Davit, Crane and Tender-Handling Systems:

1. Inspect all cables, hydraulic hose and hydraulic fittings often. Replace at the first signs of excessive wear and/or corrosion.
2. Wash the equipment with fresh water often. Regular fresh water and soap wash-downs will greatly increase the life of the painted finish, and prevent salt build-up. Turn power off at the breaker prior to a thorough wash-down. Spray fresh water into the sheave-end of the crane. Elevate the boom and spray down the exposed interior surfaces of the boom and mast. Wipe dry with a soft cloth. Spray-apply a light coating of silicone corrosion inhibitor over all of the interior components periodically.
3. Lubricate the radial crane bearing using LubriMatic Marine Corrosion Control Grease. Pump grease into the bearing until it is observed oozing past the grease seal. Touch up any visible paint damage or corrosion.
4. Inspect the equipment and its components regularly for signs of damage or non-functioning parts. Repair or replace as necessary. Touch-up any paint damage as necessary to preserve the crane's finish.
5. The linear winch system (cylinder, guides and sheaves) should be professionally serviced every 18 to 24 months. The service and inspection requires partial disassembly of the crane and should only be done by a qualified Nautical Structures Field Service Technician. Sheave wear can inhibit the crane's performance reducing the hoisting capability of the linear winch and must be serviced at regular intervals. We recommend annually. The use of Dynema / Spectron 12+ composite fiber line in Nautical Structures' system requires that the line be swapped end-for-end annually, and replaced every two years. This must be a part of the annual service schedule for this linear winch system.
6. **General Hydraulic System Maintenance.**

A. Service the hydraulic system annually or after every 50 hours of use, which ever comes first. Servicing should include verifying the condition of the hydraulic fluid. Degradation of hydraulic fluid is the most common cause of hydraulic problems, and fluid maintenance is your best assurance of long-term reliability of the hydraulic system. If the fluid appears dirty or discolored (it should be a clear amber color), or is milky with water contamination it should be replaced. If you are not sure of the fluids condition, contact Nautical Structures to arrange to have a sample of the fluid analyzed. For replacement use NSI, ISO-Oil or a filtered AW-68 or Aw-32 Hydraulic Fluid.

B. Timely replacement of filter element is essential to keeping the fluid clean. The filter element should be replaced as soon as the internal bypass valve opens. Replace the canister after the first 50 hours of operation, replace again after the next 100 hours of operation. With the high pressure filter unit, replace ONLY with a 3 micron element, Vickers 304 Series #3041 V-Pak.

C. Inspect the hydraulic lines and fittings for leaks periodically. Occasionally a hydraulic fitting may need to be re tightened if it is weeping oil. If this is the case, use the appropriate size open-end wrench on the hose-end or hard-tube fitting, and use a back-up wrench on the component fitting. Do not over tighten the fittings. The best way to monitor the condition of the hydraulic components is to keep them very clean. If a hydraulic leak is suspected, clean all residual oil from the area. Operate the davit several times and then inspect the area for leakage. Any leaking fittings should be easy to identify.

D. Always keep hydraulic cylinders fully retracted while not in use. Never use the winch cable of a linear winch crane system to secure the system for storage. Any exposed cylinder rod may quickly corrode, causing damage and leaks in the cylinder rod seals. Always use a boom tie-down cable assembly to secure the davit system to the vessel's deck.

CAUTION: Do not store the crane by attaching the cable hook to a deck pad-eye. Corrosion of any exposed winch cylinder rod will occur. Attach the crane to the deck using the provided pad-eye located on the underside of the crane's boom with a cable-down assembly, or with a shipyard supplied boom-crutch. The Lay-Down and Folding crane must be stowed using a boom-crutch.

7. **General Hydraulic Fluid Replacement Procedure:**

These instructions are general in nature and should be treated as a guide not specific to a particular piece of hydraulic equipment. An alternative to fluid replacement is to filter the volume of fluid with a filter cart using filtration elements and a water separator to condition existing fluid. Always sample and test the fluid after a filtration procedure to ensure you have achieved appropriate quality standards.

To replace the oil while in the field you will need a empty and clean 5 Gallon / 18-Liter bucket, a funnel and a short hydraulic hose (6 feet [2 meters] in length) with a #8 JIC (typical) female hose-end. Follow the Following procedures:

I. Boom the equipment down, retract the winch and rotate the crane clockwise to its rotation stop.

II. Attach the short hose to the pressure port on the Hydraulic Power Unit and pump the old oil out of the reservoir. Remove the reservoir access port to the reservoir. Remove the remaining fluid. Wipe the inside of the reservoir clean. Inspect, clean or replace the 10 micron suction strainer mounted to the pump pickup. Re-mount the access lid. Re-attach the pressure hose to the pressure port.

III. Fill the reservoir with new fluid to the maximum fill level within the sight gauge, or at 2½" (65mm) from the top of the reservoir. Remove the return line from the crane (Tank) at the HPU and allow it to drain into the bucket.

IV. Function **"Boom-Up"** and allow the boom to elevate to its full luff (65°−70°). As this happens old oil will be pushed from the boom cylinder and into the return line, draining into the bucket. Function **"Winch-Down"** and pay all of the cable out of the boom. As the cable pays out be sure to pull any slack cable out of the boom. ***Please Note:*** You will periodically need to top off the reservoir as you operate the crane functions. Function **"Rotation-C-CW" until** the crane rotates to its rotation stop (280°−360°).

V. Now reverse the above procedure, rotating the crane 280°−360° to its clockwise stop, retracting the cable and lowering the boom. It is ***very important*** that the oil level in the reservoir is maintained at levels above the suction line at ALL times. Doing this will prevent the introduction of air into the system. When the crane is returned to its starting position top off the reservoir to within 2½" (65 mm) of the top. Re-install the vented plug.

Please dispose of the waste oil properly.

For your safety, we strongly suggest that the above maintenance procedures be followed and that this document be filed away with your other crane information and reviewed on an annual basis.

we appreciate your business, and hope that your crane equipment has performed dependably and to your satisfaction.

We look forward to servicing your future needs.