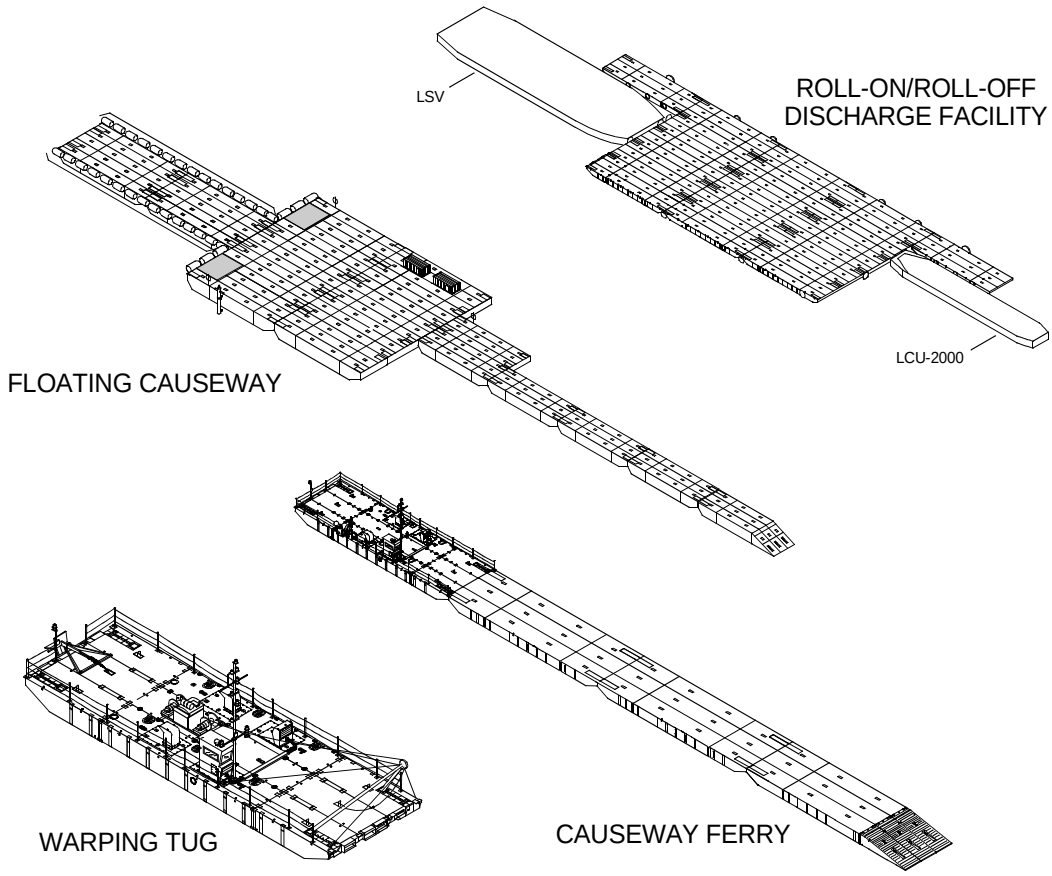
TM 55-1945-205-10-4

TECHNICAL MANUAL

OPERATORS MANUAL
FOR

MODULAR CAUSEWAY SYSTEM (MCS)
FLOATING CAUSEWAY(FC)
FC-1
NSN 1945-01-473-2162



This manual supersedes TM 55-1945-205-10 dated 29 August 1997 including all changes.

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HEADQUARTERS, DEPARTMENT OF THE ARMY
15 MAY 2002

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WASHINGTON, D.C. 15 MAY 2002

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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028-2 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is http://aeps.ria.army.mil. If you need a password, scroll down and click on "ACCESS REQUEST FORM". The DA Form 2028 is located in the ONLINE FORMS PROCESSING section of the AEPS website. Fill out the form and click on "SUBMIT". Using this form on the AEPS website will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, E-mail or fax your letter, DA Form 2028, or DA Form 2028-2 directly to: Commander, U.S. Army Tank-Automotive and Armaments Command, ATTN: AMSTA-LC-CIP-WT, Rock Island, IL 61299-7630. The E-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

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HOW TO USE THIS MANUAL

This manual contains certain features to improve the convenience of using this manual and increase the user's efficiency. These features include:

a. Accessing Information

Information is accessed by referring to the Table of Contents, located in the front of this manual, or by looking in the Alphabetical Index, located in the back of this manual.

b. Illustrations

Various methods are used to locate and repair components. Locator illustrations in Controls and Indicator tables, PMCS tables, exploded views and cut-away diagrams make the information in the manual easier to understand and follow.

c. Using This Manual

When using this manual, read and understand the entire maintenance action before performing the task. Also, read and understand all warnings, cautions and notes as well as general safety precautions that apply to the task to be performed. The warning summary will inform personnel of hazards associated with the equipment to be worked on. However, the summary is not all inclusive and personnel should be aware at all times of hazardous conditions that may arise.

Prior to starting the procedures in this manual, the initial setup requirements are located directly above each procedure. The information is given to ensure all materials, expendables, tools and any other equipment necessary are readily available for use. The initial setup will be accomplished prior to starting the actual steps of each maintenance procedure.

Locating Major Components

Obtain the manual for the system to be worked on. Open to the Table of Contents located in the front of this manual. Find Chapter 1, *Description and Theory of Operation*. Under the chapter title you will find the work package titled *Location and Description of Major Components*. Turn to the work package indicated. This work package will give a brief description of the major components, and show an illustration of what the component looks like and its location.

The Alphabetical Index, located in the back of this manual, contains an alphabetical list of all sections of this manual. *Location and Description of Major Components* is found in section L. The work package is found on the right side of the title where the *Location and Description of Major Components* is located. Turn to the work package indicated to find the description and location of each component.

Operator Instructions

To locate an operator task, open the manual to the Table of Contents located in the front of this manual. Locate the procedure that is to be performed. Next to the procedure, on the right, locate the work package number. Turn to the work package number in the manual. Perform the initial setup by obtaining the expendables, tools, materials and other items listed prior to starting the task. Perform the listed steps in order. The Alphabetical Index can also be used to locate the item and procedures to follow.

Tools: Lists all tools (standard or special) required to perform the task. Tools are identified with an item number and work package number from the *Tool Identification List* located in Chapter 4, *Supporting Information.*

Materials/Parts: Lists all parts or materials necessary to perform the task. Expendable and durables are identified with an item number from the applicable work package located in Chapter 4, *Supporting Information*.

Personnel Required: Lists all personnel necessary to perform the task.

Equipment Condition: Notes the conditions that must exist before starting the task. The equipment condition will also include any prerequisite maintenance tasks to be performed with reference to the work package number or to the TM number.

References: Includes any other manuals necessary to complete the task. When there are no references listed, all steps necessary to complete the task are contained within this manual. A listing of reference materials is contained in the work package *References* in Chapter 4, *Supporting Information*.

Location of Controls and Indicators

To locate a particular control and/or indicator, open the manual to the Table of Contents located in the front of the manual. Find Chapter 2, *Operator Instructions*. Locate the work package titled *Description and Use of Operator Controls and Indicators*. Turn to the work package indicated. Locate the control and, or indicator that you are attempting to identify. Take note of the number pointing to the control or indicator. Refer to the table below the picture and find the number in the column on the far left hand side. Reading from left to right, find the number that matches the number from the picture, then read the name of the control/indicator and following function of the item, as detailed in the far right hand column.

Troubleshooting Procedures

The Table of Contents or Alphabetical Index may be used to locate sections within this manual. To locate a particular troubleshooting procedure, open the manual to the Table of Contents located in the front of this manual. Find Chapter 3, *Troubleshooting Procedures.* Under this section, find a work package titled *Troubleshooting Index*. Turn to the work package indicated, which lists all of the troubleshooting procedures. Look down the list until you find the appropriate work package for the problem you are trying to solve. To the right side of the procedure will be a work package number. Turn to the work package indicated and follow the steps to complete the troubleshooting procedure. The procedures list the malfunction, symptom and the corrective action. The corrective action will indicate which maintenance procedure to go to for the repair of the symptom or what level of maintenance is capable of repair of the problem. Follow the procedures indicated to complete the task. At the top of the task you will have a section called INITIAL SETUP. There are five basic headings listed under INITIAL SETUP.

Test Equipment: Lists all test equipment (standard or special) required to troubleshoot, test and inspect the equipment covered in this manual. The test equipment is identified with an item number and work package number from the *Tool Identification List* located in Chapter 4, *Supporting Information*.

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References: Includes any other manuals necessary to complete the task. When there are no references listed, all steps necessary to complete the task are contained within this manual. A listing of reference materials is contained in the work package *References* in Chapter 4, *Supporting Information*.

Maintenance Instructions

To locate a maintenance procedure, open the manual to the Table of Contents located in the front of this manual. Find Chapter 4, *Maintenance Instructions*. Look down the list and find the maintenance procedure to be accomplished. On the right side of the maintenance procedure will be a work package number. Turn to the work package indicated. Before beginning the maintenance task, look through the procedure to familiarize yourself with the entire maintenance procedure. At the top of the task you will have a section called INITIAL SETUP. There are five basic headings listed under INITIAL SETUP.

Tools: Lists all tools (standard or special) required to perform the task. Tools are identified with an item number and work package number from the *Tool Identification List* located in Chapter 4, *Supporting Information*.

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CHAPTER 1

DESCRIPTION AND THEORY OF OPERATION FOR MODULAR CAUSEWAY SYSTEM (MCS) FLOATING CAUSEWAY (FC)

OPERATOR MAINTENANCE
FLOATING CAUSEWAY
GENERAL INFORMATION

SCOPE

This manual contains descriptions and instructions for the floating causeway.

Type of Manual: Operator Maintenance.

Purpose of Equipment: The system provides the capability to move rolling cargo from lighters for movement ashore.

MAINTENANCE FORMS, RECORDS AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS); and AR 700-138, Army Logistics Readiness and Sustainability.

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If any component in your system needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368, Product Quality Deficiency Report. Mail it to the address specified in DA PAM 738-750, or as specified by the contracting activity. We will send you a reply.

CORROSION PREVENTION AND CONTROL (CPC)

CPC of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling or breaking of the materials may be a corrosion problem. If a corrosion problem is identified, it can be reported using an SF 368, Product Quality Deficiency Report. Use of key words, such as “corrosion”, “rust”, “deterioration” or “cracking”, will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 738-750, Functional Users Manual for The Army Maintenance Management System (TAMMS).

OZONE DEPLETING SUBSTANCES (ODS)

The continued use of ODS has been prohibited by Executive Order 12856 of 3 August 1993.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

The procedures for destruction of Army materiel to prevent enemy use are contained in TM 750-244-6.

PREPARATION FOR STORAGE AND SHIPMENT REFERENCE

Reference 0058 00 through 0068 00 for preparation of storage or shipment of the Floating Causeway system.

OPERATOR MAINTENANCE
FLOATING CAUSEWAY
MAJOR COMPONENTS
DESCRIPTION AND DATA

EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

The floating causeway (FC) is a floating platform used during logistics over the shore (LOTS) operations. The FC consists of three major segments, trident pierhead extension, trident pierhead and causeway. Each major segment consists of non-powered floating modules that are assembled into module strings and intermediate sections.

The trident pierhead extension is the five string wide set of modules that run from the trident pierhead out to sea. This trident pierhead extension will be used by the lighter vessels to moor to the floating causeway. The overall dimensions of the trident pierhead extension is 40 ft wide by 160 ft long.

The trident pierhead consists of ten intermediate sections. The overall dimensions of the trident pierhead is 120 ft wide by 160 ft long.

The causeway consists of one or more intermediate sections connected length wise, with one end connected to the trident pierhead and the other end connected to a combination beach/sea end section. The overall dimension is determined by adding the total length of intermediate sections to the length of the combination beach/sea end section. The causeway length depends on how far offshore, from the beach, the causeway must extend to give the required water depth. The overall width of the causeway is 24 ft wide.

The trident pierhead extension, trident pierhead and the causeway are assembled to each other by flexor connectors.

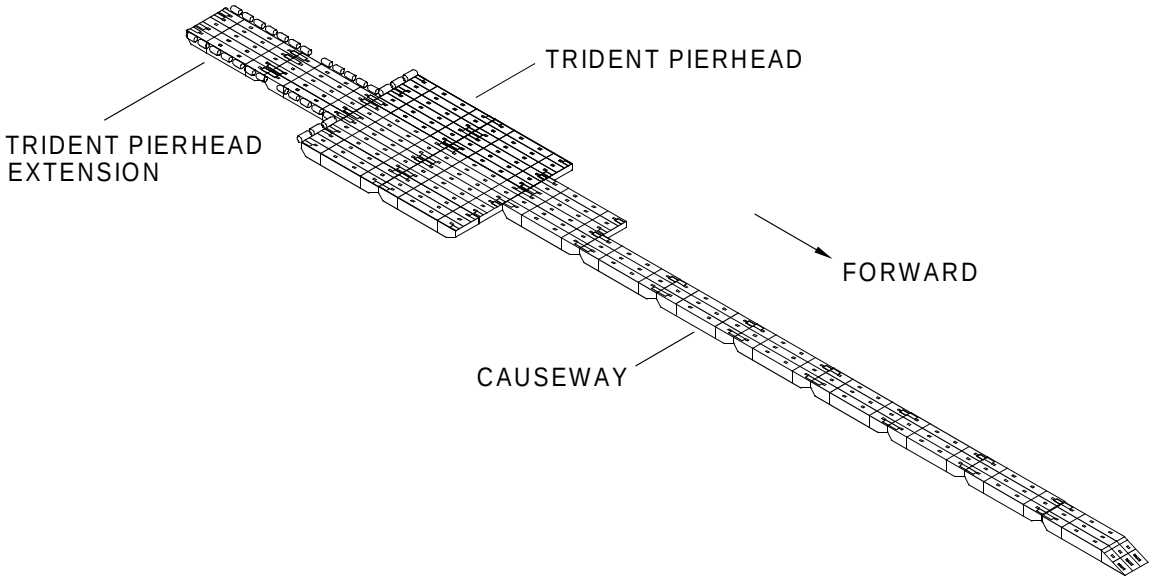
The FC shall operate in sea conditions ranging from Sea State 0 up to and including Sea State 2 (see Table 1), in surf conditions up to 5 ft with along-shore currents up to 2 knots, and in beach gradients up to 1:200. The FC system shall survive Sea State 4 conditions and be capable of being put back into service within 48 hours of the higher Sea State.

Table 1. SEA STATE (SS) Conditions.

SS	SIGNIFICANT WAVE HEIGHTS (FT)	MODAL WAVE PERIODS (SECONDS)
0	0.0 - 0.5	0.3 - 1.3
1	0.5 - 1.5	0.8 - 3.8
2	1.5 - 3.0	1.3 - 6.0
3	3.5 - 5.0	2.0 - 7.7
4	6.0 - 7.5	2.7 - 9.4
5	8.0 - 12.0	3.1 - 11.9

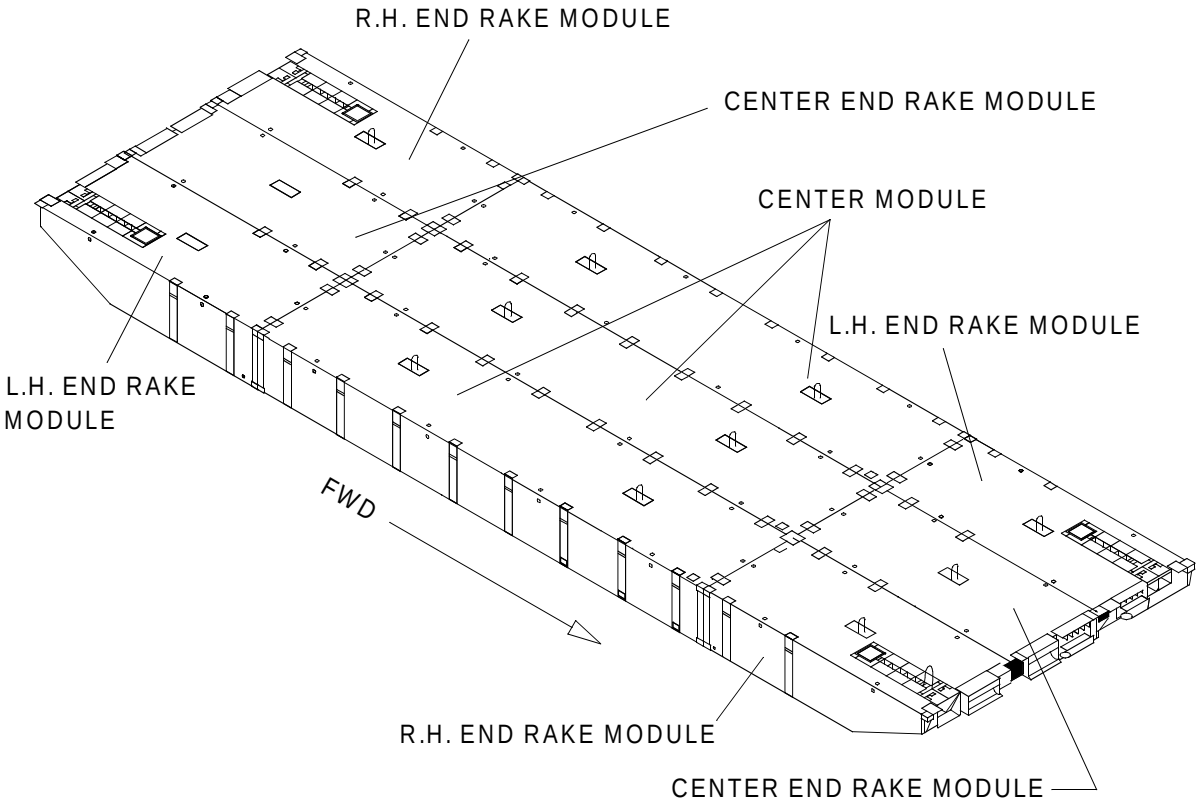
Other major components of the FC are the personnel shelter and generator shelter, the trailer-mounted light towers, the lifeline subsystem, communications equipment and the off shore and onshore anchor mooring system.

The FC is maneuvered into place by warping tugs.



INTERMEDIATE MODULAR CAUSEWAY SECTION

The intermediate section consists of three non-powered center modules and six end rake modules; two center rake modules, two right hand rake modules and two left-hand rake module. Individual modules connect together by means of male and female connector assemblies located around the perimeter of each module. These intermediate sections are assembled to other intermediate sections by means of flexor connectors. The center module is 8 ft wide and 40 ft long. Each end rake is 8 ft wide and 20 ft long. All of the modules have a depth of 4 ft 6 in. The complete assembled intermediate section weighs approximately 142,500 lbs.



PERSONNEL SHELTER

The personnel shelter is a 20 ft ISO container which has been outfitted with insulation, interior bulkheads, fluorescent lighting, electrical power distribution, table, benches, heating/cooling unit, communications equipment, electrical outlets, emergency lighting and a rest room with an electrically powered incinerator toilet.

DIESEL GENERATOR SET

The skid mounted tactical quiet 10 KW or 15 KW diesel generator set is provided to power electrical loads in the personnel shelter. It is contained in a 20 ft ISO container which will be located near the personnel shelter. It is equipped with controls, instruments, fire suppression system, 1000 gallon fuel system and accessories necessary for operation. The generator set consists of a diesel engine, brushless generator, excitation system, speed governing system, 24 volts DC starting system, control system and fault system. A power cable with a plug end, stored in the personnel shelter, is used to connect to the generator set. (Refer to TM 9-6115-642-10 or TM 9-6115-642-10 for additional information.).

LIGHTING SYSTEM

The FC lighting system consists of two trailer-mounted light towers which are stowed in two 20 ft ISO containers. Each light tower is powered by a 6 KW diesel generator and supports four metal-halide lamps. Each lamp delivers 1000 watts of light intensity. Lamps are a high pressure sodium bulbs with a NEMA 6 design for large area coverage. The aluminum reflector housings have tempered impact resistant glass lenses. The lamps come with weather resistant twist-lock connections for connecting floodlights to the light tower.

The light tower is a three-section telescoping mast which extends from 12 ft to 30 ft and has a rotation range of 360° with a position lock. The mast is easily extended with dual hand-operated winches that incorporate an automatic safety brake. The tower retracts and stows horizontally for travel.

The light system comes with a 30-gallon translucent polyethylene fuel tank, single point lifting bail, forklift slots, heavy-duty outriggers, leveling indicator and removable drawbar. The control panel comes with one GFI protected 120 volts 20 amp duplex receptacle, one 240 volts 25 amp receptacle, individual lamp switches, and a non-resettable hour meter to track records for periodic maintenance.

The overall length is (in./cm) 174/442, width is (in./cm) 79/201, height is (in./cm) 89/226 (travel position), standard tower height is (ft/m) 30/9 and shipping weight is (lb/kg) 2010/912.

LIFELINE SUBSYSTEM

The lifeline subsystem is installed along the causeway sides and trident pierhead sides and shoreward end to protect personnel from falls overboard. The stanchions for the lifelines are installed in the turn-tube fittings and ISO corner fittings of the section modules. The lifelines, life rings, nylon rope and strobe lights are installed on the inboard side of the lifeline stanchion. Chain is used to span the gap between the sections. Lifeline arrangement may vary depending on FC configuration.

COMMUNICATIONS EQUIPMENT

The communications equipment consists of four HX350S VHF/FM handheld transceivers. The transceivers have a frequency range of 156.025 to 163.275 mhz. All channels currently allocated in the USA, Canadian and International channels are available for use, plus ten weather channels.

The HX350S has an RF power output with the CNB350 battery of 5.0 watts (high) and 1.0 watts (low). The operating voltage is 7.2 volts DC. The current drain in standby mode is 40 ma, in receive mode 200 ma, in the transmit mode 1.8 amps (high power) and 0.7 amps (low power). The battery life (5% Tx, 5% rcv, 90% standby) is approximately 10 hrs (high) and 15 hrs (low).

The dimensions of the unit are 5.51 in. X 2.17 in. X 1.50 in. The weight is 1.0 lb.

The transmitter has a conducted spurious emissions of 65 dB (high) and 55 dB (low). The Audio Response (AR) is within +2/-8 of 6 dB/octave pre-emphasis characteristic from 300 hz to 3000 hz. The AF Harmonic Distortion of the transmitter is 3%. The transmitter has a hum and noise rating of 37 dB and a frequency stability (-20°C to +50°C) of $\pm$ 0.0005%.

The receiver has a sensitivity rating of 20 dB quieting at 0.35 uv and 12 dB SINAD at 0.30 uv. The squelch sensitivity (threshold) is 0.20 uv. Modulation acceptance bandwidth is $\pm$ 4.5 khz. Receiver selectivity: spurious and image rejection 60 dB, inter modulation regulation 60 dB and channel spacing 25 khz selectivity.

DECK MATTING

The deck matting is used as dunnage and is placed where the cargo ramps of the sealift vessel and the lighters will land on the FC deck. The individual mats are a high density polyethylene material and are approximately 10 ft long by 4 ft wide and 1½ in. thick. Each mat weighs 300 lbs.

DECK CLEAT AND D-RING/CLOVER LEAF FITTINGS

The modular sections are provided with deck fittings to meet various operational needs. These fittings have a 15,000 lb load capacity and are inserted into the tube turns. There are ten tube turns per non-powered module and five per end rake.