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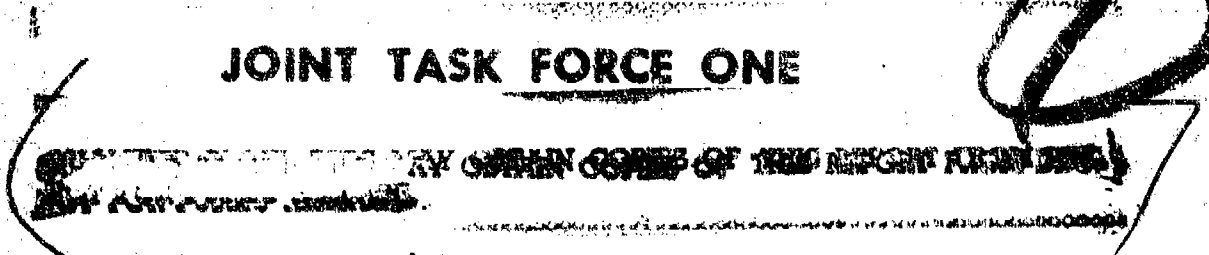
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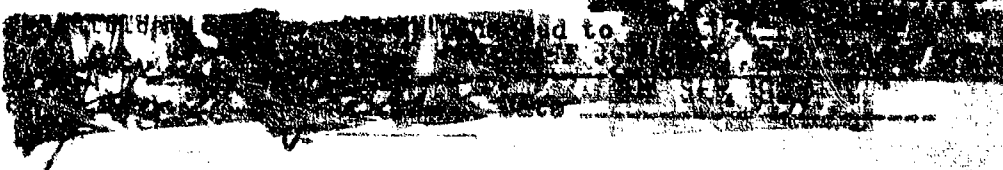
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FINAL REPORT

FOR TESTS ABLE AND BAKER

CONDUCTED JULY 1946



NAVDOCKS P-3

Classification (Cancelled) ~~Secret~~ to **UNCLASSIFIED**  
By *Major C. J. ...* Date *3/2/65*

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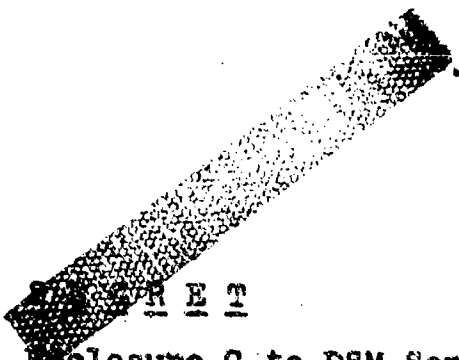
⑥ OPERATION CROSSHEADS, ~~Final~~ Final Report, ~~Tests~~ Tests Able and Baker

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S E C R E T

Enclosure G to DSM Serial 001500

Page 1 of 25 pages

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TITLE OF REPORT:

This report is intended to be a part of the final supplementary report to the Commander Joint Task Force One. As such, it contains essential items taken from the four gross damage and interim reports which have preceded it. Data from scratch gage record plates, not included herein, have been turned over to the Planning and Design Division, Bureau of Yards and Docks, for use in the structural analysis of the ARDC-13.

The crack survey of the ARDC-13, accomplished after Test Able, has been made Appendix A to this enclosure.

A listing of all photographs known to pertain to the three concrete vessels has been made Appendix B to this enclosure.

Prints of those photographs believed to be pertinent to this report have been provided in limited number as Appendix C. A complete file set of prints has been turned over to the Bureau of Yards and Docks for use in further study and analysis.

S E C R E T

Enclosure G to Director of Ship Material Serial 001500

S E C R E T

INDEX

<u>Article</u>	<u>Page</u>
Purpose	5
Comments	5
Conclusions	6
Tabulation of Pressure Data	9
ARDC-13	
Description	10
Instrumentation For Test A	10
Results of Test A	11
Repairs After Test A	12
William Day Rehearsal Explosion	14
Instrumentation For Test B	15
Results of Test B	16
Disposition	16
Table on Drafts	19
YOG-63	
Description	20
Results of Test A	20
Results of Test B	21
YO-150	
Description	22
Results of Test A	22
Results of Test B	24
Steel Pontoon 2x6 Bridge Section	25

S E C R E T

Enclosure G to DSM Serial 001500

B L A N K

S E R E T

Enclosure G to DSM Serial 001500

Page 4 of 25 pages

PURPOSE--The purpose of the inclusion of concrete vessels in the target array was primarily to determine the effects of atomic bomb phenomena on land based concrete structures. A considerable fund of information has been provided by studies of structures at Nagasaki and Hiroshima, and in furtherance of these data, the Chief of the Bureau of Yards and Docks recommended to the Commander, Joint Task Force One, and to the Chief of Naval Operations, that concrete vessels be included in the target array for test purposes.

Three concrete vessels were selected: the ARDC-13, a 2800 ton drydock; the YOG-83, a gasoline barge; and the YO-160, a fuel oil barge.

The atomic bombs employed at Bikini were the Nagasaki type. It has been reported that the test A bomb had an estimated blast equivalent of 20,000 tons of TNT at ground level over smooth ground. It is understood that no precise estimate has been made of the underwater effects of the test B bomb, but that the data available indicate an equivalent of 17,000\* 3000 tons of TNT. Other units of the task force secured data on pressures, temperatures, radiological effects, etc., a portion of which is restated later in this section to facilitate the reference. It must be borne in mind that at the date of this writing, these latter data have not been made generally available.

COMMENTS--All three concrete craft sustained damage or were made uninhabitable by both Able and Baker explosions.

In test A, the peak air blast pressures experienced ranged from 9.5 p.s.i. (YOG 83 at 1040 yards) to 40 p.s.i. (YO 160 at 540 yards). The duration of the positive pressures varied from about 3/4 of one second to about 1/2 second, the longer durations associated with the smaller peak pressures.

These pressures, or the winds which followed, affected the YOG 83 superficially (1040 yards), caused cracking and appreciable derangement of interior furnishings in the ARDC-13 (840 yards), and demolished much of the

S E C R E T

Enclosure G to DSM Serial 001500

superstructure of the YO 160 (540 yards).

The heat of the bomb presumably caused a fire on the YO 160, some ammunition on the YOG 83 burned, while timber on the ARDC-13 was charred.

The accompanying radioactivity had little if any effect on the YOG 83, had decayed to safe value in three days on the ARDC-13, and persisted for about a week on the YO 160.

In test Baker, the air blast did not apparently damage the concrete vessels. Eight days after Baker, however, the radioactivity on the ARDC-13 (1250 yards) was 70 times the allowed tolerance, on the YOG 83 (1160 yards) 140 times the allowable. The YO 160 (500 yards), judging from photographs, was swamped by the stern about 18 seconds after the blast by the wave which was generated by the underwater detonation.

The underwater shock or air blast may have damaged the YO 160. It is certain that her cargo tanks were ruptured -- since if they were not, the craft would have returned to the surface after being forced under. But it is more probable that the rupture was caused by the tons of water pouring on it than by bomb generated pressures.

Again, the underwater shock or air blast probably did no damage to the ARDC-13, since the flooding after Baker caused settlement at a rate of about .01 to .02 feet per hour, contrasted with the more rapid rate after Able of from .03 to .08 feet per hour.

CONCLUSIONS: Entirely aside from the problem of design against blast, certain broad conclusions can be made in the light of the foregoing considerations.

(1) Important water front structures must be designed to withstand severe wave action, since a harbor would appear a good target for enemy atomic bombing;

S E C R E T

Enclosure G to DSM Serial 001500

Page 6 of 25 pages



(2) Similarly, important waterfront areas must be designed and equipped to provide protection against and to effect the elimination of radioactive contamination; and

(3) The indiscriminate use of the concrete insert to fasten relatively light articles to overheads, decks, and bulkheads must be modified to insure that the insert will hold considerably more than the articles dead weight.

S E C R E T

Enclosure G to DSM Serial 001500

Page 7 of 25 pages

S E C R E T

Enclosure G to DSM Serial 001500

Page 8 of 25 pages

DATA ON PRESSURES TO WHICH CRAFTS WERE SUBJECTED

Craft	Heading of burst	Horizontal distance, yards	Air blast		Water shock	
			Peak side-on pressure, psi	Duration of positive pressure, seconds	Surface pressure psi	Duration at 10 depth,
TEST ABLE						
YO-160	76° abaft port beam	540	4C	0.48	-	-
ARDC-13	11° fwd port beam	840	15	0.65	-	-
YOC-83	45° abaft stbd beam	1040	9.5	0.78	-	-
TEST BAKER						
YO-160	Astern	500	17.5		2350	0.000
ARDC-13	Off stbd beam	1160	3.3		630	0.000
YOC-83	---	1250	2.5		550	0.000

Enclosure 613 to DSM Serial 001500

ARDC-13-DESCRIPTION. The ARDC-13, a 2800 ton capacity floating concrete drydock, was the unit about which the Yards and Docks observers centered their attention. The structure was built in March 1946, by the Haddock Company, Pasadena, California, under Contract NOy-11999. The pontoon was 84 feet by 389 feet, overall, with a depth of 14 feet, uniform throughout except for the rather abrupt fairing at the bow and stern. Mounted on the pontoon, and cast integrally with it, were two wingwalls, 26 feet high, 306 feet long, with widths of 10 feet at the top and 13½ feet at the base.

Structurally, the dock consisted of transverse frames, watertight bulkheads, and nonwatertight bulkheads, spaced 6 feet on centers, interlocked with longitudinal watertight and nonwatertight bulkheads, 13 to 28 feet apart, and with the overall shell of the walls, decks and bottom of the dock. The structural framework is depicted in the profiles and plans in Y&D Dwg. No. 267 911.

It should be pointed out that the dock was not completely equipped functionally. Pumps, flooding and discharge valves, and controls were omitted. Aside from temporary generators, bunks, and a galley, which served to make the dock habitable, it was merely a rigid frame concrete structure.

ARDC-13-INSTRUMENTATION: The dock, in presenting vertical walls rising over 30 feet above the water, resembled an industrial building more closely than any other floating unit the Navy uses. Further, its shape was admirable for the purpose, since it was anticipated that there would be a considerable movement, readily measurable, of the wingwalls relative to the pontoon.

With this movement in mind, steel frames were built within the wingwalls, rigidly mounted to the pontoon, with scribing mechanisms at the top to record sway in any direction, on plates fastened to the wingwall. Similarly, small scratch gages were mounted on the shell and frames at critical points to determine the strains at these points. These instruments are described in Y&D Dwg. No. 428 711.

S E C R E T

Enclosure G to DSM Serial OC1500

tonated according to schedule, the morning of 1 July. Subsequently the dock was boarded for the first time by initial boarding team No. 4, of which the senior Bureau of Yards and Docks representative was a member, at about 1300 on 2 July. The dock was found to be radio-active, with an intensity of about 0.2 roentgens per 24 hours, and only a limited inspection could be made in the time allotted for safety.

The team reported that the dock had retained its structural shape but did have a slight list to port and was slightly down at the stern. The fenders on the port side were charred and the outboard face of the port wall was somewhat blackened. The inboard face of the starboard wingwall was darkened by blast from the top of the wall to about one half the distance to the floor of the dock. The line of demarkation between clean and blast marked concrete was not entirely clear. The catwalk connecting the tops of the wingwalls was destroyed and had only one cable left in place. Wooden walkways along inboard side, top of wingwalls were missing but most of the framing timbers which supported the walkway were in place. Walkway framing on the starboard wingwall and the inboard draft boards on this wall were charred.

The top of each wingwall A deck had longitudinal cracks extending almost the entire length of the wingwall. The crack in the port wall was most severe and was attended with spalling of the concrete and relative displacement of the sections in some areas. Fine line cracks were observed for most of the length of the dock floor C deck running longitudinally about 3 ft. on each side of the center line. Cracks were observed in the inboard faces of the wingwalls about 5 ft. above the dock floor on the starboard side and about four or five ft. from the top on both walls and about midway down on the port wall. One steel hatch cover was blown off and apparently went over the side from port A deck. The lower halves of the forward access ladders were blasted away. A section of torpedo tube and spoon and a

S E C R E T

Enclosure G to DSM Serial 001500

Page 11 of 25 pages

dock by the explosion of the U. S. S. ANTERSON, a destroyer which was anchored about 200 yards off the port beam of the dock.

Interior damage seemed to be confined almost entirely to the port wingwall. Temporary plywood partitions for the Captain's and Chiefs' quarters and the sick bay were moved from their original positions, partly knocked down and torn apart. Bunks were in some cases knocked off their stanchions. Stanchions, secured by inserts to the overhead and deck, were still firmly in place, although a few had been bent. Mess tables, held with inserts in the concrete, had been uprooted. As a matter of record, a number of switches, mounted on bulkheads with the same type insert, had become loose during the craft's movement from California to Bikini, and the presumption is advanced that the insert employed was not the best available.

On the other hand, the electrical distribution panel and a large store of electric light bulbs, among a host of other items, remained entirely undamaged in the starboard wingwall.

At about 0830 on 3 July 1946, the dock floor was almost awash at the stern on the port side, indicating that flooding was increasing more rapidly than observed by Initial Boarding Team #4 on the previous day. The Bureau of Yards and Docks representative reboarded the dock with a monitor in attendance to check radioactivity, for the purpose of determining the extent of flooding and a proper course of action.

ARDC-13-REPAIRS AFTER TEST A: Since the water washing over the stern was occasionally covering the anchor chain on the port quarter, it was decided immediately to slip the anchor by cutting the chain, and then to tow the dock to the beaching area off the north west end of Enyu Island.

S E C R E T

Enclosure G to DSM Serial 001500

The dock was under tow at about 1100 and was subsequently anchored, bow in, at Enyu at 1420 with 6,000 pound bow and stern anchors to prevent drifting and broaching. When anchored, the dock had about 12 ft. of water under the bow and 25 ft. under the stern. While the dock was under tow, the Bureau of Yards and Docks observers removed the deflection gage plates from the wingwalls took extensive pictures of topside damage and made a hasty crack survey. The monitor advised that the dock could be occupied safely for only 12 hours on 3 July 1946. Before departing the dock, arrangements were made with Commander Task Unit 1.2.7. to arrange for pumps to facilitate inspection and salvage work.

On 4 July 1946, the ARDC-13 was cleared radiologically and the Officer in Charge of the dock returned to the ship with a part of his crew to assist in salvage work and inspection. The average draft at 1630 on 4 July was 13.2 feet and the list was about 8° - 10' to port. Water was washing through the dock on the port side. A salvage tug alongside the port wall rigged a submersible pump through hatches in the port wingwall and started pumping out the dock at about 1800.

At 0130 on 5 July 1946, after pumping for about 8 hours with a six inch submersible pump, the ARDC 13 was returned nearly to even keel and normal draft. Pumping subsequently was done intermittently, using a handy-billy. An average draft of 9 ft. 11 inches was observed at 1330 this date. The principal reason for leakage was determined to be a small crack through the port shell, about 6 inches below the water line extending from Frame 55 forward to about Frame 18. There was an observed leakage through this crack over about one fourth of its length. This underwater damage was considered to be relatively minor. The dock's generators were started without incident. A portion of the power lines passed through flooded compartments on the port side and were not utilized for providing power to the port side of the dock.

On 8 July 1946, tanks numbers one and seven on the starboard side of the dock were flooded to a depth of about four feet furnishing sufficient list to starboard to place

S E C R E T

Enclosure G to DSM Serial 001500

the crack on the port side above the water line. Minor leakage from wave action only was experienced. The dock dragged anchor during the early afternoon and was rescued by Commander Task Unit 1.2.7 using the same anchor gear.

It was planned to caulk the crack in the port side of the dock during the week of 8 and 15 July 1946. However, due to the heavy swells running in the lagoon during that time it was impossible to hold a working barge alongside for men to work at the crack. The dock also slipped her mooring and went adrift three times during this period, further complicating any work. It was also found that with the dock listed to starboard practically no leakage occurred and the necessity for effecting permanent repairs was lessened when it was decided to leave the dock listed to starboard for Test Baker. Temporary repair only was effected.

The dock was towed into position and anchored in the array on a heading of about 85 degrees true on 13 July 1946. In this position, the starboard or uncracked side of the hull was presented to the center of the target array. Four 24,000 pound anchors were used in securing the dock for Test Baker with two at the bow and two at the stern, using 100 fathoms of cable for each anchor.

#### ARDC-13-WILLIAM DAY REHEARSAL EXPLOSION:

For William Day Rehearsal of Test Baker, four M-46 flash bombs were mounted on the top of the starboard wingwall near the bow end of the dock.

These bombs have the following characteristics:

Overall length	48.4 inches
Diameter	8.0 inches
Total weight	51.9 pounds
Weight flash powder	25.0 pounds
Burning time	0.20 seconds

The flash powder has an explosive effect similar to black powder.

S E C R E T

Enclosure G to DSM Serial 001500



The bombs were mounted on a platform located on the starboard A deck at Frame 12. The platform consisted of 3 inch timber planking which was placed across the crane rails and secured by cleats and a cable tie passed under the crane rails. The platform was floored over with one layer of bagged cement. The bombs were placed 4 abreast on this bagged cement, with bags of cement used as separators. Cable ties fastened to the crane rails held the bombs secure. The bombs were detonated by a remote control mechanism.

An examination of the damage after the blast revealed that:

- (a) The platform was entirely gone except for a few strands of cable hanging to the crane rails;
- (b) Powdered cement was scattered over the starboard forward section of the dock;
- (c) The 18 inch exhaust ventilator under the platform was blown thru the A deck. It was considerably dished downward and apparently absorbed and cushioned a good share of the blast;
- (d) The concrete deck around the exhaust ventilator and the A deck beam at Frame 12 were fractured;
- (e) There was no evidence of fire from the explosion of the flash bomb; and
- (f) Damage was entirely confined to about a six foot square area on the A deck and did not affect the use of the dock as a target for Test Baker.

ARDC-13 INSTRUMENTATION FOR TEST BAKER:

Instrumentation for Test Baker consisted of 5 of the steel A frame towers with plunger type scratch gages, three in the Port wingwall and two in the Starboard wingwall. The gage at Frame 12, Starboard side, was not set due to damage received from the William Day Flash Bombs.

S E C R E T

Enclosure G to DSM Serial 001500

Page 15 of 25 pages

ARDC-13-RESULTS OF TEST BAKER:

The ARDC-13 was boarded on the 2nd of August (Baker plus 8 days) by Bureau of Yards and Docks Representatives. There was no apparent evidence of damage resulting from the Baker Test. Slow leakage was taking place through cracks developed during the Able Test and at that time the Port stern section of the dock was awash up to Frame 55. From draft measurements of the ARDC-13 on 24 July, together with estimates made on 31 July and 1 August, the rate of flooding was approximately 25 to 50 per cent of the rate observed prior to listing the craft between tests.

Deflection markings were noted on the gage at Frame 27, Starboard side, which indicated that the tip of the wall had moved 2.5 inches to port, and 1.25 inches to starboard, relative to its neutral position. Radiological conditions prevented the rescue of the record plates.

The following intensities of radio-activity were observed on the ARDC-13 on 2 August 1946:

Dock floor, at bow and stern	6	roent-			
		gens	per	24	hrs.
Dock floor, amidships	9	"	"	"	"
"A" Deck, (top) Starboard	9	"	"	"	"
Within Starboard wingwall, "B" Deck	4	"	"	"	"
Approximate dock average	7	"	"	"	"

Radiological contamination allowed the presence of personnel only from 16 to 30 minutes per day. For this reason, salvage operations could not be undertaken without endangering the health of personnel.

ARDC-13-DISPOSITION:

During the night of 4 August 1946, the dock capsized to Port due to the flooding of the Port side pontoons and wingwall. After capsizing, the dock remained afloat with

S E C R E T

Enclosure G to DSM Serial C01500

On 5 August 1946, the Director of Ship Material recommended to Commander Joint Task Force ONE That the ARDC-13 be sunk by demolition charges. This was carried out by Commander Task Unit 1.2.7, at 1755, 6 August 1946.

S E C R E T

Enclosure G to DSM Serial 001500

Page 17 of 25 pages

S E C R E T

Enclosure G to DSM Serial 001500

Page 18 of 25 pages

ARDC-13 DRAFTS AT VARIOUS STAGES OF THE TESTS

Date	Time	Drafts, feet				Trim by Stern																
		FRAME #6		FRAME #27																		
		Port	Stbd.	Port	Stbd.																	
<u>TEST ABLE</u>																						
1 July	0900	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	0
2 July	1500	10.5	9.5	12.0	10.0	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	16'
3 July	0930			14.5																		
3 July	1500	13.0	6.5	17.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	42'
4 July	1630																					40
<u>POST ABLE REPAIRS</u>																						
5 July	1330																					4'
6 July	1300																					--
<u>TEST RAKER</u>																						
22 July	--																					20
1 August	1200	6.0	11.5	8.3	11.7	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9	3'
2 August		10.5bb	9.0 b	14.0bb	13.0 b	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	42'
4-5 August		11.0	5.8	14.5	13.3	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	39'

- a. List to starboard, with starboard ballast.
- b. Estimated through ships glass.

YOG 83. The YOG 83 was built as a gasoline barge by the Concrete Ship Constructors of National City California for the Maritime Commission. It was completed in January 1944, and had a displacement of 10,960 tons, an overall length of 375 feet, beam of 56 feet, and a maximum draft of 29 ft.

Prior to the tests, this craft was in service in the Pacific as a gasoline barge. The tanks were butterworthed in preparation for the tests, and a number of steel pallets were tack-welded to the top layer of main deck reinforcing steel, exposed at various points for this purpose, and to steel plates and framework, in order to facilitate the display by Army personnel of ordnance and chemical warfare service items.

Prior to Test Able, there was minor damage to forecastle and poop deck houses, incurred when other vessels came alongside for fuel, and the guard railings were similarly damaged and in part removed. Hold No. 4, starboard, was reported to have a crack in the exterior shell about 10 feet below the waterline in a ballasted state, and was regarded as not watertight against the sea. As a matter of record, this hold was not butterworthed when it was found impracticable to pump it dry.

The craft was maintained at Bikini in utmost cleanliness. Dark spaces had been painted white, valve handles painted in distinguishing colors, and the galley area was free from spilled grease and dirt.

#### YOG-83-RESULTS OF TEST ABLE:

Preliminary inspection of the YOG 83 indicated that the craft has sustained superficial damage only.

Detailed inspection of the YOG 83 revealed that the damage was entirely confined to the top side. Items noted are listed below:

- (a) Draft remained unchanged from pre-test draft;

S E C R E T

Enclosure C to DSM Serial 001500

- (b) Roof dished downward slightly on amidships deck house or pump room causing cracks in beams at the center and near the ends;
- (c) Roof covering on wheelhouse blown off and wooden siding on tankhouse just below wheelhouse blown in;
- (d) Steel frame life raft rack on starboard poop deck pulled loose and upset;
- (e) Few blast burns on poop deck frame structures;
- (f) Wheelhouse and tankhouse frame pushed slightly forward;
- (g) Ladders to wheelhouse loosened at upper connections;
- (h) Some paint charred on forecastle;
- (i) Canvas covers blown off 40 MM guns on fore-castle; and
- (j) Top of signal mast above yardarm blown off.

The YOG 83 was moored in the target array for Test Baker on 14 July 1946.

YOG-83-RESULTS OF TEST BAKER:

There was no apparent damage to this craft resulting from Baker Test.

Intensities of radiation on 2 August 1946 were measured from 10 to 18 roentgens per day alongside the hull, with lowest readings at the bow and stern and the highest reading near the midship section. This intensity would safely allow personnel aboard less than 15 minutes each day.

S E C R E T

Enclosure G to DSM Serial 001500

YO-160. This craft was built in 1943 as a fuel oil barge by the Concrete Ship Constructors, of National City, California for the Maritime Commission. Its displacement was 10,960 tons, overall length 375 feet, and beam 56 feet.

Prior to the tests, it was in active service as an oil barge in the Pacific, and the forecastle and poop deck houses, supports, and the guard railings had been extensively damaged when other ships had come alongside for fuel.

The holds, prior to Test Able, were reported entirely tight against the sea. Upon examination at Bikini, all the cargo tanks contained small amounts of oil, apparently not contaminated by water, the residual after attempts to pump the tanks dry, except the two forward tanks which carried salt water ballast.

There was evidence of rust, debris, improperly stowed stores, and the galley area was cluttered and greasy, but the basic hull structure appeared free from defects, and the craft was considered ready as a hull for test.

#### YO-160-TEST ABLE RESULTS:

On re-entry to the lagoon the YO 160 was found to be radioactive above the daily tolerance. Accordingly, on 2 July 1946 it was towed out of its position in the center of the array and was secured to a spare mooring buoy in the lagoon between ENYU and BIKINI Islands, at a remote distance from other ships.

On 4 July 1946, the YO 160 was boarded with two radiological monitors and was found to be sufficiently active radiologically to preclude remaining on board for more than 5 hours, with isolated spots still higher in radioactivity.

On 5 July 1946, the barge was again boarded with monitors, a photographer and an inspection party, prepared to make a complete physical inspection of the topside. The barge was found to be radioactive with a twelve hour

S E C R E T

Enclosure G to DSM Serial 001500



tolerance. A detailed inspection was completed in about two hours.

The damage to the barge from the main deck and below was superficial only. A small amount of concrete was scaled from the main deck just forward of the after deck house. This scaling is believed to have been caused by an intense fire which occurred in the area of the after deck house, the wheel house and the tank house.

The hatches on the main deck, deck valves, deck concrete, and the concrete hull all appeared to be intact and undamaged. The draft at the stern was noted to be 22 feet, the figure observed prior to the test.

The structures above the main deck were almost completely demolished, considered a direct result of the blast. The poop deck was fractured over its entire area. The wooden frame pilot house was consumed by fire. The deck house which contained the pump engines, line valves and power plant were crushed in with sections scattered over the deck. The catwalks were ripped assunder and partially destroyed by fire. The after portion of the forecastle was crushed inward but the forecastle deck was almost intact. It is improbable that any personnel aboard the YO 160 would have survived the blast, the subsequent fire, or ultimately the radioactivity.

The fire in the poop deck house was confined almost entirely to the crews living spaces, the Captain's spaces, galley and mess hall, and refrigeration spaces. The generator room, the generators themselves, and prime movers, in the forward amidships section of the deck house and the steering engine room were untouched by fire but were damaged somewhat from chipped concrete and debris when the deck above was smashed downward.

On 9 July 1946, the YO 160 was declared radiologically clear and Commander Task Group 1.2 was notified that the barge could be moved into the target array for Test Baker.

S E C R E T

Enclosure G to DSM Serial 001500

Page 23 of 25 pages

S E C R E T

On 9 July 1946, the YO 160 was secured alongside the USS ARKANSAS preparatory to mooring in final target array position. Due to swells running in the lagoon at the time, a camel between the ARKANSAS and the YO 160 punched a hole in the hull of the barge just below the waterline on the after port side and the barge took on water. The YO 160 was towed clear of the target array having a 45 degree list to port and with the main deck awash. The barge was beached in the beaching area at the north west tip of ENYU ISLAND. The barge was subsequently dragged off the beach, a temporary patch secured over the hole, which was about one foot in diameter, and the barge was counterflooded in the starboard compartment to bring it to an even keel. It was trimmed down at the stern with draft of 21 ft. forward and 28.5 ft. aft. It was placed in the target array for Test Baker on 20 July 1946.

YO-160-RESULTS OF TEST BAKER: The YO-160 sank immediately after the blast. The following information of the sequence of events just after the blast has been deduced by the Bureau of Ships Group from tower camera pictures from both Bikini and Enyu Islands, and pictures taken by PBM "U". The pictures discussed here are on roll 31(R)-275. In picture No. 0, the YO-160 is clearly visible and has not yet suffered any apparent effects from the burst. Picture No. 1 shows the cloud chamber. Picture No. 2 (plus six seconds) shows the YO-160 being lifted on a conical mound of water, the stern inclined upward towards the ascending column of water and the lower portions of the hull shrouded in a light mist. In Picture No. 3, all but the upper bow of the YO-160 is obscured in the light mist that surmounts the mound of water. In Picture No. 4, the upper part of the hull of the barge is again visible, still inclined stern upward toward the now descending column of water and dense spray from the base of the column. In Picture No. 5, the after three quarters of the length of the YO-160 has been engulfed and that portion of the bow which is showing is inclined upward. In Picture No. 6 (plus 18 seconds), the barge has disappeared completely.

It is surmised from the discussion above that the barge was fractured by the water pouring on it from above.

S E C R E T

Enclosure G to DSM Serial 001500

bridge section was the standard yards and Decks pontoon assembly made up of T-6 steel pontocns, two pontoons wide and six pontoons long.

The section, moored to the stern of the ARDC 13 for Test A, was turned up side down as a result of the bomb explosion. It was structurally intact and watertight, and the only noticeable effect was the general dishing of the steel plates between the lines of internal bracing. This superficial damage in no way reduced the effectiveness of the structure.

The section was utilized as a landing float for the movie exchange between tests, and on 22 July 1946 was again moored astern of the ARDC 13 for Test Baker.

The section was not apparently affected by the Baker Test. It was ultimately carried below the surface when the ARDC-13 capsized and settled by the stern. Visual inspection of the section was made on 2 August 1946. Radiological contamination prevented the boarding of the pontoon or the undertaking of salvage operations.

S E C R E T

Enclosure G to DSM Serial 001500

Page 25 of 25 pages

ARDC-13 CRACK SURVEY

INDEX

<u>Location</u>	<u>Page</u>
Dock floor, "C", deck, bow area	3
Dock floor, "C" deck, amidship	4
Dock floor, "C" deck, stern area	5
Port wingwall, top and inboard exterior, bow area	6
Port wingwall, top and inboard exterior, amidships	7
Port wingwall, top and inboard exterior, stern area	8
Starboard wingwall, top and inboard exterior bow area	9
Starboard wingwall, top and inboard exterior, amidship	10
Starboard wingwall, top and inboard exterior, stern area	11
"B" deck, starboard wingwall	12
"B" deck, port wingwall	13
Port outboard exterior, Fr. D-17	14
Port outboard exterior, Fr. 17-38	15
Port outboard exterior, Fr. 38-56	16
Port outboard exterior, Fr. 56-64	17
Starboard outboard exterior, Fr. 0-20	18
Starboard outboard exterior, Fr. 20-41	19
Starboard outboard exterior, Fr. 41-62	20
Starboard outboard exterior, Fr. 49-64	21

S E C R E T

Appendix A

Enclosure G to DSM Serial 001500

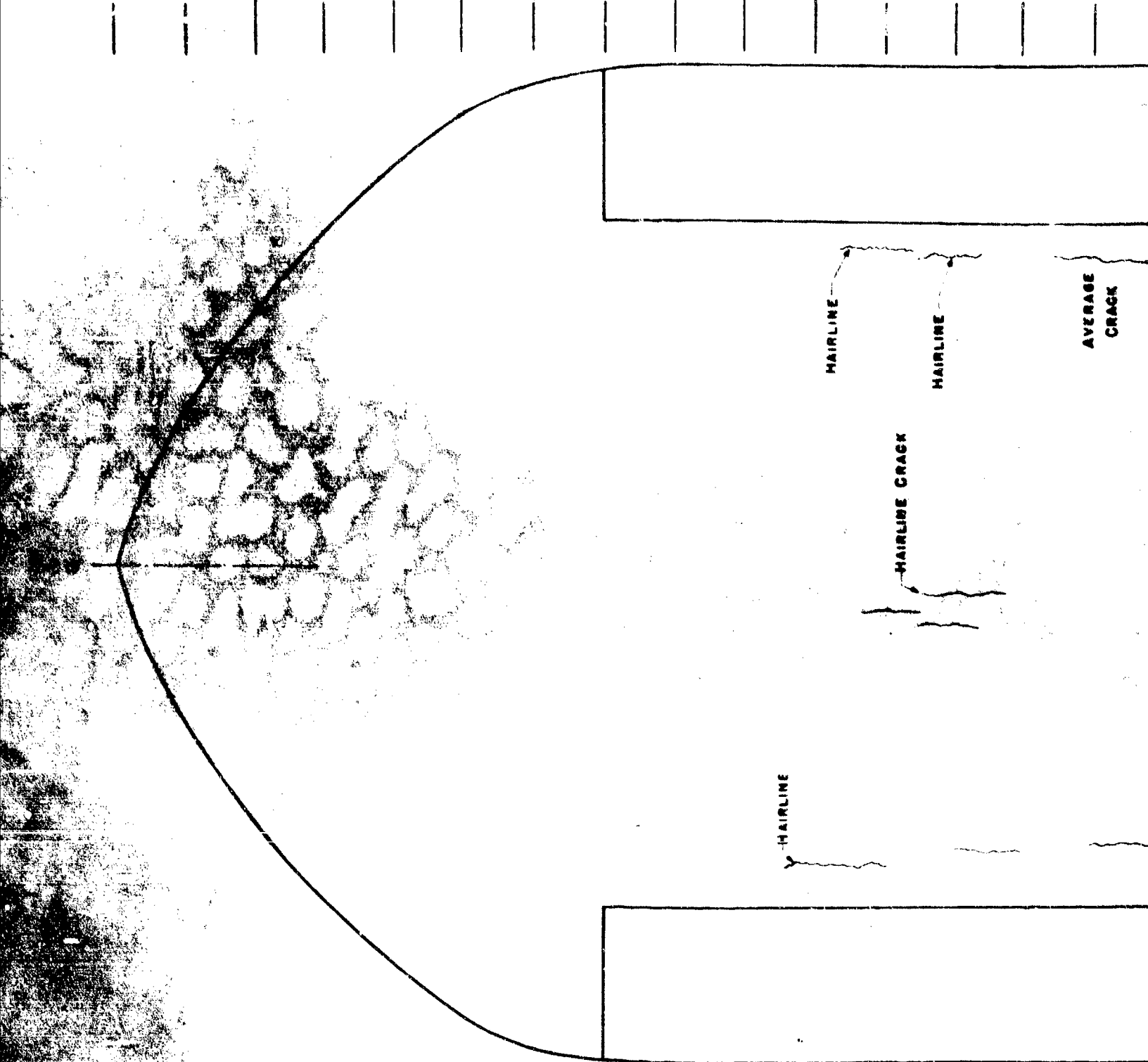
INDEX

<u>Location</u>	<u>Page</u>
Bottom shell, stern area	22
Bottom shell, bow area	23
Bulkheads at Frames 17 and 23	24
Frames 10 through 18, port wingwall	25
Frames 20 through 27, port wingwall	26
Frames 28 through 54, port wingwall	27
Frames 10 through 29, starboard wingwall	28
Frames 30 through 44, starboard wingwall	29
Frames 24 to 54, starboard wingwall	30

S E C R E T

Appendix A

Enclosure G to DSM Serial 001500



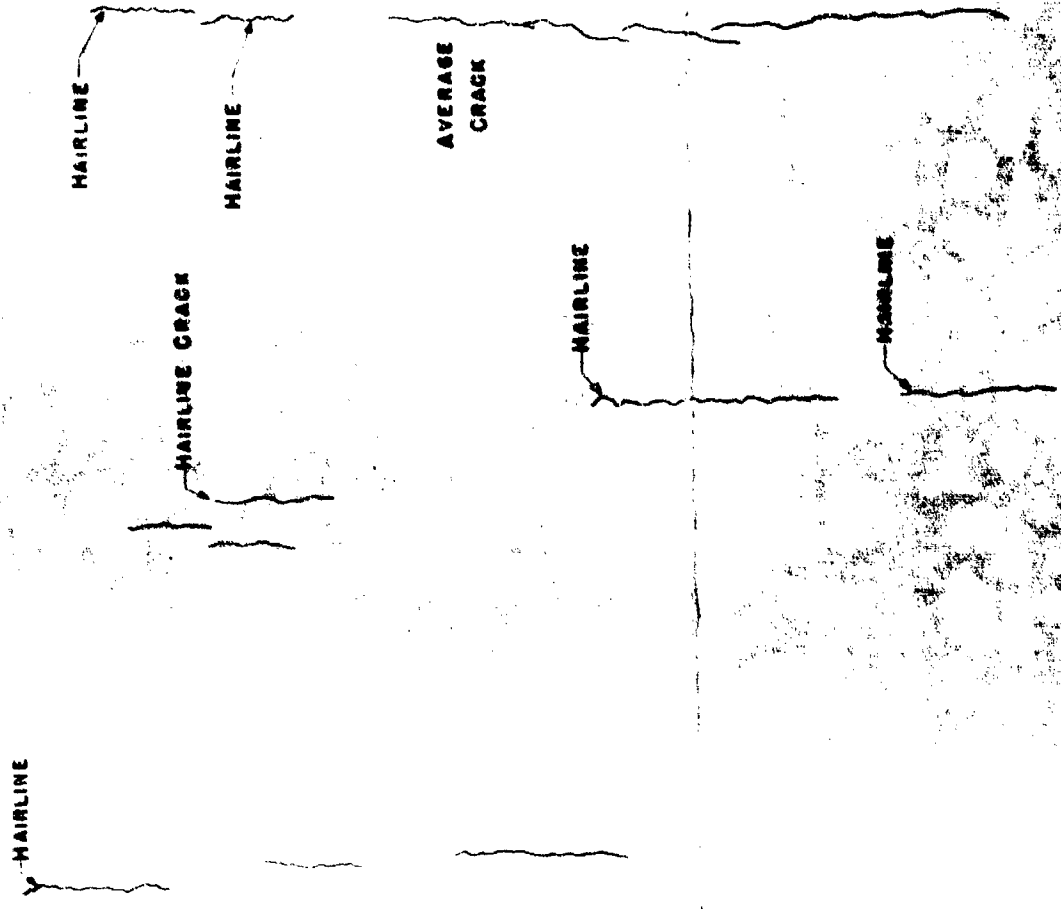
DOCK FLOOR "C" DECK LEVEL

**ARDC - 13**  
**CRACK SURVEY AFTER TEST ABLE**

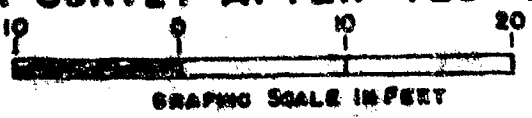


GRAPHIC SCALE IN FEET

5 6 7 8 9 10 11 12 13 14 15 16 17 18



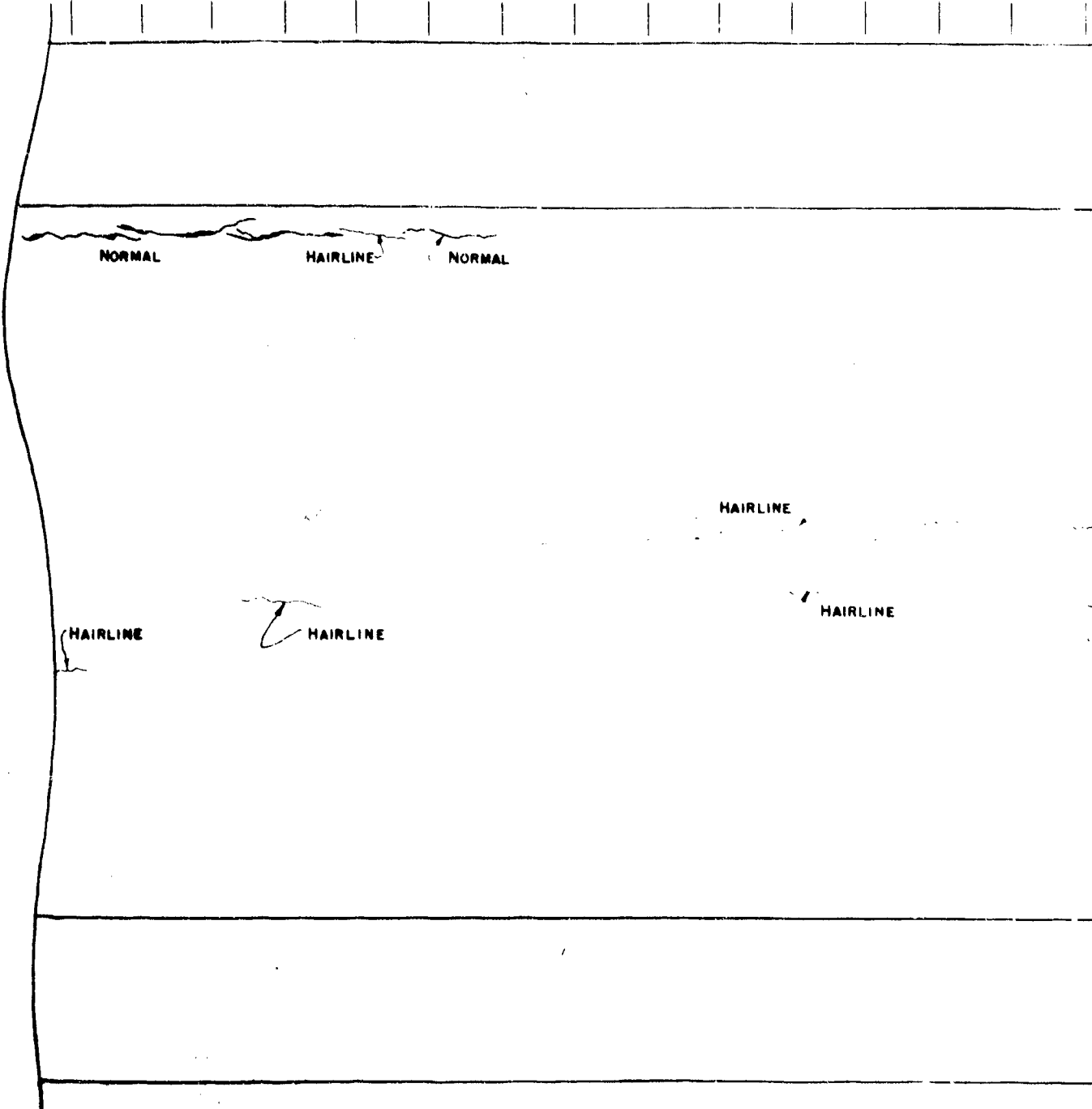
DOCK FLOOR "C" DESK LEVEL  
**ARDC - 13**  
CRACK SURVEY AFTER TEST ABLE



APPENDIX A, ENCLOSURE 6 TO DIRECTOR'S REPORT  
SERIAL 001800 PAGE 3 OF 3

DOCK FLOOR -- "C" DECK LEVEL

19 20 21 22 23 24 25 26 27 28 29 30 31 32 33

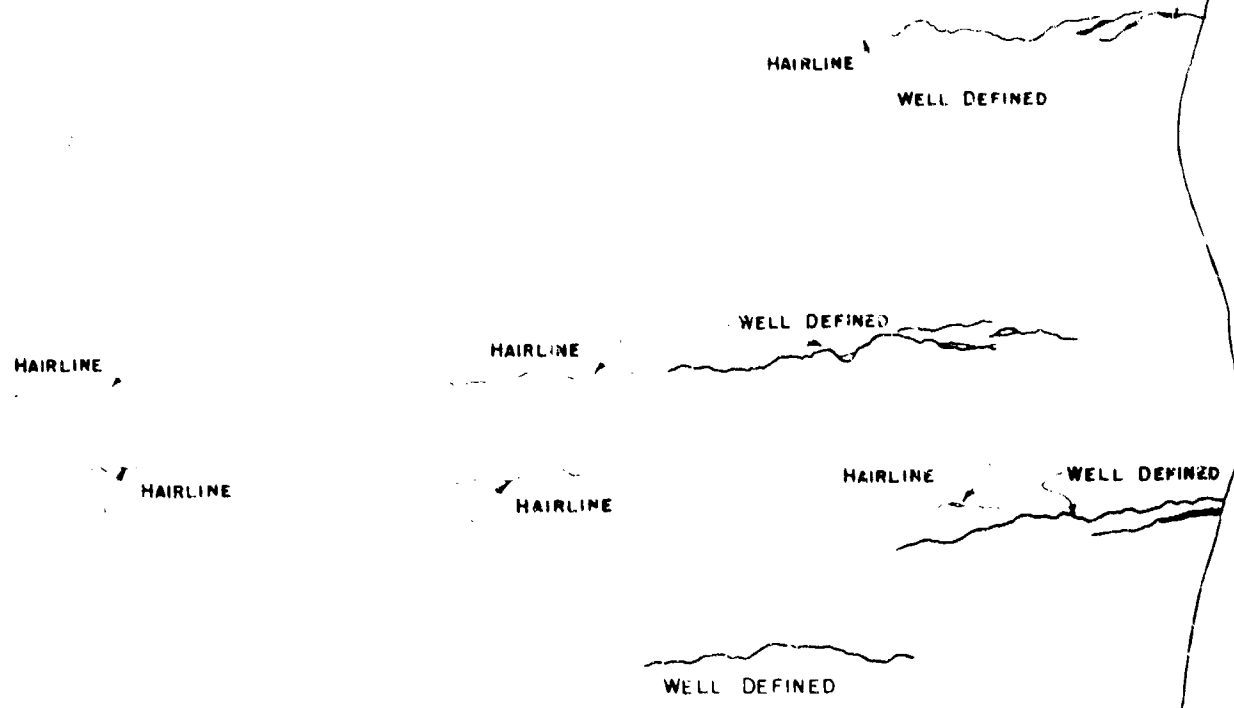


ARDC - 13  
CRACK SURVEY AFTER TEST AB





26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41



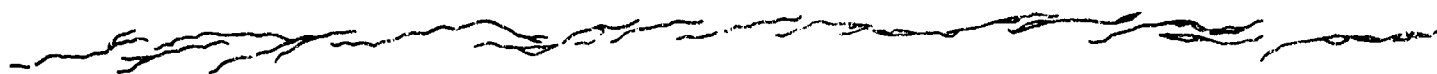
**ARDC - 13  
CRACK SURVEY AFTER TEST ABLE**



REC

2

42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57



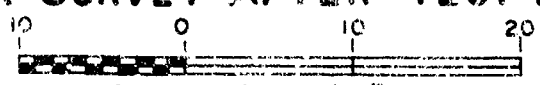
WELL DEFINED CRACKS



WELL DEFINED

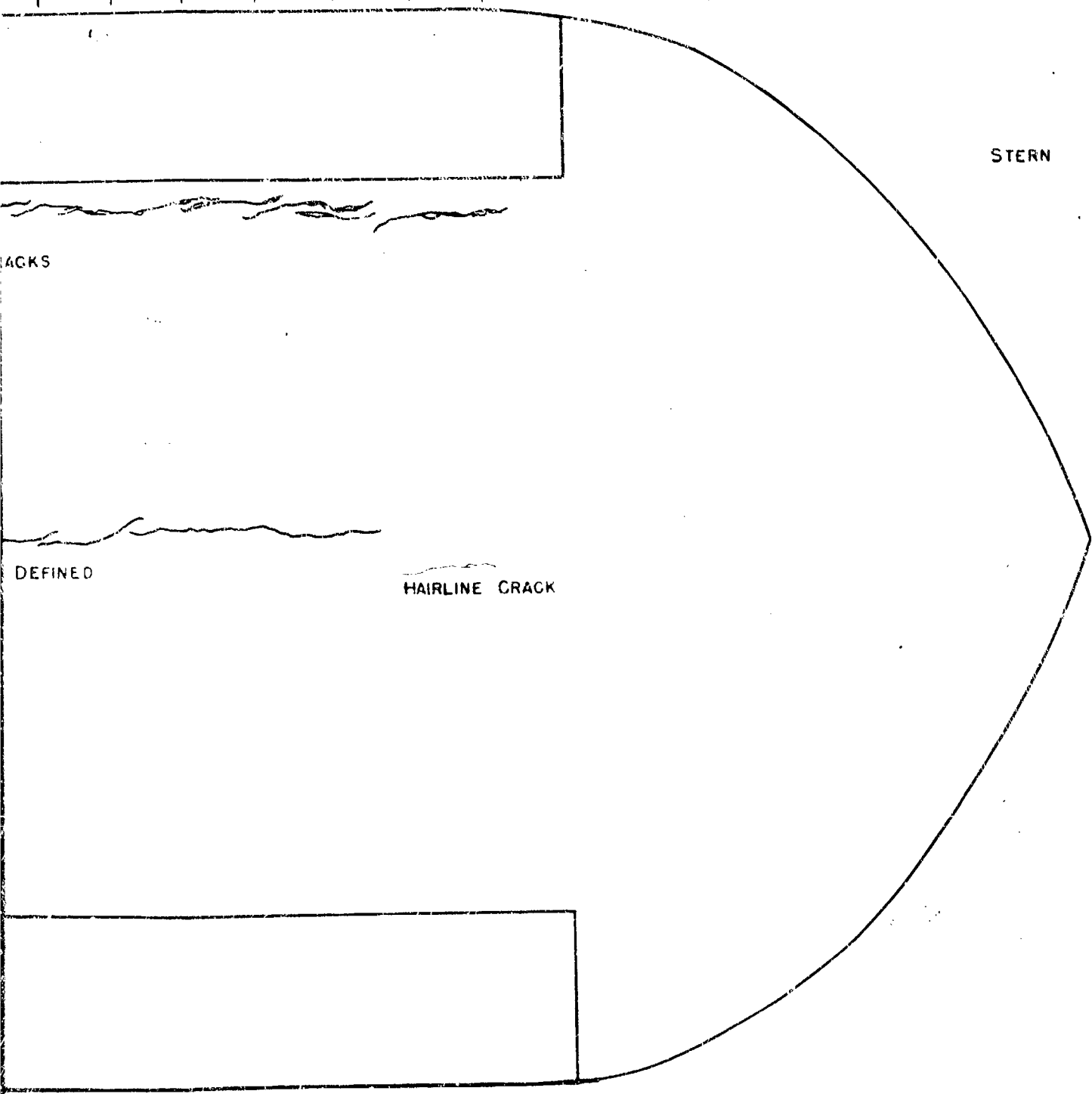
HAIRLINE CRACK

# ARDC-13 CRACK SURVEY AFTER TEST ABLE



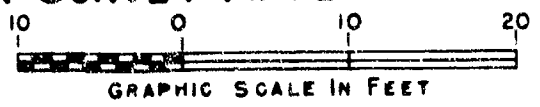
GRAPHIC SCALE IN FEET

50 51 52 53 54 55 56 57 58 59 60 61 62 63 64



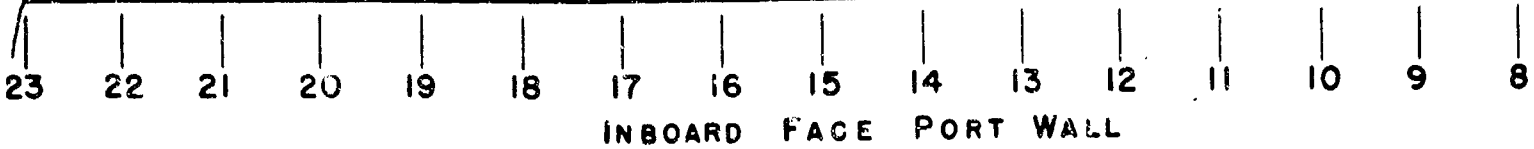
ARDC-13

CRACK SURVEY AFTER TEST ABLE

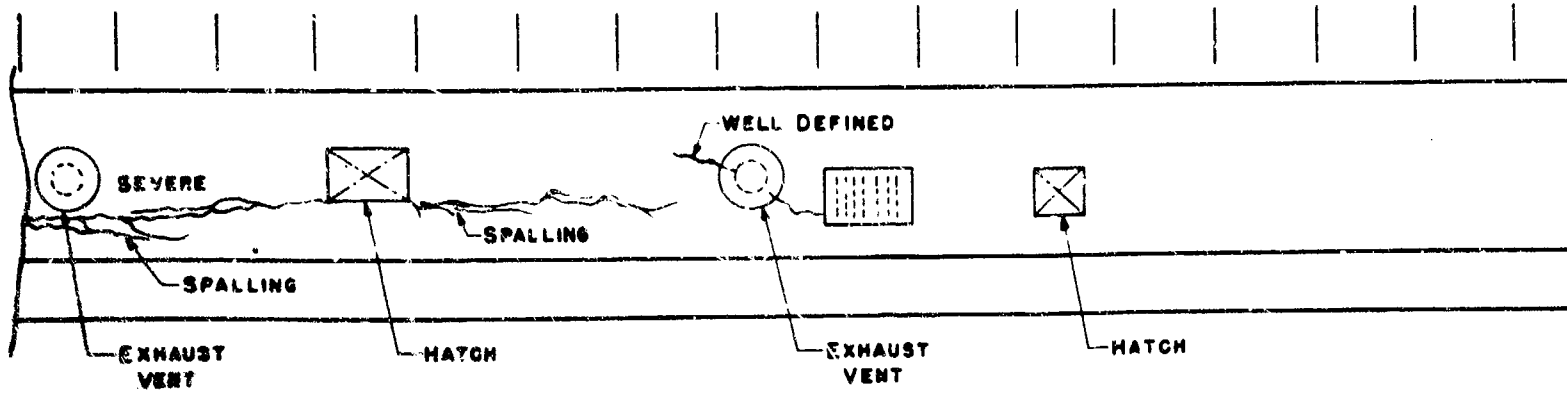


SHE  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP  
SERIAL 001500 PAGE 5 OF 30 PA

2

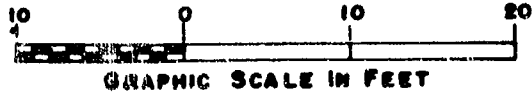


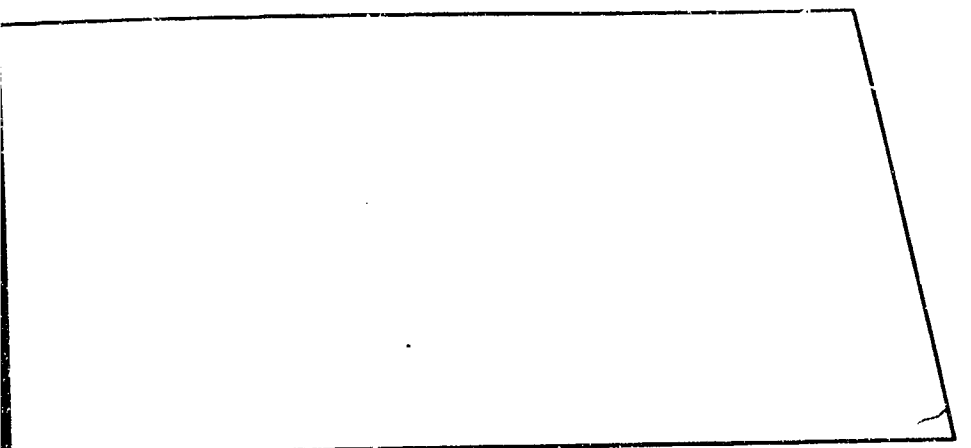
INBOARD FACE PORT WALL



"A" DECK PORT WALL

ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



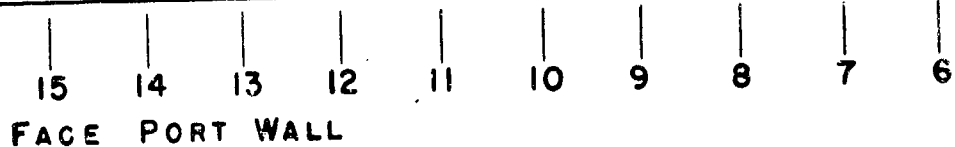


THIS CRACK  
PRESENT PRIOR  
TO TEST "A"

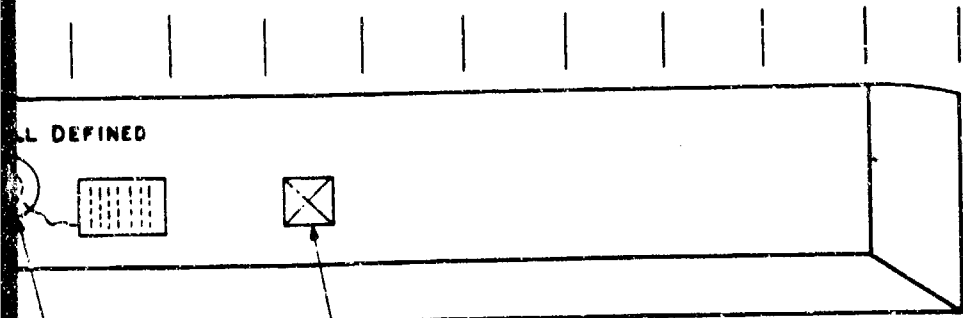


HAIRLINE

BOW FACE  
PORT WALL



FACE PORT WALL



ALL DEFINED



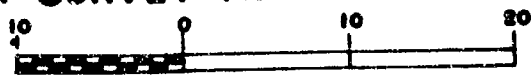
EXHAUST  
VENT

HATCH

DECK PORT WALL

ARDC - 13

CRACK SURVEY AFTER TEST ABLE



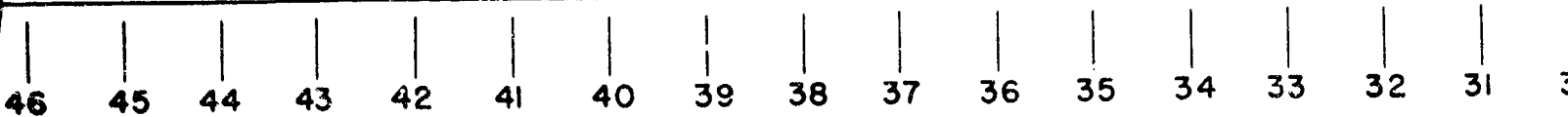
GRAPHIC SCALE IN FEET

APPENDIX A, ENCLOSURE 6 TO DIRECTOR'S REPORT  
SERIAL 001500 PAGE 6 OF 15

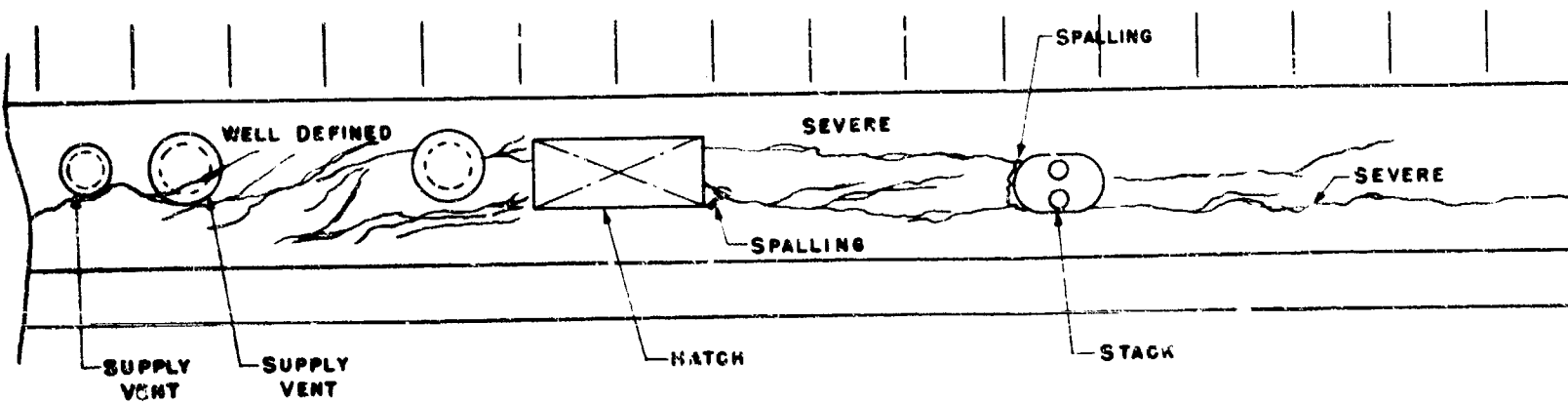
2

WELL DEFINED

WELL DEFINED



INBOARD FACE PORT WALL



"A" DECK PORT WALL

### ARDC - 13 CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET

WELL DEFINED

WELL DEFINED

38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23

INBOARD FACE PORT WALL

SPALLING

SEVERE

SEVERE

WELL DEFINED

SEVERE

SPALLING

SPALLING

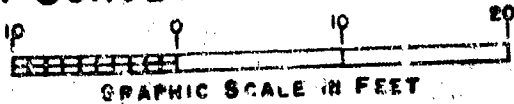
STACK

SUPPLY VENT

HATCH

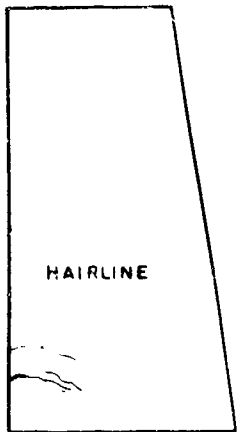
"A" DECK PORT WALL

# ARDC - 13 CRACK SURVEY AFTER TEST ABLE

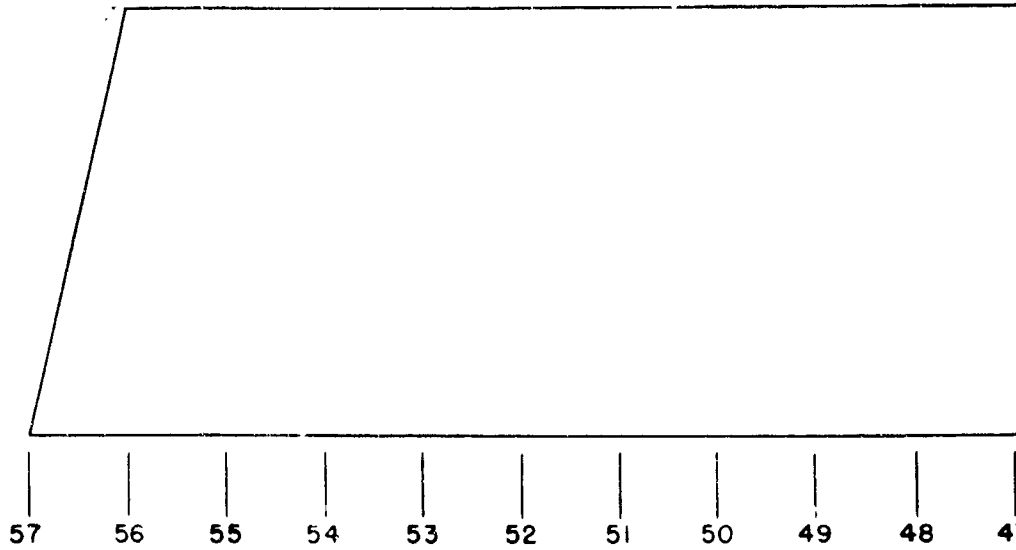


APPENDIX A, ENCLOSURE 6 TO DIRECTOR'S REPORT  
SERIAL 001500 PAGE 1 OF 30

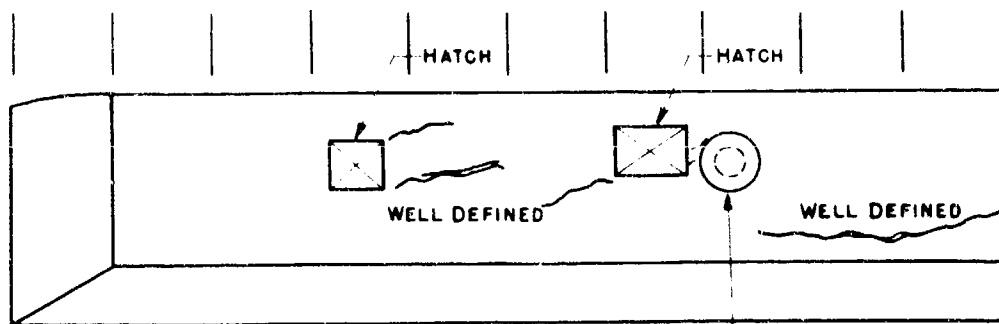
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STERN FACE  
PORT WALL

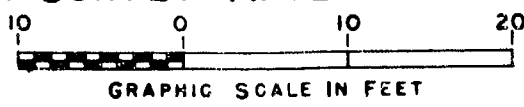


INBOARD FACE PORT WALL



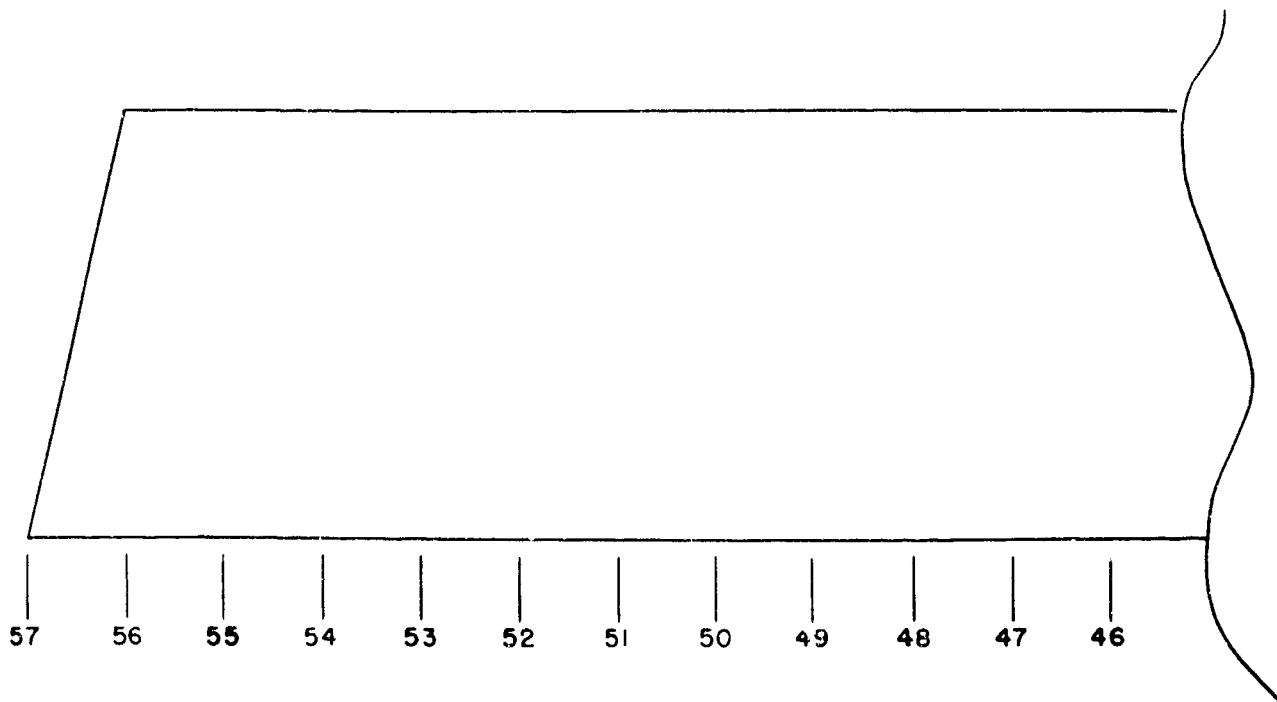
"A" DECK PORT WALL

ARDC -13  
CRACK SURVEY AFTER TEST ABLE

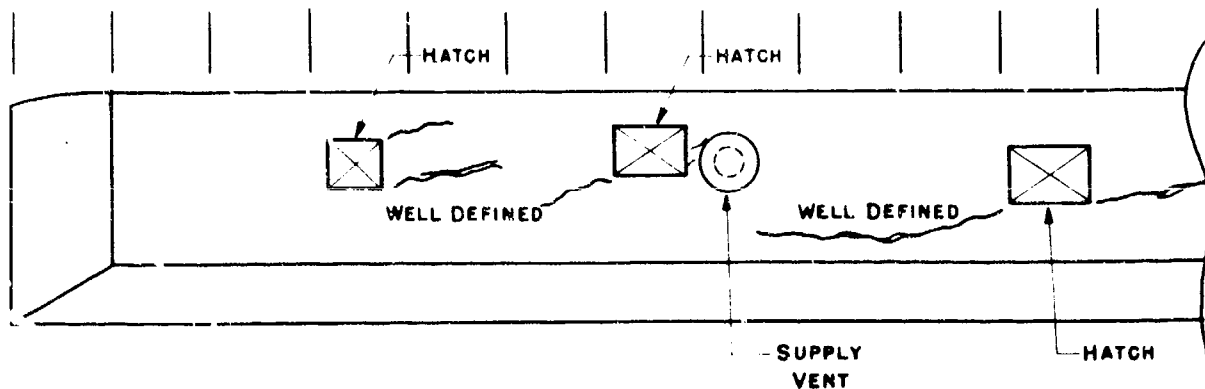


APPENDIX  
S





INBOARD FACE PORT WALL



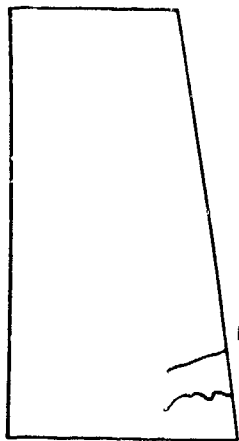
"A" DECK PORT WALL

ARDC -13  
RACK SURVEY AFTER TEST ABLE

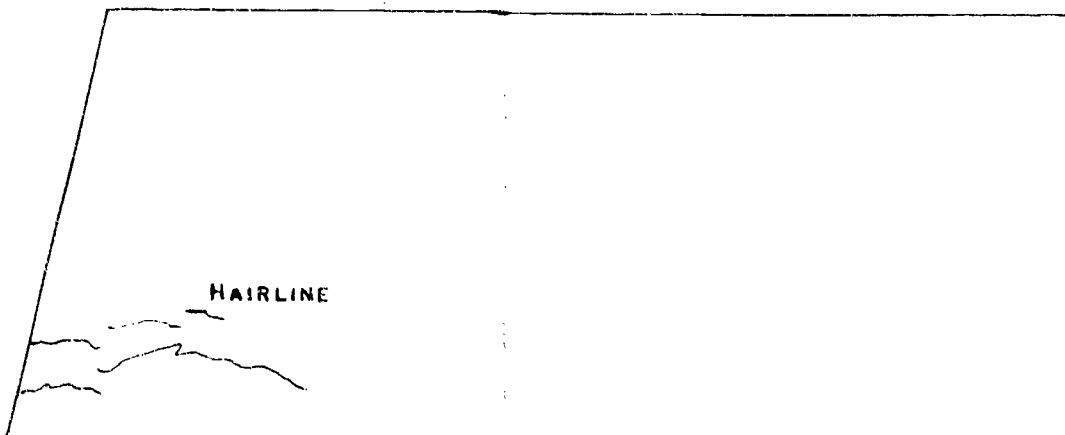


SHEET  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP  
SERIAL 001500 PAGE 8 OF 30 PAGES

2



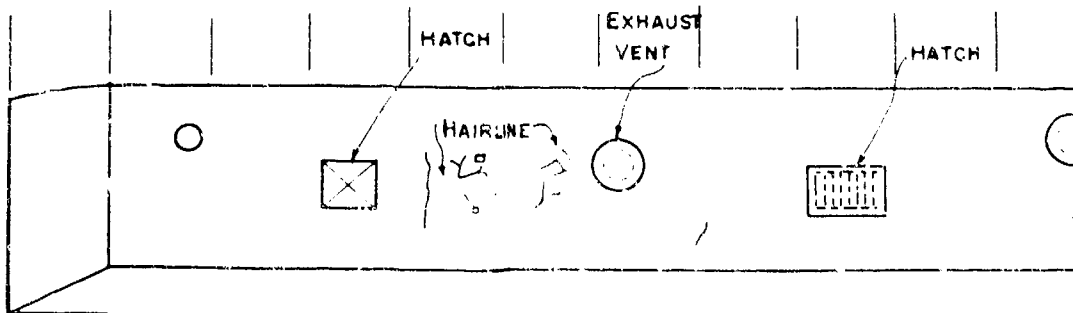
HAIRLINE



HAIRLINE

6 7 8 9 10 11 12 13 14 15 16

INBOARD FACE STARBOARD WALL



HATCH

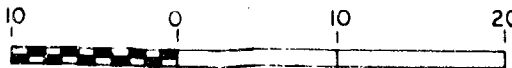
EXHAUST VENT

HATCH

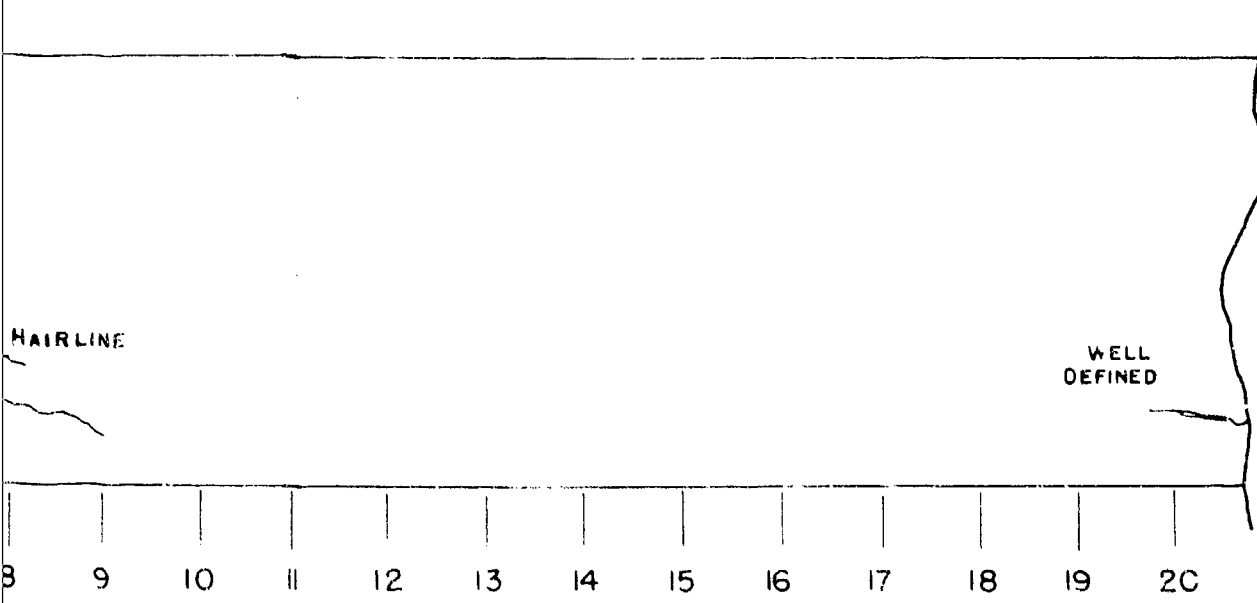
HAIRLINE

A DECK STARBOARD

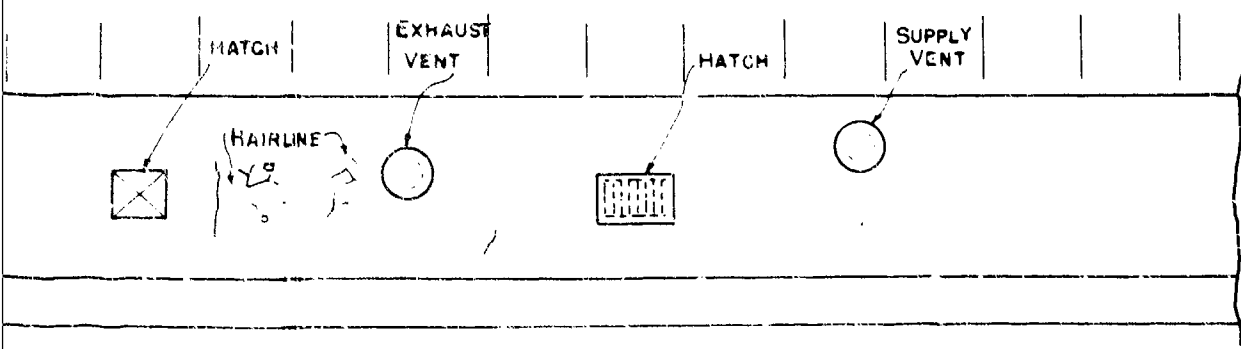
ARDC-13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET



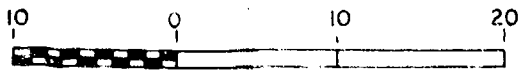
INBOARD FACE STARBOARD WALL



A DECK STARBOARD

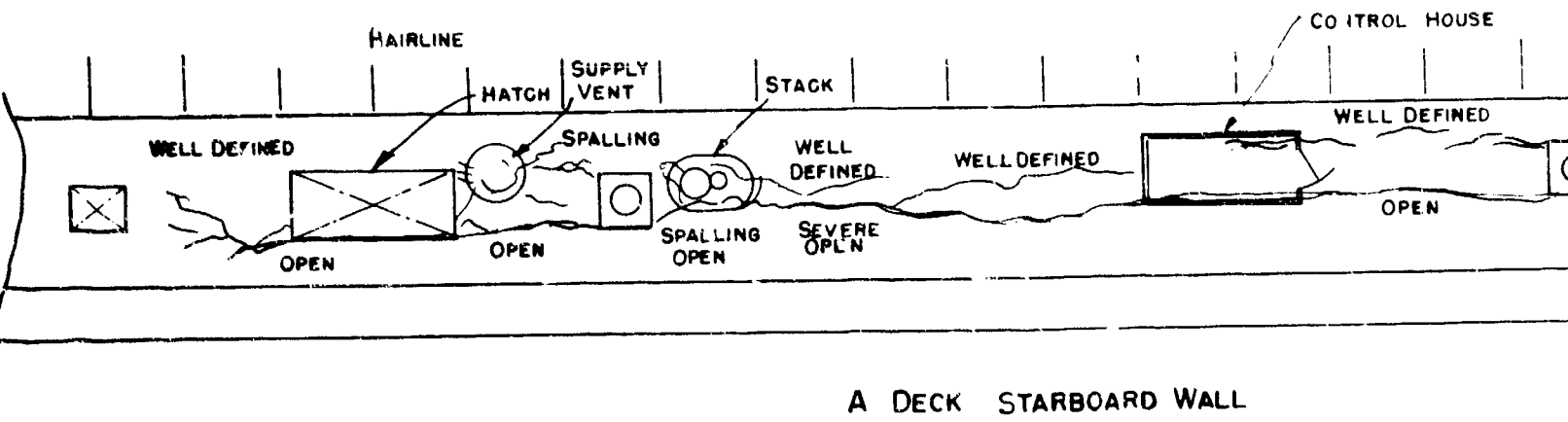
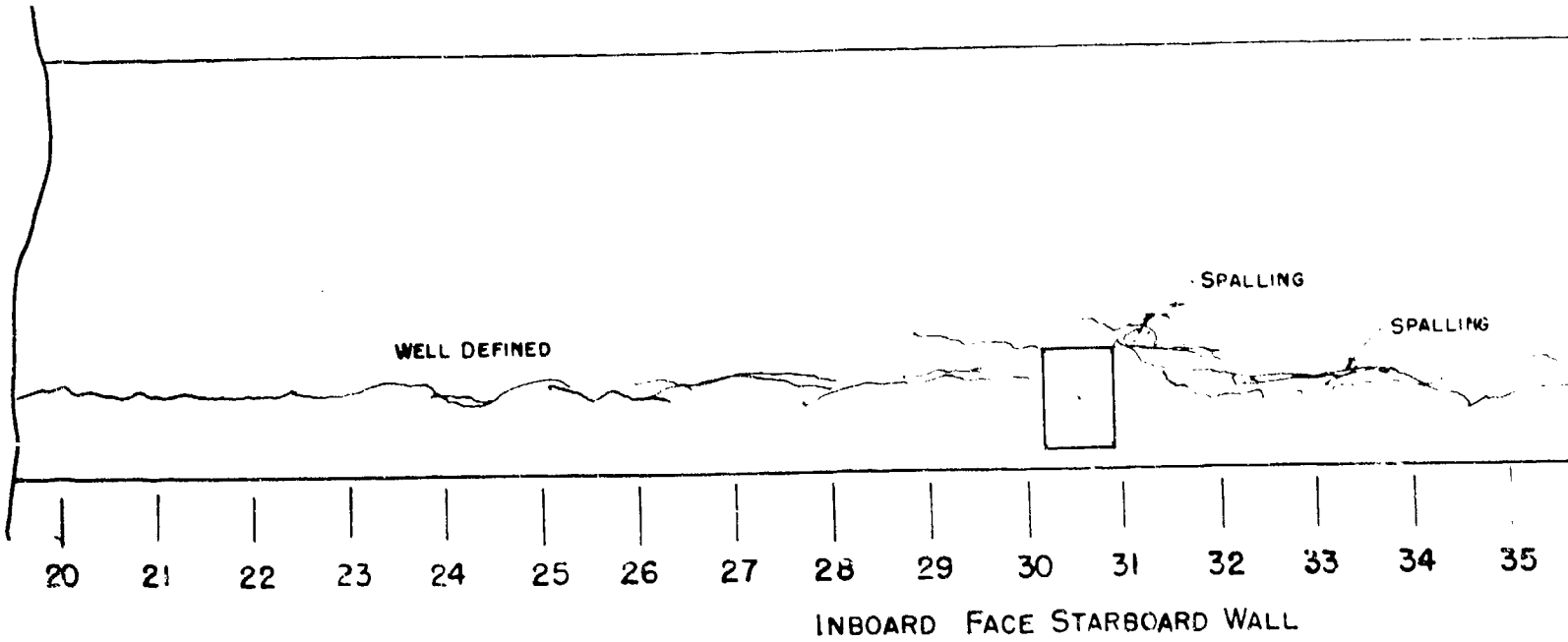
ARDC-13

TRACK SURVEY AFTER TEST ABLE



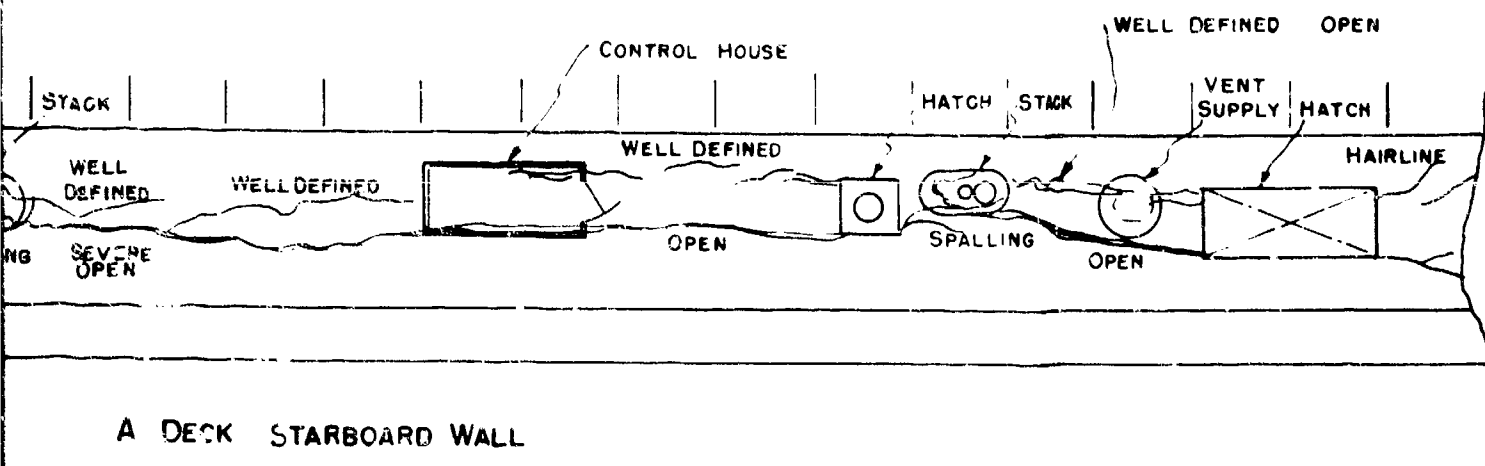
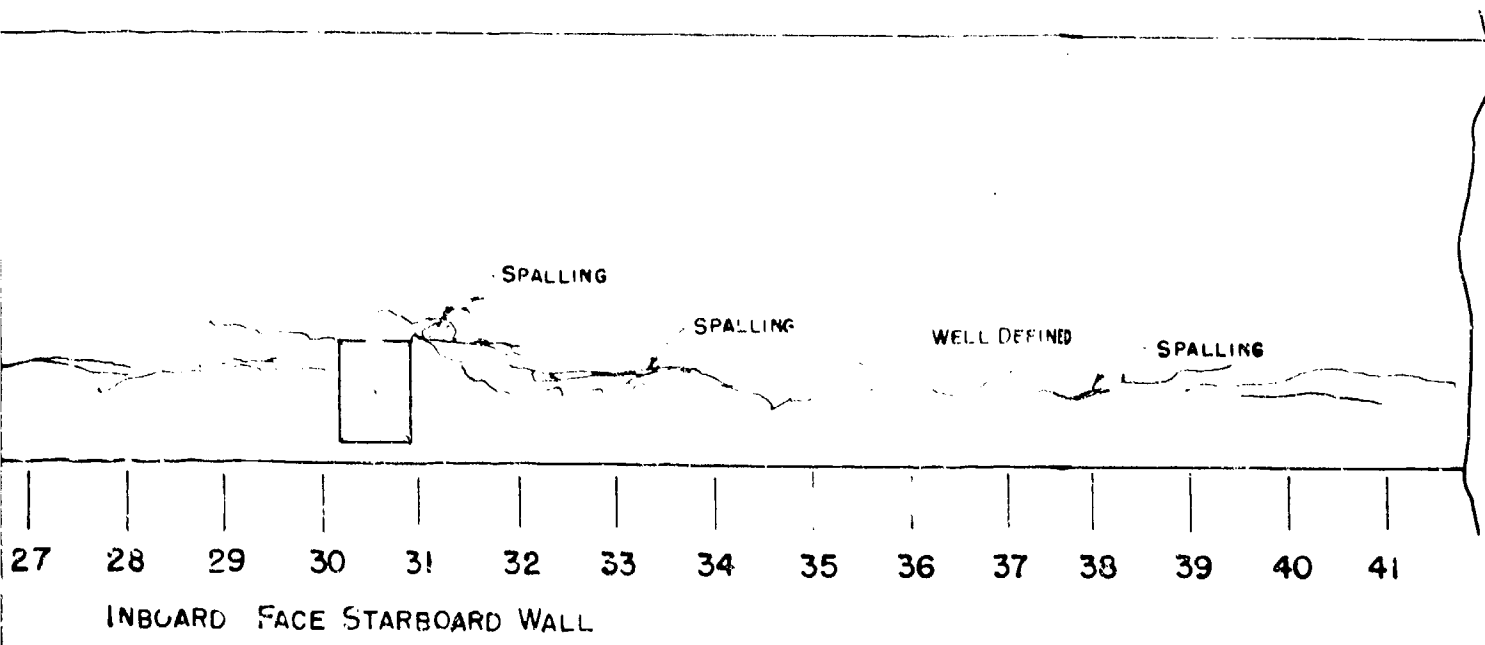
GRAPHIC SCALE IN FEET

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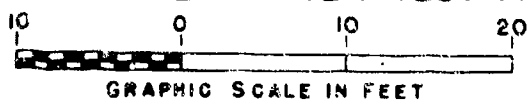


ARDC-13  
 CRACK SURVEY AFTER TEST ABLE

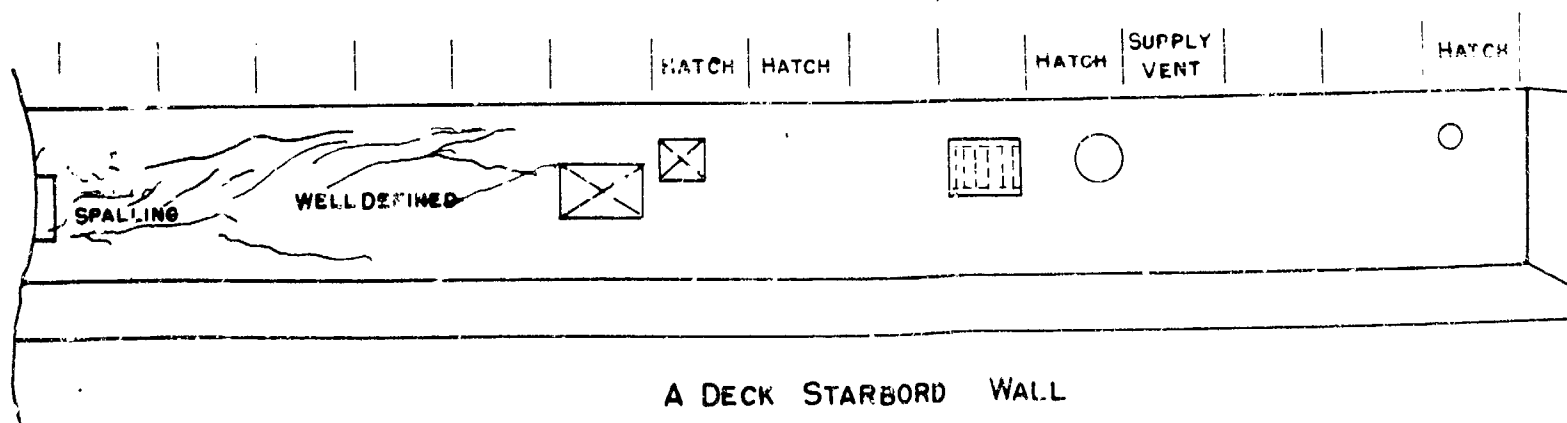
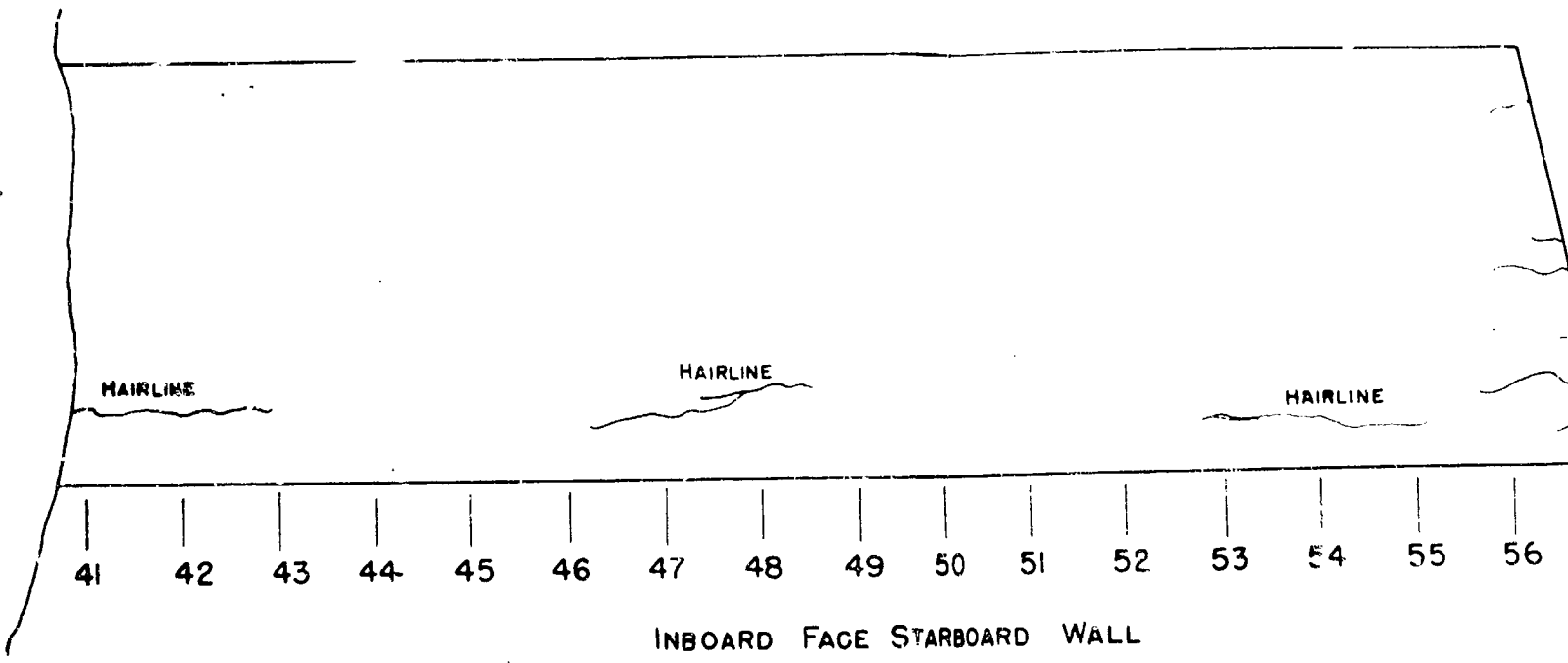




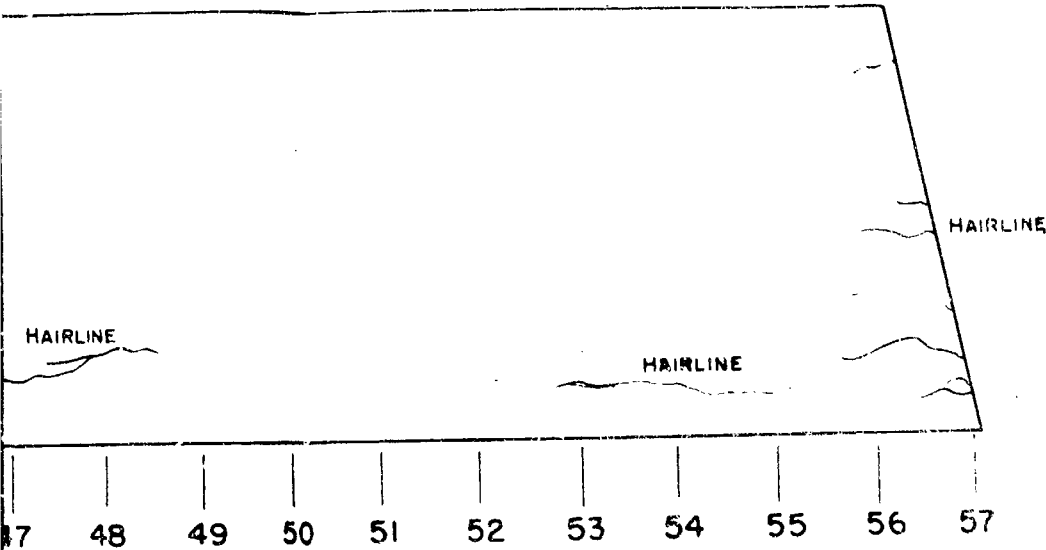
**ARDC-13**  
**CRACK SURVEY AFTER TEST ABLE**



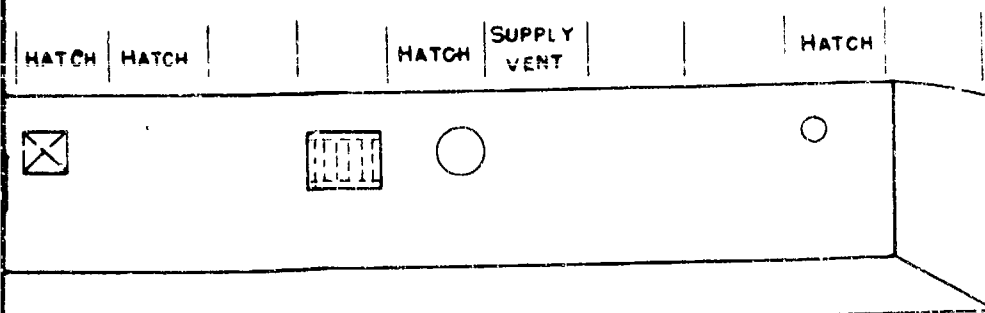
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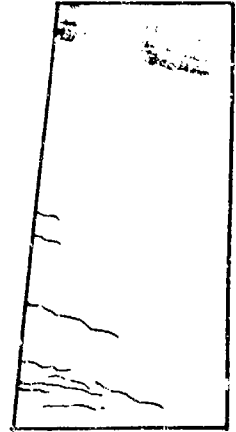
ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



INBOARD FACE STARBOARD WALL

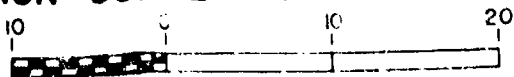


A DECK STARBOARD WALL

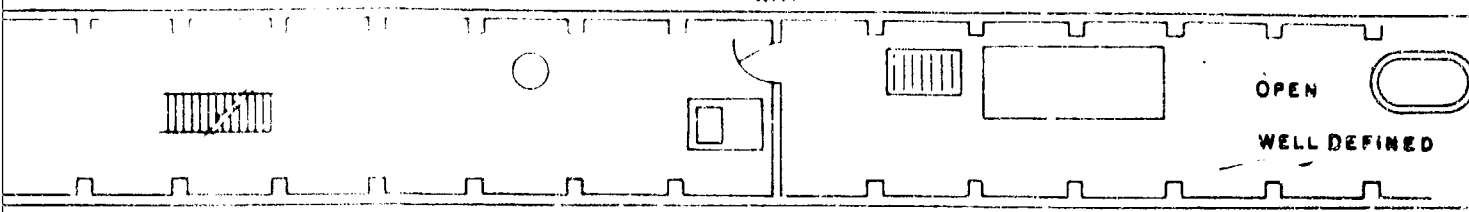


STERN FACE  
STBD WALL

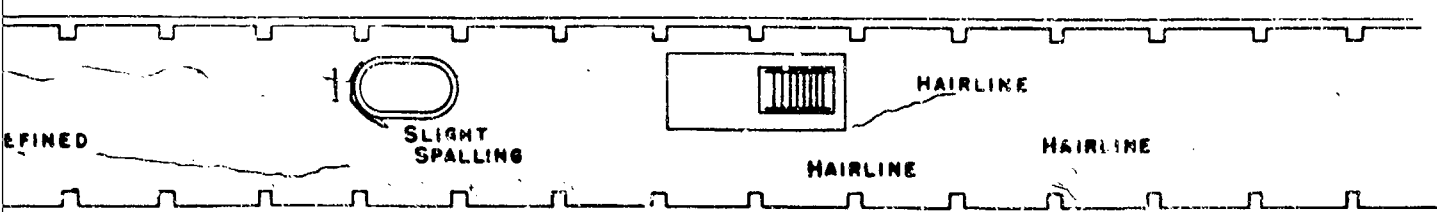
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CRACK SURVEY AFTER TEST ABLE



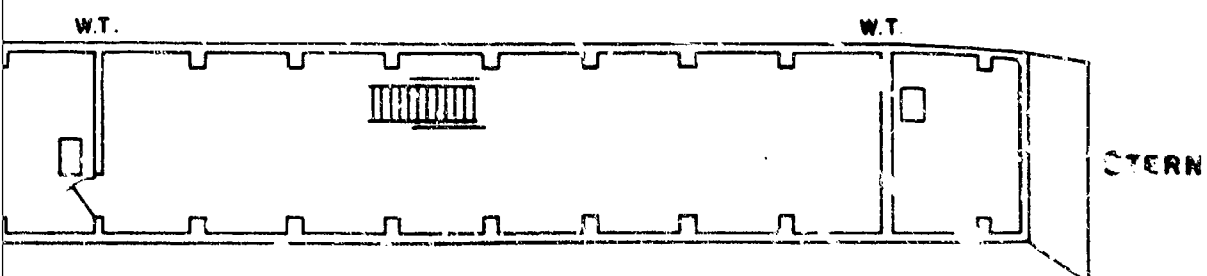
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13 14 15 16 17 18 19 20 21 22 23 24 25 26



33 34 35 36 37 38 39 40 41 42 43 44 45 46

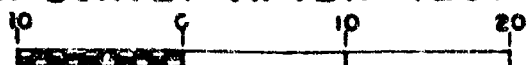


46 47 48 49 50 51 52 53 54 55 56

"B" STARBOARD WALL

ARDC - 13

CRACK SURVEY AFTER TEST ABLE

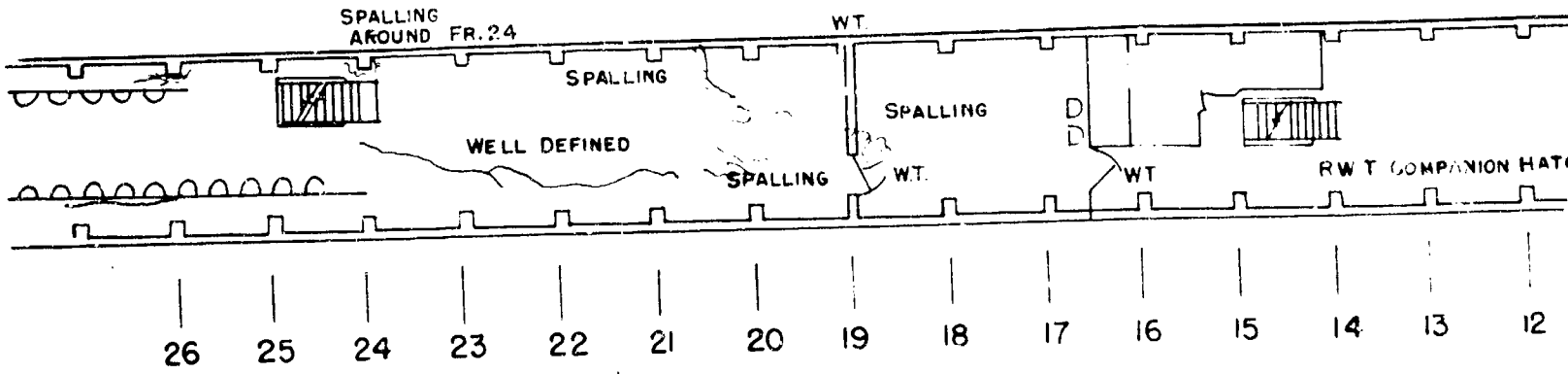


GRAPHIC SCALE IN FEET

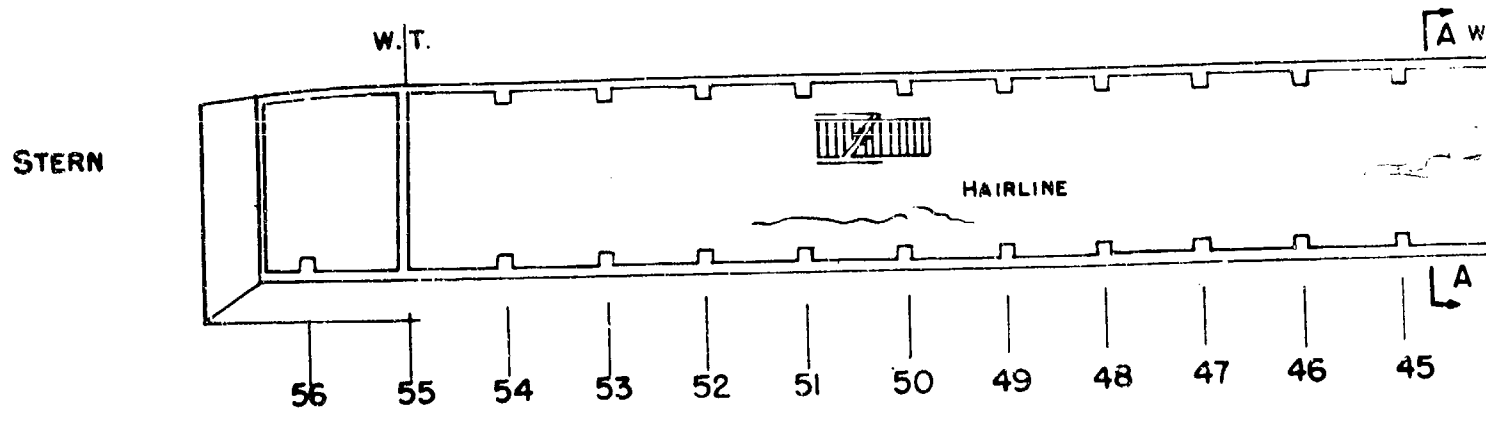
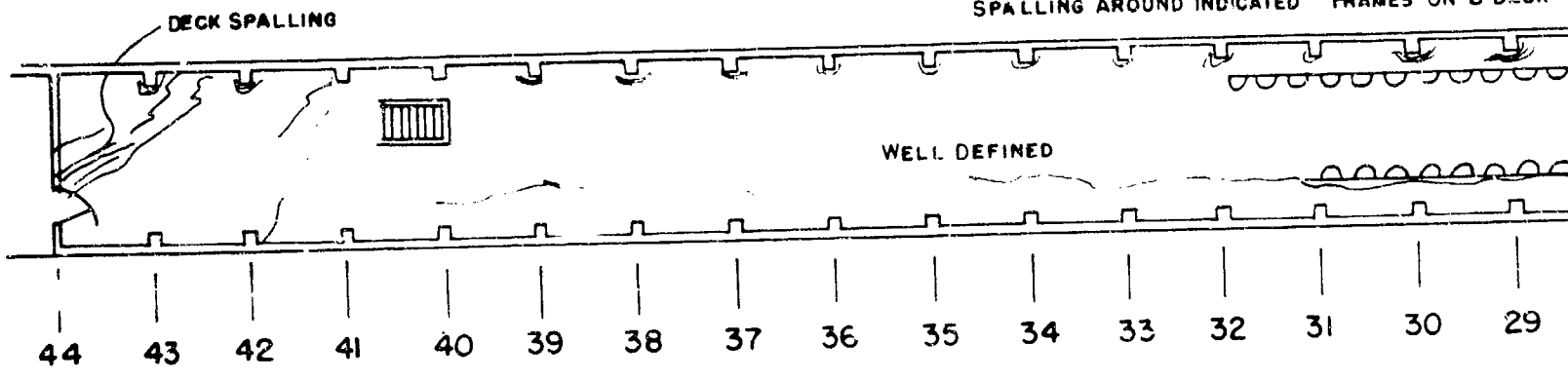
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP  
SERIAL 001000 PAGE 12 OF 30

2





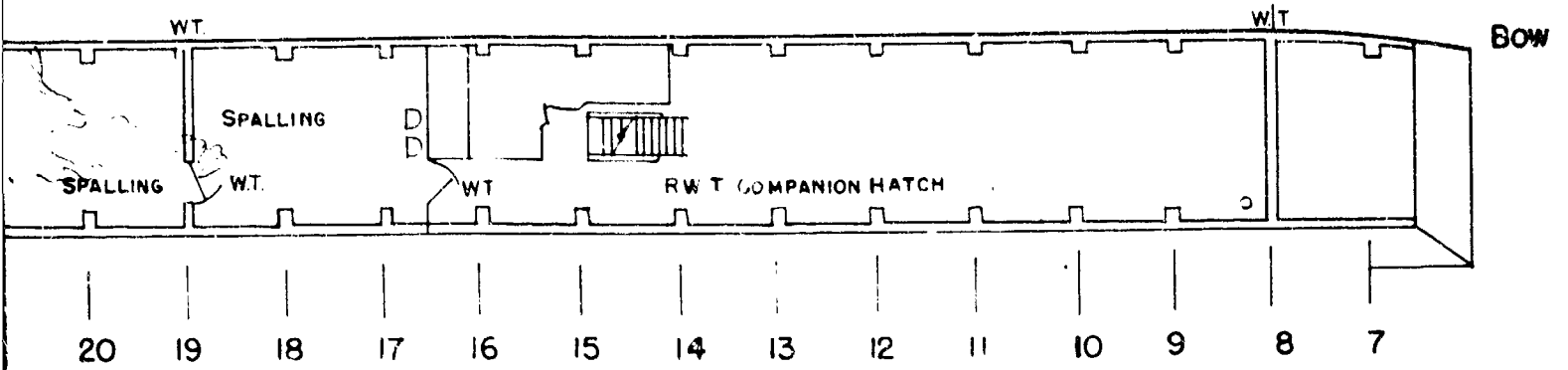
NOTE:  
SPALLING AROUND INDICATED FRAMES ON B DECK



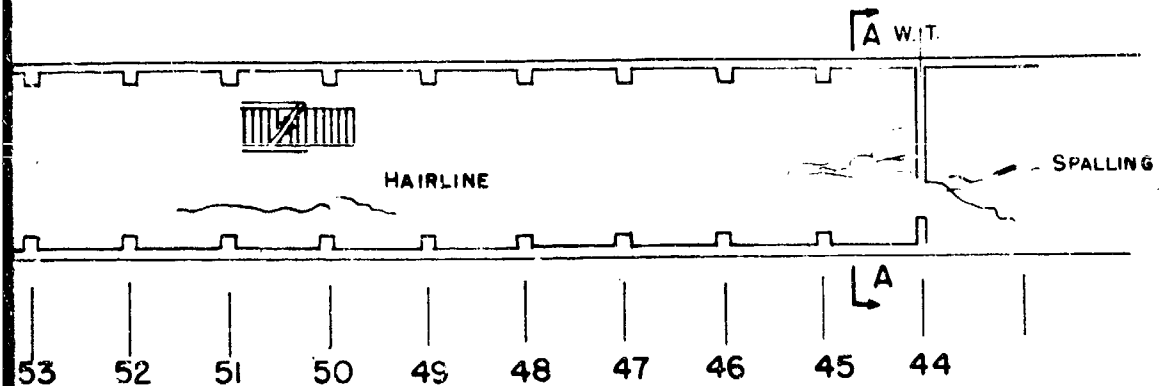
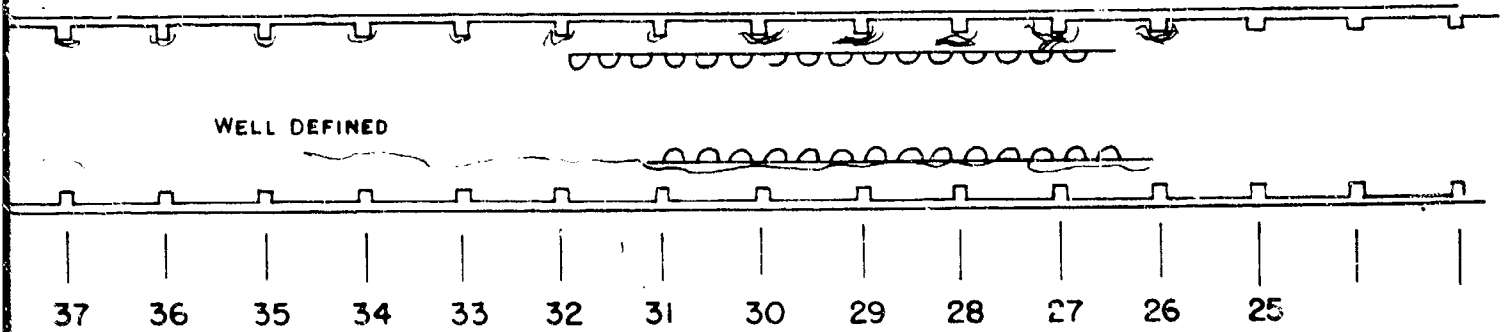
B DECK PORT WALL

ARDC-13  
CRACK SURVEY AFTER TEST ABLE

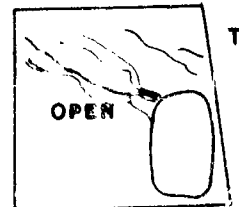
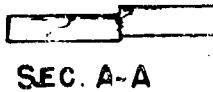




NOTE:  
SPALLING AROUND INDICATED FRAMES ON B DECK

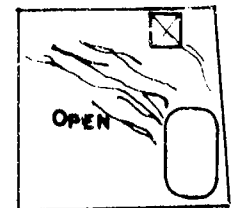


B DECK PORT WALL



TRANSVERSE  
BLKHD  
FR. 44

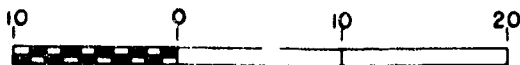
LOOKING FWD.



FR. 44

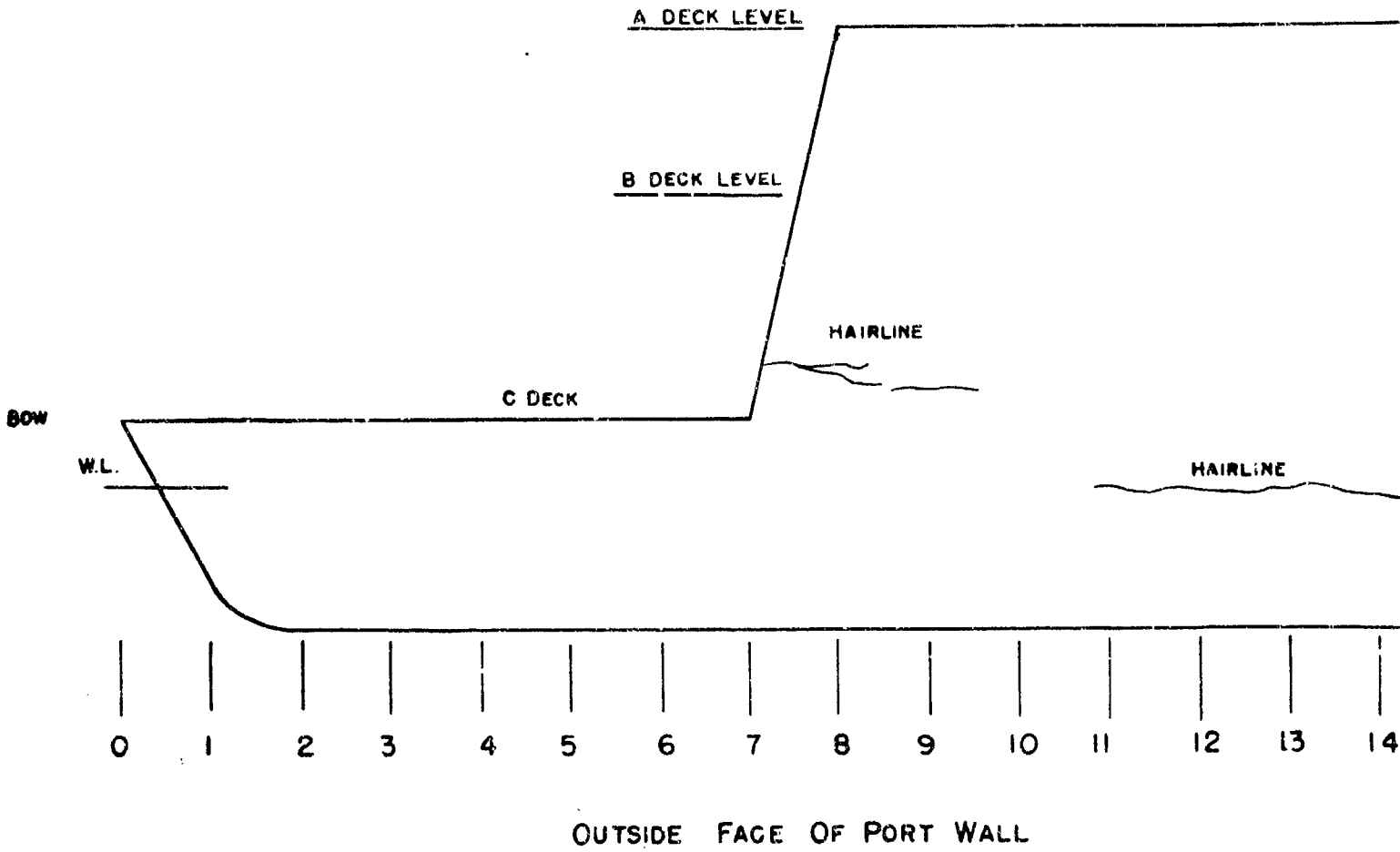
LOOKING FWD.

ARDC-- 13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET

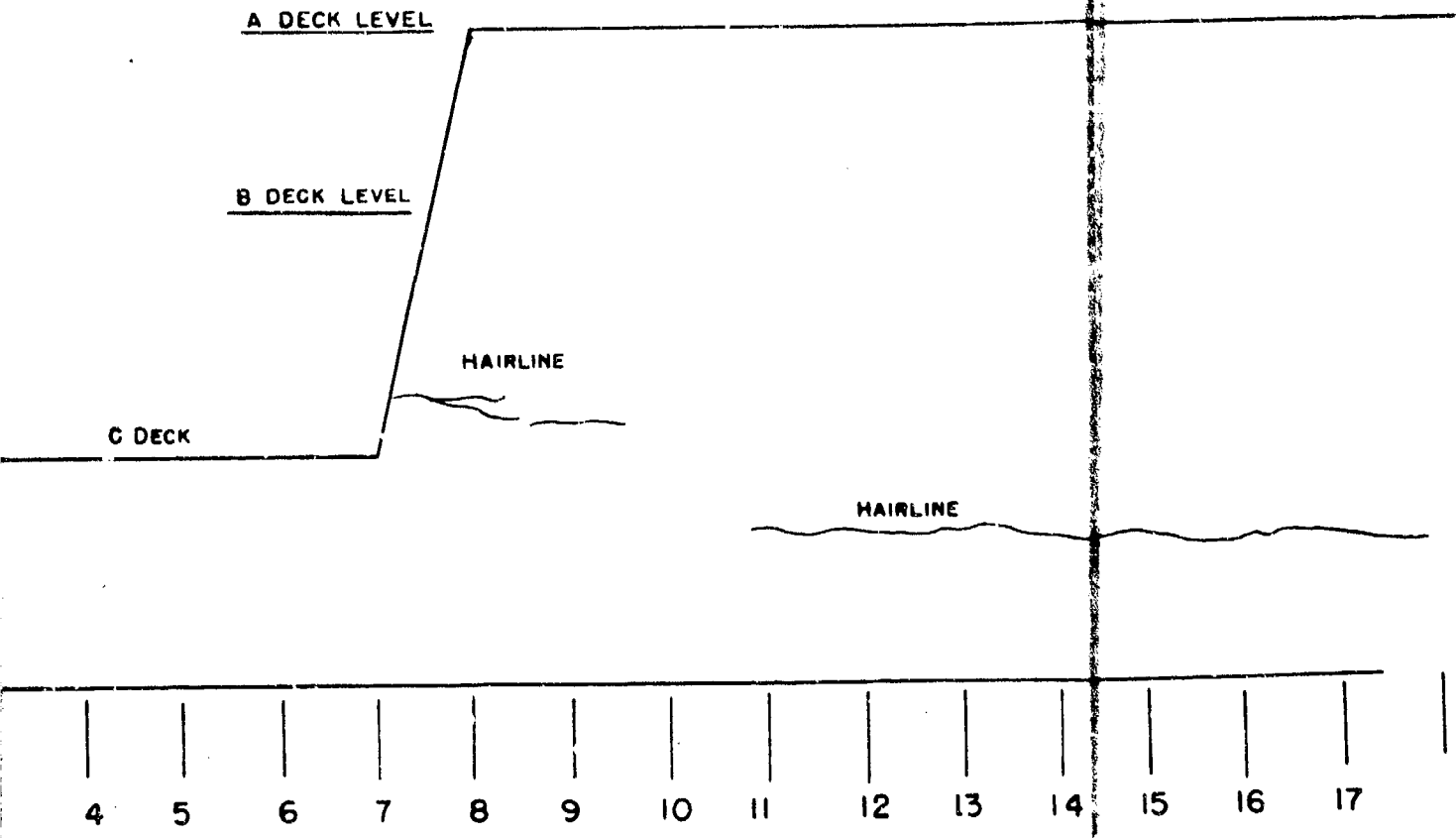
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**ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE**



APPENDIX  
 SE



OUTSIDE FACE OF PORT WALL

**ARDC - 13**  
**CRACK SURVEY AFTER TEST ABLE**



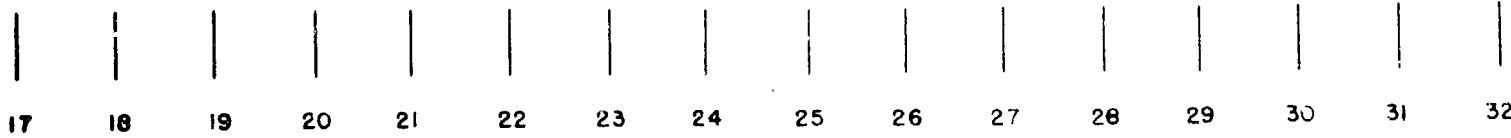
SHEET 12  
 APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MA  
 SERIAL 001500 PAGE 14 OF 30 PAGES

2

WELL DEFINED CRACK AT JOINT

WELL DEFINED

HAIRLINE



OUTSIDE FACE PORT WALL

ARDC-13  
CRACK SURVEY AFTER TEST ABLE



"A" DECK

WELL DEFINED CRACK AT JOINT

"B" DECK

WELL DEFINED

OPEN CRACK

HAIRLINE

"C" DECK

W.L.



OUTSIDE FACE PORT WALL

**SECRET**

# ARDC-13 CRACK SURVEY AFTER TEST ABLE



SHEET 13 OF 2  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MATERIALS  
SERIAL 001500 PAGE 15 OF 30 PAGES

2

WELL DEFINED CRACK ALONG JOINT

38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53

OUTBOARD FACE PORT WALL

ARDC-13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET

WELL DEFINED CRACK ALONG JOINT



OUTBOARD FACE PORT WALL

ARDC-13

CRACK SURVEY AFTER TEST ABLE

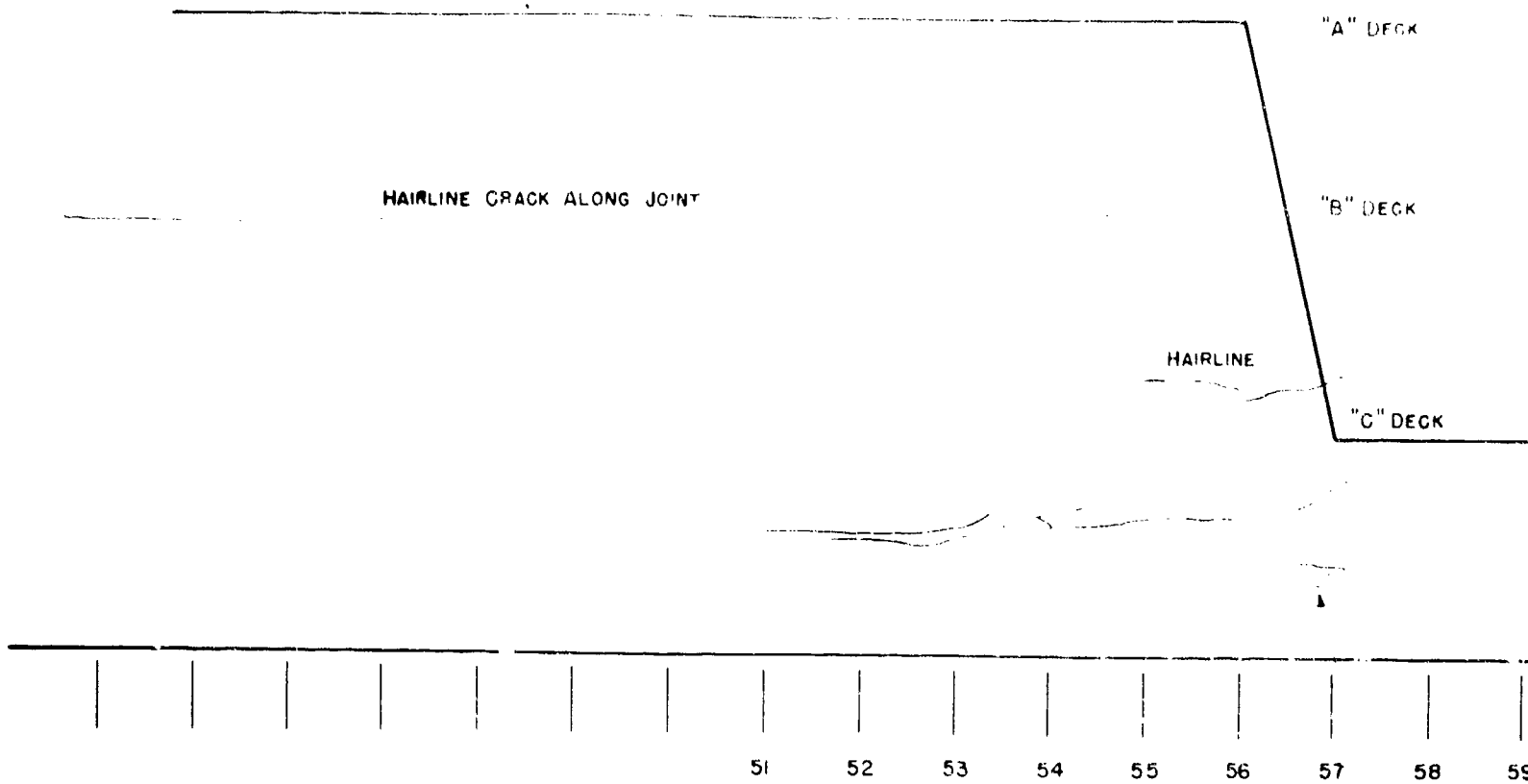


SEL

SHEET 14 OF  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MATR  
SERIAL 001500 PAGE 16 OF 30 PAGES

2



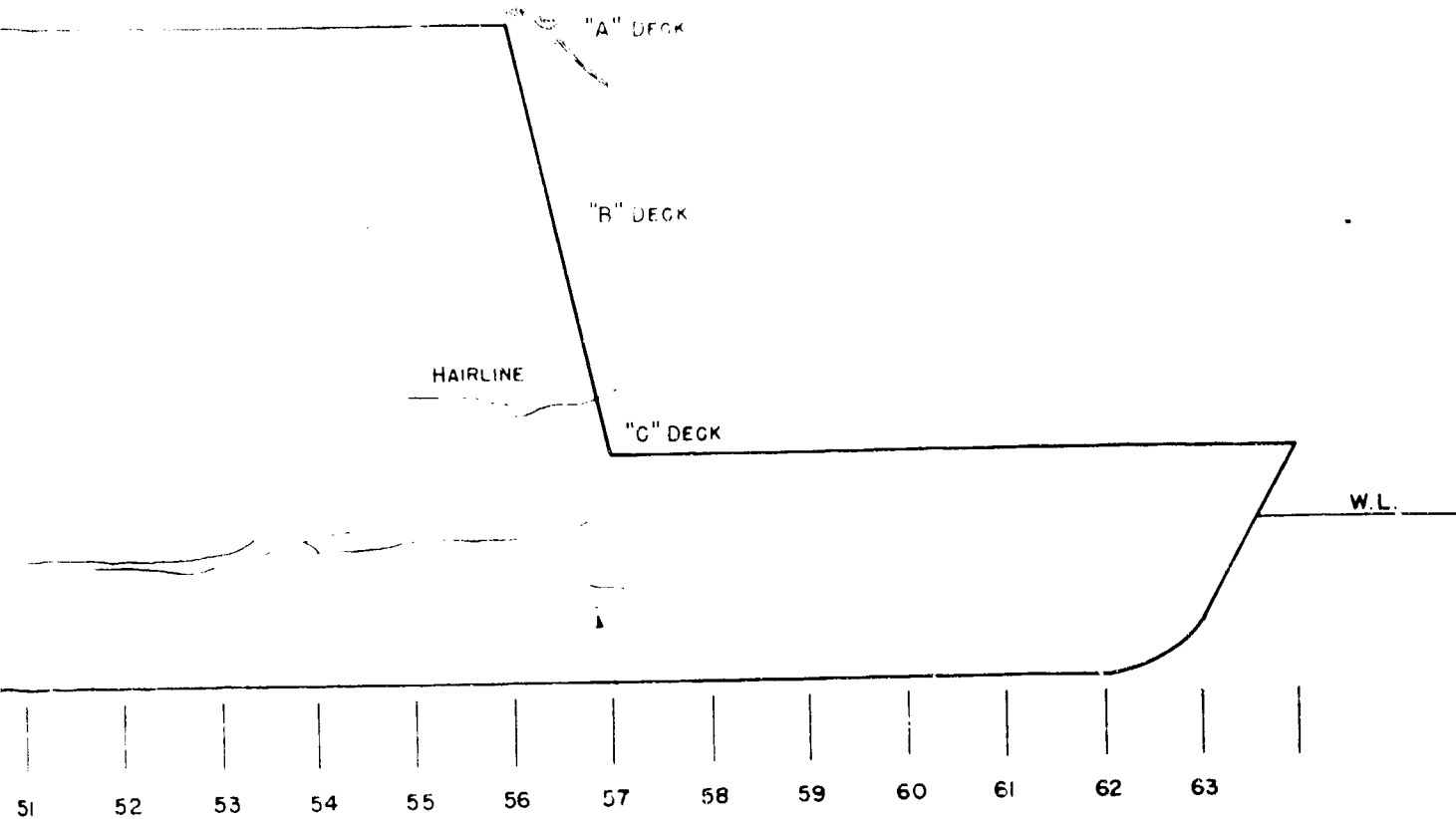


SPALLIN

OUTSIDE FACE PORT WALL

ARDC-13  
 CRACK SURVEY AFTER TEST ABLE





SPALLING NOTED ON INSIDE OF DECK APPROX. 7' BELOW WATER LINE

OUTSIDE FACE PORT WALL

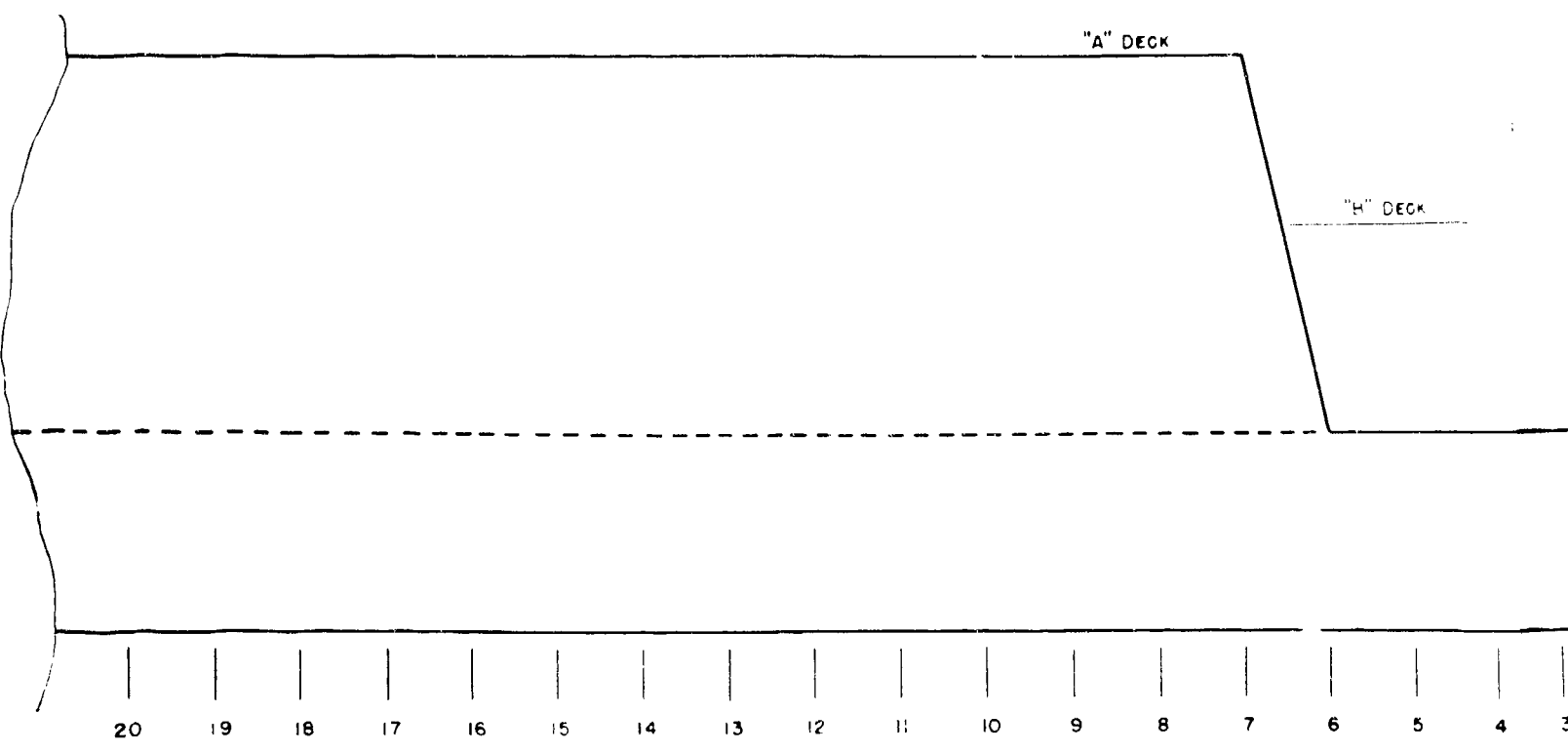
SECRET

ARDC-13  
 CRACK SURVEY AFTER TEST ABLE



SHEET 15 OF 16  
 APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MATRONS  
 SERIAL 001500 PAGE 17 OF 30 PAGES

2

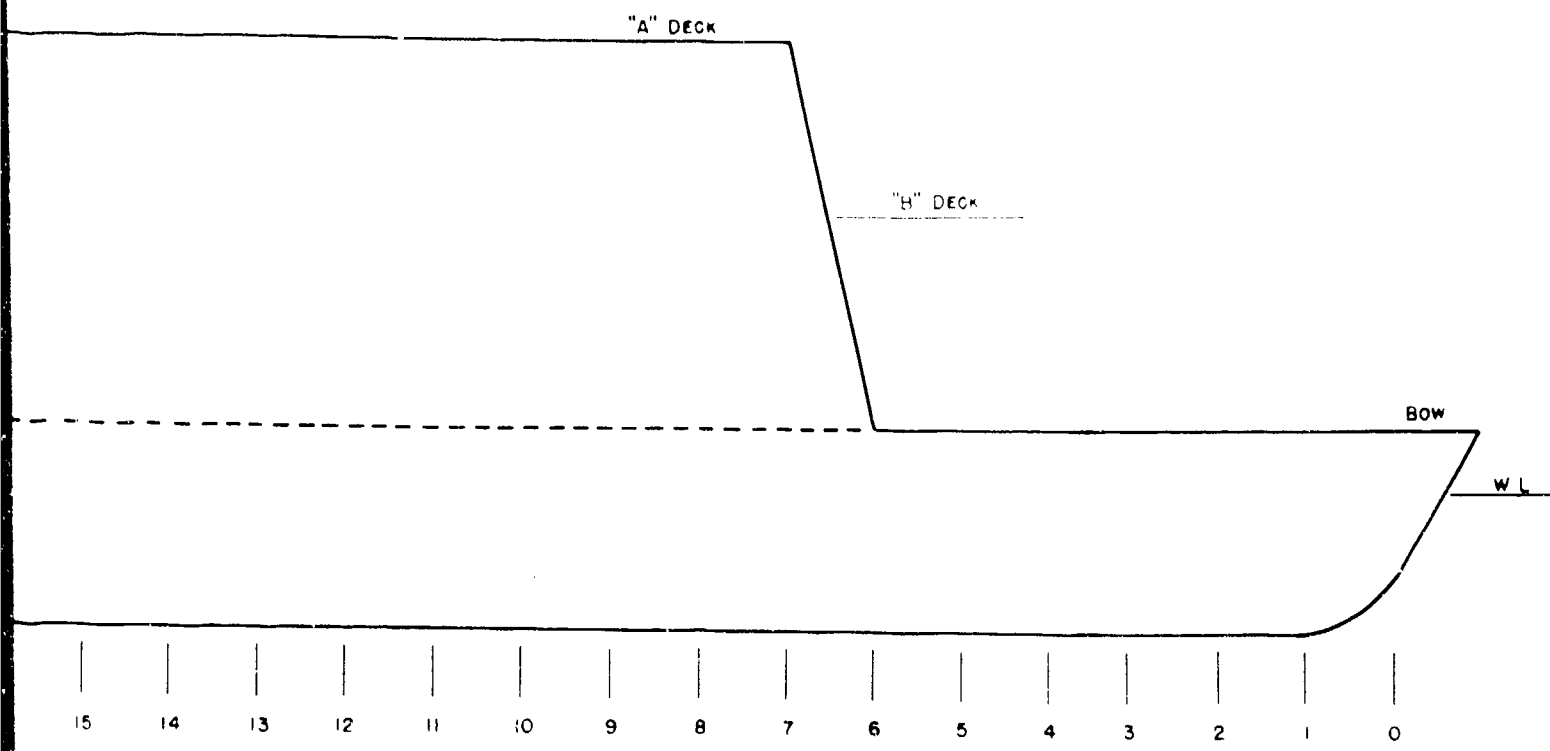


OUTSIDE FACE STARBOARD WALL

ARDC-13  
 CRACK SURVEY AFTER TEST ABLE



APPENDIX  
 SEH



OUTSIDE FACE STARBOARD WALL

**ARDC-13  
CRACK SURVEY AFTER TEST ABLE**



2

HAIRLINE

HAIRLINE

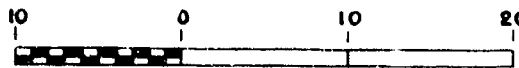
WELL DEFINED

WELL DEFINED



OUTSIDE FACE STARBOARD WALL

ARDC - 13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET

HAIRLINE

WELL DEFINED

WELL DEFINED

A D  
B' DE  
"C" D  
W.L.

35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20

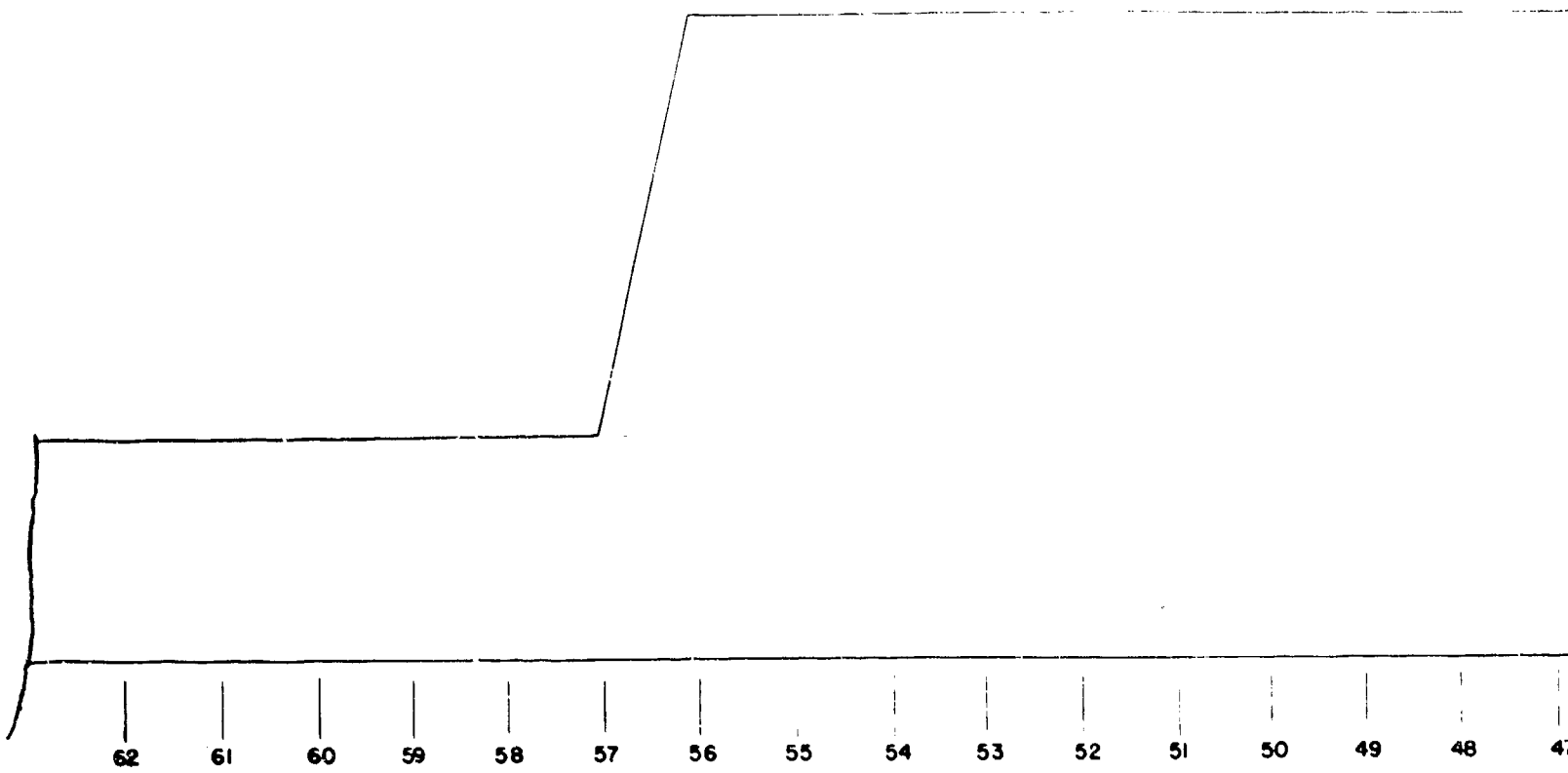
OUTSIDE FACE STARBOARD WALL

# ARDC - 13 CRACK SURVEY AFTER TEST ABLE



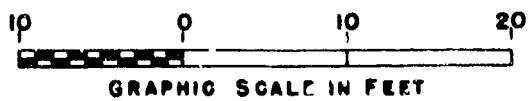
APPENDIX A, ENCLOSURE G TO DIRECTOR S  
SERIAL 001500 PAGE 19 OF 30

2

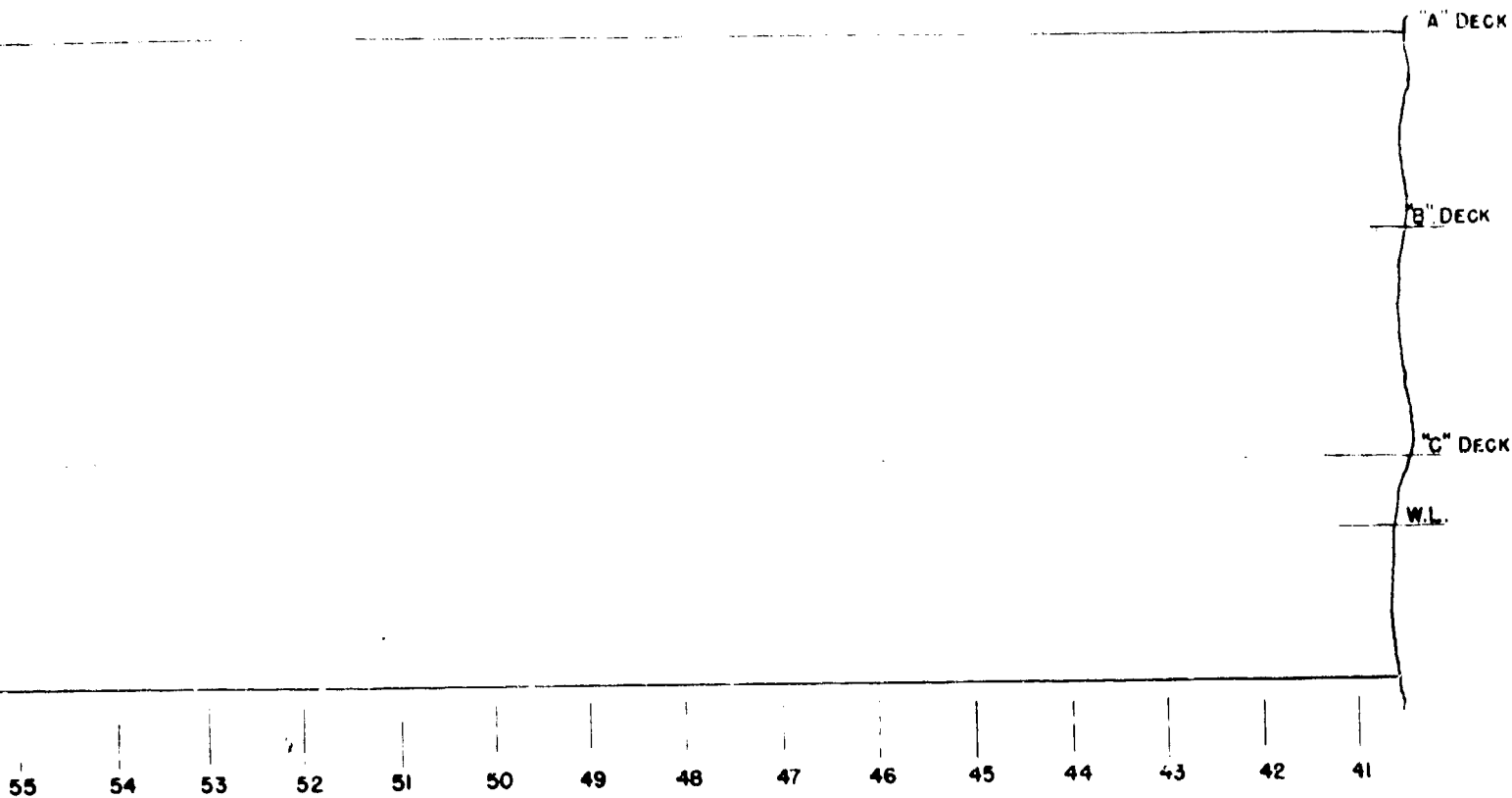


OUTSIDE FACE STARBOARD WALL

**ARDC - 13  
CRACK SURVEY AFTER TEST ABLE**



GRAPHIC SCALE IN FEET



OUTSIDE FACE STARBOARD WALL

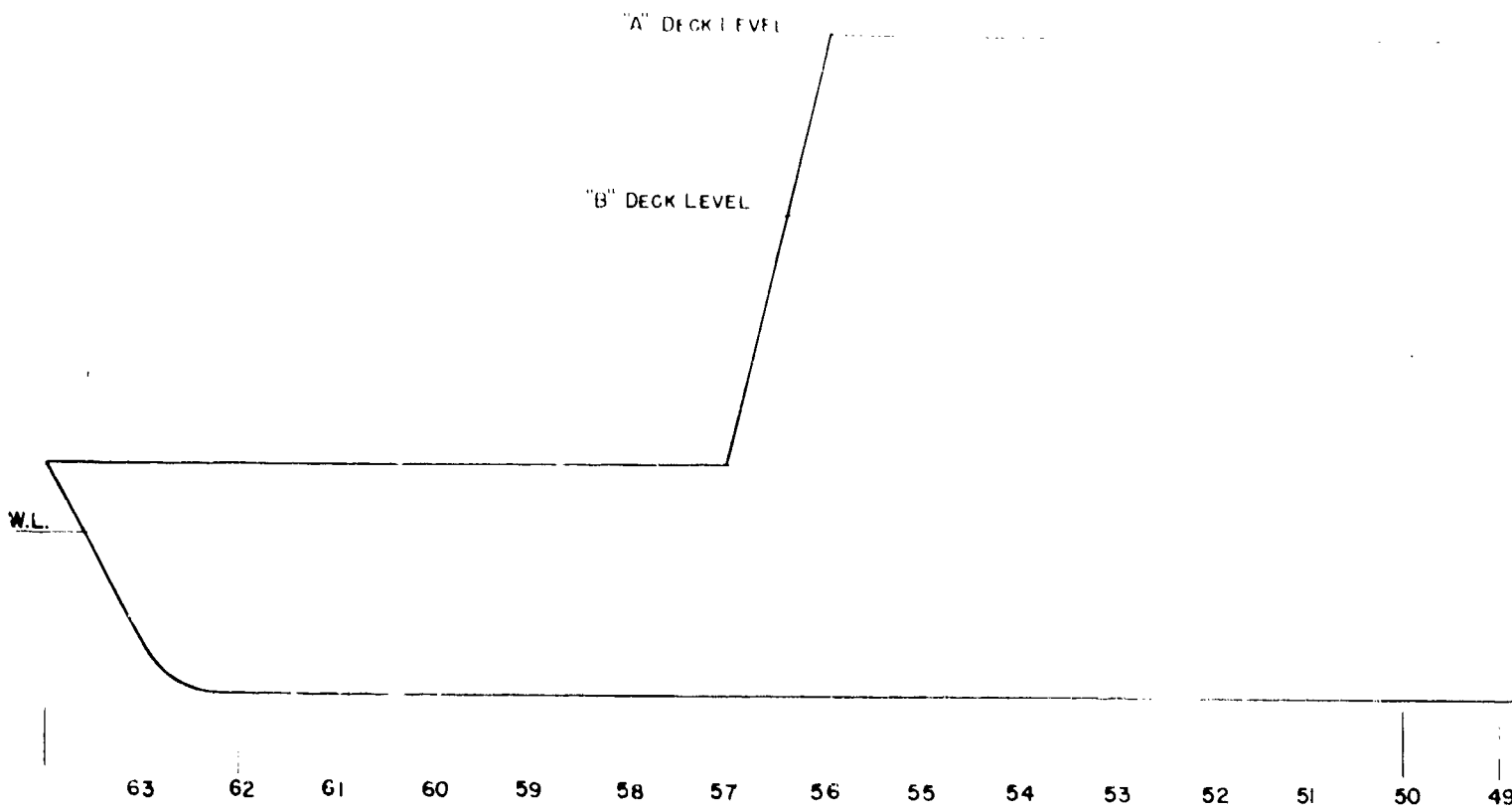
**ARDC - 13  
CRACK SURVEY AFTER TEST ABLE**



SH  
APPENDIX A, ENCLOSURE G TO DIRECTOR EN  
SERIAL 001500 PAGE 20 OF 30

2





OUTSIDE FACE STARBOARD WALL

ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



APPE

"A" DECK LEVEL

"B" DECK LEVEL

60 59 58 57 56 55 54 53 52 51 50 49

OUTSIDE FACE STARBOARD WALL

ARDC - 13

CRACK SURVEY AFTER TEST ABLE

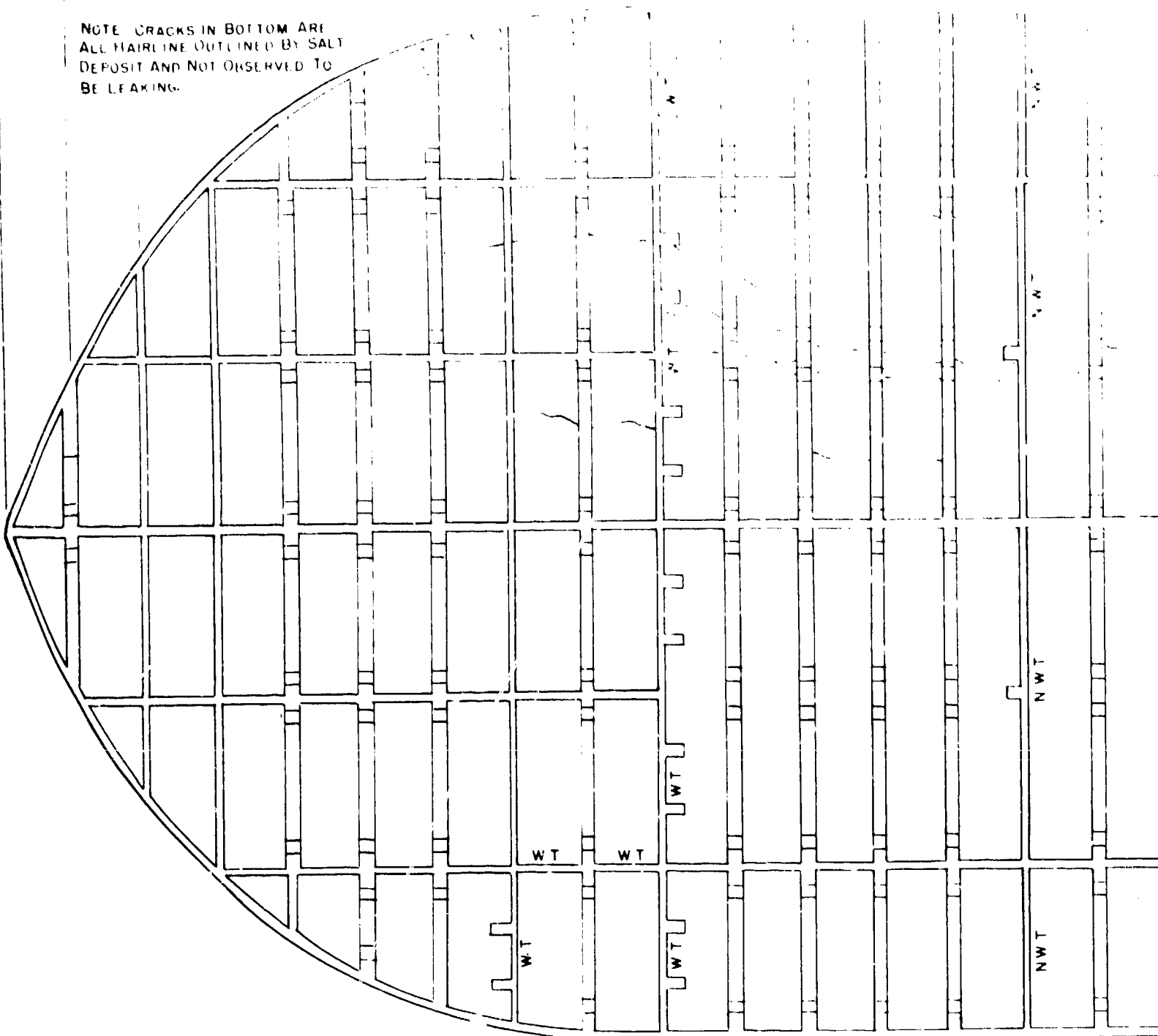


GRAPHIC SCALE IN FEET

SHEET  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP  
SERIAL 001500 PAGE 21 OF 30 PA

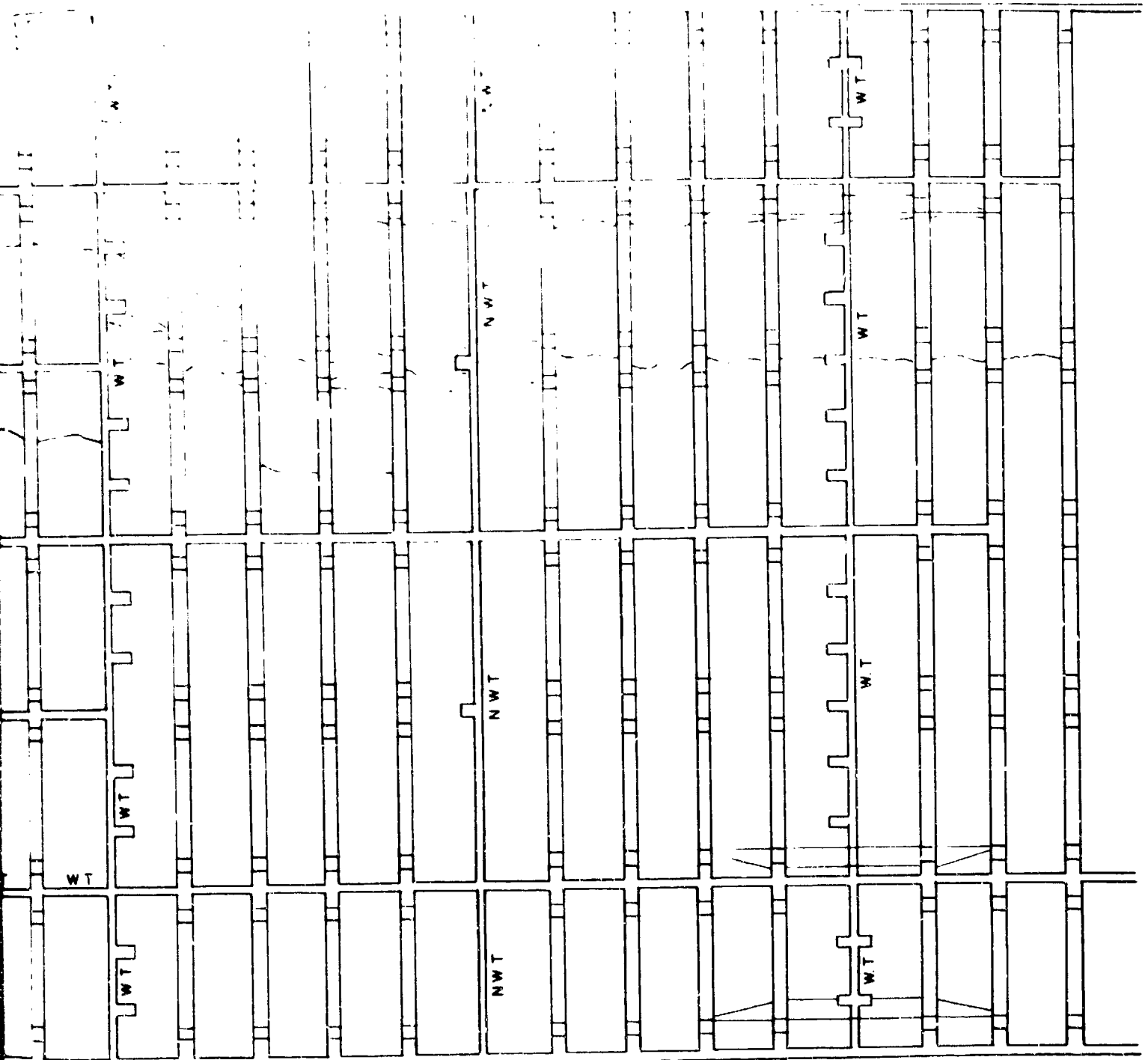
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NOTE CRACKS IN BOTTOM ARE  
ALL HAIRLINE OUTLINED BY SALT  
DEPOSIT AND NOT OBSERVED TO  
BE LEAKING.

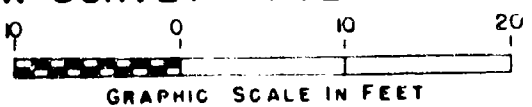


### ARDC - 13 CRACK SURVEY AFTER TEST ABLE





**ARDC - 13  
CRACK SURVEY AFTER TEST ABLE**



GRAPHIC SCALE IN FEET

APPENDIX A, ENCLOSURE G TO DIRECTOR SHI  
SERIAL 001500 PAGE 22 OF 30 P

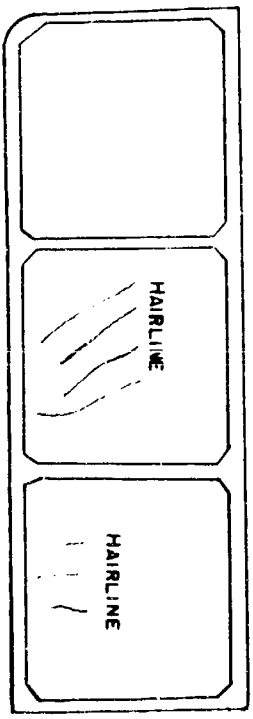
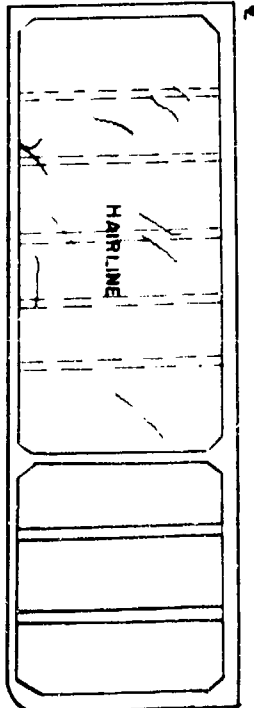
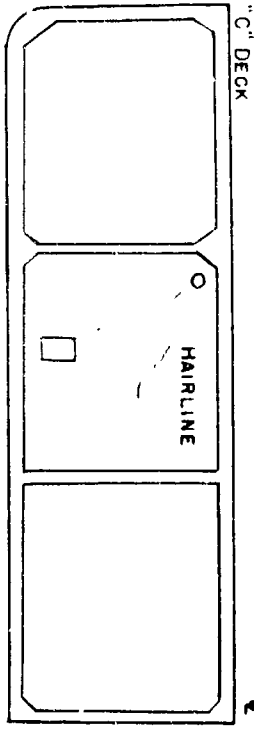
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NOTE: CRACKS IN BOTTOM ARE ALL HAIRLINE - OUTLINED BY SALT DEPOSIT AND NOT OBSERVED TO BE LEAKING.

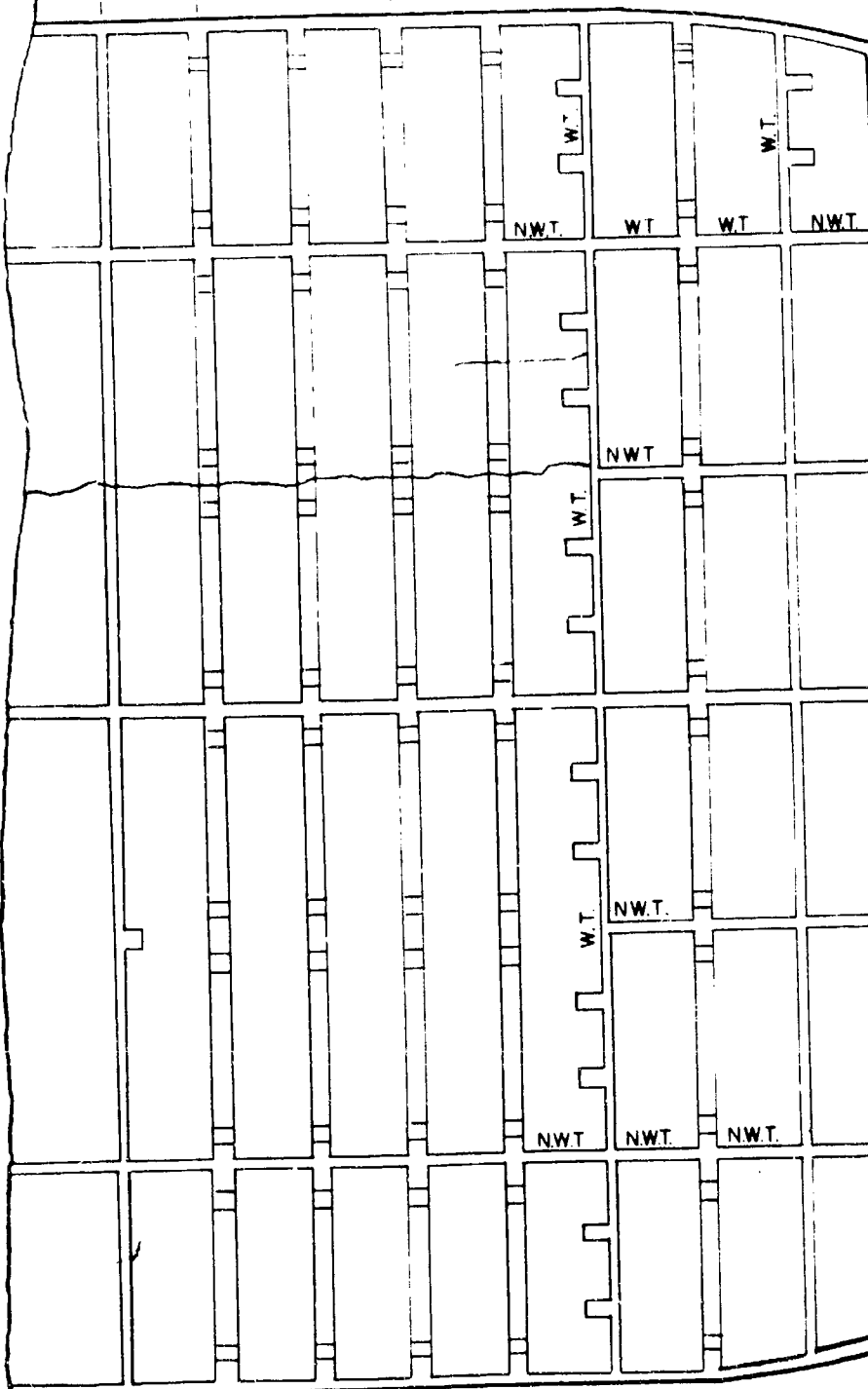
13 12 11 10 9 8 7 6

FR. 39 - NWT. BLKD. FACING FWD.

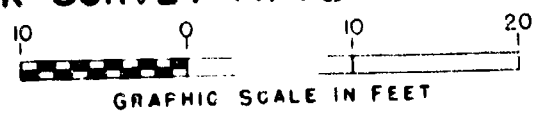
FR. 45 - W.T. BLKD. FACING AFT.



THIS CRACK EXTENDS TO FRAME 55



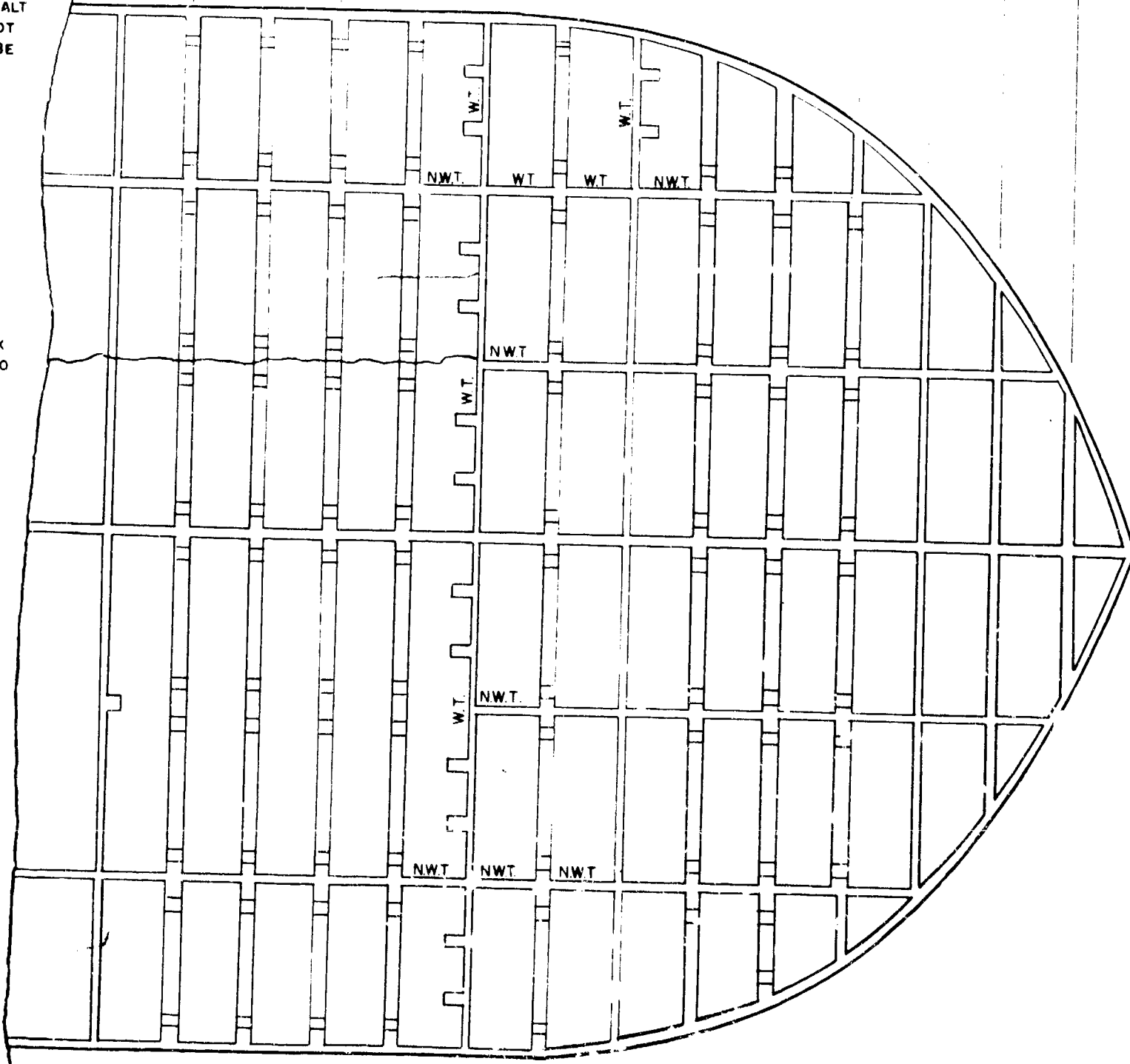
ARDC - 13  
CRACK SURVEY AFTER TEST ABLE



CRACKS IN BOTTOM  
DUE TO HAIRLINE -  
CAUSED BY SALT  
CRACKS AND NOT  
EXPECTED TO BE  
DANGEROUS.

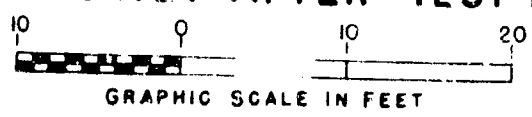
13 12 11 10 9 8 7 6 5 4 3 2 1 0

CRACK  
TENDS TO  
BE 55



### ARDC - 13

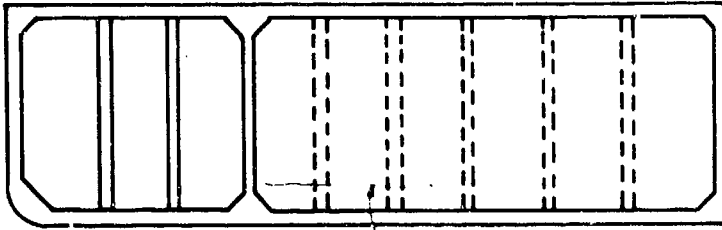
### CRACK SURVEY AFTER TEST ABLE



APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP  
SERIAL 001000 PAGE 23 OF 30 PA

2

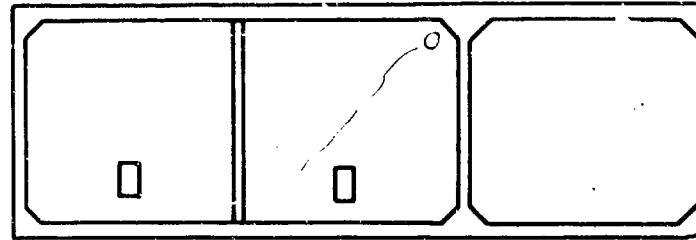
PORT



JOINT HAIRLINE CRACK

WT BLKHD FR. 17-FACING FWD

£

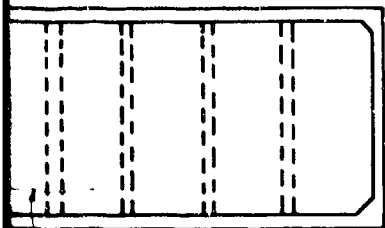


NWT BLKHD FR. 23-FACING AFT

ARDC-13  
CRACK SURVEY AFTER TEST ABLE

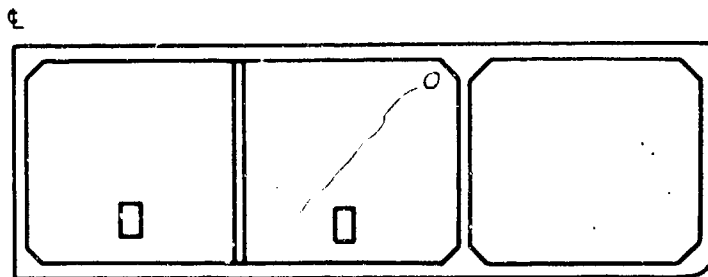


APPENDIX A,  
SERIAL



JOINT HAIRLINE CRACK

17-FACING FWD



PORT

NWT BLKHD FR. 23-FACING AFT

ARDC-13

CRACK SURVEY AFTER TEST ABLE



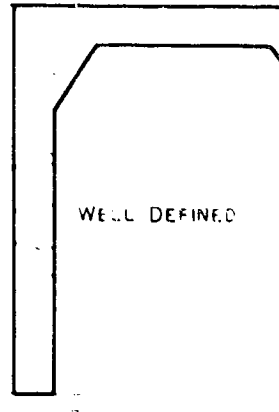
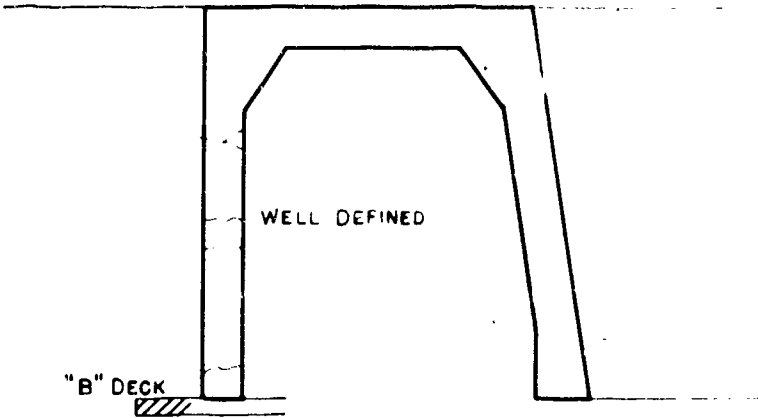
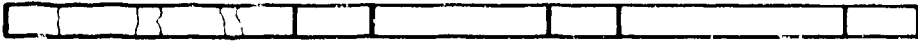
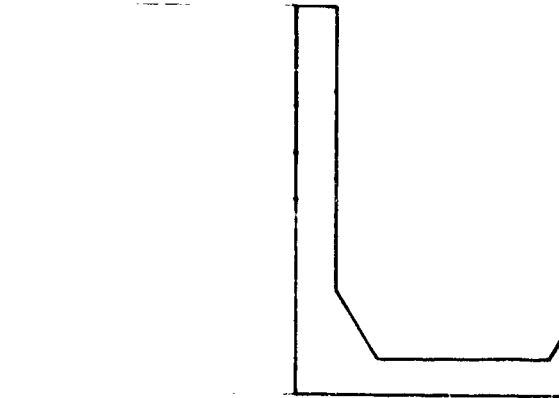
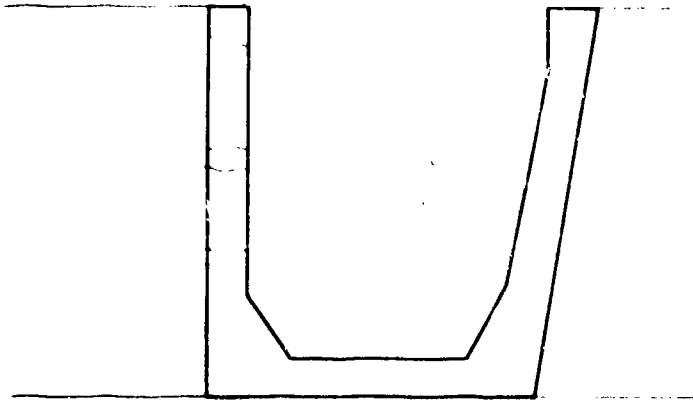
GRAPHIC SCALE IN FEET

SECRET

SHEET 22  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MAT  
SERIAL 001500 PAGE 24 OF 30 PAGES

2





FR 10 TO 13

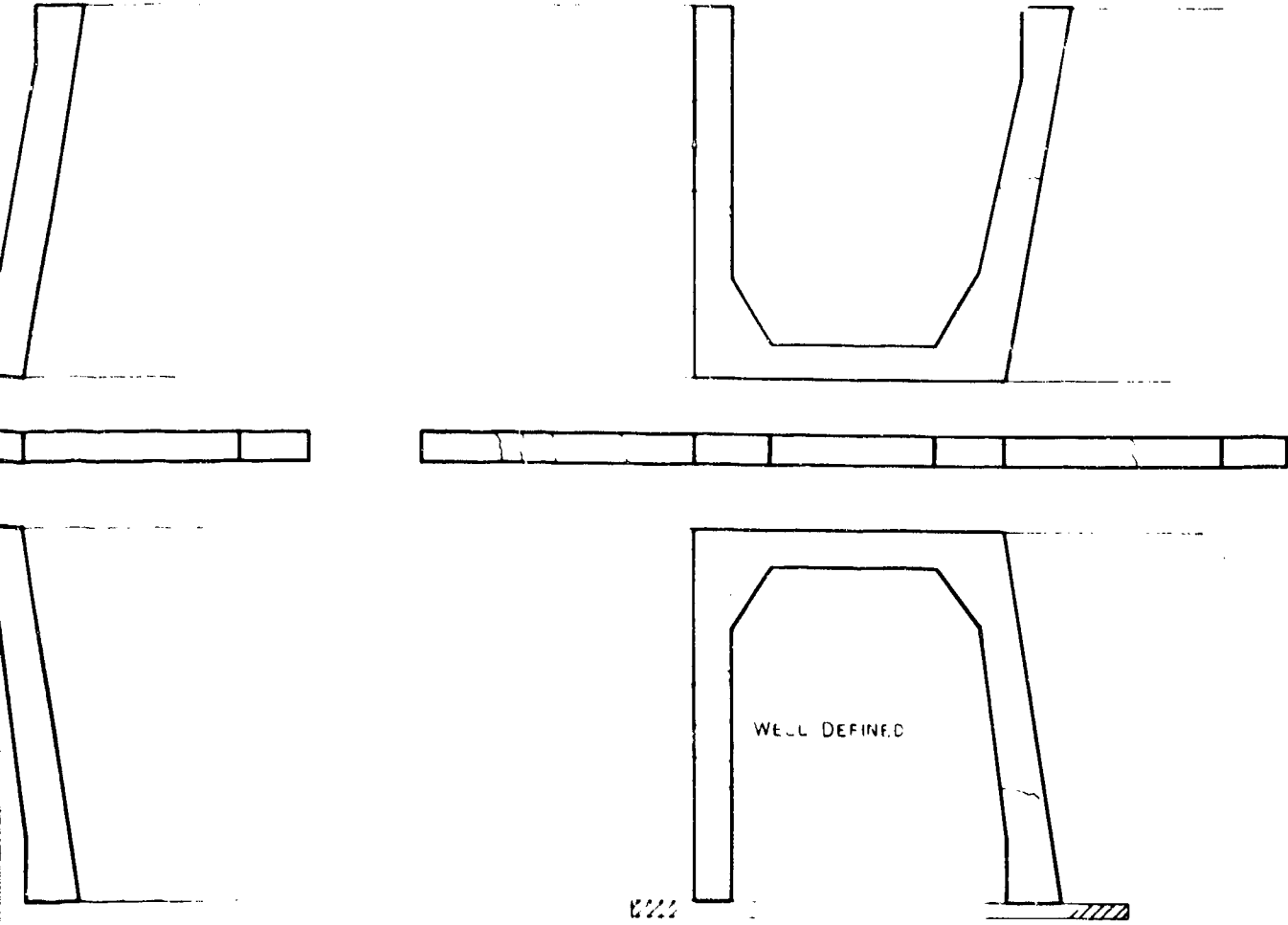
FR. 14 TO 1

PORT WALL - FACING FWD

ARDC-13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET



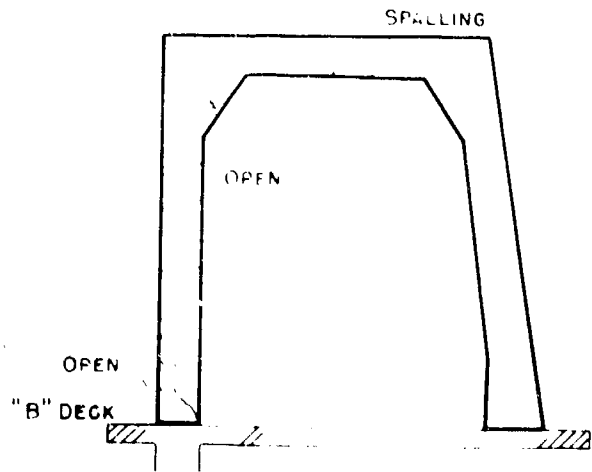
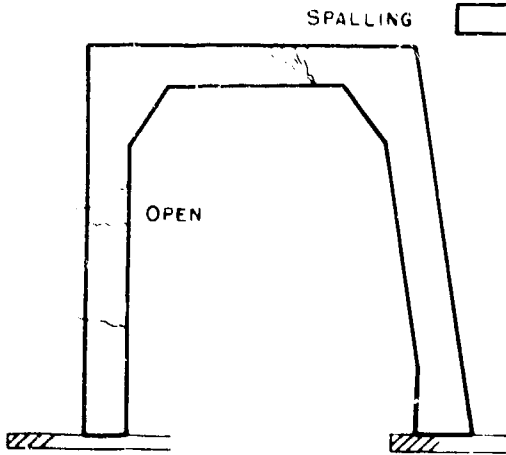
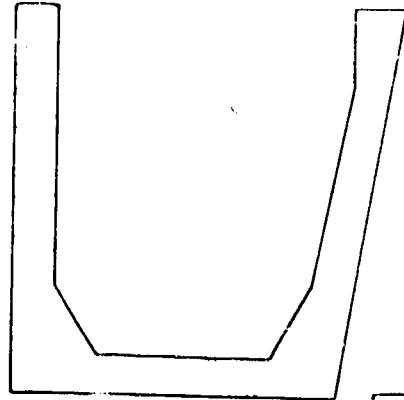
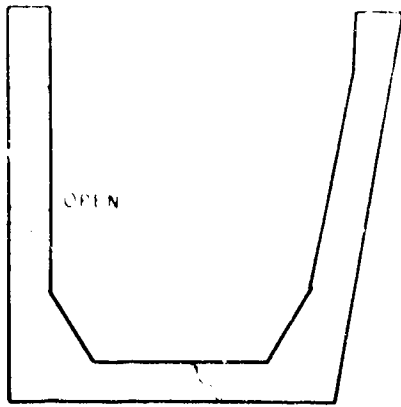
FR. 14 TO 18

PORT WALL - FACING FWD

ARDC-13  
 CRACK SURVEY AFTER TEST ABLE



2



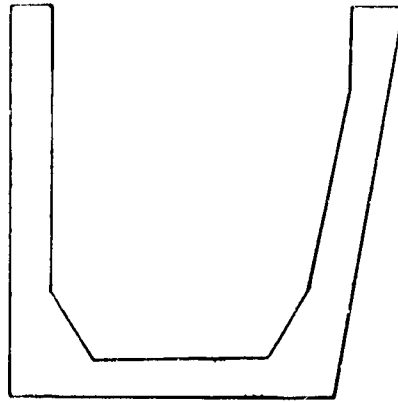
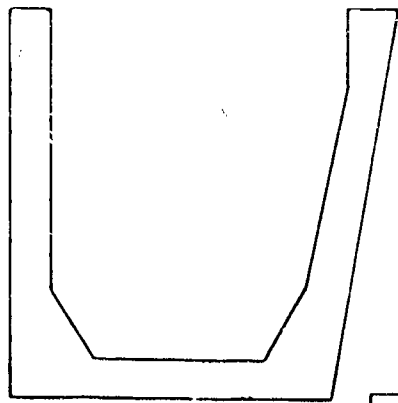
FR. 20 TO 21

FR. 22 TO 25

PORT WALL - FACING FWD

ARDC-13  
CRACK SURVEY AFTER TEST ABLE

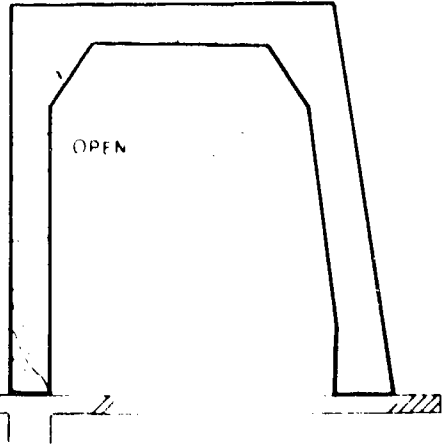




BROKEN AWAY - REINFORCING EXPOSED

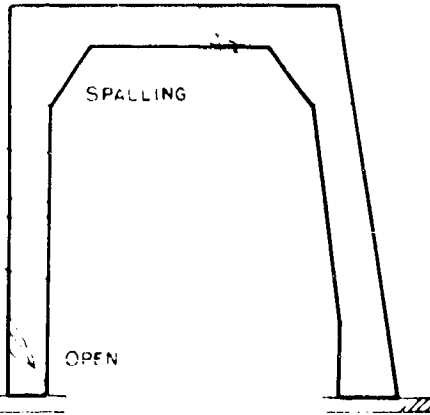


SPALLING



FR 22 TO 25

BADLEY SPALLED



FR. 26 TO 27

PORT WALL - FACING FWD

ARDC-13

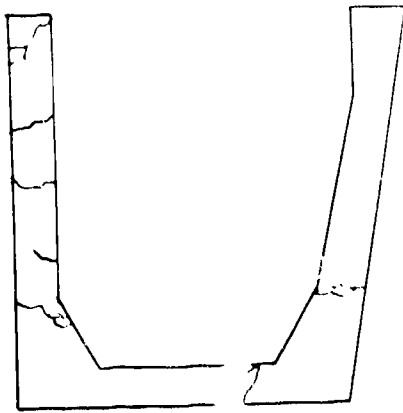
TRACK SURVEY AFTER TEST ABLE



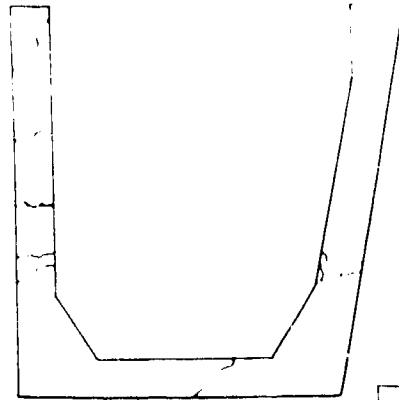
GRAPHIC SCALE IN FEET

SHEET 24 OF  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MATERIALS  
SERIAL 001500 PAGE 26 OF 30 PAGES

2



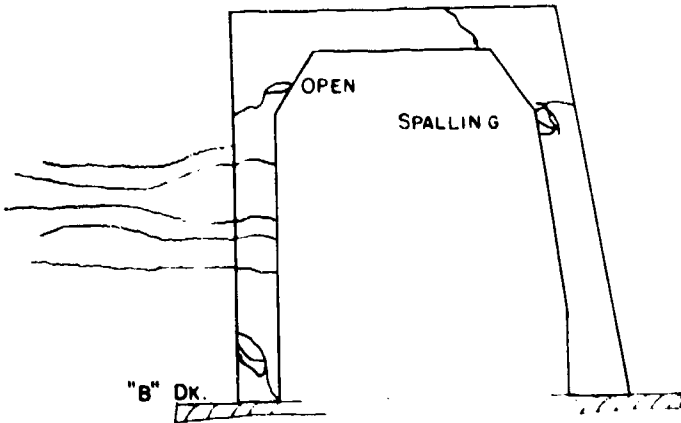
SPALLING



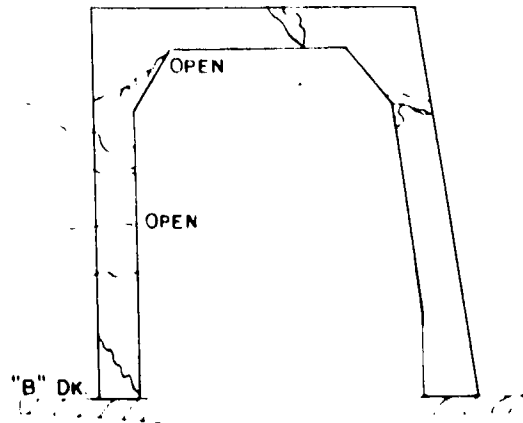
SPALLING



SPALLING



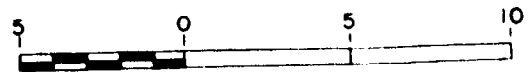
FR. 28 To 32



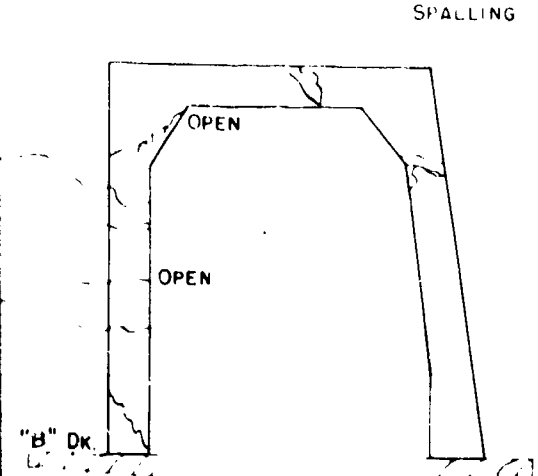
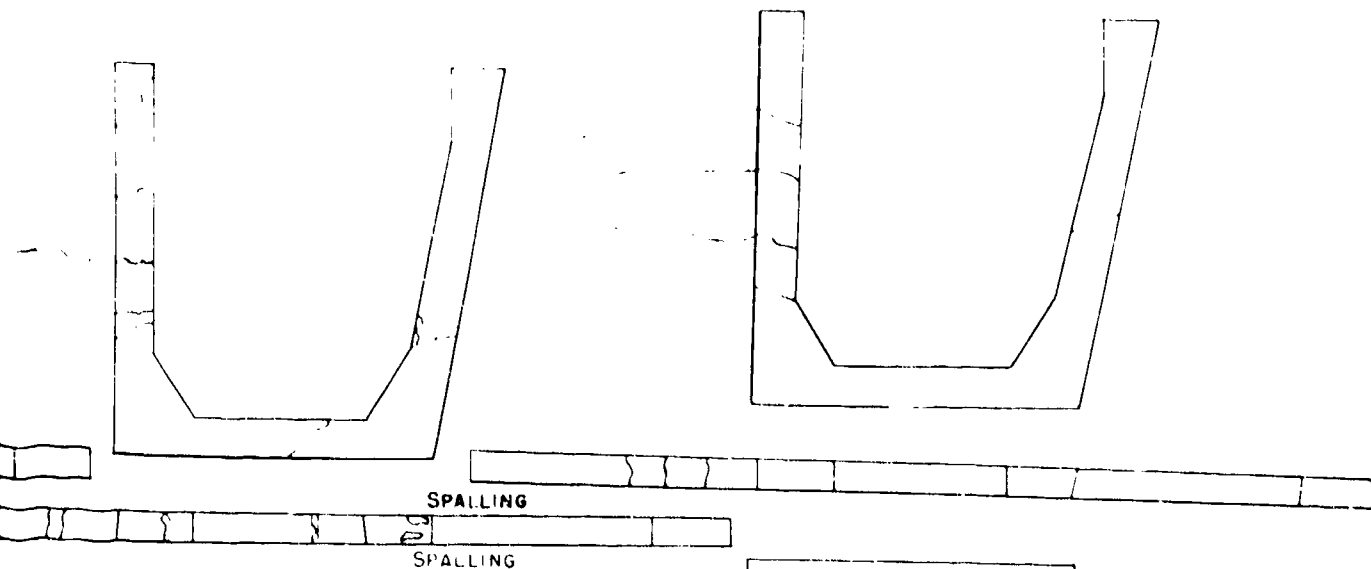
FR. 23 To 43

PORT WALL FACING FWD.

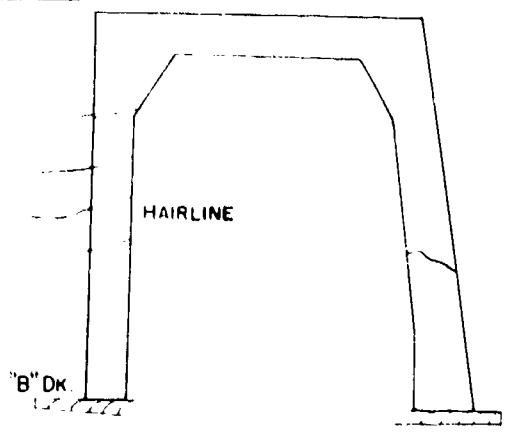
ARDC - 13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET



FR. 23 To 43



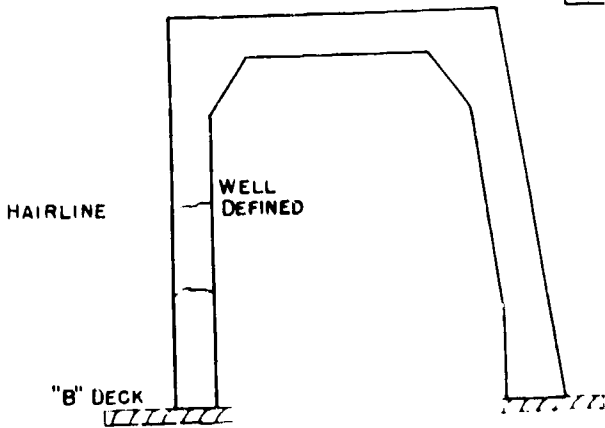
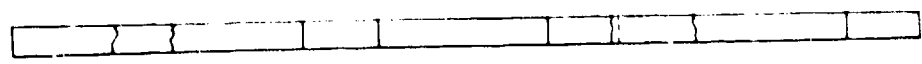
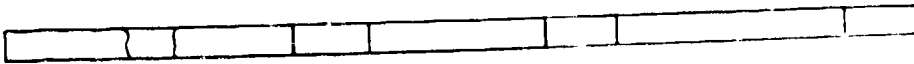
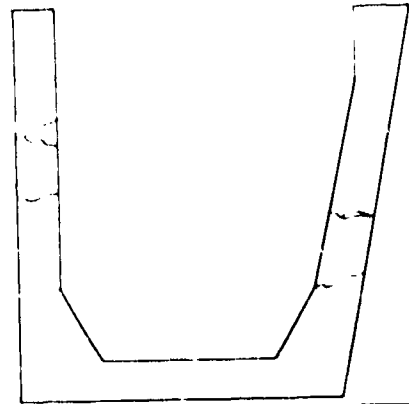
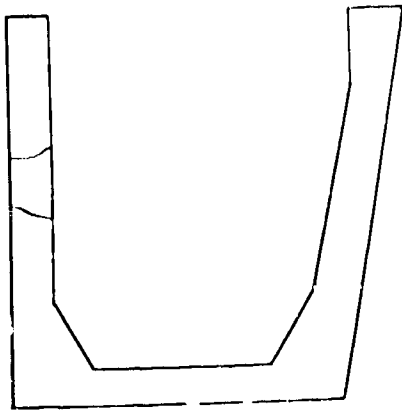
FR. 44 To 54

PORT WALL FACING FWD.

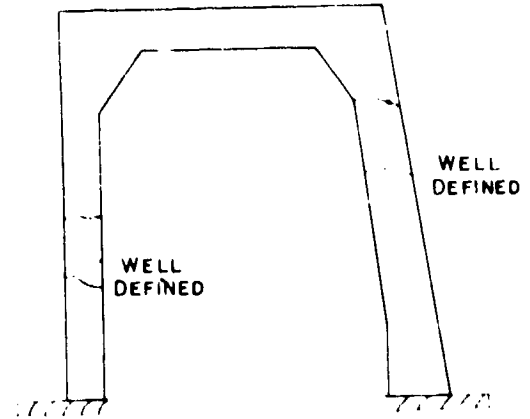
ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



2



FR. 10 TO 22



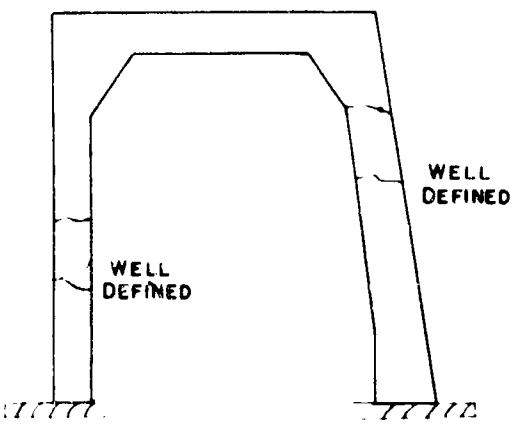
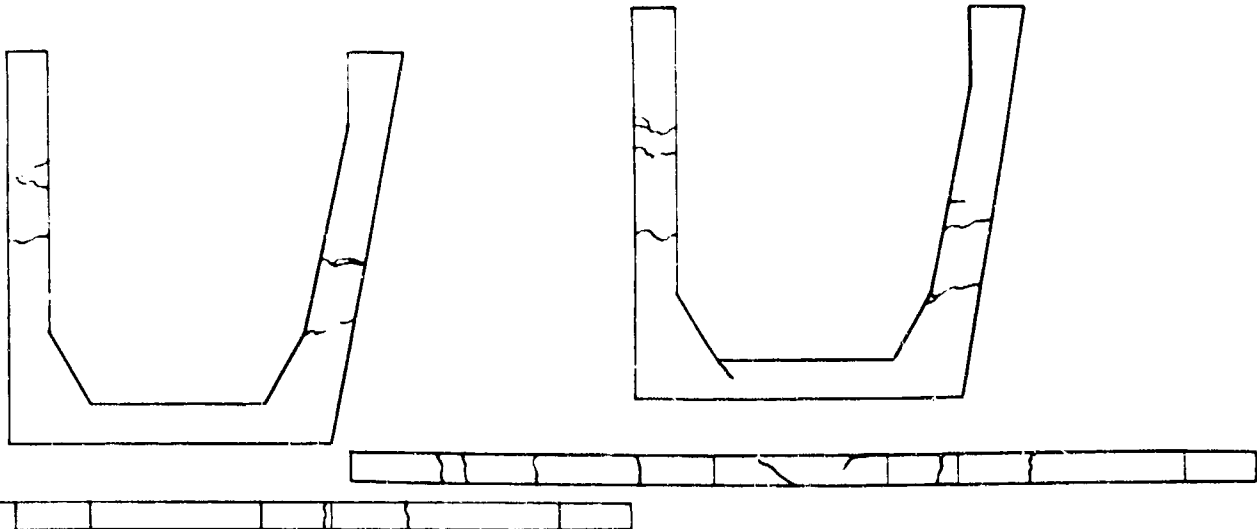
FR. 23 TO 25

STARBOARD WALL - FACING FWD.

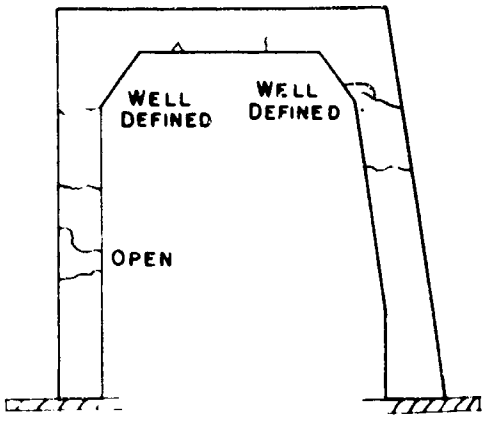
ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET



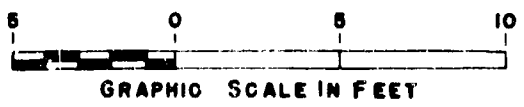
FR 23 To 25



FR. 26 To 29

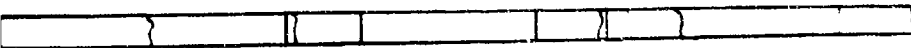
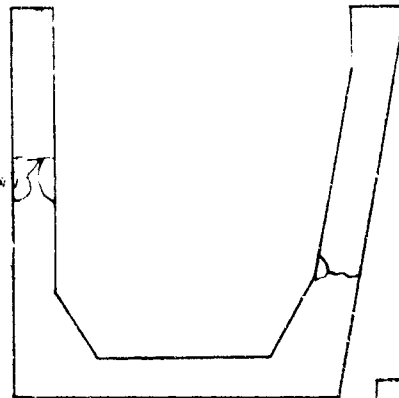
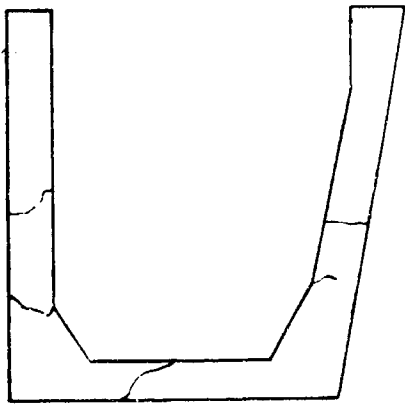
STARBOARD WALL - FACING FWD.

ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE

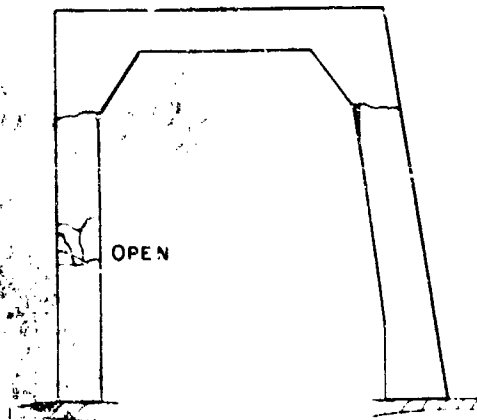
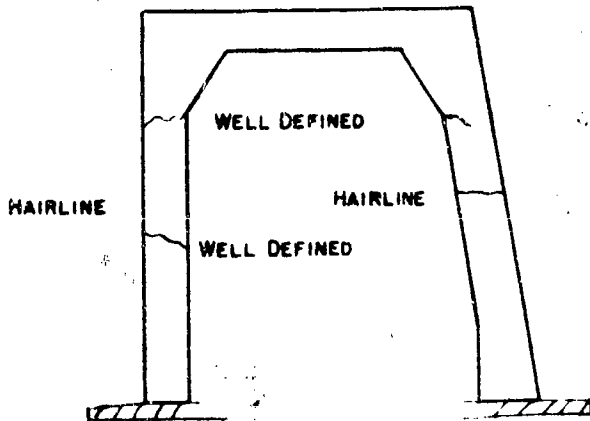
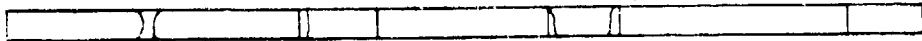


2





SPALLING

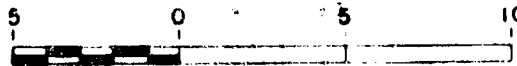


FR. 28 TO 34

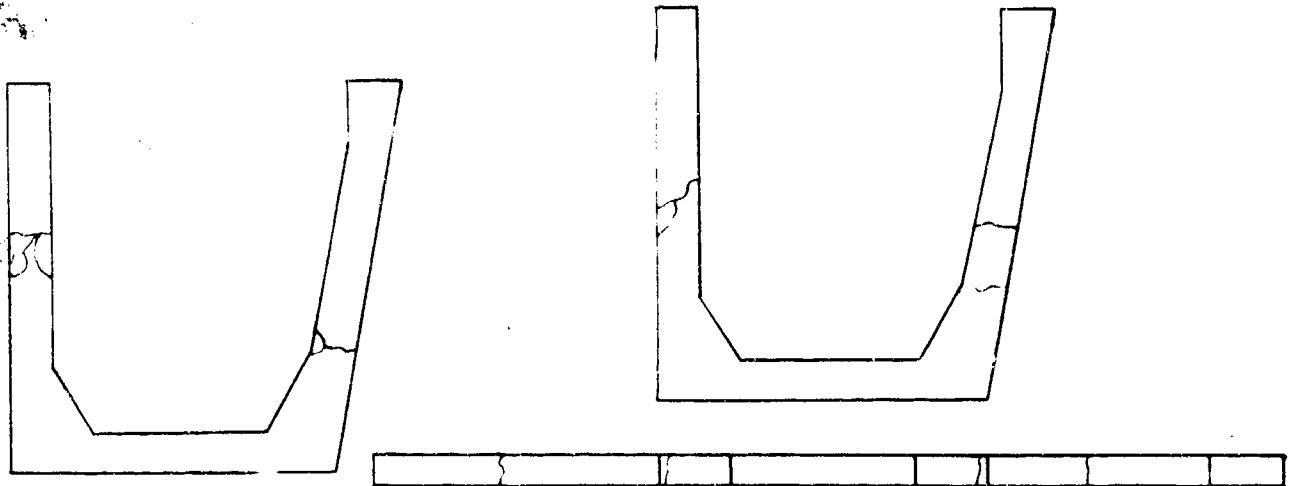
FR. 35 TO 37

STARBOARD WALL - FACING FWD

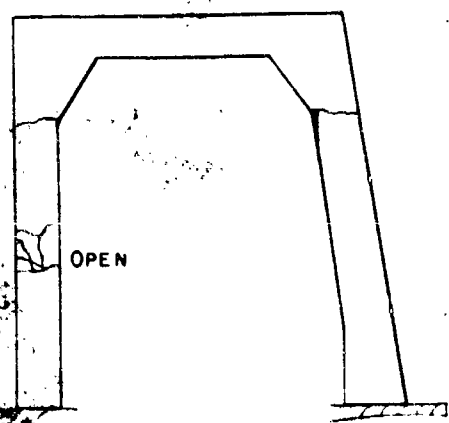
ARDC - 13  
 CRACK SURVEY AFTER TEST ABLE



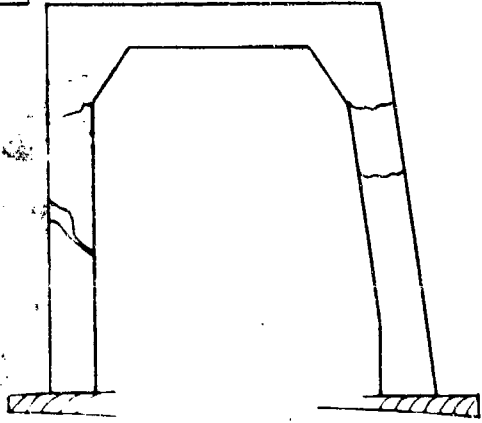
GRAPHIC SCALE IN FEET



SPALLING



FR. 35 TO 37



FR. 38 TO 44

STARBOARD WALL - FACING FWD

ARDC - 13  
 SURVEY AFTER TEST ABLE

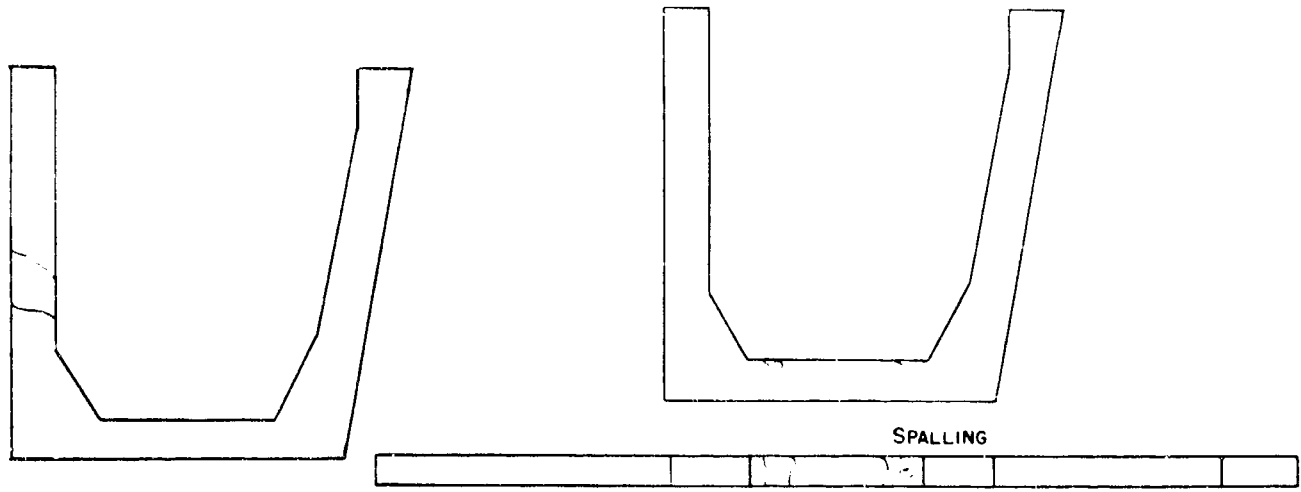


GRAPHIC SCALE IN FEET

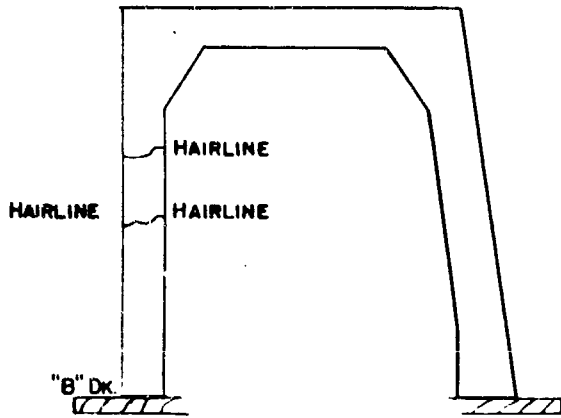
SECRET

SHEET 27 OF  
 APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP MATR  
 SERIAL 001500 PAGE 29 OF 30 PAGES

2

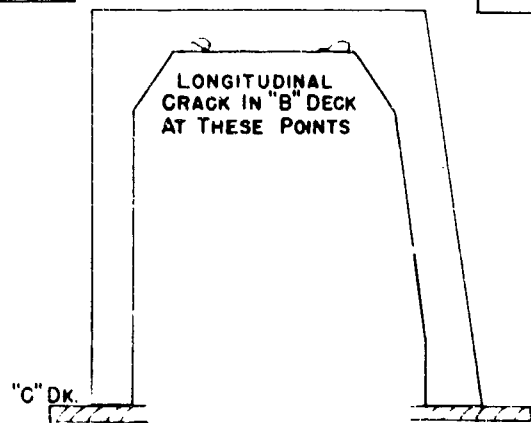


SPALLING



FR. 38 To 54

STARBOARD WALL - FACING FWD.



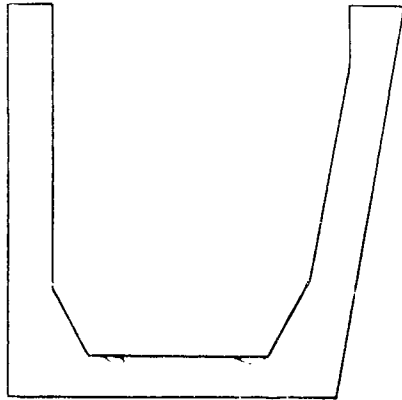
FR. 24 To 36

STARBOARD WALL - FACING FWD.

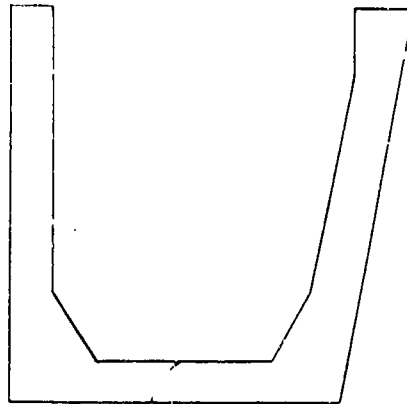
ARDC - 13  
CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET



SPALLING



LONGITUDINAL  
CRACK IN "B" DECK  
AT THESE POINTS

"C" DK.

FR. 24 TO 36

STARBOARD WALL - FACING FWD.

HAIRLINE

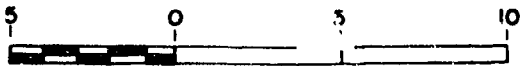
"C" DK.

FR. 45 TO 52

PORT WALL

ARDC - 13

CRACK SURVEY AFTER TEST ABLE



GRAPHIC SCALE IN FEET

SHEET  
APPENDIX A, ENCLOSURE G TO DIRECTOR SHIP M  
SERIAL 001500 PAGE 30 OF 30 PAS

2

LISTING OF PHOTOGRAPHS

APPENDIX B

S E C R E T

Enclosure G to DSM Serial 001500

Page 1 of 10 pages

ARDC-13

<u>Series</u>	<u>Number</u>	<u>Description</u>
BA-CR-66 927	6	Port beam - exterior
Do:	7	" " "
Do:	8	Port bow - exterior
Do:	9	" " "
Do:	10	Stern - exterior
Do:	11	Equalizer valve blank flange
Do:	12	Flanged fill and discharge valve
BA-CR-66-488	3	Crack port forward wing wall
Do:	4	Overall view dock floor facing aft
Do:	5	Keel block bolts (as bent)
Do:	6	Forward face port wing wall
Do:	7	Forward face st'bd wing wall
Do:	8	Army QMC water tank on deck fl.
Do:	9	Anchor and chain fittings, port bow
Do:	10	Army QMC drums on dock floor
Do:	11	Anchoring of blast tower.
BA-CR-66-505	1	Port bow mooring spud.
Do:	2	Blast tower, port wing wall f'wd.
Do:	3	Anchor windlass, control gear wing wall f'wd.
Do:	4	Catwalk, amidship, facing aft
Do:	5	Control house, st'bd wing wall
Do:	6	General view dock floor, facing f'wd from catwalk
Do:	7	Details of wood walkway, inside facing port wing wall
Do:	8	Port wing wall, facing aft from st'bd wing wall
Do:	9	Signal arms, st'bd wing wall, top deck
Do:	11	Plunger type scratch gage (unset)
Do:	12	Scratch gage tower, "B" deck
BA-CR-66-506	2	Typical strain gage rosette, outboard wall, port wing wall, inside, amidships
Do:	3	Scratch gage tower base, "C" deck
Do:	4	Scratch gage tower, passing thru "B" deck

<u>Series</u>	<u>Number</u>	<u>Description</u>
BA-CR-66-506	5	Anchor windlass and foundations, port wing wall "C" deck
Do:	6	Typical single strain gage installation
Do:	7	Generators, 100kw, "C" deck
Do:	8	Overall view, generators
Do:	9	Control panel, "C" deck
Do:	10	Typical frame construction, interior "B" deck, st'bd wing wall
Do:	11	Typical frame construction, interior "C" deck st'bd wing wall
Do:	12	View port bow
BA-CR-66-76	2	Ship's bell, mounted on blast gage tower
Do:	3	Deck marking ARDC-13
BA CR-219-28*	166	Aerial view ARDC-13
Do:	167	Aerial view ARDC-13
<u>YO-160</u>		
BA-CR-62-356	1	Exterior - Bow-on
Do:	2	" Port bow
Do:	3	" Port beam
Do:	4	" Port quarter
Do:	5	" Stern
Do:	6	" St'bd quarter
Do:	7	" St'bd beam
Do:	8	" St'bd bow
BA-CR-65-106	1	Exterior - bow-on in array
Do:	2	" St'bd bow
Do:	3	" St'bd beam
Do:	4	" St'bd quarter
BA-CR-65-105	9	Exterior - Port beam
Do:	10	" Port bow
Do:	11	" Port quarter
Do:	12	" Stern
BA-CR-57-229	5	Topside - forward looking aft
Do:	6	Aft - looking f'wd to bridge
Do:	7	Bridge aft - looking forward

\* Secret Photographs

<u>Series</u>	<u>Number</u>	<u>Description</u>
BA-CR-93-96	1	Starboard wall, deck rail at fore-castle deck
Do:	2	Pilot house
Do:	3	Pipes and valves, amidships
Do:	4	Column, starboard poop deck
Do:	5	Column, port poop deck
Do:	6	View of fan tail
BA-CR-93-982	6	Damage to st'bd bow railing
Do:	7	Chipped concrete at bow
Do:	8	Damage along port bow rail
Do:	9	View of forecastle deck
Do:	10	Port rail and main deck, aft
Do:	11	St'bd rail and main deck, aft
Do:	12	Forward catwalk

YOG-83

BA-CR-82-85	1	St'bd side, abaft abeam
Do:	2	St'bd quarter
Do:	3	From top of pilot house looking fw'd
Do:	4	From top of pilot house looking fw'd
Do:	5	From forecastle looking aft, port side
Do:	6	" " " " st'bd side
Do:	7	From top of pump house looking aft
Do:	8	Port side, abaft abeam
Do:	9	Port side, forward abeam
Do:	10	St'bd side, forward abeam

AFTER TEST ABLE

YOG-83

AA-CR-227-91	22	Port side abeam
Do:	23	Port side abaft abeam
Do:	24	Stern
Do:	25	St'bd abaft abeam
Do:	26	St'bd beam
Do:	27	St'bd, forward abeam
Do:	28	Bow
Do:	29	Port side, fw'd abeam

S E C R E T



<u>Series</u>	<u>Number</u>	<u>Description</u>
AA-CR-82-1829	6	View of deck beam - Pump room house
Do:	7	View of wooden bridge house
Do:	8	" " " " "
Do:	9	Life raft frame and foundations

2 JULY 1946

ARDC-13

AA-CR-98-1962	7	Aft dock floor and st'bd wing wall
Do:	8	Fw'd dock floor and st'bd wing wall
Do:	9	Catwalk wreckage
Do:	10	Deck floor fw'd from aft st'bd wing wall
Do:	11	Stern and dock floor
Do:	12	Top view crane near stern
AA-CR-98-1963	1	Pontoon bridge, stern of dock, upside down
Do:	2	Torpedo tube and spoon, stern ARDC-13
Do:	3	Torpedo tube and spoon, stern ARDC-13
Do:	4	Torpedo spoon, stern ARDC-13
Do:	5	Crack st'bd wing wall inside aft
Do:	6	Running light frame (from APA)
Do:	7	General view fw'd from port side
Do:	8	St'bd wall inboard draft gage
Do:	9	Crane on dock floor looking aft
Do:	10	Army water tank
Do:	11	Ladder, st'bd wing wall fw'd
Do:	12	St'bd wing wall, blast marks
AA-CR-98-1964	1	Crack, port side, top of wing wall
Do:	2	Hatch opening, port top deck, hatch cover gone
Do:	3	Hatch opening on stern showing bent clips
Do:	4	Torpedo tube, stern ARDC-13
Do:	5	Signal tower blown over side, St'bd bow
Do:	6	General view bow
Do:	7	" " "
Do:	8	Port bow
Do:	9	Port, fw'd section
Do:	10	Port, after section
Do:	11	Port quarter
Do:	12	Stern

S E C R E T

<u>Series</u>	<u>Number</u>	<u>Description</u>
AA-CR-93-1835	1	General View of Port Bow
Do:	2	General View of Starboard Quarter
Do:	3	General View of Stern showing Dock floor
Do:	4	General View of After Port Quarter
Do:	5	General View of Port Quarter
Do:	6	General View of Port Beam
Do:	7	General View of Port Bow
Do:	8	Head on View of Bow
Do:	9	View of Damage Material on Dock Floor Facing Forward
Do:	10	View of Damage Material on Dock Floor Facing Aft.
Do:	11	General View of Port Wing Wall Facing Aft
Do:	12	General View of Starboard Wing Wall Facing Aft
AA-CR-93-1988	1	View of Damage to Forward Face of Port Wing Wall
Do:	2	View of Damage to Forward Face of Starboard Wing Wall
Do:	3	Longitudinal Crack in "A" Deck, Port Wing Wall, Frame 25 Facing Aft
Do:	4	Longitudinal Crack in "A" Deck, Port Wing Wall, Frame 25 Facing Forward
Do:	5	View of Blown Out Hatch, "A" Deck, Port Wing Wall at Frame 40.
Do:	6	View of Damage to Crane on Dock Floor from Top of Port Wing Wall
Do:	7	View of "A" Deck Starboard Wing Wall from After End of Port Wing Wall
Do:	8	Crack - Inboard Face Starboard Wing Wall - Amidships - 3' Above Dock Floor
Do:	9	Crack - After Face and Inboard Corner of Starboard Wing Wall - 3' Above Dock Floor
Do:	10	Crack - After Face of Starboard Wing Wall
Do:	11	Spalling - Inboard Face Starboard Wing Wall - Frame 40 - 3' Above Fl.
Lo:	12	Crack - "A" Deck Starboard Wing Wall at Frame 30 Facing Aft.

S E C R E T

AA-CR-93-1986	2	Crack - Spalling - Around Ventilator at Frame 28 - "A" Deck Starboard Wing Wall
Do:	3	View of "A" Deck Port Wing Wall from Starboard Wing Wall
Do:	4	Spalling - Around Ventilator - "A" Deck - Starboard Wing Wall at Frame 38
Do:	5	View of "A" Deck Forward Port Wing Wall from Starboard Wing Wall
Do:	7	Crack - Inboard Face - Port Wing Wall Frame 20-35 - 10' Above Fl.
Do:	8	Crack - Inboard Face - Port Wing Wall - Frame 20-40-2' from Top
Do:	9	Crack - "B" Deck Port Wing Wall - Frame 18
Do:	10	Crack - "B" Level - Port Wing Wall - Frame 20 - Outboard Wall - Inside Face
Do:	11	Crack - "B" Level - Port Wing Wall - Frame 26 - Top Inside Face of Outboard Wall
Do:	12	Crack - "B" Level - Port Wing Wall - Frame 24 - Top
AA-CR-93-1987	1	Longitudinal Crack - Inside Face - Outboard Wall - Frame 24 - Port
Do:	2	View of Mess Table Ripped Off Fastenings to "B" Deck
Do:	3	View of Damage to Sick Boy "B" Deck
Do:	4	Crack in Transverse Bulkhead at Frame 44, Port Wing Wall
Do:	5	View of Dock Under Tow - Stern
Do:	7	" " " " " - Starboard Bow
Do:	8	View of Dock Under Tow - Port Bow
Do:	9	" " " " " - Port Quarter

S E C R E T

ARDC-13

<u>Series</u>	<u>Number</u>	<u>Description</u>
AA-CR-92-1776	9	Blast shadow, face st'bd wing wall, Fr. 6 to 13
Do:	10	" " " " " "
Do:	11	wall, Fr. 12 to 19
Do:	12	wall, Fr. 19 to 27
		wall, Fr. 27 to 34
AA-CR-92-1777	1	Blast shadow inside face st'bd wing wall Fr. 34 to 44
Do:	2	" " " " " "
Do:	3	wing wall Fr. 44 to 49
Do:	4	wing wall Fr. 49 to 56
Do:	5	Fr. 36 below "A" deck outboard shell st'bd wall
Do:	7	Fr. 36 between "A" & "B" deck, Fr. 27 to 28 near inboard shell, st'bd wall
Do:	8	Bottom of "A" deck, Fr. 27 to 28 near outboard shell, st'bd wall
Do:	10	"B" deck Fr. 25 to 26 near outboard shell, st'bd wall
Do:	11	Fr. 29 below "B" deck near outboard shell, st'bd wall
Do:	12	Fr. 28 below "B" deck near outboard shell, st'bd wall
		Inboard shell, Fr. 27 to 28 about 4 feet above "C" deck, st'bd wall
AA-CR-92-1778	1	View of preparations for pumping out dock

5 JULY 1946

YO-160

AA-CR-58-2007	1	General view of stern
Do:	2	General view of st'bd quarter
Do:	3	" " " " " "
Do:	4	General view of st'bd beam
Do:	5	" " " " " "

S E C R E T

<u>Series</u>	<u>Number</u>	<u>Description</u>
AA-CR-58-2007	6	General view of st'bd bow
Do:	7	" " " " "
Do:	8	" " " port "
Do:	9	" " " " beam
Do:	10	General view of blast effects poop deck, port side
Do:	11	" " " " " "
Do:	12	deck, port q'tr
		deck, port q'tr
AA-CR-58-2008	1	Close up of st'bd q'tr poop deck
Do:	2	View of deck damage facing aft from midships
Do:	3	" " " " " fwd
Do:	4	from midships
Do:	5	View of damage to after midship deckhouse
Do:	6	" " " " fwd "
Do:	7	deckhouse
Do:	8	Damage to after bulkhead of midship deckhouse
Do:	9	View of port side of midship deckhouse
Do:	10	View of damage to forecastle deck
Do:	11	Blast shadow port side of doc'le deck
Do:	12	Damage to main deck, port side aft
		Damage to poop deck at center line
		Dished-in effect to tank on main deck aft
AA-CR-58-2009	1	Poop deck, port side aft - Dished-in deck
Do:	2	Poop deck, port side - Dished-in deck
Do:	3	Poop deck, st'bd - Dished-in deck
Do:	4	Interior view of damage to deckhouse - midships
Do:	5	" " " " " "
		house - midships

S E C R E T

C

23 JULY 1946

M - 46 BOMB DAMAGE TO ARDC - 13

<u>Series</u>	<u>Number</u>	<u>Description</u>
AA-CR-175-2180	2	Hole in Starboard Wing Wall - Facing Forward - Close-up
Do:	4	Hole in Starboard Wing Wall - General View Forward.
Do:	5	Hole in Starboard Wing Wall - Facing Aft Close-up
Do:	6	Hole in Starboard Wing Wall - General View Aft.
Do:	7	Frame Nos. 12 and 13 - Starboard Wing Wall - Facing Forward.
Do:	8	Frame 12 - Details of Failure - Facing Forward
Do:	9	" " " " "
Do:	10	Facing Forward " " "
Do:	11	Facing Aft " " "
Do:	12	Facing Aft " " - General View of Damage
AA-CR-175-2181	1	View of Pontoon Moored Astern of ARDC - 13
Do:	2	Army barge " " " ARDC - 13

S E C R E T

**AFTER ABLE**

**YOG-83**



Port Side Abeam





C

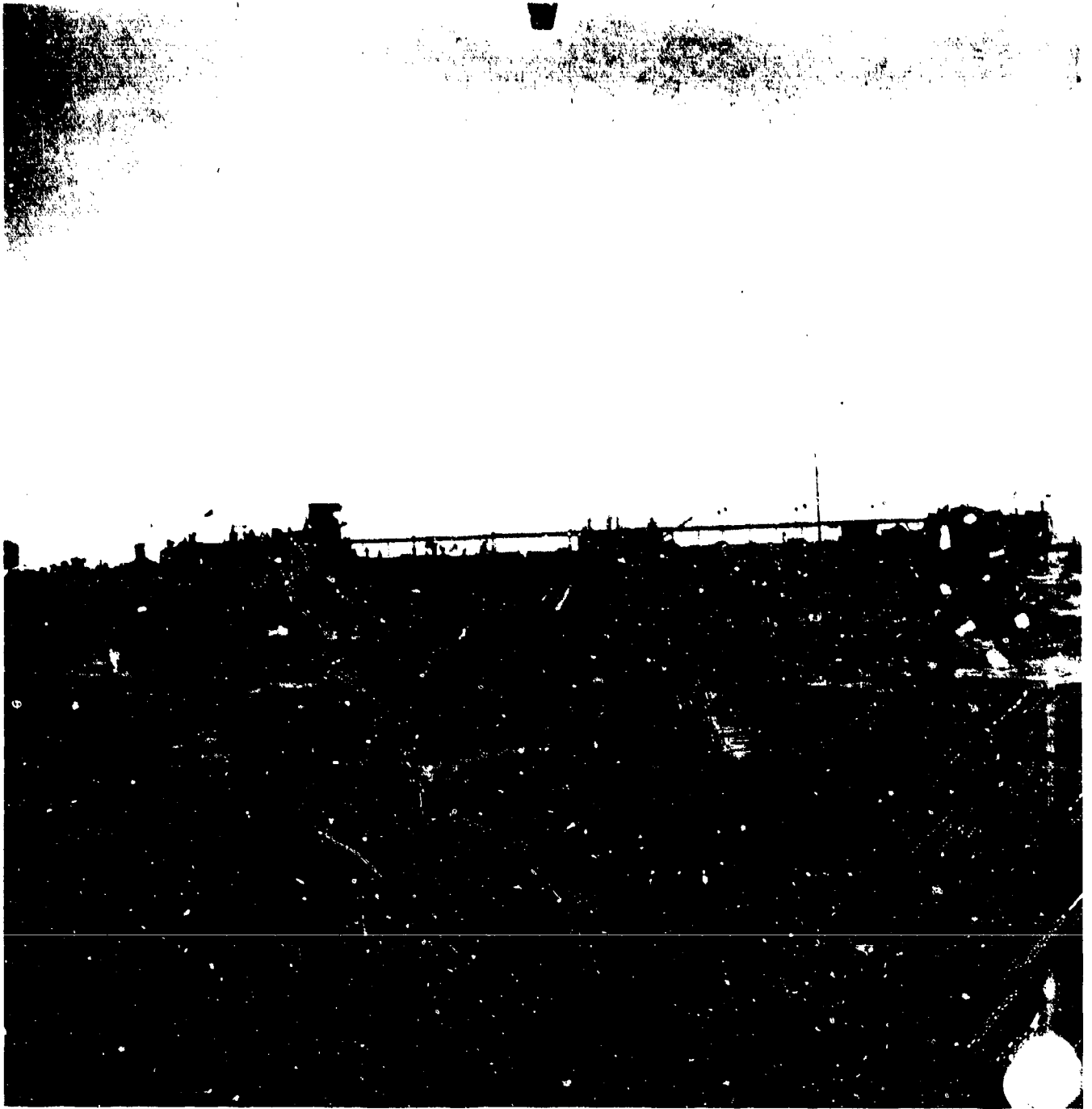
Port Side Abeam - Aloft



**Stern**



Starboard Aloft Abeam

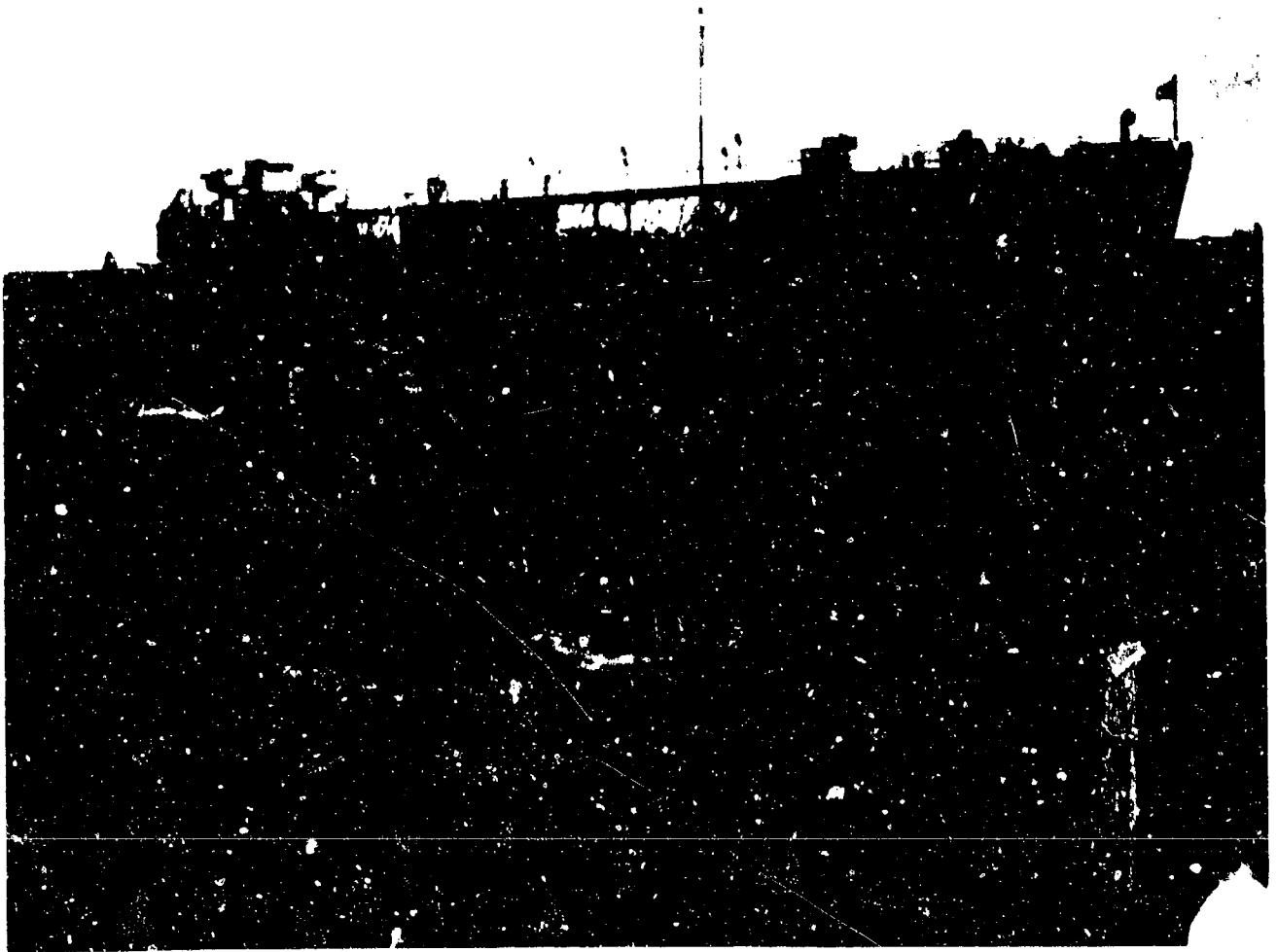


Starboard Beam

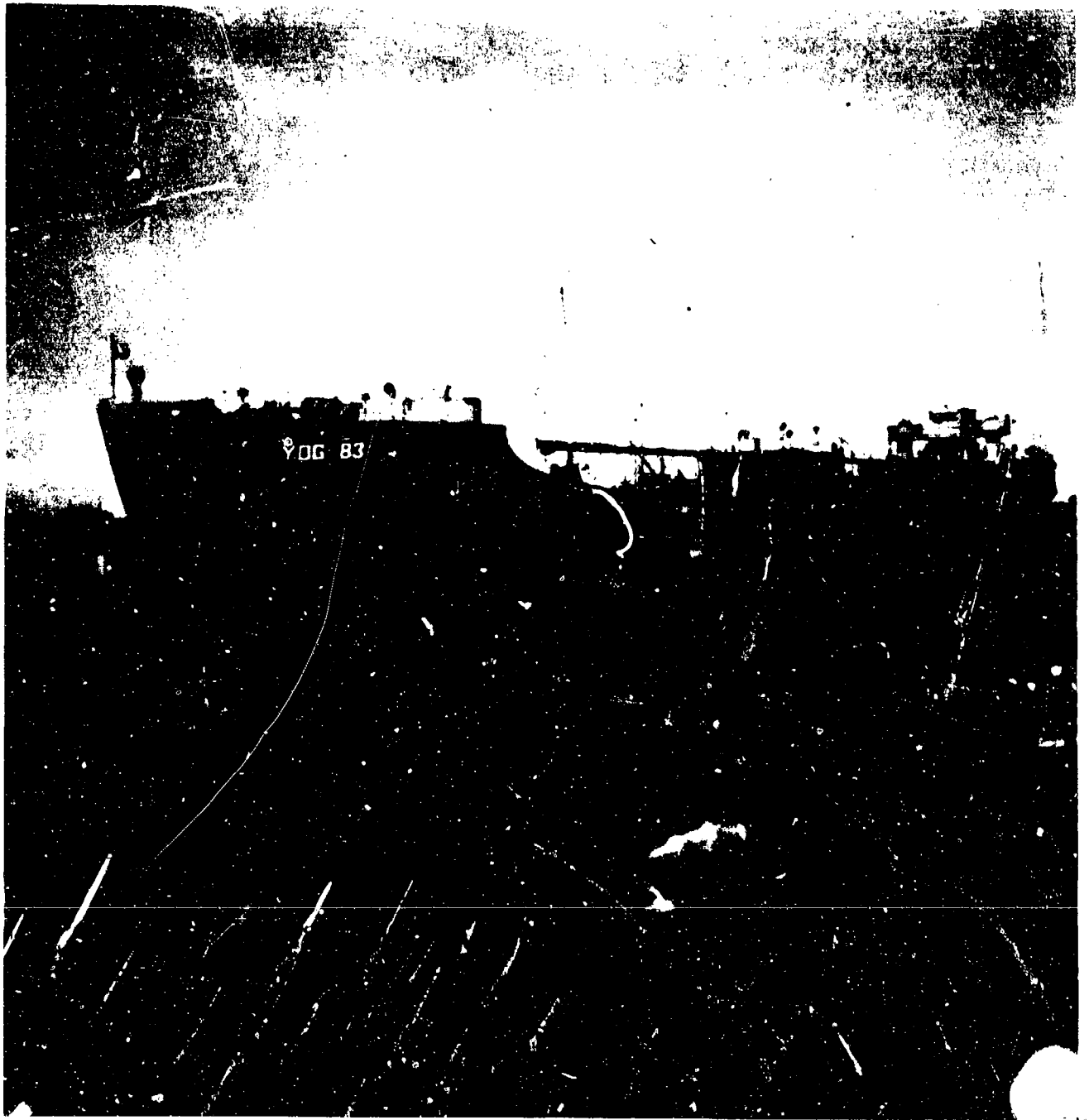


Bow

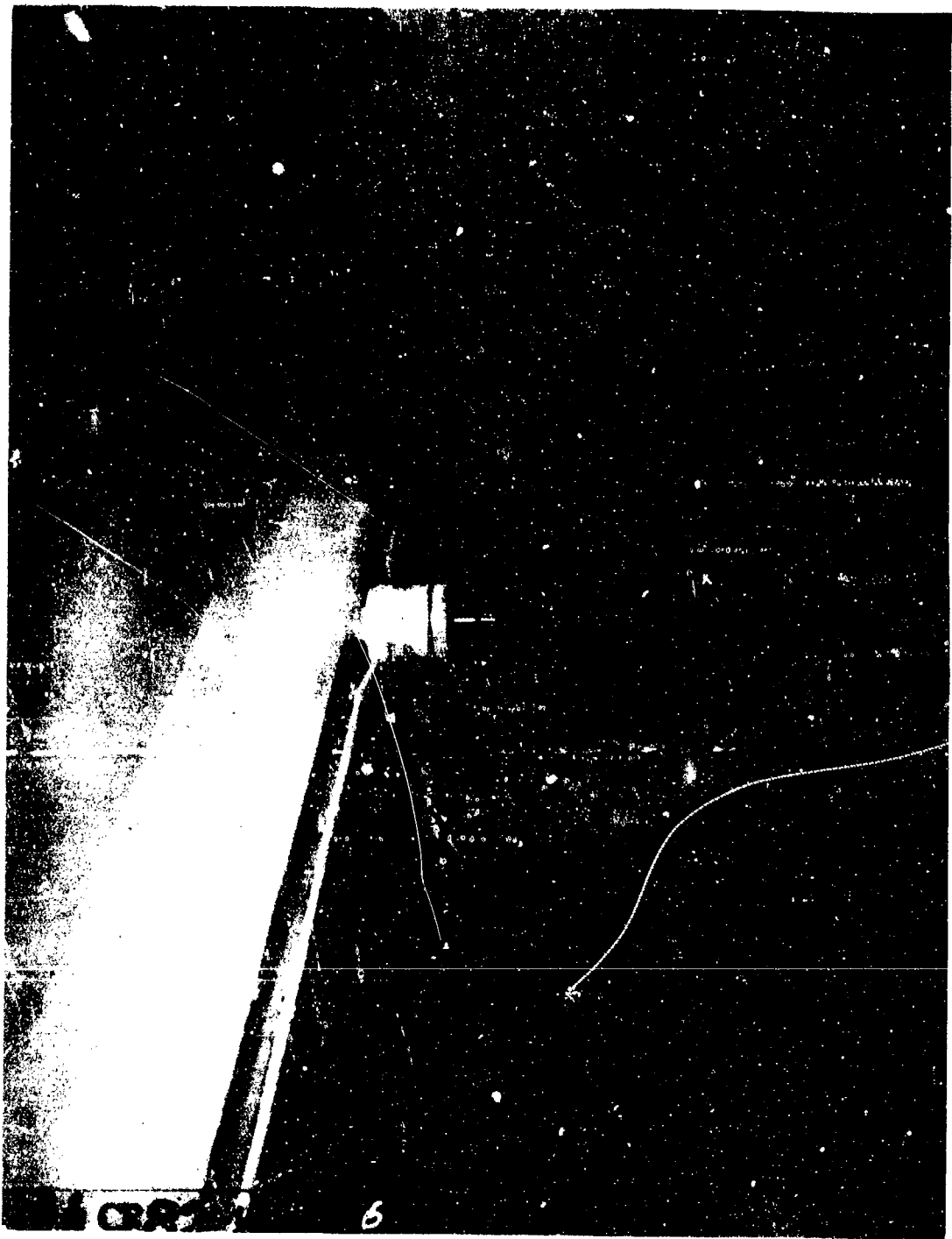
C



**Starboard Forward Abeam**

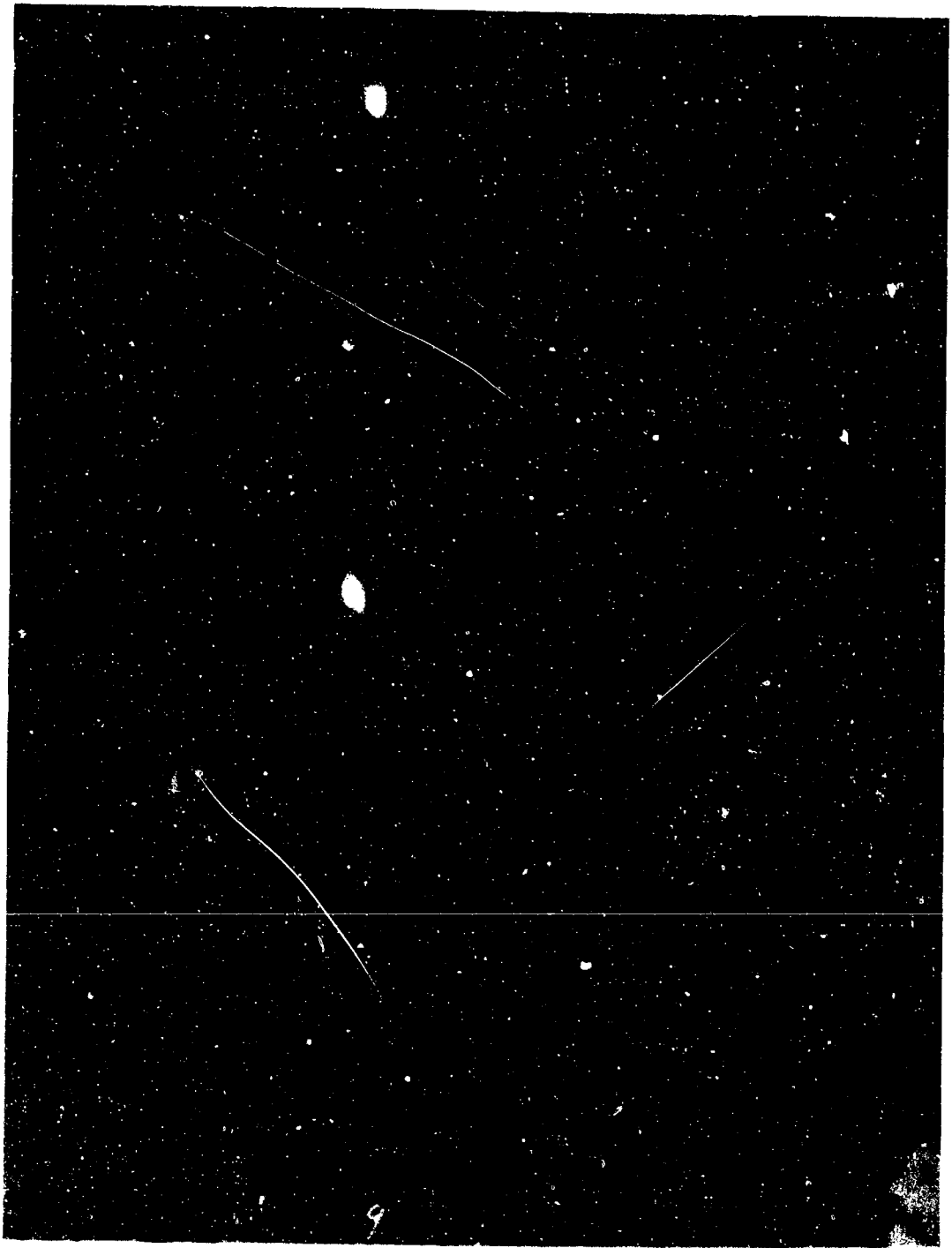


Port Side, Forward Abeam



View of Deck Beam Pump Room House





Life Raft Frame and Foundation

**BEFORE ABLE**

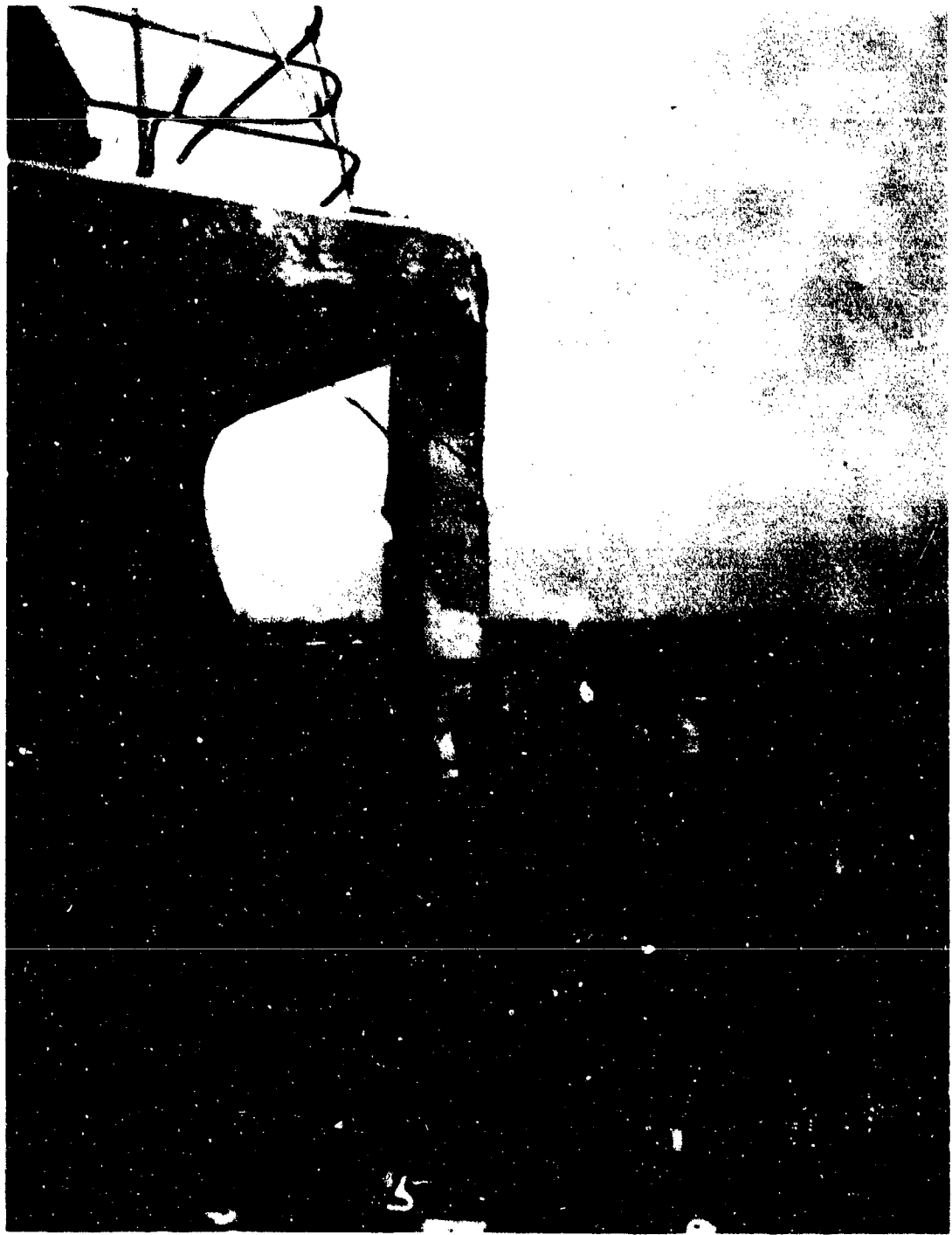
**YO-160**

5162

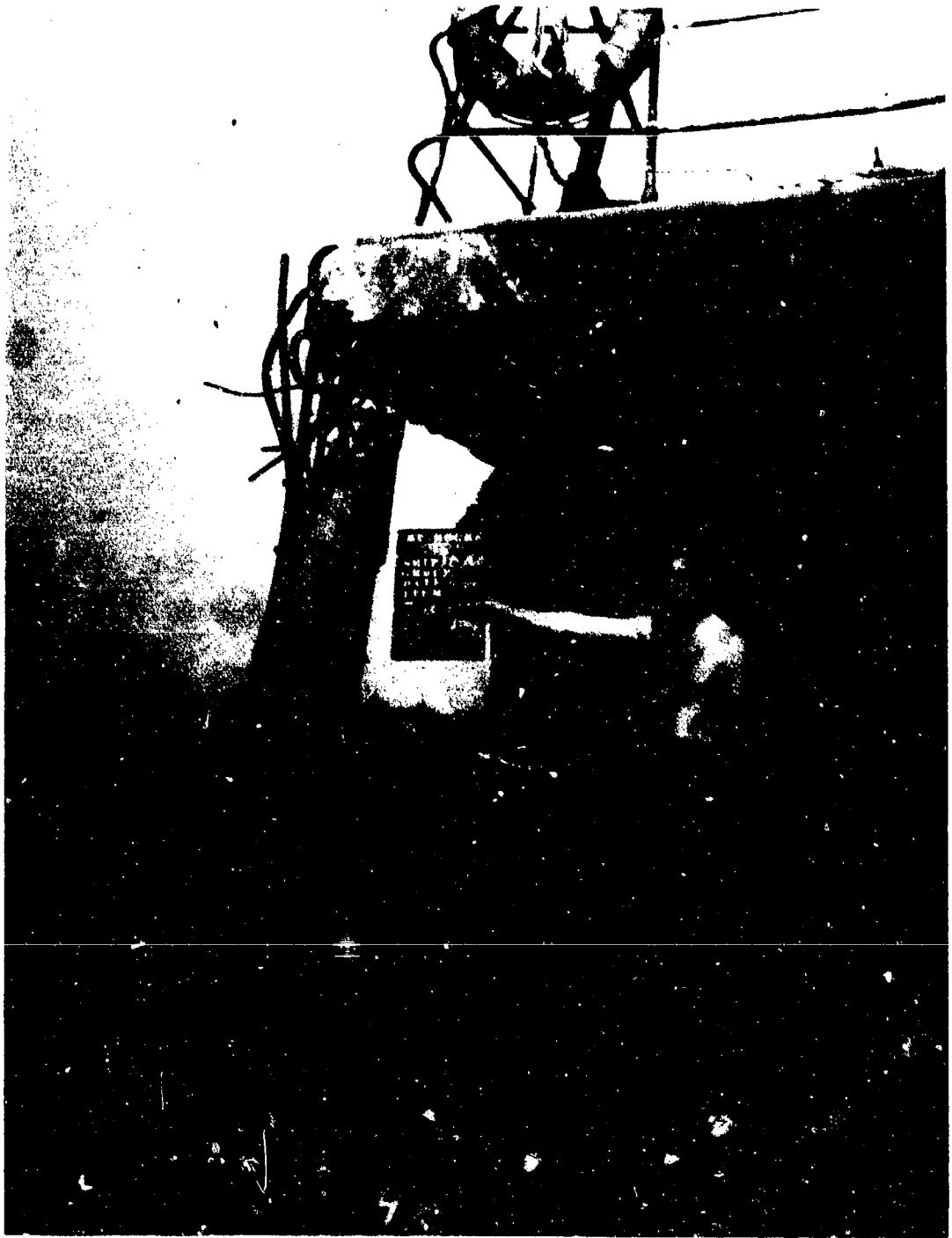
C



View of Fan Tail



Column - Port Poop Deck



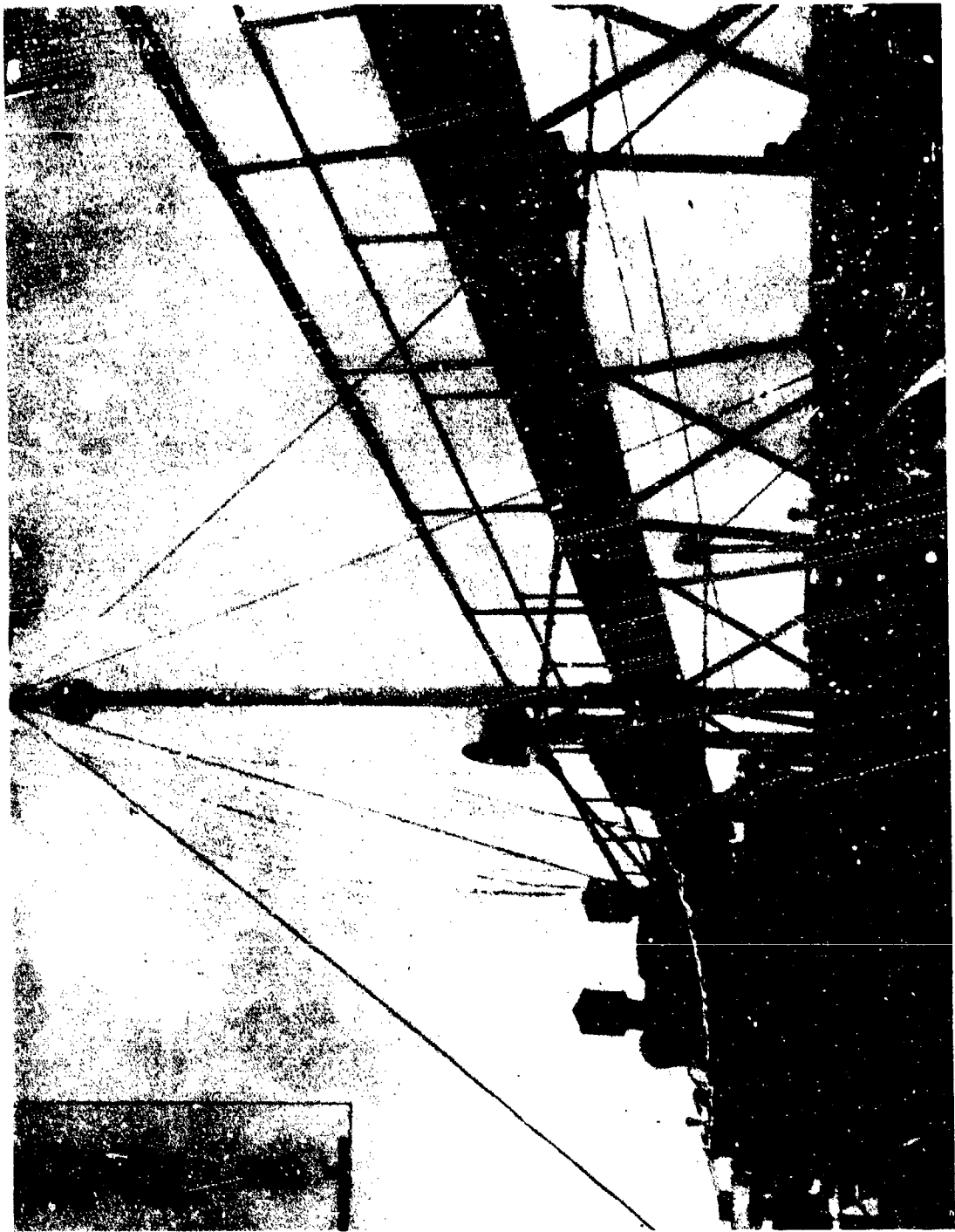
C  
Column - Starboard Poop Deck



Starboard Wall, Deck Rail at Forecastle Deck



Chipped Concrete at Bow



Forward Catwalk



**AFTER ABLE**

**YO-160**



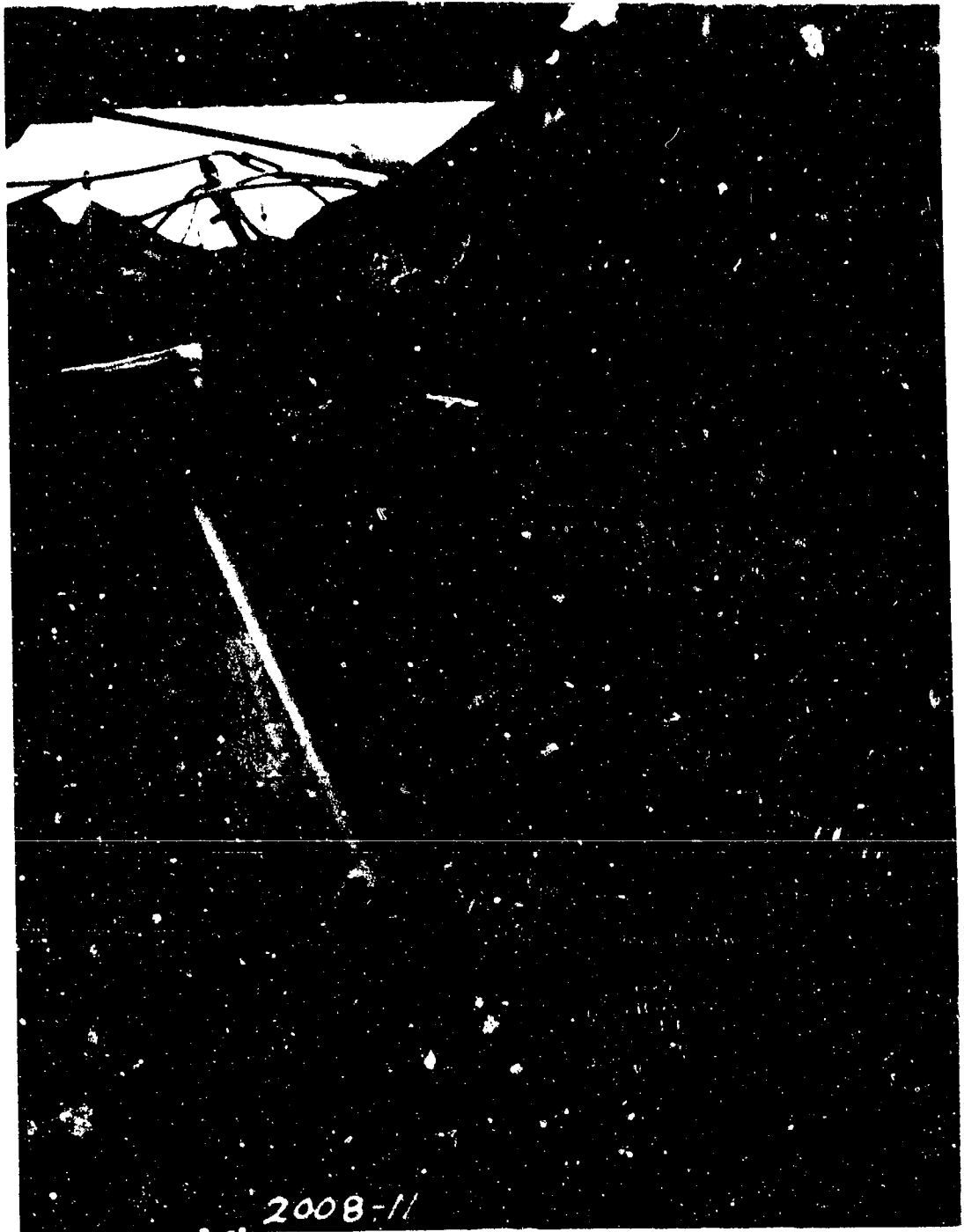
View of Port Side of Midship Deck House



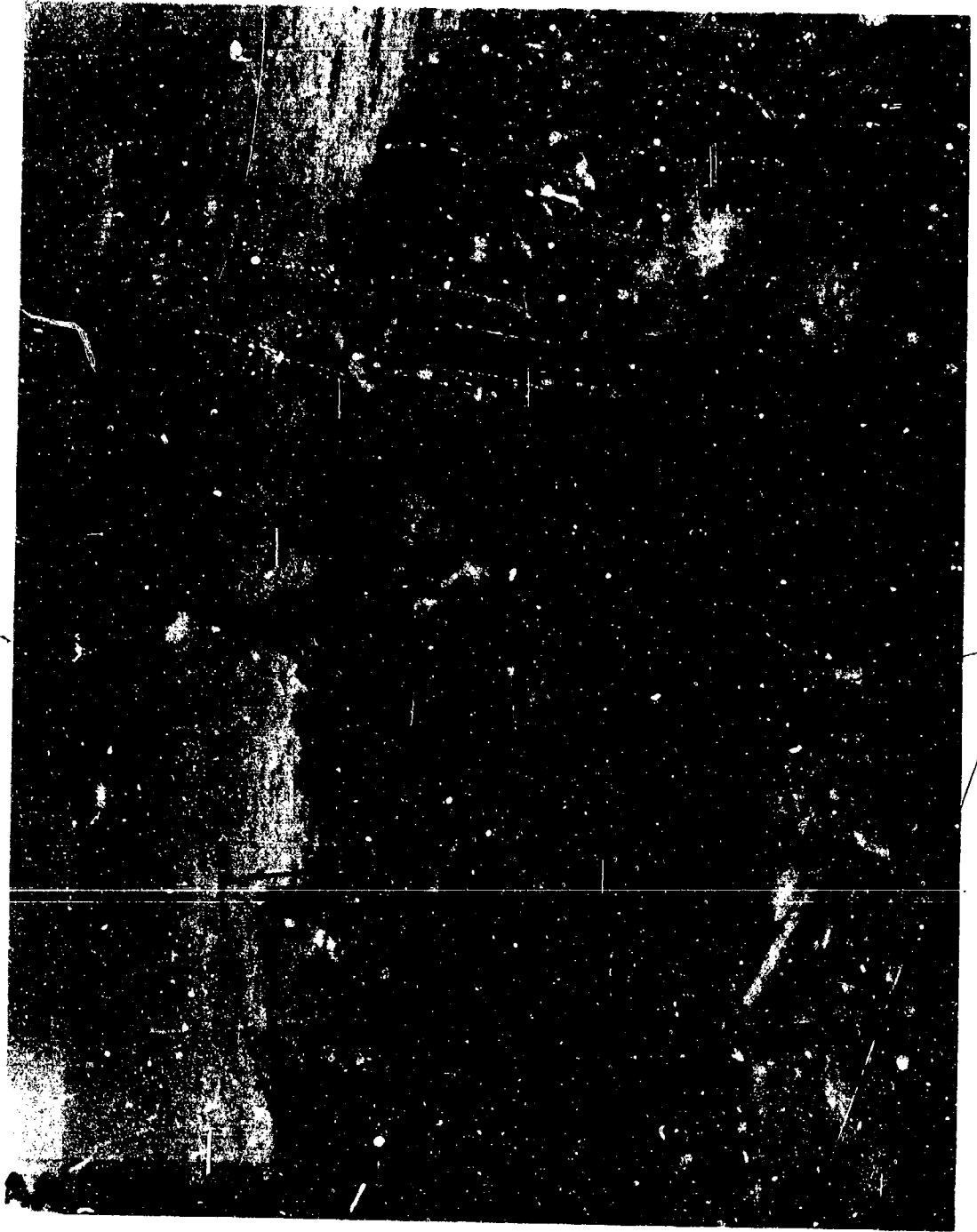
View of Damage to Forecastle Deck



Blast Shadow, Port Side of Forecastle Deck



Damage to Poop Deck at Center Line



Poop Deck - Port Side Aft, Dished-in Deck



Poop Deck - Port Side, Dished-in Deck

C



Poop Deck - Starboard Dished-in Deck





Interior View of Damage to Deck House Amidship



Interior View of Damage to Deck House Amidship

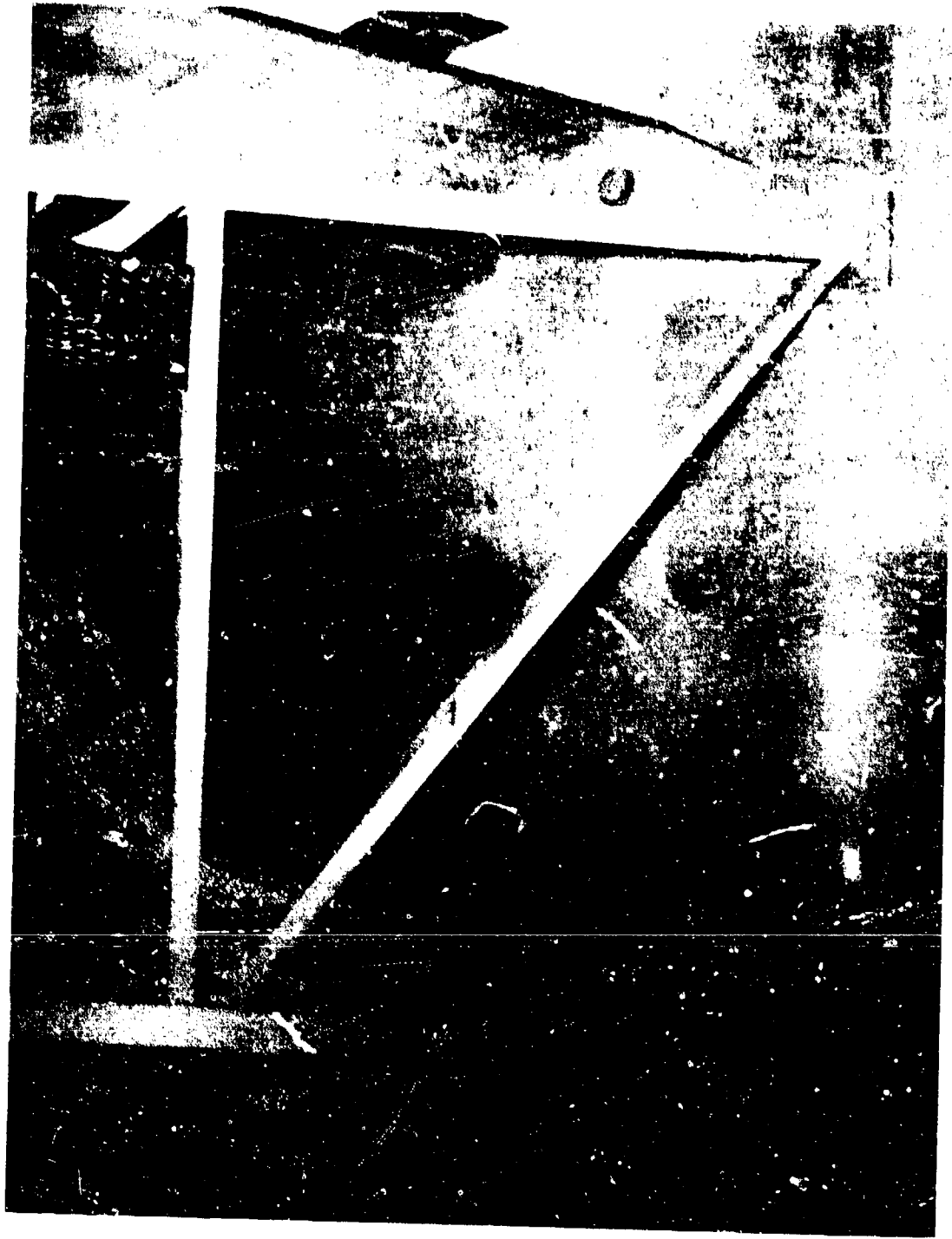
**BEFORE ABLE**

**ARDC-13**

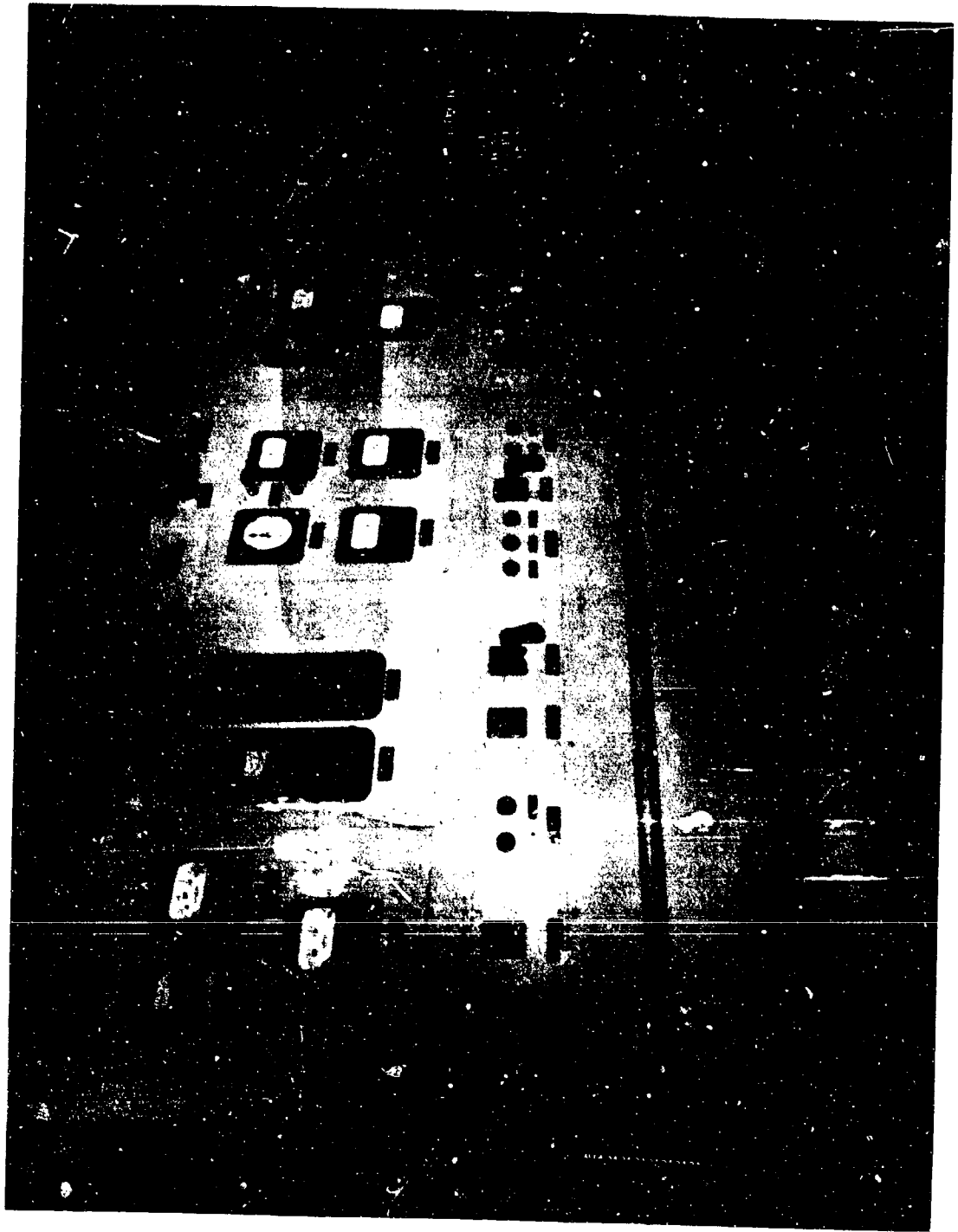
5162



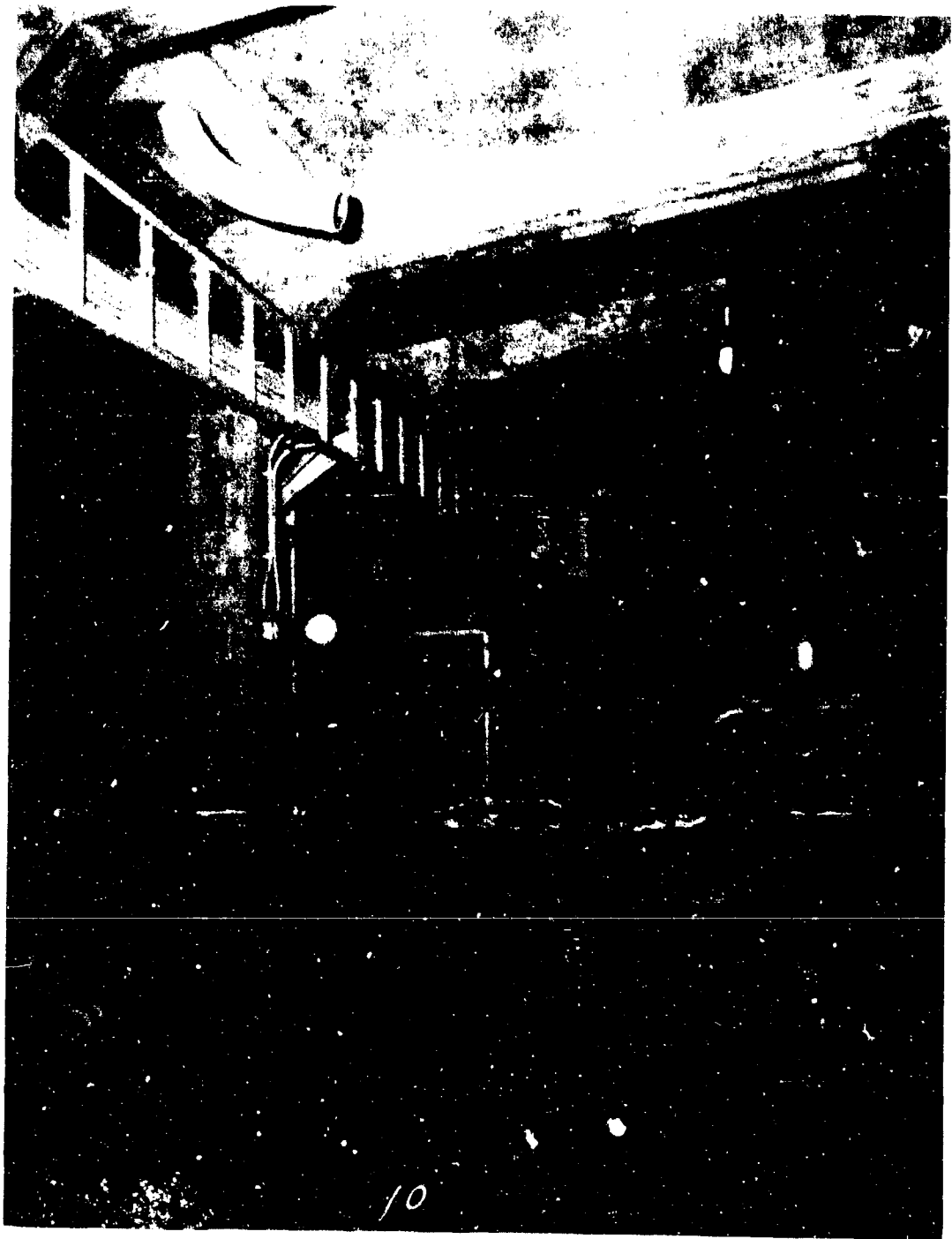
Typical Strain Gage Rosette - Outboard Wall Port - Wing Wall Inside Amidship



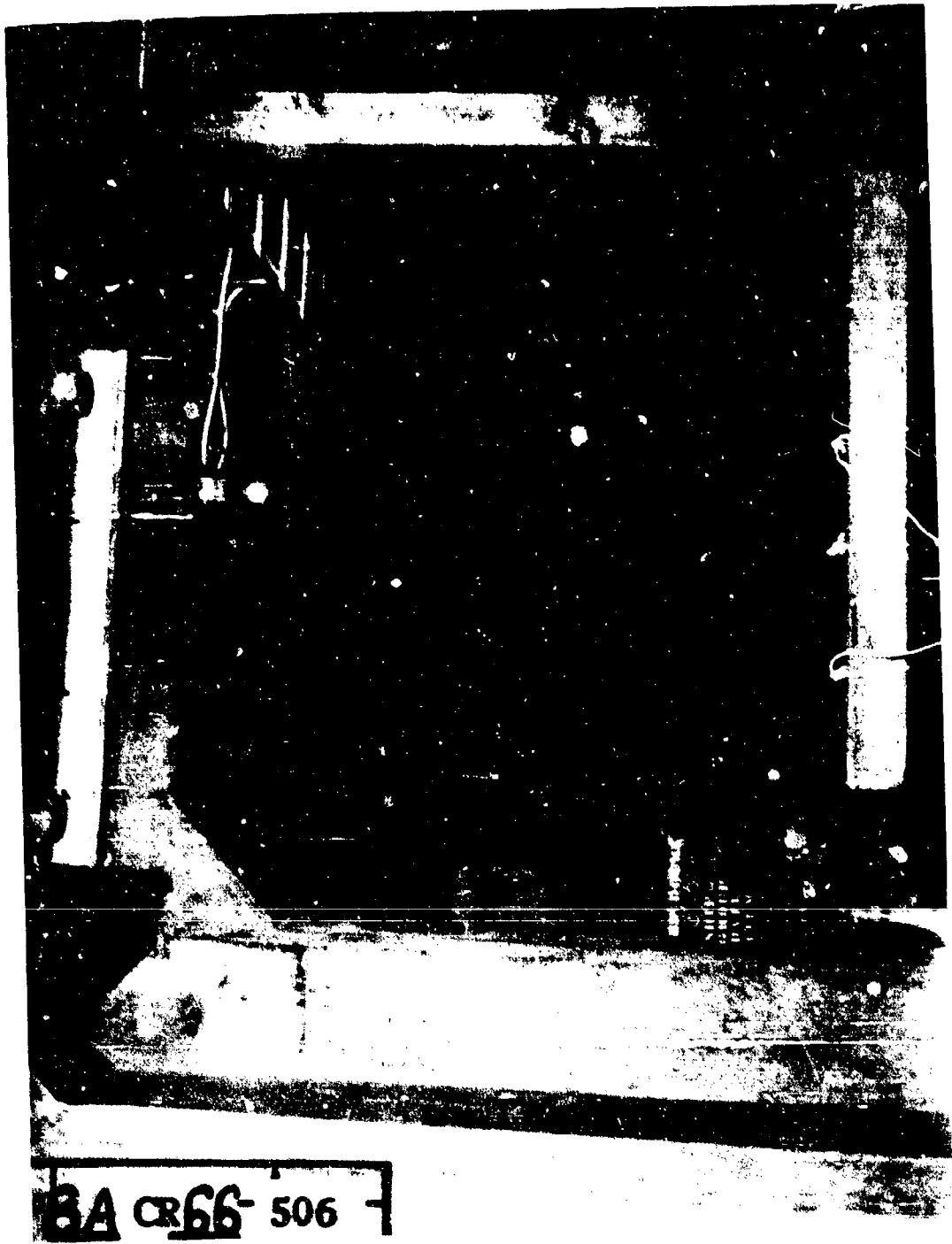
Scratch Gage Tower Base "C" Deck



Control Panel "C" Deck

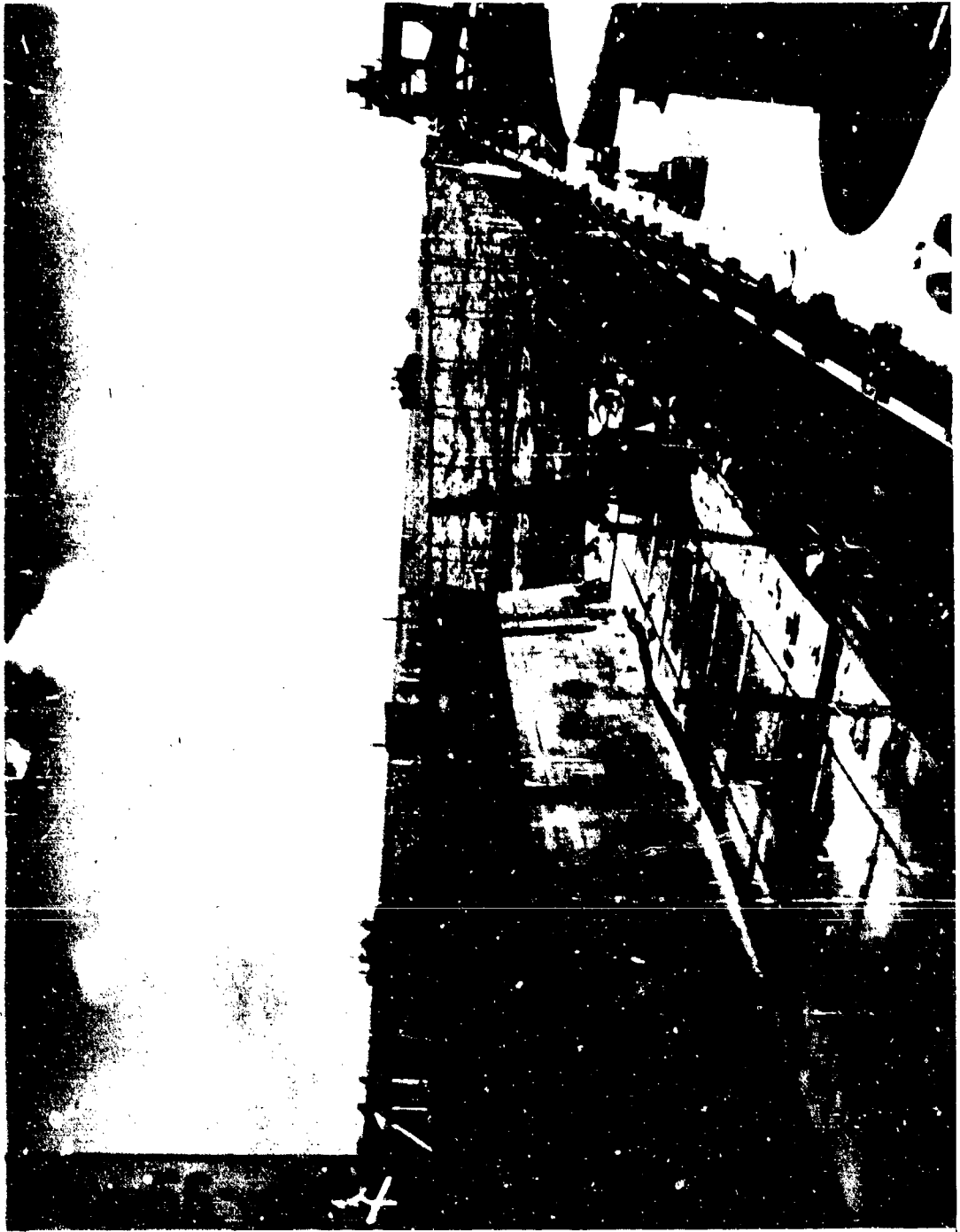


Typical Frame Construction - Interior "B" Deck - Starboard Wing Wall

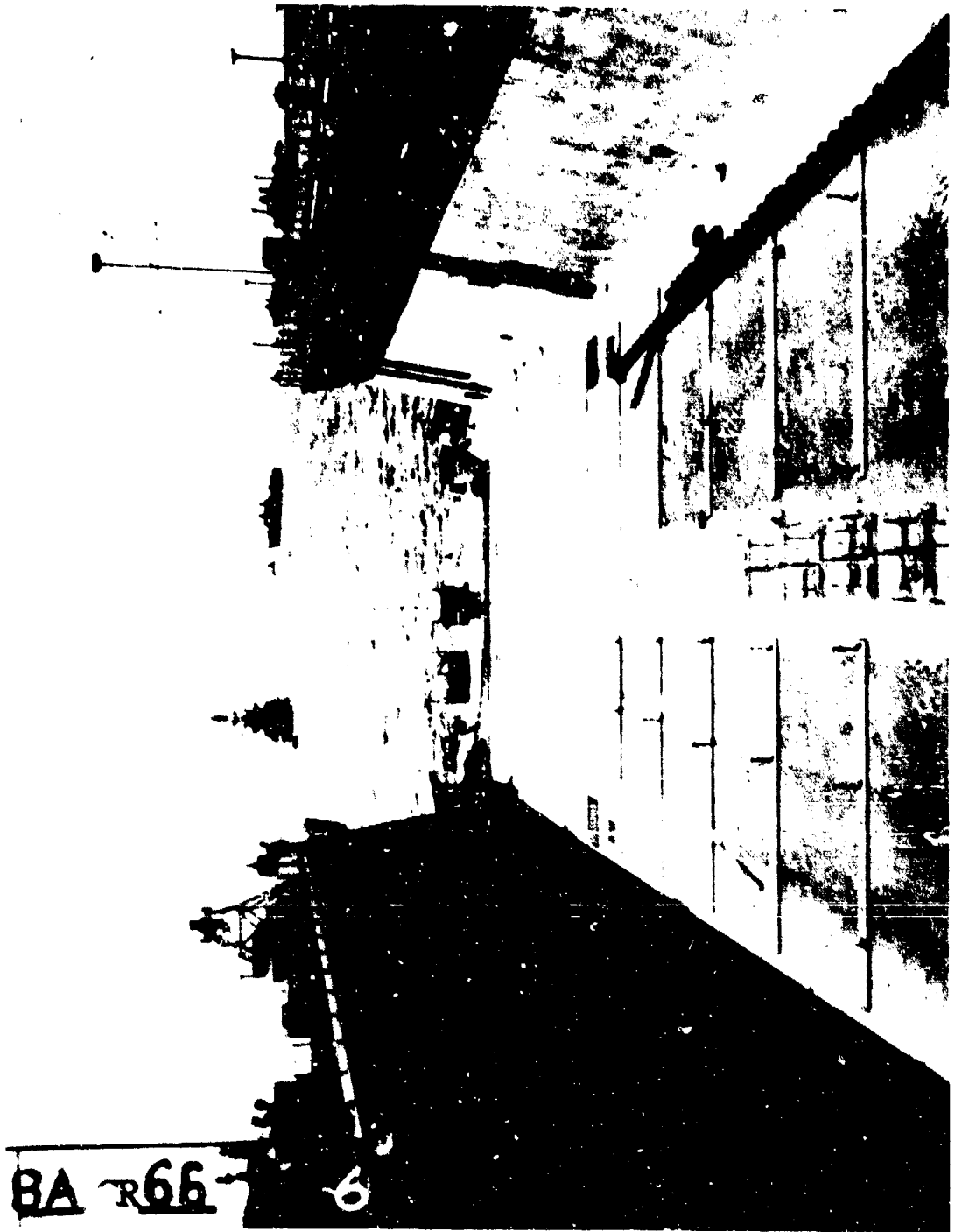


Typical Frame Construction - Interior "C" Deck - Starboard Wing Wall

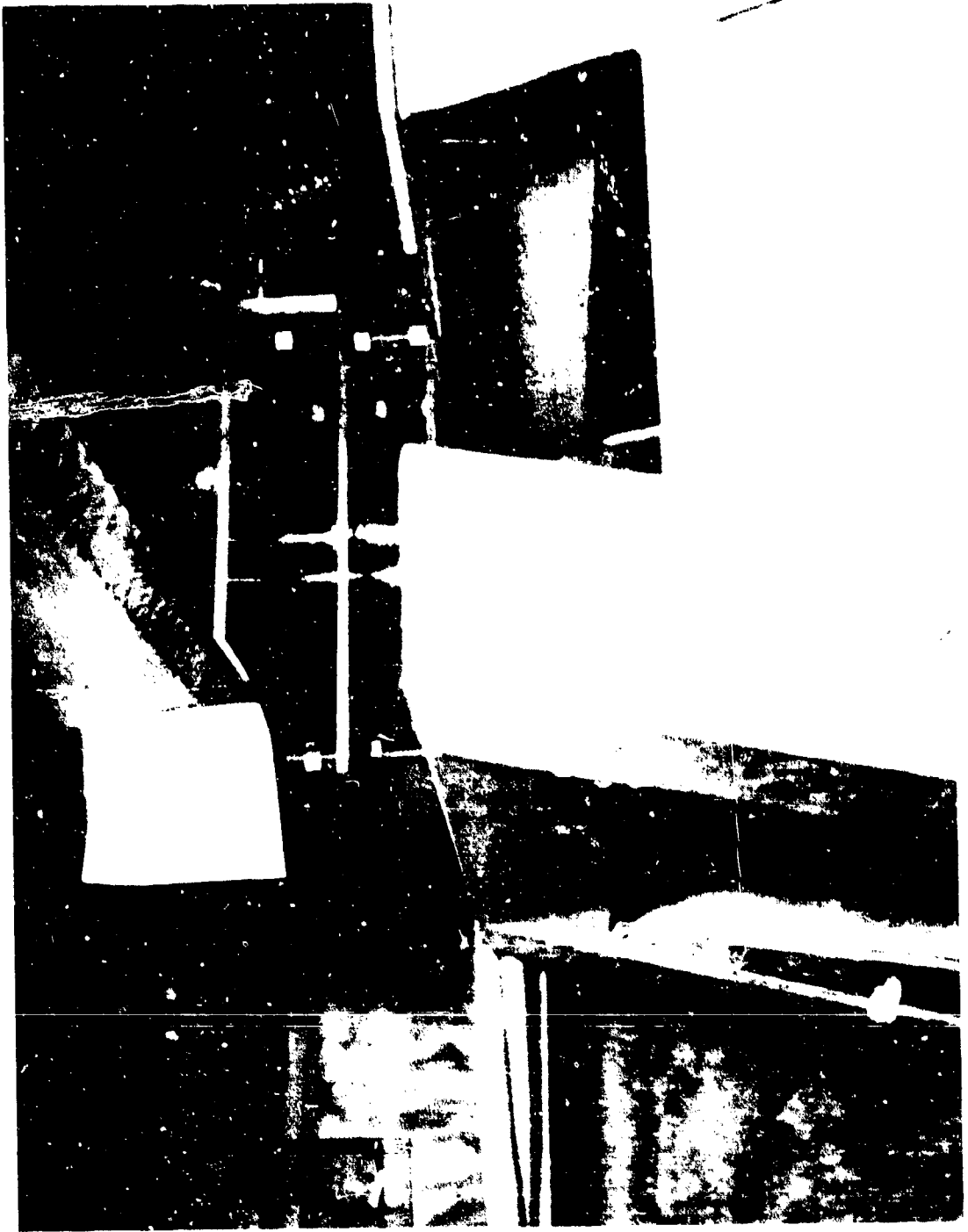




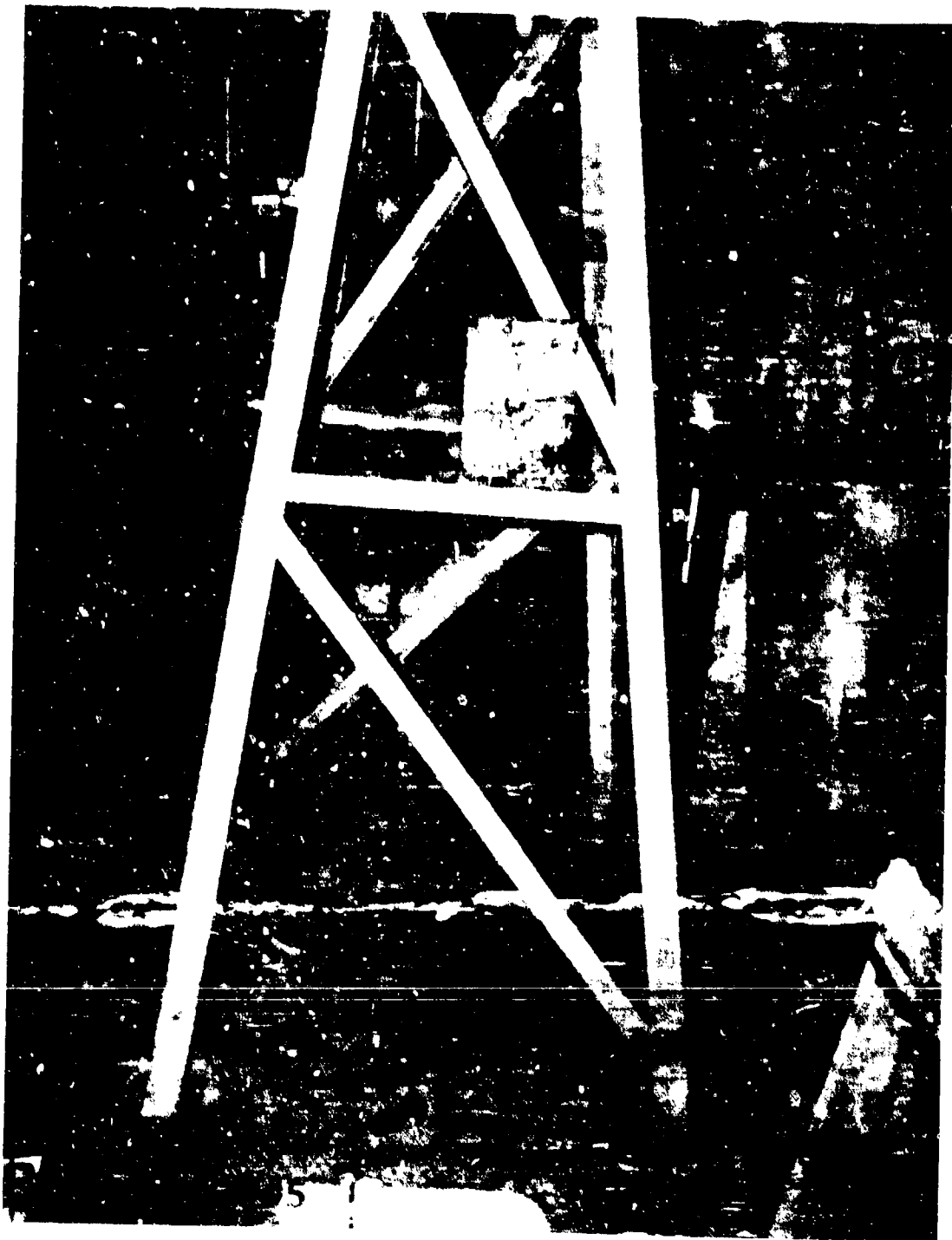
Catwalk, Amidship, Facing Aft



General View Dock Floor Facing Forward From Catwalk

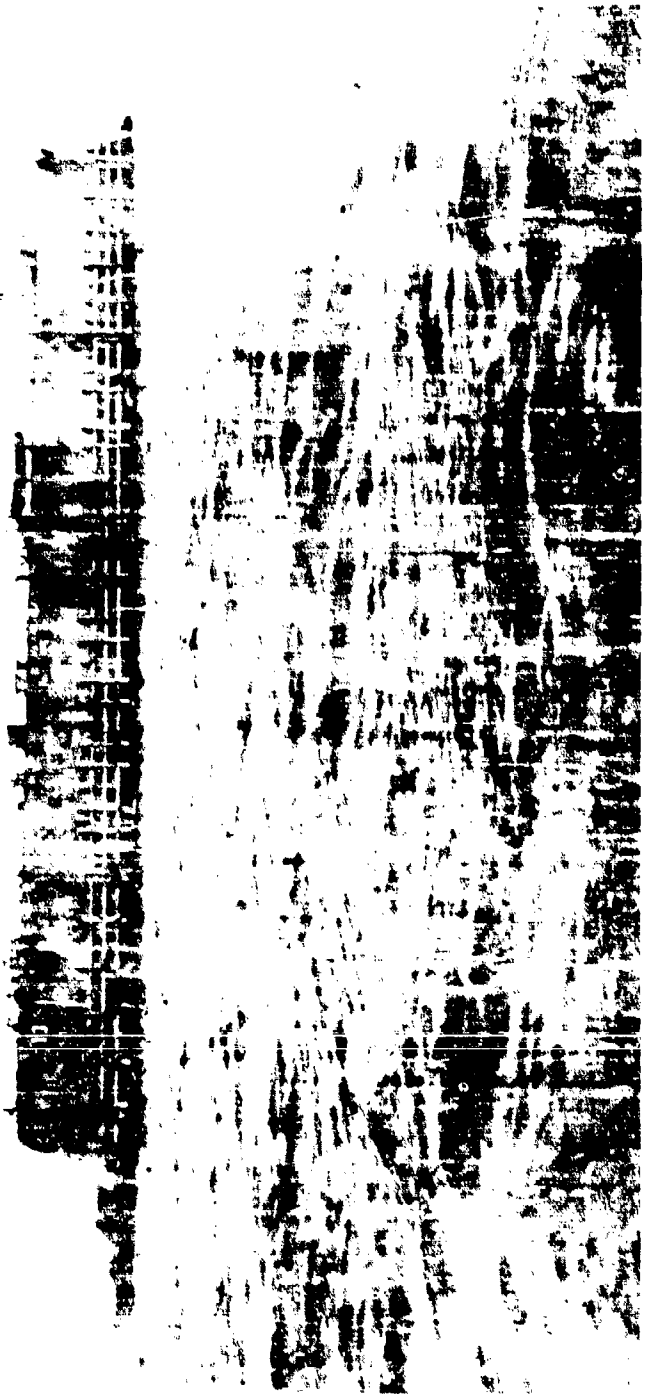


Plunger Type Scratch Gage (Unset)

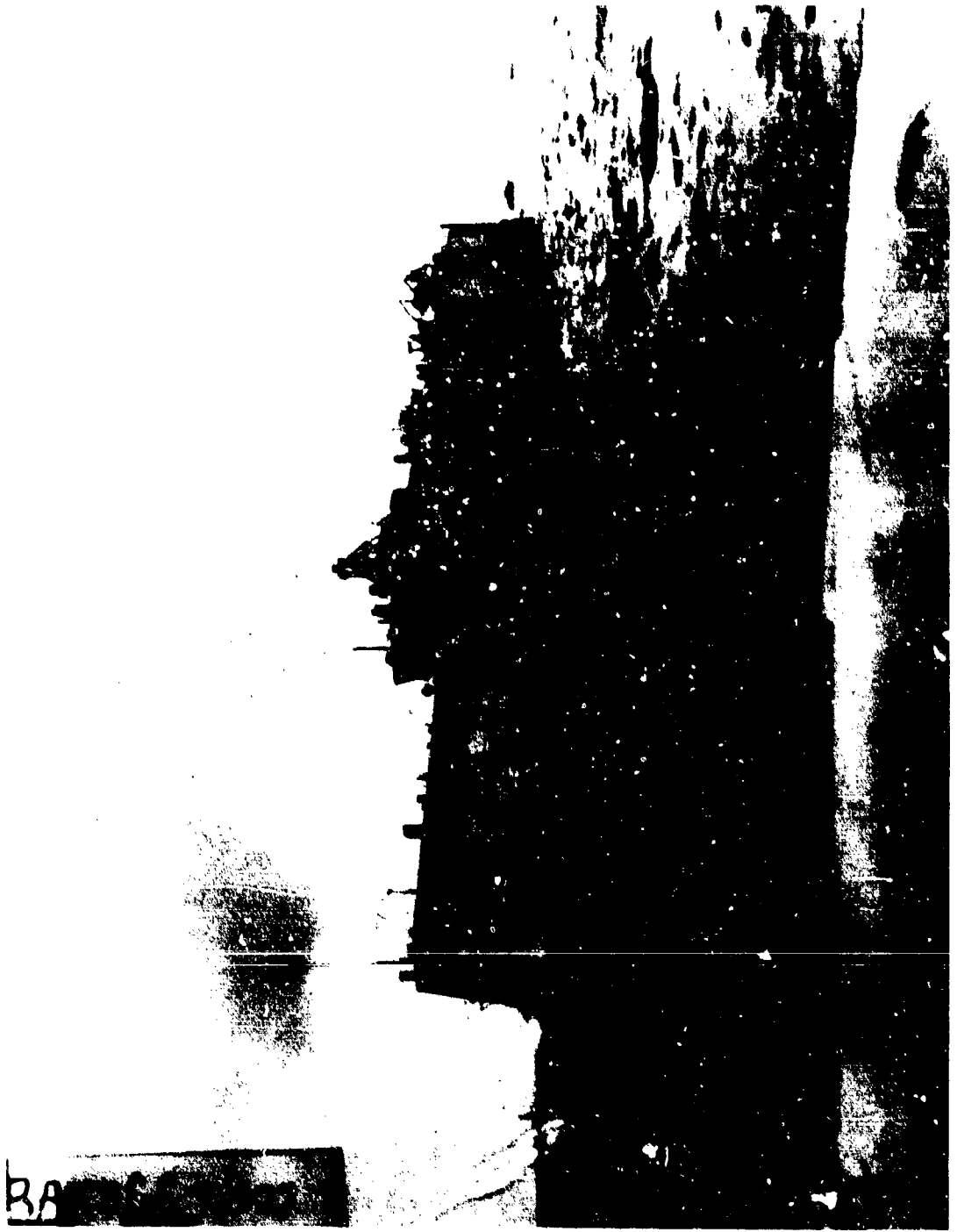


3. Catch Gage Tower "B" Deck

BA CR 56 - 927



Port Beam - Exterior



Port Bow - Exterior

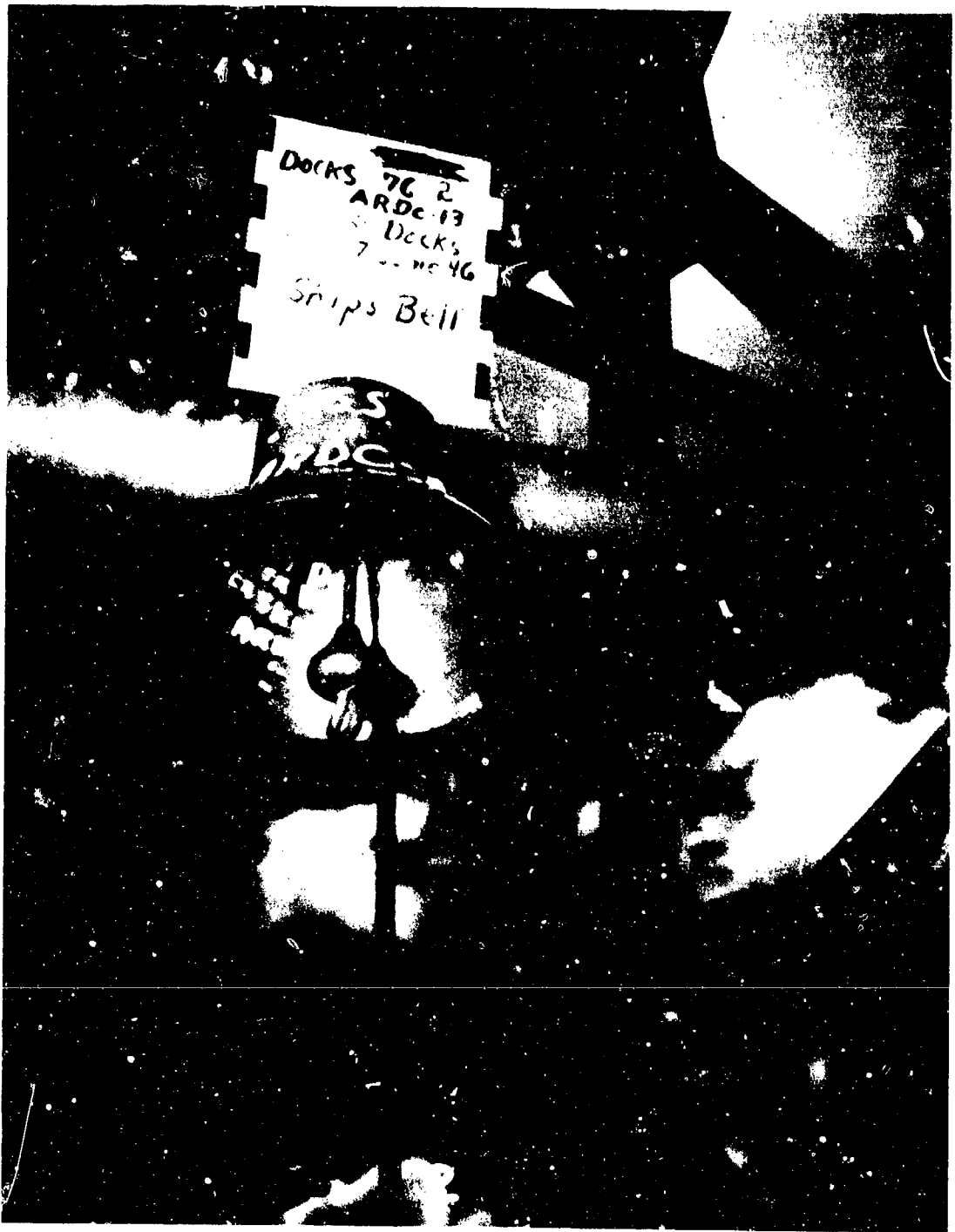


Anchor and Chain Fittings - Port Bow



Flanged Fill and Discharge Valve



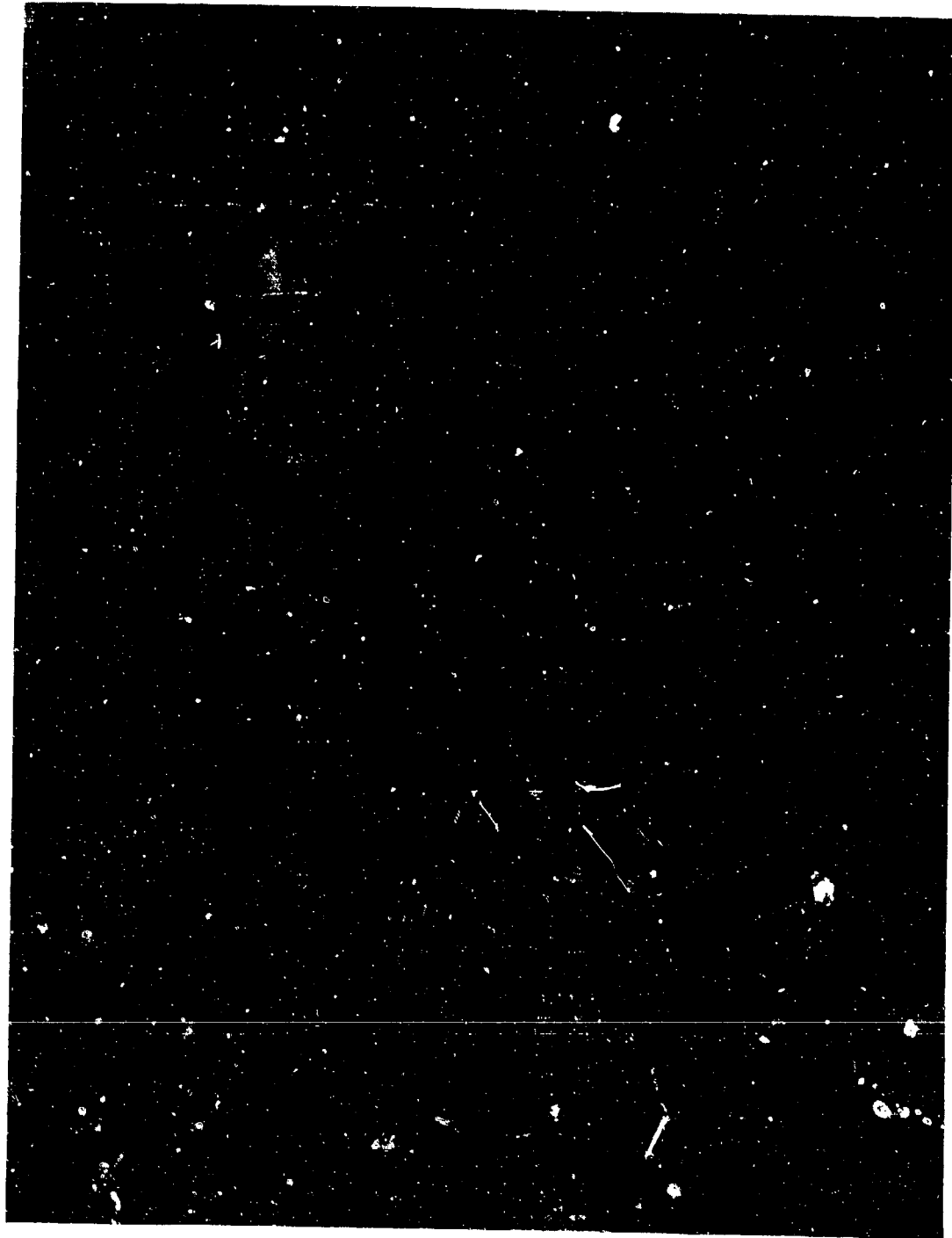


Ships Bell, Mounted on Blast Gage Tower



C

Army Q.M.C. - Water Tank on Deck Floor



Overall View, Dock Floor Facing Aft



Forward Face, Port Wing Wall



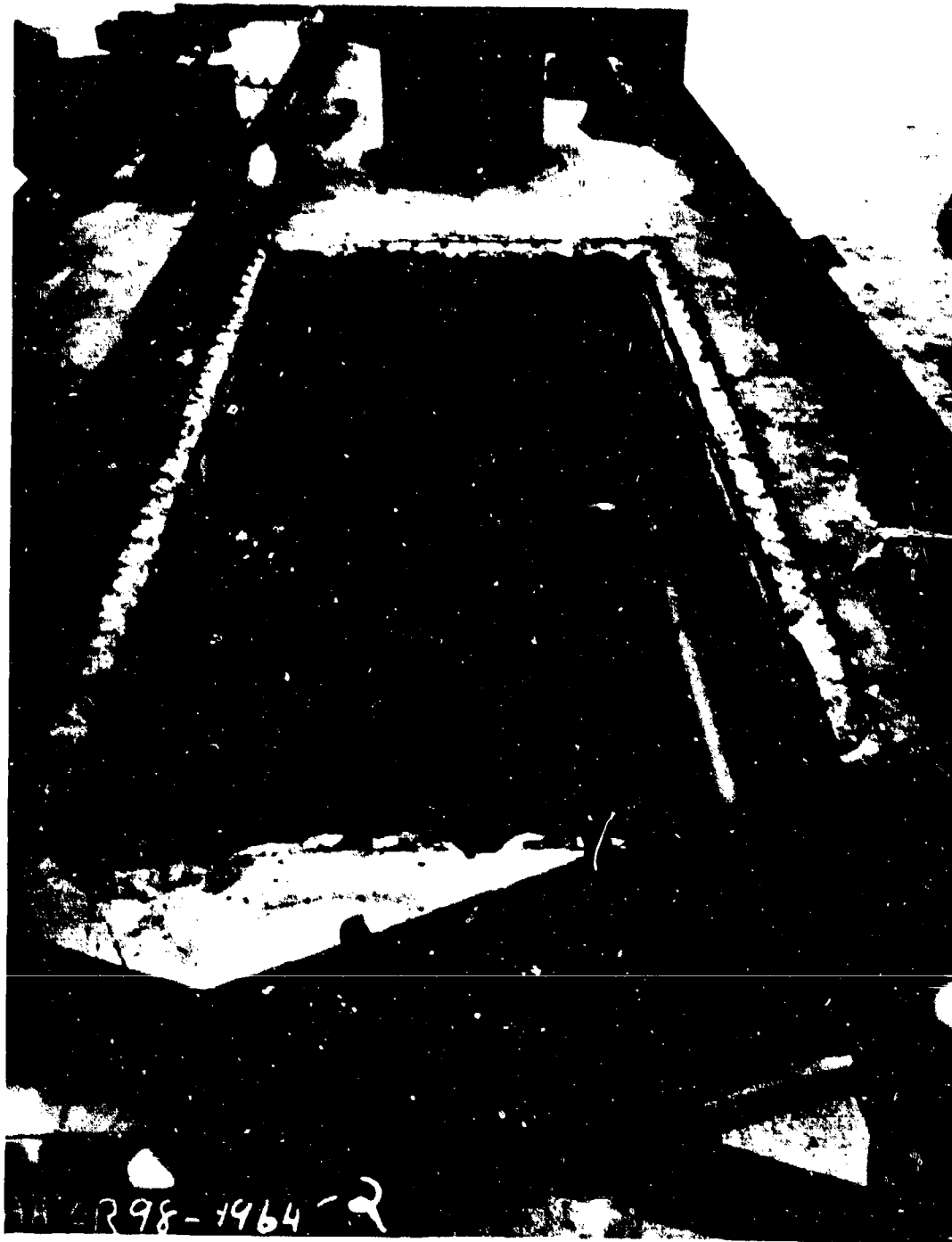
C  
7  
Forward Face, Starboard Wing Wall

**AFTER ABLE**

**ARDC-13**

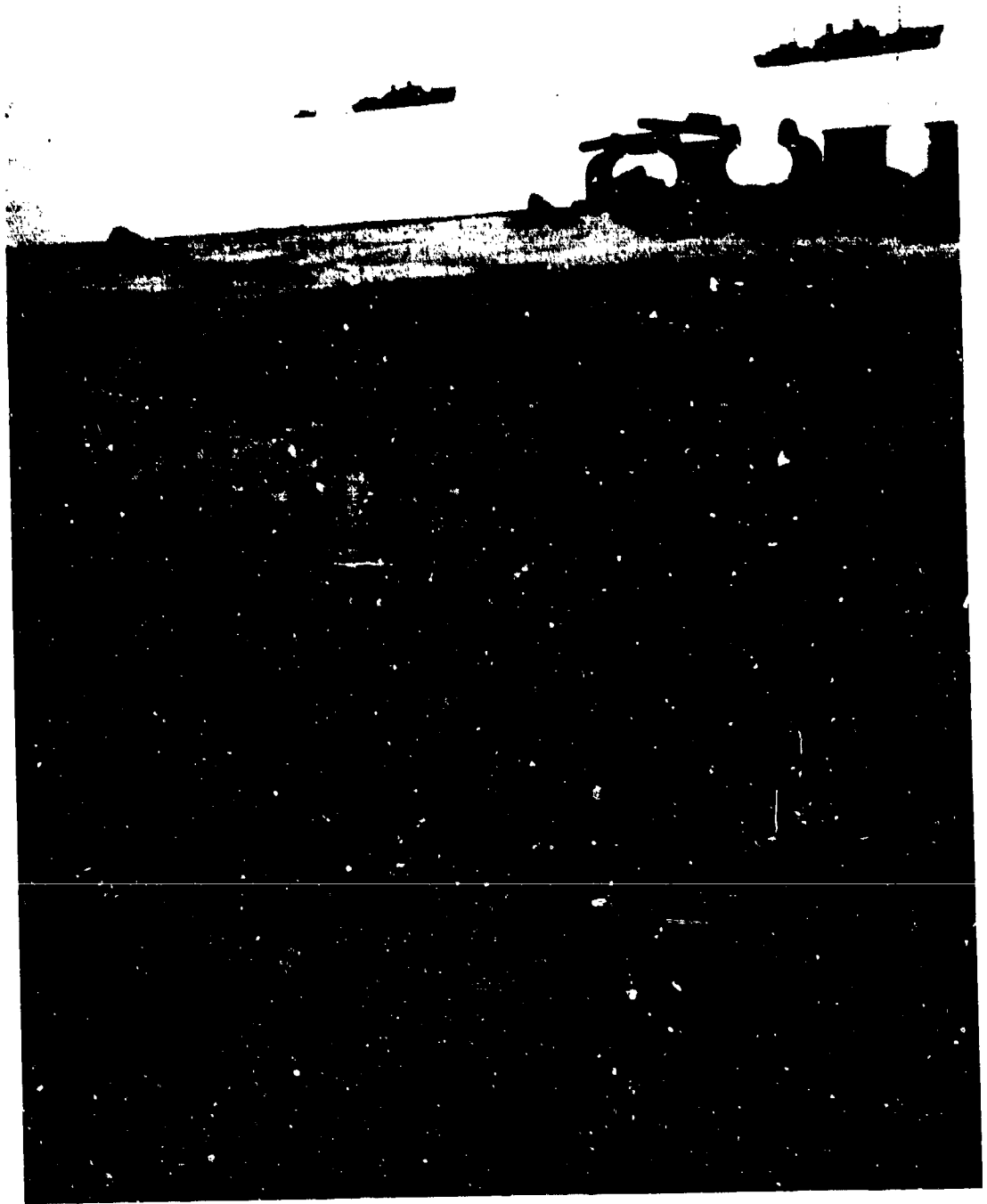


Crack - Port Side, Top of Wing Wall



C  
Hatch Opening - Port Top Deck, Hatch Cover Gone





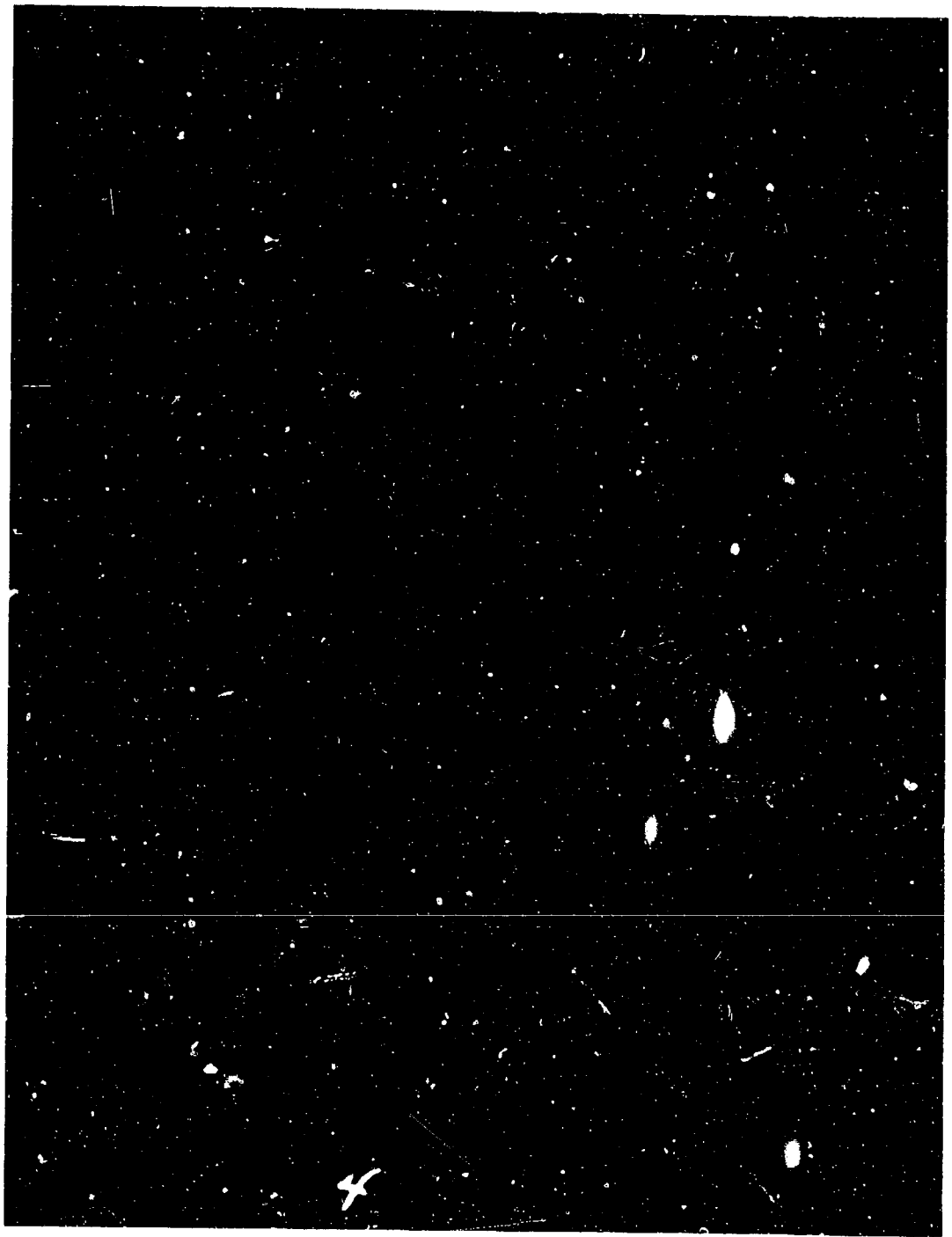
Hatch Opening on Stern Showing Bent Clips



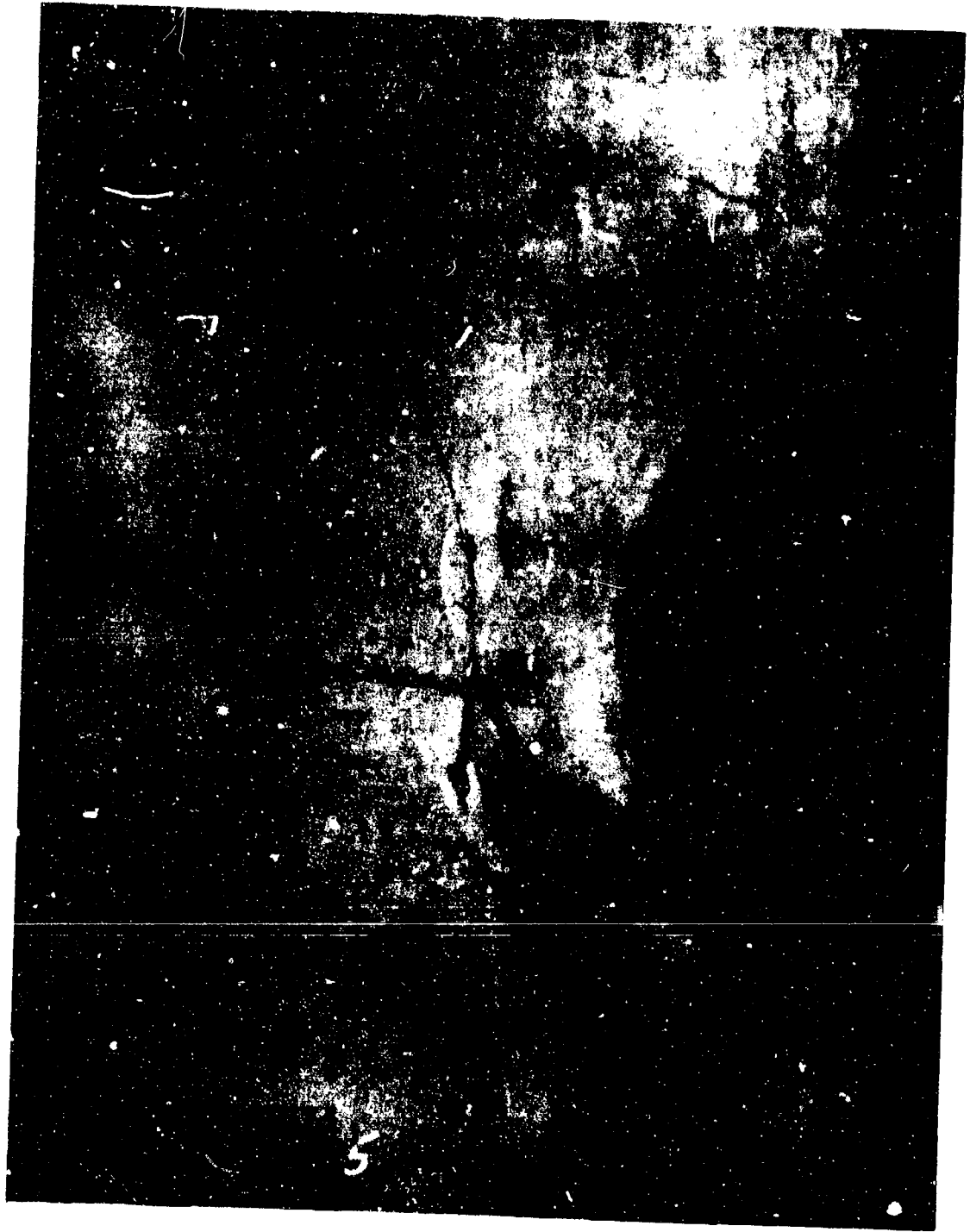
General View - Bow

ANCR98-1964

Port Bow



Torpedo Spoon, Stern ARDC - 13



Crack - Starboard Wing Wall, Inside Aft



Running Light Frame (From APA)



Army Water Tank

C

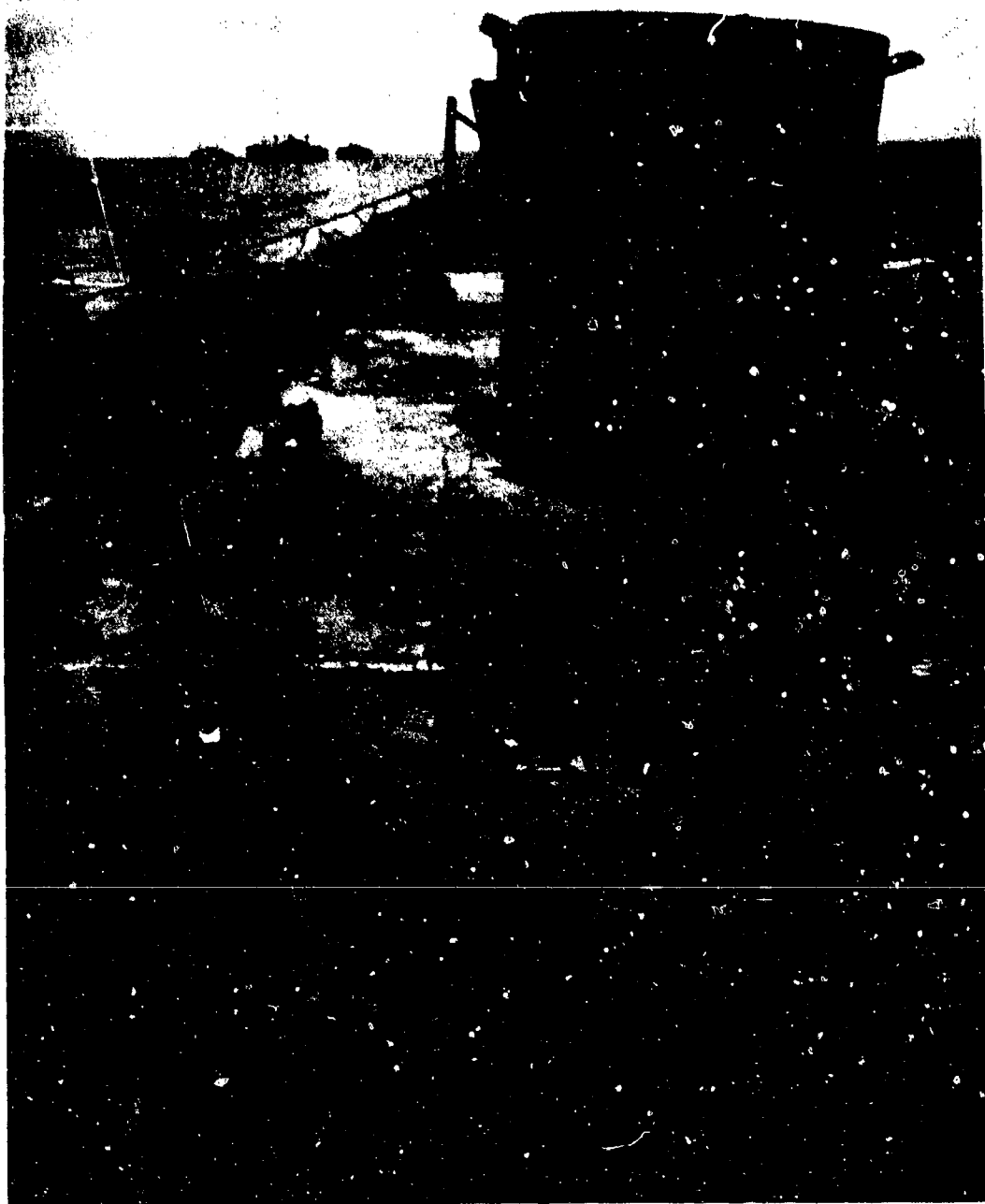


View of Damage to Forward Face of Port Wing Wall





View of Damage to Forward Face of Starboard Wing Wall



Longitudinal Crack in "A" Deck Port Wing Wall,  
Frame 25 Facing Aft



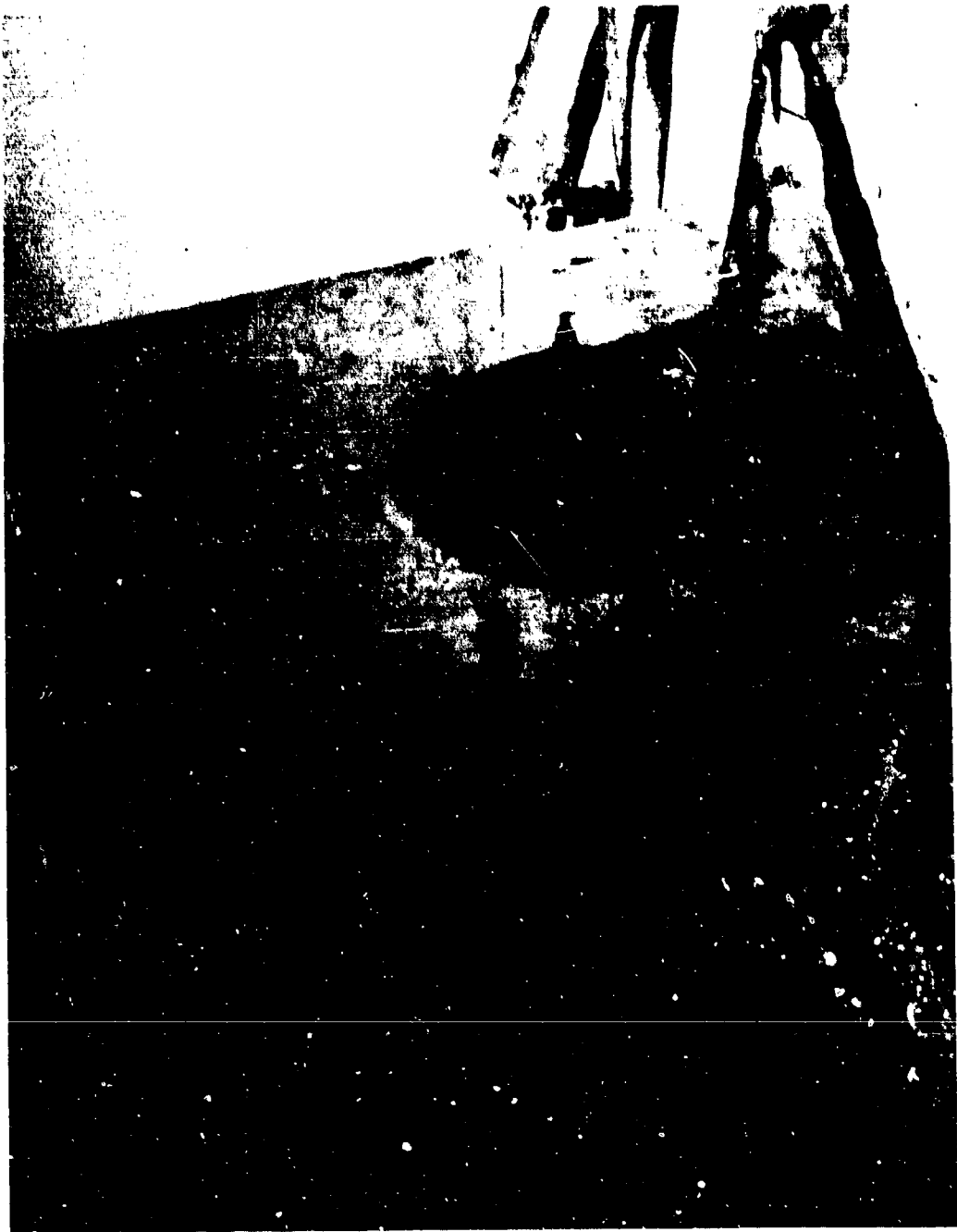
Longitudinal Crack in "A" Deck Port Wing Wall,  
Frame 25 Facing Forward



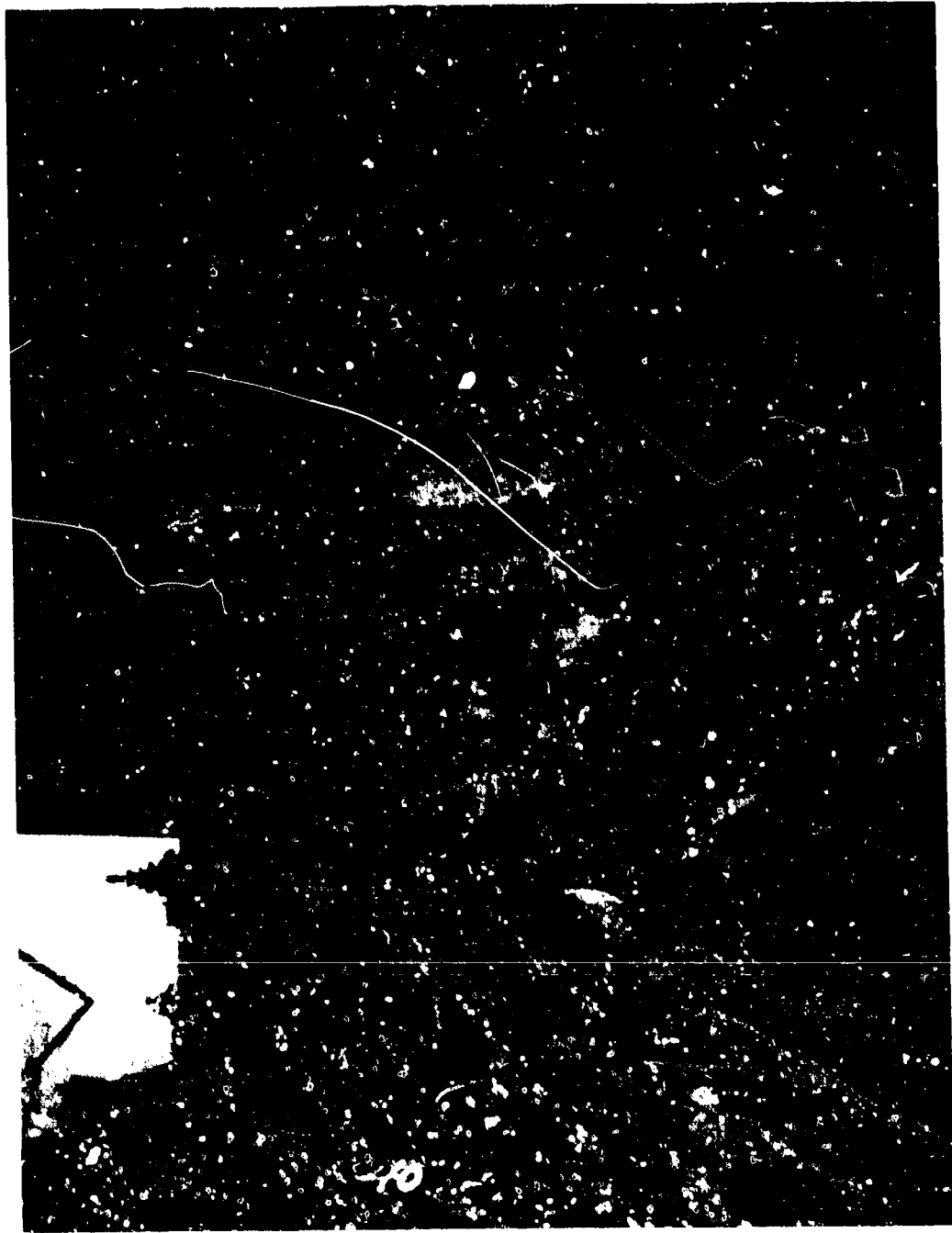
View of Damage to Crane on Deck Floor from Top of Port Wing Wall



Crack - Inboard Face, Starboard Wing Wall - Amidships - 3' Above Deck Floor



Crack - After Face and Inboard Corner of Starboard Wing Wall  
3' Above Dock Floor

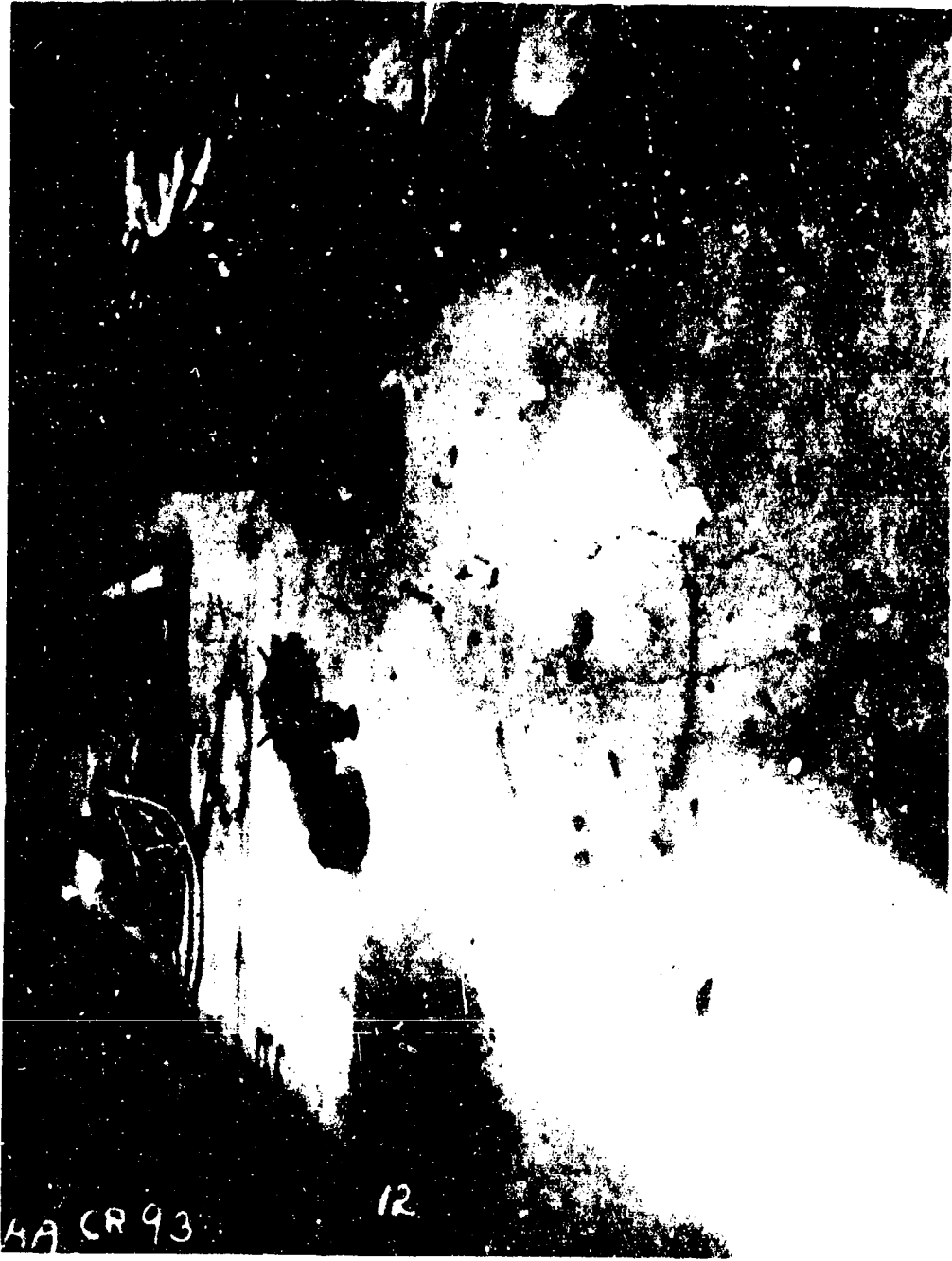


Crack - After Face of Starboard Wing Wall



Spalling - Inboard Face Starboard Wing Wall - Frame 40 - 3' Above Floor





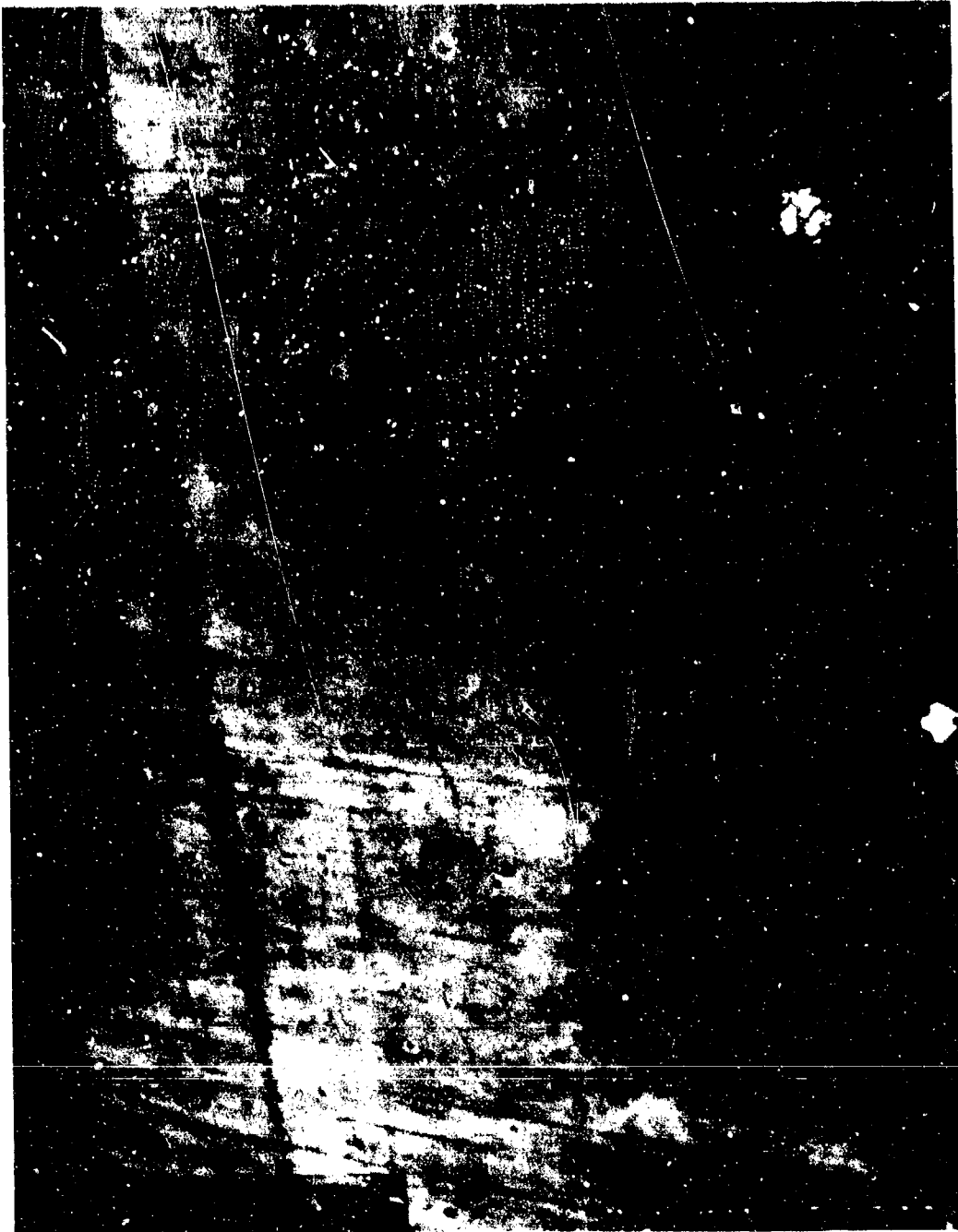
Crack - "A" Deck Starboard Wing Wall - Frame 30 Facing Aft



Crack - Spalling - Around Ventilator at Frame 28 - "A" Deck Starboard Wing Wall



Spalling Around Ventilator - "A" Deck - Starboard Wing Wall at Frame 38

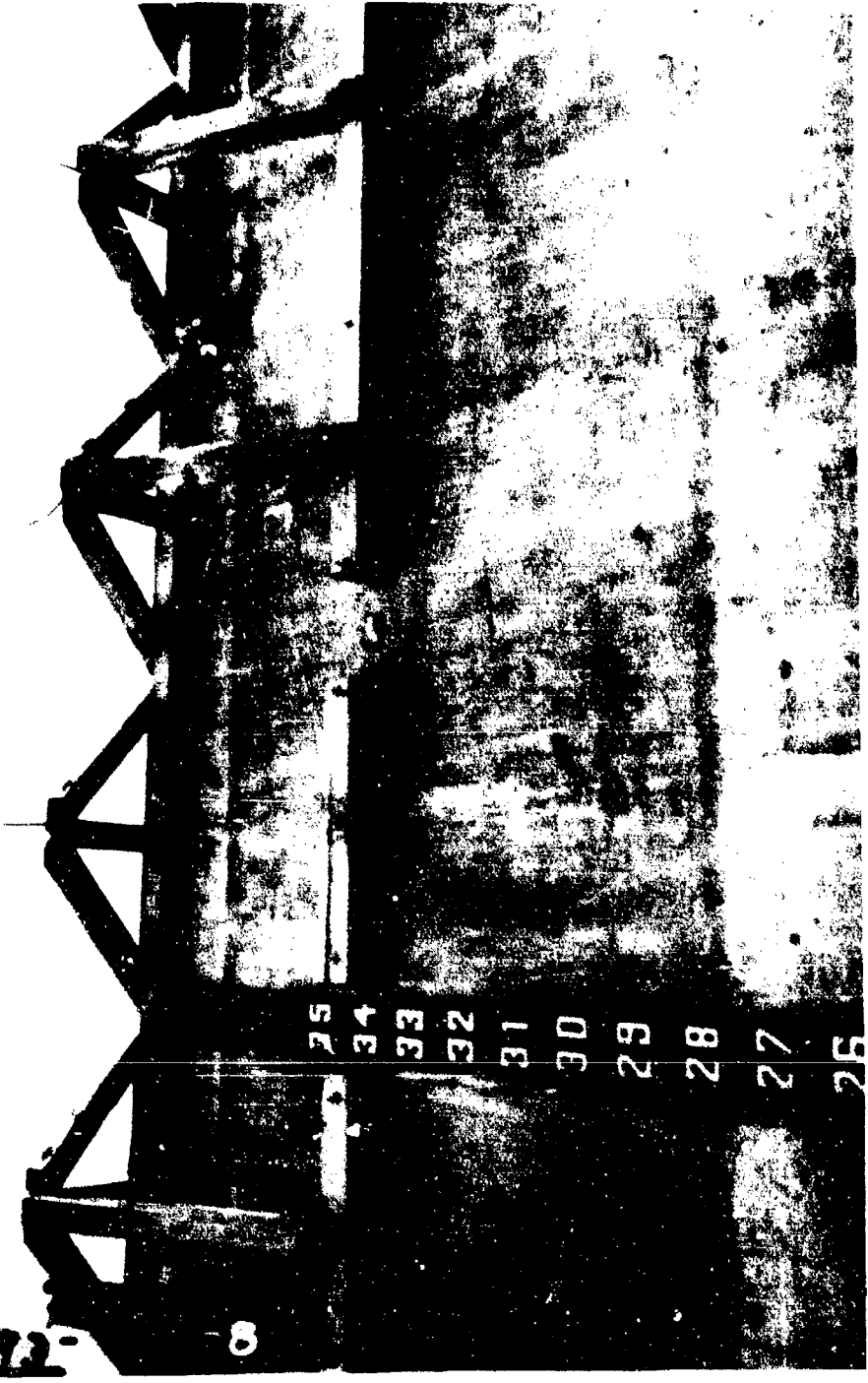


Crack - Inboard Face - Port Wing Wall - Frame 20 - 35 - 10' Above Floor

AA CR 92-

8

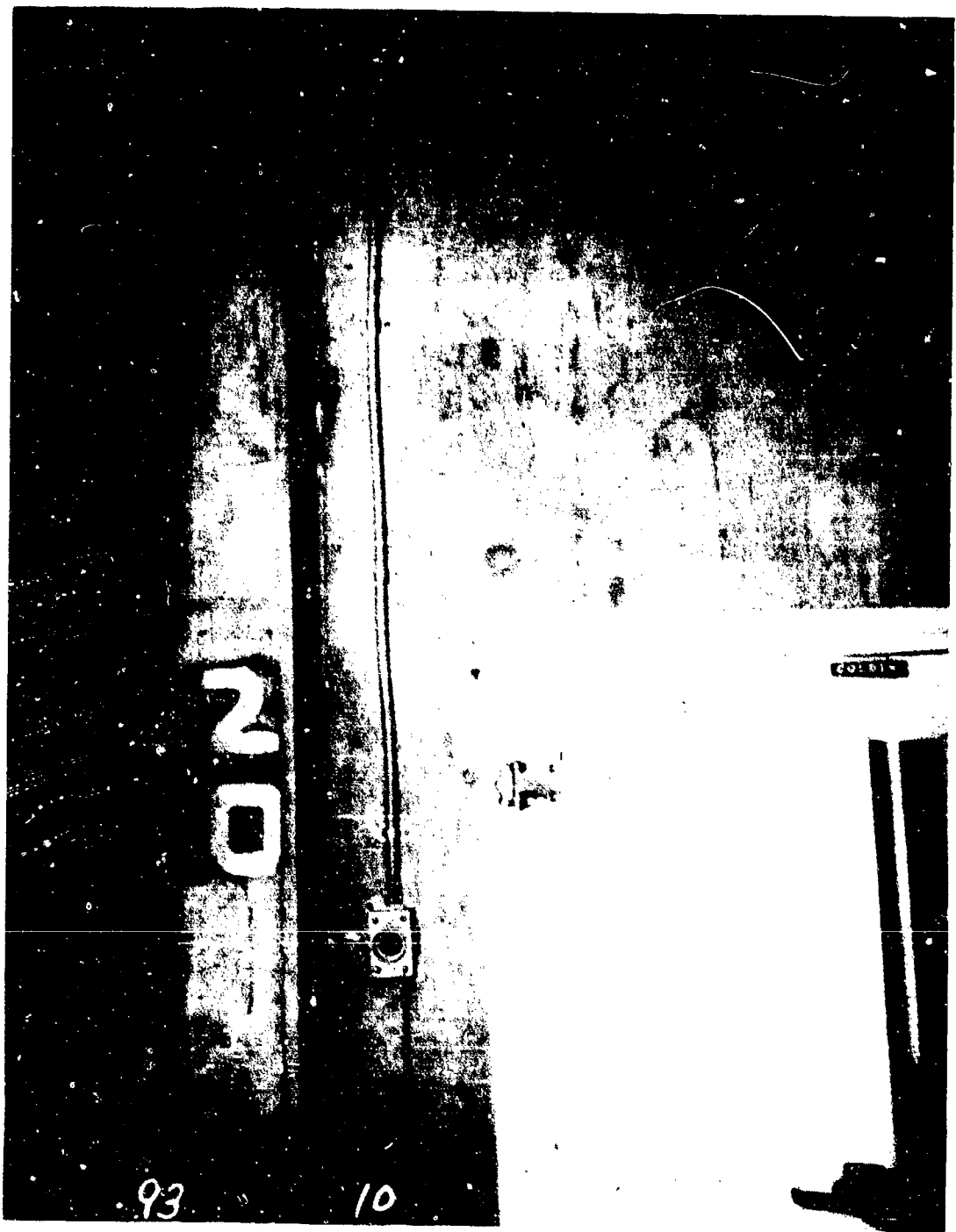
25  
34  
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27  
26



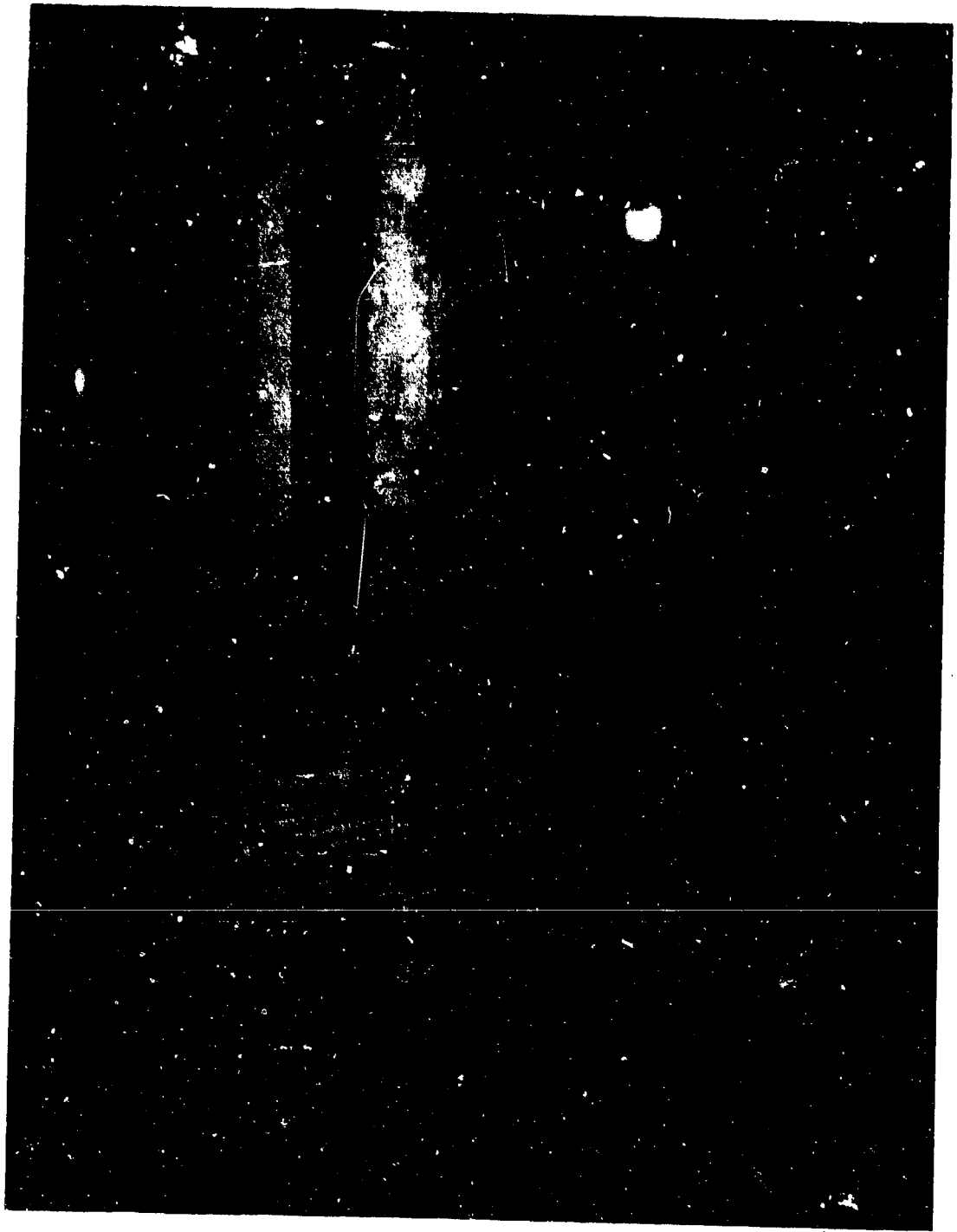
Crack - Inboard Face - Port Wing Wall - Frame 20 - 42 - 2' From Top



Crack in "B" Deck Port Wing Wall - Frame 18

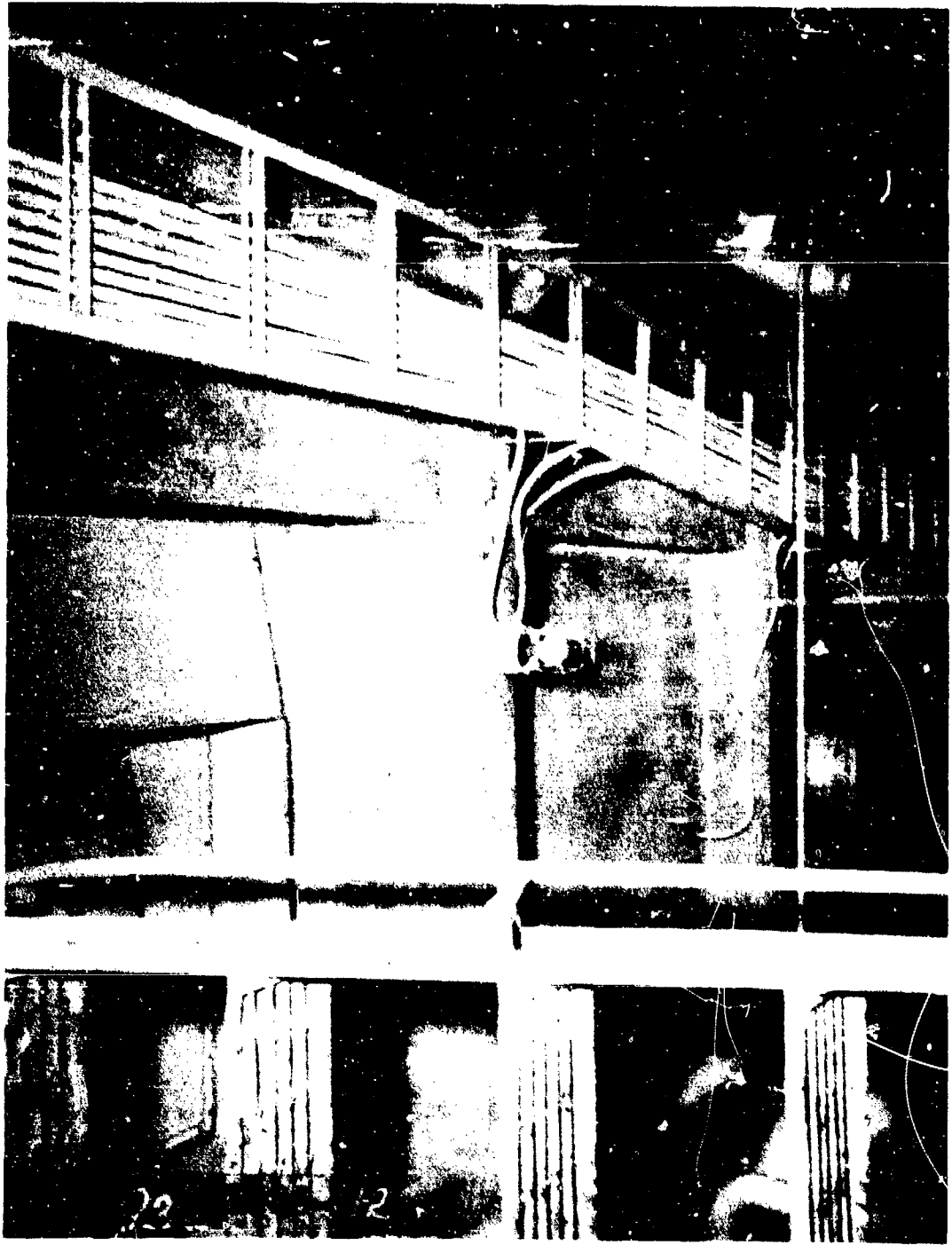


C  
Crack - "B" Level - Port Wing Wall - Frame 20 -  
Outboard Wall - Inside Face



Crack - "B" Level - Port Wing Wall - Frame 26 -  
Top Inside Face of Outboard Wall





Crack - "B" Level - Port Wing Wall - Frame 24 - Top



View of Preparations for Pumping out Dock



Longitudinal Crack Inside Face - Outboard Wall - Frame 24 - Port



View of Mess Table Ripped Off Fastenings to "B" Deck



**View of Damage to Sick Bay "B" Deck**

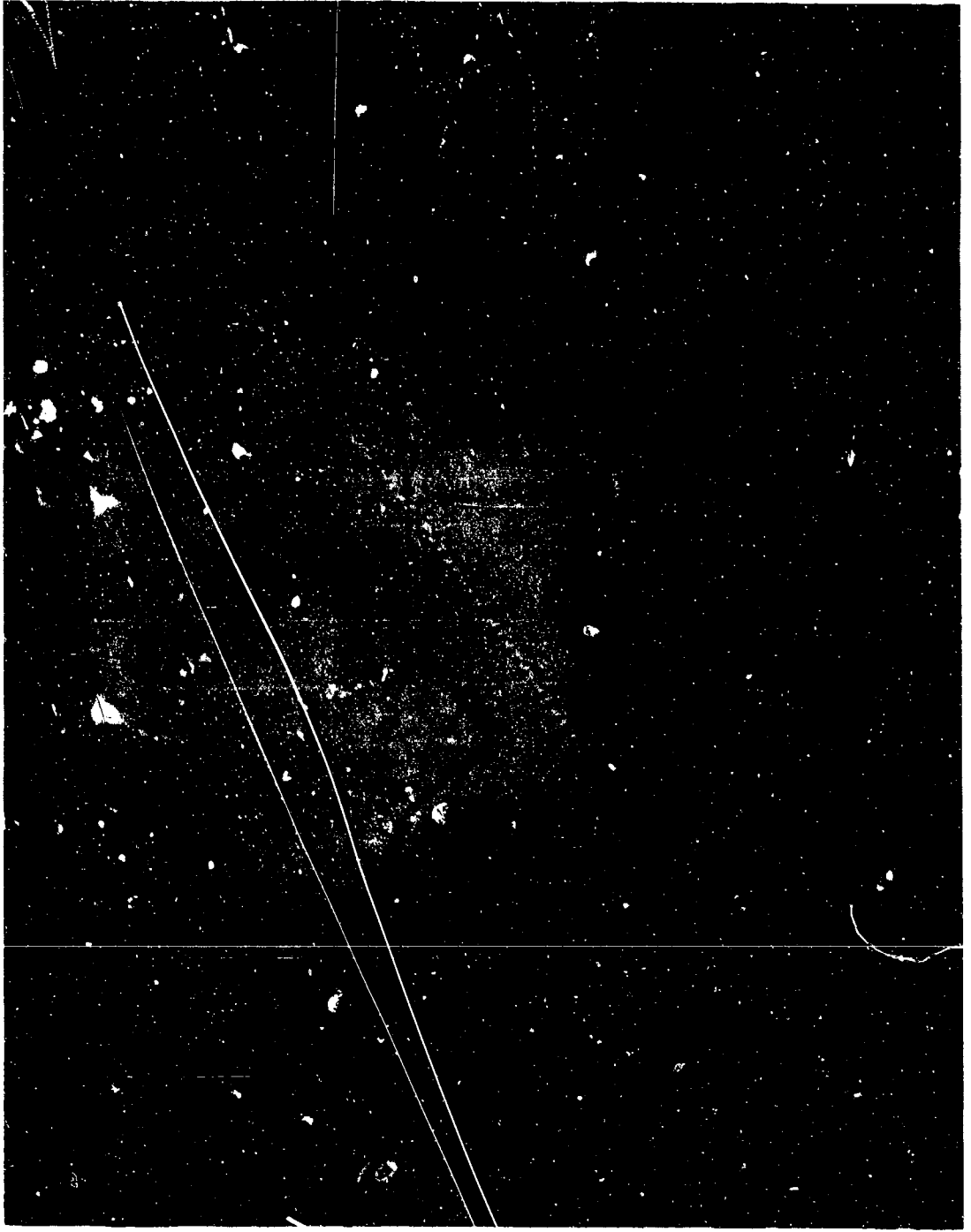
C



Crack in Transverse Bulkhead at Frame 44, Port Wing Wall



General View of Port Quarter

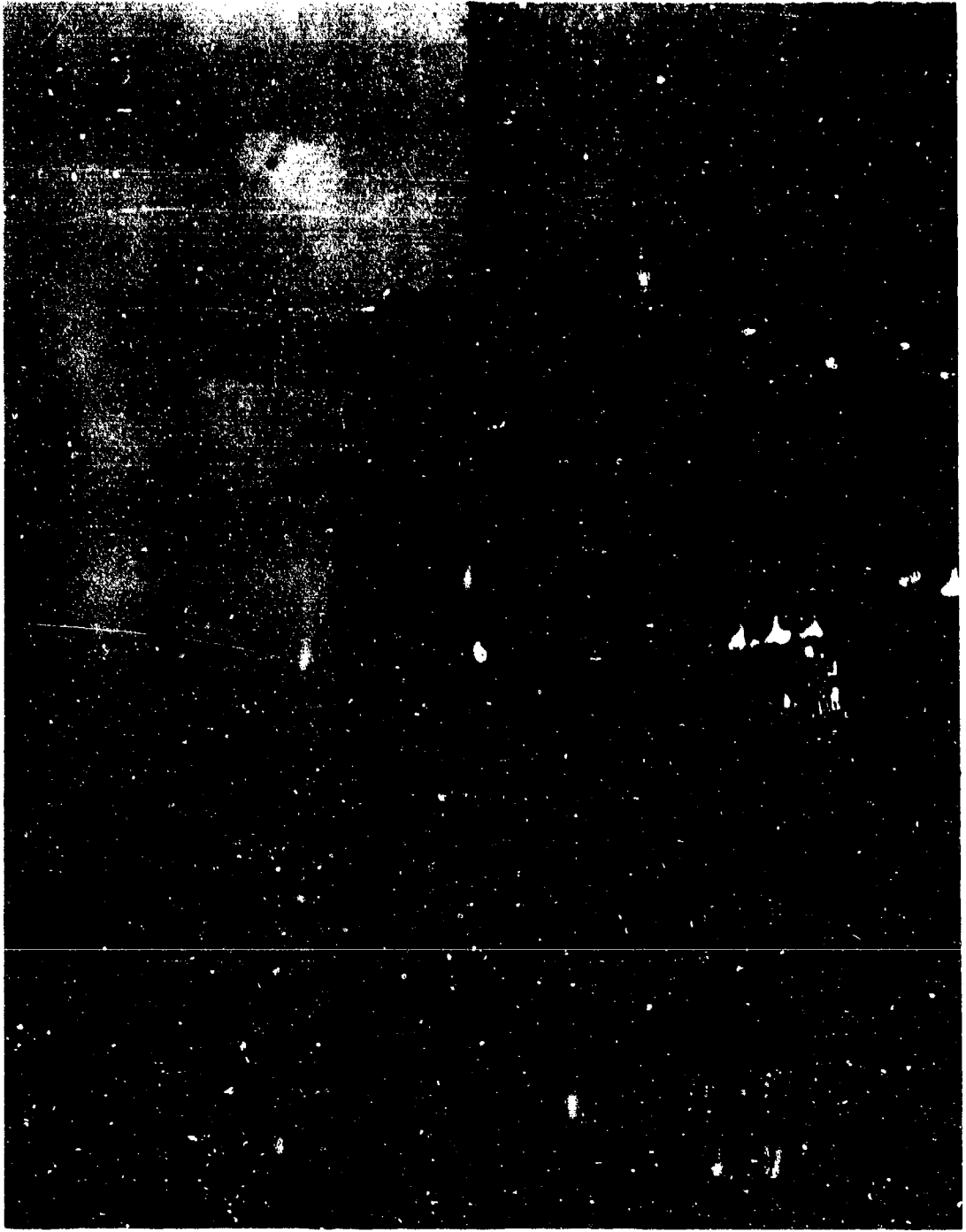


View of Damage Material on Dock Floor Facing Aft





General View of Starboard Wing Wall Facing Aft

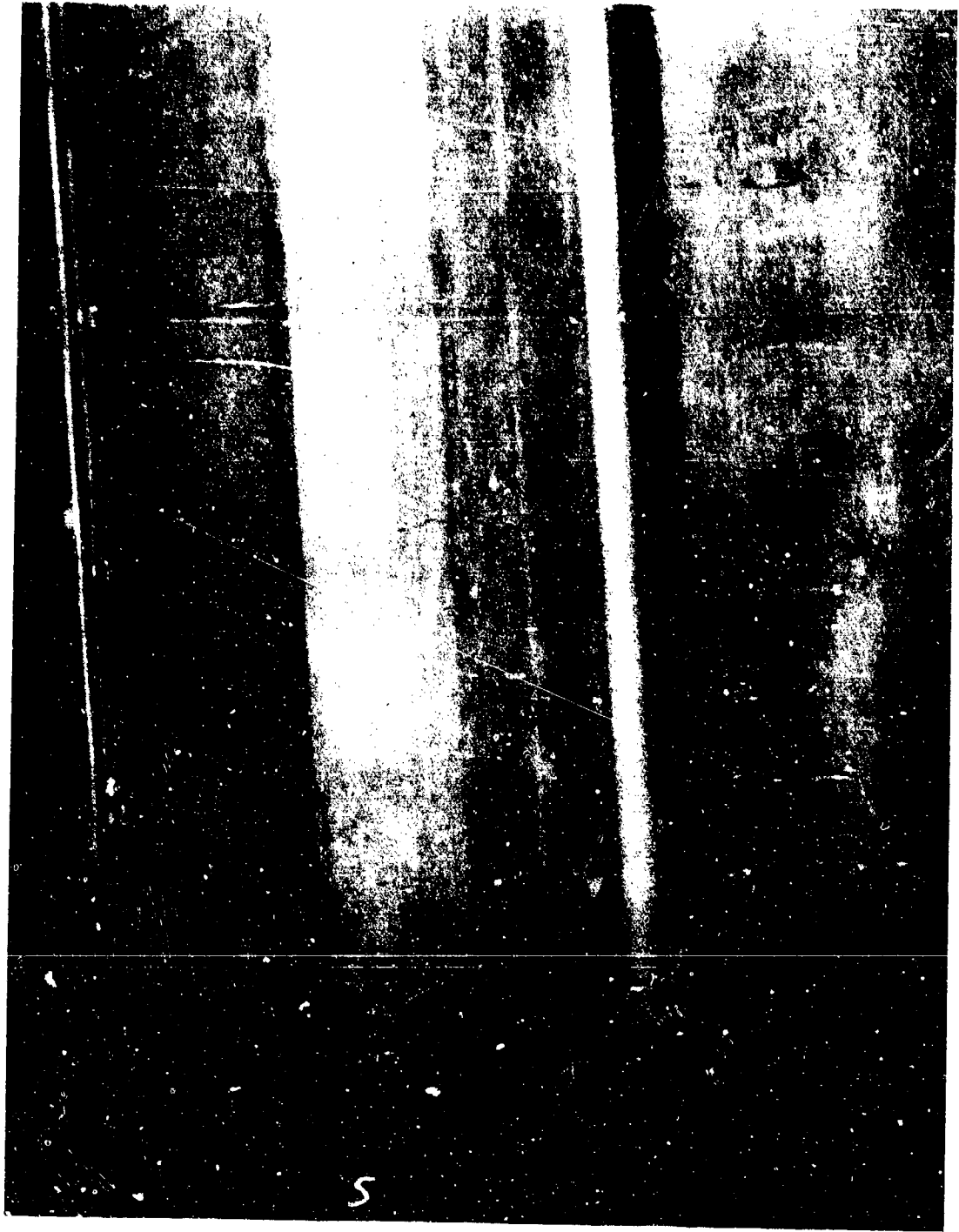


Blast Shadow Inside Face Starboard Wing Wall - Frame 49 to 56

C

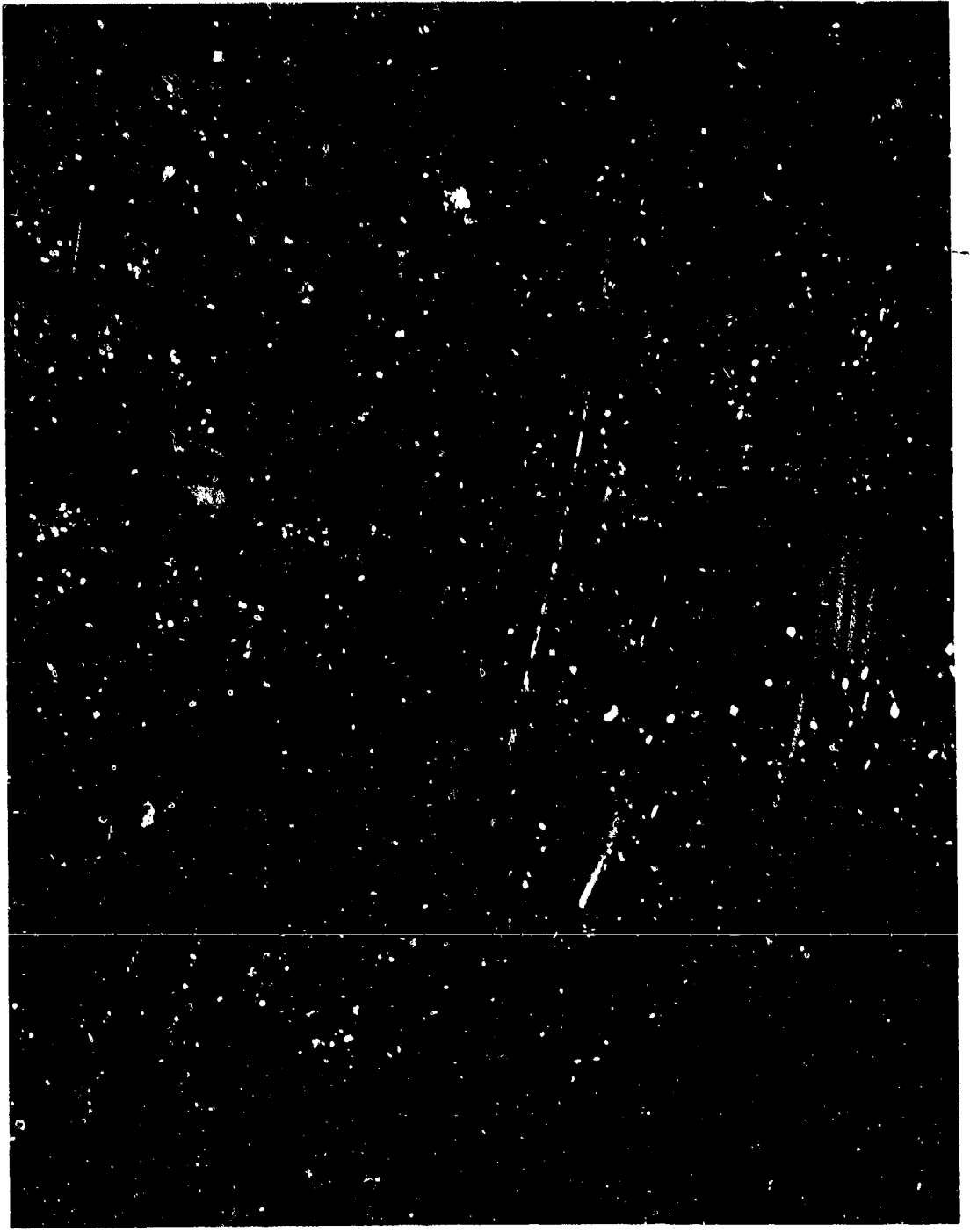


**Frame 36, Below "A" Deck Outboard Shell - Starboard Wall**



C

Frame 36 Between "A" and "B" Deck - Frame 27 to 28 near  
Inboard Shell, Starboard Wall

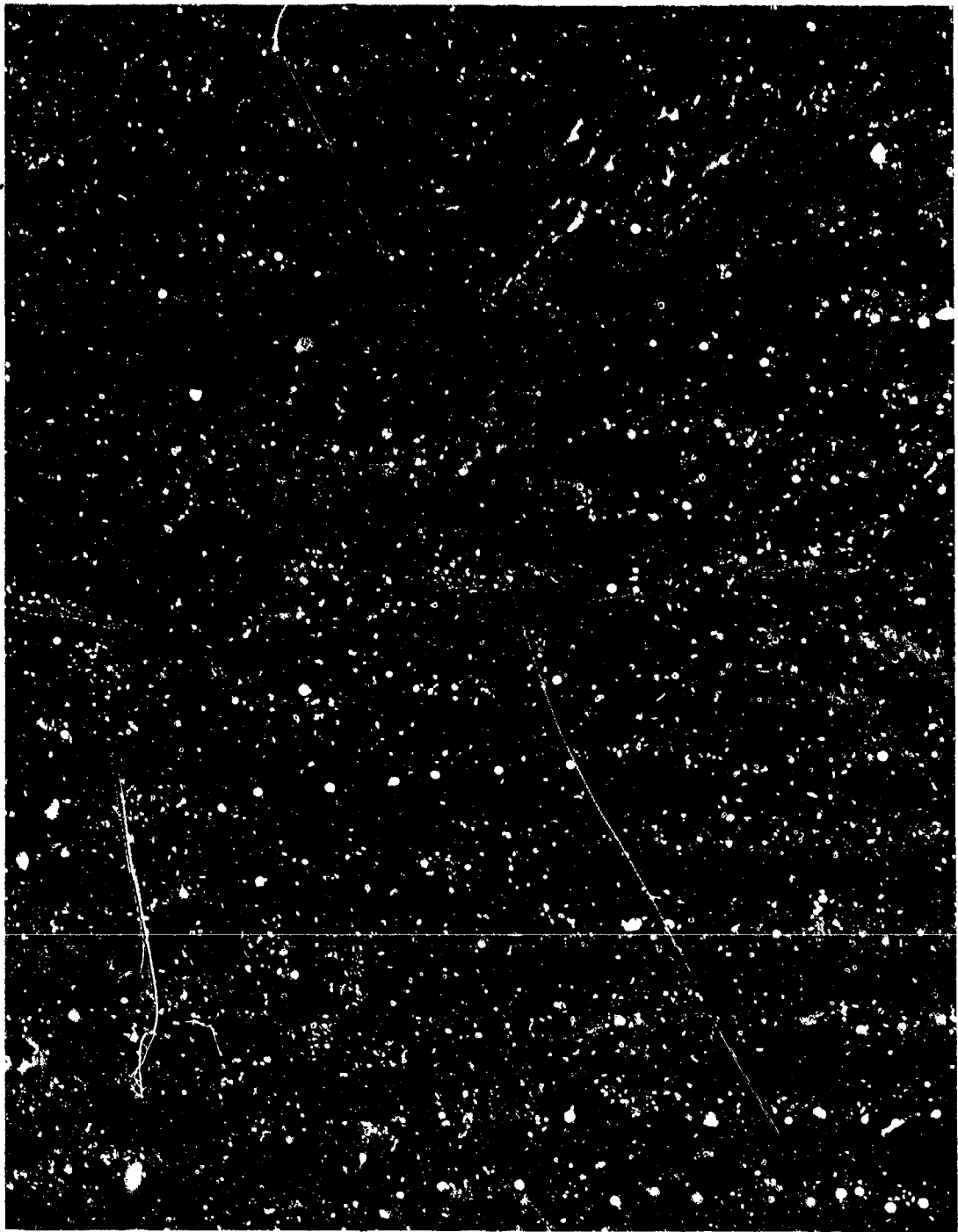


Bottom of "A" Deck - Frame 27 to 28 Near Outboard Snell - Starboard Wall

0

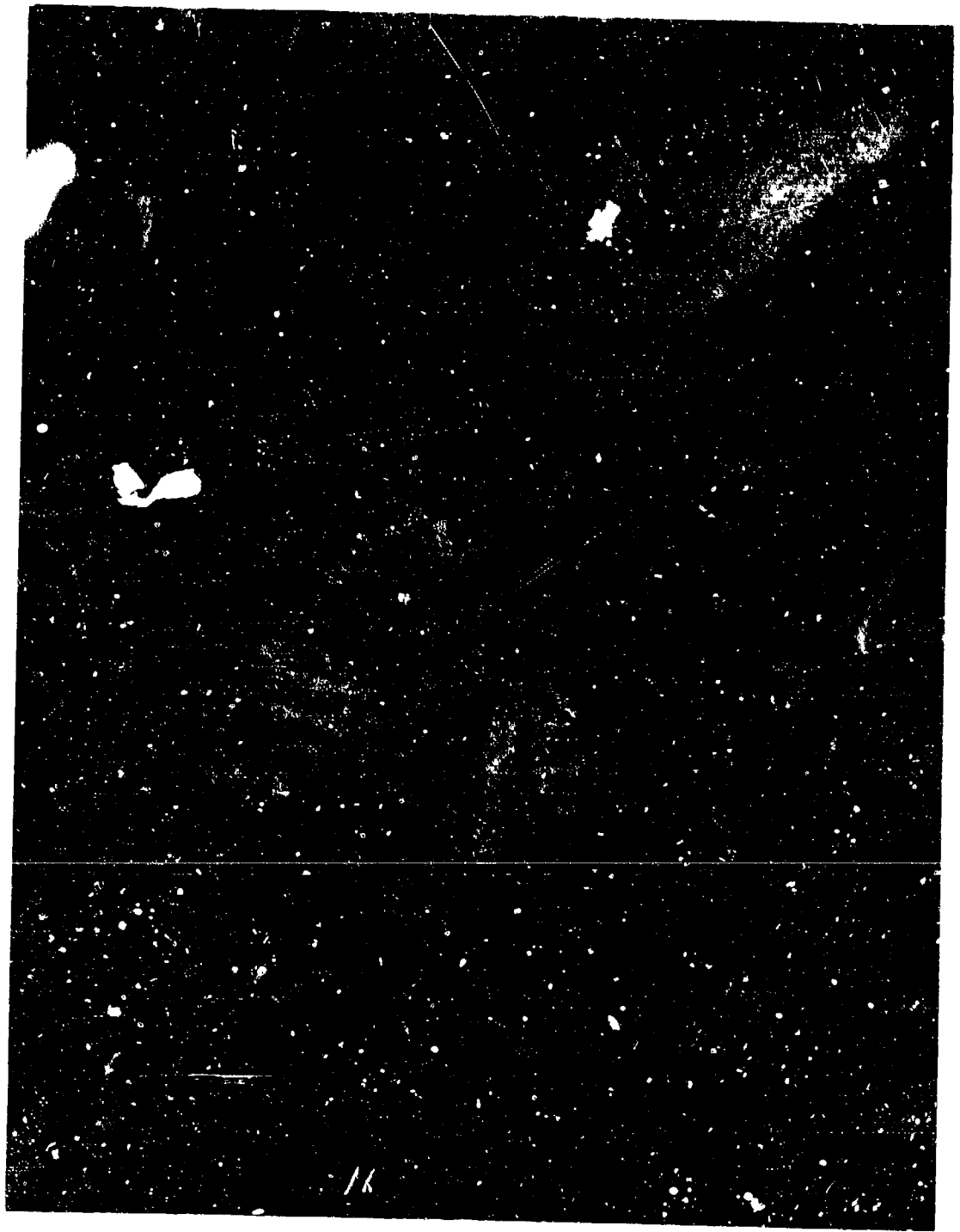


“B” Deck Frame 25 to 26 Near Outboard Shell - Starboard Wall



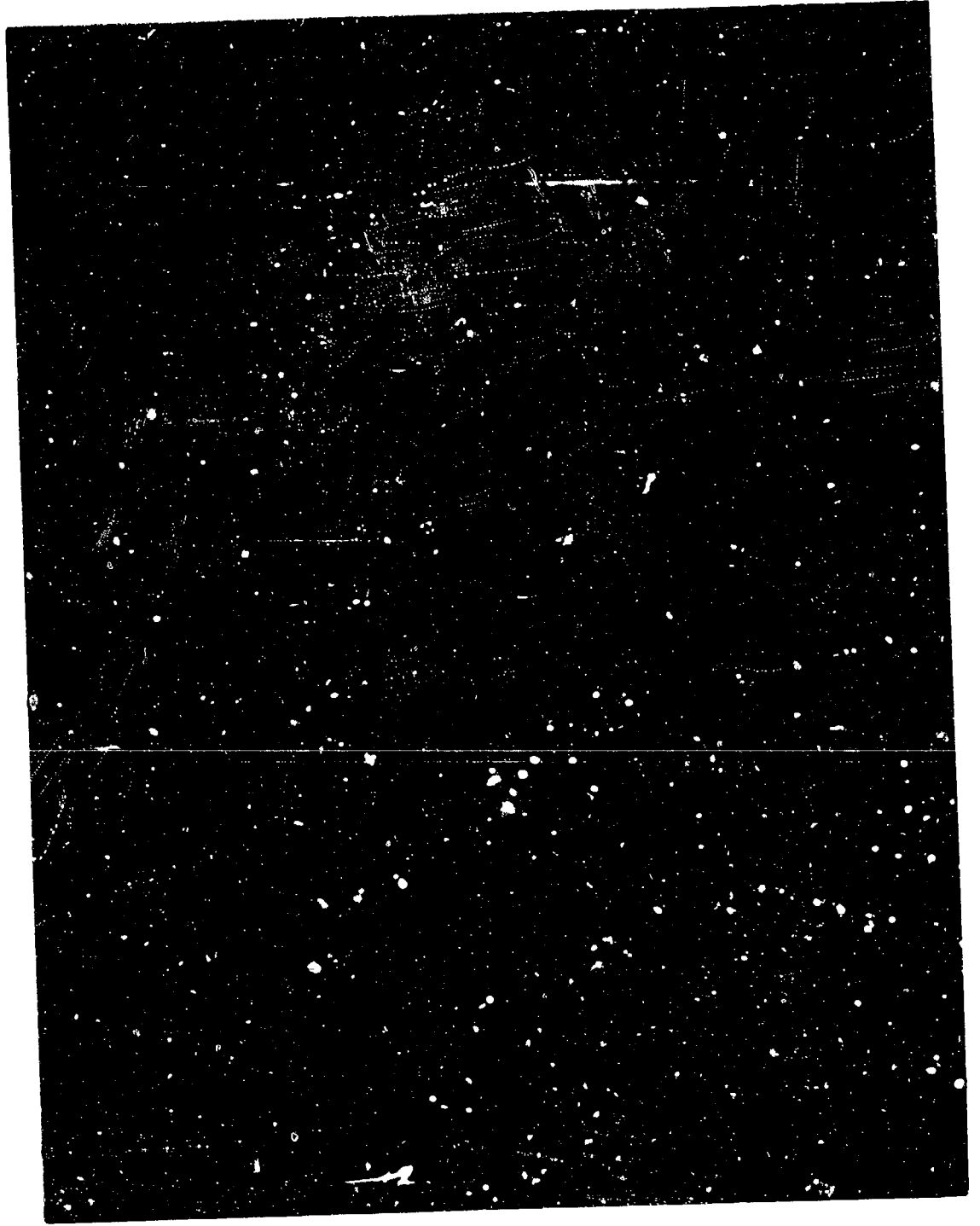
Frame 29 Below "B" Deck Near Outboard Shell - Starboard Wall

C

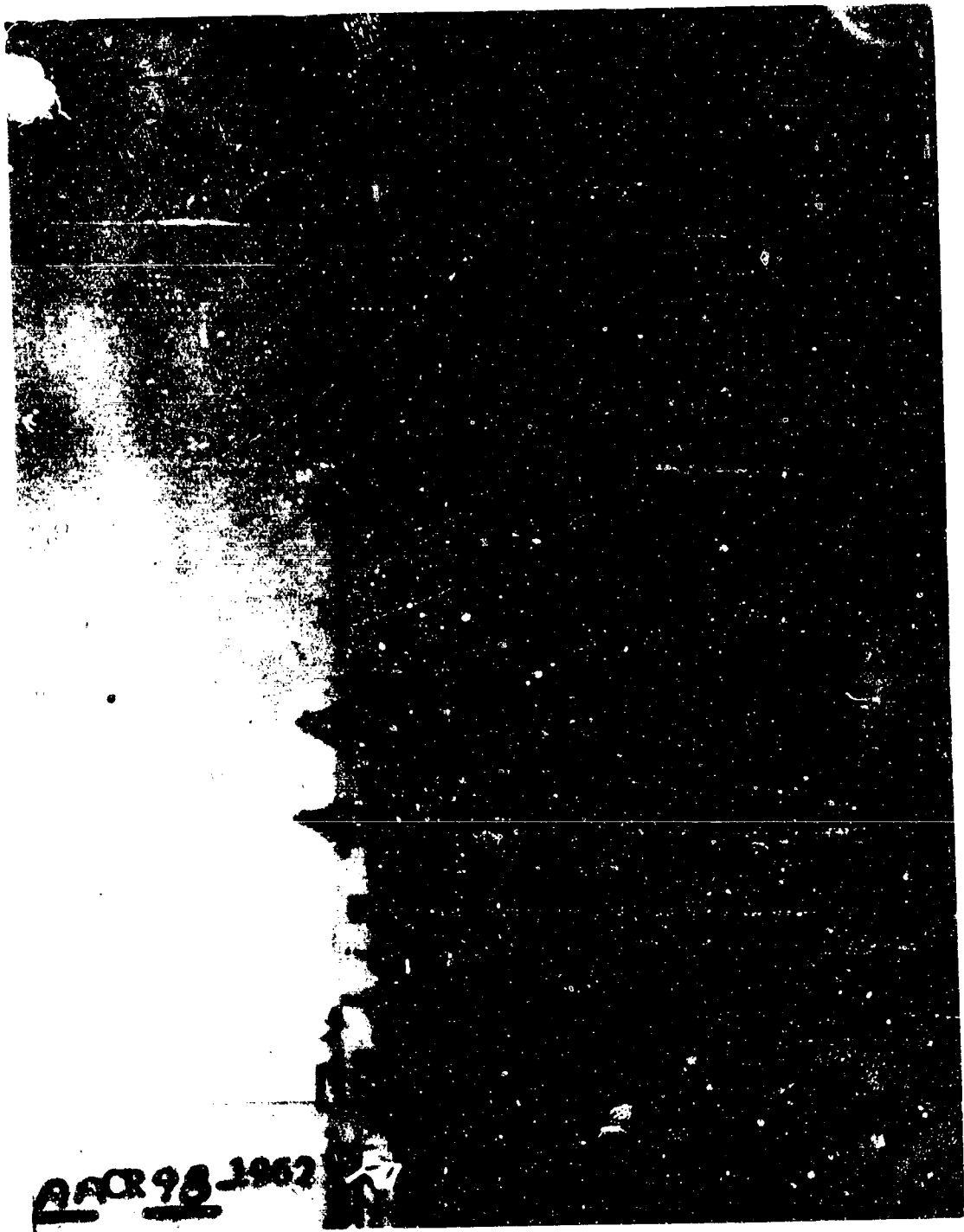


Frame 28 Below "B" Deck Near Outboard Shell - Starboard Wall





**Inboard Shell, Frame 27 to 28 About 4 Feet Above "C" Deck Starboard Wall**



Deck Wall Forward From Aft Starboard Wing Wall

C

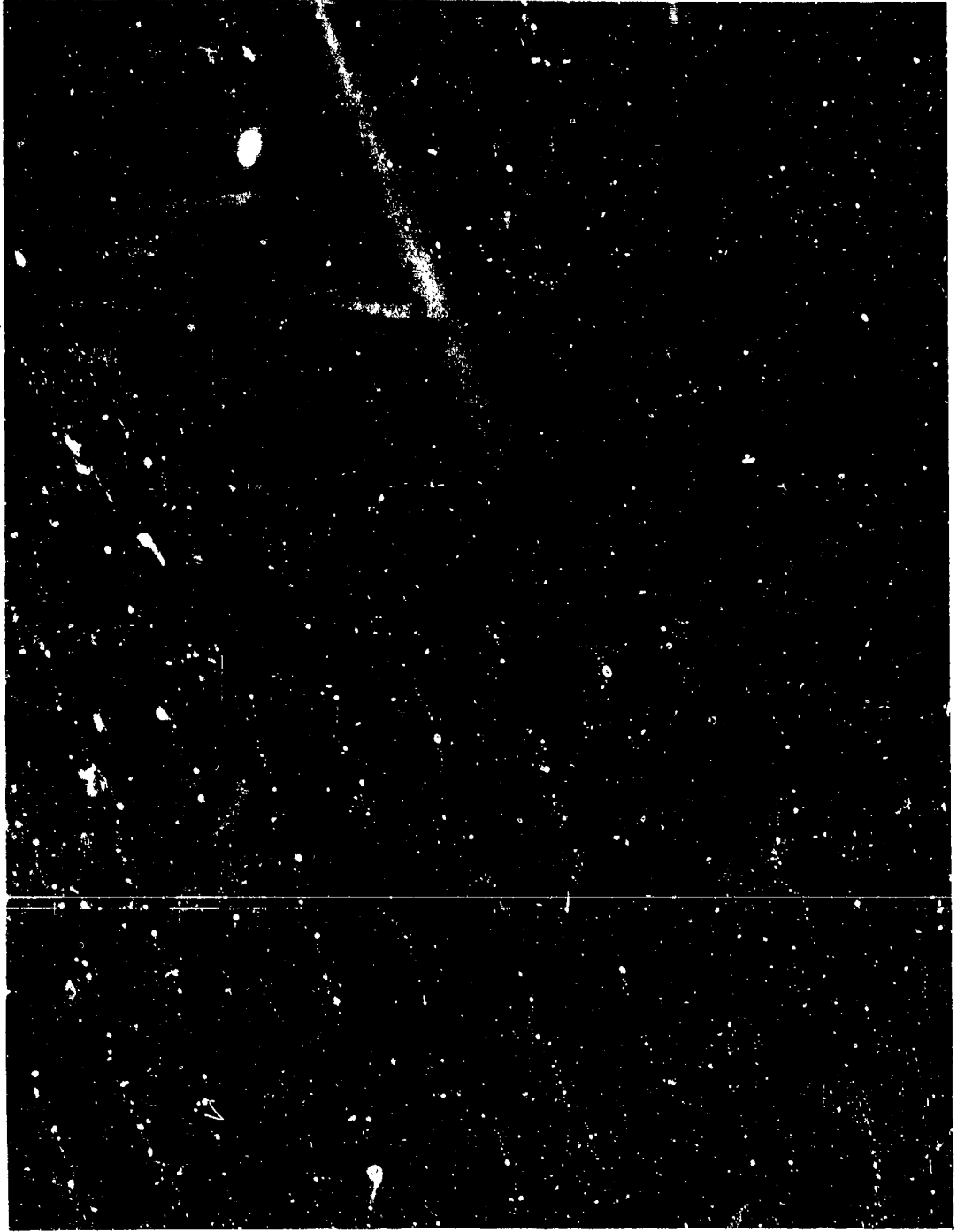
**M-46 BOMB DAMAGE  
TO  
ARDC-13**



View of Pontoon Moored Astern of ARDC - 13

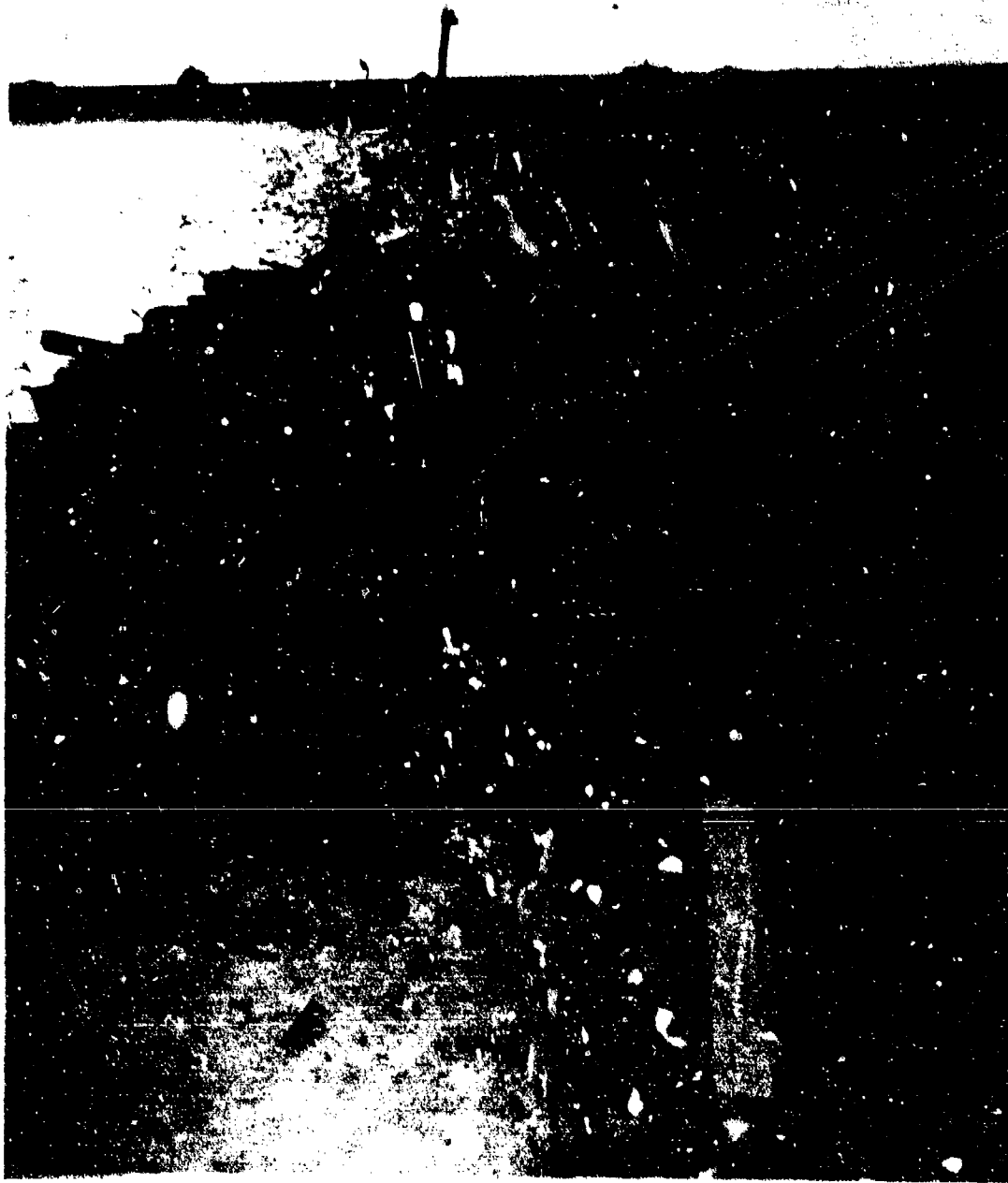


Frames 12 and 13 - Starboard Wing Wall - Facing Forward



Frame 12 - Details of Failure, Facing Forward

2180



C

Hole in Starboard Wing Wall - General View Forward



TRC

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

10 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:

AD-366718	XRD-32-Volume 3	
AD-366726	XRD-12-Volume 2	
AD-366703	XRD-16-Volume 1	
AD-366702	XRD-14-Volume 2	
AD-376819L	XRD-17-Volume 2	
AD-366704	XRD-18	
AD-367451	XRD-19-Volume 1	
AD-366700 <sup>5</sup>	XRD-20-Volume 2	AD-366705
AD-376028L	XRD-4	
AD-366694	XRD-1	
AD-473912	XRD-193	
AD-473891	XRD-171	
AD-473899	XRD-163	
AD-473887	XRD-166	
AD-473888	XRD-167	ST-A 28 JAN 80 made target
AD-473889	XRD-168	



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10 April 1997

SUBJECT: Declassification of Reports

AD-B197749	XRD-174
AD-473905 ✓	XRD-182
AD-366719 ✓	XRD-33 Volume 4
AD-366700 ✓	XRD-10
AD-366712 ✓	XRD-25 Volume 1
AD-376827L ✓	XRD-75
AD-366756 ✓	XRD-73
AD-366757 ✓	XRD-74
AD-366755 ✓	XRD-72
AD-366754 ✓	XRD-71
AD-366710 ✓	XRD-23 Volume 1
AD-366711 ✓	XRD-24 Volume 2
AD-366753 ✓	XRD-70
AD-366749 ✓	XRD-66
AD-366701 ✓	XRD-11
AD-366745 ✓	XRD-62.

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

*Arduith Jarrett*  
ARDITH JARRETT  
Chief, Technical Resource Center

copy furn: FC/DSWA (DASIAC)  
KSC

*Completed*

*B.W*