35. Because of smoke, fire and fumes of burning material conditions aboard the ship became untenable and one of the tugs took the personnel off the HIGH FLYER and all tugs proceeded out of the area. One tug remained in the basin to observe conditions. At this time, about 12:55 A.M. 17 April 1947, the area was ordered evacuated. The order was being complied with when the HIGH FLYER exploded about 1:10 A.M. The observing tug (J.R. Guyton) was damaged, some of the persons on board were injured, and a tug returned and towed the Guyton to Galveston. The loss of life as a result of this explosion is reported as one. The injured reported as from 35 to 100.

36. The explosion completely destroyed the HIGH FLYER and that portion of the WILSON B. KEENE abaft #2 hatch, and wrecked the remaining portion of this vessel. Warehouse "B" was completely demolished except for a short section at the shore end which was severely damaged. A considerable section of Pier "B" was demolished. The explosion was

of a high order, duplicating the characteristics and end results of the explosion of the GRAND CAMP.

37. Immediately following the first explosion all Coast Guard craft available in Galveston proceeded to Texas City. Upon arrival they participated in fire and rescue efforts and were instrumental in caring for many of the injured and later transporting them to Galveston. A number of bodies were also recovered and cared for. Later in the day Coast Guard craft were augmented by Coast Guard Auxiliary craft and personnel from Houston, Texas, members of the Coast Guard Auxiliary of Galveston reported to the Galveston Lifeboat Station and were assigned duty on Coast Guard boats, increasing the personnel on these boats to efficient strength.

38. The CGC IRIS arrived at Texas City about 10:40 A.M. Took injured and dead on board. Received orders by radio to evacuate area. Transported injured to Galveston. Returned Texas City 1500. The Commanding Officer deemed it impossible at any time while at Texas City to enter the slip and attempt to extinguish reported fire on board vessels or to tow the vessels out due to smoke, acid fumes and debris in and under water in slip. At 1940 received message from Army authorities to evacuate waterfront area due to expectation of explosion. At this time impossible to determine conditions inshore due to increasing volume of dense smoke and fumes. Departed for Galveston. Upon arrival departed by automobile for Texas City to determine if possible, actual conditions in marine terminal. While at Texas City was advised fire on board vessels was extinguished and vessels were being removed by commercial tugs.

39. Testimony before, and visual observation by the board, clearly demonstrated the effectiveness and practicability of the CG-64309 type of boat for normal and emergency work, especially fire fighting.

40. No personnel of the Coast Guard was guilty of any neglect or inattention to duty.

41. None of the licensed or certificated personnel of the SS HIGH FLYER and the SS WILSON B. KEENE committed any act of misconduct, inattention to duty, negligence or wilful violation of any law or regulation.

42. The shipping officers of the U.S. Army, Iowa Ordnance Plant, West Burlington Iowa; the Cornhusker Ordnance Plant, Coplant, Nebraska; and the Nebraska Ordnance Plant, Firestone, Nebraska; violated Section 417 of the Interstate Commerce Commission regulations governing the Transportation of Explosives and Other Dangerous Articles, dated 7 January 1941, and in effect at time of shipment, by describing the substance offered for transportation by rail under a shipping name not authorized by subject regulations.

43. Ammonium nitrate has been named as a dangerous substance, in Coast Guard regulations governing Transportation of Dangerous Articles on Board Vessels, since April 9, 1941. The regulations classify the nitrate as an oxidizing material. Despite these and other provisions of said regulations the J. D. Latta representative did not consider it as hazardous cargo. The manager of the Galveston, Texas, office of J. D. Latta, Mr. A. Clark violated provision of Section 146.05-13(a) and (b) by not advising the vessel operator in writing, in advance, regarding the characteristics of the shipment in conformity with the applicable regulations.

44. The officer of the SS GRAND CAMP normally designated as responsible for the supervision of loading cargo, i.e. the cargo officer, violated provisions of Section 146.02-14 (a) of the U.S. Coast Guard regulations governing Explosives or Other Dangerous Articles on Board Vessels by permitting damaged containers of ammonium nitrate to be placed in stowage on board the vessel.

45. The fire on the SS GRAND CAMP which preceded the explosion was of undetermined origin.

46. Smoking on board merchant ships in many United States ports is difficult to control by ships' officers. Smoking on deck and in the holds while cargo is being handled is not uncommon. Efforts to strictly enforce no smoking restrictions are met with threats by longshoremen to walk off the ship.

47. The methods of combatting the fire on the GRAND CAMP in its early stages were futile. The procedure of closing the hatch and sealing the ventilators increased the danger potentiality of the fires and caused a serious delay in the later introduction of water into this hold. The introduction of steam resulted in raising the temperature of the mass of the cargo in the hold. The action of the Second Captain of the GRAND CAMP in ordering that no water from the ships fire hose be applied to the fire in its early stages resulted in eliminating all opportunity of the city fire department to combat the fire upon their arrival.

48. At Texas City within a radius of 7000 feet from the berth at which the GRAND CAMP lay were located the plants of the Monsanto Chemical Company, Humble Oil and Refining Co., Stone Oil Co., Republic Oil Refining Company, 11 warehouses, 9 piers, one grain elevator, and two thirds of the residential area of Texas City. Outward from this sector and within a radius of 3 miles were located the plants of the Tin Processing Corporation, Pan-American Refining Corporation, Carbide and Carbon Chemical Company and the remainder of the residential area. Within this congested area were hundreds of oil tanks, stills, connecting pipe lines, and supply lines to tanker loading and discharge piers.

49. As is usual under circumstances involving explosions, testimony of persons involved varied and many witnesses were in a plainly shocked or dazed condition when appearing before the board. In some instances their testimony was of small value. Important witnesses that would have been best qualified to testify to events on the GRAND CAMP up to the time of the explosion were either killed or so seriously injured as to be unavailable to the board.

50. The number of casualties resulting from the explosion of the SS GRAND CAMP up to and including 24 April 1947 are as follows:

Dead 433

Missing 128

Urged on by natural curiosity many persons employed in the area or residing in Texas City came to the scene to observe the fire. This contributed in no small measure to the high casualty total.

51. Under the stress of circumstances following the outbreak of fire on the GRAND CAMP the lack of an organized disaster plan was plainly evident. Unauthorized persons assembled close to the burning vessel. Following the explosion many heroic persons volunteered for and performed herculean efforts to rescue the injured and carried out many other tasks of mercy. However the Coast Guard vessels were in receipt of conflicting orders requesting action on the waters of the port which were followed by orders to evacuate the area. Coordination of shore and floating facilities left much to be desired. As an illustration, at 7:40 P.M. 16 April 1947 one authority, by radio, ordered all vessels to leave the waterfront because of danger of an explosion, yet approximately fifteen minutes later another authority requested by phone that tugs be sent to remove the SS. HIGH FLYER.

OPINIONS

1. That the fire in lower #4 hold of the GRAND CAMP started between 8:10 a.m., April 16, 1947, the time longshoremen entered the hold, and 8:20 a.m., that date when it was discovered and that it was caused by unauthorized smoking in the hold.
2. That the fire could have been extinguished in its early stages if water had been applied by means of the fire hoses of the GRAND CAMP immediately after discovery of the fire.
3. That even if the fertilizer had been described in all shipping papers as "ammonium nitrate" the end result would have been the same.

RECOMMENDATIONS

1. That the action of the originating shippers, in tendering for shipment by rail, ammonium nitrate described by an unauthorized shipping name in violation of Section 417 of Interstate Commerce Commission Regulations for Transportation of Explosives and Other Dangerous Articles, dated January 7, 1941, be brought to the attention of the Interstate Commerce Commission for their action.
2. That the action of J. D. Latta of Galveston, Texas, the ocean shipper through its Manager, Mr. Arthur Clark of Galveston, Texas, in failing to notify the vessel operator in advance regarding the characteristics of the shipment of ammonium nitrate tendered to the SS GRAND CAMP at Texas City, Texas, in violation of Section 146.05-13(a) (b) (c) of U. S. Coast Guard Regulations Explosives or Other Dangerous Articles on Board Vessels be referred to the Department of Justice for their action.

3. That the operators of the SS GRAND CAMP, Compagnie Generale Atlantique, Paris, France, through the action of the Master of the vessel in accepting on board said vessel damaged containers of ammonium nitrate as cargo at Texas City, Texas, violated provisions of Section 146.02-14(a) of the U. S. Coast Guard Regulations Explosives or Other Dangerous Articles On Board Vessels and that the violation be referred to the Department of Justice for their action.
4. That action be taken to bring to the attention of shippers, vessel owners, masters and others concerned with the handling and transportation of dangerous cargoes by water of the scope and contents of the U. S. Coast Guard Regulations "Explosives or Other Dangerous Articles on Board Vessels". The fact that these regulations were issued eight months prior to the outbreak of the war, and that during the war the handling and transportation of dangerous cargoes was actually supervised and controlled by Federal agencies, whereas today federal supervision is nil, may be responsible for a widespread lack of knowledge of the requirements of the regulations.
5. That Congress be requested to authorize and appropriate funds, to permit a designated federal agency to:
 - (a) Establish an office for the purpose of collecting, evaluating and disseminating data on the art of fire prevention and extinguishment of fire on board merchant vessels.
 - (b) Prepare and publish a fire prevention and fire extinguishment manual for use on board merchant vessels.
 - (c) Establish and operate a fire fighting school for the training of key operating personnel of merchant ship operators, stevedores and related marine activities.
6. That regulations entitled "Explosives or Other Dangerous Articles on Board Vessels" 9 April 1941 be reviewed for the purpose of determining necessity of amendment to or addition of provisions as follows:
 - (a) Section 146.22-100 Ammonium Nitrate. Consider deletion of authorization of wooden barrels, wooden kegs, wooden boxes, Fiberboard boxes, Fiber drums, Plywood drums and bags and provide in lieu thereof metal drums. Permit barrels, kegs, boxes and drums provided they have inside metal containers.
 - (b) Section 146.22-100 Ammonium Nitrate. Require specification containers.
 - (c) Section 146.22-100 Ammonium Nitrate. Require labels on containers of nitrates.
 - (d) Sections 146.03-1 to 38 inclusive. Add a section defining a "Shipper".

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- (e) Section 146.05-1 to 17 inclusive. Add a section requiring the shipper, in addition to information presently required on shipping papers, to notify the vessel, in writing, at the time the cargo is tendered, of the fact the article is dangerous, cite the title of the regulations and give the characteristics of the material.
- (f) Section 146.06-11 Revise this section to make it apply to loading of any dangerous cargo, with appropriate exemptions and require posting of "No Smoking" signs and eliminate use of such signs painted on ships structure.
- (g) Section 146.20-42 Revise this section to apply to all Class "A" explosives by eliminating 500# exemption.
- (h) (No specific section) Consider adding a provision to require application, by shipper, for a permit to load dangerous cargo other than Class "A" explosives and the application to be accompanied by a preliminary cargo stowage plan.

- 7. That inasmuch as no specific funds have been provided for personnel to be assigned to the enforcement of regulations governing the transportation of dangerous cargo on board ships and conceding that the needs for sustaining life, is in many instances dependent upon substances of a dangerous nature, and it being foreseen that the number, kinds and amounts of these substances will in the future increase, consideration be given to requesting Congress to appropriate funds for the purpose of promoting safety in the transportation of these dangerous substances.
- 8. That it be made a requirement of license that Masters and Mates qualify themselves as possessing a satisfactory knowledge of the art of handling, stowage and segregation of dangerous cargo on board merchant vessels.
- 9. That existing boats of the CG-64309 type be retained in active service because of their practicability for harbor work, their ability to perform a multiple of tasks including emergency fire fighting.

/s/ GORDON T. FINLAY
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