

OPINION

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1. That the Naval and Coast Guard personnel killed or injured in this explosion and listed in the Finding of Facts herein were killed or injured in line of duty and not as a result of their own misconduct.
2. That the civil personnel listed in the Finding of Facts herein as having been killed by the explosion were killed while performing their regularly assigned duties and in the service of their country.
3. That the loss of and damage to government property and privately-owned vessels caused by this explosion were incident to the prosecution of the war.
4. That the amount of damages caused to government-owned property is \$9,892,034.74.
5. That the amount of damage suffered by the M. S. REDLINE does not exceed the sum of \$136,840.00, the cost of repairs, and \$11,437.57, the expenses incident thereto, totaling \$149,277.57, which is greater than the sound value of the vessel, which did not exceed \$150,000.00, less the value of the vessel in her damaged condition.
6. No opinion is expressed as to the amount of damages suffered as the result of death, personal injuries or by small craft, as these claims have been delivered to the Board of Investigation for consideration.
7. That the establishment of a facility such as the U.S. Naval Magazine, Port Chicago, was necessary in this area and the location was well chosen.
8. That the development of the Naval Magazine, Port Chicago, to maximum efficiency and capacity as a loading facility was retarded by the following circumstances which were beyond the control of the Officer in Charge, Naval Magazine, Port Chicago, and the Commanding Officer, Naval Ammunition Depot, Mare Island, California:
  - a. A general failure to foresee and prepare for the tremendous increase in explosives shipments.
  - b. A failure to assemble and train the officers and crew for their specialized duties prior to the time they were required for actual loading.
  - c. A failure to provide initially the collateral equipment so necessary for morale.
  - d. A failure to provide an adequate number of competent petty officers or even personnel of petty officer caliber.
9. That the Commanding Officer, Naval Ammunition Depot, early realized the necessity for expansion, for trained officers and the importance of collateral equipment. He made every reasonable effort to obtain these.
10. That the operation of the Naval Magazine, Port Chicago, as an annex of the Naval Ammunition Depot, Mare Island, is sound and proper.
11. That the internal organization at Port Chicago is sound and proper.

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12. That the training of the officers was the best possible under existing circumstances. That the dissemination of pertinent information required by the officers in the performance of their duties was adequate.

13. That the officers at Port Chicago have realized for a long time the necessity for great effort on their part because of the poor quality of the personnel with which they had to work. They worked loyally, conscientiously, intelligently, and effectively to make themselves competent officers and to solve the problem of loading ships safely with the men provided.

14. That the enlisted personnel comprising the ordnance battalions at Port Chicago were poor material for training in the handling and loading of munitions, and required an unusual amount of close supervision while actually engaged in this work.

15. That the training and supervision of these men was made even more difficult by the lack of petty officers or petty officer material.

16. That a very sustained and vigorous effort was made to train these men in the proper handling of munitions. Despite this, there was a considerable history of rough and careless handling by individuals. A marked and continuing improvement was discernible in recent months.

17. That the methods used in training these men were the most effective possible under the circumstances.

18. That in the months immediately preceding the explosion real progress had been made toward a better training program for officers and men. This work had been retarded by a lack of competent senior officers.

19. That the morale of the station was improving steadily as a result of the completion of the gymnasium and bachelor officers' quarters, and provision for additional transportation.

20. That the civil service personnel were about the average available for the ratings held and were in general of mediocre ability.

21. That the policies and doctrines followed were sound, well thought out, and aimed at generally getting essential war work done as safely as possible.

22. That the security measures in effect were adequate.

23. That the liaison between the office<sup>s</sup> of the Port Director, Captain of the Port, Service Force Subordinate Command, and the Naval Magazine, Port Chicago, was satisfactory.

24. That the pre-loading inspections made by representatives of the Captain of the Port and of the Port Director were not always thorough or well-timed in relation to fuelings. This lack of thoroughness was not a contributing cause to the explosion under investigation.

25. That the pier was well laid out for the work to be done. A pier which allows tandem berthing would be preferable, since it results in a lesser concentration of explosives and personnel.

26. That the loading procedures and the gear used at Port Chicago were safe and in accordance with standard naval practice and did not violate naval safety precautions.

27. That the few practices listed in the Finding of Facts which were contrary to the Coast Guard shiploading regulations were not dangerous and did not increase the hazards.

28. That there exists no publication or instruction for naval establishments which adequately specified the methods to be used in handling high explosives. Regulations as they exist are negative in nature and prohibitory.

29. That the Coast Guard instructions are not practicable in their entirety in that a literal compliance with all requirements would so restrict operations that loading could not be accomplished at a reasonable rate.

30. That where any regulation cannot be followed, it should be changed rather than ignored.

31. That it is possible to draw up a practicable set of loading instructions with no sacrifice to safety.

32. That the details of loading procedure at Naval Magazine, Port Chicago, were as safe, and in most cases safer, than those in use at many other points.

33. That the Coast Guard detail under the conditions it was originally assigned at Naval Magazine, Port Chicago, did not contribute to the efficiency or safety of the loading operations.

34. That this Coast Guard detail could contribute to the efficiency of the operations provided: -

a. Their instructions were carefully reviewed and adapted to the special circumstances existing at a naval station, rather than arbitrarily using the same methods as when dealing with civilian stevedores at a commercial pier.

b. The methods of handling each item were agreed upon by competent representatives before loading started.

c. That only competent men especially trained in ammunition handling were assigned to such duty.

35. That the loading divisions were well organized for the work to be accomplished, insofar as the availability of petty officers permitted.

36. That the working hours and schedules were well planned and reasonable.

37. That the officer supervision during loading operations was adequate.

38. That the petty officer supervision was inadequate both in numbers and quality.

39. That the posting of the amounts loaded by each division did not operate to increase the hazards of loading.

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40. That a loading rate of 10 tons per hatch per hour with the personnel available was high but a goal that could be attained with proper training and supervision.

41. That the loading rate attained at Port Chicago was approximately that attained by commercial stevedores at Naval Ammunition Depot, Mare Island.

42. That the S. S. E. A. BRYAN was seaworthy and in a satisfactory condition to receive explosive cargo on arrival at the Naval Magazine, Port Chicago.

43. That the S. S. QUINAULT VICTORY was seaworthy and in a satisfactory condition to receive explosive cargo on arrival at the Naval Magazine, Port Chicago.

44. That the loading of the S. S. E. A. BRYAN up to the time of the explosion was proceeding in a normal manner, using methods and gear that are considered safe and in accordance with good practice.

45. That the quantities of explosive vapors probably present, the absence of any evidence of fire or other igniting agent, the speed with which the explosion was transmitted indicate to the court that the explosive qualities of the oil in the S. S. QUINAULT VICTORY did not cause or contribute to the explosion.

46. That in an explosion of this magnitude where substantially all the possible initiating agents were destroyed and all eyewitnesses at the point of initiation were lost, it is impossible to determine positively the agent or act which caused the explosion.

47. That the following unusual circumstances existed just prior to the explosion, any one of which might have been a contributing cause:

a. The S. S. QUINAULT VICTORY, a ship that had been in service only one week, was being rigged for the first time by enlisted personnel of the ordnance battalions and some difficulty was experienced, which might have led to the dropping of a boom on one of the cars of explosives spotted alongside.

b. The propeller of the QUINAULT VICTORY was turning over, which might have caused a failure in the pier structure.

c. A diesel switch engine was in motion on the pier, entailing the possibility of collision and damage to explosives being handled.

d. An unusual noise was heard which could have been caused by the falling of the boom or the failure of the structure of a boxcar or the pier. A similar noise could have been caused by the possibilities outlined in a, b, and c above.

48. That the weather conditions in no way contributed to the explosions.

49. That there was no unnecessary concentration of explosives or personnel on the pier at the time of the explosion.

50. That the possibility exists that a supersensitive ammunition component, such as is defined below, was present and that such a component was detonated either in the ordinary course of loading operations or as a result of rough or careless handling by an individual or individuals.



The term "supersensitive component" as herein used is defined as:

a. One wherein a thin film of high explosives is present because of defects in the manufacture of the case or faulty filling of that particular component. (This condition could have occurred in the Mark 47 and the Mark 54 depth bombs.)

b. One which has become prematurely armed by reason of damage to the safety features either in transit to the magazine or in the handling after arrival. (This condition could have occurred in the M-7 incendiary bomb clusters.)

The term "rough or careless handling" as herein used is defined as handling which would subject a component or its container to a severe blow or cause deformation of the case or container by the application of a concentrated stress. Examples of this would be a bomb which is allowed to roll against and strike another bomb, a hoist which is allowed to swing against the ship's side or a hatch coaming, or a hoist which is dropped from a height or is allowed to strike the deck a hard blow in lowering, or the arrangement of the load in the net or sling which is such as to impose concentrated stress on one or more of the components of the load.

51. That the probable causes of the initial explosion listed in the order of probability are:

a. Presence of a supersensitive element which was detonated in the course of handling.

b. Rough handling by an individual or individuals. This may have occurred at any stage of the loading process from the breaking out of the cars to final stowage in the holds.

c. Failure of handling gear, such as the falling of a boom, failure of a block or hook, parting of a whip, etc.

d. Collision of the switch engine with an explosive loaded car, possibly in the process of unloading.

e. An accident incident to the carrying away of the mooring lines of the QUINAULT VICTORY or the bollards to which the QUINAULT VICTORY was moored, resulting in damage to an explosive component.

f. The result of an act of sabotage. Although there is no evidence to support a sabotage as a probable cause, it cannot be ignored as a possibility.

52. That the initial explosion occurred in the vicinity of the inboard end of the pier near the bow of the E. A. BRYAN, probably among components being handled on the pier or being loaded into No. 1 or 2 holds. The sharp distinct sound and the brilliant white flash lead to the belief that the initial detonation was that of an M-7 cluster or Mark 47 depth bomb which was, in turn immediately propagated to other explosives on the pier, producing the first explosion.

53. That the second and larger explosion consisted of the detonation — substantially simultaneously — of the ammunition in the holds of the E. A. BRYAN. That this was initiated by the detonation of a component or group of components, or by hot fragments from the first explosion which entered the holds either through the ship's side or through the open hatches.

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RECOMMENDATIONS

1. That concerning merchant vessels scheduled to load explosives;
  - a. A preliminary inspection be made as soon as a vessel arrives in port in order that any major faults may be corrected.
  - b. Final pre-loading inspections should be made after fueling and should be very thorough, with emphasis on the operating condition of the cargo handling equipment.
  - c. The inspections now made by representatives of the Captain of the Port and the Port Director be coordinated in order that they supplement and assist each other without needless duplication of work.
2. That in assigning personnel to duty in the ordnance battalions each draft should include an adequate number of men of petty officer caliber. Older and more mature men should be assigned this duty whenever possible.
3. That the feasibility of bringing some of the mature, experienced, reliable negro civil service personnel from the Naval Mine Depot, Yorktown, Virginia, and the civil service negro stevedores from the Supply Depot, Naval Operating Base, Norfolk, Virginia, should be investigated.
4. That the loading of explosives at commercial piers be restricted to an absolute minimum and that when such loading must take place, the amounts of explosives present on the pier be restricted to the minimum and in no case exceed the amounts permitted in the American Table of Distances, Article 14D18, Bureau of Ordnance Manual.
5. That the methods used by commercial stevedores in loading explosives be carefully reviewed by competent persons and only those methods meeting acceptable standards of safety be permitted.
6. That a loading manual setting forth acceptable methods for loading each type of explosive item, and to include the gear to be used, be drawn up and promulgated.
  - a. The board or committee to draw up such a manual should have representatives from the Navy thoroughly familiar with all components in use and their structural weaknesses, representatives of the Navy and possibly from stevedoring firms, thoroughly familiar with loading, stowing, and rigging, and representatives from the Coast Guard familiar with the laws governing such subjects.
  - b. This manual should not be so restrictive in nature as to prevent a facility from developing and improving operating methods so long as these new means conform to safety requirements.
  - c. As new items or types of ammunition are brought out, the agency producing them be required to supply pertinent information, especially hazards of handling in order that acceptable methods of handling may be incorporated in the manual.
7. That the present regulations and instructions relating to the handling of explosives be carefully reviewed and those not applicable or impracticable of attainment be eliminated.

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8. That facilities loading ammunition and explosives should be given priority in the assignment of experienced officers and stevedores.

9. That an experienced officer or officers of suitable rank, acting directly under the Commandant of the District, make surprise inspections from time to time at all explosive loading operations carried on in this district.

10. That a reasonable number of officers over and above those required for actual loading operations and in an "under instruction" status be maintained at the Naval Ammunition Depot, Mare Island, or Naval Magazine, Port Chicago, in order to provide adequately trained officers to meet normal attrition and expansion.

11. That the loading of explosives should never be a matter of competition.

12. That the feasibility of placing barricades between loading piers and adjacent facilities be investigated.

13. That inasmuch as the Commanding Officer of a Naval activity is in fact responsible for everything at his station, all representatives of other activities visiting the station for any duty should be required to report to the Commanding Officer for the specific duty and to submit their reports through the Commanding Officer of the station visited.

14. That the present policy of allowing the Commanding Officer of a Naval activity to accept or decline a Coast Guard loading detail be continued. That where this detail is accepted the detail should report to the Commanding Officer of the station for this duty.

15. That only such fuel oil as meets Navy specifications be delivered to ships scheduled to load ammunition.

16. That the following recommendations covering specifications for magazine facilities made by the Public Works Officer, Navy Yard, Mare Island, be favorably considered:

a. Structures that are vital for operation of the station in time of disaster should be of permanent fireproof construction. This includes the administration building, marine barracks, fire station, fire pumping station, and central power plant.

b. All important structures not of permanent, fireproof construction should be of a substantial wood frame construction, well braced.

c. Flimsy, war-time construction should not be used except for minor buildings, the loss of which will not seriously interfere with station operations.

d. Where practicable, important buildings should be laid out and on rather than broadside on to probable line of blast.

e. Unless strongly reinforced and braced, walls of buildings, should have a considerable proportion of the area glazed to present a minimum obstruction to the blast.

f. Investigations should be undertaken by the Bureau of Standards

relative to the use of a material for glazing other than glass, that will not splinter into small, sharp fragments under the impact of the blast.

g. Mechanical services:

- (1) Mechanical services should be run underground wherever possible.
- (2) Hangers for pipe lines should be arranged and secured to structures to allow some freedom of motion, yet definitely limit movement.
- (3) BuDocks standard specification 217c should be modified to permit wider use of welded joint pipe and steel valves, flanges and fittings for steam, as well as other fluids in explosion hazard areas.
- (4) Spring loaded pressure reducing valves should be used instead of dead weight loaded type.

17. That gas mains should not be permitted in an explosive area.

18. That the provisions for the protection of explosive ammunition components during shipment and handling, including the containers, be carefully reviewed as the present necessity of shipping large quantities of high explosives over long distances to commercial carriers, together with the lack of skilled personnel, has introduced many additional hazards.

19. The court recommends that no further proceedings be had in the matter.

All redactions  
are B-6

Captain, U. S. Navy.

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The record of proceedings of the fortieth day of the inquiry was read and approved, and the court having finished the inquiry, then at 1:30 p.m., on 30 October 1944, adjourned to await the action of the convening authority.

Captain, U. S. Navy,  
President.

Lieutenant Commander, U.S. Naval Reserve,  
Judge Advocate.