AD-A167 617 NAVAL WEAPONS STATION CHARLESTON FLEET MOORINGS UNDERWATER INSPECTION REPORT(U) NAVAL FACILITIES ENGINEERING COMMAND WASHINGTON DC CHESAPEAKE DIV 1/1

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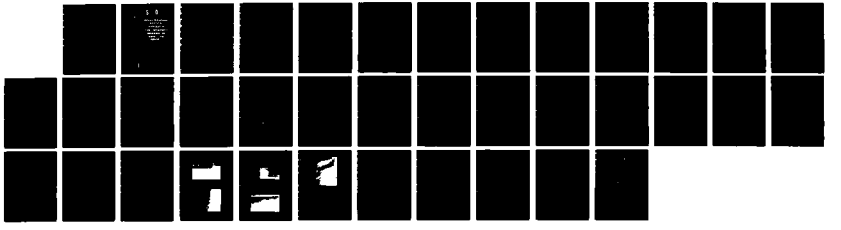

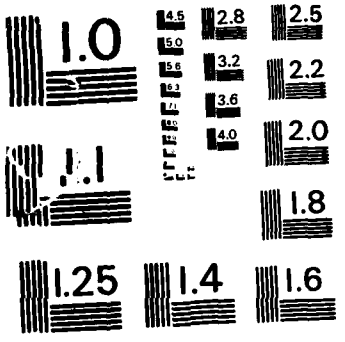

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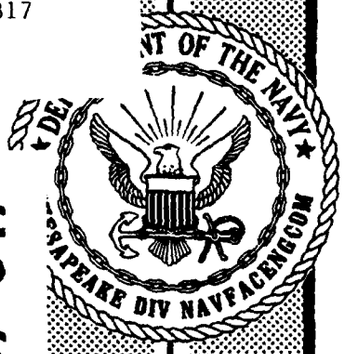

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NAVAL WEAPONS STATION CHARLESTON FLEET MOORINGS UNDERWATER INSPECTION REPORT

AUGUST 1983

OCEAN ENGINEERING
AND CONSTRUCTION PROJECT OFFICE
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, D.C. 20374

FPO-1-83 (17)

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19. ABSTRACT (Continue on reverse if necessary & identify by block number)
Under the COMNAVFACENGCOM Fleet Mooring Maintenance (FMM) Program, CHESNAV-FACENGCOM has been assigned the responsibility to plan and conduct periodic diver inspections of all fleet moorings worldwide. In carrying out this responsibility, CHESNAVFACENGCOM designated an Engineer-in-Charge to (Con't

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provide inspection planning and on-site technical direction for the underwater inspection of fleet moorings located at the naval Weapons Station (NWS) Charleston, South Carolina. The actual underwater portion of the inspection was performed by divers of Underwater Construction Team One (UCT 1). The inspection was conducted from 4-9 April 1983.

A total of three fleet moorings is currently operated and maintained by NWS Charleston: A Meditteranean mooring, an auxiliary moorings, and a ARDM mooring. Each of these moorings is installed in the Cooper River within half a mile of Pier C at Weapons Station.

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NWS CHARLESTON FLEET MOORING INSPECTION

1.0 INTRODUCTION

1.1 Background

Under the COMNAVFACENGCOM Fleet Mooring Maintenance (FMM) Program, CHESNAVFACENGCOM has been assigned the responsibility to plan and conduct periodic diver inspections of all fleet moorings worldwide. In carrying out this responsibility, CHESNAVFACENGCOM designated an Engineer-in-Charge (EIC) to provide inspection planning and on-site technical direction for the underwater inspection of fleet moorings located at the Naval Weapons Station (NWS) Charleston, South Carolina. The actual underwater portion of the inspection was performed by divers of Underwater Construction Team One (UCT 1). The inspection was conducted from 4-9 April 1983.

A total of three fleet moorings is currently operated and maintained by NWS Charleston: a Mediterranean mooring, an auxiliary mooring, and an ARDM mooring. Each of these moorings is installed in the Cooper River within a half a mile of Pier C at the Weapons Station. The locations of these moorings are shown in Figure 1. A brief description of each of these moorings follows:

- Mediterranean Mooring – The Mediterranean mooring consists of two stakepile moorings which are positioned to the port and starboard of the tender's bow. The stakepiles are used to moor the bow of a tender, while the stern of the tender is moored to a pier. Figure 2 is a design schematic of this mooring. (Note: The marker buoys shown on Figures 1 and 2 are used as navigation aids only and do not serve as part of the Mediterranean mooring system.)

- Auxiliary Mooring – The auxiliary mooring is a riser-type mooring located directly off the bow of the tender and between the two stakepiles of the Mediterranean mooring. It is used by a tender to facilitate mooring to the Mediterranean mooring.

- ARDM Mooring – The Auxiliary Recovery Drydock Medium (ARDM) mooring is used to anchor a floating drydock. There are 13 legs in this mooring, each attached to a 25,000-pound anchor. An impressed current cathodic protection system has been installed on the ARDM which consists of two 300-amp capacity, standard calomel reference controlled constant potential systems. Figure 3 is a schematic of the designed ARDM mooring.

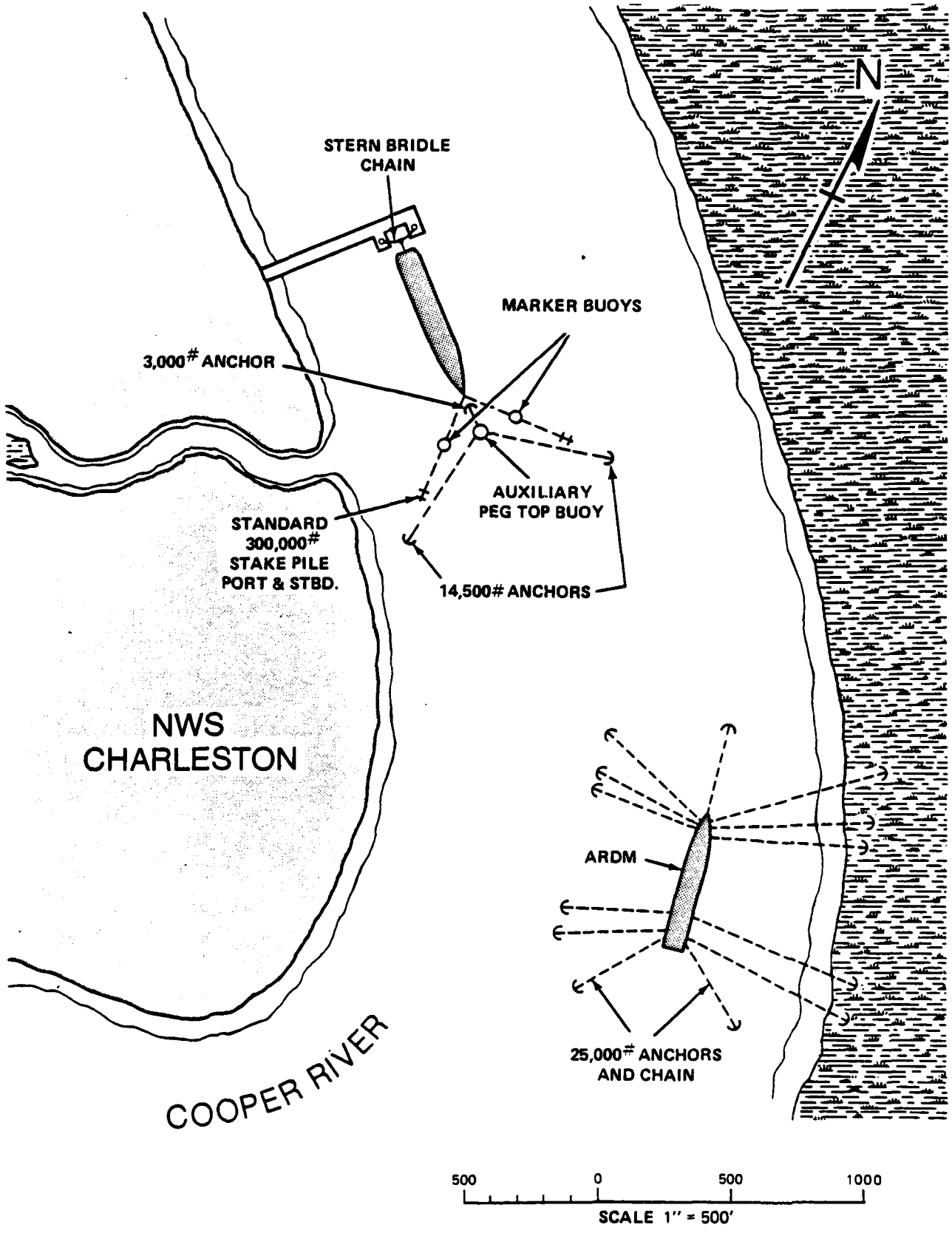

Figure 1. Mooring Locations

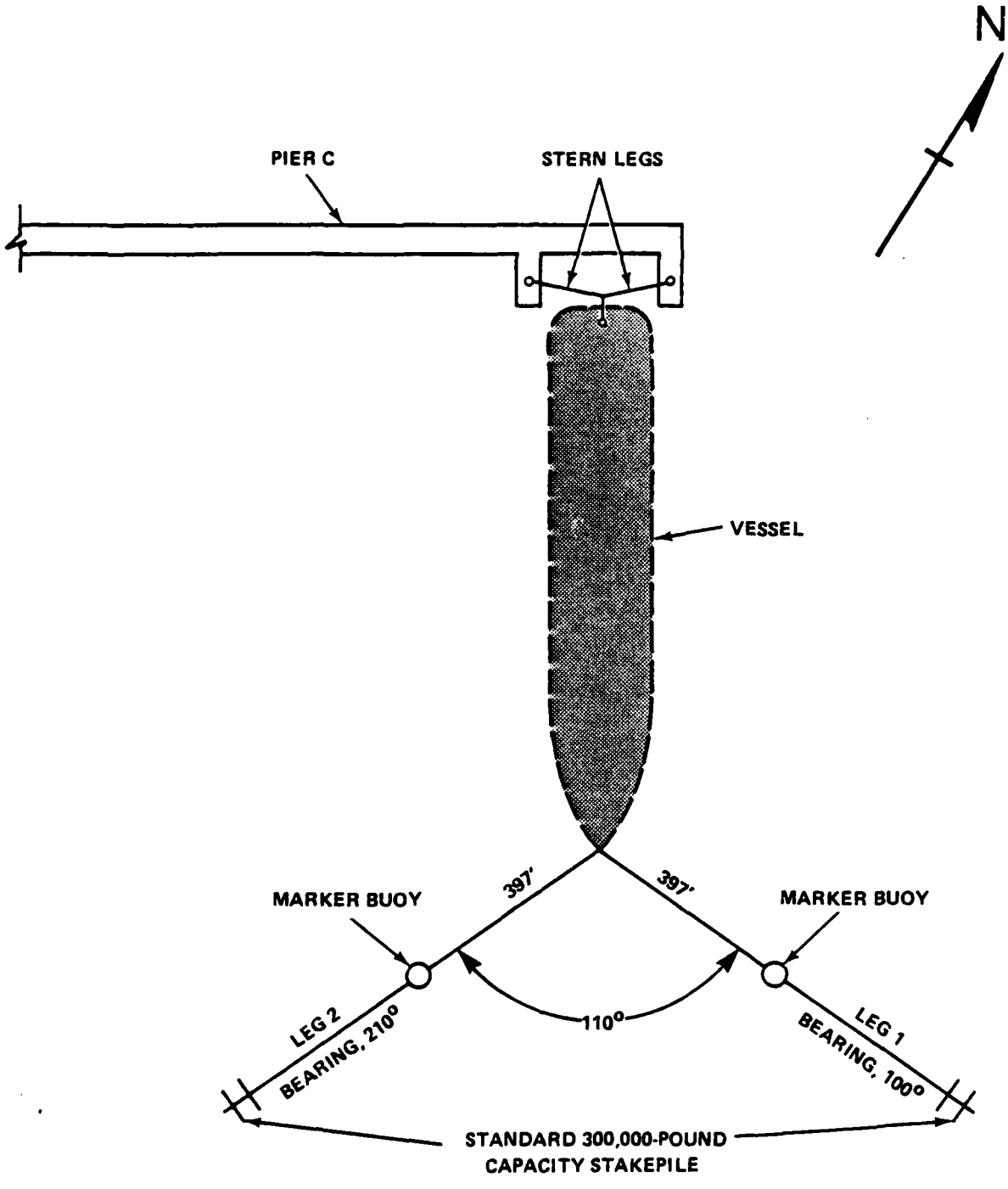

Figure 2. Design Schematic of NWS Charleston's Mediterranean Mooring

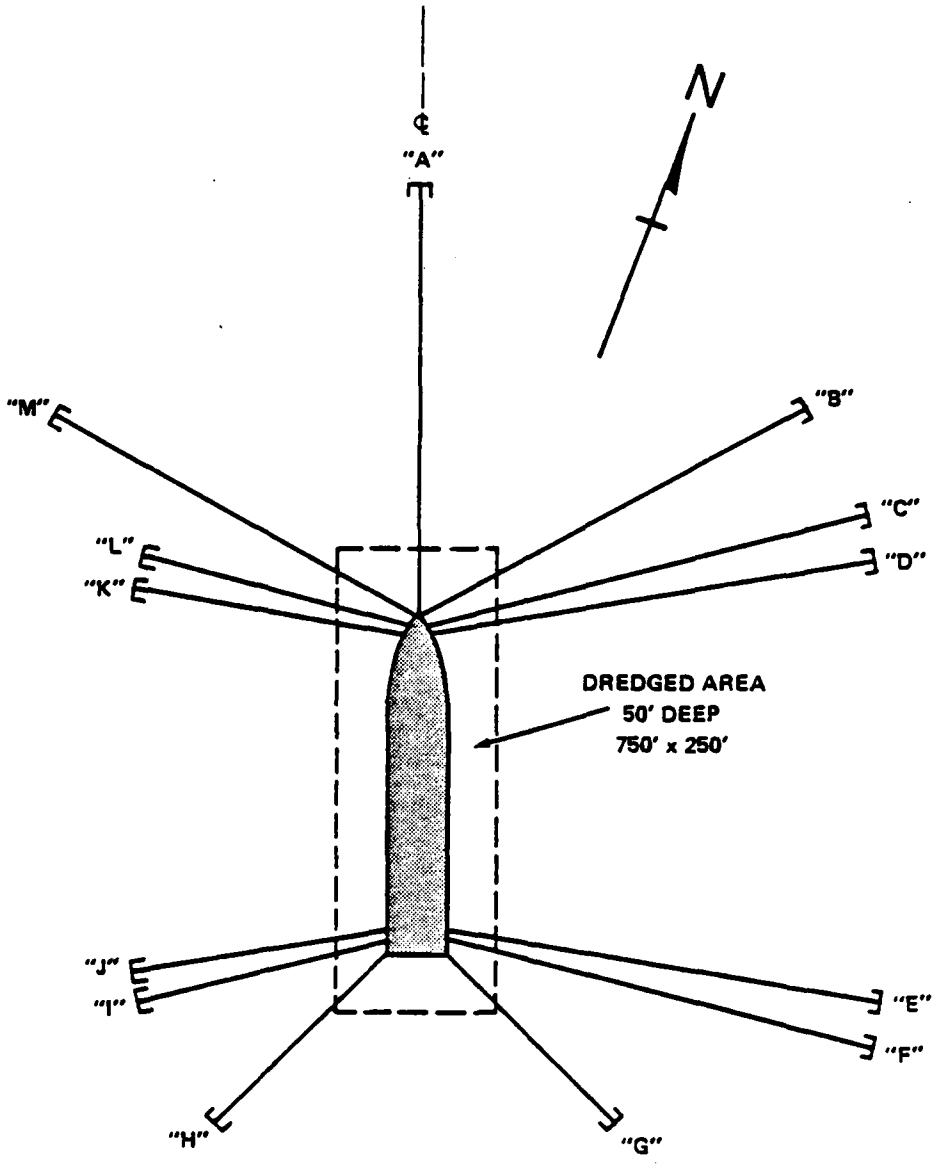

Figure 3. Design Schematic of Spread Mooring for ARDM-2 (USS ALAMOGORDO)

2.0 INSPECTION PROCEDURES

2.1 Inspection Objectives. The purpose of the mooring inspections was to determine the general physical condition of the buoys and chain assemblies and, when possible, to verify or update existing as-built and maintenance records. Divers inspected only a portion of the submerged buoy hull and chain assemblies in order to compile a general description of the mooring's condition. The existence of fairly consistent measurements during this inspection provides a good indication of the mooring's overall condition. It should be kept in mind that periodic underwater inspections are intended as an expedient and relatively inexpensive supplement to accurate maintenance records. As such, they cannot fully substitute for a complete inspection involving recovery of the mooring and the measurement and evaluation of each component.

Chain wire diameter measurements are used to evaluate the condition of a mooring. After cleaning to bare metal, a selective sampling of the wire diameter of chain links and connecting hardware was taken in order to determine the amount of deterioration due to corrosion and wear. "Single link" measurements were taken where chain was slack to detect corrosion loss. "Double link" measurements were taken where two links connected under tension to detect the combined effects of corrosion and wear. Chain links and other components which measured 90 percent or greater of original wire diameter are considered to be in "good" condition; measurement between 80 and 90 percent of original diameter is considered "fair" condition and is cause for the mooring to be downgraded in classification; any measurement less than 80 percent is considered "poor" and is cause for the mooring to be declared unsatisfactory for fleet use.

Standard underwater inspection procedures do not call for the inspection of any part of the mooring which has been buried. Ground legs and risers were observed only to the point at which they become buried; no attempt was made to locate and inspect anchors or other mooring materials which were not readily visible.

2.2 Buoy. The auxiliary mooring's buoy was inspected and its general condition noted. The buoy's diameter was measured, its paint was checked for cracking, chipping, and peeling, and its hull closely examined for physical damage and thickness of marine growth. The bottom of the hawse pipe and the rubbing casting were also inspected.

The buoy's fenders and chafing rails were checked for integrity and secure connection to the buoy. The topside jewelry was measured with calipers and inspected for wear.

2.3 **Riser.** To determine chain wear, the auxiliary mooring's riser was inspected by taking three consecutive double link measurements, using calipers, just below the hawse pipe, at the mud line, and about halfway in between.

2.4 **Ground Ring.** The auxiliary mooring's ground ring was examined for general and localized wear. Caliper measurements were made of the wire size in the region of the most severe wear and across the inner diameter.

2.5 **Ground Legs.** Double link measurements of the ground legs of all three moorings were taken near the upper end, at the mud line, and about halfway in-between. The positions of anchor joining links and detachable links were noted. Although ground leg catenary information was desired for all three moorings, most of the legs dropped vertically into the bottom and no catenary was evident.

2.6 **Anchors.** All anchors were buried in the mud.

3.0 INSPECTION SUMMARY

An in-depth discussion of the inspection results is presented in Annex A. Annex B contains photographs, and Annex C contains a copy of the preliminary report of the results of the inspection.

The data gathered during the inspection indicates the following:

3.1 Mediterranean Mooring

This mooring was not in use during the inspection. When the Tender left her mooring, the bow leg chain was dropped to the bottom after being connected by wire rope to pickup buoys. Although divers were able to locate the upper few links of each mooring leg, most of the 3 1/2-inch cast chain was buried in the mud and was not accessible for inspection. The stern legs, which were left on the pier when the Tender departed, were inspected and found to consist of 3 1/2-inch mixed cast and Dilok chain which is in good condition.

3.2 Auxiliary Mooring

This mooring's buoy is in poor condition. It has a 45° list that could be caused by internal leaking, and it is badly rusted and pitted. The riser and ground legs are in good condition with only minor pitting. All chain was measured to be greater than 90 percent of its original wire diameter.

3.3 ARDM Mooring

- The three bow legs (A, B, and M) are 2 3/16-inch chain, while the remaining 10 legs consist of 2 3/4-inch chain. The legs are comprised of a mixture of cast, forged, and Dilok chain.

- Ten of the ARDM legs measure greater than 90 percent of original wire diameter. Legs C, J, and K, however, measure between 80 and 90 percent.

- Only six legs (A, B, D, G, H, and M) are under tension. The remaining seven are slack and drop vertically into the bottom.

- The drydock's stern to bow heading is 350° vice the designed 360°.

- According to shipboard instruments, the vessel's impressed current system puts out almost twice as much current on the starboard side as it does on the port side.

- The starboard legs are heavily pitted and have no rust, while the port side legs are rusted but show little pitting. This could be caused by the unbalanced impressed current system which may be inducing the localized corrosion of the starboard chain legs, although additional data is required to fully substantiate this conclusion.

- Ground leg K has a badly worn or damaged detachable link at the 45-foot depth.

- The anchor joining link at the inboard end of leg J is missing the lead plug which secures the pin in place.

4.0 COMMENTS AND RECOMMENDATIONS

4.1 Mediterranean Mooring

- The stern legs are in satisfactory condition for continued use. Because the bow leg chain was buried and therefore not available for inspection, an assessment of its condition will be deferred until after the next underwater inspection, scheduled for FY85.

4.2 Auxiliary Mooring

- The buoy should be removed from the water, the cause of its list determined and repaired, and the buoy completely overhauled. The remainder of this mooring is in good condition.

4.3 ARDM Mooring

- The drydock should be realigned to the designed heading, and each of the 13 legs should be reset and pretensioned to provide the proper chain catenaries.

- The three legs (C, J, and K) which measured less than 90 percent of original wire diameter should be considered for replacement during the next overhaul.

- The damaged detachable link in ground leg K should be replaced.

- A lead plug should be inserted in the anchor joining link at the inboard end of leg J.

- To avoid damage to the mooring chain, the impressed current system should be inspected, repaired, calibrated, and monitored as necessary to ensure the system is providing a constant potential within design limits.

- The addition of a wire-rope continuity cable should be considered as a way to provide more uniform distribution of the impressed current along the length of each ground leg and to reduce the likelihood of localized corrosion which may be caused by improper electrical continuity.

ANNEX A

FLEET MOORING
INSPECTION RESULTS

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

SUMMARY OF INSPECTION
MEDITERRANEAN MOORING

Bow Legs

During the period of the inspection, USS CANOPUS was at sea and the mooring was not being used. As standard procedure when the Tender gets underway, the bitter ends of the bow legs are attached to pickup buoys and the legs dropped to the bottom. By swimming down the 3/8 inch stainless steel wire rope attaching the pickup buoys to the bitter ends of the bow legs, the divers were able to locate the upper few links of each leg. Both legs consist of 3 1/2-inch diameter cast chain which is moderately rusted. The cast iron sinkers, stakepiles, and the remainder of the bow legs were not visible.

Stern Legs

When the Tender gets underway, the stern legs are left on the pier. Two 3 1/2-inch mixed Dilok and cast chain legs secure the stern of the Tender to the southeastern end of Pier C at NWS Charleston. Both legs are freshly painted and are in good condition. Single link measurements were all above 90 percent of the original wire diameter.

When in use, the stern legs consist of a single chain, the bitter end of which is attached to the afterdeck of the Tender. From this point, the chain runs through a stern hawse pipe to a spider "A" plate, from which two stern legs extend to the pier where each is secured to a bollard.

Marker Buoys

Currently, large rubber fenders (normally used for protection of yard craft) are being used in place of buoys. The buoys are located about halfway between each stakepile and the Tender (see Figures 1 and 2), and are used as navigation aids during Tender mooring operations. Each marker buoy is attached by 3/8-inch steel wire rope to a short length of 3 1/2-inch chain which is embedded in a concrete clump (see Figure A-1). Note: The marker buoys (including riser and anchor) are used only as navigation aids and do not serve as in-line mooring components.

Comments and Recommendations

The stern legs are in satisfactory condition for continued use. Because the bow leg chain was buried and therefore not available for inspection, an assessment of its condition will be deferred until after the next underwater inspection, schedule for FY85.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

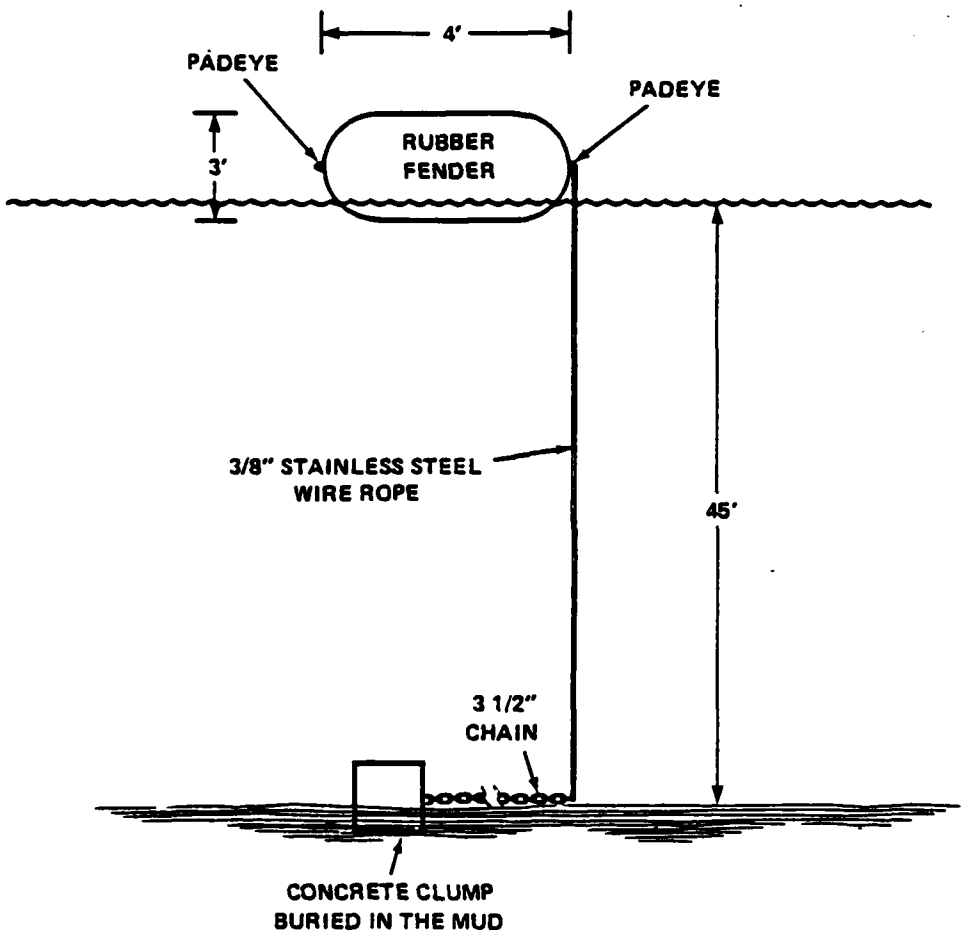

Figure A-1. Mediterranean Mooring Bow Leg Marker Buoy

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

SUMMARY OF INSPECTION
AUXILIARY MOORING

Buoy

This Mark II Peg-Top buoy with hawse pipe measures 12-feet wide by 9 1/2-feet high. The buoy has a 45° list which could be caused by failure of its watertight integrity. It has two wooden fenders which are covered with thin steel strips and a 1/4-inch-thick steel plate covering the topside. The buoy is badly rusted and layers of rust are flaking off. In addition, the buoy has 1/8-inch-deep pitting in its bottom, and the top has a heavy coating of guano. In general, this buoy is in poor condition.

Riser

The wire diameter of the riser chain is 2 3/4-inches, and double link measurements showed that the chain is greater than 90 percent of its original wire diameter. An in-line anode, measuring 9 by 9 by 29 inches, was found in the riser about 22 feet below the surface, and a swivel was noted just below the anode. The riser chain is in good condition.

Ground Ring

The ground ring is about 30 feet below the surface and its minimum wire diameter was measured to be 4 7/16-inches. The ring is in good condition.

Ground Legs

About 8 feet below the ground ring (at a depth of 38 feet) the three ground legs drop vertically into the bottom. Each of the ground legs is comprised of 2-3/4 inch forged chain, and measurements of these legs were all above 90 percent of original wire size. Just below the ground ring, one of these legs has a zinc anode which measured 9 by 9 by 24 inches. Figure A-2 is a schematic drawing of the Auxiliary Mooring.

Comments and Recommendations

The buoy should be removed from the water and the cause of its list determined and repaired. The buoy should also be completely overhauled. The remainder of the mooring is in good condition.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

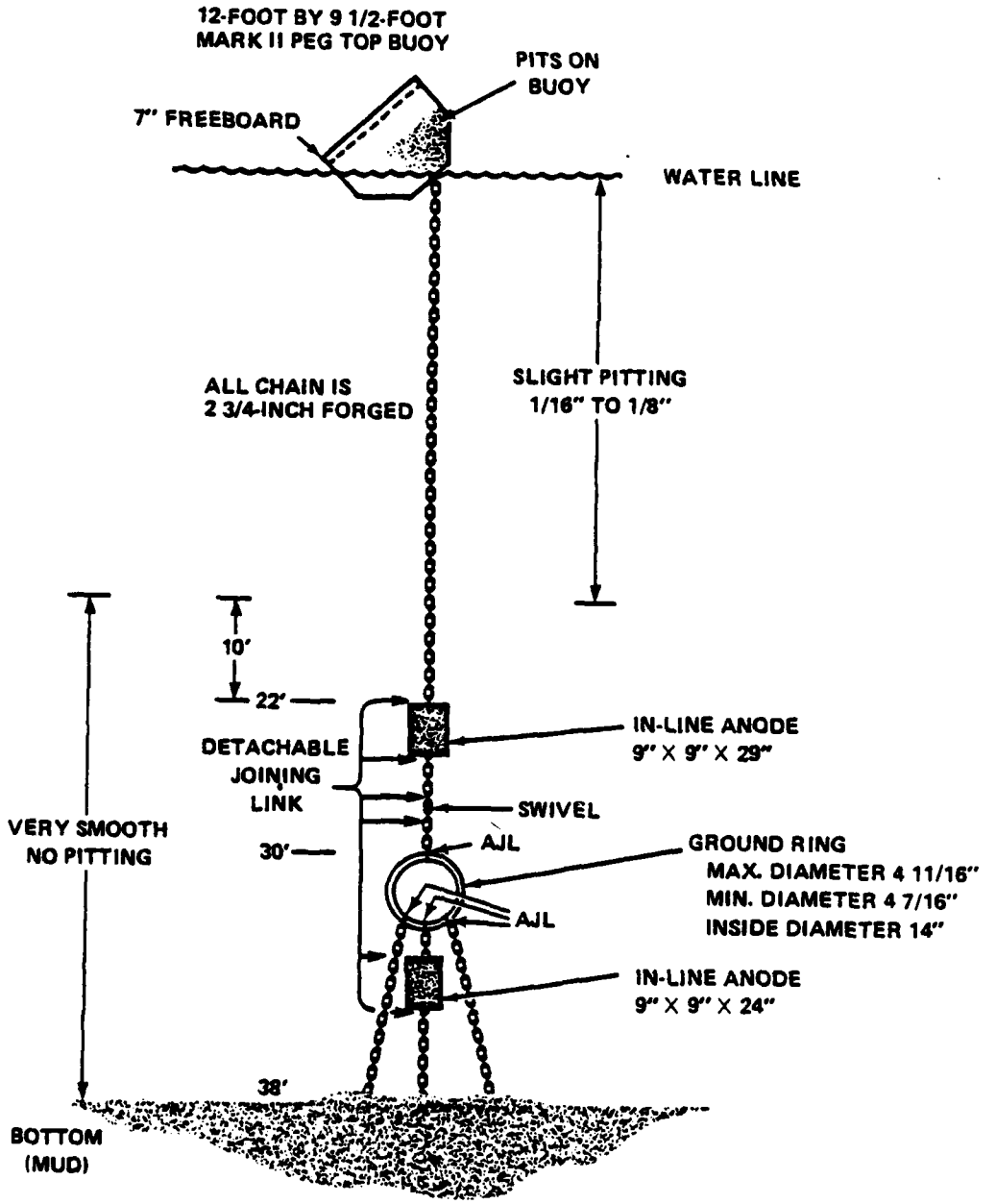

Figure A-2. Auxiliary Mooring

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

MOORING NO.: AUXILIARY CLASS: _____ LOCATION: NWS CHARLESTON AT: — LONG: —

WATER DEPTH: 38 ft ANCHOR SIZE/TYPE: NOT OBSERVED BUOY TYPE: PEG TOP

BOTTOM TYPE: ☐ SAND ☒ MUD ☐ CLAY ☐ CORAL ☐ ROCK Visibility: About 1 ft D = depth NI = not inspected, inaccessible

COMPONENTS		NI	CONDITION								COMMENT
			NEW	SINGLE LINK %			DOUBLE LINK %			D	
				90+	80+	80-	90+	80+	80-		
BUOY HARDWARE											
3 1/8" DETACHABLE				✓							12' x 9'6" MARK II PEG TOP WITH HAUSE
2 1/4" DETACHABLE				✓							PIPE. TWO WOODEN FENDERS WITH
											COVERING METAL STRIPS. WIDE AREA
											PITTING OF BUOY BOTTOM. TOP AND
RISER	NEAR BUOY		2 3/4"				✓✓				SIDES RUSTED AND FLAKING. BUOY
	MIDDLE		↓				✓✓				LISTING ABOUT 45°.
	NEAR GRD RG		↓				✓✓				
GROUND RING			4 3/4"							30'	RISER FITTING TO 12' DEPTH THEN
GROUND LEG NO. A	UPPER END		2 3/4"				✓✓				SMOOTH. OUTER DIAMETER OF 23 1/2".
	MIDDLE		BURIED								
	ENTERS BOTTOM		↓								ABOUT 7' OF EACH GROUND LEG
GROUND LEG NO. B	UPPER END		2 3/4"				✓✓				VISIBLE BETWEEN G.R AND BOTTOM.
	MIDDLE		BURIED								RISER/GROUND LEGS ATTACHED
	ENTERS BOTTOM		↓								TO GR WITH ANCHOR JOINING LINKS
GROUND LEG NO. C	UPPER END		2 3/4"				✓✓				
	MIDDLE		BURIED								ONE IN-LINE ANODE (9"x 9"x 29") FOUND
	ENTERS BOTTOM		↓								ABOVE GR AT 32'. A SECOND IN-LINE
GROUND LEG NO. D	UPPER END										ANODE FOUND ON ONE GROUND LEG
	MIDDLE										BELOW GR AT 31'.
	ENTERS BOTTOM										

DATE: 5 APRIL 83 ENGINEER-IN-CHARGE: N.S. JENNINGS DIVERS: TAYLER/SLEAN

AUXILIARY MOORING
AS BUILT

Top Jewelry

3 1/8-inch Detachable Link
2 3/4-inch Detachable Link

Buoy

12-foot-wide by 9 1/2-foot-high MK II Peg Top with Hawse Pipe

Riser

21 feet of 2 3/4-inch A Links (Forged)
One 2 3/4-inch Detachable Link
One In-Line Anode (9 by 9 by 29 inches)
One 2 3/4-inch Detachable Link
Three 2 3/4-inch A Links (Forged)
One 2 3/4-inch Detachable Link
One 2 3/4-inch Swivel
One 2 3/4-inch Detachable Link
Three 2 3/4-inch A Links (Forged)
One 2 3/4-inch Anchor Joining Link (AJL)
One 4 3/4-inch Ground Ring

Leg 1	Leg 2	Leg 3
One 2 3/4-inch AJL	One 2 3/4-inch AJL	One 2 3/4-inch AJL
Eight 2 3/4-inch A Links	One 2 3/4-inch Detachable Link	Eight 2 3/4-inch A Links
	One In-Line Anode (9 by 9 by 24 inches)	
	One 2 3/4-inch Detachable Link	
	Two 2 3/4-inch A Links	

The remainder of the mooring was buried and was not inspected.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

SUMMARY OF INSPECTION

ARDM-2 MOORING

Ground Legs

Ground Leg A. This leg is a 2 3/16-inch wire-diameter cast chain manufactured by NACO. The portion of the chain near the water line is heavily pitted. The chain had been recently sandblasted, re-painted, and changed end for end. There is no evidence of pitting on the end of the chain near the bottom. Double link measurements indicated that all of the chain is greater than 90 percent of its original wire diameter. About 120 feet of chain was visible.

Catenary Data

Depth (Ft)	Angle
10	67°
20	67°
30	75°
40	80°

Ground Leg B. This leg is also 2 3/16-inch wire-diameter cast chain manufactured by NACO. The black paint coating is in good condition even in the grip area. However, pitting was observed along the entire visible length of the chain. All double link measurements were greater than 90 percent and no wear was noted. About 70 feet of chain was observed before it entered the bottom. A detachable link was noted at a depth of 40 feet.

Catenary Data

Depth (Ft)	Angle
10	33°
20	35°
30	42°
40	52°
50	60°

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

Ground Leg C. This leg is 2 3/4-inch wire-diameter cast chain. The chain drops vertically to the bottom. All double link measurements were greater than 90 percent except for one taken near the bottom which was between 80 and 90 percent of original wire diameter. Detachable links were noted at 10- and 18-foot depths. The chain is heavily pitted with the upper end showing the most severe pitting. Pits as large as 1/4 inch in diameter by 1/4 inch deep were found. This leg has no catenary.

Ground Leg D. This leg is 2 3/4-inch flash-butt-welded chain. Only slight pitting was observed. A number of wire straps were found to be attached to the leg. A detachable link was noted at a depth of 15 feet. All double link measurements were greater than 90 percent.

Catenary Data

Depth (Ft)	Angle
10	35°
20	45°
30	58°
40	60°
50	90° (Bottom)

Ground Leg E. This leg is 2 3/4-inch cast chain. All double link measurements were greater than 90 percent of original wire diameter. The leg is heavily pitted with some pits as large as 1/8-inch wide by 1/8-inch deep. This leg was covered with heavy marine growth and drops vertically into the bottom. Detachable links were noted at 10- and 20-foot depths. This leg has no catenary.

Ground Leg F. This leg is 2 3/4-inch Dilok chain. All double link measurements were greater than 90 percent. The chain is heavily pitted with some pits as large as 1/8-inch wide by 1/8-inch deep. A detachable link was noted at a depth of 20 feet. The leg drops vertically into the bottom and has no catenary.

Ground Leg G. This leg is 2 3/4-inch Dilok chain, and all double link measurements were greater than 90 percent. About 110 feet of chain was visible and the leg is under tension. Detachable links were found at 5-, 7-, and 10-foot depths.

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Catenary Data

Depth (Ft)	Angle
10	62°
20	65°
30	80°
40	85°

Ground Leg H. This leg is 2 3/4-inch cast chain. All double link measurements were greater than 90 percent of original wire diameter. About 250 feet of chain was visible to the divers before the chain entered the bottom. The chain's coating has deteriorated and the chain is rusted. Little pitting was noted. Detachable links were found at 10- and 20-foot depths.

Catenary Data

Depth (Ft)	Angle
10	50°
20	60°
30	70°
40	70°
50	75°

Ground Leg I. This leg is 2 3/4-inch cast chain. The leg slopes under the drydock before entering the bottom. All double link measurements were greater than 90 percent. The chain is rusted below 30 feet of water depth. Detachable links were found at 10-, 20-, and 30-foot depths.

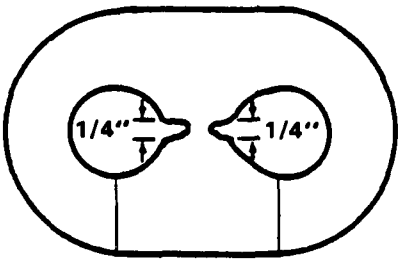
Catenary Data

Depth (Ft)	Angle
10	5°
20	10°
30	10°
40	15°
50	15°

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

Ground Leg J. This leg is 2 3/4-inch cast chain. Double link measurements near the mudline were between 80 and 90 percent of original wire diameter. Detachable links were found at 20- and 40-foot depths. The lead plug is missing from the anchor joining link which connects the leg to the drydock. The chain drops vertically into the mud and is badly rusted. This leg has no catenary.

Ground Leg K. This leg is 2 3/4-inch cast chain which drops vertically into the bottom. Detachable links were found at 20- and 45-foot depths. The detachable link at the 45-foot depth is damaged and should be replaced. There appears to be a deep 1/4-inch-wide cut into each side of the stud of this link (see Figure A-3). Double link measurements near the mudline were between 80 and 90 percent. The chain is heavily rusted and no evidence of pitting was noted. The leg has no catenary.



LEG K

Figure A-3. Deep Cuts on Either Side of Detachable Link Stud

Ground Leg L. This leg is 2 3/4-inch cast chain. There is little pitting, but the chain is badly rusted. Heavy marine growth covers most of the chain. Double link measurements were greater than 90 percent. The chain drops vertically into the bottom and has no catenary. A single detachable link was found at a depth of 45 feet.

Ground Leg M. The upper 35 feet of this leg is 2 3/16-inch Dilok chain which is connected by a detachable link to 2 3/16-inch cast chain. All double link measurements were greater than 90 percent. This leg has a good coating and has no noticeable pitting. A wire rope was found woven through the chain between the 30- and 37-foot depths.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

Catenary Data

Depth (Ft)	Angle
10	55°
20	60°
30	70°
40	80°

General.

Except for some heavy pitting and rusting, the chain appears to be in fair to good condition. However, only six legs are under tension. The remaining seven are slack and drop vertically into the bottom. Figure A-4 shows which legs are under tension, while Table A-1 provides a summation of the condition of the ARDM-2 ground legs.

The ARDM-2, USS ALAMAGORDO, has an impressed current system consisting of port and starboard direct current power supplies. The starboard power supply puts out more amperage than the port side. This could be the reason for heavy localized corrosion of the starboard leg chains. However, because the condition of the chain in each leg was not recorded when the chain was installed, it is impossible to draw any firm conclusions regarding the possible corrosive effects of the imbalanced power supplies. Numbers 1 and 2 in Figure A-4, show the positions of the starboard and port impressed current power supplies.

Comments and Recommendations.

- With the exception of legs C, J, and K which were measured between 80 and 90 percent, all of the legs measured greater than 90 percent of original wire diameter. These three legs should be considered for replacement during the next overhaul.

- The drydock's magnetic heading is 350° vice the designed 360°.

- Only six legs (A, B, D, G, H, and M) are under tension. The remaining seven are slack and drop vertically into the bottom.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

- The drydock should be realigned to the desired magnetic heading and each of the ground legs should be reinstalled so that all are under tension and sharing the mooring loads.

- The impressed current system should be inspected, repaired, and calibrated as required to ensure that the potentials being provided are within design limits.

- The damaged detachable link in leg K should be replaced.

- The lead plug should be replaced in the anchor joining link which connects leg J to the drydock.

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

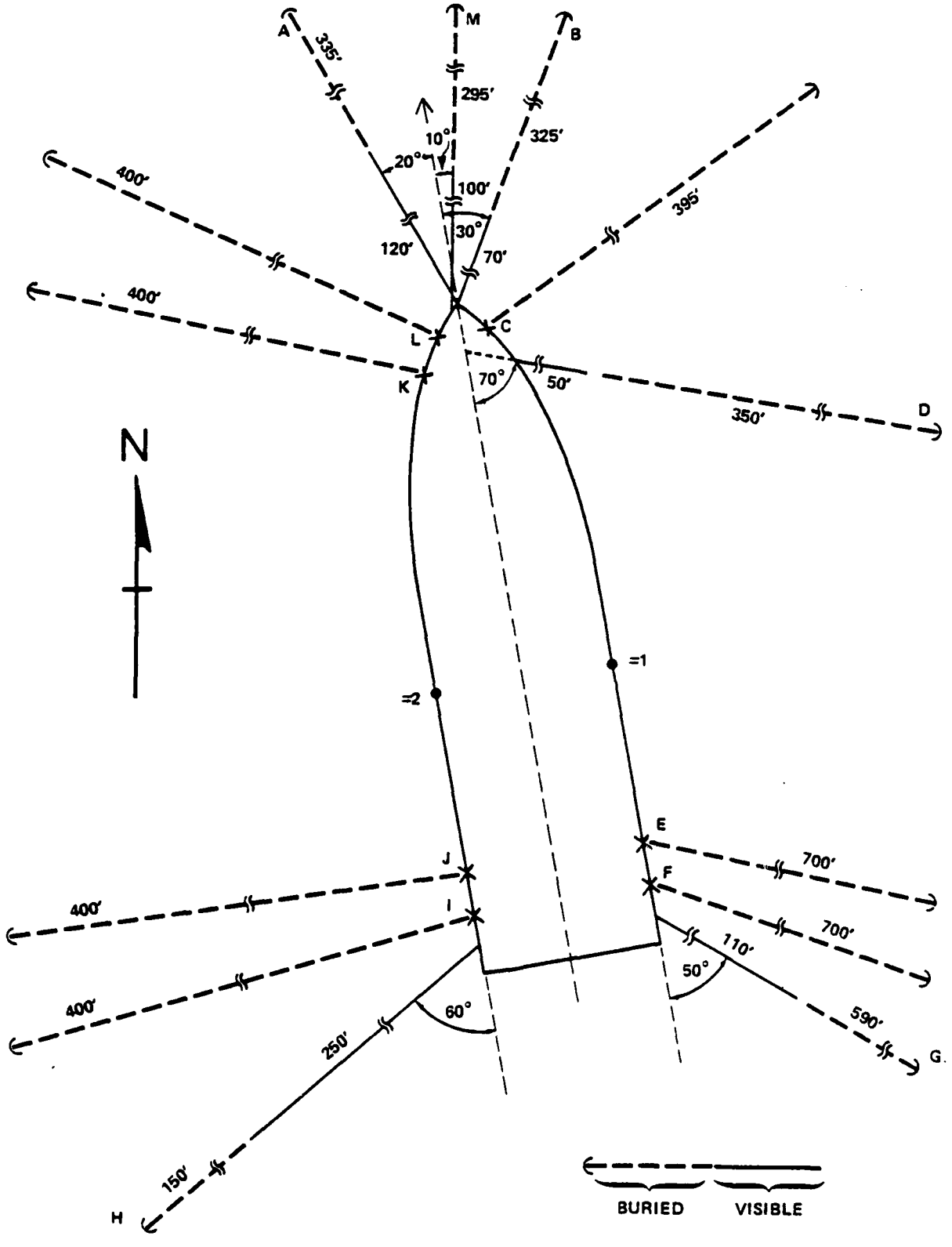


Figure A-4. ARDM Leg Positions

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

TABLE A-1

MOORING NO.: ARDM 2 CLASS: DRY DOCK LOCATION: NWS CHARLESTON LAT: _____ LONG: _____

WATER DEPTH: 50' ANCHOR SIZE/TYPE: 25,000 lb BUOY TYPE: _____

BOTTOM TYPE: ☐ SAND ☒ MUD ☐ CLAY ☐ CORAL ☐ ROCK Visibility 3' D = depth NI = not inspected, inaccessible

LEG	TYPE CHAIN	SIZE (in.)	LOCATION	DOUBLE LINK ≥90%	DOUBLE LINK ≥80%	DOUBLE LINK <80%	MAGNETIC BEARING	CATENARY	COMMENTS
A	Cast	2 3/16	On the Bow				330°	Yes	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
B	Cast	2 3/16	Starboard Bow				030°	Yes	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
C	Cast	2 3/4	Starboard Bow				–	No	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XX	X				
D	Forged	2 3/4	Starboard Bow				100°	Yes	Light Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
E	Cast	2 3/4	Starboard Quarter				–	No	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
F	Dilok	2 3/4	Starboard Quarter				–	No	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
G	Dilok	2 3/4	Starboard Quarter				120°	Yes	Heavy Pitting
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					

CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

TABLE A-1 (Continued)

MOORING NO.: ARDM 2 CLASS: DRY DOCK LOCATION: NWS CHARLESTON LAT: _____ LONG: _____

WATER DEPTH: 50' ANCHOR SIZE/TYPE: 25,000 lb BUOY TYPE: _____

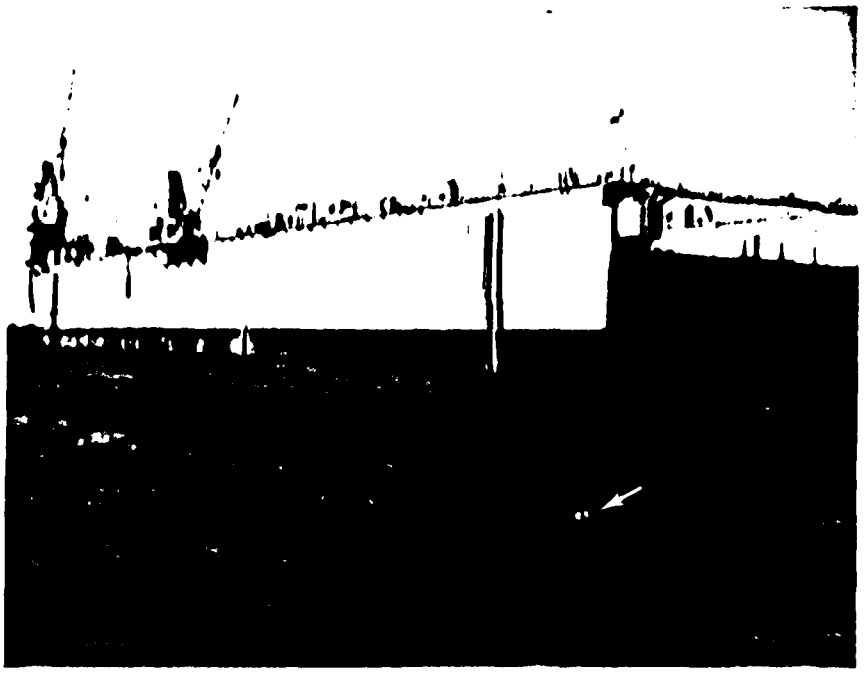
BOTTOM TYPE: ☐ SAND ☒ MUD ☐ CLAY ☐ CORAL ☐ ROCK Visibility 3' D = depth NI = not inspected, inaccessible

LEG	TYPE CHAIN	SIZE (in.)	LOCATION	DOUBLE LINK			MAGNETIC BEARING	CATENARY	COMMENTS
				≥90%	≥80%	<80%			
H	Cast	2 3/4	Port Quarter				230°	Yes	Light Pitting/Rust
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
I	Cast	2 3/4	Port Quarter				–	No	Light Pitting/Rust
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
J	Cast	2 3/4	Port Quarter				–	No	Rust
			Upper End	XXX					
			Middle	XXX					
			Lower End		XXX				
K	Cast	2 3/4	Port Bow				–	No	Heavy Rust
			Upper End	XXX					
			Middle	X	XX				
			Lower End		XXX				
L	Cast	2 3/4	Port Bow				–	No	Heavy Rust
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					
M	Dilok/Cast	2 3/16	Port Bow				000°	Yes	Good Coating
			Upper End	XXX					
			Middle	XXX					
			Lower End	XXX					

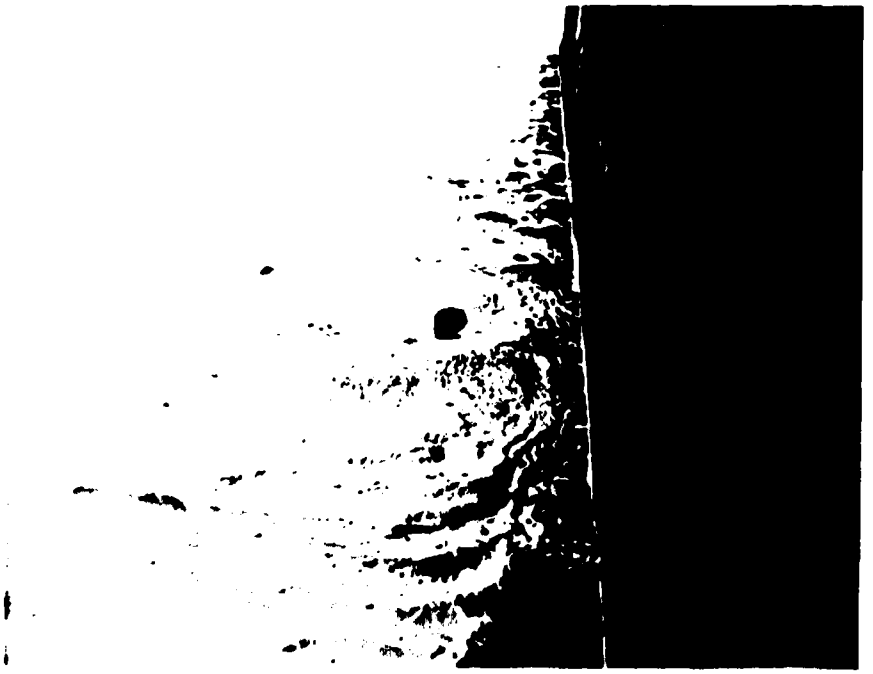
CHESNAVFACENGCOM REPORT FPO-1-83(17), "NWS CHARLESTON FLEET MOORING UNDERWATER INSPECTION REPORT."

ANNEX B

PHOTOGRAPHS

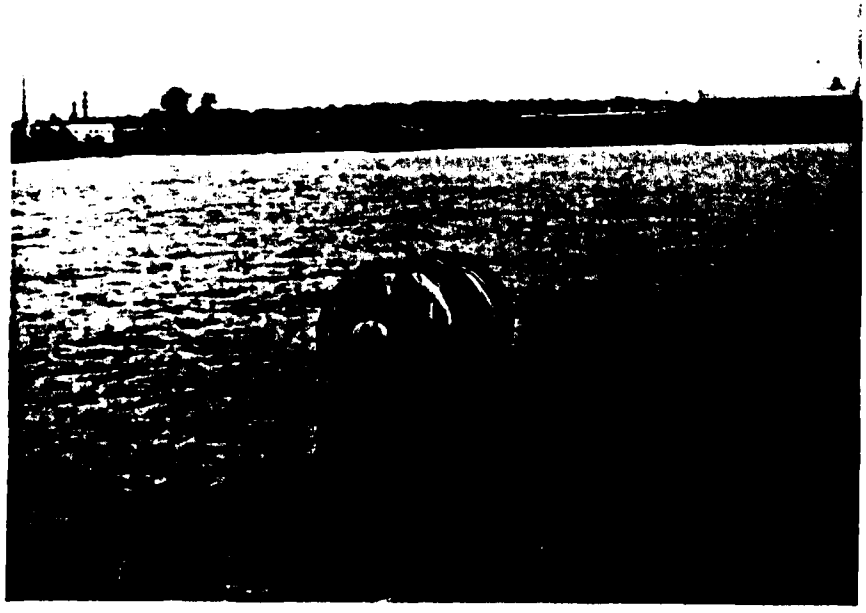


The ARDM and Marker Showing Position Where Leg H Enters the Bottom



Marker Showing Position Where Leg J Enters Bottom Close Aboard ARDM

Badly Listing Auxiliary Mooring Buoy



Rubber Fender Marker Float

Above Water Portion of ARDM Leg B.
Note Typical Chain Pitting

ANNEX C

REFERENCES

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ROUTINE

R 3120447 MAR 83

FM CHESNAVFACENGCOM WASHINGTON DC

TO NPWSTA CHARLESTON SC

INFO COMNAVFACENGCOM ALEXANDRIA VA
USS ALAMOGORDO
SOUTHNAVFACENGCOM CHARLESTON SC
UCT ONE

BT
UNCLAS //N11000//

SUBJ: FLEET MOORING INSPECTION; VISIT REQUEST FOR

A. CHESNAVFACENGCOM WASHINGTON DC 151910Z MAR 83

1. PER REF A, THE SUBJECT INSPECTION WILL OCCUR DURING THE PERIOD 4-10 APR 83. THE INSPECTION TEAM WILL CONSIST OF A SEVEN-MAN DETACHMENT FROM UNDERWATER CONSTRUCTION TEAM ONE (UCT-1) AND A CONTRACTOR, ENGINEER-IN-CHARGE (EIC) REPRESENTING THIS COMMAND. THE ARDM, MED-MOOR AND AUX MOORING WILL BE INSPECTED. IN ADDITION A CURSORY INSPECTION OF ANY ON SHORE FLEET MOORING INVENTORY WILL BE CONDUCTED.

2. REQUEST WEAPONS STATION PASSES FOR THE BASE AND WATERFRONT AREAS FOR THE BELOW LISTED PERSONNEL AND THEIR VEHICLES: EIC IS MR. NYAL S. JENNINGS OF VSE CORPORATION OF VIRGINIA, SSN: 216-55-1754 POB: NEW LONDON, CT; DOB: 2 SEP 50, U. S. CITIZEN, CONFIDENTIAL SECURITY CLEARANCE. CHESNAVFACENGCOM OBSERVER, POC, MR. DARYL E. PAUNIL, SSN: 213-68-1371, POB: HAVRE DE GRACE, MD; DOB: 24 FEB 57, U. S. CITIZEN, GRANTED EMERGENCY ACCESS LETTER PER OPNAVINST 5510.1F. UCT-1 HAS SENT A ROSTER BY SEPCOR.

3. REQUEST AN AUTHORIZATION FOR CAMERAS WHICH PROVIDE DOCUMENTATION FOR THIS INSPECTION. ALL PHOTOS WILL BE FOR OFFICIAL NAVY USE ONLY.

4. POINT OF CONTACT AT CHESNAVFACENGCOM IS MR. J. MCLAUGHLIN AT AUTOVON 288-3881 OR (202) 433-3881. POINT OF CONTACT AT NPWSTA IS MR. E. CROSBY AT AUTOVON 794-7600.
BT

DLVR:CHESNAVFACENGCOM WASHINGTON DC(9)...ORIG

RTD:000-000/COPIES:0009

521636/091 1 OF 2 MI 0345 091/17:10Z 3120447 MAR 83
CSN:PXOY00358 CHESNAVFACENGCOM WASHINGTON DC

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ROUTINE

R 031316Z MAY 83

FM CHESNAVFACENGCOM WASHINGTON DC

TO WPNSTA CHARLESTON SC

INFO COMNAVFACENGCOM ALEXANDRIA VA
USS ALAMOGORDO
COMCBLANT NORFOLK VA
SOUTHNAVFACENGCOM CHARLESTON SC
UCT ONE

BT
UNCLAS //N11000//

SUBJ: FLEET MOORING INSPECTIONS

1. WITH THE ASSISTANCE OF UCT ONE DIVERS, THIS COMMAND CONDUCTED AN UNDERWATER INSPECTION OF THE MOORINGS LOCATED AT WPNSTA CHARLESTON DURING THE PERIOD 4-9 APRIL 1983. THIS IS A PRELIMINARY REPORT OF THE INSPECTION RESULTS. SIGNIFICANT FINDINGS ARE AS FOLLOWS:

A. ARDM MOORING

(1) THE THREE BOW LEGS (A, B, AND M) ARE 2 3/16 INCHES CHAIN WHILE THE REMAINING 10 LEGS ARE 2 1/4 INCHES.

(2) ALL CHAIN IS GREATER THAN 80 PERCENT (AND SOME GREATER THAN 90 PERCENT) OF ORIGINAL WIRE DIAMETER.

(3) THE TENDER IS ALIGNED ABOUT 10 DEGREES WEST OF ITS DESIRED HEADING.

(4) ONLY FIVE OF THE 13 LEGS ARE IN TENSION. THE REMAINDER HANG VERTICALLY INTO THE BOTTOM.

(5) THE STARBOARD LEGS SHOW LITTLE EVIDENCE OF RUST BUT ARE HEAVILY PITTED. THE PORT SIDE LEGS ARE LIGHTLY RUSTED AND SHOW LIGHT PITTING.

(6) SHIPBOARD INSTRUMENTS INDICATE THAT THE IMPRESSED CURRENT SYSTEM PUT OUT TWICE AS MUCH CURRENT ON THE STARBOARD SIDE AS ON THE PORT SIDE. THE IMPRESSED CURRENT SYSTEM IS UNBALANCED AND, AS A RESULT, MAY BE INDUCING LOCALIZED CORROSION.

B. AUXILIARY MOORING

(1) THE BUOY HAS A 45 DEGREE LIST AND SHOULD BE CHECKED FOR LOSS OF WATERTIGHT INTEGRITY.

(2) THE RISER AND GROUND LEG CHAINS ARE 2 3/4 INCHES FLASH BUTT WELDED. THE GROUND LEGS DROP VERTICALLY INTO THE MUD BOTTOM.

(3) ONE INLINE ANODE WAS FOUND IN THE RISER AND IN THE VISIBLE PORTION OF EACH GROUND LEG.

DLVR:CHESNAVFACENGCOM WASHINGTON DC(9)...ORIG

RTD:004-000/COPIES:0009

714271/123 1 OF 2 MI 0310 123/18:08Z 031316Z MAY 83
CSN:RXOY00297 CHESNAVFACENGCOM WASHINGTON DC

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U U N C L A S S I F I E D U
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C. MEDITERRANEAN MOORING

(1) RISER CHAINS ARE 3-1/2 INCH CAST ATTACHED TO 300,000 LB. STAKE PILES.

2. ALL THREE MOORINGS ARE IN SATISFACTORY CONDITION FOR CONTINUED USE AT THEIR RATED CAPACITY. HOWEVER, THE CAUSE OF THE 45 DEGREE LIST IN THE AUXILIARY MOORING BUOY SHOULD BE INVESTIGATED, THE MAJORITY OF THE ARDM GROUND LEG ANCHORS SHOULD BE RESET AND THE LEGS PRETENSIONED, AND THE ADDITION OF CONTINUITY WIRE TO THE ARDM GROUND LEGS SHOULD BE CONSIDERED.

BT

END

DTIC

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