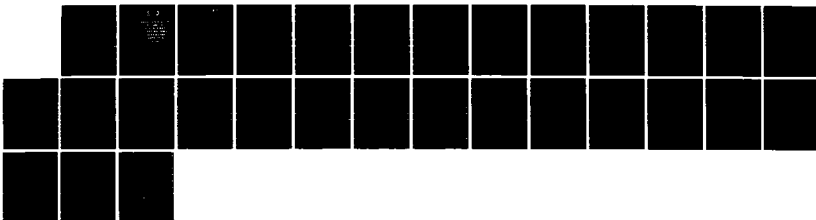
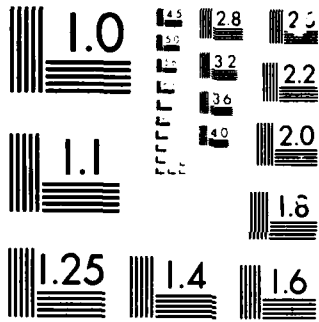


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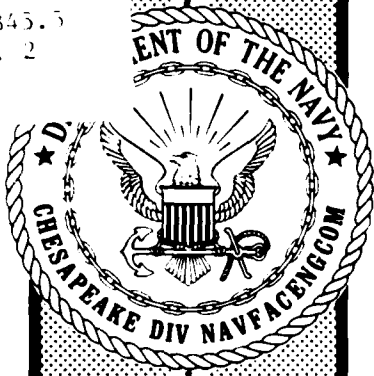




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# NAVAL AIR STATION SIGONELLA (AUGUSTA BAY) FLEET MOORING UNDERWATER INSPECTION PLAN

JULY 1983

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

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As part of COMNAVFACENGCOM's Fleet Mooring Maintenance (FFM) Program, CHESNAVFACENGCOM has been assigned the responsibility to conduct the underwater inspections of fleet moorings worldwide. This plan provides guidelines for the underwater inspection of the fleet mooring operated (Con't)

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and maintained by the Naval Air Station (NAS), Sigonella, Sicily. The inspection is scheduled to take place in September 1983.

CHESNAVFACENGCOM has designated an Engineer-in-Charge (EIC) to provide on-site technical guidance to Underwater Construction Team One (UCT ONE) who will perform the underwater portion of the inspection. In addition, the EIC will prepare the post inspection report which will include the results of the inspection and recommendations for required maintenance actions.

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## NAVAL AIR STATION SIGONELLA UNDERWATER FLEET MOORING INSPECTION PLAN

### 1.0 BACKGROUND

As part of COMNAVFACENGCOM's Fleet Mooring Maintenance (FMM) Program, CHESNAVFACENGCOM has been assigned the responsibility to conduct the underwater inspections of fleet moorings worldwide. This plan provides guidelines for the underwater inspection of the fleet mooring operated and maintained by the Naval Air Station (NAS), Sigonella, Sicily. The inspection is scheduled to take place in September 1983.

CHESNAVFACENGCOM has designated an Engineer-in-Charge (EIC) to provide on-site technical guidance to Underwater Construction Team One (UCT ONE) who will perform the underwater portion of the inspection. In addition, the EIC will prepare the post inspection report which will include the results of the inspection and recommendations for required maintenance actions.

### 2.0 PROJECT RESPONSIBILITIES

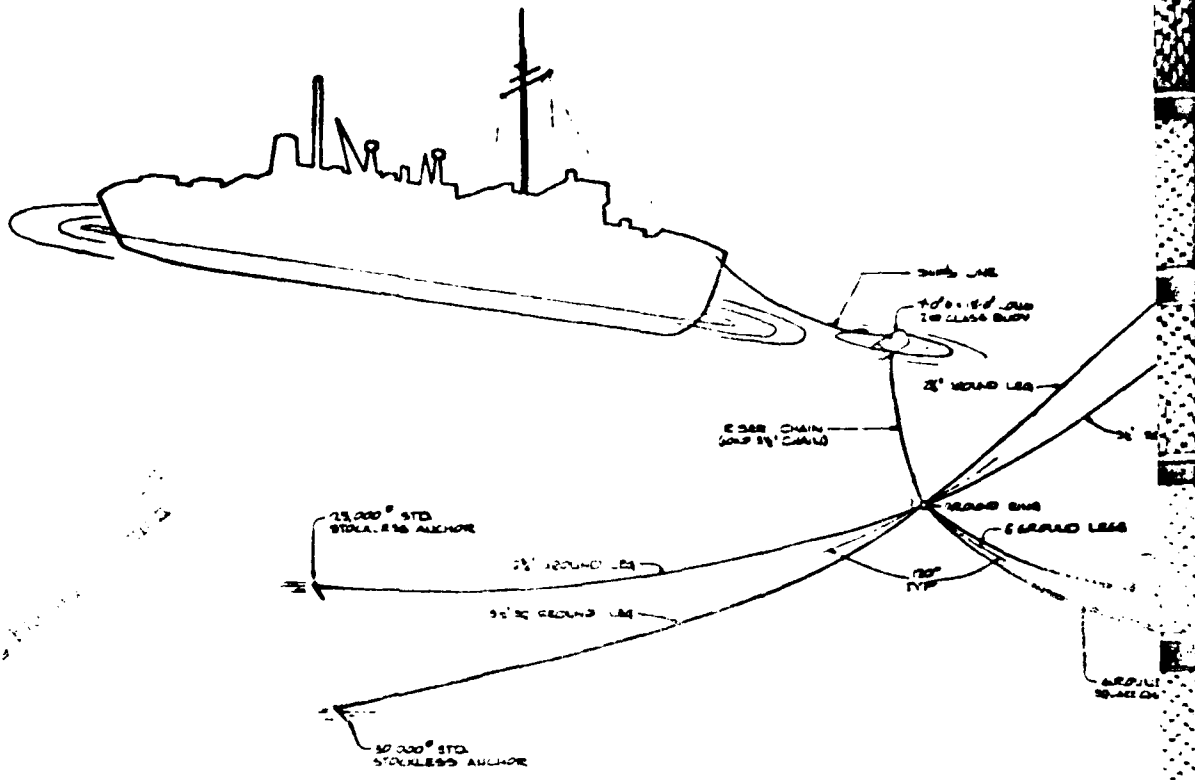
CHESNAVFACENGCOM will develop the FM underwater inspection plan, provide technical assistance to the dive team, prepare the required inspection forms, evaluate the observed inspection data, and report and results of the inspection to interested activities.

UCT ONE will provide divers to accomplish the inspection within the allotted time frame, gather and accurately report all required data, and ensure that the required amount of diving support material/equipment is available. In addition, UCT ONE divers will perform the underwater inspection in accordance with this plan and collect the data specified in paragraph 4.0.

The activity responsible for the moorings being inspected will provide logistic support as required by the Engineer-in-Charge and the UCT dive team.

### 3.0 GENERAL MOORING HISTORY

NAS Sigonella currently operates and maintains a Class CC Fleet Mooring located in Augusta Bay, Sicily. This mooring is installed in about 75 feet of water and was last overhauled in October 1980. Figure 1 is a schematic drawing of the mooring, including its relative geographic position, while Figure 2



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**MOORING SCHEMATIC**  
 AND TO SCALE

**DESIGN CRITERIA**

- WIND - 65 KNOTS
- CURRENT - 8 KNOTS
- WAVE - 8 FEET
- TIDE - 1 FOOT
- BOTTOM - SOFT CLAYEY BUT 2 METERS DEEP ABOVE A LAYER OF SANDY CLAY
- WAVE DEPTH - 15 FEET

**DESIGN ASSUMPTIONS**

THE MOORING WAS DESIGNED TO ACCOMMODATE 1 TOWER (RANSET BRAND 40-30) WITH A CON. MODEL ALPHA 300

**NOTE**

THE MATERIALS SELECTED WERE BASED ON A STANDARD STEEL WOULD BE THE TYPE WOULD BE AVAILABLE OF THE SHIP AND THE LOCAL PORT OF 200,000 LBS. AT THE PORT OF THE PROJECT.

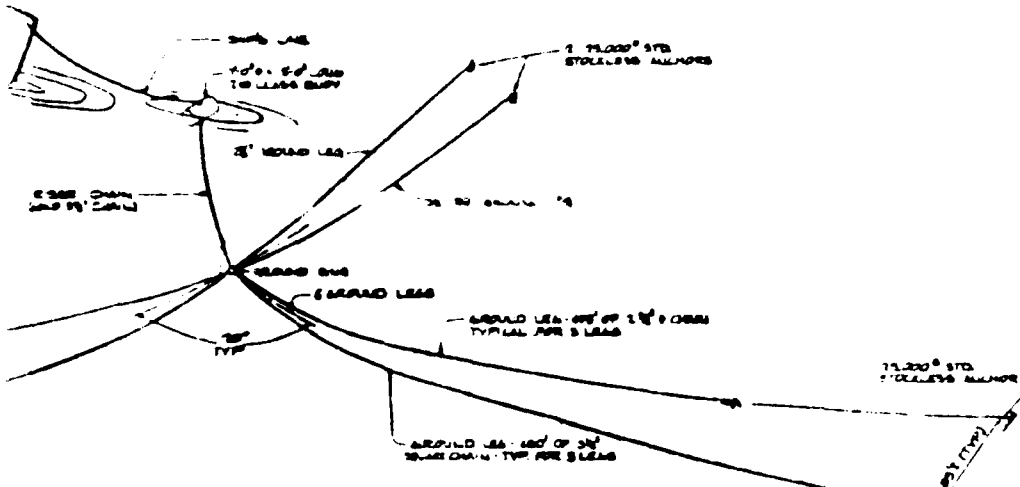
THE SELECTION FOR EDGE CHAIN CHAINS WAS MADE BY THE DESIGNER TO PROVIDE STRENGTH AND TO HAVE SOME STRENGTH AVAILABLE AT THE HEAD END. THE SELECTION FOR STOCKLESS ANCHOR WAS MADE BY THE DESIGNER TO PROVIDE STRENGTH AND TO HAVE SOME STRENGTH AVAILABLE AT THE HEAD END.

**DESIGN NOTE**

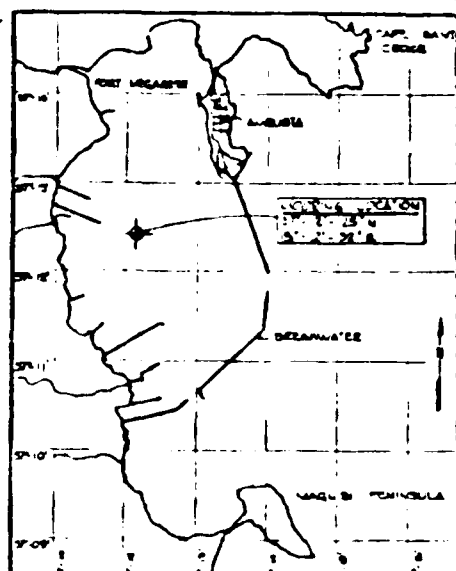
THE SQUARE CROSS SECTION RECTANGULAR LINK AND THE ASSOCIATED JOINTS SHACKLES PROVIDED FROM SURPLUS ARE NOT OF AMERICAN MANUFACTURE, BECAUSE ENOUGH DETAILED INFORMATION WAS NOT AVAILABLE AN ACCURATE DETERMINATION OF THE STRENGTH OF THESE ITEMS WAS UNOBTAINABLE. HOWEVER, BY COMPARING THE CROSS SECTIONAL AREA OF THE SQUARE LINK CHAIN AGAINST A STEEL ONE LINK OF THE STANDARD ROUND CHAIN OF EQUAL STRENGTH, IT WOULD APPEAR THAT ADEQUATE STRENGTH IS AVAILABLE. THIS STRENGTH WAS NOT THE ONLY MANUFACTURED LITERATURE



REVISIONS		
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1	REDESIGNED MOORING TO ACCOMMODATE ALL PURPOSES	10/1/78



VICINITY MAP NO SCALE



LOCATION MAP NO SCALE

**SCHEMATIC**

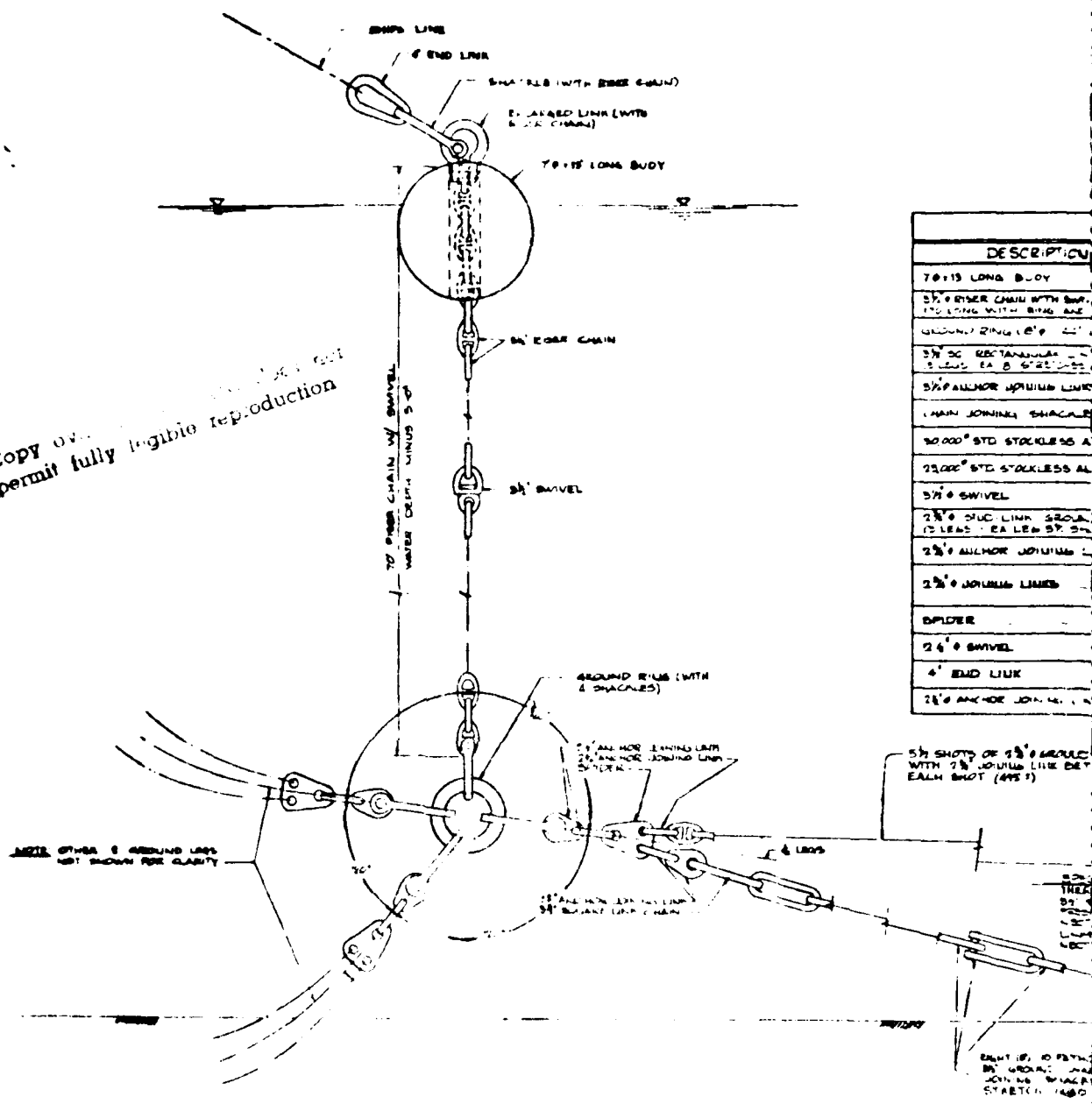
1. ON RECTANGULAR LIA TO MOORING THICKNESS 3" ARE NOT OF AMERICAN DESIGN. DETAILED LOCATION MUST BE DETERMINED BY SURVEY. IF THESE THICKNESS IS COMPARING TO THE SQUARE AND CHAIN CHAIN THE STANDARD SQUARE CHAIN SHOULD BE USED. IF AVAILABLE, THIS THICKNESS IS AVAILABLE IN THE LITERATURE.

9.22.78		<b>S-1</b>	
ATLANTIC DIVISION			
ANCHORAGE AT			
AUGUSTA BAY			
MAGLIE PENINSULA			
NO. 80091	DATE 10/1/78		

FIGURE 1. AUGUSTA BAY FLEET MOORING



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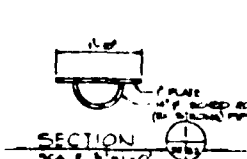
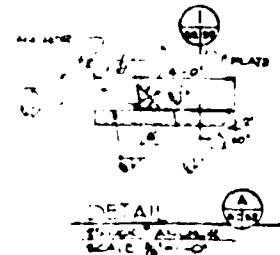
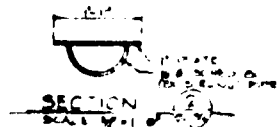
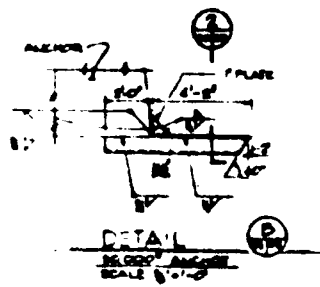


DESCRIPTION
70x15 LONG BODY
3/4\"/>
GROUND RING (1\"/>
3/4\"/>
3/4\"/>
CHAIN JOINING SHACKLE
30,000\"/>
22,000\"/>
3/4\"/>
2 1/2\"/>
2 1/2\"/>
2 1/2\"/>
2 1/2\"/>
4\"/>
2 1/2\"/>

NOTE OTHER 8 GROUND RINGS NOT SHOWN FOR CLARITY

5 1/2\"/>

MOORING GENERAL ASSEMBLY



WELD BRAD. 1/2\"/>

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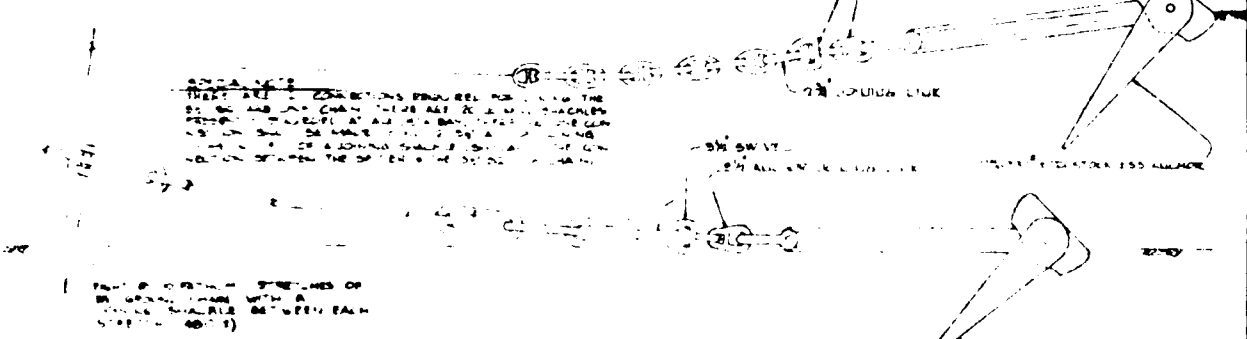
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**BILL OF MATERIALS**

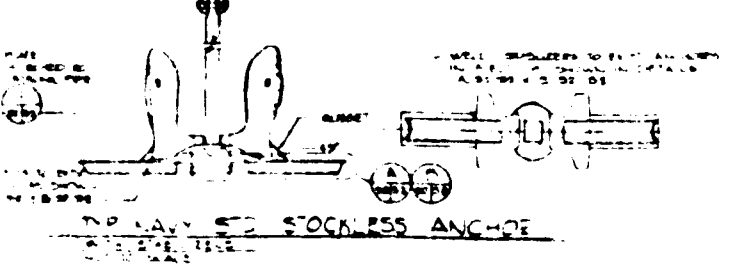
DESCRIPTION	QUANTITY	UNIT	MANUFACTURER	REMARKS
1000 LBS. B. CO.	1		AUGUSTA BAY, ITALY	
2000 LBS. B. CO.	1		AUGUSTA BAY	TO BE MADE UP FROM SHURTER'S ANCHORS AVAILABLE AT AUGUSTA BAY
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	
1000 LBS. B. CO.	1		AUGUSTA BAY	

**NOTES**  
 1. VERIFY QUANTITIES.  
 2. SPARE PARTS ARE NOT INCLUDED.  
 3. INSTALLATION PRECEDENCE IS SHOWN IN NAVAL DESIGN  
 MANUAL TO CHAPTER THREE 302

1000 LBS. B. CO. CHAIN  
 WITH 18" STOCKLESS ANCHOR  
 EACH END (3000)



**GRAPHIC SCALES**  
 1" = 100'  
 1" = 200'



9-22-78	S-2
ATLANTIC DIVISION	
AUGUSTA BAY, VA	
MOORING AT	
AUGUSTA BAY	
BILL OF MATERIALS	
100001	4056789

FIGURE 2 AUGUSTA BAY MOORING AS BUILT

depicts the as-built configuration of the mooring. The mooring consists of a 13-foot-long by 7-foot diameter 2nd class buoy, a 3-1/2 inch riser, a ground ring, three double legs and six 25,000-pound standard stockless anchors. Each double ground leg configuration contains a spider plate, one leg of 5 1/2 shots (495 feet) of 2-3/4 inch chain leading to an anchor, and a second ground leg consisting of 480 feet of 3-1/2 inch square link chain leading to a second anchor.

#### 4.0 INSPECTION PROCEDURES

4.1 Inspection Objectives. The purpose of this mooring inspection is to determine the general physical condition of the buoy and chain assembly and, when possible, to verify or update existing as-built and maintenance records. Divers will inspect only a portion of the submerged buoy hull and chain assembly 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.

One of the more important parameters used to evaluate the condition of a mooring is chain wire diameter. After the chain is cleaned to bare metal, a selective sampling of the wire diameter of chain links and connecting hardware is taken in order to determine the amount of deterioration due to corrosion and wear. "Single link" measurements are taken where chain is slack, and detect only corrosion loss. "Double link" measurements, taken where two links connect under tension, detect the combined effects of corrosion and wear. Chain links and other components which measure 90 percent or greater of original wire diameter are considered to be in "good" condition; measurement between 80 percent 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. Figure A-1 in Annex A depicts the proper method of taking both single and double link measurements.

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

The following paragraphs contain the general inspection procedures that will be followed. Inspection check lists are contained in Annex B.

**4.2** Buoy. The geographic position of the buoy will be verified. In order to accomplish this, a transit will be used to sight the buoy from known positions ashore.

**4.2.1** Buoy Upper Portion. The buoy shall be observed to determine its general condition. The size of the buoy (diameter and height) should be recorded along with its freeboard. Physical damage such as holes, dents, or listing shall be described. The paint will be checked for cracking, chipping, and peeling. Hatches, openings, and penetrations will be examined and broken parts and rust will be reported.

The buoy fenders and rubbing rails shall be checked for integrity and secure connection to the buoy.

Buoy top jewelry shall be identified and measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size. Methods for presetting calipers are contained in Annex A.

**4.2.2** Buoy Lower Portion. Divers shall thoroughly inspect the buoy below the waterline. The thickness of marine growth shall be recorded, three one-foot-square areas shall be selected and cleared of growth without damaging the paint and the condition of the paint will be noted.

**4.2.3** Bottom Jewelry. The jewelry connecting the buoy to the riser shall be identified and measured with calipers. As with the topside jewelry, the overall dimensions and the smallest wire size of each type of link or shackle will be recorded.

**4.3** Riser. Three consecutive double link measurements using pre-cut gauges will be made at both ends and near the center of the riser. Procedures for the use of pre-cut gauges are contained in Annex A. The swivel and detachable links contained within the riser assembly shall be visually inspected and measured. As the divers swim down the riser, all chain links and other mooring hardware will be visually observed. Material suspected to be in worn or damaged condition will be investigated.

**4.4** Ground Ring. The ground ring shall be examined for general and localized wear. Caliper measurements shall be made of both the wire size in the region of most severe wear and across the inner diameter.

**4.5** Ground Legs. Three consecutive double link measurements of each ground leg shall be taken every 20 feet. In those cases where the ground leg chain is slack and not in tension, three single link measurements shall be taken of each selected link as shown in Figure A-1 (Annex A). Even though the grip areas are rounded, the go/no-go gauges may not be able to be used for the measurement of square chain. In this event, calipers will be used for taking measurements. All connecting hardware including

detachable links, anchor joining links, pear links, end links, swivels and shackles shall be identified and measured with calipers. Worn hardware and unusual chain joining practices shall be recorded and photographed.

The legs shall be labeled A, B, and C clockwise from magnetic north and their orientation (determined by the diver's compass) sketched as in Figure 3.

**4.6**     Anchors. If an anchor is located, a pop float shall be attached to it so that the relative positions of the anchor from the mooring buoy can be observed from the surface. The anchor's position shall be recorded. The hardware connecting an anchor to its ground leg will be measured by calipers and the wire diameters recorded.

#### **4.7**     Photography

**4.7.1**    Topside. Topside photography and ashore photographs are the responsibility of the Engineer-in-Charge. Film for standard size slide transparencies should be used.

Photographs will be taken of the buoy showing its general condition. Photographs of the topside jewelry and damaged buoy components will be taken as deemed appropriate by the EIC.

Photographs will be taken of ashore spare mooring material inventories and construction equipment as deemed necessary.

**4.7.2**    Underwater. Underwater photography shall be the responsibility of the dive team. The buoy bottom, bottom jewelry, worn links, swivels, ground rings, and other hardware shall be photographed wherever required to support material conditions and when environmentally feasible. Photographs shall include clear annotation as to the location of the hardware being photographed. High speed film (i.e. ASA 400) for standard size slide transparencies should be used. Because silt and other particles suspended in the water tend to reduce picture quality when illuminated, the flash should be used only when absolutely necessary to provide adequate light levels.

### **5.0**     **DOCUMENTATION**

The Engineer-in-Charge will document the inspection procedures used and record the data obtained by the dive team. He may require additional or alternative inspection procedures as deemed necessary during the course of the inspection. He will maintain a time log of events occurring during the

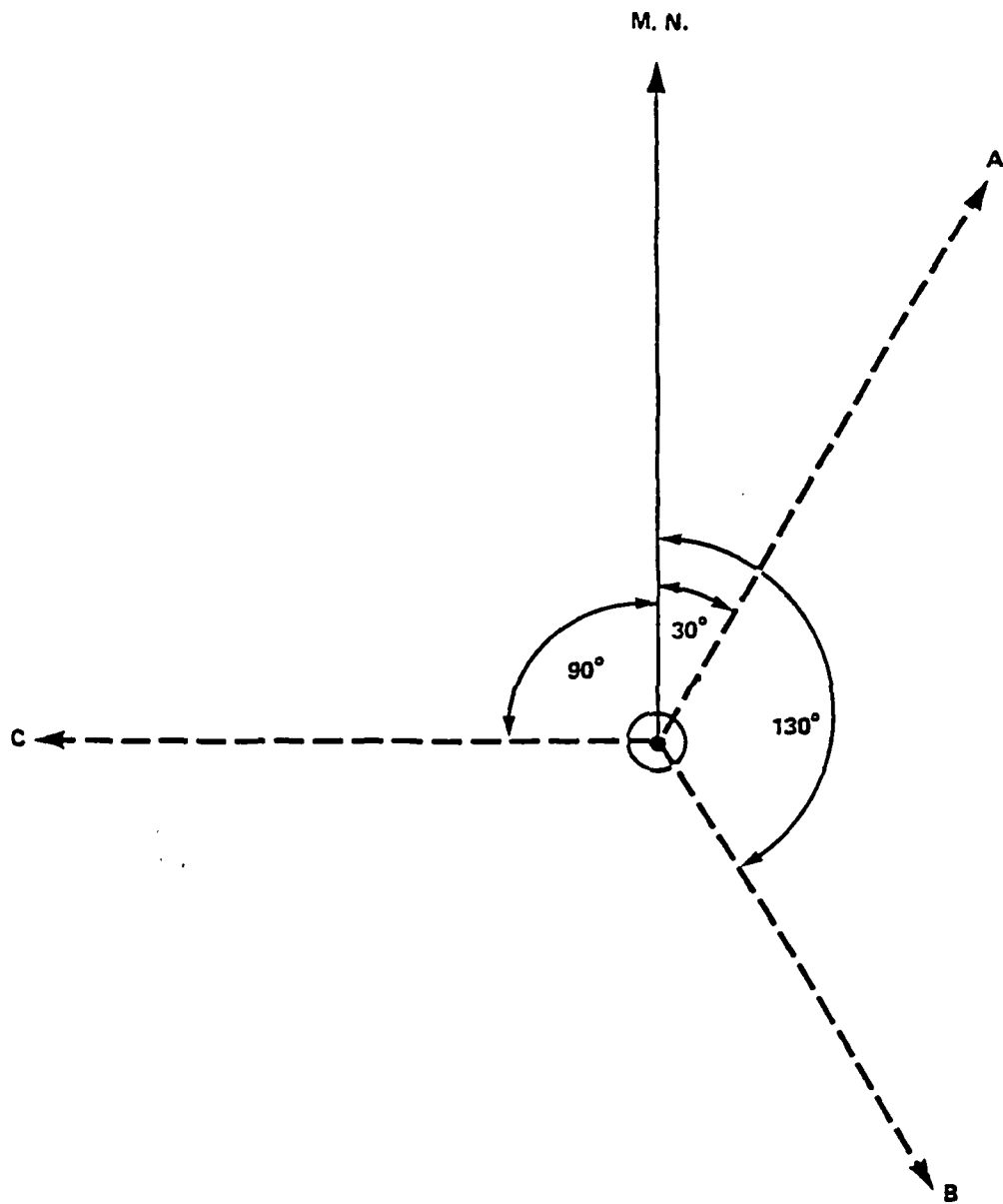


FIGURE 3. MAGNETIC BEARING OF GROUND LEGS



inspection, and the master inspection form. In addition, the EIC must be prepared to debrief each diver, upon his return to the surface, in order to gain immediate knowledge of what the diver observed. The information obtained from the divers will be recorded, and this data will subsequently be the basis for the development of the moorings as-built configuration and for the preparation of the Fleet Mooring Inspection Report, which will contain the results of the inspection and recommendations for corrective maintenance actions.

While on site, the EIC will investigate the availability and cost of local mooring maintenance support. In addition he will conduct a cursory inspection of any on-shore Fleet Mooring Inventory (FMI) used for maintenance and repair or ready reserve. The type, size, quantity and general condition of the inventory shall be reported.

## **6.0 MEETINGS/BRIEFINGS**

Upon arrival on site, the Engineer-in-Charge will conduct a pre-dive briefing to familiarize diving personnel with the mooring inspection procedures and to advise them of possible modifications to this inspection plan. In addition, after approval by CHESDIV, the EIC will give a post-inspection debriefing to advise station personnel of the preliminary inspection findings.

## **7.0 LOGISTICS**

**7.1 UCT ONE.** All arrangements for messing, berthing, and transportation of diver personnel, and the acquisition of a suitable dive platform/boat, will be the responsibility of UCT 1. In addition, the following equipment will be provided by the divers in support of this inspection:

- All diving support equipment
- Measuring aids
  - 100-foot tape measures for use underwater
  - 1-, 2-, and 3-foot scales with large numbers suitable for underwater photo documentation
  - Accurate depth gauges
  - Marker tags to relocate or mark chain links or accessories
  - Calipers (24-inch minimum)
  - Go/no-go gauges
  - White slates (2) w/marker pens for underwater use

- Survey equipment
  - Compass (diver's)
  - Survey buoys with line (pop floats)
  - Surveying transits for establishing mooring buoy locations
- Underwater voltmeters
- Two Underwater still cameras (35mm) with film (color and B & W) and flash with spare batteries
- Cleaning equipment – Hand tools including wire brushes, chipping hammers, and sharp chisels.

7.2 CHESNAVFACENGCOM. The CHESNAVFACENGCOM Engineer-in-Charge will provide the following:

- Inspection plan
- Data sheets and forms
- 35mm surface camera and film
- Drafting supplies, graph paper, scales
- Calculator
- Pre-dive briefing data
- DM-26

**ANNEX A**

**MEASURING DEVICES AND THEIR USE**

## ANNEX A

### 1.0 MEASURING DEVICES AND THEIR USE

Tables A-1 and A-2 outline the 80 and 90 percent measurements for mooring components. These tables are based on the standard sizes of mooring material listed in DM-26 and can be used to preset calipers before measuring various items. For example, a class BB riser type mooring will require calipers set to 3.15 inches (90 percent) and 2.8 inches (80 percent) for single link measurements on the riser. These values are then doubled obtaining 6.3 inches (90 percent) and 5.6 inches (80 percent) for double link measurements on the riser. Similarly, for the ground legs, single link measurements of 2.25 inches (90 percent) and 2.0 inches (80 percent) are obtained from Table A-1. These values are also doubled to obtain 4.5 inches and 4.0 inches for double link measurements. For the ground ring the single link measurements are determined to be 5.85 inches and 5.2 inches.

The preferred measuring devices, however, are back-to-back 80 and 90 percent "go-no go" gauges. These gauges simplify the diver's job in that, unlike calipers, they have to be damaged to be knocked out of adjustment. The locations for measuring chain links are shown in Figure A-1. Figure A-2 contains the drawings and data required to fabricate these gauges. Although these gauges provide a simpler way of sampling the wire size of chain links and some jewelry, the divers still have to carry calipers to measure ground rings and chain connecting links.

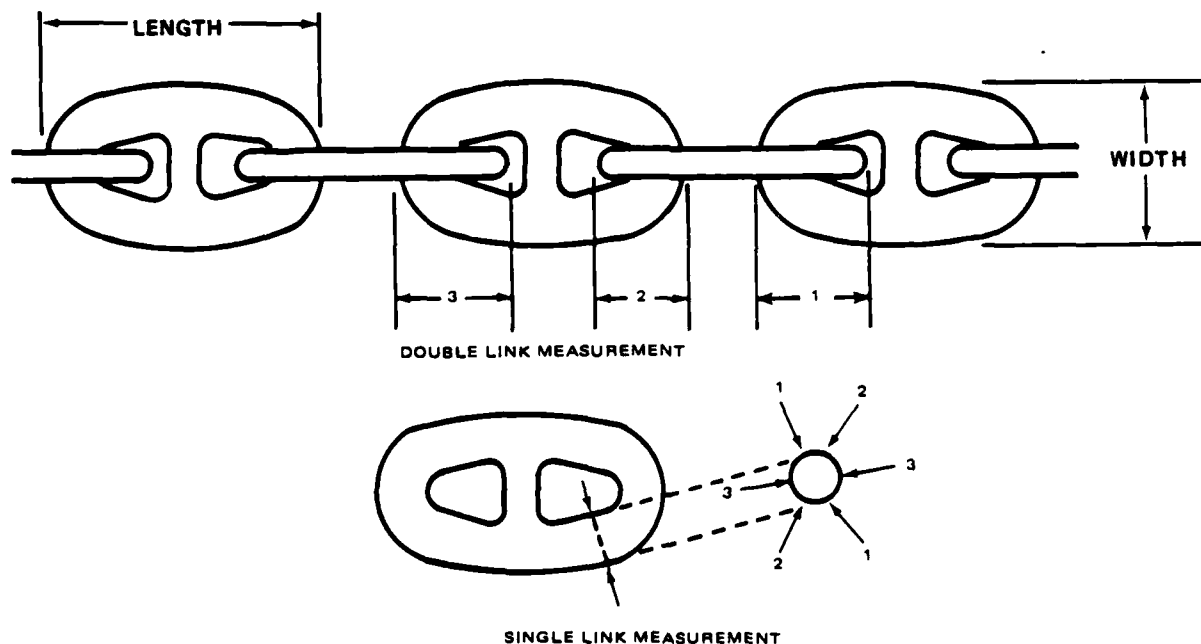


FIGURE A-1. LOCATIONS FOR TAKING CHAIN LINK MEASUREMENTS

TABLE A-1. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF RISER-TYPE MOORINGS  
(DOUBLE LINK MEASUREMENTS ARE OBTAINED BY MULTIPLYING SINGLE LINK MEASUREMENTS BY TWO)

Class Mooring	Percent Remaining	Top of Bump (End Link)		Riser Chain		Ground Ring		Ground Jackle		Anchor		
		F-Shackle	End Link	AJL	Chain	AJL	Wing	Spider	Chain	AJL	Stockless w/Stabilizer	LWL
A-A	100	5 3/8	4 1/2	4"	4	4	6"	4	2 3/4	2 3/4"	25,000	-
	90	4.838	3.285	Type	3.6	3.6	5.85	3.6	2.475	Type		
	80	4.3	2.92		3.2	3.2	5.2	3.2	2.4			
B-B	100	4 15/16	3 15/16	3"	3"	3"	6"	4	2 1/2	2 1/2"	20,000	13,000
	90	4.44	3.544	Type	3.15	3.15	5.85	3.6	2.25	Type		
	80	3.75	3.15		2.8	2.8	5.2	3.2	2.4			
C-C	100	4 15/16	3 15/16	3"	3"	3"	6"	4	2 1/2	2 1/2"	18,000	10,000
	90	4.44	3.544	Type	3.15	3.15	5.85	3.6	2.025	Type		
	80	3.95	3.15		2.8	2.8	5.2	3.2	1.8			
D-D	100	4 3/16	3 3/4	3"	3	3	6	-	3	3"	30,000	-
	90	3.769	3.375	Type	2.7	2.7	5.4	-	2.7	Type		
	80	3.35	3		2.4	2.4	4.8	-	2.4			
A	100	3 7/8	3 3/8	2 3/4"	2 3/4	2 3/4"	5"	-	2 3/4	2 3/4"	25,000	-
	90	3.488	3.038	Type	2.475	2.475	4.95	-	2.475	Type		
	80	3.1	2.7		2.2	2.2	4.4	-	2.2			
B	100	3 1/8	3 1/8	2 1/2"	2 1/2	2 1/2"	4 3/4	-	2 1/2	2 1/2"	20,000	13,000
	90	3.15	2.813	Type	2.25	2.25	4.275	-	2.25	Type		
	80	2.8	2.5		2.0	2.0	3.8	-	2.25			
C	100	3 1/8	2 3/4	2 1/2"	2 1/2	2 1/2"	4"	-	2 1/2	2 1/2"	10,000	10,000
	90	2.813	2.813	Type	2.025	2.025	4.05	-	2.025	Type		
	80	2.5	2.5		1.8	1.8	3.6	-	1.8			
D	100	2 13/16	2 1/2	2"	2	2"	4	-	2	2"	13,000	6,000
	90	2.531	2.25	Type	1.8	1.8	3.6	-	1.8	Type		
	80	2.25	2.0		1.6	1.6	3.2	-	1.6			
E	100	2 7/16	2 1/2	1 3/4"	1 3/4	1 3/4"	3 1/2	-	1 3/4	1 3/4"	9,000	4,000
	90	2.174	2.025	Type	1.575	1.575	3.15	-	1.575	Type		
	80	1.95	1.8		1.4	1.4	2.8	-	1.4			
F	100	1 3/4	1 3/4	1 1/2"	1 1/2	1 1/2"	2 3/4	-	1 1/2	1 1/2"	5,000	2,000
	90	1.575	1.575	Type	1.125	1.125	2.813	-	1.125	Type		
	80	1.4	1.4		1.0	1.0	2.5	-	1.0			
G	100	1 1/16	.1	3/4"	3/4	3/4"	1 7/8	-	3/4	1"	3,000	300
	90	.956	.9	Type	.675	.675	1.688	-	.675	Type		
	80	.85	.8		.6	.6	1.5	-	.6			

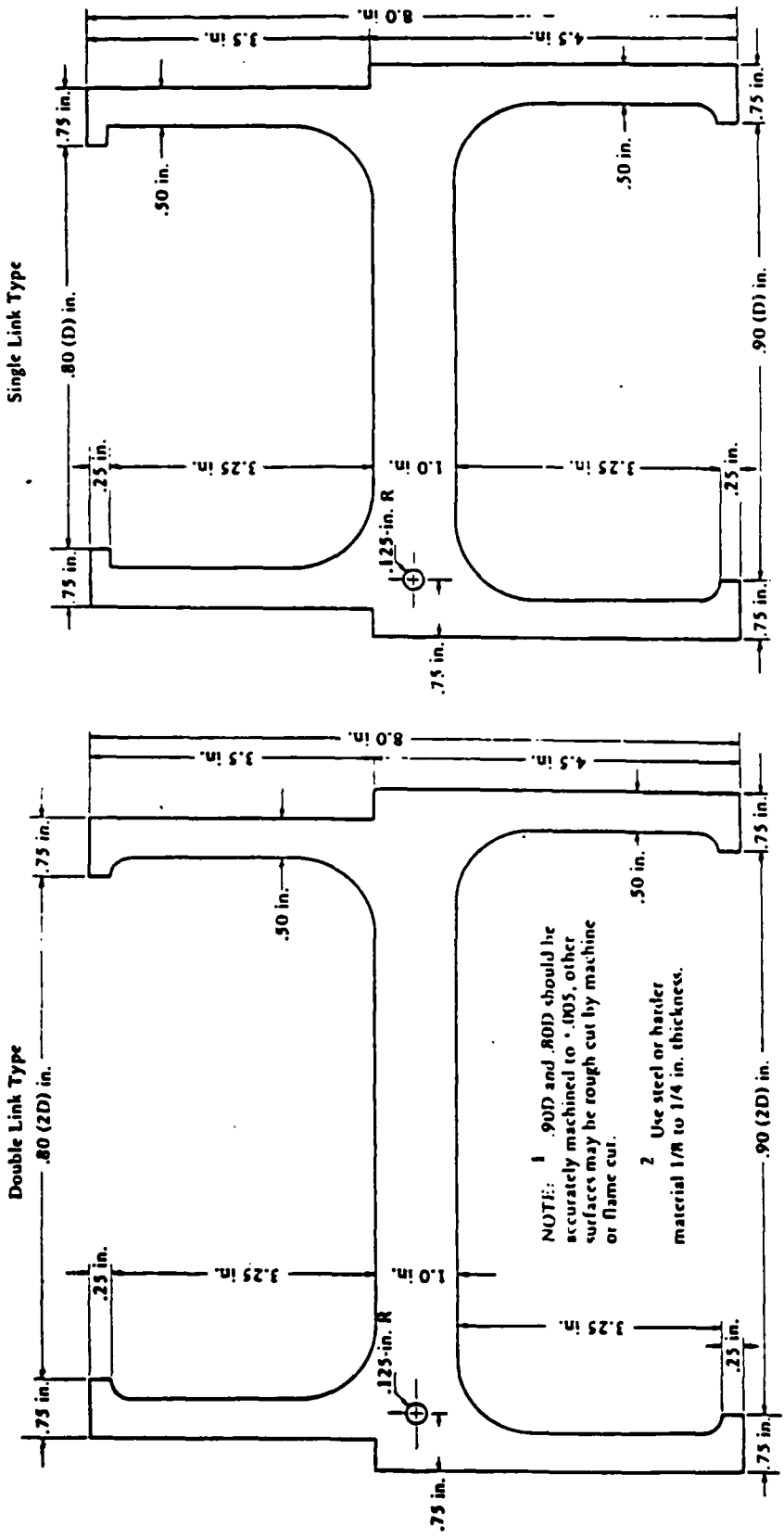
1. AJL measurement vary according to manufacturer, see Mt. 76
2. Assumes firm sand bottom
3. Assumes cast steel chain

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TABLE A-2. SINGLE LINK MEASUREMENTS FOR COMPONENTS OF TELEPHONE-TYPE MOORINGS  
(DOUBLE LINK MEASUREMENTS ARE OBTAINED BY MULTIPLYING SINGLE LINK MEASUREMENTS BY TWO)

Class Mooring	Percent Remaining	Lgt of Buoy (End Link)	Lgt of Buoy (Adj)	Buoy-to-Ground Tackle		Spider	Ground Tackle		Anchor <sup>2</sup> Slackness/Stabilizer	LWT
				D/F-Shackle	Adj <sup>1</sup>		Adj <sup>1</sup>	Chain		
A-A	100	4"	4 11/16	4	3	2 3/4"	25,000	-		
	90	3.285	4.219	3.6	2.7	2.475				
	80	2.92	3.75	3.2	2.4	2.2				
B-B	100	4"	4 11/16	4	3	2 1/2"	20,000	13,000		
	90	3.285	4.219	3.6	2.7	2.25				
	80	2.92	3.75	3.2	2.4	2.0				
C-C	100	4"	4 11/16	4	3	2 1/2"	18,000	10,000		
	90	3.285	4.219	3.6	2.7	2.025				
	80	2.92	3.75	3.2	2.4	1.8				
D-D	100	4"	4 11/16	4	3	3"	30,000	-		
	90	3.285	4.219	3.6	2.7	2.7				
	80	2.92	3.75	3.2	2.4	2.4				
A	100	3 3/8	3 7/8	2 3/4"	2 3/4"	2 3/4"	25,000	-		
	90	3.038	3.486	2.7	2.7	2.475				
	80	2.7	3.1	2.2	2.2	2.2				
B	100	3 3/8	3"	2 1/2"	2 1/2"	2 1/2"	20,000	13,000		
	90	3.038	3.15	2.7	2.7	2.25				
	80	2.7	2.8	2.0	2.0	2.0				
C	100	3 3/8	3 1/8	2 1/2"	2 1/2"	2 1/2"	10,000	10,000		
	90	3.038	2.813	2.5	2.5	2.025				
	80	2.7	2.5	2.0	2.0	1.8				
D	100	3 1/8	2 11/16	2 1/2"	2 1/2"	2 1/2"	13,000	6,000		
	90	3.038	2.531	2.25	2.25	1.8				
	80	2.7	2.25	2.0	2.0	1.6				

1. All measurements vary according to manufacturer. see DM-26
2. Assumes firm sand bottom
3. Assumes cast steel chain



NOTE: 1 .90D and .80D should be accurately machined to .005, other surfaces may be rough cut by machine or flame cut.  
 2 Use steel or harder material 1/8 to 1/4 in. thickness.

D"	Single Link		Double Link		D"	Single Link		Double Link		D"	Single Link		Double Link	
	.90D	.80D	.90(2D)	.80(2D)		.90D	.80D	.90(2D)	.80(2D)		.90D	.80D	.90(2D)	.80(2D)
6-1/2	① 5.85	5.20	⑥ 3.15	2.80	3-1/2	① 1.80	⑦ 6.30	5.60	2	① 1.80	② 3.60	3.20		
6	② 5.40	4.80	⑦ 2.70	2.40	3	② 1.69	⑧ 5.40	4.80	1-7/8	③ 1.50				
5-1/2	③ 4.95	4.40	⑧ 2.48	2.20	2-3/4	③ 1.58	⑨ 4.96	4.40	1-3/4	④ 1.40	③ 3.06	2.80		
4-1/2	④ 4.05	3.60	⑨ 2.25	2.00	2-1/2	④ 1.35	⑩ 4.50	4.00	1-1/2	⑤ 1.20	④ 2.70	2.40		
4	⑤ 3.60	3.20	⑩ 2.03	1.80	2-1/4	⑤ 1.125	⑪ 4.06	3.60	1-1/4	⑥ 1.00				

FIGURE A-2. 80/90 PERCENT "GO-NO-GO" GAUGES

## ANNEX B

### SAMPLE INSPECTION FORMS

Figures B-1 and B-2 are two forms the EIC and divers may use to record measurements and as-built summations.





**FIGURE B-2  
MOORING DATA SUMMARY FOR PREPARATION OF AS-BUILTS**

MOORING# _____	CLASS _____	LOCATION _____	DATE _____
BOTTOM TYPE _____	WATER DEPTH _____	MOORING CONDITION _____	
ENGINEER-IN-CHARGE _____		DIVERS _____	

<p><b>BUOY TYPE</b></p> <p>DIMENSIONS _____</p> <p>CONDITION _____</p> <p>TOP HARDWARE _____</p> <p>BOTTOM HARDWARE _____</p> <p><b>RISER LENGTH</b></p> <p>TYPE CHAIN _____</p> <p>LINK WIDTH _____</p> <p>WIRE DIAM. _____</p> <p><b>GROUND RING LOC.</b></p> <p>OUTER DIAM. _____</p> <p>WIRE DIAM. _____</p> <p>CONDITION _____</p> <p><b>LEG A LENGTH</b></p> <p>EXPOSED LENGTH _____</p> <p>TYPE CHAIN _____</p> <p>LINK WIDTH _____</p> <p>WIRE DIAM. _____</p> <p><b>LEG B LENGTH</b></p> <p>EXPOSED LENGTH _____</p> <p>TYPE CHAIN _____</p> <p>LINK WIDTH _____</p> <p>WIRE DIAM. _____</p>	<p><b>LEG C LENGTH</b></p> <p>EXPOSED LENGTH _____</p> <p>TYPE CHAIN _____</p> <p>LINK WIDTH _____</p> <p>WIRE DIAM. _____</p> <p><b>LEG D LENGTH</b></p> <p>EXPOSED LENGTH _____</p> <p>TYPE CHAIN _____</p> <p>LINK WIDTH _____</p> <p>WIRE DIAM. _____</p> <p><b>RISER CONNECTIONS</b></p> <p>_____</p> <p>_____</p> <p><b>LEG CONNECTIONS</b></p> <p>_____</p> <p>_____</p> <p><b>OTHER</b> _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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**ANNEX C**

**REFERENCES**

PAGE	DATE PREPARED TIME			PRECEDENCE		CLASS	TIME	EXT	GROUP
01 of 02	DATE TIME	MONTH	YR	ACT	INFO	UUUU			1461827

BOOK MESSAGE HANDLING INSTRUCTIONS

FROM: CHESNAVFACENGC COM WASHINGTON DC  
 TO: NAS SIGONELLA IT  
 INFO CINCUSNAVEUR LONDON UK  
 COMFAIRMED NAPLES IT  
 COMNAVFACENGC COM ALEXANDRIA VA  
 CINCLANTFLT NORFOLK VA  
 COMCBLANT NORFOLK VA  
 LANTNAVFACENGC COM NORFOLK VA  
 LANTNAVFACENGC COMBRO NAPLES IT  
 NAVSUPACT NAPLES IT  
 UCT ONE

UNCLAS //N11000//

SUBJ: FLEET MOORING INSPECTION OF AUGUSTA BAY, ITALY

- AS PART OF THE COMNAVFACENGC COM FLEET MOORING MAINTENANCE (FMM) PROGRAM, CHESNAVFACENGC COM, WITH DIVER SUPPORT FROM UCT ONE, PLANS TO CONDUCT AN UNDERWATER INSPECTION OF THE ONE FLEET MOORING AT AUGUSTA BAY, ITALY.
- AVAILABLE DATA INDICATES A SINGLE, FREE-SWINGING, RISER TYPE, CLASS CC MOORING FOR USE BY AD TYPE SHIPS. OUR RECORDS INCLUDE

DISTR:

DRAFTER TYPED NAME TITLE OFFICE SYMBOL AND PHONE <i>James E. McLaughlin</i> JAMES E. MCLAUGHLIN, FPO-1C7 26 MAY 1983 433-3881		SPECIAL INSTRUCTIONS COPY TO: 09..00..FPO-1C..FPO-1C7.. FPO-10P2..FPO-1MP..DAILY..0161	
TYPED NAME TITLE OFFICE SYMBOL AND PHONE H. S. STEVENSON, CDR, CEC, USN SIGNATURE <i>[Signature]</i>		SECURITY CLASSIFICATION DATE TIME GROUP 261936Z MAY 83	

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PAGE 02 of 02	DTG RELEASE TIME			PRECEDENCE		CLASS	SPECIAL	IMP	CIC	INSTRUMENT
	DATE TIME	MONTH	YR	ACT	INFO	UUUU				1261827

BOOK \_\_\_\_\_ MESSAGE HANDLING INSTRUCTIONS \_\_\_\_\_

LANTNAVFACENGCOM DRAWINGS NUMBERS - S1:4036288 AND S2:4036289 OF 31 AUGUST 1977.

3. REQUEST ADDITIONAL DATA ON MAINTENANCE HISTORY, RECORD OF OVERHAULS, SHIP UTILIZATION OR ANTICIPATED SHIP USAGE DURING INSPECTION PERIOD. NO CLASSIFIED MATERIAL REQUIRED. AREA AND FACILITY MAPS WITH SPECIFIC MOORING LOCATIONS ARE REQUESTED.

4. INSPECTION SCHEDULE IS 17-22 SEPTEMBER 1983. POINT OF CONTACT AT CHESNAVFACENGCOM IS J. MCLAUGHLIN, AUTOVON 288-3881 OR (202) 433-3881.

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5  
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