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TECHNICAL INSPECTION REP[redacted]T

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366752

(6) OPERATION CROSSROADS.

U.S.S. DAWSON (APA79)

(8)

TEST ABLE (U).

[redacted]

(11) 1947,
(12) 144p.
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BUREAU OF SHIPS GROUP

TECHNICAL INSPECTION REPORT

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USS DAWSON (APA79)

Page 1 of 144 Pages

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1 JAN 1965

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U.S.S. DAWSON (APA 79)

SHIP CHARACTERISTICS

Building Yard: Consolidated Steel Corp.; Wilmington, California.

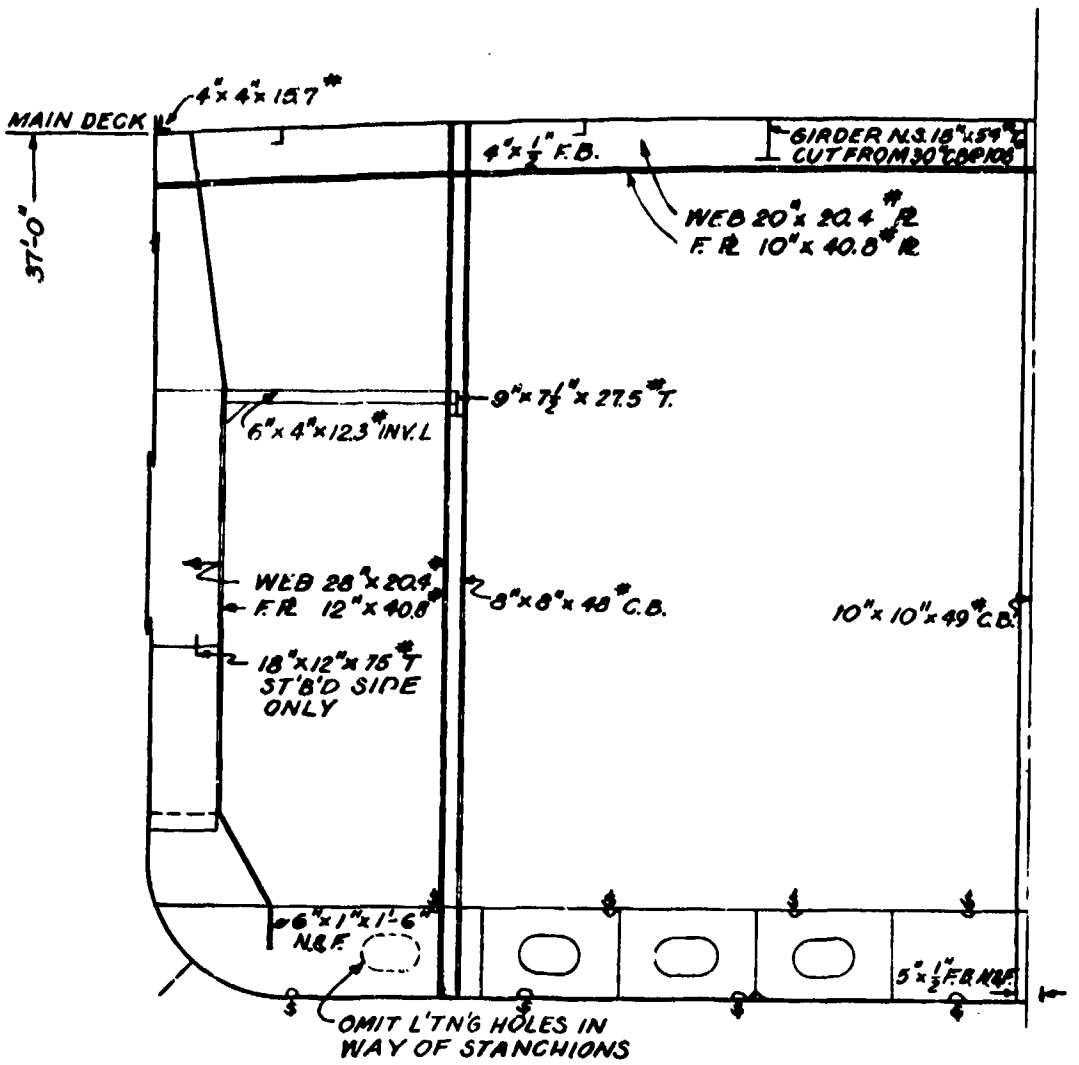
Commissioned: 4 February 1945.

HULL

Length Overall: 426 feet 0 inches.
Length on Waterline: 400 feet 0 inches.
Beam (extreme): 58 feet 0 inches.
Depth (molded to upper deck): 37 feet 0 inches.
Drafts at time of test: Fwd. 12 feet 0 inches.
Aft. 17 feet 6 inches.
Limiting displacement: 7,080 tons.
Displacement at time of test: 6,476 tons.

MAIN PROPULSION PLANT

Main Engines: Two sets of Westinghouse steam turbines, directly connected to Westinghouse main generators. Two main shaft motors.
Main Condensers: Two are installed in ship.
Boilers: Two Babcock and Wilcox boilers are installed in ship. 450 psi gauge - 750° F.
Propellers: Two are installed.
Main Shafts: Two are installed in ship.
Ships Service Generators: Five are installed in ship. Two - 250 KW. - 450 V. - A.C., One - 150 KW. - 450 V. - A.C., and Two 100- KW. - 120/240 V. - D.C.



FRAME 76 LOOKING AFT

MIDSHIP SECTION

TEST A

SECRET

U.S.S. DAWSON (APA 79)

8042

TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test; list; gneral areas of flooding, sources.

There was no flooding, hence no change in drafts or list.

(b) Structural damage.

HULL

Weather bulkheads in the superstructure facing forward and to port are generally dished. Maximum dishing is about four inches and occurs in the pilot house forward bulkhead, the port bulkhead of the pilot house and chart room, and in bulkhead 88 which forms the forward face of the 20mm clipping room. Deflection of longitudinal bulkheads diminishes from forward to aft. Distortion of the forward bulwarks is severe at the navigating bridge and signal bridge levels. Dishing of decks in the superstructure is slight.

The foremast is essentially undamaged but the port cargo boom, stowed vertically against the foremast, is bent in two places. The main topmast, which supports the air search radar screen is bent aft and to starboard. The signal mast and yard arm located on the forward stack are bent aft. Nearly all radio antennae and signal halyards are down.

The outer casing of the after stack is severely dished.

The upper deck in way of the forward cargo hatch is permanently deflected approximately five inches, port and starboard, and the hatch longitudinal coamings are bowed outboard four inches at the upper edge. Hatch battens, strongbacks, and pontoon covers are blown into the hold. The main deck in the forward cargo hatch area is deflected four inches, starboard and a lesser amount, port. The first platform is uninjured.

In way of the after cargo hatch the upper deck is deflected approximately two inches, port and starboard. The main deck is not deflected. Hatch battens, pontoon covers and a strongback fell into the hold.

Damage in the interior of the ship is superficial and is confined to sheet metal and joiner bulkheads in main deck areas adjoining the forward and after cargo hatch spaces.

MACHINERY

The outer casings of both stacks were considerably pushed in by blast pressure and the galley smokestack was flattened between the casings of the after stack. Both Welin davits on the port side were severely damaged structurally. No. 4 davit (after port) is considered to be beyond repair.

ELECTRICAL

The director shields at frame 27, one joiner bulkhead at frame 104 on the port side and one joiner bulkhead at frame 109 on the starboard side carried away and severed electrical cables, rendering their associated equipment inoperable.

(c) Other damage.

HULL

No damage of any consequence occurred to machinery, electrical, electronics fire control, or gunnery equipment.

MACHINERY

One electric drinking fountain was severely damaged. There is no other damage to machinery. The machinery of both port Welin davits is undamaged and fully operable.

ELECTRICAL

Principal electrical damage consisted of the following:

1. The bases were distorted on both 24 inch searchlights. The port searchlight was rendered inoperable.

2. Three gyro repeaters were dislodged from their gimbal rings. However, no material damage resulted to these repeaters and when they were replaced, they were all operable.

3. The port 12 inch signal searchlight was blown over the side.

4. Number 2 fuel oil service pump was rendered inoperable due to a severed cable in its control circuit.

5. The fire alarm circuit for the after cargo hold was rendered inoperable due to a severed cable.

6. The Anemometer cups were carried away by the air blast.

7. Some lamps were broken, mainly on the port side above the main deck.

II. Forces Evidenced and Effects Noted.

(a) Heat.

HULL

The heat of the bomb explosion came from approximately 310 degrees relative. Paint is uniformly and heavily scorched with little blistering over large areas facing toward the blast. Vertical surfaces are much more severely scorched than are horizontal surfaces.

MACHINERY

Paint on the port side of exposed machinery was scorched and blistered.

ELECTRICAL

Radiant heat blistered paint on exposed electrical equipment and cable. None, however, was rendered inoperable from this radiant heat.

(b) Fires and explosions.

HULL

No explosions occurred. A number of small fires, which had negligible effect on structure, occurred in topside areas in wiring insulation, cocoa matting fenders, manila rope, and fire hoses. The cause of these fires was the direct effect of heat radiation from bomb explosion.

MACHINERY

No evidence.

ELECTRICAL

A small fire on the starboard side of the forward deck house at frame 27, destroyed the insulation on a sound powered telephone cable and a call bell cable. It is also believed that this fire contributed to the damage to cables on the lower part of the foremast.

(c) Shock.

HULL

Shock effect is slight and resulted in no greater damage than the jumping of the peloruses out of their pedestals.

MACHINERY

No evidence.

ELECTRICAL

No evidence of damage to electrical equipment as a result of shock.

(d) Pressure.

HULL

Blast pressure struck this ship from a relative bearing of approximately 310 degrees. Areas most severely affected are the forward face of the bridge structure, weather bulkheads facing forward or to port, the upper deck in way of the forward and after cargo hatches, and the port boat davits. Panel dishing is most severe in forward areas of the superstructure and in the upper deck forward. The critical weight of superstructure plating generally appears to be in excess of 10 lbs. Bulwarks and lookout tubs of 7 1/2 lb. plate are distorted by blast pressure; similar shields of 10 pound plate effectively resisted the blast.

MACHINERY

Blast pressure pushed in the outer casings of both stacks, flattened the galley smokepipe, slightly bent the steering wheel in secondary conn, and severely damaged the two port Welin davits. The blast apparently came from aft of the port beam.

ELECTRICAL

Air blast is considered responsible for the following electrical damage.

1. The distortion of both 24 inch searchlight bases.

2. The smashing of five (5) cargo handling lights.

3. The freeing of three (3) gyro repeaters from their gimbal rings.

4. The tearing of one reproducer from its mounting.

5. The bent forward 6 MC bull horn.

6. The cracking of the dial window on the Rudder Angle Indicator at the Secondary Control Station.

7. The anemometer cups carrying away.

(e) Effects peculiar to the atomic bomb.

HULL

No comment.

MACHINERY

Blast pressure of such magnitude at such a distance from an explosion is apparently peculiar to the atom bomb.

ELECTRICAL

There were no effects noted that are considered peculiar to the atomic bomb other than radioactivity and the intensity of the radiant heat.

III. Results of Test on Target.

(a) Effect on machinery, electrical, and ship control.

HULL

Ship control is slightly affected by the collapse of the master magnetic compass stand.

MACHINERY

Both port Welin davits are inoperable because of structural damage. Neither can be repaired by the ship's force.

The after one is probably beyond repair. One electric drinking fountain is probably beyond repair. Otherwise, there was no damage that affected operation of machinery.

ELECTRICAL

The effects on electrical equipment and ship's control were slight. Except for the damage to the searchlights and the wind intensity system, emergency repairs could have been made to all items by the ship's force without serious difficulty.

(b) Effect on gunnery and fire control.

HULL

No comment.

MACHINERY

No comment.

ELECTRICAL

Electrically, there was no effect on gunnery or fire control.

(c) Effect on watertight integrity and stability.

HULL

None.

MACHINERY

No comment.

ELECTRICAL

None.

(d) Effect on personnel and habitability.

HULL

Personnel exposed in superstructure areas would have been subject to injury from air blast and heat. It is estimated that personnel in enclosed spaces in the bridge area and below decks, except in the forward and after cargo hatch areas, would have been reasonably safe from injury from blast. Some casualties might have occurred in the machinery spaces due to boiler flare-backs.

Habitability is temporarily slightly affected by disarrangement of berths in the cargo hatch areas, by debris in those areas, and by damaged sheet metal bulkheads obstructing passageways.

MACHINERY

There might have been some personnel casualties from blast pressure entering through the cargo hatches. The cover panels of both of these hatches were blown in and blast pressure was able to enter part of the interior of the ship. Otherwise, it is not believed that there would have been any personnel casualties below deck. Casualties among exposed personnel would have been high. Habitability was not affected.

ELECTRICAL

Personnel and habitability not affected from electrical failures. Effects from radioactivity are not known. It is considered that there would have been casualties from the air blast and radiant heat. There was no effect on habitability.

(e) Total effect of fighting efficiency.

HULL

Fighting efficiency would probably have been seriously impaired by personnel casualties in topside gunnery and fire control stations. Effectiveness of the ship in amphibious operations would be materially reduced by the damage to the port davits, the probable

damage to all boats stowed on the port side, and the partial crippling of one cargo boom.

MACHINERY

Damage to the two port Welin davits would have reduced by 50% the ability of the ship to lower boats. As she is an attack transport, this would have considerably reduced her military effectiveness. It should also be noted that if the ship's normal war allowance of boats had been aboard, a number of them would have been wrecked. Otherwise, the test had no effect on fighting efficiency.

ELECTRICAL

Negligible, unless radioactivity and blast caused sufficient personnel casualties to affect the fighting efficiency.

IV. General Summary of Observers' Impressions and Conclusions.

HULL

At the distance of this ship from an air burst, it can be expected that moderate to severe dishing of weather bulkheads and decks, and that damage to boat davits and cargo booms, topmasts, radar screens, and radio antenna will occur. Many casualties to personnel in exposed topside locations seems certain. The overall ability of the ship to carry out an amphibious attach mission would be materially reduced.

MACHINERY

Deck equipment near the side of a vessel, especially of a type having long structural members supported only at one end, such as a Welin davit, appears to be peculiarly susceptible to damage by blast pressure.

ELECTRICAL

Exposed electrical equipment received approximately 13 lbs. per square inch pressure. In view of the resulting damage to

such equipment as the pelorus, stands and searchlights, it is considered design modifications are necessary on such items to increase their resistance to damage by air pressure.

V. Preliminary Recommendations.

HULL

The strength should be augmented in way of structural discontinuities in the forward and after cargo hatch areas. Plating of less than 10 lbs. weight should not be used in areas exposed to blast pressure.

Boat davits should be redesigned to offer less area to blast pressure and to prevent dislodging of the rollers from the roller tracks. Provision should be made for stowage of boats below decks or behind shields as a protection against air blast and heat.

Personnel in gunnery and fire control stations should be protected by shields of not less than 10 lbs. plating weight, preferably streamlined with the surrounding structure. Bridge wings and overhangs, generally, should be eliminated.

Topside structures built up on high foundations should not be installed, because of the strong couple resulting from blast pressure on the structure.

Hatch covers should be made less vulnerable to distortion and dislodging by blast pressure. Cargo hatches should be trunked through the living spaces in the hatch areas, for protection of personnel.

Fire hose, rope, and other inflammable materials exposed to bomb blast should be housed in metal lockers or other non-inflammable covering.

Automatic release mechanisms for life rafts should not be pressure operated.

Topmasts should be eliminated and radar screens should be made retractible or readily replaceable by spares.

Stack outer casings should be constructed of heavier plating and reduced in area.

MACHINERY

It is recommended that a study be made to determine whether Welin davits can be made more resistant to blast pressure.

ELECTRICAL

(a) It is recommended that the 24 inch searchlights be redesigned to have resistance to air blast comparable with that of other electrical equipment.

(b) It is believed a great deal of the damage to the pelorus repeaters could be eliminated by lengthening the gimbal pins which hold the repeater, and substituting threaded binnacle pins with locking nuts for the type binnacle pins being used at the present.

TECHNICAL INSPECTION REPORT

SECTION I - HULL

GENERAL SUMMARY OF HULL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

There was no flooding, hence no change in drafts or list.

(b) Structural damage.

Weather bulkheads in the superstructure facing forward and to port are generally dished. Maximum dishing is about four inches and occures in the pilot house forward bulkhead, the port bulkhead of the pilot house and chart room, and in bulkhead 88 which forms the forward face of the 20 MM clipping room. Deflection of longitudinal bulkheads diminishes from forward to aft. Distortion of the forward bulwarks is severe at the navigating bridge and signal bridge levels. Dishing of decks in the superstructure is slight.

The foremast is essentially undamaged but the port cargo boom, stowed vertically against the foremast, is bent in two places. The main topmast, which supports the air search radar screen is bent aft and to starboard. The signal mast and yard arm located on the forward stack are bent aft. Nearly all radio antennae and signal halyards are down.

The outer casing of the after stack is severely dished.

The upper deck in way of the forward cargo hatch is permanently deflected approximately five inches, port and starboard, and the hatch longitudinal coamings are bowed outboard four inches at the upper edge. Hatch battens, strongbacks, and pontoon covers are blown into the hold. The main deck in the forward cargo hatch area is deflected four inches, starboard and a lesser amount, port. The first platform is uninjured.

In way of the after cargo hatch the upper deck is deflected approximately two inches, port and starboard. The main deck is not deflected. Hatch battens, pontoon covers and a strongback fell into the hold.

Damage in the interior of the ship is superficial and is confined to sheet metal and joiner bulkheads in main deck areas adjoining the forward and after cargo hatch spaces.

(c) Other damage.

No damage of any consequence occurred to machinery, electrical, electronics fire control or gunnery equipment.

II. Forces Evidenced and Effects Noted.

(a) Heat.

The heat of the bomb explosion came from approximately 310° relative. Paint is uniformly and heavily scorched with little blistering over large areas facing toward the blast. Vertical surfaces are much more severely scorched than are horizontal surfaces.

(b) Fires and Explosions.

No explosions occurred. A number of small fires, which had negligible effect on structure, occurred in topside areas in wiring insulation, cocoa matting fenders, manila rop, and fire hoses. The cause of these fires was the direct effect of heat radiation from the bomb explosion.

(c) Shock.

Shock effect is slight and resulted in no greater damage than the jumping of the peloruses out of their pedestals.

(d) Pressure.

Blast pressure struck this ship from a relative bearing of approximately 310°. Areas most severely affected are the

forward face of the bridge structure, weather bulkheads facing forward or to port, the upper deck in way of the forward and after cargo hatches, and the port boat davits. Panel dishing is most severe in forward areas of the superstructure and in the upper deck forward. The critical weight of superstructure plating generally appears to be in excess of 10 lbs. Bulwarks and lookout tubs of 7-1/2 lb. plate are distorted by blast pressure, similar shields of 10 pound plate effectively resisted the blast.

(e) Effects apparently peculiar to the atom bomb.

No comment.

III. Effects of Damage.

(a) Effect on machinery, electrical and ship control.

Ship control is slightly affected by the collapse of the master magnetic compass stand.

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on water-tight integrity and stability.

None.

(d) Effect on personnel and habitability.

Personnel exposed in superstructure areas would have been subject to injury from air blast and heat. It is estimated that personnel in enclosed spaces in the bridge area and below decks, except in the forward and after cargo hatch areas, would have been reasonably safe from injury from blast. Some casualties might have occurred in the machinery spaces due to boiler flare-backs.

Habitability is temporarily slightly affected by disarrangement of berths in the cargo hatch areas, by debris in those areas, and by damaged sheet metal bulkheads obstructing passageways.

(e) Effect on fighting efficiency.

Fighting efficiency would probably have been seriously impaired by personnel casualties in topside gunnery and fire control stations. Effectiveness of the ship in amphibious operations would be materially reduced by the damage to the port davits, the probable damage to all boats stowed on the port side, and the partial crippling of one cargo boom.

IV. General Summary of Observers' Impressions and Conclusions.

At the distance of this ship from an air burst, it can be expected that moderate to severe dishing of weather bulkheads and decks, and that damage to boat davits and cargo booms, topmasts, radar screens, and radio antenna will occur. Many casualties to personnel in exposed topside locations seems certain. The overall ability of the ship to carry out an amphibious attack mission would be materially reduced.

V. Preliminary General or Specific Recommendations of Inspection Group.

The strength should be augmented in way of structural discontinuities in the forward and after cargo hatch areas. Plating of less than 10 lbs. weight should not be used in areas exposed to blast pressure.

Boat davits should be redesigned to offer less area to blast pressure and to prevent dislodging of the rollers from the roller tracks. Provision should be made for stowage of boats below decks or behind shields as a protection against air blast and heat.

Personnel in gunnery and fire control stations should be protected by shields of not less than 10 lbs. plating weight, preferably streamlined with the surrounding structure. Bridge wings and overhangs, generall, should be eliminated.

Topside structures built up on high foundations should not be installed, because of the strong couple resulting from blast pressure on the structure.

Hatch covers should be made less vulnerable to distortion and dislodging by blast pressure. Cargo hatches should be trunked through the living spaces in the hatch areas, for protection of personnel.

Fire hose, rope, and other inflammable materials exposed to bomb blast should be housed in metal lockers or other non-inflammable covering.

Automatic release mechanisms for life rafts should not be pressure operated.

Topmasts should be eliminated and radar screens should be made retractible or readily replaceable by spares.

Stack outer casings should be constructed to heavier plating and reduced in area.

VI. Instructions for Loading the Vessel Specified the Following:

ITEM	LOADING
Fuel Oil	50%
Diesel Oil	50%
Ammunition	50%
Potable and reserve feed water	Full Load
Salt water ballast	620 tons
Gasoline	None

Details of the actual quantities of the various items aboard are included in Report 7, Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessesl for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available in the Bureau of Ships Crossroads Files.

DETAILED DESCRIPTION OF HULL DAMAGE

A. General Description of Hull Damage.

(a) Overall condition of vessel.

The overall condition of the ship is good, but the strength is somewhat impaired in the forward cargo hatch area due to deflection and tilt of the hatch girders and to the dished upper deck. The port shell plating, forward, is dished slightly with no damage existing below the first platform. Topside bulkheads exposed to blast pressure are dished. Masts and booms are damaged. The outer casings of both stacks are dished. All davits on the port side are inoperable.

Watertight integrity is not affected and there is no flooding. Seaworthiness is affected slightly by dislodgement of cargo hatch closures at all levels in the hold areas. General views of the exterior of the ship before and after the test shown on pages 58 to 73, inclusive.

(b) General areas of hull damage.

Areas of damage are the port shell plating forward, the forward face of the bridge structure, weather bulkheads and doors in the superstructure, the main deck weather passages, both stacks, the upper deck in way of the forward and after cargo hatches, and interior spaces on the main deck near the cargo hatches. Blast damage to the longitudinal weather bulkheads diminishes from forward to aft.

(c) Apparent causes of hull damage in each area.

Most of the damage is considered to be the result of blast pressure. Shock damage is very slight.

(d) Principal areas of flooding with sources.

No flooding occurred.

(e) Residual strength, buoyancy and effect of general condition of hull on operability.

The strength of the ship in the forward hold area is decreased in that, the ability of the upper flange of the ships girder to take further compressive load is impaired. Damage to the shell plating is slight. The condition of the hull has no effect on buoyancy or operability.

B. Superstructure.

(a) Description of damage.

The air blast emanated from approximately 310 degrees relative. All bulkheads facing forward or to port are dished where the panel length between principal supports exceeds six feet horizontally. Dishing of doors and door frames is general and of the order of three to four inches. Some doors on the port side could not be opened without the use of a sledge hammer and crowbar because the bulkhead is distorted adjacent to the door frames. Structure around airports is not damaged.

Bulkhead 59, the forward face of the bridge structure, is dished locally, with the greatest distortion occurring in the signal bridge bulwark. (Photos. 1772-12, 1741-5, 6; pages 74 , 75 , and 76).

In the pilot house bulkhead 59 is dished a maximum of four inches. (Photo 2104-7, page 77).

On the superstructure deck level, port, bulkhead 59, is dished approximately four inches. The port side weather bulkhead is also dished about four inches from frame 59 to 67. Further aft, the port weather bulkheads are lightly dished from frames 73 to 75 and from 85 to 88. The wing bulwarks at frame 59 are deflected a maximum of six inches at their upper edge. On top of the house the central bulwark in way of the fire control station is dished a maximum of eight inches. Distortion of this bulkhead caused a weld

failure in the bulwark capping at the centerline. (Photo. 1741-7; page 78). The forward port bulwark of the port 20 MM gun enclosure is deflected approximately 14 inches (Photo. 1741-5; page 75).

On the navigation deck, the port weather bulkhead is dished about four inches from frame 59 to 67. Bulkhead 88, the forward face of the 20 MM ready service room is dished about three inches over its entire face with evidence of some restraint having been supplied by the centerline stiffener.

The wing decks and walkways on all superstructure levels are only lightly dished, one-half to one inch being the general and maximum amounts. On the port side in the superstructure slight distortion of the deck bearm brackets occurs generally. This is most noticeable from frames 59 to 69.

Numerous vertical ladders about the topsides are distorted or torn loose at their end connections. Distortion of port side railings in the superstructure is general. (Photo. 1741-8; page 79).

The starboard flag bag was blown from its position at the after edge of the signal bridge wing and fell to the deck below. (Photos. 1741-8, 9; pages 79 , and 80). The port flag bag is partially demolished.

The 12-inch signal searchlight located on the signal bridge forward bulwark, starboard, is missing (Photo. 2104-4; page 81), and the port signal searchlight is badly damaged. On the navigating bridge, a pelorus at frame 60, starboard, jumped out of its pedestal. The gimbal ring of the port pelorus is distorted.

The forward stack is slightly dished. Paint on the forward side of the stack is scorched (Photos. 1741-1, 2168-12 and 2104-8; pages 82 , 83 , and 84). The ladders to the searchlight platforms are bowed (Photos. 2168-12, 2104-8; pages 83 , and 84). The base of the port 24-inch searchlight is collapsed allowing the searchlight frame to come up against the platform railing. The mounting flange of the starboard searchlight is bent but the searchlight remains operable.

The forward and port sides of the after stack outer casing are collapsed. The galley smoke pipe located on the port side of this stack is demolished. The stack casing is severely buckled and torn in way of rectangular openings and louvers (photos 2168-9, 10, 1741-2, 2104-9; pages 85 , 86 , 87 , and 88).

The inner casings of both stacks are essentially undamaged. At the secondary ship control station just forward of the after stack, the wood master compass pedestal is carried away (Photo. 2104-9; page 88).

On the blower house top, forward, the two lookout tubs (7-1/2 lb plate) located at frame 28 are torn from their hold-down clips and severely distorted (Photo. 2104-4; page 81). The blower house port bulkhead is dished about 1/2 inch. The lookout tub (7-1/2 lb plate) on the top of the house at frame 101, port, is distorted by blast pressure (Photo. 1922-9; page 102). Director and gun tubs, constructed of 10 pound plate, withstood the air blast.

On the after deck house top, the emergency steering wheel at frame 140 is bent aft. The wheel was covered with canvas during the test. The yoke is twisted on a gyro repeater at frame 142.

This ship had ten life rafts rigged to slide overboard upon operation of a pressure operated quick-release device. Nine of these rafts went overboard as a result of the test.

The foremast is uninjured except for the truck light extension which is slightly bent.

The anemometer on the foremast yard-arm is carried away.

The port 15-ton cargo boom, stowed vertically against the foremast, has a 5 degree bend about 8 feet from the boom hinge and another 5 deegree bent about 10 feet from the outer end. Otherwise, this boom is still serviceable (Photo. 2104-6; page 89). The overall cargo handling ability of the ship is only slightly affected.

The signal mast on the forward edge of the forward stack is bent aft. The yard-arm and brace are distorted. The halyards are carried away (Photo. 2104-10; page 90).

Nearly all radio antennae and signal halyards are blown down.

The main topmast which supports the crows nest and SC4 air search radar antennae is bent aft and to starboard. The radar screen is askew (Photos. 2103-1, 1773-2, 1922-10; pages 91 , 92 , and 93).

(b) Causes of damage in each area.

All damage in the superstructure is considered to be the result of air blast and heat.

(c) Evidences of fire in the superstructure.

On the blower house top, frame 28, short pieces of manila rope with frayed ends and a coiled fire hose burned.

At frame 129, starboard, a cocoa matting fender hanging over the side of the after deckhouse, and a firehouse directly below, burned. Another cocoa matting fender burned at frame 135, port. A mattress burned at frame 88, port. Damage to ship's structure from these fires is negligible.

(d) Estimate of relative effectiveness of structure against blast.

The critical plate weight for weather bulkheads appears to be about ten pounds. Lookout tubs constructed of 7-1/2 lb. plate are distorted. Gun and director tubs of 10 lb plate are essentially undamaged. Bulkhead panels more than six feet in width between principal supports are dished by blast pressure.

(e) Constructive criticism of superstructure design or construction.

Dishing of door frames and adjacent bulkhead plating indicates a need for stiffening of frames and surrounding plating to facilitate repair or replacement of damaged doors.

Plating less than 10 lbs in weight should not be installed in areas exposed to blast pressure. Important structure such as pilot house bulkheads preferably should be protected by 15 lb plate. Greater protection should be provided for lookouts, gun, and fire control stations against the effects of air blast, heat, and radioactivity. Clips are not an effective means of securing shields to decks.

Topmasts should be eliminated. Radar antennae should be mounted on retractible supports or made quickly replaceable by spares.

Stacks should be constructed of heavier plating and have less projected area.

Cargo booms in the stowed position should be cradled and short spans between cradles should be used.

Quick launching devices for life rafts should not be operable by air blast. Inflammable equipment such as fire hose, rope, and fenders should be housed for protection against heat radiation.

C. Turrets, Guns and Directors.

All guns and directors are in operating condition. Glass on the directors is smudged by soot and paintwork is scorched.

The rangefinder is frozen in train but is undamaged optically.

D. Torpedo Mounts, Depth Charge Gear.

Not Applicable.

E. Weather Deck.

(a) General condition of deck and causes of damage.

The upper deck is dished approximately five inches on both sides of the forward cargo hatch, (photo 1902-2; page 94), and about two inches on both sides of the after cargo hatch. In addition, the upper deck along the starboard side of the deck house is slightly dished. The longitudinal coamings of the forward cargo hatch at the upper deck are bowed outboard four inches at the upper edge. All strongbacks in this hatch sheared their roller pins and fell. All the upper deck hatch battens were blown into the hold. One pontoon cover at the main deck level and two at the first platform level fell into the hold. The end covers remain in place at both levels. The end pontoons of the forward hatch at the main deck level are buckled (photos. 1902-5, 1889-2; pages 95 , and 96).

In way of the after cargo hatch, all upper deck battens are blown into the space below. The middle strongback crumpled at the ends, twisted, and fell. Pontoon covers are dislodged at the main deck. (Photos. 1773-2, 1901-11, pages 97 , and 98). The main deck is not deflected.

The cover of the hatch on the upper deck, frames 56-58 1/2, center line, was blown into the magazine and the high coaming is severely bent inward. Hatch covers over small hatches leading to the paint locker, forward fire pump room, and boatswains lockers are dished but other wise remain intact.

The port life line stanchions on the upper deck forward of the bridge structure are bent inboard.

Weather bulkheads between the upper and superstructure decks are dished generally on the port side approximately one inch, with greater failure in way of the door frames. On the starboard side the only damage is slight distortion of the double door

into the wardroom. The forward bulkhead of the after deck house, frame 128, is dished approximately two inches. The carpenter shop double doors, port side of after deck house, are torn from their hinges.

The port, main deck weather passageway longitudinal bulkhead is dished a maximum of three inches. All doors in this bulkhead are dished with the exception of two of the quick acting type (photo. 1742-1; page 99). Doors and door frames in the after transverse bulkhead (bulkhead 122) of the port weather passage are severely damaged (photos. 1742-3, 2103-2; pages 100, and 101). The only damage in the starboard main deck weather passage is the slight dishing of one door in the after transverse bulkhead. Appendix 124 , contains a tabulation of deck deflection scratch gage locations and readings.

(b) Usability of deck in damaged condition.

Usability of the upper deck is only slightly affected.

(c) Condition of equipment and fittings.

The starboard boat davits are intact and in operating condition. The port forward davits are intact except for parting of the wire rope falls. The port after davit traveling arms and strongback are thrown aft, the arms are dislodged from their roller paths; the strongback is disconnected from the after travelling arm; and the falls are nearly severed. (Photos 1922-9, 2169-3, 2104-11, 2169-4, 6; pages 102 , 103 , 104 , 105 , and 106). Blast damage probably would have rendered unserviceable any boats nested on the port side. Boats nested on the starboard side, partially shielded from the effects of blast, probably would have been undamaged.

The anchor windlasses and cargo winches are undamaged.

The port boat boom, previously fractured, is broken in way of the former failure.

The jack staff is bent slightly. The stern ensign staff carried away.

F. Exterior Hull (above waterline).

(a) Condition of exterior hull plating and causes of damage.

No damage to the shell as a result of the test was observed.

The port shell plating forward is wrinkled to a depth of 1/2 inch from the waterline to 12 feet above, frames 30 to 50. This is believed to be the result of normal operating conditions. The port shell is dished from one to two inches, frames 45 to 55, just above the first platform. The port shell plating aft, frames 124 to 128, in way of the troop berthing compartment C-010L, is dished approximately four inches. The shell stiffeners and brackets are buckled. This damage aft is reported to have occurred prior to Test A as a result of vessels coming alongside, but it appears to have been somewhat accentuated during Test B. (Photo 1901-12; page 107). No other damage to shell plating is known to exist.

(b) Condition of exterior hull fittings and causes of damage.

No damage.

(c) Details of any impairment of shear strakes.

No damage.

(d) Condition of side armor.

Not Applicable.

G. Interior Compartments (below w.l.).

(a) Damage to structure and causes.

The main deck, abrease the forward cargo hatch is dished approximately 4 inches starboard and a lesser amount port. The longitudinal girder at the starboard edge of the hatch is deflected and is severely strained at the juncture with the supporting web columns

at bulkheads 40 and 56 under the upper deck. (Photo 1902-5, page 95). One pontoon cover at the main deck level was dislodged and fell into the hold. Shell frame brackets under the upper deck, starboard, frame 40 to 50, are buckled. Similar damage to brackets occurs to a lesser degree along the port side. The semi-structural longitudinal bulkhead at the port edge of the forward cargo hatch is essentially undamaged except for a hole punched by a falling strongback. (Photo. 1902-3, page 108).

Transverse bulkheads 40 and 56 suffered no apparent damage.

The first platform plating in the forward cargo hatch area is undamaged. Two hatch covers from this level are distorted and have fallen into the hold. The port shell stiffeners, frames 45 to 55 are twisted just above the first platform in way of the shell plate dishing.

In the after cargo hatch space the main deck is undamaged. Side shell brackets, port and starboard, under the upper deck in this region are moderately buckled. In troop berthing compartment C-101-L, port side, frames 124 to 128 are buckled in way of shell dishing. (Photo 1901-12, page 107). This damage is believed to have occurred prior to Test A, with some increase attributable to the test.

(b) Damage to joiner bulkheads and causes.

The longitudinal joiner bulkhead forming the outboard side of the main deck passage, frames 40 to 56, port, is severely bulged inboard, (photo 1902-3, page 108).

On the main deck in the forward part of the after cargo hatch space, sheet metal bulkheads port and starboard are demolished. This was caused by the air blast. (Photo 1741-11, 12, pages 109 , and 110). Similar damage to a lesser degree occurred in the port side passages on the main deck aft, due primarily to blast pressure coming down through the cargo hatch.

(c) Details of damage to access closures and fittings.

No damage except to cargo hatch closures.

(d) Condition of equipment within compartments.

Pipe berths and lockers on the main deck in the forward and after cargo hatch spaces are disarranged.

The electric drinking fountain located on the main deck in the port passage just aft of frame 128 is severely damaged by air blast coming in from the after cargo hatch. The sheet metal casing is blown off and the coils and water tank are smashed.

(e) Evidence of fire.

There is no evidence of fire in interior compartments.

(f) Damage in way of piping, cables, ventilation ducts.

There is no damage to piping or cables. Ventilation duct damage is confined essentially to the forward cargo hatch area. A large exhaust duct located on the forward side of bulkhead 56, starboard is dished. (Photo 1742-5, page 111). Ventilation ducts in this area are in general moderately damaged.

(g) Estimate of reduction in watertight subdivision, habitability and utility of compartments.

Watertight subdivision and utility of compartments is unaffected. Habitability in cargo hatch berthing spaces is affected slightly and temporarily. There is some obstruction of passages by damaged sheet metal bulkheads.

H. Armor Decks and Miscellaneous Armor.

Not Applicable.

I. Interior Compartments (below w.l.).

No damage occurred in compartments below the waterline.

J. Underwater Hull.

There is no known damage to the underwater hull, propellers, shafts, struts, or rudder. Buoyancy, operability, and maneuverability are unaffected.

K. Tanks.

There is no damage to tanks.

L. Flooding.

No flooding occurred in this ship.

M. Ventilation.

Ventilation duct damage is confined essentially to the main deck areas around the forward cargo hatch. Damage in this region is moderate except for a dished exhaust duct just forward of bulkhead 56, starboard. (Photo. 1742-5, page 111). There is no evidence that the ventilation system conducted heat, fire, or smoke below decks.

N. Ship Control.

(a) Damage to ship control stations and causes.

The wooden master compass pedestal located at the secondary conning station on the house top at frame 90 is blown down. At this location the dial window of the rudder angle indicator is cracked. (Photo. 2104-9, page 88).

On the after deck house top, the emergency steering wheel is bent aft. This wheel was canvas covered during the test.

Pilot house instruments are undamaged, although the pilot house bulkheads are dished by the blast pressure. (Photo. 2104-7, page 77).

(b) Constructive criticism of ship control.

Topside control stations should be protected by shields against the effects of air blast and heat.

O. Fire Control.

No damage to fire control stations occurred except t hat the paint on instruments is blistered.

P. Ammunition Behavior.

No damage to ammunition or magazines occurred in this ship. Vulnerability of the hatch to the forward magazine to air blast constitutes a hazard.

Q. Ammunition Handling.

No damage occurred to ammunition hoists or any other ammunition handling devices.

R. Strength.

(a) Permanent hog or sag.

There is no evidence of hog or sag.

(b) Shear strains in hull plating.

There are no evidences of shear strains in the hull plating. Dishing of the port side plating, forward, is considered to be the result of air blast.

(c) Evidences of transverse or racking strains.

None.

(d) Details of any local failures in way of structural discontinuities.

Strength is somewhat impaired in way of the forward cargo hatch area due to distortion of hatch longitudinal girders and dishing of the upper and main decks.

(e) Evidence of panel deflection under blast.

Panel deflection under blast is most pronounced in the forward bulkhead of the main deck house, weather bulkheads and doors facing to port, and the upper and main decks in way of the forward cargo hatch. Blast damage to bulkheads diminishes from forward to aft. Dishing of bulkheads occurs generally where the length horizontally between principal supports exceeds 6 feet.

S. Miscellaneous.

Paint is uniformly and heavily scorched over large areas, facing forward and to port. There is little blistering of paint. Horizontal surfaces are slightly scorched. Wood surfaces are more severely scorched than comparable steel surfaces. (Photos. 2104-4, 8; 1741-3, 4; pages 81 , 84 , 112 , and 113).

TECHNICAL INSPECTION REPORT

SECTION II - MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No data taken by machinery group.

(b) Structural damage.

The outer casings of both stacks were considerably pushed in by blast pressure and the galley smokestack was flattened between the casings of the after stack. Both Welin Davits on the port side were severely damaged structurally. No. 4 davit (after port) is considered to be beyond repair.

(c) Other damage.

One electric drinking fountain was severely damaged. There is no other damage to machinery. The machinery of both port Welin davits is undamaged and fully operable.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Paint on the port side of exposed machinery was scorched and blistered.

(b) Fires and explosions.

No evidence.

(c) Shock.

No evidence.

(d) Pressure.

Blast pressure pushed in the outer casings of both stacks, flattened the galley smokepipe, slightly bent the steering wheel in secondary conn, and severely damaged the two port Welin davits. The blast apparently came from aft of the port beam.

(e) Effects apparently peculiar to the atom bomb.

Blast pressure of such magnitude at such a distance from an explosion is apparently peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on machinery and ship control.

Both port Welin davits are inoperable because of structural damage. Neither can be repaired by the ship's force. The after one is probably beyond repair. One electric drinking fountain is probably beyond repair. Otherwise, there was no damage that affected operation of machinery.

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on water-tight integrity and stability.

No comment.

(d) Effect on personnel and habitability.

There might have been some personnel casualties from blast pressure entering through the cargo hatches. The cover

panels of both of these hatches were blown in and blast pressure was able to enter part of the interior of the ship. Otherwise, it is not believed that there would have been any personnel casualties below deck. Casualties among exposed personnel would have been high. Habitability was not affected.

(e) Total effect on fighting efficiency.

Damage to the two port Welin davits would have reduced by 50% the ability of the ship to lower boats. As she is an attack transport, this would have considerable reduced her military effectiveness. It should also be noted that if the ship's normal war allowance of boats had been aboard, a number of them would have been wrecked. Otherwise, the test had no effect on fighting efficiency.

IV. General Summary.

Deck equipment near the side of a vessel, especially of a type having long structural members supported only at one end, such as a Welin davit, appears to be peculiarly susceptible to damage by blast pressure.

V. Preliminary Recommendation.

It is recommended that a study be made to determine whether Welin davits can be made more resistant to blast pressure.

DETAILED DESCRIPTION OF MACHINERY DAMAGE

A. General Description of Machinery Damage.

(a) Overall condition.

No damage occurred to main propulsion machinery. Slight damage occurred to utility equipment. Both port Welin davits are inoperative because of failures of wire rope falls and structural members. The galley smokestack was flattened between the inner and outer casings of the after stack (See Items P, V, and W below).

(b) Areas of major damage.

Upper deck, port side.

(c) Primary cause of damage in each area of major damage.

Blast pressure.

(d) Effect of target test on overall operation of machinery plant.

The test had no effect on the operation of the machinery plant. However, because of structural failure, #2 and #4 boat davits are inoperable and require replacement of structural members at a shipyard. This reduces the ability of the vessel to lower boats for landing troops and cargo by approximately 50% and prevents the use of boats served by these davits. The vessel shifted berths under her own power after Test A, at which time all machinery was operated.

B. Boilers.

The boilers are undamaged. Both were steamed after Test A and functioned normally. Hydrostatic tests indicate no change in their tightness.

Boiler #1 was left under hydrostatic pressure of 450 lbs/sq/inch and #2 boiler under steam pressure of 450 lbs/sq/inch when the ship was abandoned at 0345 1 July. Upon return of the crew at 1730 2 July, boiler #1 had 12 lbs/sq/inch pressure remaining and #2 boiler had no pressure remaining.

The outer casings of both stacks were considerably pushed in by the blast pressure. This does not affect operation. The inner stack casings are undamaged. (See photos 2168-9, 10, 11, 12, 2169-1, 2; pages 85 , 86 , 114, 83 , 115, and 116).

C. Blowers.

Undamaged. All 4 blowers have been operated under service conditions since Test A.

D. Fuel Oil Equipment.

Undamaged. All fuel oil equipment has been operated under service conditions since Test A.

E. Boiler Feedwater Equipment.

Undamaged. All feedwater equipment has been operated under service conditions since Test A.

F. Main Propulsion Machinery.

Both main turbines are undamaged. They were operated under service conditions for about one hour at 3000 R.P.M. while the ship was shifting berths after Test A.

G. Reduction Gears.

Not Applicable.

H. Shafting and Bearings.

Undamaged. The shafting, bearings and bearing foundations, stern tubes and packing glands were inspected while the ship was underway. Performance was normal.

I. Lubrication System.

Undamaged. The lubrication system was inspected while the ship was underway. Performance was normal.

J. Condensers and Air Ejectors.

Undamaged. The main and auxiliary condensers have all been operated since Test A under service conditions with a vacuum of 28-1/2 inches.

K. Pumps.

Undamaged. All pumps have been operated under normal service conditions since Test A.

L. Auxiliary Generators (Turbines and Gears).

Undamaged. All auxiliary generators have been operated under service conditions since Test A.

M. Propellers.

Undamaged. The propellers have not been inspected but are considered to be in good condition as operation was checked while the ship was underway and no defects appeared.

N. Distilling Plant.

Undamaged. The distilling plant was placed in operation immediately after Test A. Performance was normal.

O. Refrigeration Plant.

Undamaged. The refrigeration plant was placed in service immediately after Test A. Performance was normal.

P. Winches, Windlasses, and Capstans.

Undamaged. All equipment was operated after Test A, and functioned normally.

Q. Steering Engine.

The port side of the steering wheel in secondary conn, upper deck, was bent aft. This does not prevent operation or the steering gear from this station.

There is no other damage to steering equipment. Both units were operated from all stations after Test A, and functioned normally.

R. Elevators, Ammunition Hoists, Etc..

All ammunition hoists and the gasoline hoist were operated under power and are undamaged. Welin davits #1 and #3, on the starboard side of the vessel, sustained no damage. They have been operated under service conditions since the test.

The machinery of Welin davit #2 can be turned over by power, however, the after wire rope fall is about 50% parted near the davit heads. The davit was in the inboard position during the test. Both trackways are bent toward the stern of the vessel. The upper flange of the forward trackway is bulged upward to the contour of the outer roller. Replacement of the trackway would be required before this davit could be operated.

The machinery of Welin davit #4 can be turned over by power, however, the strongback is torn loose from the davit heads. The after strongback trunnion bearing cap is missing. The forward strongback trunnion bearing cap bolts are stretched and nearly out. The forward wire rope falls are parted at the sheave. The entire davit structure above the trackways is leaning aft and rollers are out or nearly out of trackways. This derangement is shown on photos serial # 2169-3, 4, 6; pages 103,105 , and106 . This davit is considered damaged beyond repair.

S. Ventilation (Machinery)

Undamaged. All ventilation machinery has been operated under normal conditions since Test A.

T. Compressed Air Plant.

Undamaged. The air compressors was operated under service conditions after Test A. Performance was normal.

U. Diesels (Generators and Boats).

Undamaged. The diesel generator and diesel fire pump have been operated under service conditions since Test A.

No boats were aboard during the test.

V. Piping Systems.

The galley smoke pipe (Charley Noble) was badly bent and crushed where passing between the inner and outer casings of #2 stack. There was evidently a whipping action here as the smoke pipe was not touching either stack casing when inspected after the test.

All other piping was undamaged. Piping systems have been tested under service conditions since Test A.

W. Miscellaneous.

The electric drinking fountain at frame 108, main deck, was damaged by the blast entering #2 cargo hold and passing into the communicating passageway in which this fountain is located. The sheet metal casing of this fountain was blown off. The coils and water tank were smashed.

No other miscellaneous equipment was damaged. The galley, laundry, and machine shop equipment have been operated under service conditions since Test A.

TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

Not observed.

(b) Structural damage.

The director shields at frame 27, one joiner bulkheat at frame 104 on the port side and one joiner bulkhead at frame 109 on the starboard side carried away and severed electrical cables, rendering their associated equipment inoperable.

(c) Other damage.

Principal electrical damage consisted of the following:

1. The bases were distorted on both 24" searchlights. The port searchlight was rendered inoperable.

2. Three gyro repeaters were dislodged from their gimbal rings. However, no material damage resulted to these repeaters and when they were replaced, they were all operable.

3. The port 12" signal searchlight was blown over the side.

4. Number 2 fuel oil service pump was rendered inoperable due to a severed cable in its control circuit.

5. The fire alarm circuit for the after cargo hold was rendered inoperable due to a severed cable.

6. The anemometer cups were carried away by the air blast.

7. Some lamps were broken, mainly on the port side above the main deck.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Radiant heat blistered paint on exposed electrical equipment and cable. None, however, was rendered inoperable from this radiant heat.

(b) Fires and explosions.

A small fire on the starboard side of the forward deck house at frame 27, destroyed the insulation on a sound powered telephone cable and a call bell cable. It is also believed that this fire contributed to the damage to cables on the lower part of the foremast.

(c) Shock.

No evidence of damage to electrical equipment as a result of shock.

(d) Pressure.

Air blast is considered responsible for the following electrical damage:

1. The distortion of both 24" searchlight bases.

2. The smashing of five cargo handling lights.

3. The freeing of three gyro repeaters from their gimbal rings.

4. The tearing of one reproducer from its mounting.

5. The bent forward 6 MC bull horn.

6. The cracking of the dial window on the Rudder Angle Indicator and the Secondary Control Station.

7. The anemometer cups carrying away.

(e) Any effects apparently peculiar to the atom bomb.

There were no effects noted that are considered peculiar to the atom bomb other than radioactivity and the intensity of the radiant heat.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

The effects on electrical equipment and ship's control were slight. Except for the damage to the searchlights and the wind intensity system, emergency repairs could have been made to all items by the ship's force without serious difficulty.

(b) Effect on gunnery and fire control.

Electrically, there was no effect on gunnery or fire control.

(c) Effect on water-tight integrity and stability.

None.

(d) Effect on personnel and habitability.

Personnel and habitability not affected from electrical failures. Effects from radioactivity are not known. It is considered that there would have been casualties from the air blast and radiant heat. There was no effect on habitability.

(e) Total effect on fighting efficiency.

Negligible, unless radioactivity and blast caused sufficient personnel casualties to affect the fighting efficiency.

IV. General Summary of Observers' Impressions and Conclusions.

Exposed electrical equipment received approximately 13 lbs. per square inch pressure. In view of the resulting damage to such equipment as the pelorus, stands and searchlights, it is considered design modifications are necessary on such items to increase their resistance to damage by air pressure.

V. Any Preliminary General or Specific Recommendations of the Inspecting Group.

(a) It is recommended that the 24" searchlights be redesigned to have resistance to air blast comparable with that of other electrical equipment.

(b) It is believed a great deal of the damage to the pelorus repeaters could be eliminated by lengthening the gimbal pins which hold the repeater, and substituting threaded binnacle pins with locking nuts for the type binnacle pins being used at the present.

DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

A. General Description of Electrical Damage.

(a) Overall condition.

There was very little electrical damage to this vessel as a result of this test. A few cables were cut, a few lighting fixtures and lamps were damaged, 3 gyro repeaters were knocked from their stands and the anemometer cups were carried away. The ship could have continued to operate electrically at practically 100% efficiency since the gyro repeaters were operable when replaced in their stands temporary emergency repairs could have been readily made on severed cables and damaged lighting equipment.

(b) Areas of major damage.

The areas of major damage were exposed locations, around the cargo holds and just inside of weather doors.

(c) Primary causes of damage in each area of major damage.

The primary cause of damage was air blast. Secondary causes of damage to electrical equipment were hull distortion and fire.

(d) Effect of target test on overall operation of electric plant.

1. The ship's service generator plant was undamaged by the test. All equipment was operable.

2. All engine and boiler auxiliaries were operable electrically except for the #2 fuel oil service pump. The control circuit for the pump controller was opened when to the remote "Emergency Stop" pushbutton was severed when the bulkhead on which the pushbutton was mounted gave way. This damage could easily be repaired by the ship's force. Furthermore, there is a standby steam fuel oil service pump so that operability would not have been affected while repairs were being made.

3. Electric propulsion was not damaged by the test. All equipment was operable.

4. Communications equipment was all operable except for one 12" signalling searchlight, two telephone jack boxes, and one sound-power telephone.

5. All fire control circuits were operable.

6. Ventilation equipment was operable except for one blower in the after engine room. The control circuit for the blower controller was opened when the cable to the remote "Emergency Stop" pushbutton was severed when the bulkhead upon which this pushbutton was mounted gave way. This damage could have been easily repaired by the ship's force.

7. All lighting equipment was operable except a few red steamtight fixtures, cargo flood lights, a few lamp bulbs, and lighting for the after cargo hold. Temporary lights could have been rigged by the ship's force so that only slight reduction in lighting would have resulted.

(e) Types of equipment most affected.

The types of equipment most affected were cable and lighting equipment.

B. Electric Propulsion Rotating Equipment.

No damage.

C. Electric Propulsion Control Equipment.

No damage.

D. Generators - Ships Service.

No damage.

E. Generators - Emergency.

(a) No damage occurred to the ship's emergency generator. This set was operated during the test and continued to operate after the test until all fuel was expended.

(b) The special Bureau of Ships (Code 660), 100 KW, 450 V. AC emergency diesel generator set, Item 13E 3, installed in the after cargo hold was hit by falling hatch covers. The generator end of the set was undamaged since it was not hit. The engine end of the set received the impact of the falling covers and received considerable damage, which would have rendered the unit inoperative.

(c) The special Bureau of Ships (Code 660) 60 KW, 440 V. AC Casualty Power Diesel Generator Set, Item 13E 1, installed in the forward cargo hold had one of the pins which holds the generator control panel broken. The control panel pulled loose at the vibration mounting so that the panel was out of line with the set. (See photograph 1948-6; page 121). The generator and the control panel appeared undamaged. The cargo hatch covers were blown in, however, there was no evidence of anything striking the set. It is therefore considered that this damage was due to the air blast.

Recommendations.

It is recommended that consideration be given to strengthening the mounting of the control panel on sets of this type to resist blast pressures. The use of the resilient mountings appears to be of questionable value. It is recommended that consideration be given to the use of bulkhead mounted panels if the vibration of the set interferes with proper operation when using rigidly mounted panels.

F. Switchboards, Distribution and Transfer Panels.

(a) No damage occurred to the ship's switchboards, distribution and transfer panels.

(b) The special Bureau of Ships (Code 660), CV9 class switchboard Item 13E4, installed in the forward cargo hold was welded between the deck and the overhead. Ref. photo 1948-8; page 120 . This damage

occurred when the overhead was deflected downward due to blast. There was originally approximately 3 inches clearance above the top of the switchboard panel. The equipment inside the switchboard appeared undamaged. The breakers in the top section of the board operated normally when checked manually. Other special test switchboards in the same general area were undamaged since they were not tall enough to be struck by the distorted overhead. Ref. photo. 1902-5; page 95 . The edge of switchboard, Item 13E 4, is shown at the extreme right side of the photograph.

G. Wiring, Wiring Equipment and Wireways.

(a) Cable.

1. One speaker cable located at frame 108 on the centerline of the 02 deck had some of its armor blown off by the air blast. However, it showed distinct signs of pre-rust.

2. Radiant heat burnt the paint off the Inter Communication supply cables that were exposed at frame 60 on the 04 level. The cables were still operable although some outside insulation had melted and seeped through the armor.

3. Cables installed on the foremast and mainmast were burnt by the radiant heat which in some cases, partially melted the outside insulation, however, no cables were rendered inoperable from this cause. Ref. photo. 1948-4; page 118 .

4. The director shields located at frame 27 on the port and starboard sides on the 02 deck were torn loose by the air blast. These shields severed two call bells and two sound powered jack box cables in carrying away.

5. A small fire in a fire hose and cordage burned all insulation from the cables on the starboard side of the deck house on which the director shields were mounted.

6. The cables to an engine room ventilation set and to the #2 fuel oil service pump "Emergency Stop" pushbuttons were severed at frame 104 on the port side of the main deck when a light metal joiner bulkhead gave way due to the air blast.

7. Six cables supplying lighting, sound power phone and fire alarm circuits were severed at frame 109 on the starboard side of the main deck when a light metal joiner bulkhead carried away from the air blast.

Recommendation.

It is noted that in two instances on this vessel vital cables were severed due to the fact that they were installed on joiner bulkheads. It is therefore recommended that cable be installed where possible on stronger structures such as beams.

(b) Wiring equipment.

1. The mounting welds failed on one 10 amp double switch recepticle and on one connection box located in the movie booth at frame 108 on the 02 level. Failure was due to shock transmitted through the light metal constructed booth and poor welds.

(c) Wireways.

There was no damage to wireways.

H. Transformers.

No damage.

I. Submarine Propelling Batteries.

Not Applicable.

J. Portable Batteries.

No damage.

K. Motors, Motor Generator Sets and Motor Controllers.

(a) There was no damage to motors.

(b) There was no damage to motor generator sets.

(c) There was no damage to motor controllers, however, the cables located in the port passageway, frame 104, to the remote emergency stop stations for the #2 fuel oil service pump and an engine room ventilation fan were cut due to the bulkhead carrying away. This damage could have been readily repaired by the ship's force. Since the ship has a standby steam fuel oil service pump, the supply of fuel oil to the boiler would not have been lost.

Recommendation.

It is recommended that important electrical equipment not be mounted on thin bulkheads such as used along the passageways and for office partitions on these vessels.

L. Lighting Equipment.

(a) The only lamps that were observed broken were two 100 watt rough service lamps located in the movie booth at frame 108 on the 02 deck. These lamps were mounted on the overhead which was of light steel construction and distorted from the air blast.

(b) One 12" reflector at frame 45 and two 12" reflectors at frame 109 all on the starboard side of the main deck were smashed by missiles when the cargo hatch covers gave way.

(c) Cargo lights of the type shown in photograph 2104-6; page 89 received the following damage:

1. Two mounted on the foremast were smashed beyond repair, one on the port side and the other on the starboard.

2. One installed on the port wing of the bridge at frame 60, 03 deck was smashed beyond repair.

3. Of the four cargo lights aft, three were completely demolished and one had its frame badly bent.

(d) One red steamtight globe located at frame 18 in the port passageway on the main deck was broken from the shock. There was no evidence of missiles or of distortion of the overhead.

(e) One red steamtight globe located at frame 40 on the starboard side of the main deck was broken by missiles when the forward cargo hatch covers gave way.

(f) One red steamtight globe located at frame 25 on the main deck in compartment A-102-4T was broken from shock.

(g) One RSH1 lamp located at frame 139 in compartment C-0104 M had its lead in wires broken between the socket and the globe.

M. Searchlights.

(a) The twelve inch signalling searchlight located on the port side of the signal bridge was blown over the side. It was lifted upward at least 5 inches and out of its socket. There was no evidence of distortion to the socket.

Recommendation.

It is recommended that a positive method of pinning these searchlights in their sockets be devised. Since these searchlights are often moved from one location to another on the vessel, it is necessary that the pinning device be such that it will not be carelessly misplaced or lost.

(b) The two 24-inch General Electric Company, Navy model 93113 searchlights were both damaged by the air blast. The port searchlight supporting flange was bent thereby allowing the searchlight to impact against the railing. This bent the searchlight barrel slightly. The internal mechanism of the searchlight was not installed in the barrel during the test. The door glass and reflector appeared to be undamaged. Photograph 2168-12; page 83 , shows the port searchlight

and the damage to the hull in the vicinity of the searchlight. The starboard searchlight supporting flange was bent so that the searchlight had a list of approximately 15 degrees. The searchlight was otherwise in good operating condition.

Recommendation.

Since these searchlights are of the latest Navy shockproof design, it appears that the searchlight base requires strengthening if they are to be required to withstand blast pressures as experienced on this vessel.

N. Degaussing Equipment.

The standard compass binnacle at the secondary control station carried away due to the blast. The cables to the compass compensating coils were severed. The compensating coils and control box appeared to be undamaged. See photograph 2104-9; page 88 , showing the binnacle lying on the deck.

O. Gyro Compass Equipment.

(a) Air blast twisted the yoke holding the steering repeater at the after steering station, frame 142. The unit was still operable.

(b) The gimbal ring for the pelorus on the starboard wing of the navigation bridge was found on the deck a few feet from the stand and the repeater was loose in the binnacle. No material damage resulted to the repeater, gimbal ring or binnacle and the unit was operable when reassembled.

(c) The repeater for the pelorus on the port side of the navigation bridge was blown free of its gimbal ring by the air blast and was loose in the binnacle. The unit was operable when replaced in its ring.

(d) The steering repeater located at the secondary control station was blown free off its gimbal ring and is shown in photograph 2104-9; page 88 , loose in the binnacle. The unit was operable when replaced in its ring.

Recommendations.

It is believed that a great deal of the damage to the pelorus repeaters, as described in paragraphs (b), (c), and (d) above, could be eliminated by lengthening the gimbal pins, which hold the repeater and by the use of threaded binnacle pins with locking nuts.

P. Sound Powered Telephones.

(a) The only sound powered equipment observed damaged was one RCA Mod. MI-2040-A hand set which was exposed to the blast at frame 19 on the upper deck (01). Its receiver diaphram was sufficiently distorted to prevent reproduction of speech. The cover on the hand set cabinet either was not fastened or was left open.

(b) Two sound powered jack boxes located at frame 27 on the 02 deck, were disabled when their cables were severed when the director shield upon which they were mounted carried away.

Q. Ship's Service Telephones.

Not Applicable.

R. Announcing Systems.

(a) Air blast bent the tripod for the PAB reproducer, located on the port side of the signal bridge, otherwise, no damage occurred to this system.

(b) The forward 6 MC bull horn installed on the foremast at frame 35 was slightly bent by the air blast, but it was still operable. See photograph 1948-3 and 4; page 117 and 118 .

(c) One Stromberg-Carlson Type H and M reproducer located at frame 59 on the bridge structure was bent by a missile but was still operable.

(d) One Stromberg-Carlson Type H and M reproducer located exposed at frame 63 on the starboard side of the 03 deck was torn from its mounting by the air blast. This unit was mounted on a pipe which in turn was welded to the bulkhead. The weld at the bulkhead failed. The unit was still operable.

S. Telegraphs.

No damage.

T. Indicating Systems.

(a) Air blast cracked the dial window on the Pilot Marine Corp. Mod. SR1RA1 Rudder Angle Indicator located at the Secondary Control Station, frame 92, on the 04 level. The dial was still readable and the unit was operable.

(b) The anometer cups located on the yardarm were carried away by the air blast thereby rendering the wind intensity system inoperable.

(c) The fire alarm circuit for the after cargo hold was rendered inoperable due to a severed cable that was mounted on a metal joiner bulkhead which carried away at frame 109 on the starboard side of the main deck.

U. I.C. and A.C.O. Switchboards.

No damage.

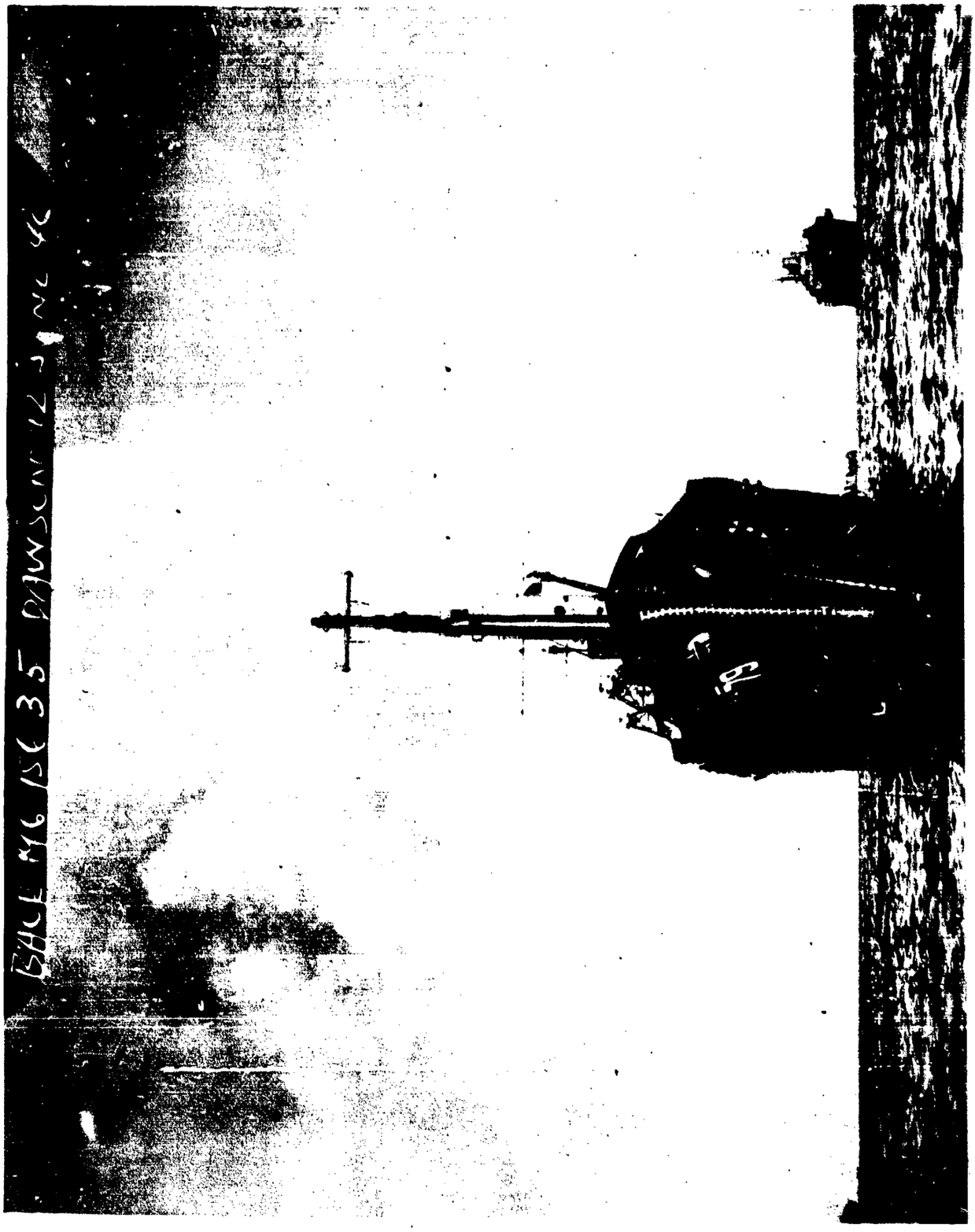
V. F.C. Switchboard.

No damage.

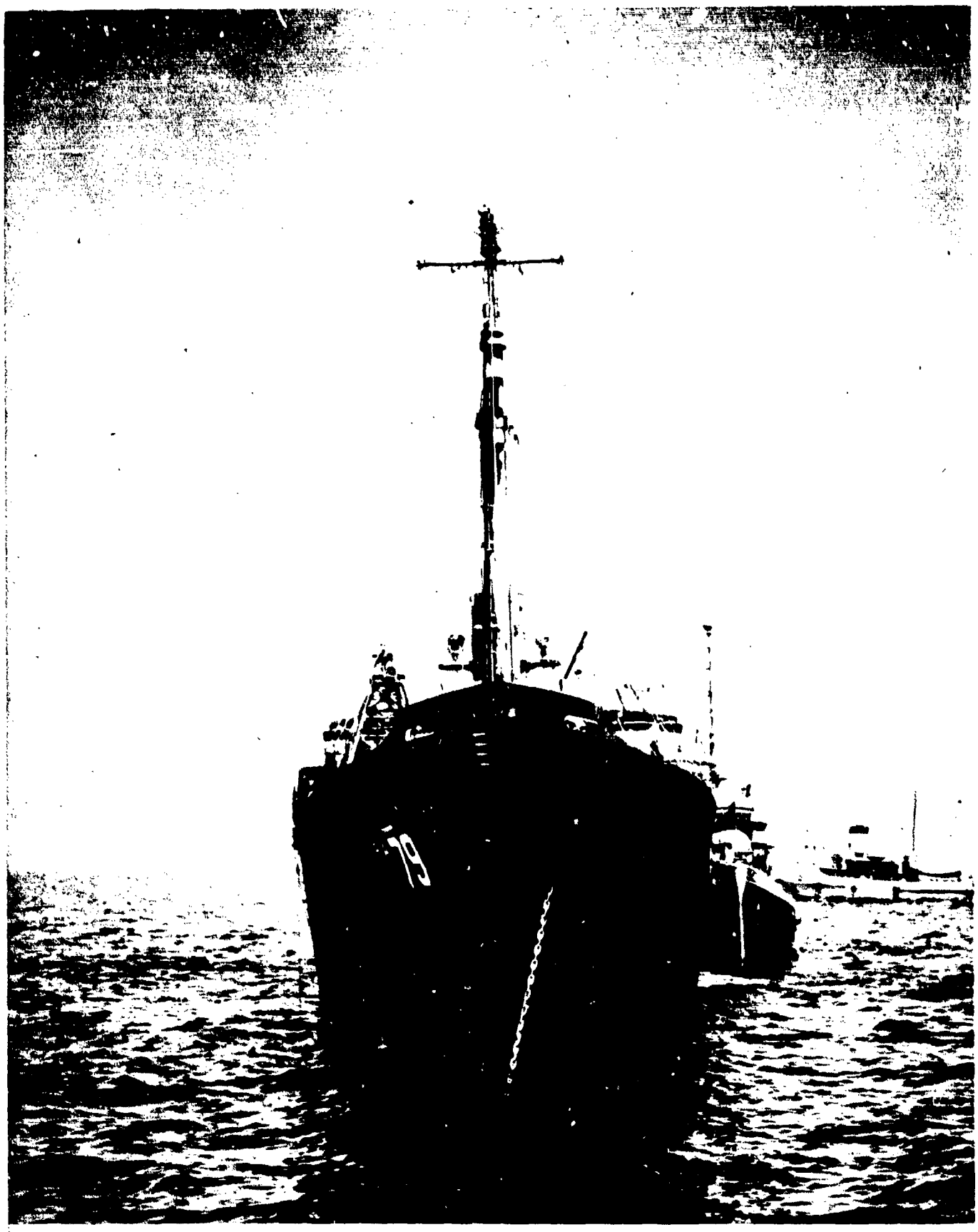
SECTION IV

PHOTOGRAPHS

TEST ABLE

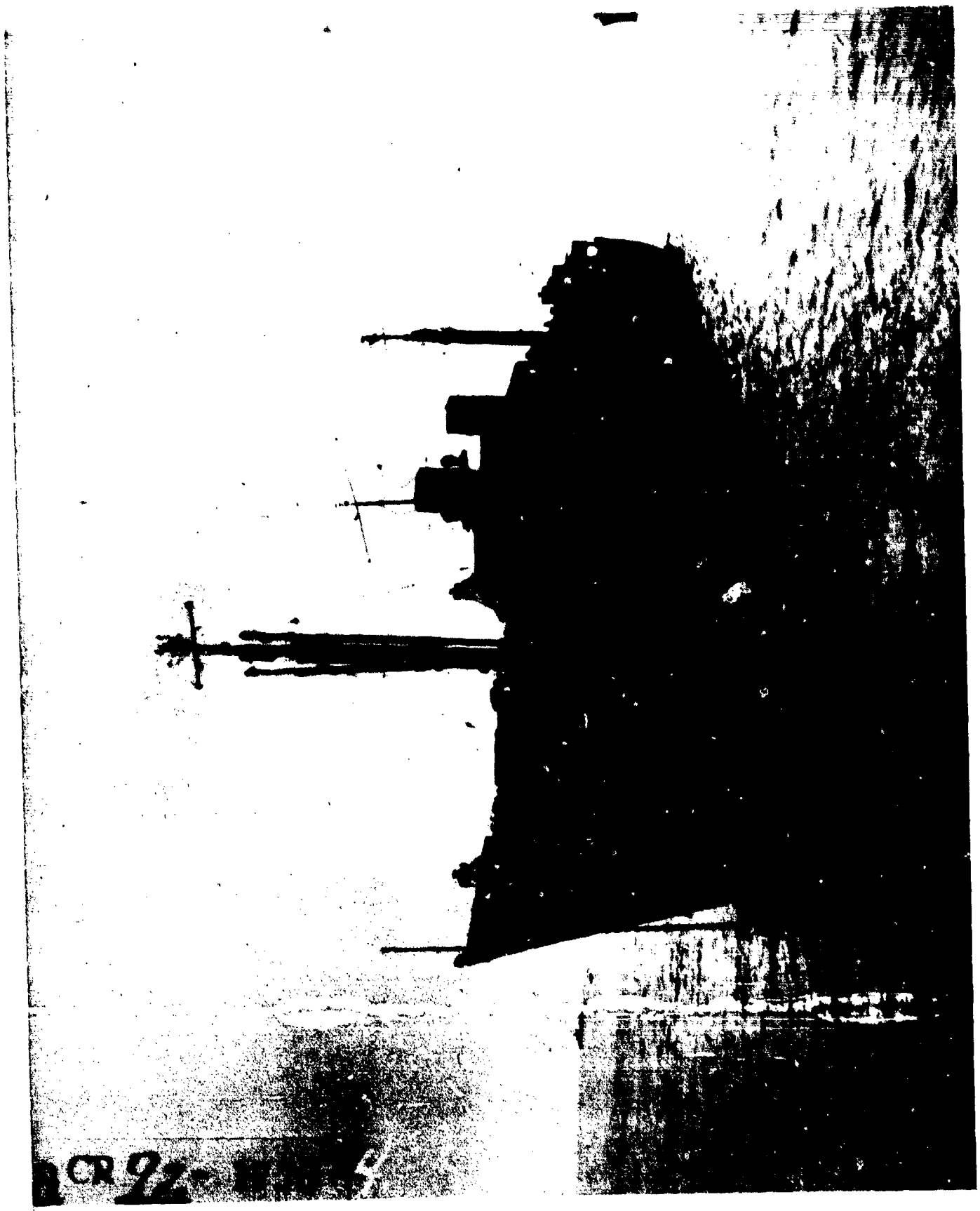


BA-CR-196-156-35. View from dead ahead before Test A.

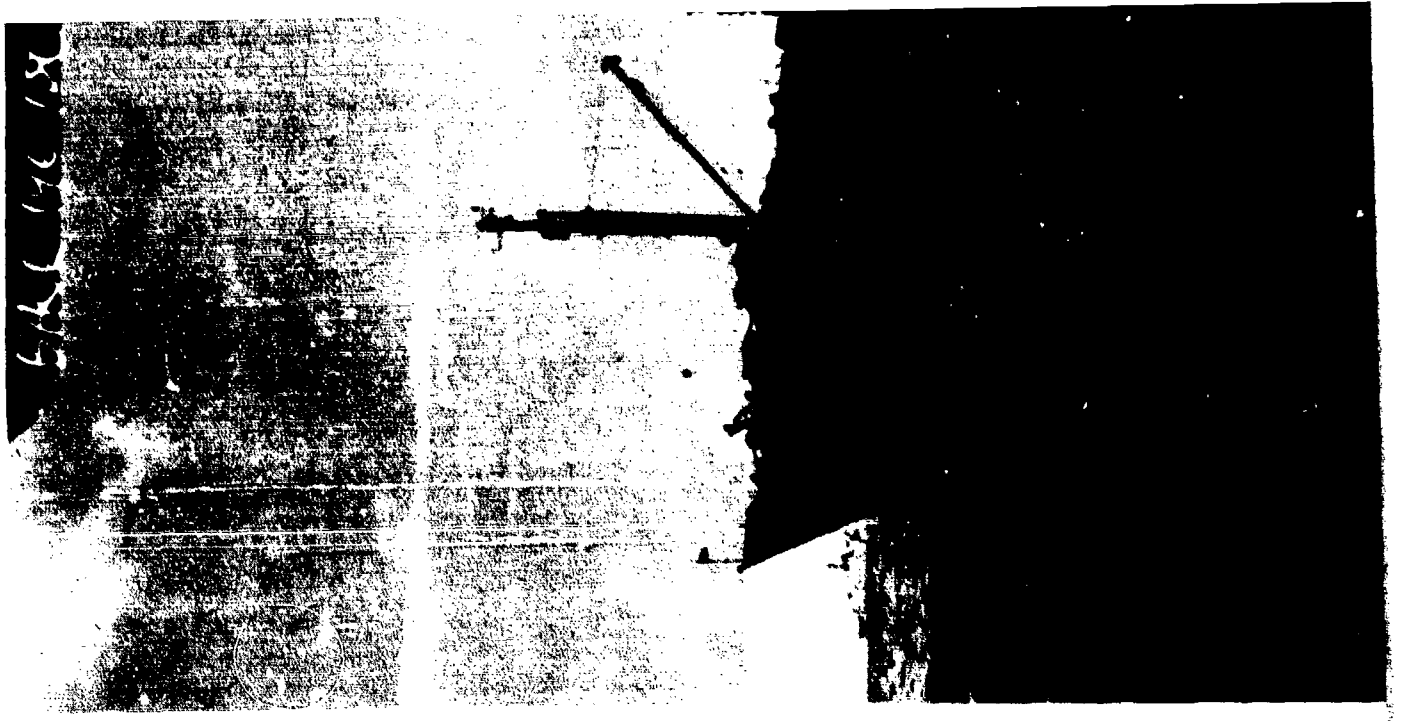


AA-CR-227-87-63. View from dead ahead after Test A.

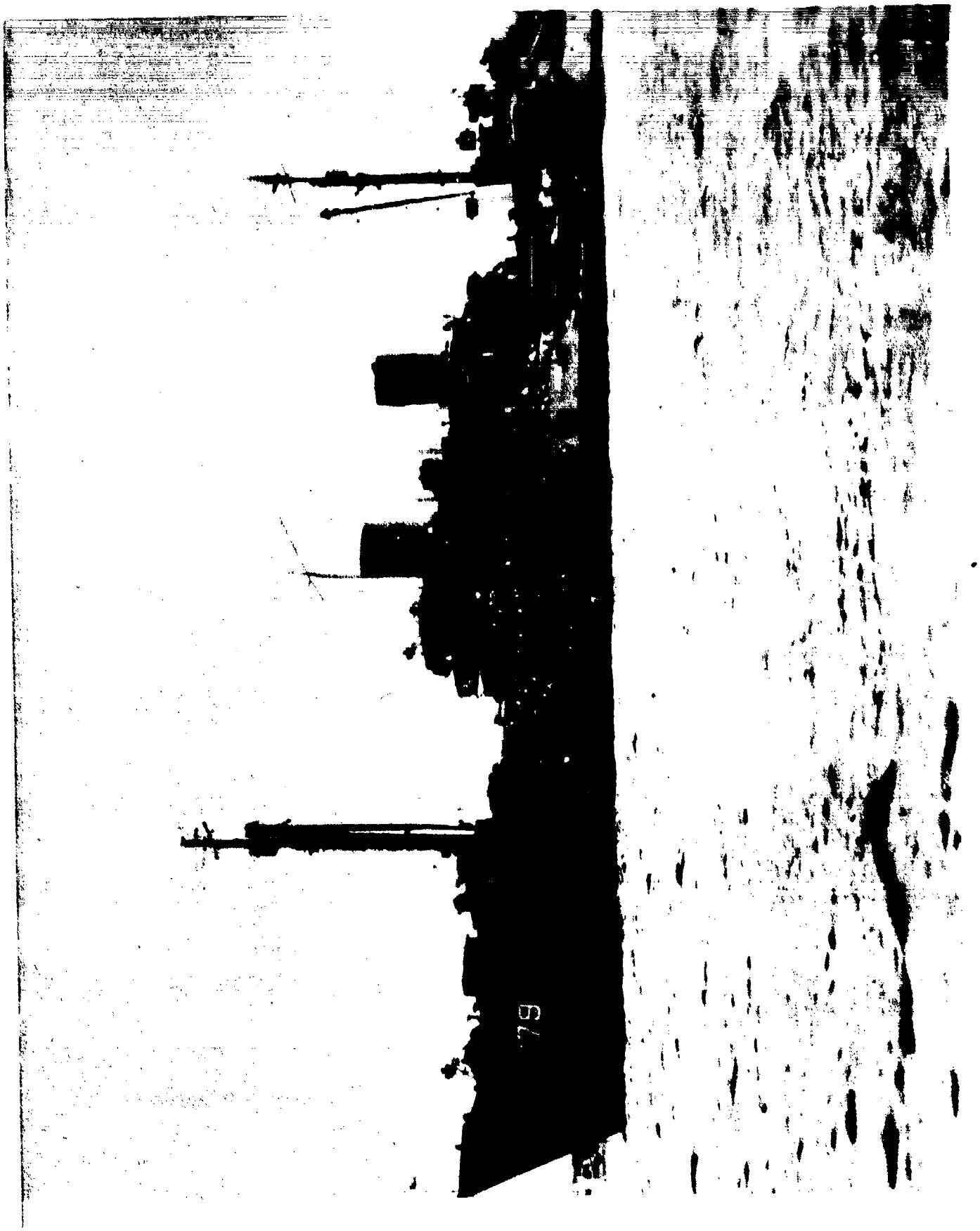
BA-CR-196-156-34. View from off port bow, before Test A.



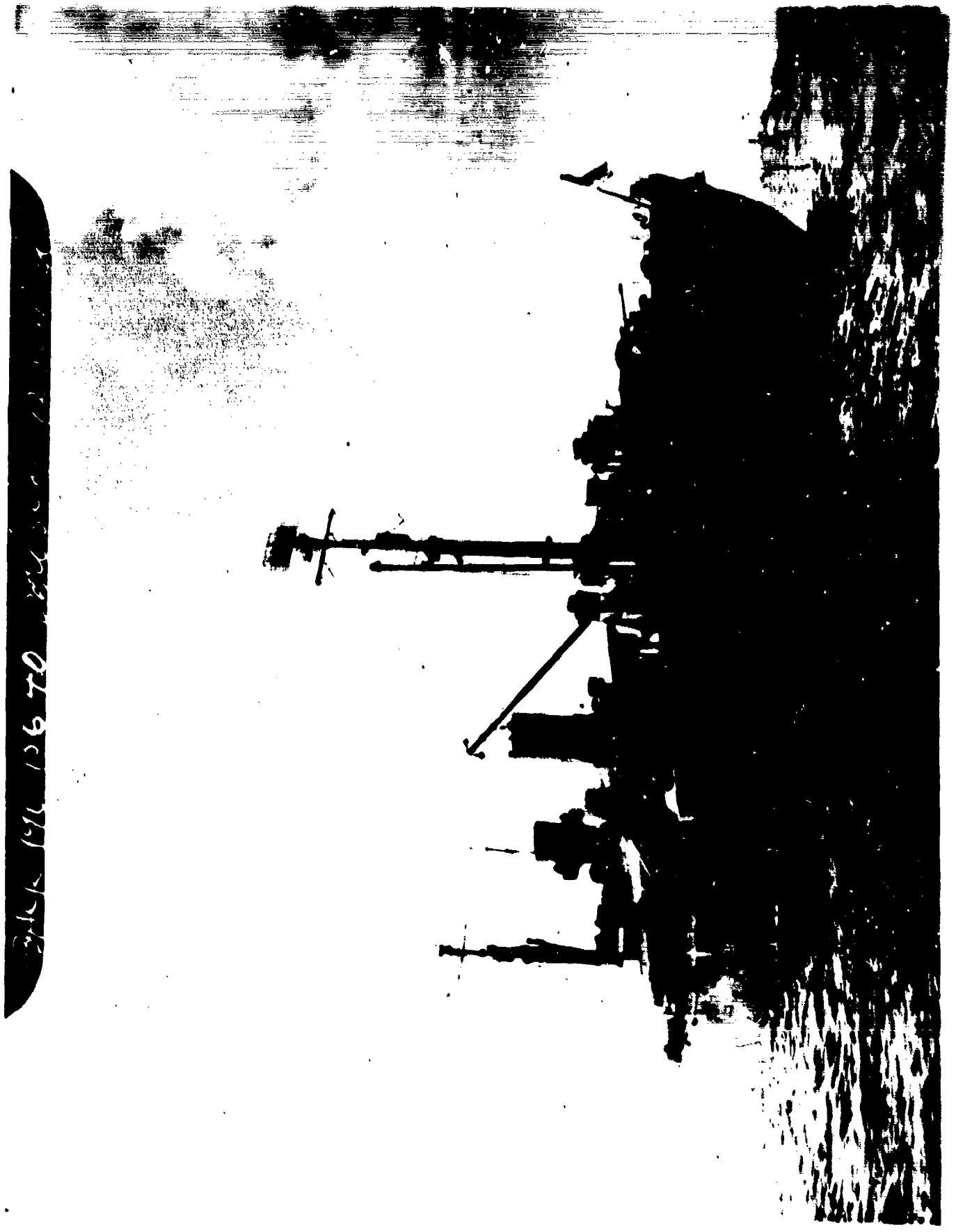
AA-CR-92-1773-4. View from off port bow after Test A.



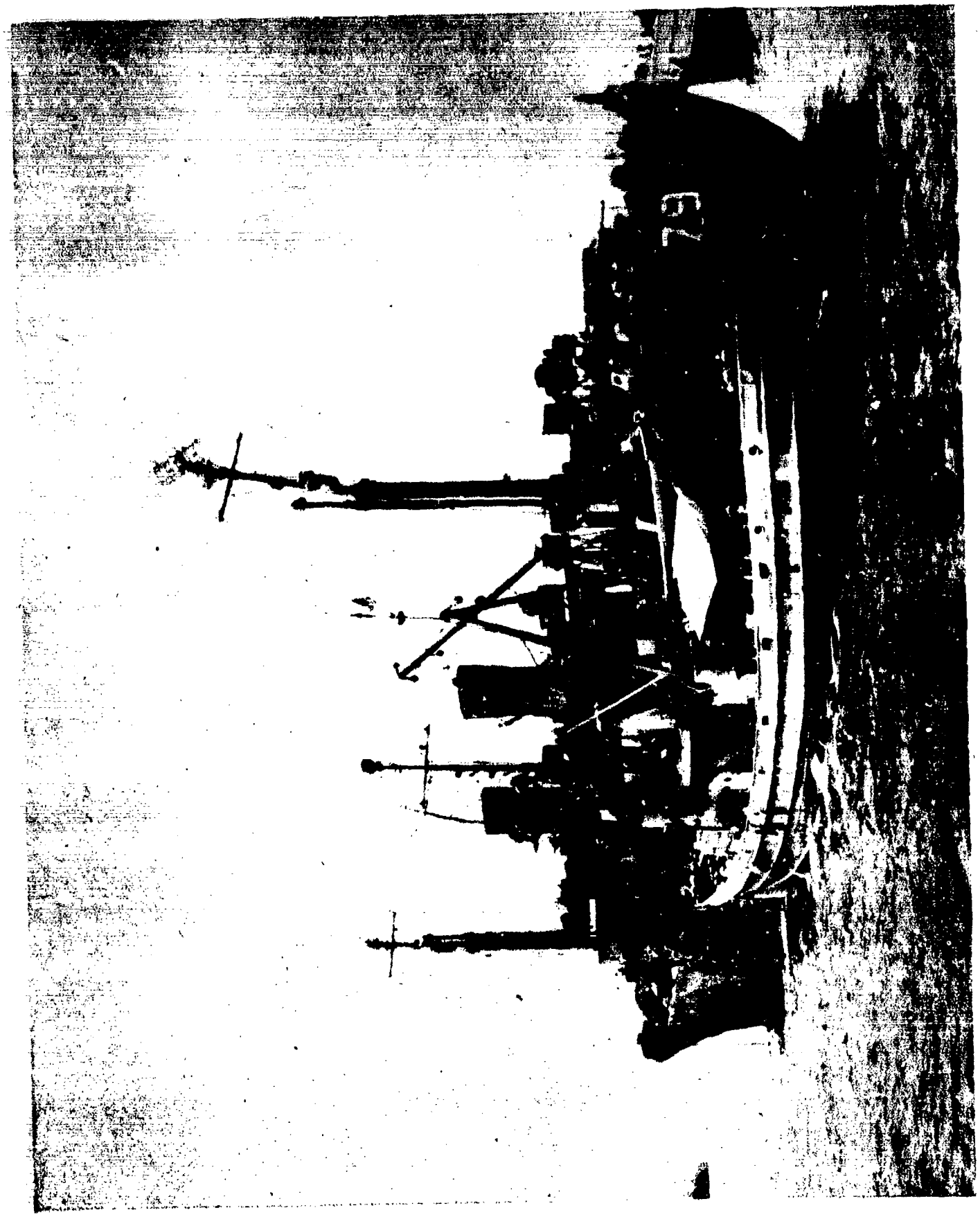
BA-CR-196-156-33. View from off port beam before Test A.



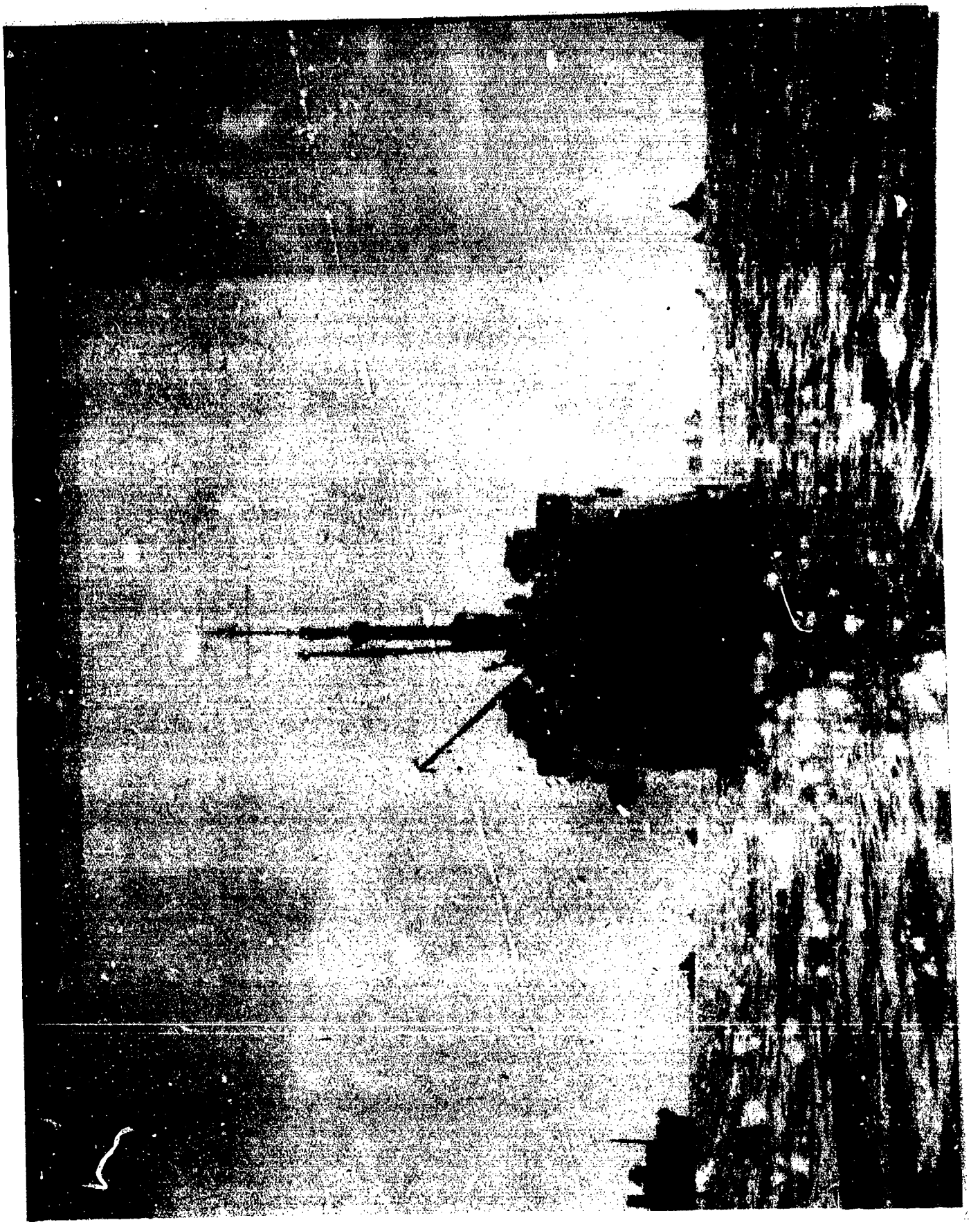
AA-CR-227-92-102. View from off port beam after Test A.



BA-CR-196-156-40. View from off port quarter before Test A.

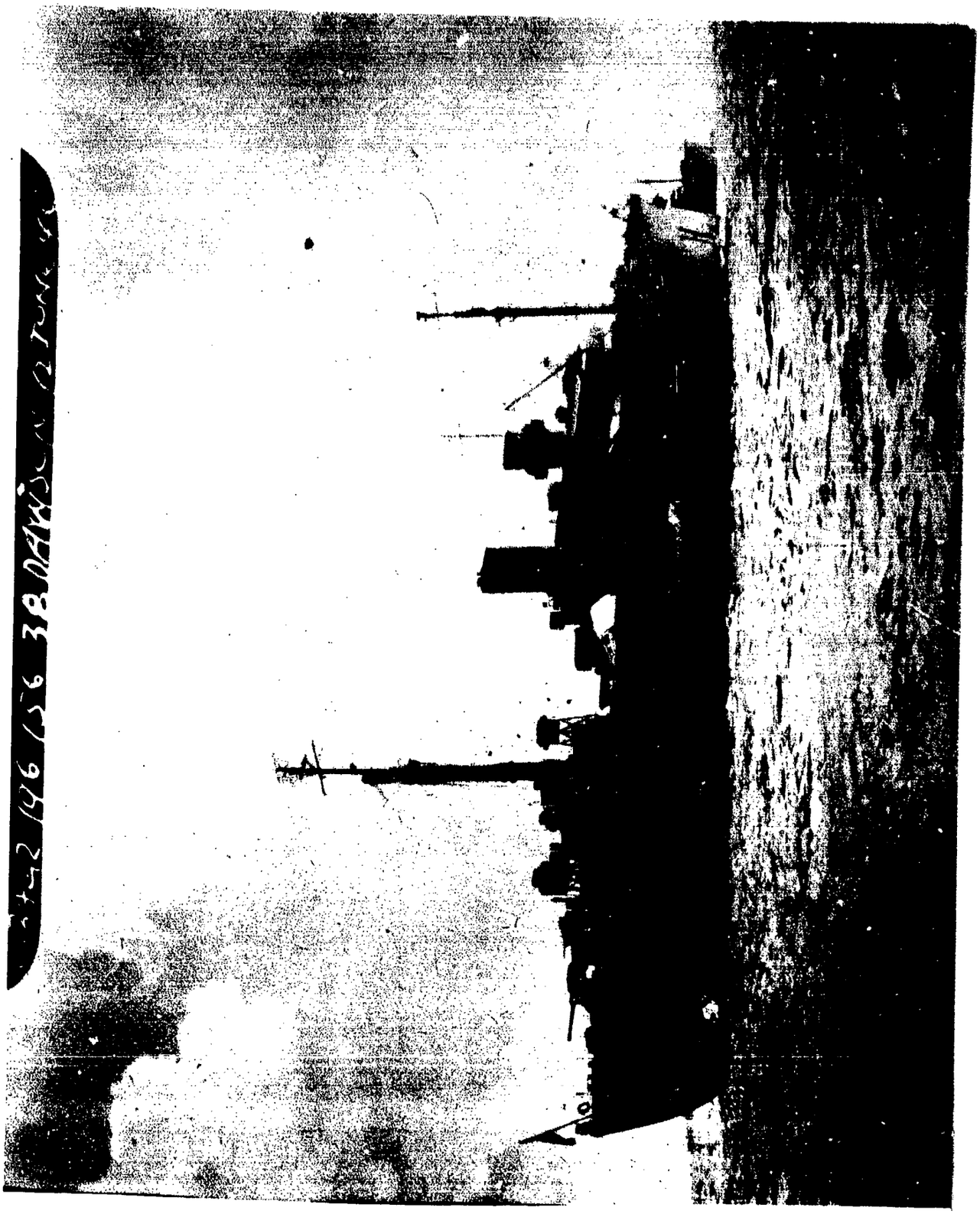


BA-CR-227-87-67. View from off port quarter after Test A.

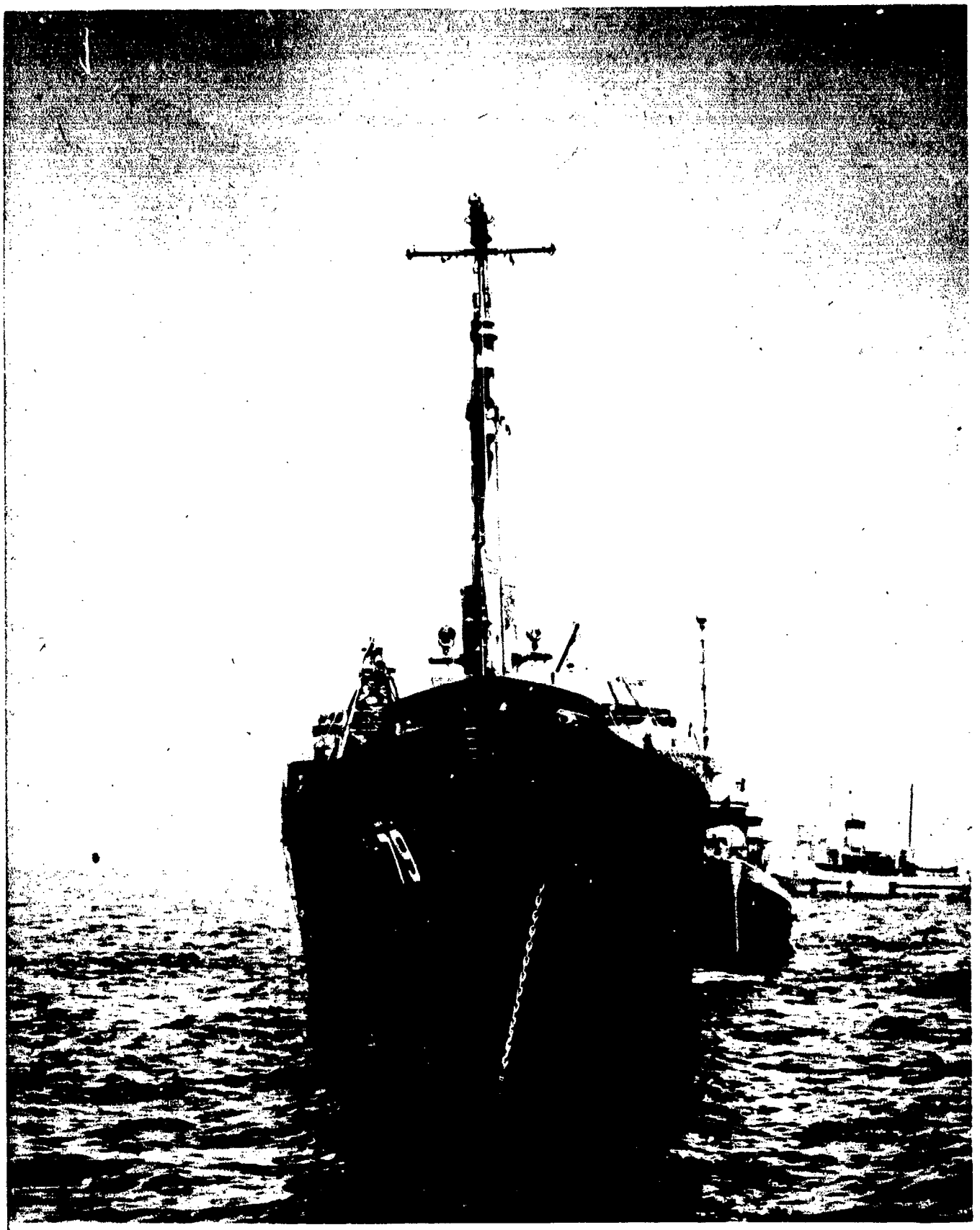


BA-CR-196-156-39. View from astern before Test A.

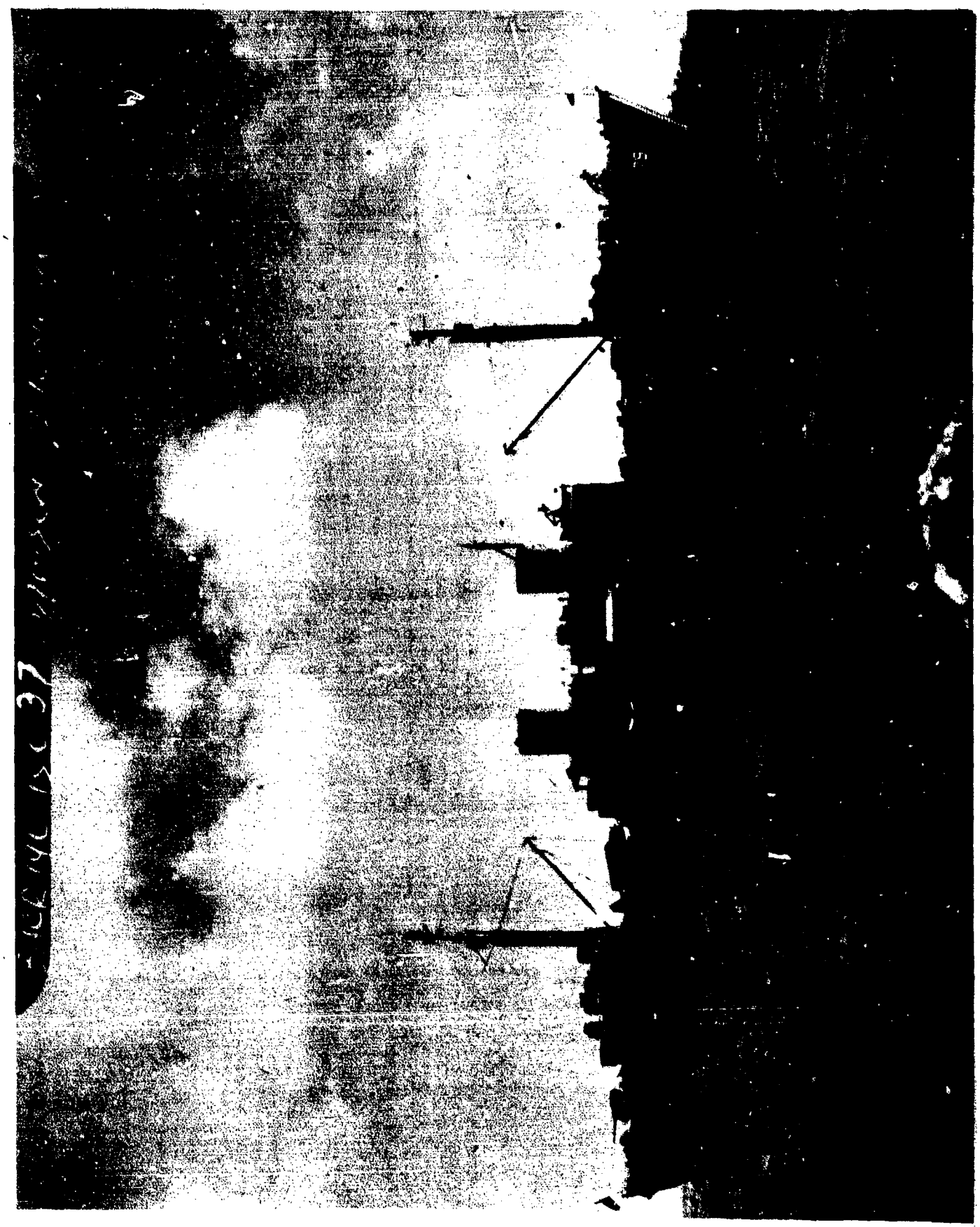
AA-CR-227-87-66. View from off astern after Test A.



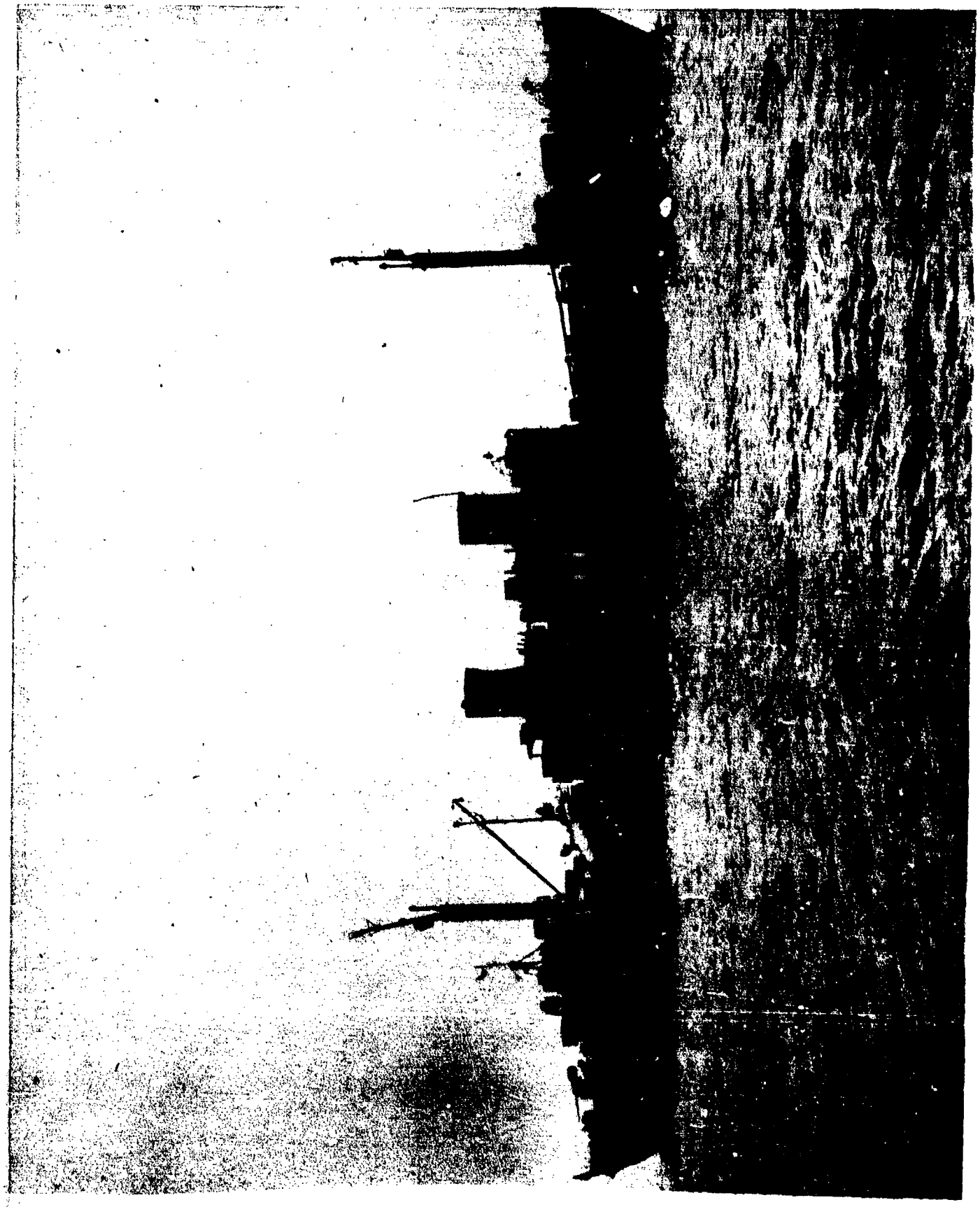
BA-CR-196-156-38. View from off port quarter. Before Test A.



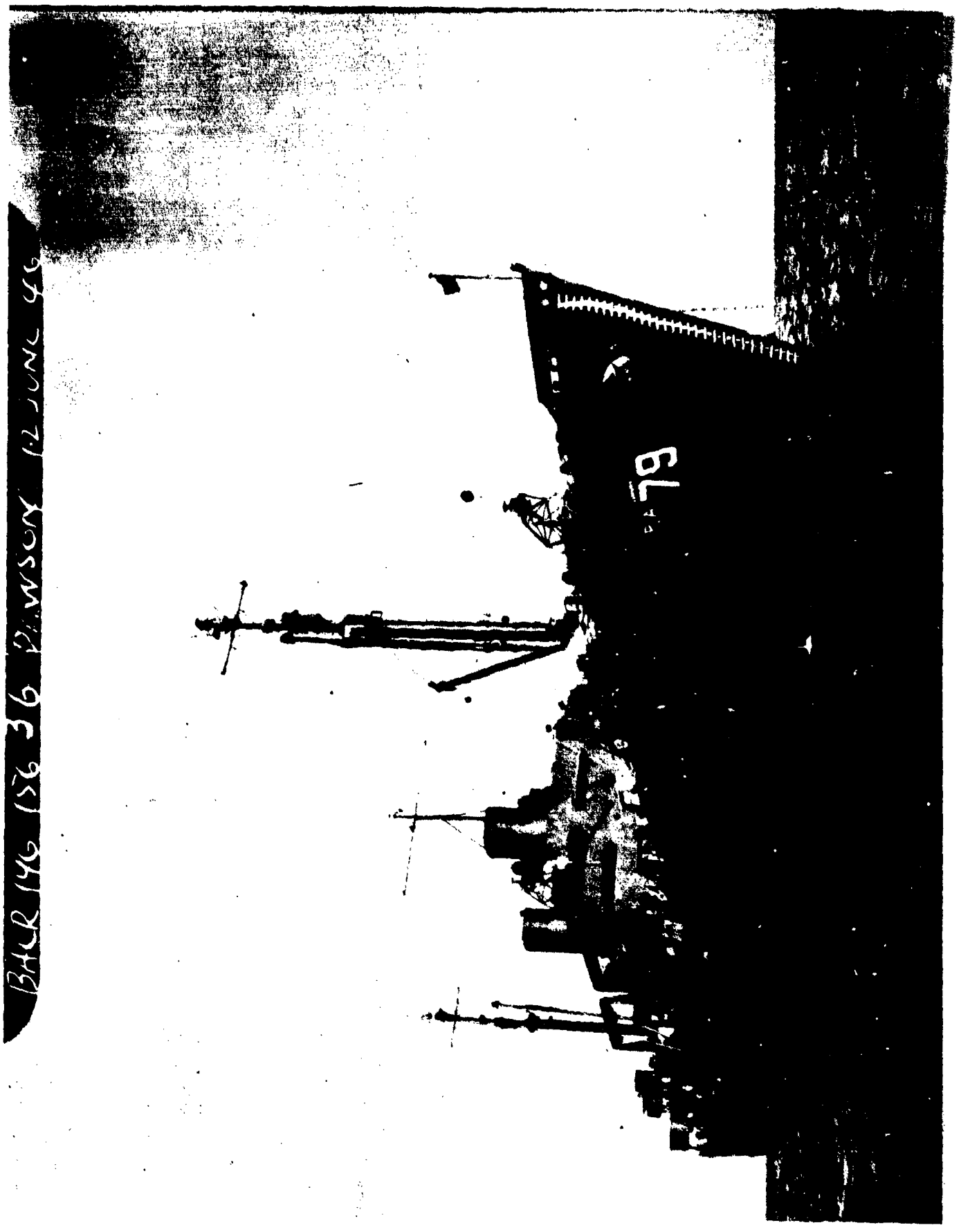
AA-CR-227-87-65. View from off starboard quarter after Test A.



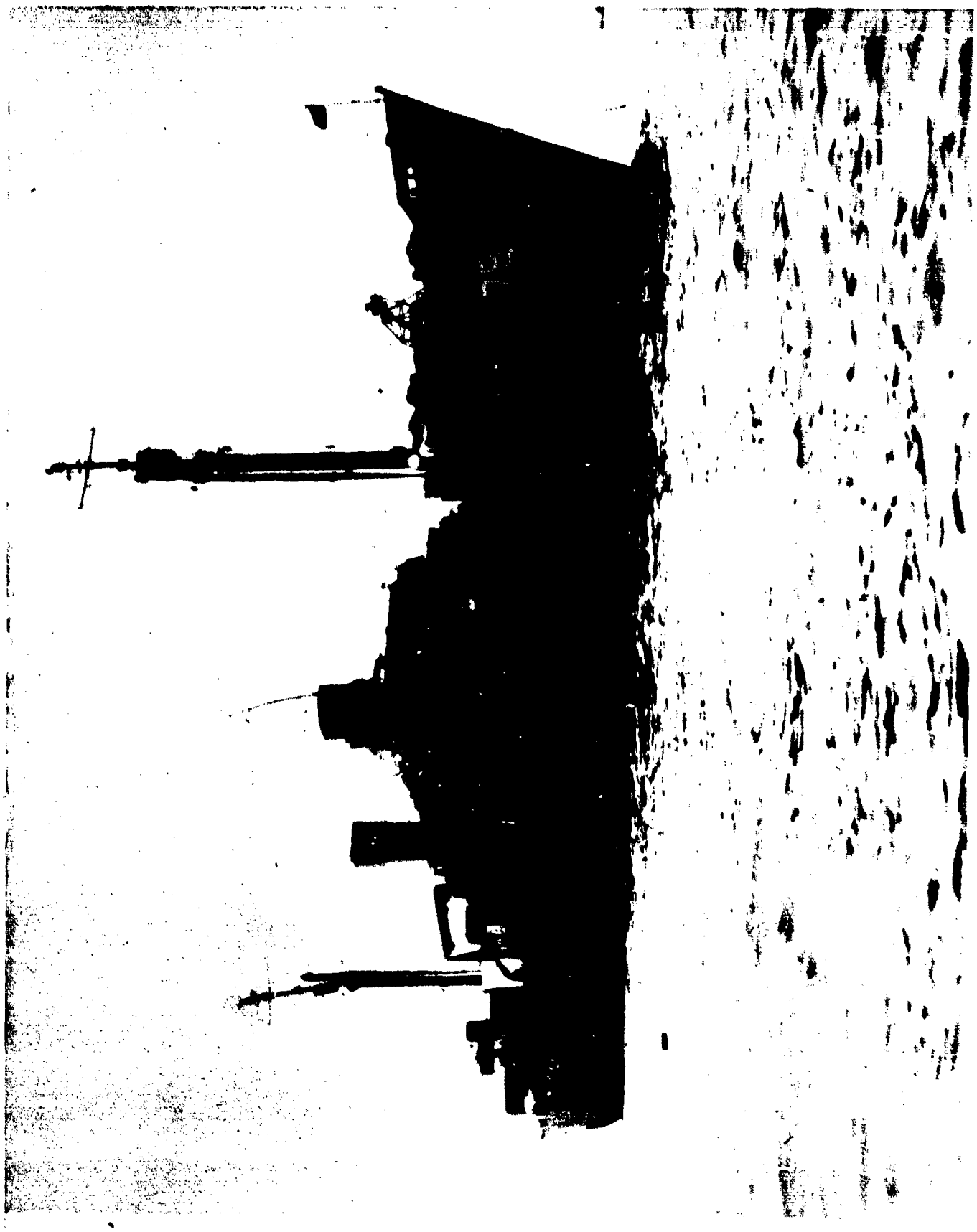
BA-CR-196-156-37. View from off port beam before Test A.



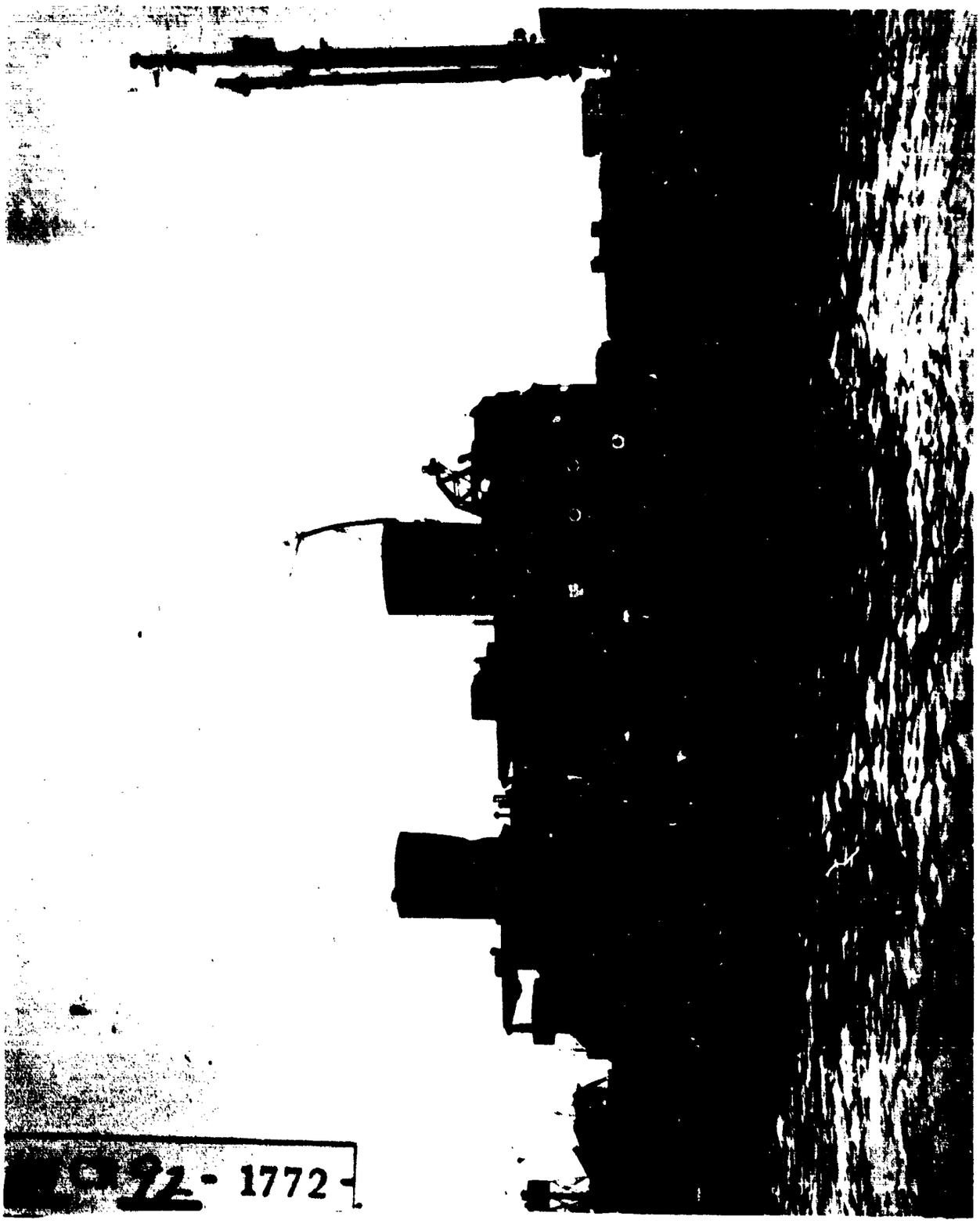
A A-CR-227-87-64. View from off starboard beam after Test A.



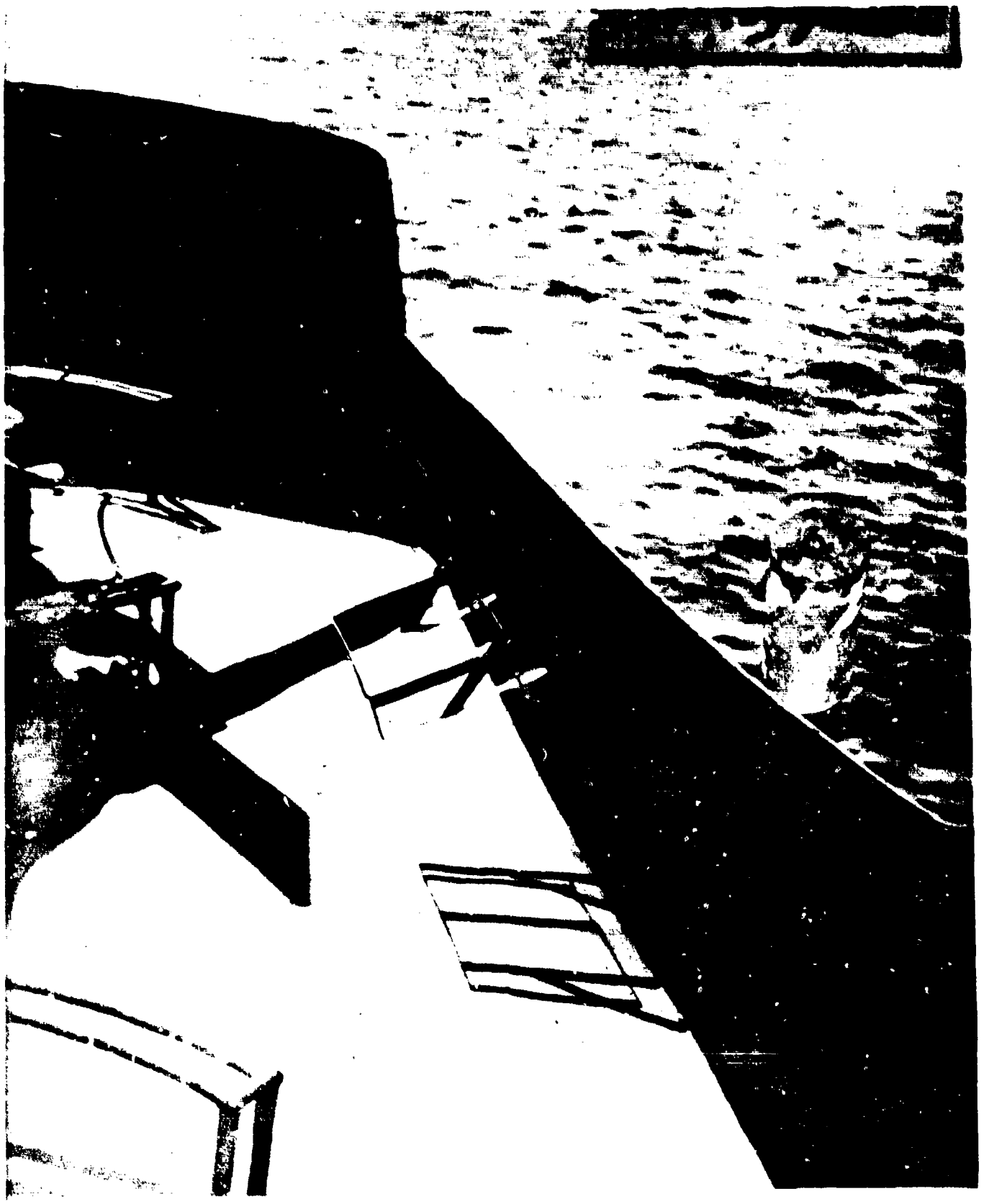
BA-CR-196-156-36. View from off starboard bow before Test A.



AA-CR-227-92-103. View from off starboard bow after Test A.

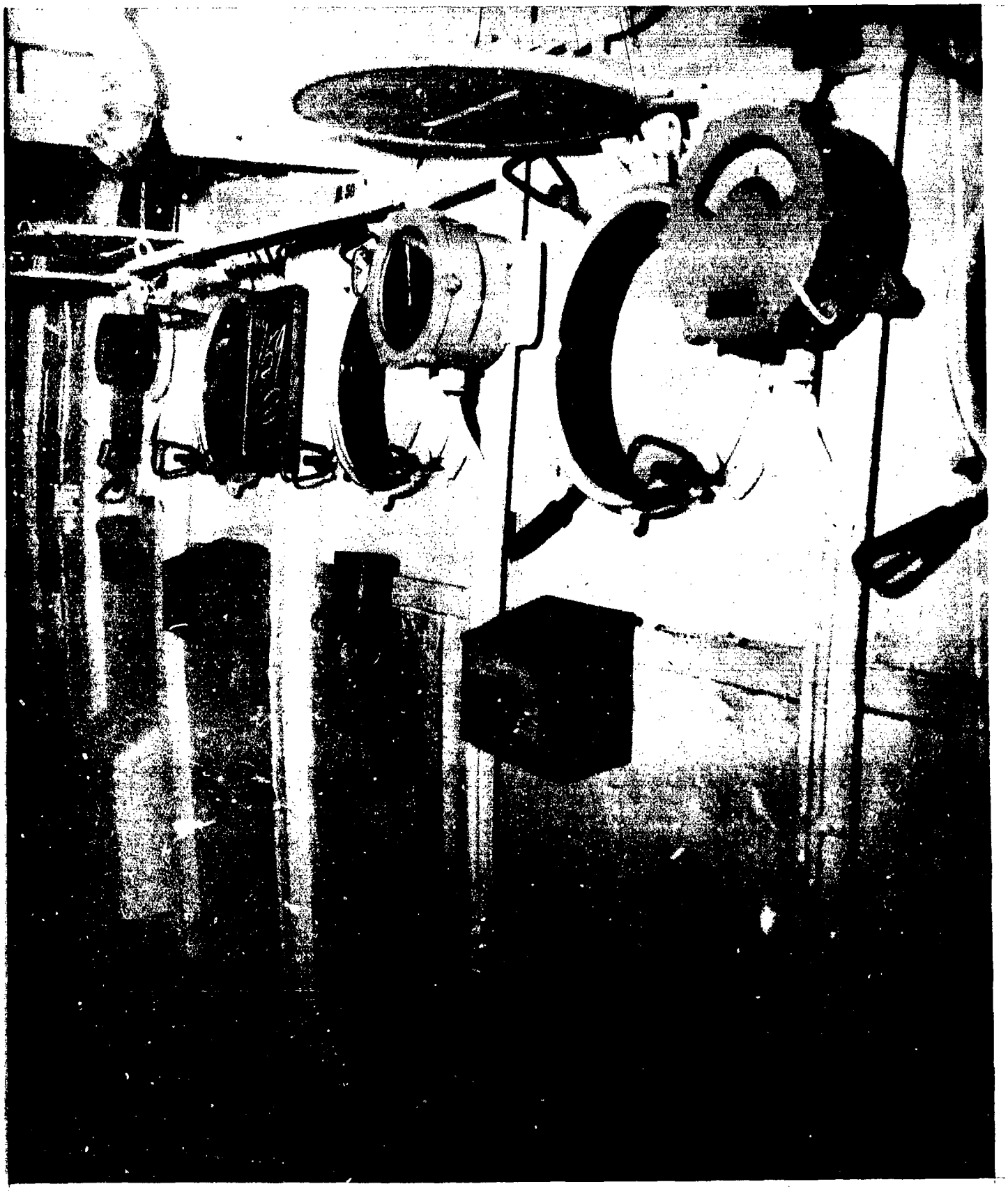


AA-CR-92-1772-12. Starboard side, frames 25 to 115.

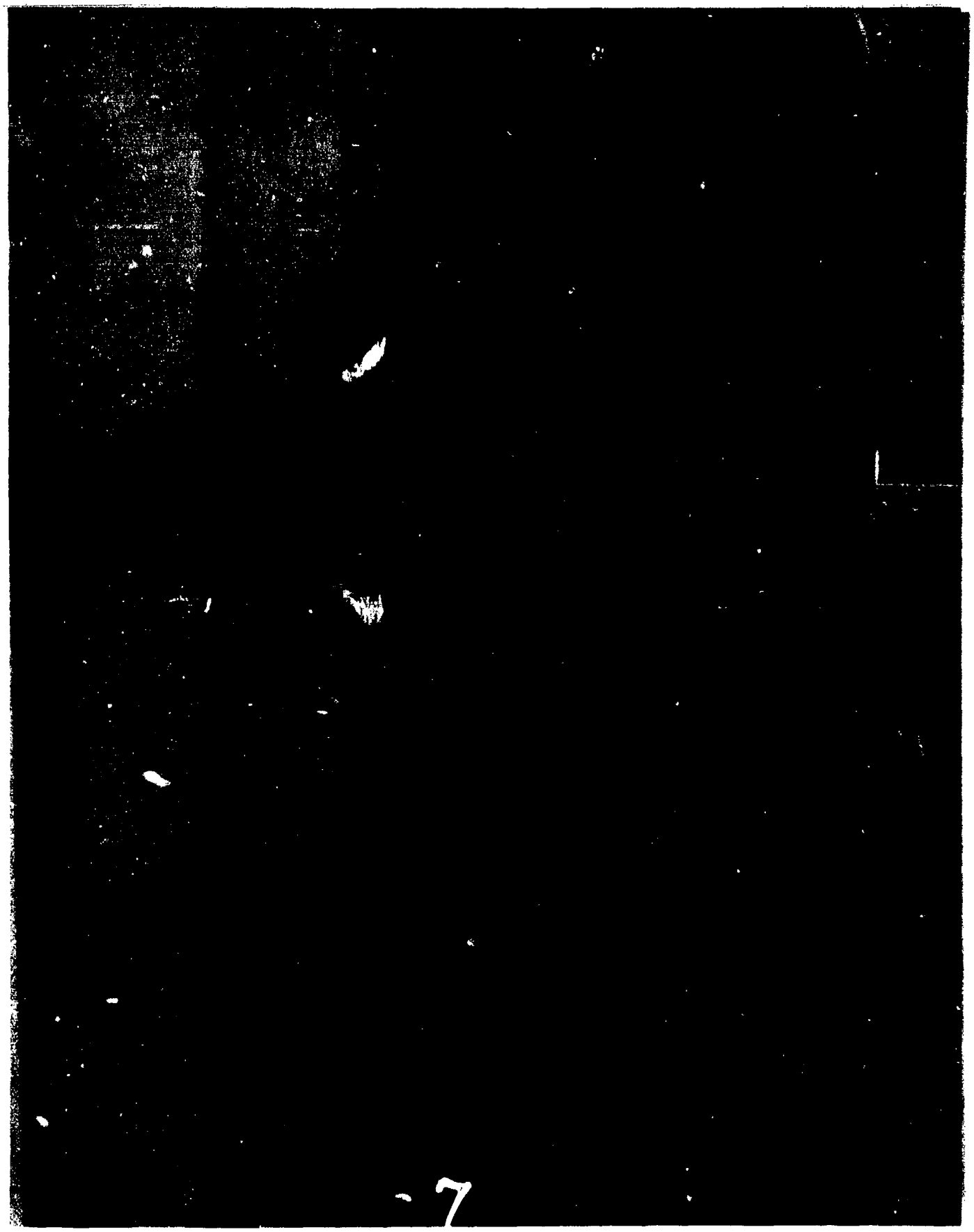


AA-CR-65-1741-5. Looking to port, along forward bulwark of signal bridge and 20MM gun enclosure.

AA-CR-65-1741-6. Looking to starboard along forward bulwark of signal bridge.



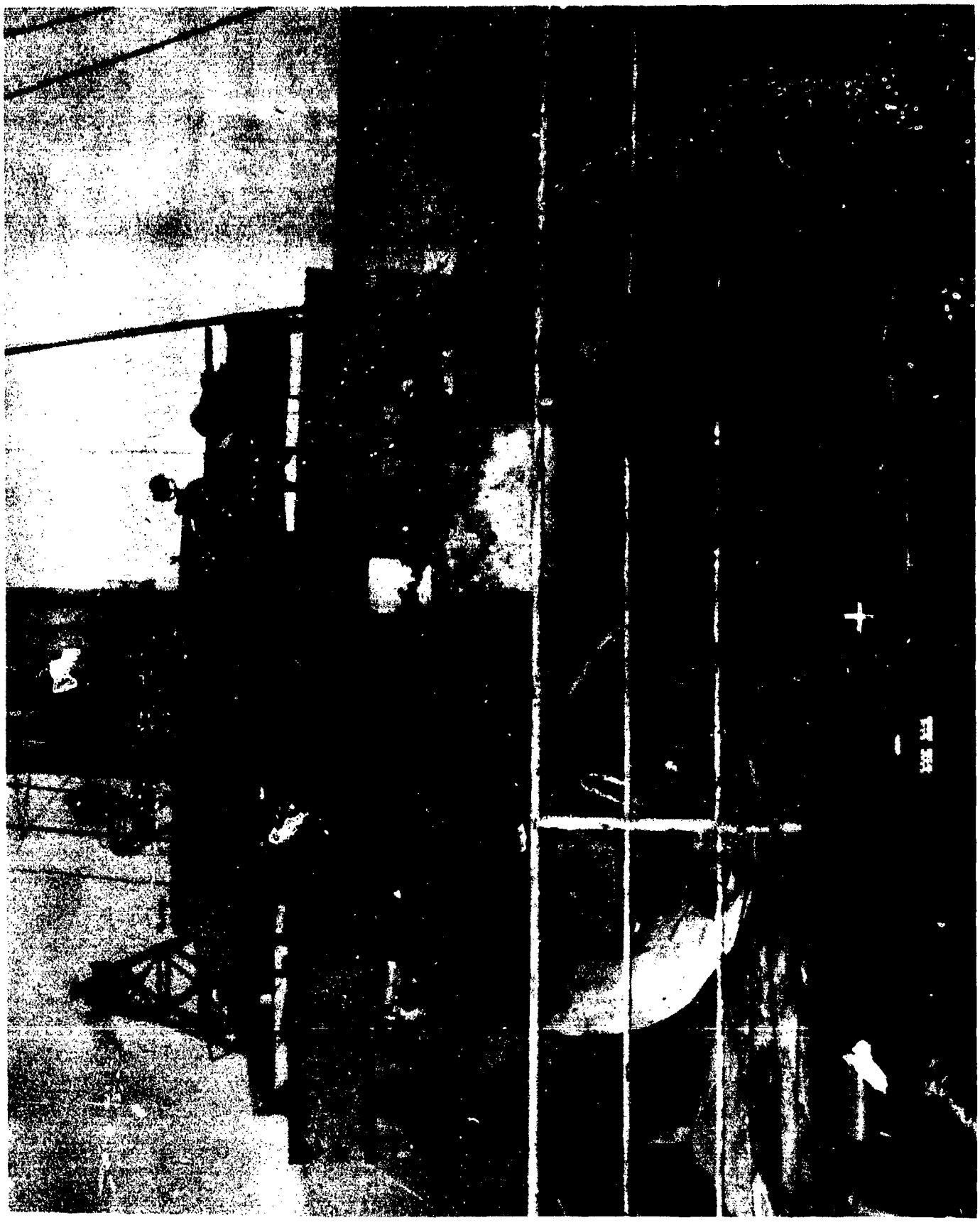
AA-CR-88-2104-7. Looking forward and to port in pilot house showing dishing of forward bulkhead.



AA-CR-65-1741-7. Weld failure of bulwark capping at centerline of ship on starboard side of signal bridge, looking forward.

AA-CR-65-1741-8. Looking forward and to starboard, on starboard side of signal bridge, showing damage to railings, in way of starboard flagbag location. The flagbag was blown to the level below.

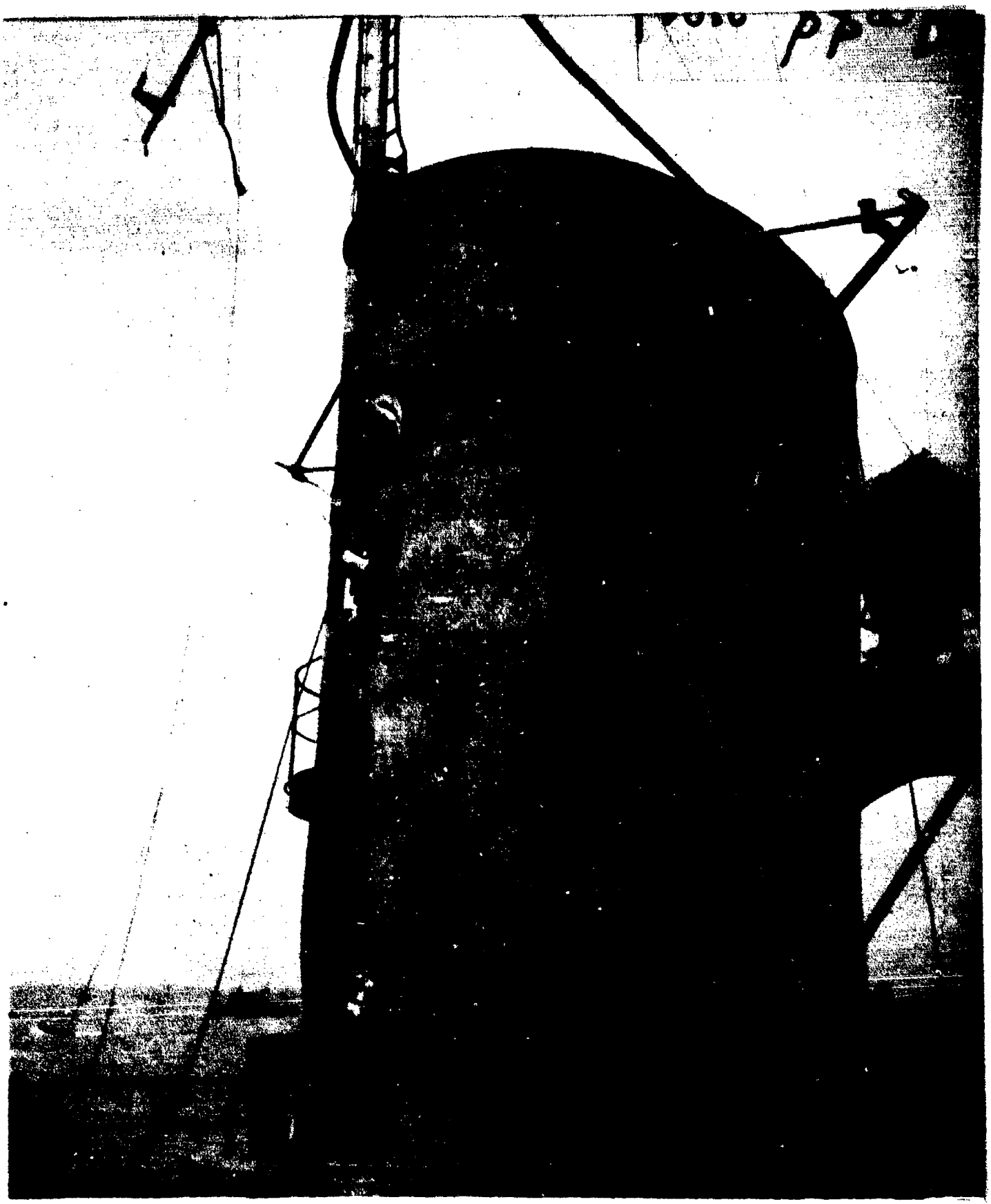
AA-CR-65-1741-9. Demolished flag bag lying on walkway below signal bridge, starboard.



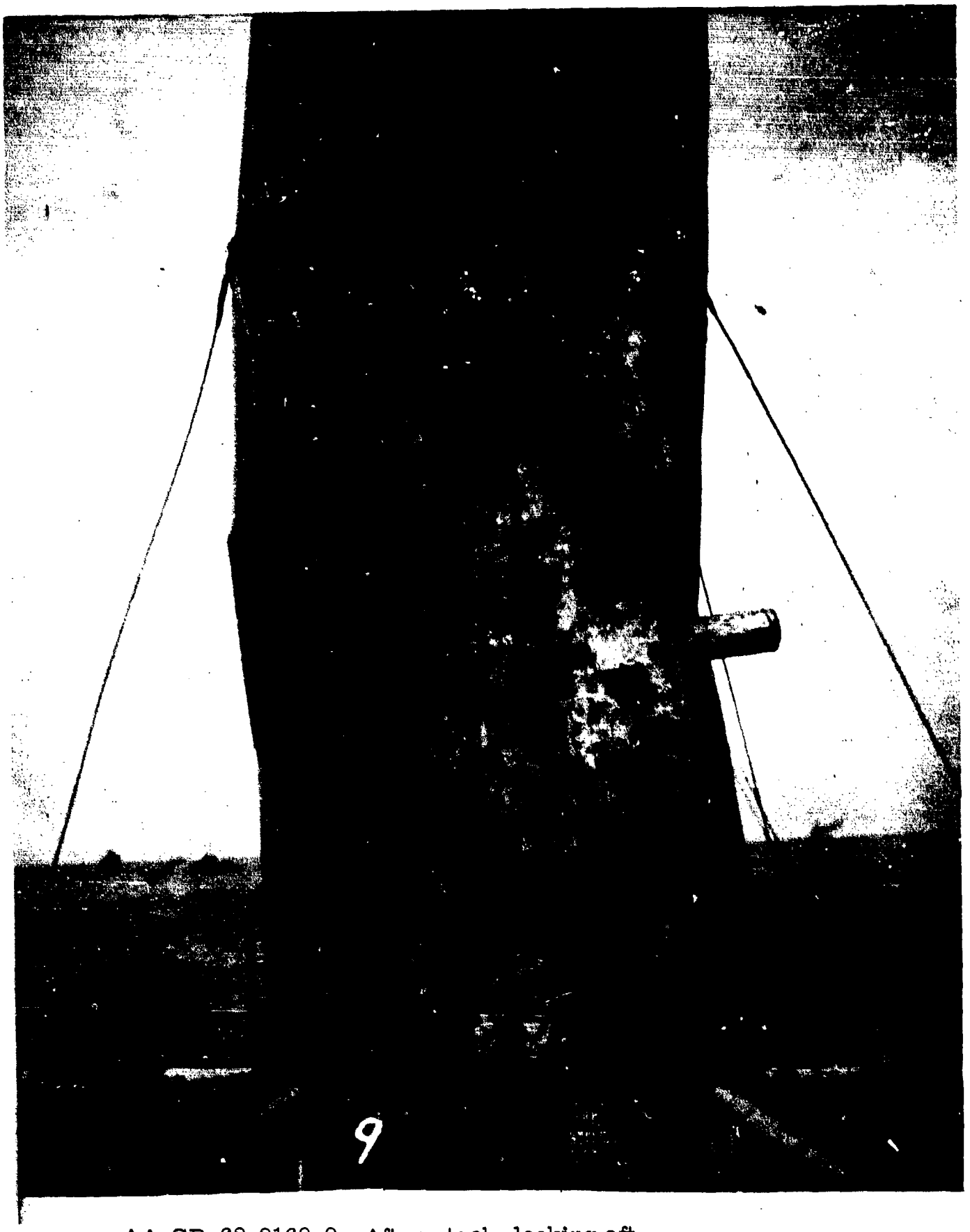
AB-CR-88-2104-4. Looking aft from top of potato locker on focle, showing damaged lookout tube on top of fan house, frame 28, not missing signal light on starboard wing of signal bridge.

AA-CR-65-1741-1. Looking forward and to starboard, showing damage to port side of forward stack.

AA-CR-62-2168-12. Forward stack, port side, looking aft, note bowed ladder.



AA-CR-88-2104-8. Looking aft and to starboard, showing damage to forward stack, ladder and sun shields on ready service ammunition lockers.



AA-CR-62-2168-9. After stack, looking aft.

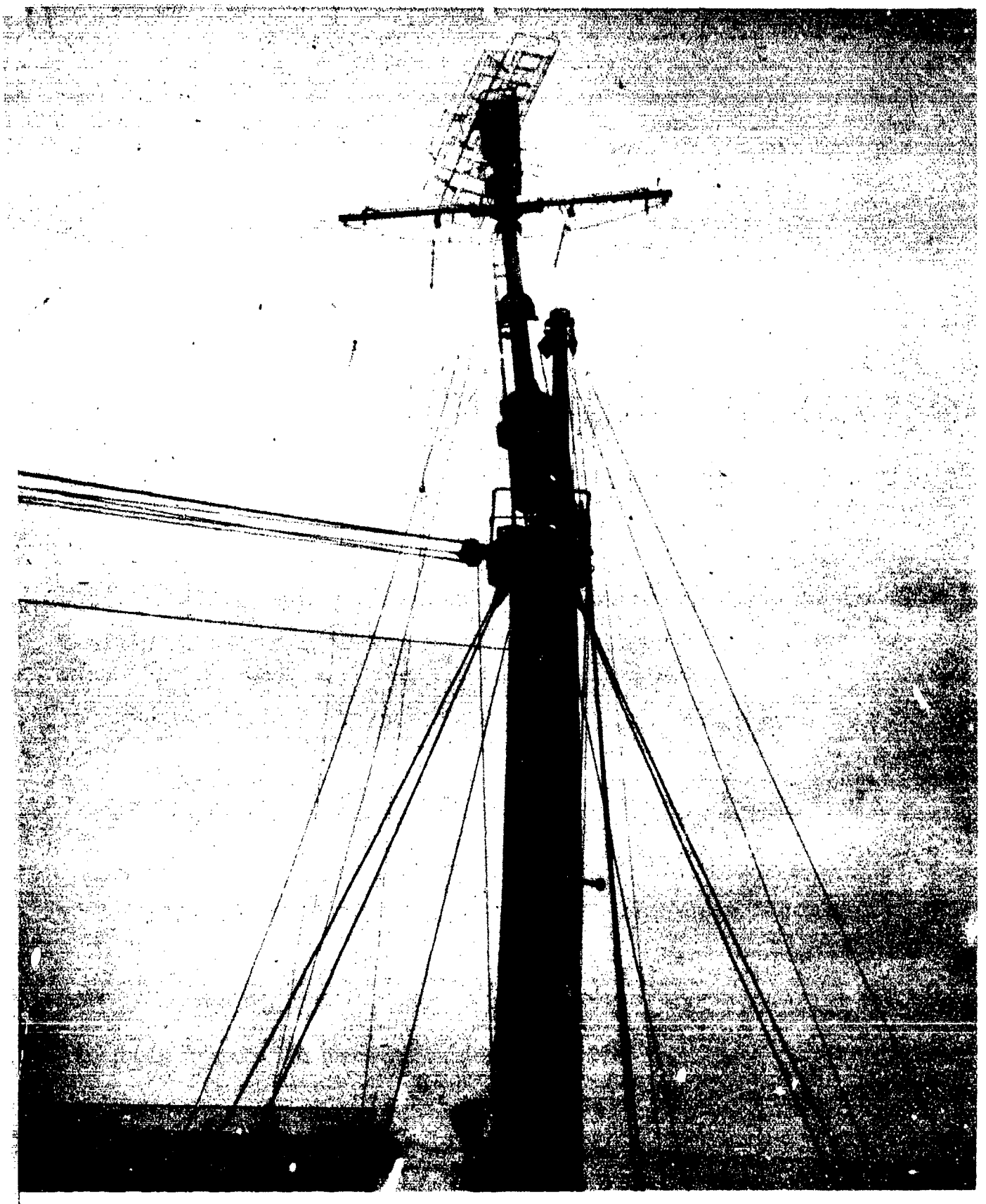
AA-CR-62-2168-10. After stack, damage to port side.

AA-CR-65-1741-2. Looking forward and to starboard, showing damage to port side of after stack.

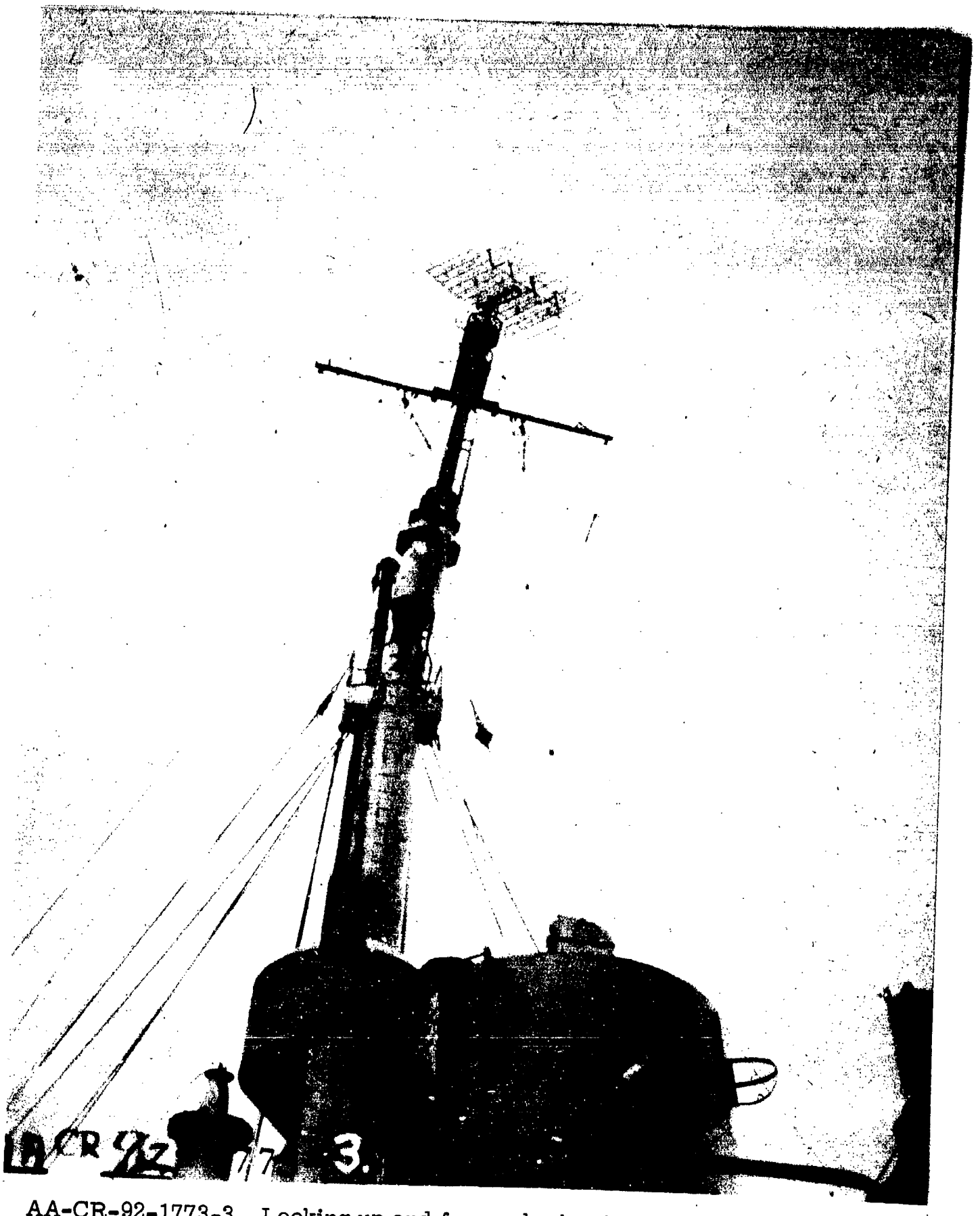
AA-CR-88-2104-9. Looking aft and to starboard, showing damage to after stack and to instruments in secondary conning station.

AA-CR-88-2104-6. Foremast, looking up and to starboard, showing bends in port cargo boom.

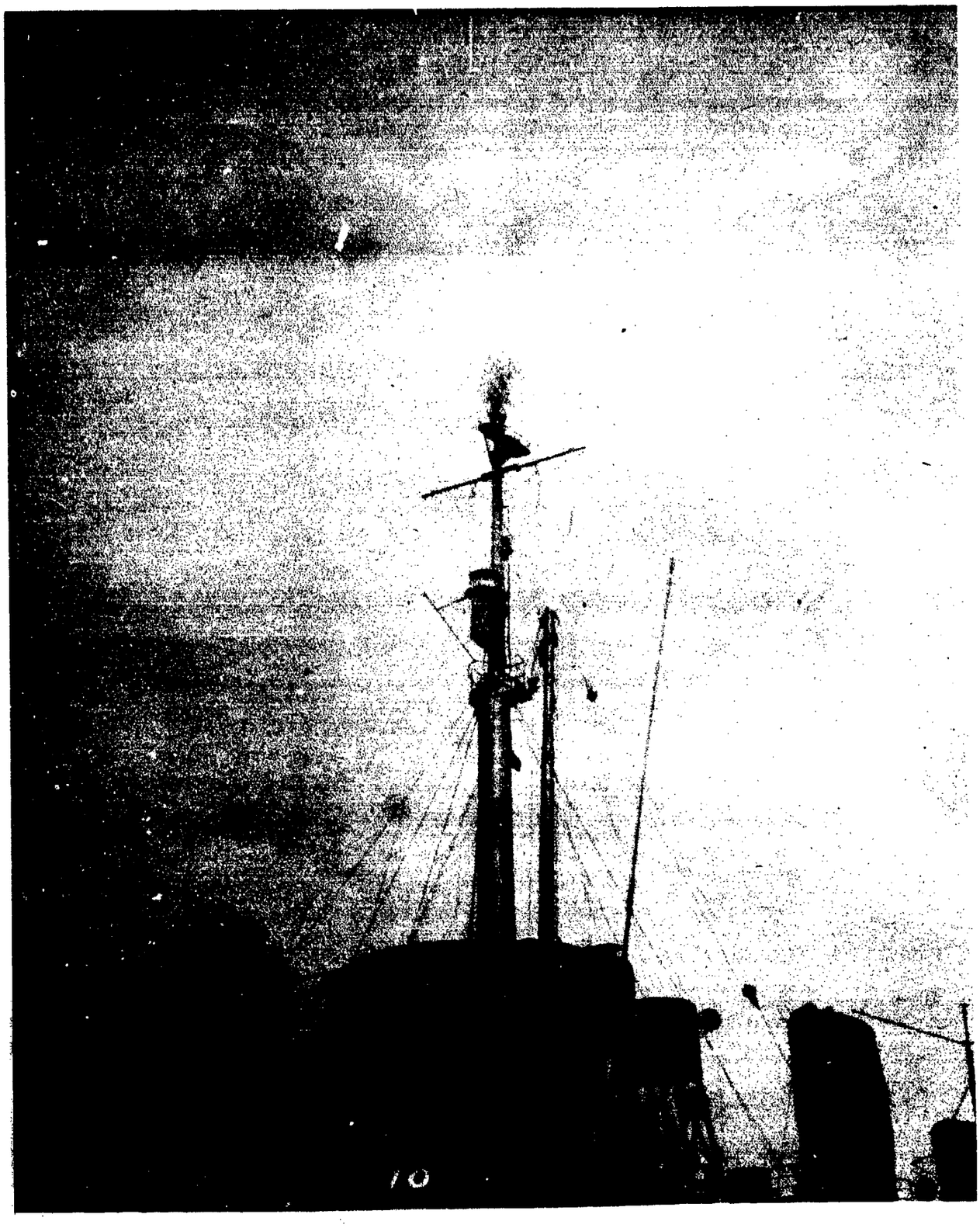
AA-CR-88-2104-10. Looking up, aft, and to port, showing damaged signal mast and yardarm at forward edge of forward stack.



AA-CR-88-2103-1. Looking up and aft, showing bent main topmast and damaged radar screen.

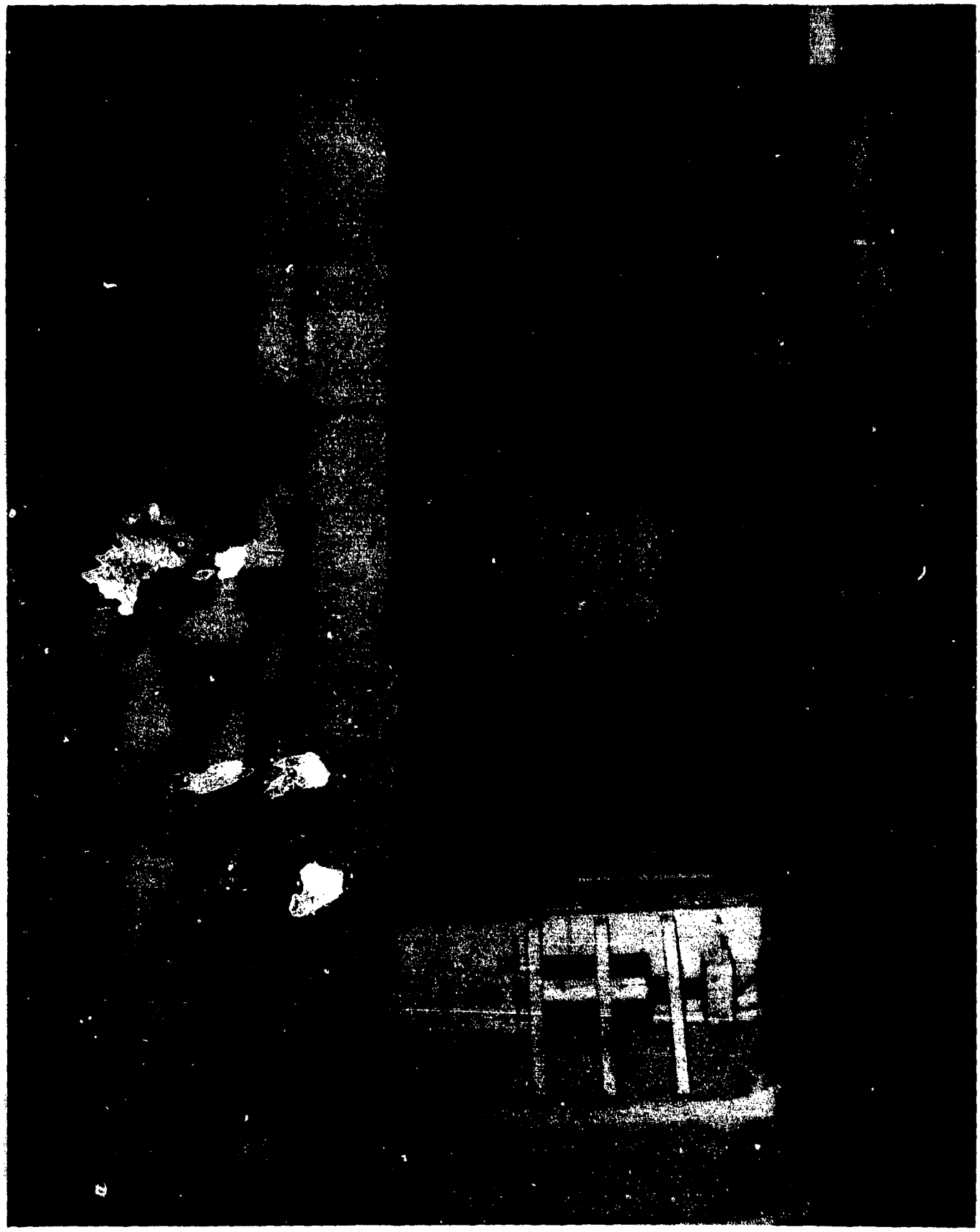


AA-CR-92-1773-3. Looking up and forward, showing bent main topmast and damaged radar screen.

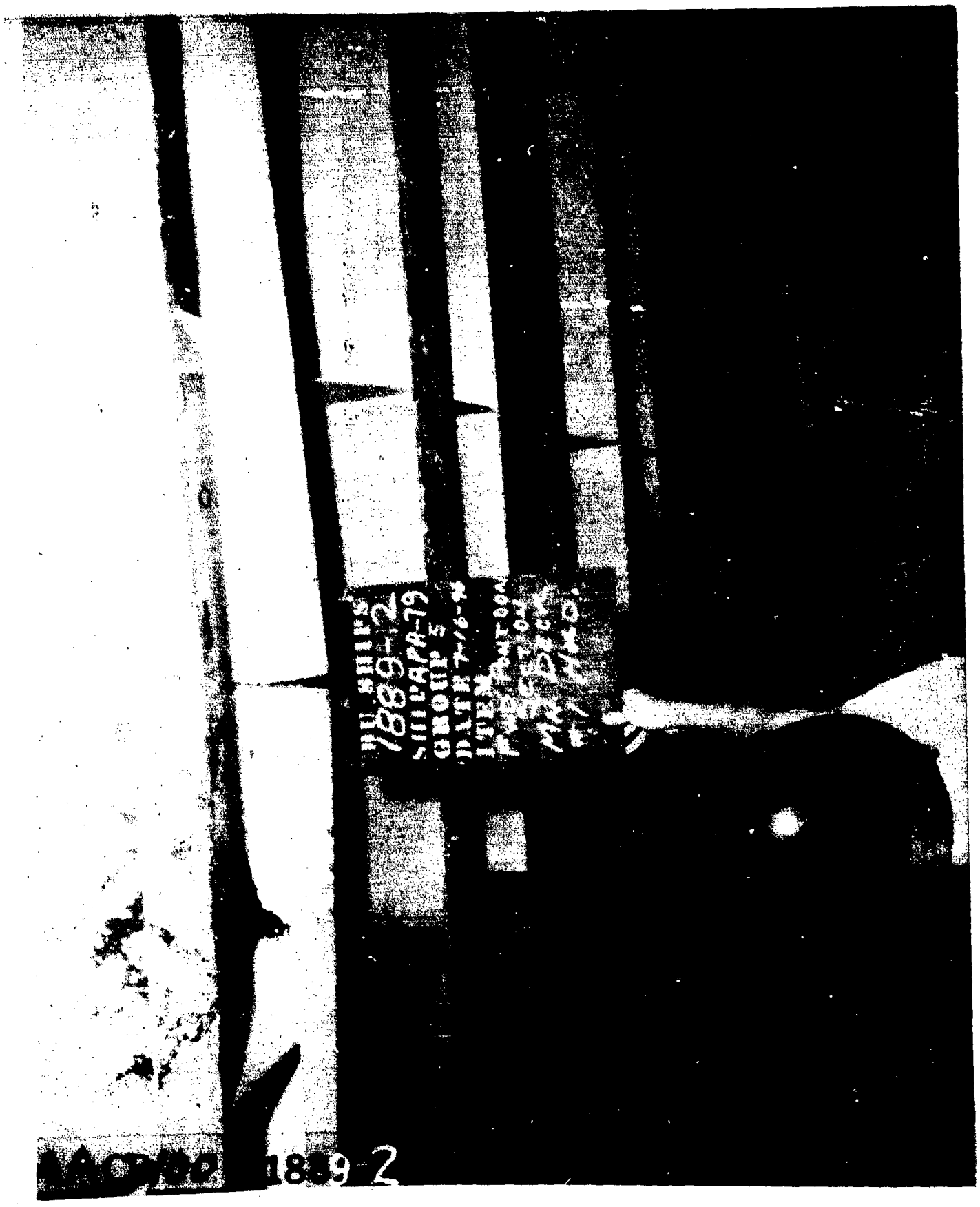


AA-CR-82-1922-10. Looking forward and to port showing damaged radar screen on main mast.

AA-CR-80-1902-2. Looking forward on port side of the upper deck showing deck dishing abreast the forward cargo hatch.

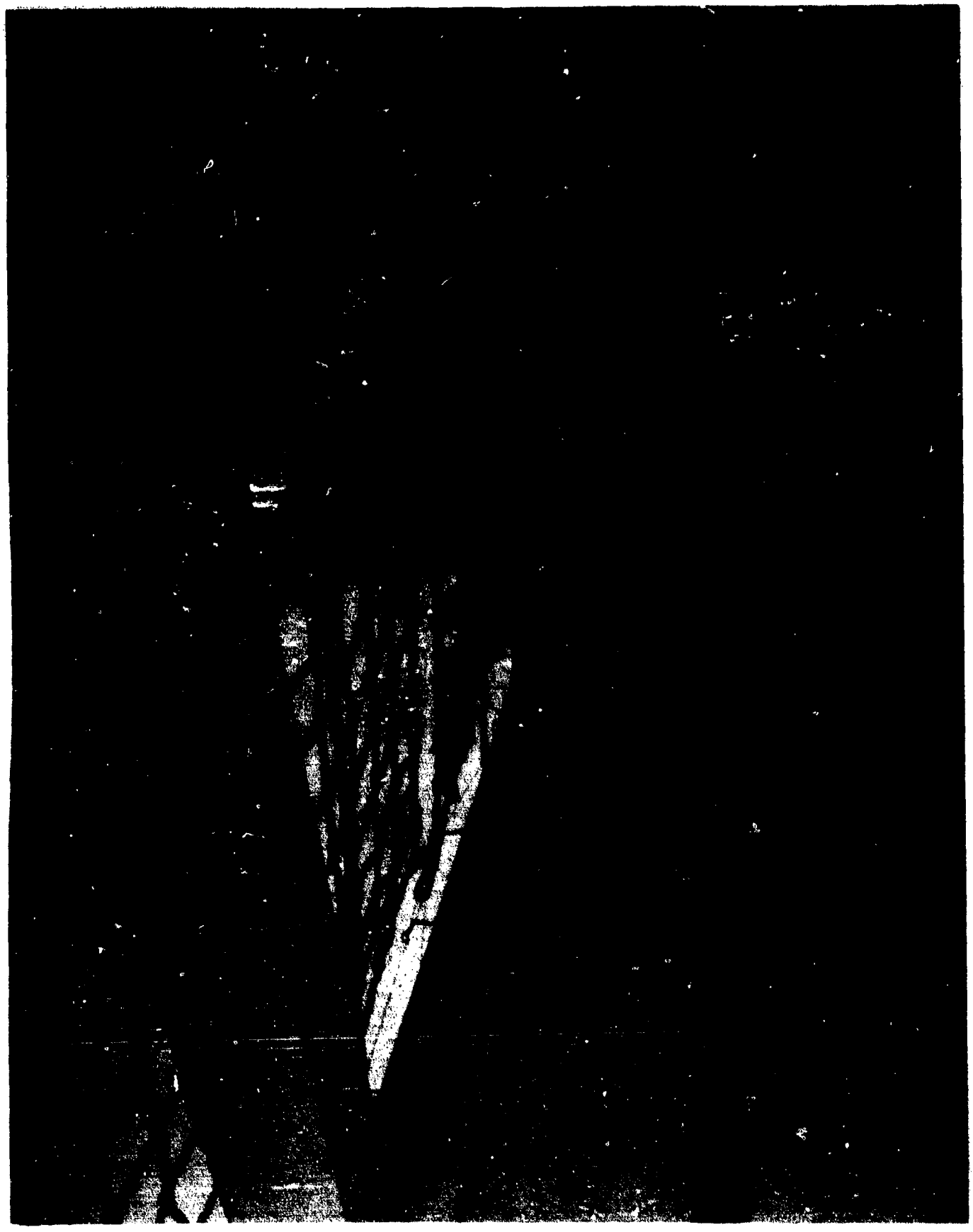


AA-CR-80-1902-5. Looking forward and to starboard on main deck in forward cargo hatch space, showing deflected girder at starboard edge of hatch and strained web column at bulkhead 40.

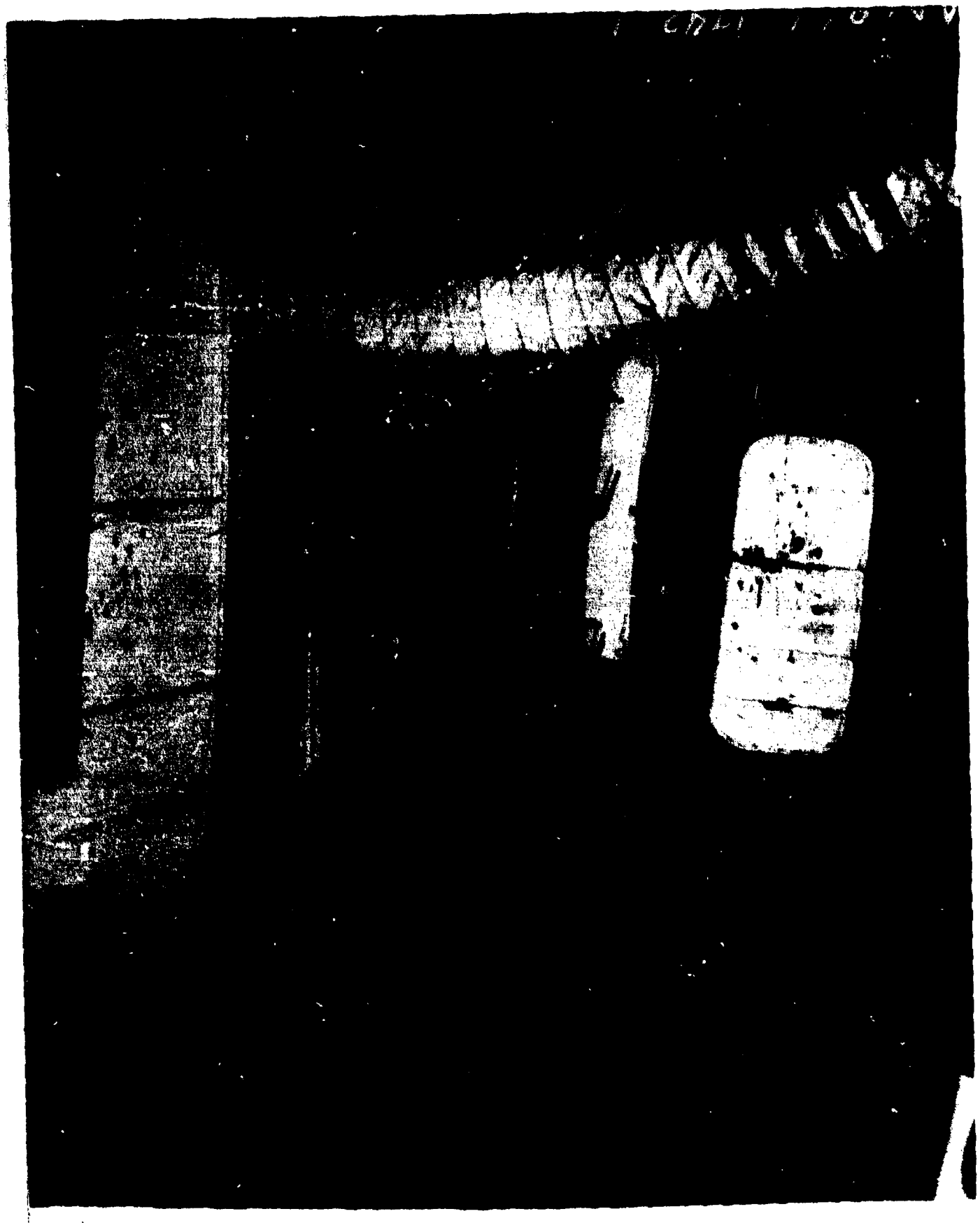


AA-CR-100-1889-2. Looking aft on first platform in forward cargo hatch space showing damage to pontoon covers at main deck level.

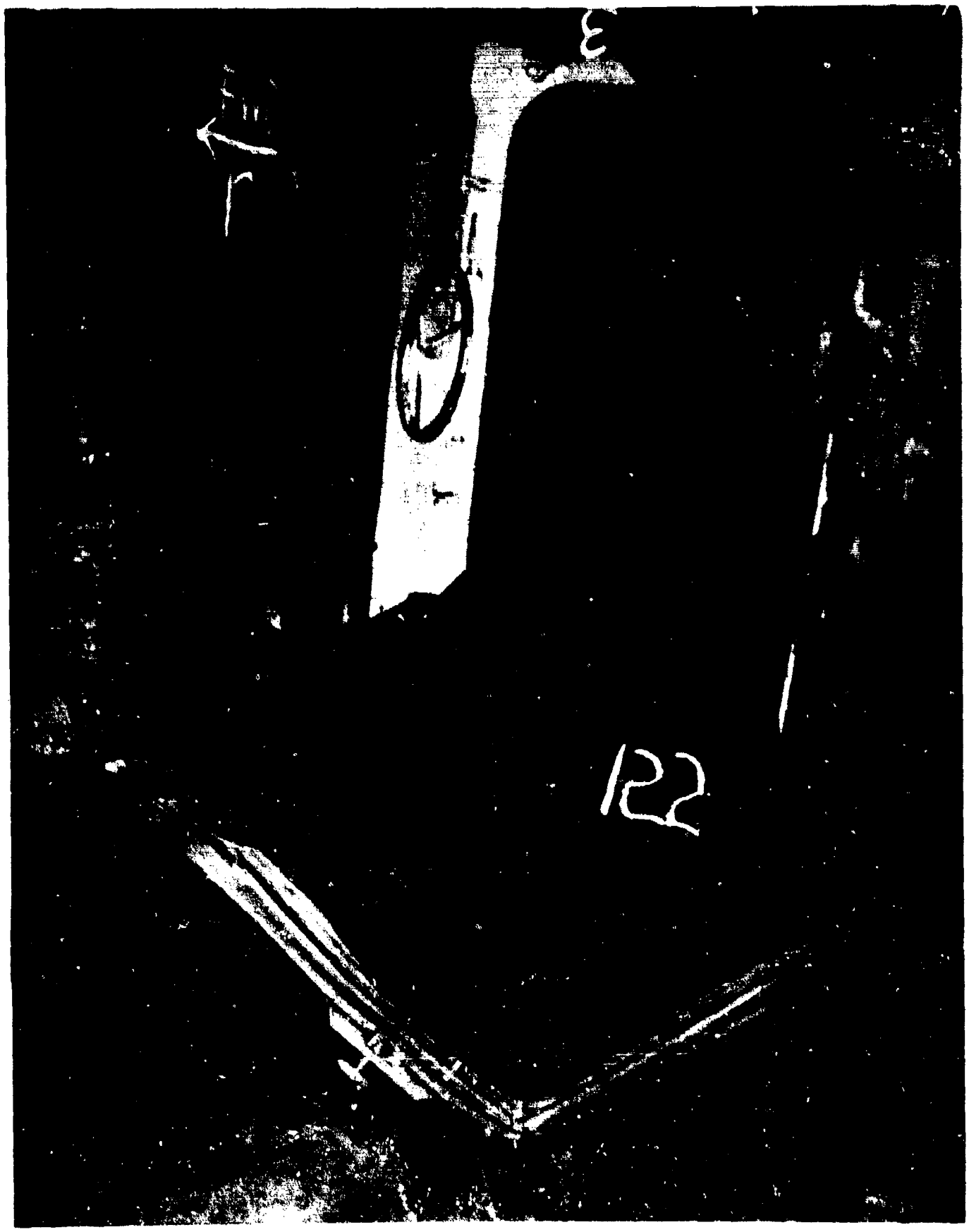
AA-CR-92-1773-2. Looking to starboard on upper deck in way of after cargo hatch showing demolished hatch closure and damaged airplane.



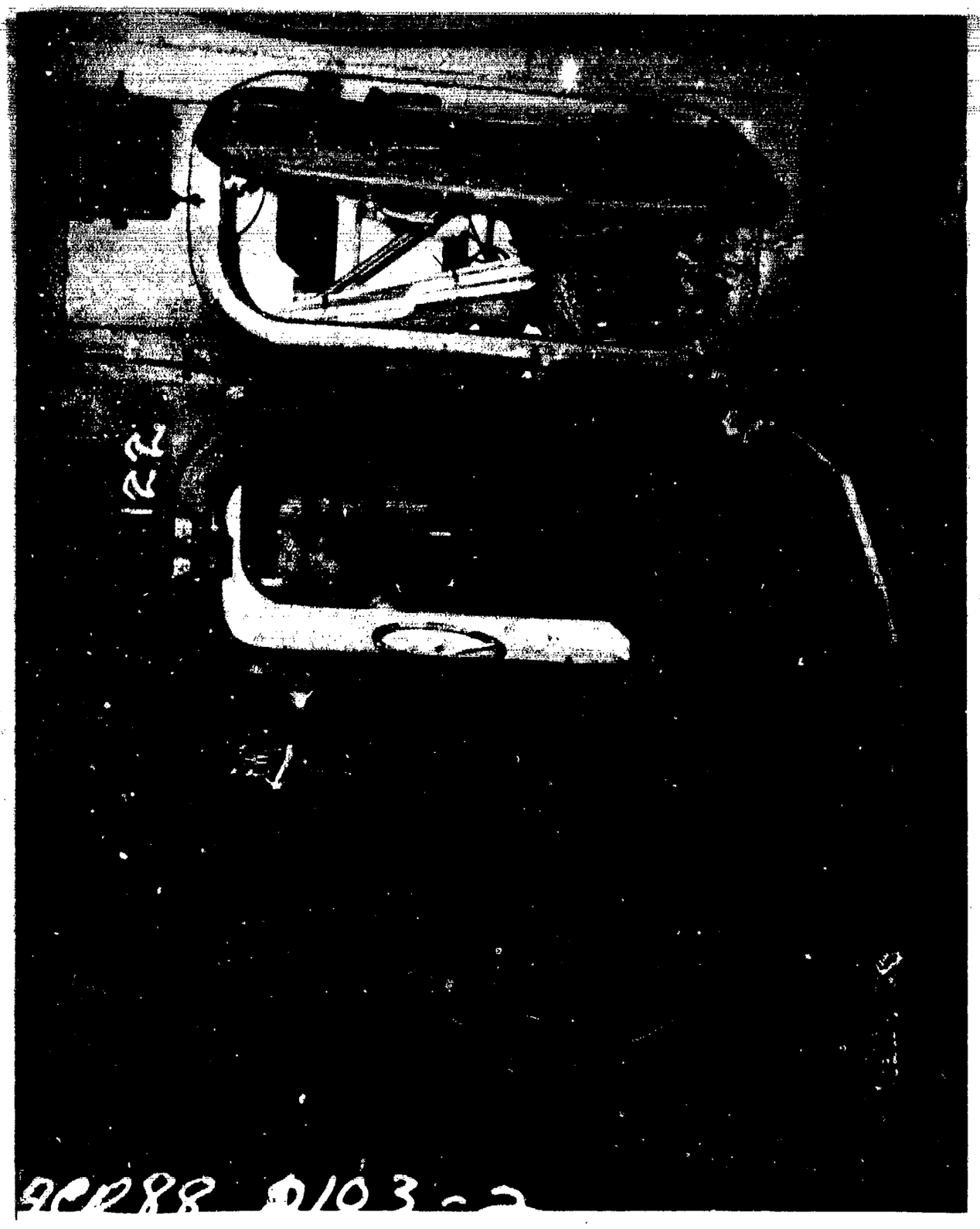
AA-CR-80-1901-11. Looking forward in after cargo hatch space, showing bent strongbacks.



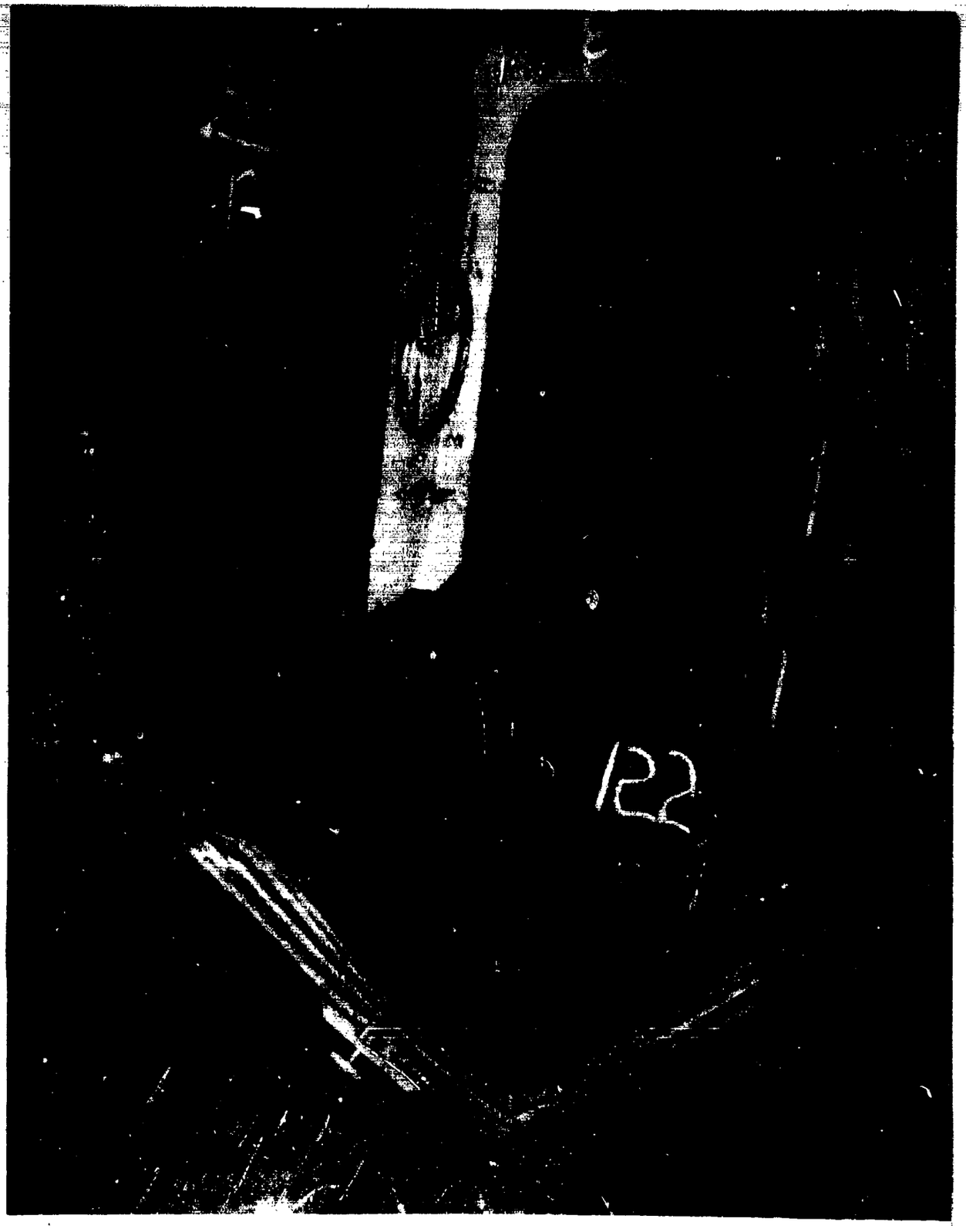
AA-CR-65-1742-1. Looking aft from frame 100 in main deck weather passage, port side, showing dishing of doors, door frames and longitudinal bulkhead.



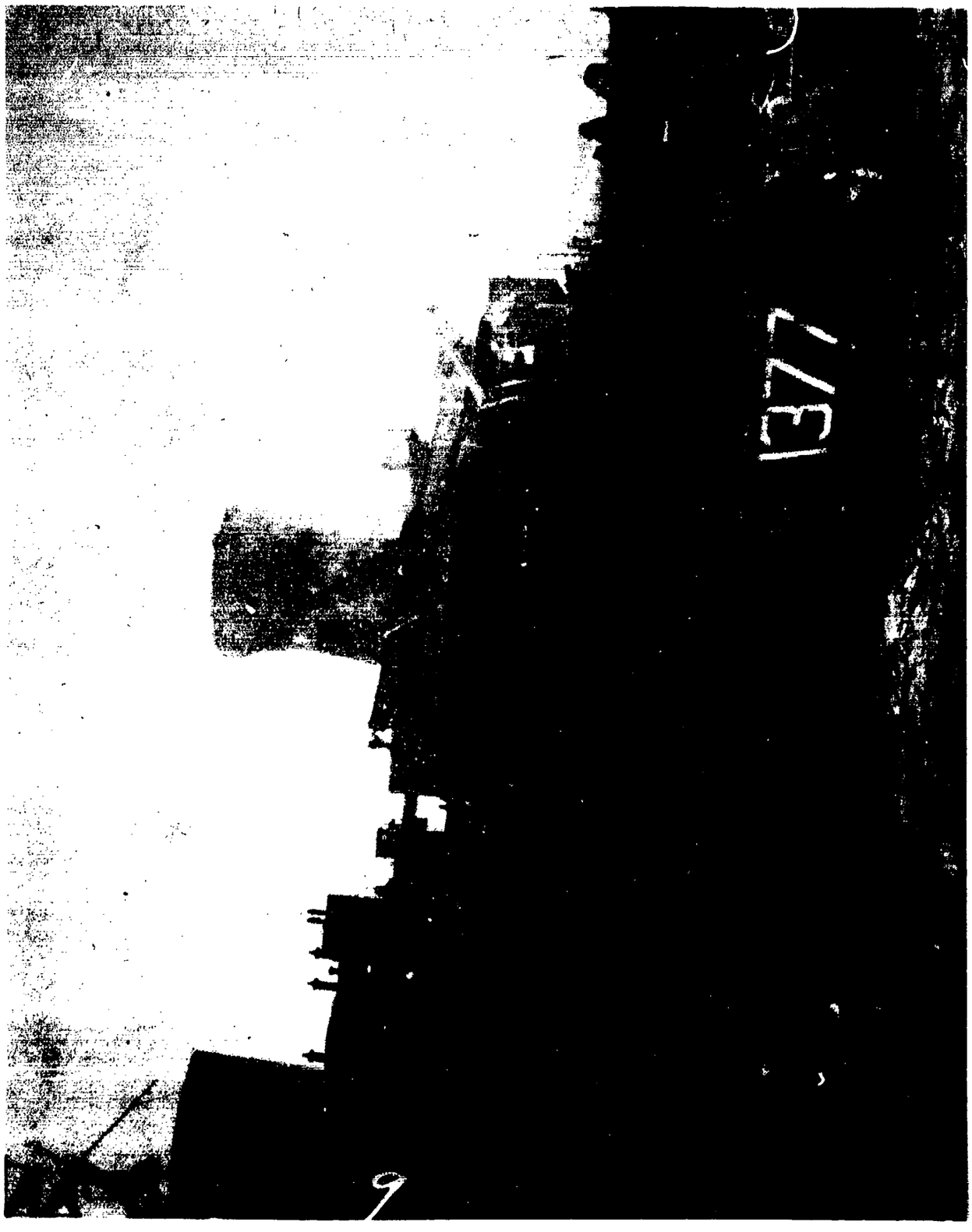
AA-CR-65-1742-3. Looking aft in main deck weather passage port side, showing damage at bulkhead 122.



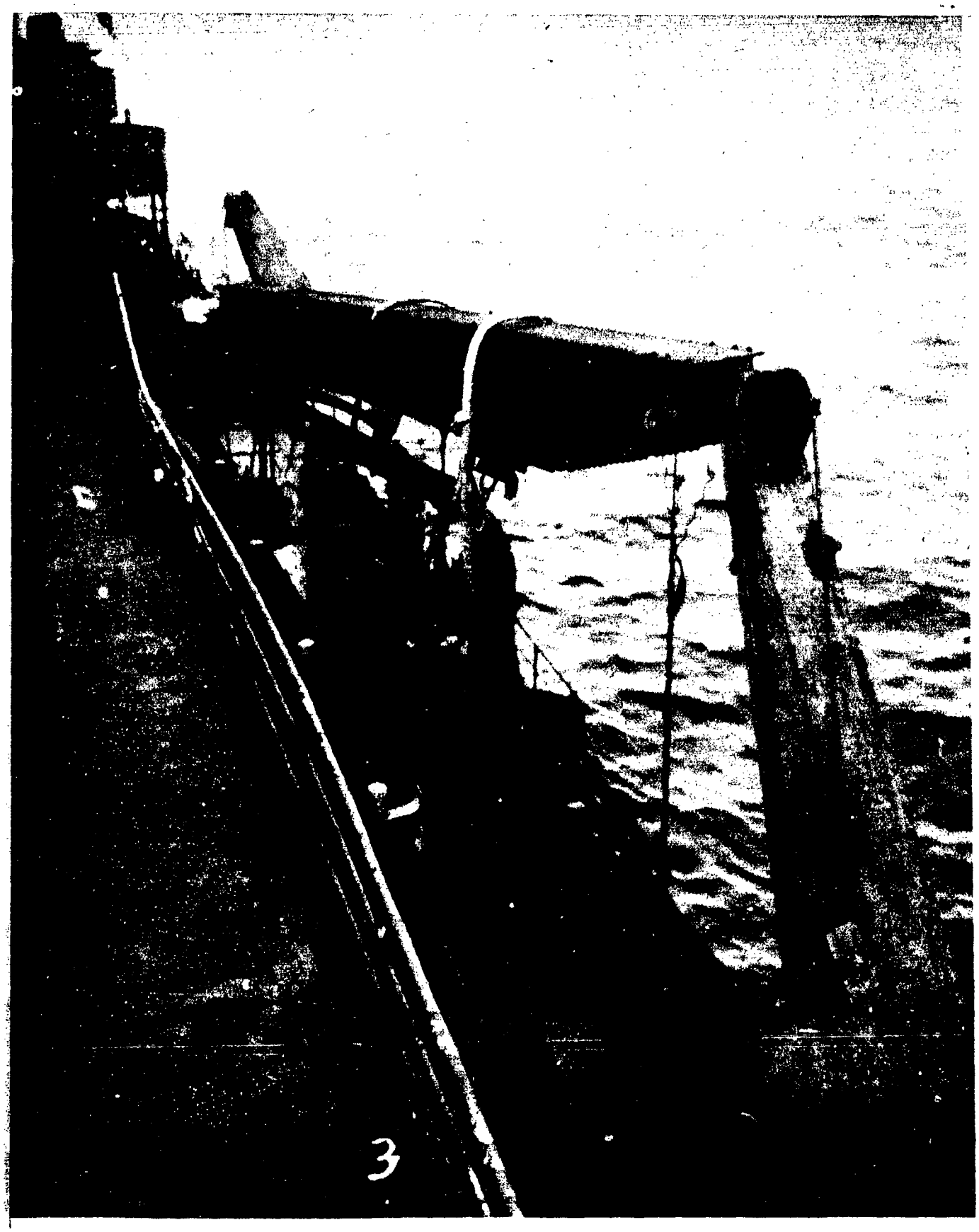
AA-CR-88-2103-2. Looking aft in main deck weather passage port side, showing damage at bulkhead 122.



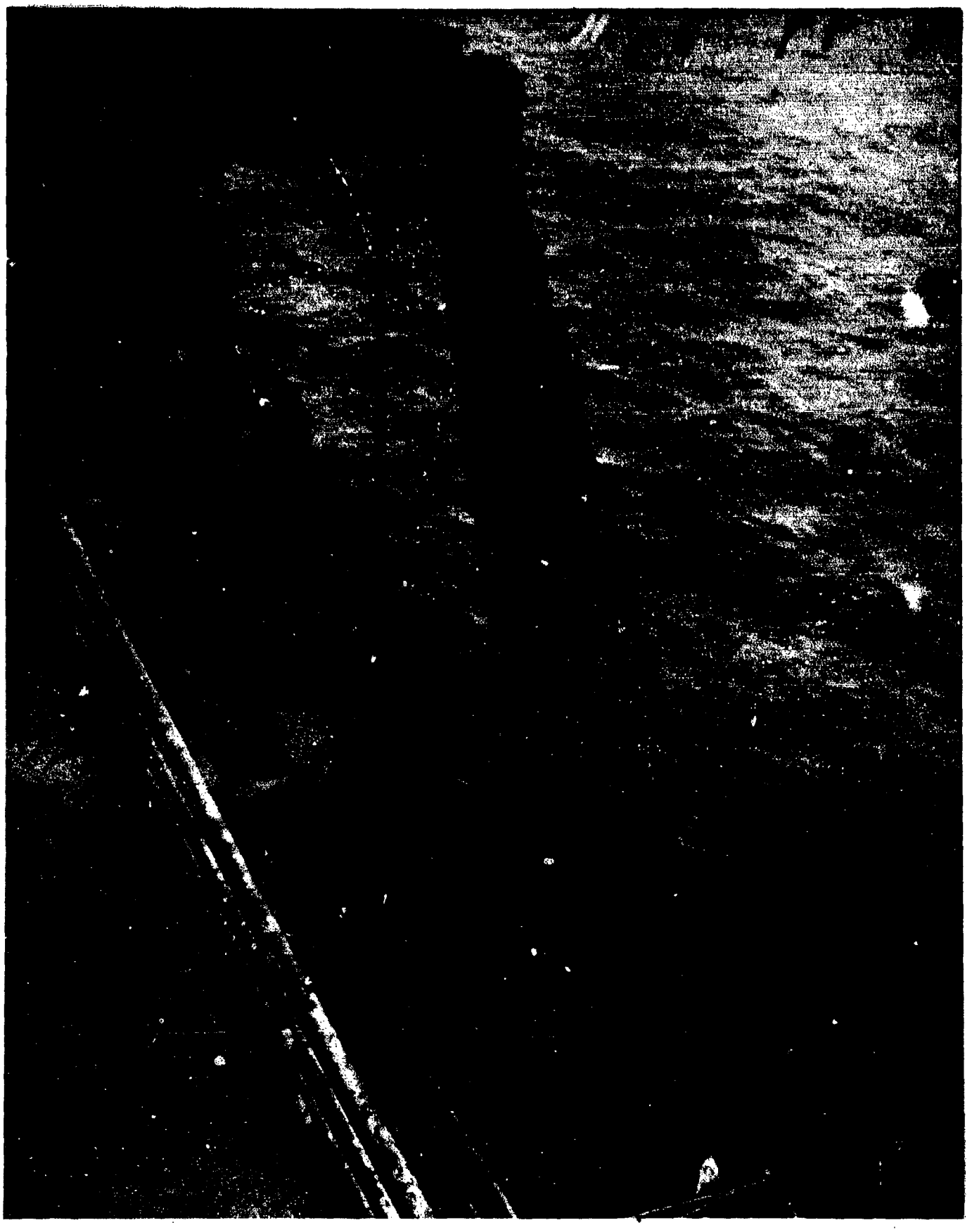
AA-CR-65-1742-3. Looking aft in main deck weather passage port side, showing damage at bulkhead 122.



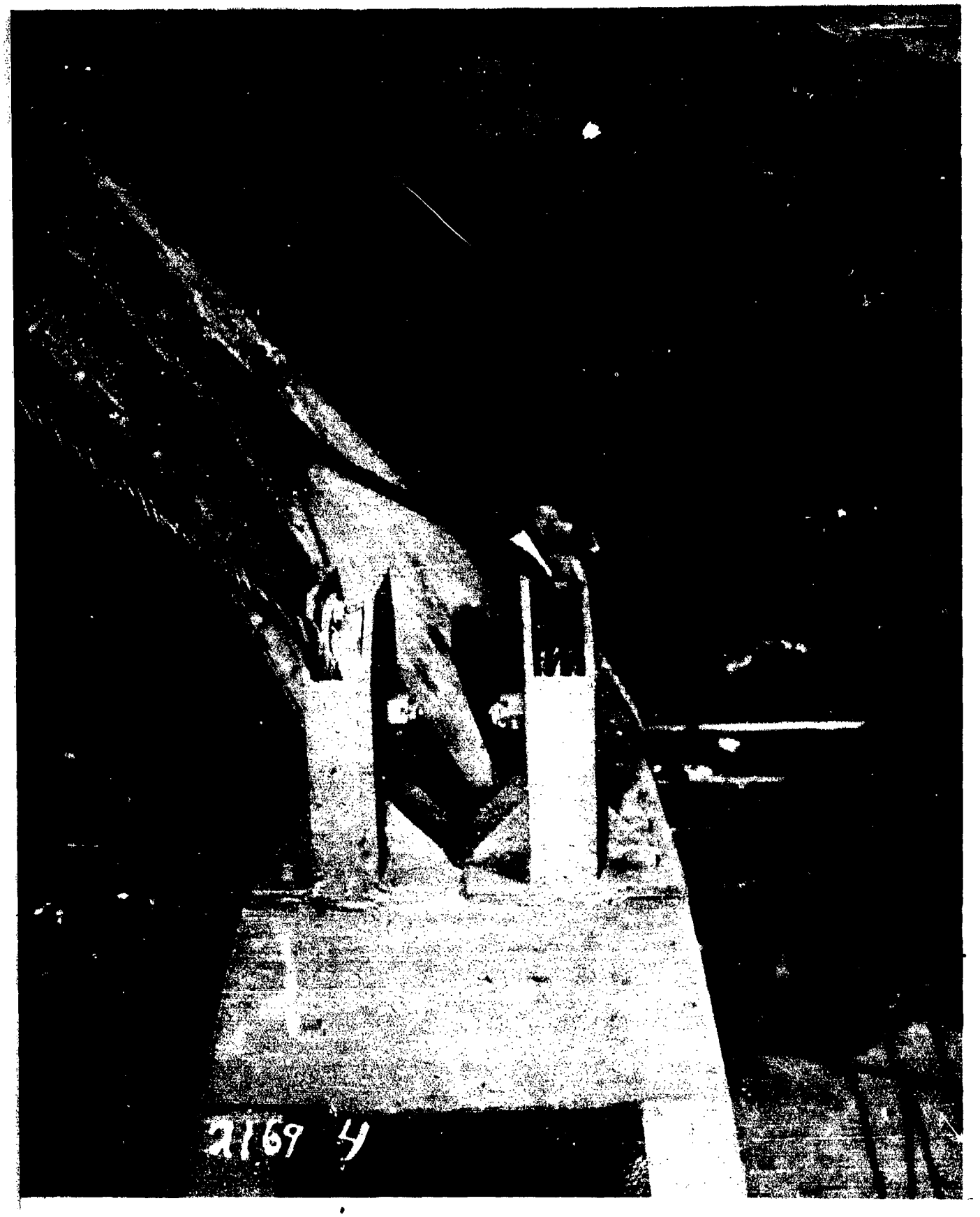
AA-CR-82-1922-9. Port side close-up, frame 75 to 121, showing damage to boat davits. Note damage to after stack and okout tub.



AA-CR-62-2169-3. Looking aft at No. 4 davit.

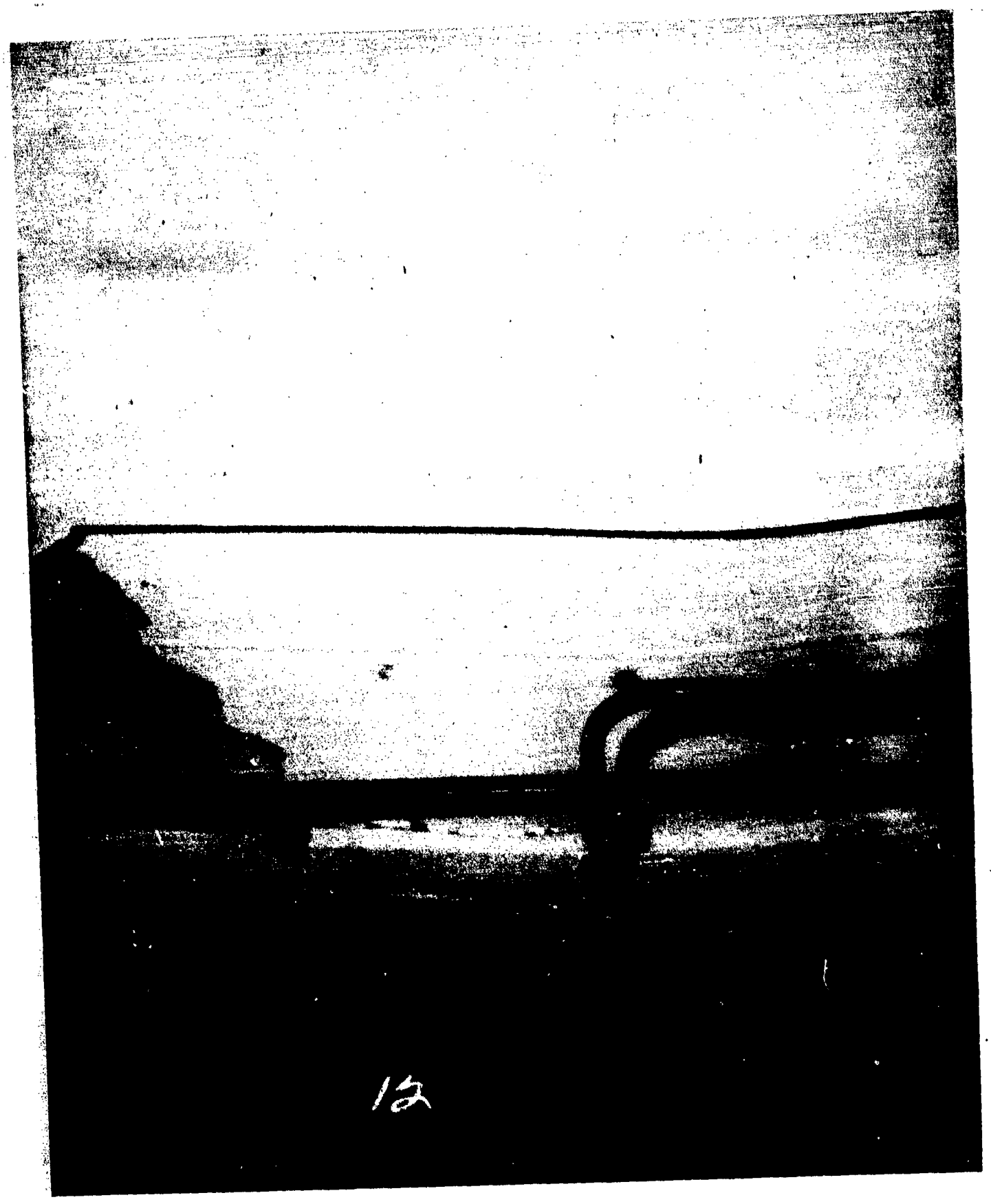


AA-CR-88-2104-11. Looking aft and to port, showing damage to after boat davits.

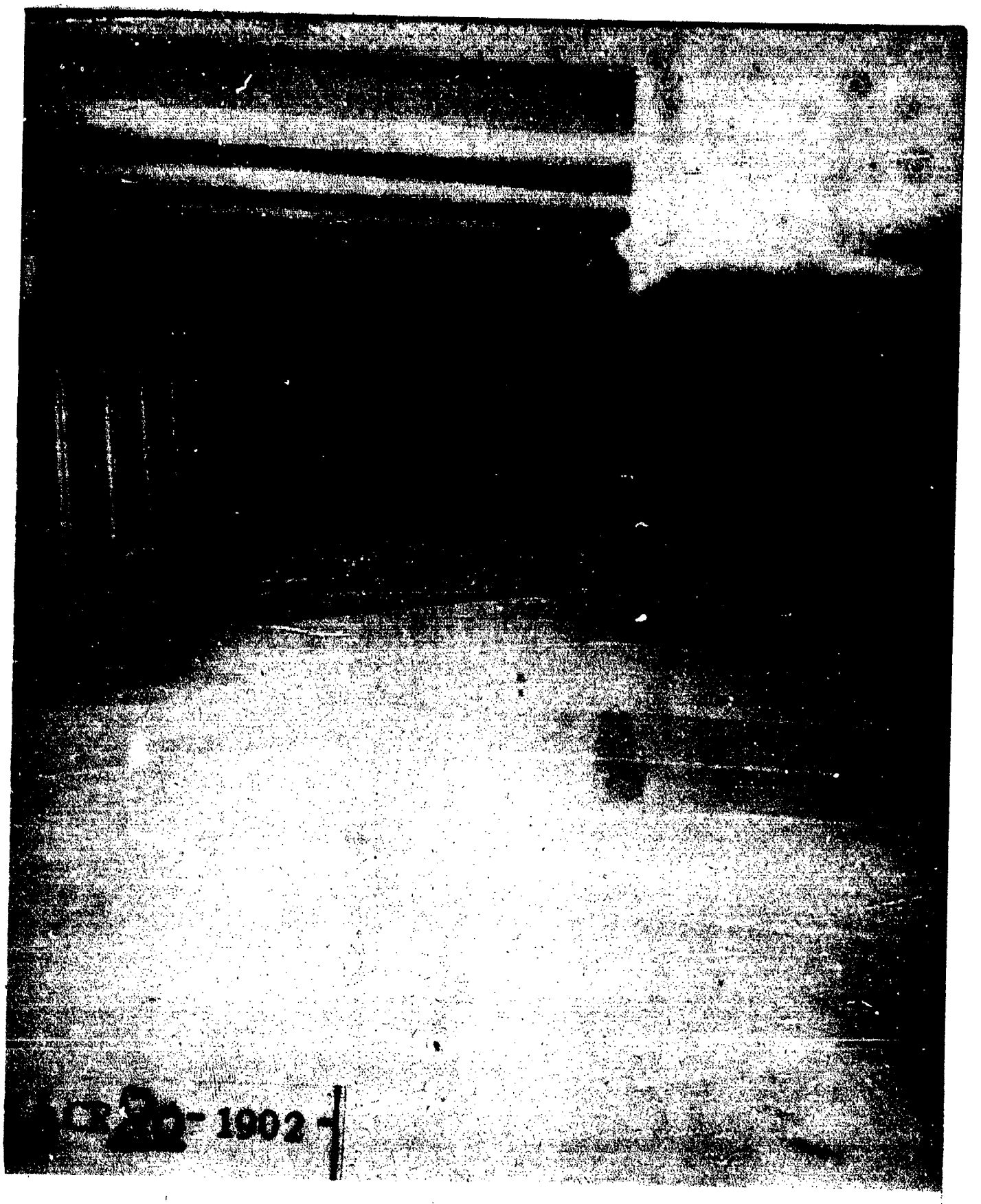


AA-CR-62-2169-4. Forward end of No. 4 davit, frame 88

AA-CR-62-2169-6. Forward strong back bearing of No. 4 davit, frame 88.



AA-CR-80-1901-12. Looking to port on main deck in troop berthing C-101L showing damage to port shell stiffeners and brackets, frames 124 to 128.

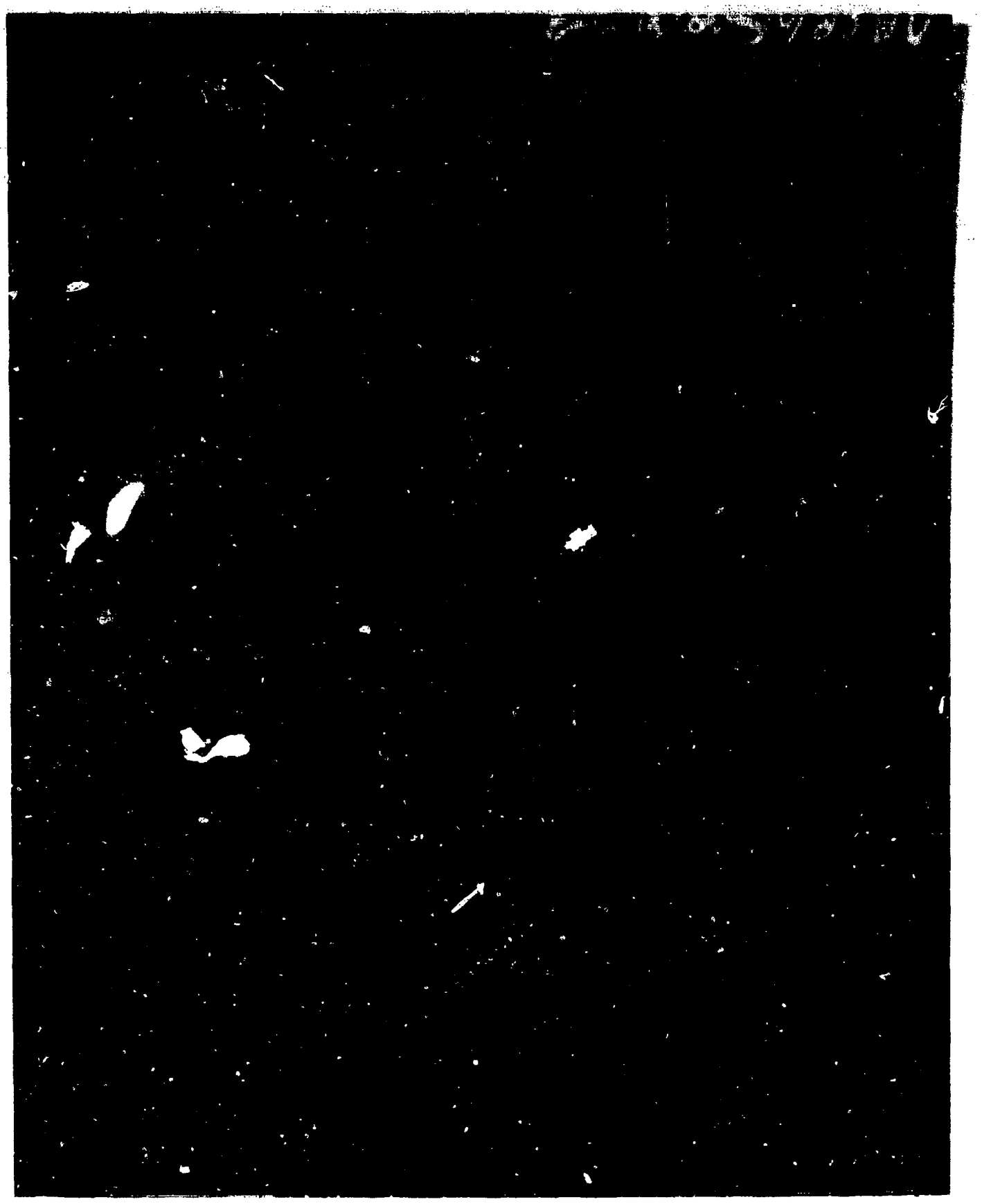


AA-CR-80-1902-3. Looking forward on main deck in port passage abreast forward cargo hatch showing damage to bulkhead at inboard side of crews berthing compartment A-104L.

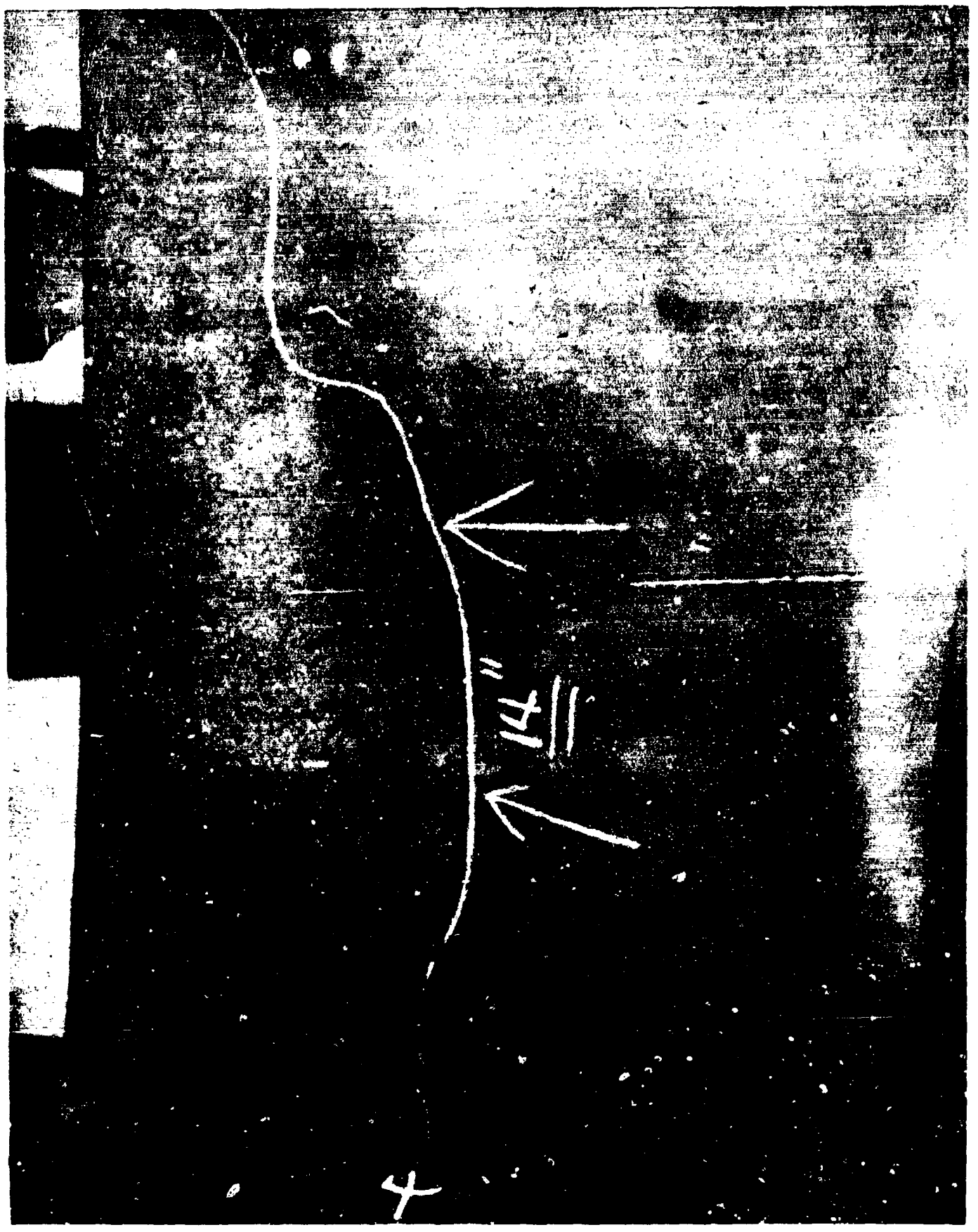
AA-CR-65-1741-11. Looking to port on main deck into after cargo hatch space from starboard weather passage door at frame 109 showing blast damage to light-lock bulkheads.

AA-CR-65-1741-12. Looking aft on main deck, port, from light-lock at frame 109 showing damage to forward bulkhead 110 of crews berthing compartment B-102L.

AA-CR-65-1742-5. Looking aft and to starboard on main deck in forward cargo hatch space showing damage to ventilation duct at forward side of bulkhead 56



AA-CR-65-1741-3. Burned paint on port side of radio direction finder house, signal bridge level.

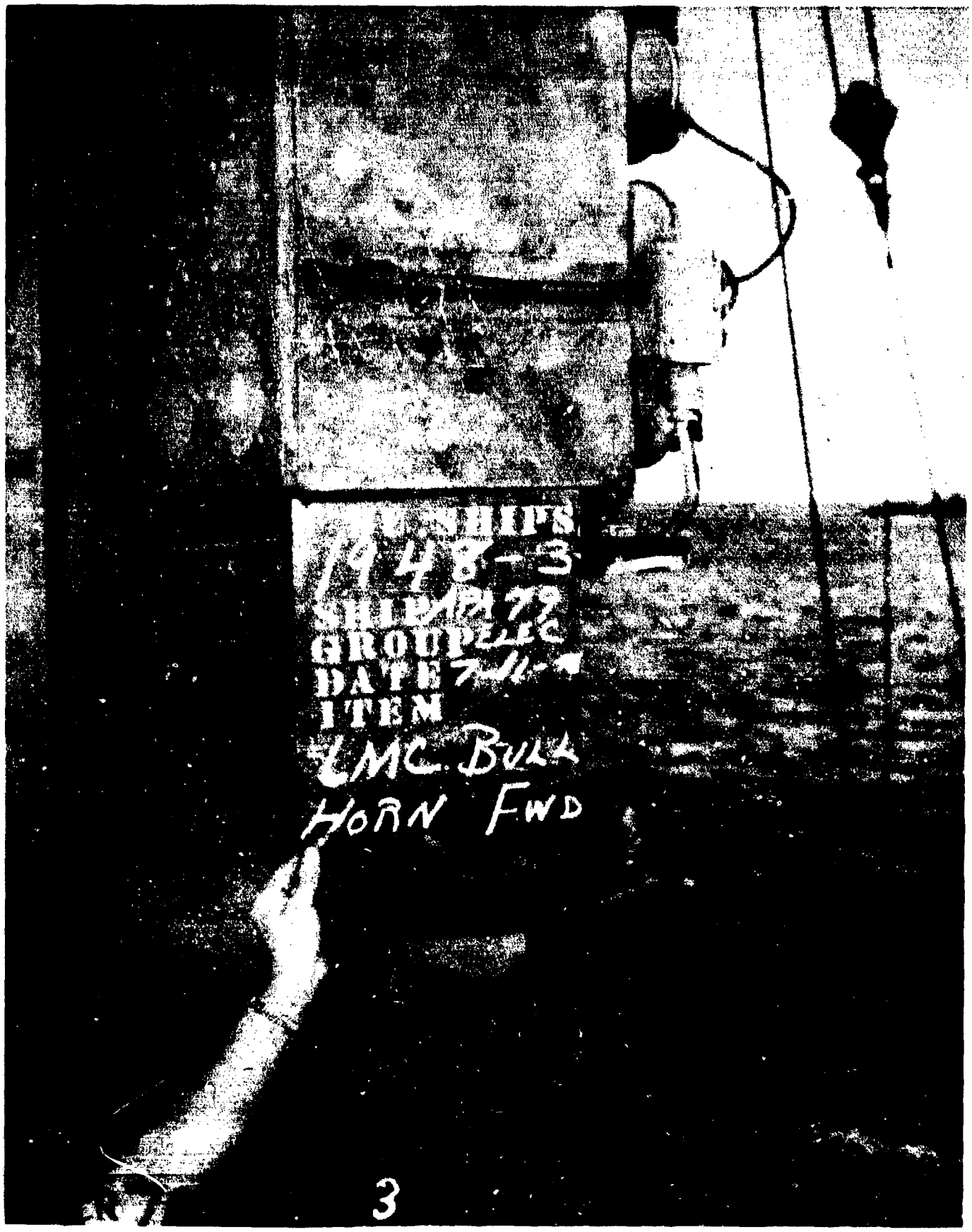


AA-CR-65-1741-4. Looking aft in gun enclosure on port side of signal bridge showing outline of scorched paint.

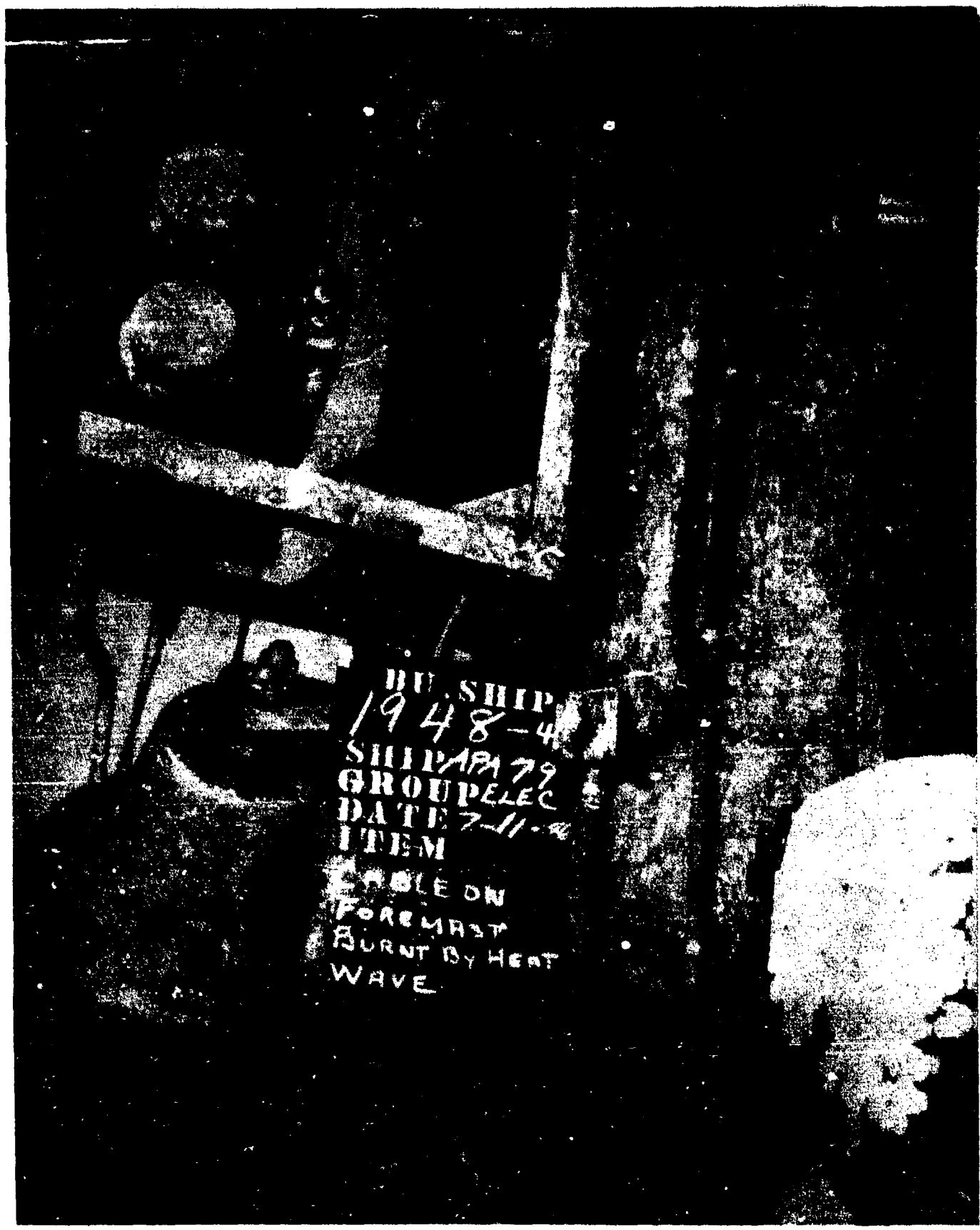
AA-CR-62-2168-11. After stack, starboard side.

AA-CR-62-2169-1. Forward stack, starboard quarter.

AA-CR-62-2169-2. Forward stack, showing dish on port quarter.

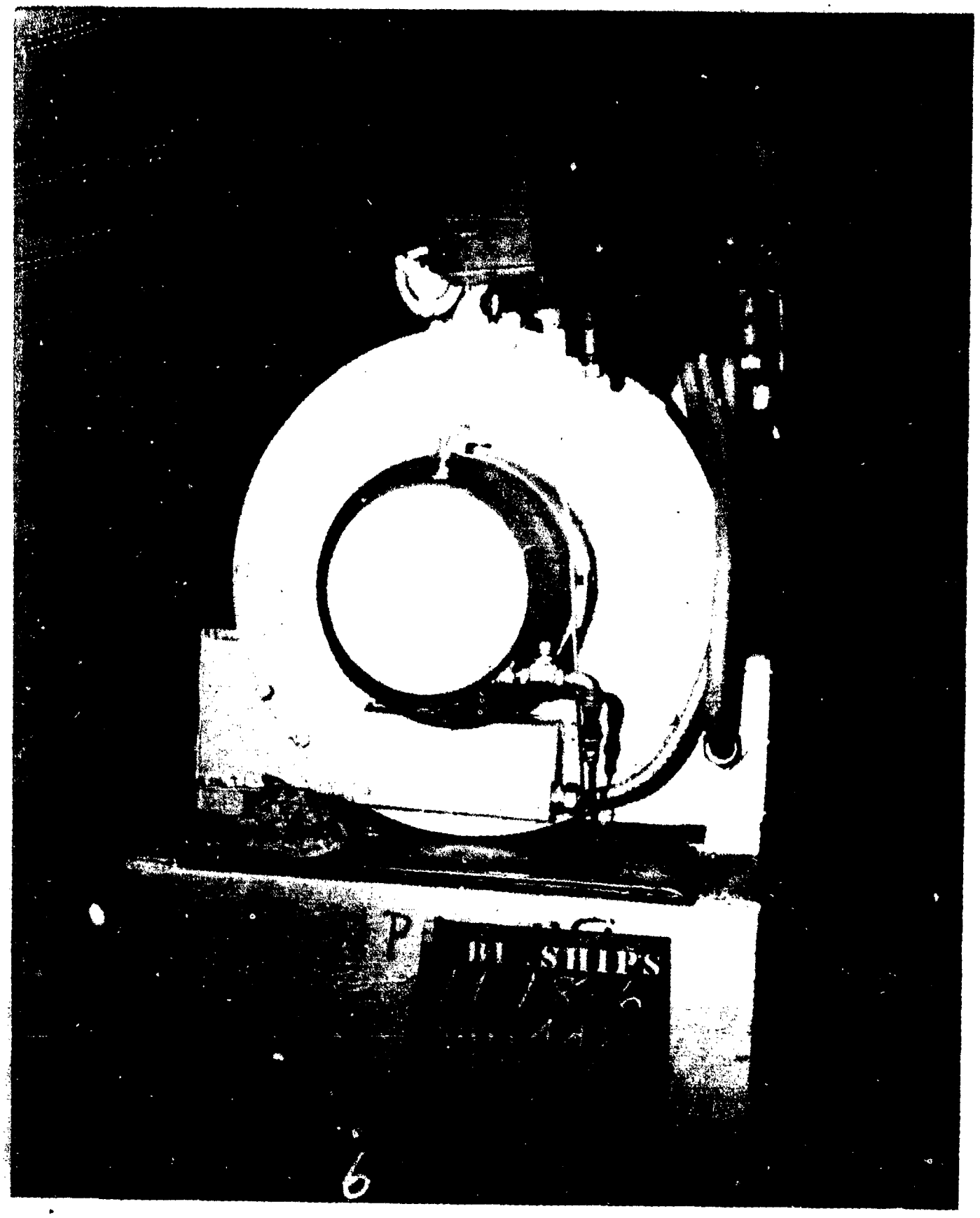


AA-CR-78-1948-3. Forward 6 MC bull horn, showing the effects of the air blast.

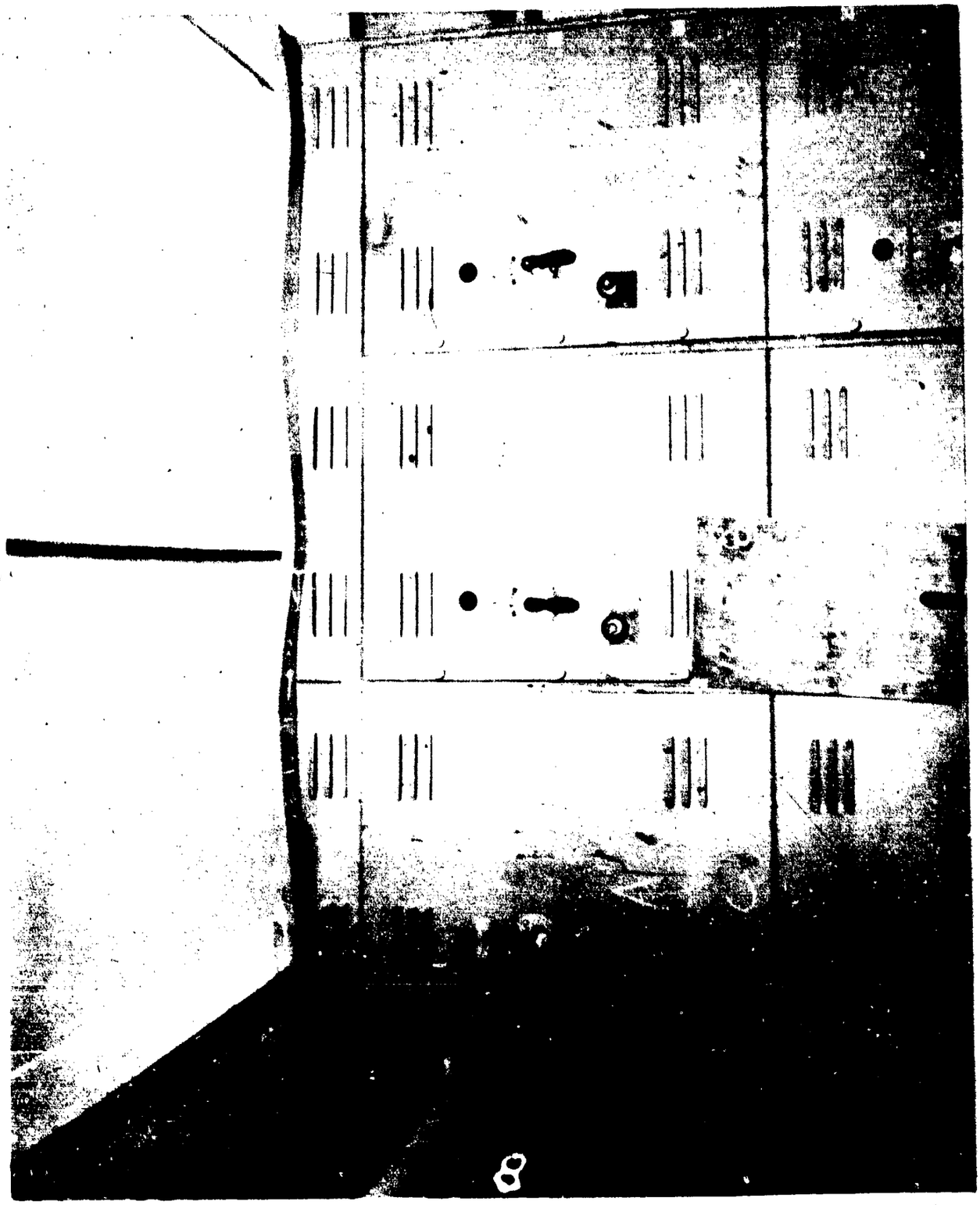


AA-CR-78-1948-4. Showing the effects of radiant heat on the cables installed on the foremast. Note insulation seeping through armor.

AA-CR-78-1948-5. Port 24" searchlight, showing the effects of the air blast on its base.



AA-CR-78-1948-6. Showing the damage to the controller for the 60 K.W. diesel generator set. Code 660. 13E1. Forward cargo hold.



AA-CR-78-1948-8. Showing the damage to the special 660 switchboard, installed for the test, when the overhead came down on it. Code 660, item 13E4. Located in the forward cargo hold.

APPENDIX

SHIP MEASUREMENT DIAGRAM

TEST ABLE

APPENDIX

SHIP MEASUREMENT DATA

Six deck deflection scratch gages were installed to measure relative movement between the main and upper decks. The locations and readings of these gages are tabulated on page 124 .

SECRET

DECK DEFLECTION GAGES

SHIP U.S.S. DAWSON (APA-79) TEST A

LOCATION			MAXIMUM	MAXIMUM	PERMANENT SET		REMARKS
FR. NO.	DECK	DIST. OFF ℄	COMP.	EXP.	DISTANCE	EXP./COMP.	
22	MAIN	CENTER L.	NONE	NONE	NONE	NONE	NO MARKER ARM
48	"	9'5" PORT	0-0-5/16	0-0-3/16	NONE	NONE	VERY POOR MARKER
48	"	9'6" STBD.	NONE	NONE	NONE	NONE	INSUFFICIENT MARKER ARM
48	"	20'6" PORT	NONE	NONE	NONE	NONE	INSUFFICIENT MARKER ARM
48	"	20'8" STBD.	"	"	"	"	INSUFFICIENT MARKER ARM
129	"	14'9" STBD	0-0-5/8	0-0-3/16	0-0-3/16	COMP.	NONE

APPENDIX

COMMANDING OFFICERS REPORT

TEST ABLE

REPORT # 11

COMMANDING OFFICERS REPORT

SECTION I

The over-all appearance of this vessel indicates that the force of explosion originated at an angle of 30° to 40° on the port bow. Visual inspection disclosed no change in list, trim or draft, due to test and no flooding either from sea or firemain occurred. Water-tight integrity was not affected. The hull below main deck suffered no damage with exception of blistering of paint on the port side and the failure of No. 1 and 2 hatch coverings and collapse of light metal partitions on the main deck enclosing spaces such as offices. These partitions had no structural significance and had no bearing on water-tight integrity.

TOPSIDE DOORS AND BULKHEADS

All the outside bulkhead doors and door frames in the superstructure were dished.

Bulkhead doors and door frames on the port side were badly dished and distorted.

Doors on the carpenter shop frame 130 port side were torn off the hinges, these were double doors.

Some bulkhead doors on the port side could not be opened without the use of sledgehammer or crowbar because the structure around the door frame was distorted.

Structure around portholes and porthole covers showed no evidence of injury.

Outer transverse bulkhead on 0200 deck forward vertical enclosure of officers living quarters was dished on port side about 4 inches for a distance of about 20 feet, at frame 59.

The longitudinal outer bulkhead on the port side was dished about 4 inches from frame 59 to frame 67.

Also slight dishing was evident at frame 73 to frame 75 and frame 85 to 88.

Navigation bridge pilot house transverse bulkhead, deck 0300, was dished about 4 inches.

Longitudinal bulkhead was dished about 4 inches from frame 59 to 67.

The outer wings of the bridge forward bulkhead and the port outer bulkhead was dished in the center.

TOPSIDE DECKS

The upper deck is dished about 5 inches on port and starboard side of No.1 hatch, and about 2 inches on port and starboard side of No.2 hatch. There is slight dishing and bulging on starboard side upper deck, frames 65 to 108.

Slight dishing and bulging occurred on decks 0200, 0300 and 0400. All outer hatch coverings on No.1 and 2 hatches collapsed into the hold. The pontoon coverings on No.1 and 2 hatches were distorted and the center section collapsed into the hold.

The forward troop ammunition hatch in the upper deck at frame 56 caved into the hold, part of the hatch coaming was bent and distorted. Smaller hatches to the paint locker, forward fire pump room and the boatswain's locker were dished but remained intact.

MASTS

The foremast was apparently uninjured except for the truck light extension which was slightly bent.

The base of the mainmast was uninjured, the top of the mainmast which supports the crows nest and air search antenna failed at the basr of the extension and was bent at an angle of about 30° from the vertical.

The signal mast was bent about 30° from the vertical, and the halyards were carried away.

BOOMS

The port boom on the foremast which is a fifteen ton boom has a 5° bend about 8 feet from the base and a 5° bend about 10 feet from the top end, it is still serviceable.

Other booms were uninjured except the port boom which was broken off about a foot from the step, this boom was previously fractured at the point where failure occurred.

BOAT DAVITS

Boat davits on the starboard side were intact and in operating condition. Forward port davit showed evidence of strain, the after wire fall on this davit had about 1/2 of the strands between the winch and the fall block broken. It is believed that if this wire fall was renewed and tests made on the davit it would be in operating condition. The after port davit was partially demolished and entirely unserviceable. The travelling arms on this davit were pushed aft to an angle of about 60° from the vertical and the strongback was dislodged from its bearings. It is believed that this was caused by the effect of the blast on the traveling arms and strongback being set in motion by the blast. The weight of the strongback dislodged the arms from the roller path, the wire falls were very nearly severed being held at present by about 1/4 of their strands.

BOATS AND RAFTS

Ten (10) liferafts were carried ready for launching, all were released but one. All boats were transferred previous to test.

LOOKOUT TUBS AND GUN TUBS

Light metal structures exposed to the blast were dished, bulged or distorted. Starboard lookout tub on deckhouse forward was completely sheared from its base. The port lookout tub on the deckhouse forward was distorted and dished on the side exposed to the blast.

Lookout tubs on the port side amidship and aft showed some distortion and dishing but not to a great extent.

All gun tubs, 40 and 20 MM were not damaged being constructed of heavier metal than the lookout tubs.

AMMUNITION AND GUNS

Ammunition and powder samples are intact and no evidence of deterioration or overheating was detected.

All guns, gun director and ammunition hoists are in operating condition. Stereo range finder is undamaged opticall but is frozen in train.

COMPASSES, GYRO AND MAGNETIC

The standard compass was removed from its stand and stored in evacuation transport, the standard compass binnacle (a wooden binnacle) was demolished. The steering compass card was distorted and is unreliable at present. The main gyro and gyro repeaters are in excellent operating condition. The gryo repeaters on the wings of the bridge were dislodged from their stands, but when reinstalled and adjusted were found to be operating normally.

SEARCHLIGHTS; SIGNAL LIGHTS, AND CARGO LIGHTS

Searchlights installed on port and starboard side of forward stack are not damaged.

Port signal light on top of navigation bridge was blown from its socket and is missing.

Signal light on starboard side of navigation bridge is demolished.

All cargo lights were demolished.

ELECTRONICS

Radio and radar installations were not damaged except all antennas were carried away and about 1/3 of SG radar antenna reflector was blown off. Fathometer was not damaged.

BOILERS, ENGINES AND MACHINERY

The outer covering of the stacks was distorted and bent away from the direction of the blast.

The inner stack on No.2 boiler was slightly damaged but had no apparent effect on steaming.

The boilers, engines, auxiliary machinery, auxiliary diesel engines, cargo and boat handling gear, anchor motors and anchor windless were unaffected in the test.

No electrical failures were experienced through broken or defective wiring either in motors or lighting systems except through failure of supporting structure on the topside.

PIPING AND TANKS

The firemain and piping is intact and shows no injury from blast. Water tanks and oil tanks are intact, no leakage or distortion is evidenced.

RUDDER AND CONTROLS

Rudder was undamaged, rudder controls to both steering stations, engine room indicators, steering gear and motors were not damaged.

DECK RIGGING

Life line stanchions and rails where subjected to the blast were bent and distorted.

The jackstaff was bent about 10° from the vertical.

Ground tackle, rigging, stays, mooring lines and running gear, except port boat falls, were not damaged.

COMMUNICATIONS

Radio and radar was out because of loss of antennas. All telephone communication was unimpaired. Visual light communication was available when power was cut in from diesel engine, as one singal light remained undamaged. Flag bag on starboard side was demolished, flag bag on port side was partially demolished. Signal flags were not damaged either by fire or explosion.

FIRES

Evidence of fire was apparent on top of deck house forward and aft. Material on fire was fenders, coiled rope and one section of fire hose,, which was coiled on starboard side of forward deck house. These fires were out on arrival of Able party. There was no evidence of fire or heating in interior compartments.

RADIOACTIVITY

It was observed by radiological monitor who was a member of Able party that radioactivity was negligible, which registered on the Geiger

counter about 1/100 of 1%, except in soap powder with a sodium base. Sample was removed to the U.S.S. HAVEN for observation and tests.

LIFE HAZARDS

It is estimated that personnel in inclosed spaces in bridge area would be reasonably safe from effects of the blast.

Also personnel below decks would be reasonably safe except in the areas of No.1 and 2 hatch.

Personnel in the areas of No.1 and 2 hatch or any personnel exposed on the topside would be subject to grave injury.

SECTION II

Considering seaworthiness and seagoing qualities of this vessel as affected by test Able and the effect on its usefulness to perform its functions as a troop transport it is noted that engines boilers and auxiliary machinery, maneuverability, ordnance and gunnery installations except range finder was not affected in the test.

Messing facilities suffered no damage. Seaworthiness was slightly impaired because the covers were demolished on the large cargo hatches, No.1 and 2, habitability was somewhat impaired as these hatches not being trunked communicated with some living spaces. Satisfactory temporary repairs to hatches could be made in approximately 2 hours by ship's repair parties.

All cargo booms were found in normal operative condition and cargo could be handled.

It is estimated that blast damage would render unserviceable any boats nested or swinging on davits on port side, port side davits are unserviceable.

It is probable that boats nested on the starboard side in the vicinity of boat davits, or swinging from davits, (an area sheltered from the blast) would be serviceable and could be lowered as starboard boat davits are in normal operative condition.

Radio and flag signals except semaphore was out, but could be reestablished by jury rigging. Blinker lights on foremast and one 12" signal searchlight were not damaged. SC4 air search radar was disabled. It is considered that the most serious damage which would affect this vessel as a troop transport if subjected to a similar experience in operation besides the casualties to exposed personnel is disabling of boat davits on port side and probable loss of all boats nested there.

SECTION III

RECOMMENDATIONS

Heavier or better grade metal should be used for hatch coamings in proportion to size of hatch.

Heavier or better grade metal should be used for hatch coverings in proportion to size of hatch.

Fastenings for hatch coverings on large hatches should be designed to withstand blast pressure such as experienced in test without dislodgement of any section.

Bulkhead door frames should be strengthened also the area around bulkhead doors so that should door fail when doors is repaired replacement will be simplified.

Cargo hatch opening should be trunked through living spaces to hold, for protection of personnel in living compartments.

Mast extension supporting radio antenna, radar and other gear should be sufficiently substantial and braced to survive a shock such as experienced in test.

Adequate protection for exposed top side personnel is recommended.

Stowing of deck fire hose in metal lockers or non-inflammable covering.

Strengthening of decks adjoining large hatches.

Welin davits to be made more secure from dislodgement by a force acting at a right angle to roller path.

SECTION IV

PART C - INSPECTION REPORT

SECTION A - HULL

A.

(a) 1. The over-all appearance of this vessel indicates that the force of explosion originated at an angle of 30° to 40° on the port bow. Visual inspection disclosed no change in list, trim or draft, due to test and no flooding either from sea or firemain occurred. Watertight integrity was not affected. The hull below main deck suffered no damage, with exception of blistering of paint on the port side, and the failure of No.1 and 2 hatch coverings, and collapse of light metal partitions on the main deck enclosing spaces such as offices. These partitions had no structural significance and had no bearing on watertight integrity.

2. Considering seaworthiness and seagoing qualities of this vessel as affected by test Able and the effect on its usefulness to perform its functions as a troop transport it is noted that engines, boilers and auxiliary machinery, maneuverability, ordnance and gunnery installations except range finder was not affected in the test.

3. Messing facilities suffered no damage. Seaworthiness was slightly impaired because the covers were demolished on the large cargo hatches No.1 and 2, habitability was somewhat impaired as these hatches not being trunked communicated with some living spaces. Satisfactory temporary repairs to hatches could be made in approximately 2 hours by ship's repair parties.

4. All cargo booms were found in normal operative condition and cargo could be handled.

5. It is estimated that blast damage would render unserviceable any boats nested or swinging on davits on port side, port boat davits are unserviceable.

6. It is probable that boats nested on the starboard side in the vicinity of boat davits, or swinging from davits, (an area sheltered from the blast) would be serviceable and could be lowered as starboard boat davits are in normal operative condition.

7. Radio and flag signals except semaphore was out but could be reestablished by jury rigging. Blinker lights on foremast and one 12'' signal searchlight were not damaged. SC4 air search radar was disabled. It is considered that the most serious damage which would affect this vessel as a troop transport if subjected to a similar experience in operation besides the casualties to exposed personnel is disabling of boat davits on port side and probable loss of all boats nested there.

(b) There was no hull damage.
(c) No damage.
(d) There was no flooding.
(e) The operability and buoyancy was unaffected.

B.

1. (a) Bridge port wing slightly dished in.
   (b) Gyro repeaters on both wings knocked from binnacles.
   (c) Starboard flag bag ripped off.
   (d) Part of flag bag blasted inboard but not torn.
   (e) One 12 inch signalling light missing. (St'bd missing).
   (f) All flood lights broken.
   (g) All antennas and signal halyards gone.
   (h) Signal mast bent aft.
   (i) Interior of bridge intact.
   (j) Six foot of port railing on signal bridge caved in.

2. (a) Secondary conning station intact except standard compass binnacle was demolished.
   (b) Both booms undamaged.

(c) Bulkheads and doors dished in or bulged.
(d) Antenna and halyards gone.
(e) All paintwork throughout port side scorched.

3. The cause of damage in all areas was due to blast.

4. There was evidence of fire on forward deckhouse and after deckhouse, fenders, fire hose and line were burned.

5. Any plating which withstood blast seemed to be sufficient protection against heat.

6. Shape of structures seemed to be of slight significance in comparison with thickness of material.

7. No stainless steel fittings on board.

8. No aluminum structures on this vessel.

C.
(a) Not applicable.
(b) General condition good. All guns operative. Paintwork scorched. There are no gun crew shelters.
(c) All directors operative. Undamaged except for scorched paintwork. The ship's rangefinder was frozen in train. Optically undamaged.

D. Not applicable.

E. (a) The upper deck which is the weather deck is dished about 5 inches on port and starboard side of No.1 hatch, and about 2 inches on port and starboard side of No.2 hatch. There is a slight dishing and bulging on starboard side upper deck, frames 65 to 108. Slight dishing and bulging occurred on decks 0200, 0300, and 0400. All outer hatch coverings on No.1 and 2 hatches collapsed into the hold.
The pontoon coverings on No.1 and 2 hatches were distorted and the center section collapsed into the hold.
The forward troop ammunition hatch in the upper deck at frame 56 caved into the hold, part of the hatch coaming was bent and distorted.

Smaller hatches to the paint locker, forward fire pump room, and the boatswain's locker were dished but remained intact.

(b) All decks usable except for hatches.

(c) 1. Undamaged except as noted elsewhere.
2. All life rafts unseated from stowage. Number three and four Welin davits badly damaged. Both inoperative. There were no boats aboard.
3. Not applicable.
4. Not applicable.

F. (a) Undamaged.
(b) Undamaged except for demolished port boat boom.
(c) Undamaged.
(d) Not applicable.

G. (a) Light metal partitions caved in by blast. No damage to structural bulkheads.
(b) Undamaged.
(c) All bulkhead areas around bulkhead doors and frames distorted, doors dished in.
(d) Equipment in excellent condition.
(e) No fires.
(f) No damage except sound powered telephone cable to lookouts on forward deck house severed.
(g) There is no watertight integrity above the main deck. All compartments habitable.

H. Not applicable.

I. There was no damage below the waterline whatsoever.

J. There was no damage to the under-water hull whatsoever.

K. There was no damage to tanks. No contamination of liquids and no effect on ships operability.

L. No flooding at all.

M. There was no damage to ventilating system. No effect on habitability and no evidence of conduction of heat or smoke.

N. 1. No damage to bridge control except for derangement of gyro repeaters.
2. No damage except radar inoperative due to lack of antenna.
3. Steering repeater had 4° westerly error. Port wing repeater 5° westerly error. Starboard repeater 4° westerly error.
4. Undamaged.
5. Undamaged.

O. (a) 1. All mark 51 directors undamaged except glass smudging.
2. Not applicable.
(b) There are no protected fire control stations on this type vessel.

P. (a) 1. Not applicable.
2. 5"/38 AA common stored in ready service lockers at frame 151 upper deck. No evidence of heat or blast. Protected by air gap.
3. 40 MM stored in forward and after clipping rooms. No evidence of heat or blast. Protected by spun glass.
4. 20 MM stored in ready service box frame 102 port, frame 104 starboard, frame 88 center line, forward frame 78, port and starboard. No evidence of heat or blast. Protected by air gap.

(b) 1. Not applicable.
2. 5"/38 AA common stored in magazine frame 147, center line, third deck. No evidence of heat or blast. Protected by spun glass insulation.
3. 40 MM and 20 MM stored in magazine at frame 141, third deck. No evidence of heat or blast. Protected by spun glass. 40 MM stored in magazine frame 32, 4th deck, no evidence of heat or blast, spun glass insulation.
4. Not applicable.

(c) No comment.

(d) Excellent. No damage.

Q.

(a) 1. Not applicable.
2. 5"/38 hoist undamaged.
3. Undamaged.
4. Not applicable.

(b) No evidence of conduction of heat, blast or flooding.

R.

(a) 1. No damage.
2. No damage.
3. No damage.

(b) None

(c) No damage.

(d) No damage.

(e) No damage.

(f) No damage.

S. (a) Ship painted dark grey, U.S. Navy 5N. All unprotected paint directly exposed to blast scorched. No visible variation in color.

SECTION V

PART C - INSPECTION REPORT

SECTION B - MACHINERY

A. There was no machinery damage whatsoever.

B. No damage to boilers whatsoever.

C. No damage to blowers.

D. No damage.

E. No damage.

F. No damage.

G. No damage.

H. No damage.

I. No damage.

J. No damage.

K. No damage.

L. No damage.

M. No apparent damage. Have been unable to inspect visually, but the ship got underway under own power and no thumping or difficulty of any kind was incurred.

N. No damage.

O. No damage.

P No damage.

Q. No damage.

R. No damage.

S. No damage.

T. No damage.

U. No damage.

V. No damage.

W. No damage.

SECTION VI

PART C - INSPECTION REPORT

SECTION C-ELECTRICAL

A. (a) Overall condition excellent, except broken light globes. No other damage.

B. No damage.

C. No dmaage.

D. No damage.

E. No damage.

F. No damage.

G. No damage.

H. No damage.

I. Not applicable.

J. No damage.

K. No damage.

L. No damage except for broken light globes.

M. (a) One 12" signal light missing with no evidence of breakage or damage to mounting from st-bd wing of signal bridge.

(b) No damage. No further damage.

N. No damage.

O. (a) No damage to master gyro.

(b) 5° westerly error in repeater on port wing of bridge. 4° westerly error in steering repeater in pilot house. 4° westerly error in repeater on starboard wing of bridge, both port and starboard repeaters knocked from binnacles. Repeaters were adjusted to 0° error and are now functioning properly.

(c) No damage.

P. (a) Sound powered telephone cable to forward lookout station upper deck severed.

(b) No damage.

(c) No damage.

(d) All exposed port side stowage boxes demolished.

Q. Not applicable.

R. No damage.

S. No damage.

T. No damage.

U. No damage.

V. No damage.

SECTION VII

PART C - INSPECTION REPORT

SECTION D - ELECTRONICS

A. (a) Overall condition fair.

(b) All antennas down, was the only major damage.

(c) Blast.

(d) All inoperative due to lack of antennas.

1. No antennas - Master scope broke, duplexing unit blown apart.

2. No, antennas only.

3. Not applicable.

4. No damage.

(e) Radar - Antennas.

All electronic equipment survived test except antennas. Surface search radar operative on repair of master scope. All radios operative on rigging of jury antennas. Air search radar non-operative as repairs of antenna is beyond capacity of ships force.

Classification (~~Cancelled~~) (Changed to CONFIDENTIAL)
By Authority of JOINT CHIEFS OF STAFF ACTION OF 15 APRIL 1949
By [illegible] Date 24 Apr 61
1st V. APSWP

[redacted]

CONFIDENTIAL

Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

9 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER
ATTENTION: OMI/Mr. William Bush

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency (formerly Defense Nuclear Agency) Security Office has reviewed and declassified the following reports:

+ ST-A

AD-366748	XRD-65
AD-366747	XRD-64
AD-366746	XRD-63
AD-376826	XRD-60
AD-376824	XRD-58
AD-376825	XRD-59
AD-376823	XRD-57
AD-376822	XRD-56
AD-376821	XRD-55
AD-366743	XRD-54
AD-376820	XRD-53
AD-366742	XRD-52
AD-366741	XRD-51
AD-366740	XRD-50-Volume-2
AD-366739	XRD-49-Volume-1
AD-366738	XRD-48
AD-366737	XRD-47

TRC 9 April 1997

SUBJECT: Declassification of Reports

AD-366736	XRD-46
AD-366735	XRD-45
AD-366723	XRD-37
AD-366721	XRD-35
AD-366717	XRD-31-Volume-2
AD-366716	XRD-30-Volume-1
AD-366751	XRD-68-Volume-2
AD-366750	XRD-67-Volume-1
AD-366752	XRD-69
AD-366744	XRD-61.

All of the cited reports are now **approved for public release. Distribution statement "A"** now applies.

Ardith Jarrett
ARDITH JARRETT
Chief, Technical Resource Center

Completed
1 mar 2000
B.W