U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

2100 Second Street, S.W.
Washington, DC 20593-0001
Staff Symbol: CG-543
Phone: (202) 372-1241
Fax: (202) 372-1917

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Michael B. Karr

From: M. B. Karr, CAPT
COMDT (CG-543)

To: Distribution

Subj: GUIDANCE ON THE INSPECTION, REPAIR AND MAINTENANCE OF LIFTBOATS

Ref: (a) 46 Code of Federal Regulations (CFR), Subchapter I – Cargo/Misc. Vessels
(b) 46 CFR Subchapter L – Offshore Supply Vessels (OSVs)
(c) 46 CFR Subchapter T – Small Passenger Vessels
(d) Navigation & Vessel Inspection Circular 8-91 (NVIC 8-91) – Initial and Subsequent Inspection of Existing, Un-certificated Offshore Supply Vessels, Including Liftboats
(e) NVIC 7-68 – Notes on Inspection and Repair of Steel Hulls
(f) NVIC 1-78 CH-1 – Automation of Offshore Supply Vessels of 100 Gross Tons and Over
(g) D8 Policy letter dated 09Oct98 – Persons Allowed On Liftboats
(h) D8 Policy letter dated 12Nov98 – Rescue Boat Requirements on OSVs
(i) American Bureau of Shipping's 1973 & 1988 MODU Rules
(j) American Bureau of Shipping's 1973 Steel Barge for Offshore Service Rules
(k) American Petroleum Institute (API), Recommended Practice for Offshore Cranes, API RP 2D, First Edition (October 1972) with supplement 1
(l) Commandant Policy letter dated 17Nov05 – DIXIE ENDEAVOR

1. Purpose. Throughout their Coast Guard inspected history, liftboats have been subjected to an evolving regulatory and inspection regime. Since the publication of 46 CFR Subchapter L on September 19, 1997, most liftboats now fall under the same regulatory standards as conventional hulled OSVs; however, there are several areas of inspection that are unique to this type of vessel. Liftboat issues covered in this policy letter include: automation, steel wastage, tail shaft inspection intervals, drydock inspections, lifesaving systems, fire fighting equipment, systems/equipment for general operation, crane inspection and manning.

2. Discussion. This guidance is designed to assist the Officer in Charge, Marine Inspection (OCMI) and marine inspector in the interpretation and application of the regulations, policies and standards that are distinct to liftboats and does not impose requirements additional to the applicable regulations. This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to, nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. An alternative approach for complying with these requirements is acceptable, if the approach satisfies the requirements of the applicable statutes and regulations. If you wish to discuss an alternative approach (you are not required to do so),

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you may contact the local OCMI to discuss an alternate degree of safety which would be consistent with the minimum standards as set forth in references (a), (b), and (c).

3. Applicability. This policy letter provides guidance for the inspection of liftboats that are certificated under 46 CFR Subchapter T – Small Passenger Vessels, 46 CFR Subchapter I – Cargo and Miscellaneous Vessels and 46 CFR Subchapter L – Offshore Supply Vessels. The guidance in NVIC 8-91 describes how 46 CFR Subchapter T or 46 CFR Subchapter I, and certain sections of 46 CFR Subchapter I-A, may be applied to liftboats contracted for, or the keel of which was laid, before March 15, 1996 and which were certificated by March 16, 1998. This policy letter supplements the guidance provided in NVIC 8-91.

4. Directives Affected. None.

5. Action. Guidance is provided in enclosures (1) and (2) to assist Coast Guard marine inspectors, vessel owners, and shipyards in the proper inspection, repair, and maintenance of Coast Guard certificated liftboats. OCMI's are encouraged to share this guidance with appropriate individuals in the marine industry within their jurisdiction. OCMI's are also encouraged at the next required annual inspection to evaluate liftboats in their fleet of responsibility in accordance with these guidelines, and to make appropriate changes to vessels' Certificates of Inspection (Routes and Conditions, Manning, etc.). A special note should be recorded in the Marine Information for Safety and Law Enforcement (MISLE) database to indicate evaluation of the vessel in accordance with this policy. However, any discrepancy or enforcement action should reference the appropriate CFR subchapter for exact requirements.

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Encl: (1) Guidance on Inspection, Repair and Maintenance of Liftboats
(2) Recommended Liftboat Jacking System Inspection

Copy: All Areas / District (p) Officers
All Sectors / Activities / MSUs

GUIDANCE ON THE INSPECTION REPAIR AND MAINTENANCE OF LIFTBOATS

1. Engineering Related Systems

Whether new or existing, each liftboat will have varying degrees of automation based upon its' requirements at the time of the vessel's certification. NVIC 1-78 addresses automation on those vessels 100GT and over certificated before September 19, 1997. 46 CFR 130.400, Subpart D, addresses requirements for those vessels 100 GT or more inspected under 46 CFR Subchapter L. However, the items listed below, at a minimum, should be installed on all liftboats regardless of tonnage or inspection subchapter and inspected for proper operation. Any discrepancy or enforcement action should reference the appropriate subchapter for exact requirements.

a. Bilge Alarm Sensors – Should be located in all engineering and machinery spaces. An audible and visual alarm for each space should be provided in the pilothouse and be properly marked. No devices should be installed to disable these alarms.

b. Engine Overspeeds - Engine overspeed devices on all pre-46 CFR Subchapter L prime movers are "grandfathered". If installed, however; they should operate properly.

c. Ventilation Shutdown - All power ventilation equipment, heat pumps and other such devices used in hotel services should have appropriate shutdowns. Natural vents connected to the engine room and deckhouse should have weather-tight closures that are appropriately marked, "Close in Case of Fire".

d. Level Alarm - All liftboats not inspected in accordance with 46 CFR Subchapter L should be fitted with a level alarm in accordance with NVIC 8-91 consisting of a distinct alarm that sounds at the main operating station to indicate an out-of-level condition or uneven leg sinkage in the vessel's elevated condition.

e. Low Hydraulic Oil Level Alarm - All liftboats should be fitted with an audible and visual alarm at the main operating station that indicates a loss in hydraulic oil level in the main jacking system.

f. Shaft Speed – An indicator providing the propeller shaft speed should be available to the operator in the pilothouse. Shaft speed indication may be obtained via: (1) an engine tachometer with corresponding "shaft sheets" that convert engine RPM to shaft RPM or (2) a separate shaft tachometer.

2. Steel Wastage Allowance

Liftboats are weight-sensitive vessels and experience maximum hull bending (and buckling) stresses when elevated since they are only supported at each end of the vessel, compared to a conventional vessel which has its hull supported by buoyancy distributed along its' length. Historically, liftboats have been built with the objective of keeping both leg weight and overall hull weight to a minimum. The desire to reduce weight in the past led to many older liftboats to be built with reduced scantlings when compared to conventional hulls of the time.

For newer liftboats, built in accordance with approved 46 CFR Subchapter L plans, the wastage allowances can follow current standards; however, for older (non-Subchapter L) liftboats, evaluation should be based on more conservative allowances unless structural analyses demonstrate that greater wastages can be safely tolerated. Although most of the older vessels were built using the American Bureau of Shipping's (ABS) 1973 MODU Rules and the referenced ABS Steel Barge rules, some were not. In the latter case, it was often trial and error until the vessel was found to be sturdy enough to satisfactorily meet service demands. The oldest liftboats were in service for many years prior to the requirement to be inspected. Consequently, these vessels were built without Coast Guard oversight or approved plans. Therefore, approved section modulus or leg strength calculations and associated structural analyses may not be available. Fortunately, most vessels still in service were built with the aforementioned ABS rules and appropriate wastage allowances may be applied.

The thickness utilized for evaluation of hull wastage should be the actual plate thickness on board the vessel compared to the approved thickness. In some cases, thicker plate was used during construction when compared to the thickness required by ABS' Rules or otherwise approved. Because of this, more wastage may be seen on a particular "over scantling" vessel, while still within tolerance of the approved plans. Since there are many possible scenarios on vessels currently operating, the following guidelines for liftboat categories are provided when determining appropriate wastage allowances:

a. Vessels built to 46 CFR Subchapters L or I standards with approved plans - Allow 25% wastage in accordance with NVIC 7-68.

b. Vessels built without approved plans - Allow 20% wastage for ¼" or thicker steel hull or deck plating in accordance with ABS 1973 MODU and Steel Barge rules. Allow 10% wastage for 3/16" or thinner steel hull or deck plating in accordance with ABS 1973 MODU and Steel Barge rules.

c. Vessels built without approved plans but having a Professional Engineer (P.E.)-provided section modulus and strength calculations - Allow maximum wastage as per calculations, but in no case allow more than 25%. Guidance for the acceptance of P.E. certifications can be found in NVIC 10-92, Change 2.

3. Tailshaft Inspection Intervals and Examinations

Liftboats less than 100 GT (domestic) are not normally required to pull tail shafts for examination unless deemed necessary by the marine inspector or unless necessary to determine the condition of the shaft bearings. Liftboats of 100 GT or more will be required to undergo tail shaft examinations in accordance with the appropriate regulations. Proper tail shaft/propeller fit-up is necessary to eliminate or minimize damage due to excess vibration. An owner/operator may prove proper fit-up by many methods, including bluing, micrometer readings and others. The owner is responsible to ensure proper fit-up of the vessel's tail shaft.

4. Drydocking Alternatives

There are many acceptable methods for conducting a liftboat hull exam. The following methods may generally be considered acceptable:

a. Conventional Drydocking - Includes lifting the vessel and its appendages out of the water to allow a comprehensive inspection and evaluation of the vessel's underwater hull, submerged portions of legs, towers and pads.

b. Drydocking Alternatives – The regulations provide for various alternatives which may provide an equivalent level of safety as a conventional vessel drydocking. These regulations are found in 46 CFR Subchapter L, 46 CFR 125.170; and alternatives found in 46 CFR Subchapter I-A, 46 CFR 107.267 for self-elevating units. OCMIs may entertain dry-docking alternatives proposed by industry representatives. At no time shall the alternative method place the crew, shipyard workers, third party surveyors, contractors, or Coast Guard inspectors in danger.

c. Underwater Inspection in Lieu of Drydocking (UWILD) – This alternative may be utilized in accordance with 46 CFR 126.140. In such cases, the guidance in NVIC 1-89 "Underwater Survey Guidance" should also be followed.

5. Conducting a Liftboat Drydock Inspection

Liftboats spend the majority of their service life jacked up out of the water; so special attention must be paid to the following items:

a. Pads - These connections at the bottom of the legs are the main load-bearing area of the vessel. The entire pad, (top, bottom and all sides) should be visually inspected for damage/ insets, by dry-docking or some other alternative method acceptable to the OCMI. The "leg-to-can" connection welds and the "can-to-pad" connection welds should be non-destructively tested (NDT) at every hull exam or anytime the vessel has had an incident involving undue stress in these areas.

b. Leg Tower Sponsons - The area above the leg pad on the hull should be examined for deformation and fractures. Often debris remains on the pad and may cause hull damage when the leg is retracted. This area is critical to the support of the leg and tower. If vertical deformation of the hull or insets are deep or numerous, the area should be cropped and renewed and suitable access provided to the leg sponson in order to ensure the internal framing is not tripped or fractured.

c. Legs and Leg Rack - The leg rack is another critical area of the vessel. This is where the hydraulic motor drive gear meets the mechanical leg rack. Great amounts of torque are applied to this area on a regular basis. The racks should be inspected for chipped, damaged or missing teeth, and excessive rack-to-gear wear. The leg rack lower terminus should also be NDT tested for fractures at each dry-docking. The legs should also be inspected for significant creases, dents and deflections that may increase the rack to gear clearance and potentially allow the gear to free wheel, and cause the vessel to descend uncontrollably.

6. Leg Removal and Inspection Intervals

Liftboat companies should have in place a fleet-wide plan adequately addressing the preventive maintenance and corrective measures for each vessel's legs, pads and jacking systems. At minimum, the following items should be addressed in the plan:

a. Leg Inspection Cycles and Maintenance - While legs are installed, the legs should be visually inspected annually. The legs should be examined for significant creases, dents and deflections. Note that exceptionally long legs fitted with a single rack system may have slight deflection over the length of the leg during extreme temperatures. The leg rack and pinion should be checked for missing or damaged teeth and fractures. When visual examination warrants, additional/more detailed inspections should be conducted. In addition to the annual visual inspection, at every five (5) year dry-dock cycle, the legs and jacking components should be inspected as described in Enclosure (2). If the Coast Guard marine inspector determines that the legs cannot be inspected adequately while installed, they should then be removed to facilitate examination.

b. Leg Removal Cycles – The leg removal cycle should start ten (10) years from the vessel's delivery date with the first leg removals/examinations occurring, under normal circumstances, at a scheduled drydocking approximately twenty (20) years from delivery. After twenty (20) years from vessel delivery, the legs should be removed not less than once every ten (10) years (per Enclosure (2)) for examination. If the legs are removed before the recommended interval for any reason, such as repair, each removed leg may be given removal credit and another ten-year cycle started, provided the "10 year" inspections described in Enclosure (2) are completed. Credit should be annotated on the vessel's Certificate of Inspection. Those vessels operating exclusively on protected routes (Lakes, Bays, and Sounds) are generally excepted from leg removal, unless circumstances dictate their removal for repair. When the legs are removed for their 10 year inspection cycle, the entire rack, rack lower terminus, all leg butt welds, and leg to can connections should be cleaned or degreased prior to inspection. The owner should then perform inspections as outlined in Enclosure (2) and provide reports and/or third party results to the attending marine inspector. If a vessel has a delivery date greater than twenty (20) years prior to the effective date of this policy, and the owner cannot provide documentation confirming the legs have been pulled and inspected as outlined in Enclosure (2), then the legs should be pulled and inspected before the end of current drydock cycle, or at the maximum within five (5) years.

7. Jacking System Maintenance

a. The following jacking system components should be maintained in accordance with the manufacturer's recommendations:

(1) Fluid levels;

(2) Hydraulic piping and hoses;

(3) Pump drive shaft assembly;

(4) Jacking system controls;

(5) Jacking system pressure;

(6) Gearbox assembly; and

(7) Bearings.

b. Vessel owners should demonstrate that the installed hydraulic jacking system complies with the requirements of 46 CFR Subchapter F (46 CFR 58.30). Owners of vessels certificated under subchapter L or I may provide approved plans. Owners of vessels certificated under NVIC 8-91 should demonstrate substantial compliance with 46 CFR 58.30 and that the system is "fail-safe". Often during initial certification, these vessels (certificated under NVIC 8-91) were held to varying standards and may not "substantially" comply with Subchapter F. Recent liftboat casualties highlight the need to verify, at a minimum, substantial compliance with Subchapter F, for all liftboats. Jacking system hydraulic review should be submitted to ensure fail-safe systems, including counter-balance valves and motor brakes. Additionally, the installed hydraulic fittings/hoses/piping should be demonstrated to be adequate for the rated system pressure and comply with the applicable regulations and guidance. This review should include a basic line drawing and component list to the satisfaction of the attending marine inspector. Once completed, a copy of the review and associated drawings should be inserted into the vessel's approved operating manual.

8. Leg-To-Tower Clearance

Each designer and builder specifies a particular leg-to-tower clearance range for proper operation of the vessel's leg and jacking system; too tight and the system may bind, too loose and the system may wobble and/or cause improper rack-pinion operation. This clearance may deviate from one vessel class to another, however; it is important that the clearance be checked in accordance with the manufacturer's guidelines and compared to the recommended range. When the clearance falls out of the recommended range, the owner/operator should present a proposal to bring this clearance back to the builder's or designer's specifications.

9. Lifesaving Policy

a. Rescue Boat - Unlike conventional vessels, liftboats operate in both elevated and afloat modes of operation. Therefore, liftboats must be able to recover a helpless person from the water in both the elevated and afloat modes. Since a liftboat cannot serve as its own "rescue platform" while elevated, each liftboat must have at least one rescue boat. If no launching device is provided, on vessels with two cranes, the rescue boat must be capable of being launched with either crane. Approval of crane launching of the rescue boat on vessels with only one crane is at the discretion of the OCMI. A crane that is used to launch a rescue boat should be certified for personnel use. All pre-Subchapter L rescue boats should be equipped with safety equipment to the satisfaction of the cognizant OCMI. However, at a minimum, these pre-Subchapter L rescue boats should have the following safety equipment and

quantities (#): paddles (2), heaving lines (2), sponges (2), boat hook (1), and bailer (1). All Subchapter L rescue boats must be outfitted with the equipment described in 46 CFR 133.175.

(1) A motor-propelled workboat or launch may be used in place of the required rescue boat if the embarkation and recovery arrangements of 46 CFR 133.160 (a), (c), (d), (e) and (f) are met.

(2) While liftboats may be allowed to use the installed cranes to launch rescue boats in lieu of an installed davit, stability concerns and the vessel's operating manual normally prohibit the use of the cranes while the vessel is afloat. While in the afloat mode, cranes should only be used to launch and recover the rescue boat if the vessel's operating manual permits use of the crane(s) in the afloat mode. Also, while in the afloat mode, and in accordance with 46 CFR 133.135, the OCMI may determine if the vessel is arranged to allow a helpless person to be recovered from the water, provided the recovery can be viewed from the navigation bridge and the vessel does not regularly engage in operations which restrict its maneuverability. Depending on the vessel's hull design, this may be accomplished in several ways. Older vessels have leg pads that retract up to the hull and are exposed when underway. These leg pads can be used as a platform to rescue a helpless person if a suitable means is installed to access the pad and to transfer the helpless person from the pad to the main deck. On many newer vessels, the pad is submerged while underway, and a separate platform should be provided. These platforms may vary based upon hull design, and it is the OCMI's discretion to judge the platform to be fit to recover a helpless person from the water. A rescue harness should also be provided, regardless of rescue platform type.

b. Lifesaving Systems – The general rule is that previously approved lifesaving appliances or arrangements are acceptable. The regulations in 46 CFR 133.10 should be consulted when changes are made to lifesaving equipment or arrangements.

c. Embarkation Devices - It is a long-standing industry practice to install knotted "manropes" on liftboats for emergency disembarkation as a partial means to meet the intent of an embarkation ladder (Jacob's ladder). These knotted manropes are generally considered acceptable as an alternative to traditional embarkation ladders as required by 46 CFR 133.110, on liftboats only. The rationale is that, on a liftboat, the Jacob's ladder is a redundant lifesaving device and egress from a liftboat in an emergency will be to a nearby platform or rig, or by crane and appropriate personnel lifting device (Billy Pugh) to waterborne lifesaving devices or a waiting vessel. The manrope is intended for use by the crane operator and/or the last person off to have a means of escape during an emergency situation. If a knotted manrope is installed, it should be long enough to reach the water at the liftboat's highest elevated position, and be examined at least annually by the vessel's crew. Excessively soiled, worn or frayed ropes or ropes with cracked or corroded attachments should be replaced or repaired immediately.

10. Firefighting and Alarm Equipment

    a. Fire Pumps - All liftboats must have an installed fire pump and fire main system, its output is regulated under the appropriate subchapter and capable of operation at all times, including the elevated mode. The typical fire pump installation is a submersible type, mounted on the main deck, and connected to the fire main system through a flexible hose. These hoses should be routinely inspected for condition and serviceability. The launch appliance for lowering the pump into the water should also be inspected for proper operation and condition.

    b. Smoke Alarms - Each separate living space and galley should have a smoke alarm. Smoke alarms may be battery powered, independent type units, and all should have a test button to indicate proper operation.

11. General Operations

    a. Operating Manual - All liftboats should have an operating manual onboard which is approved by the OCMI. This manual should include, at a minimum, those items required by 46 CFR 134.170.

    b. Dead Man Switch - The liftboat jacking system should incorporate a "dead man" feature at the system controls, which requires a physical force from the operator (through hand and or foot pedal) be applied to the controls in order for the system to function. Once the applied force is removed, the vessel's jacking stops. Often, this is done through use of spring-loaded foot pedal or hand toggle switches.

    c. Anemometer - If the liftboat's approved operating manual specifies required actions based upon wind speed, the vessel should have a reliable means to determine wind speed such as a properly operating anemometer (portable or fixed) onboard.

    d. Anchors - Anchors should be installed on all liftboats in accordance with the applicable subchapter. "Grandfathered" liftboats may use existing vessel anchors. Standards set forth in ABS rules, utilizing first principal calculations, may be used to determine the appropriate anchor size. Liftboats are restricted in their routes through their approved operating manual to water depths that do not exceed the vessel's ability to jack up. However, if a liftboat loses steering or propulsion in a river current the liftboat may travel a significant distance before the legs can be jacked down to stop the vessel, which may cause serious damage to nearby vessels; or the vessel may incur damage to the legs by suddenly stopping the vessels utilizing legs as emergency anchors. The anchors are considered emergency anchoring systems and should be ready for use at any time.

12. Cranes

    Cranes should be inspected and tested in accordance with the requirements of American Petroleum Institute's standard, API RP 2D, First Edition (October 1972) with supplement 1; except that the rated load test must be performed in accordance with 46 CFR 107.260.

a. Additionally, cranes should have the following basic safety features:

(1) Load charts for the specific crane installed showing both dynamic and static load;

(2) Hand signal safety charts;

(3) All controls properly labeled; and

(4) Boom angle indicator provided.

13. Manning

Minimum safe manning for liftboats of 100 GT or over is a straightforward application of the guidance in Marine Safety Manual, Volume III, Chapter 21.

a. However, manning continues to be a contentious issue for those liftboats less than 100 GT throughout the Gulf of Mexico and across various OCMI zones. There are numerous vessels that have requested route changes over the years from partially protected and exposed water routes to protected routes and back again based upon contracts that the vessel had at the time. The vessel's COI endorsements for minimum manning were not always updated to reflect these changes. Because of this, various interpretations and local policies have conflicted, creating an uneven level of safety and may impose an economical disadvantage from one operator to another. After careful examination of liftboats less than 100 GT across various OCMI zones, the guidance in Figure 13.b (below) was determined to provide minimum safe manning, based upon the vessel's route, associated required equipment onboard and applicable laws, regulations and national policies.

Figure 13.b – LIFTBOAT MANNING (< 100GT)

Voyage >12 hours of operation in a 24 hour period
Oceans, Coastwise or Lakes, Bays & Sounds (L, B & S):
- 1 Master, 1 Mate, 2 Deckhands

Voyages <12 hours of operation in a 24 hour period
Oceans & Coastwise Route – Rescue Boat Required:
- 1 Master, 2 Deckhands

Lakes, Bays & Sounds Route, Vsl – Rescue Boat Required:
- 1 Master, 2 Deckhands

Lakes, Bays & Sounds Route, Vsl – No Rescue Boat Required:
- 1 Master, 1 Deckhand

14. Domestic Voyage Personnel Carriage Allowance

A liftboat may carry no more than 36 *offshore workers* when certificated under 46 CFR Subchapter L. In order to facilitate the industry need to carry persons in addition to the crew, who are engaged in the business of the vessel, a liftboat may be inspected under the authority of 46 CFR Subchapter I, according to the Commandant policy in reference (l), with the unique characteristics of self-elevating units being addressed by Subchapter L. In such instances, authorization may be provided on a case-by-case basis, for certification to carry more than 36 *industrial personnel* as defined in 46 Subchapter I. This approach is similar to that used in the past to bring liftboats into certification, as described in NVIC 8-91, reference (d).

15. International Voyages

To engage in international voyages, a liftboat must meet the applicable SOLAS requirements and have all appropriate SOLAS documentation. The SOLAS standards for cargo ships are acceptable for this purpose. Not more than 12 passengers (as defined by SOLAS) are authorized on international voyages. For clarification, offshore workers or industrial personnel who are legitimately engaged in the business of the vessel (and not merely being transported from point A to point B), are not considered to be SOLAS passengers.

16. Security

All vessels shall adhere to their approved Vessel Security Plan; see 33 Code of Federal Regulations Subchapter H, Parts 101, 103 and 104, as appropriate. Liftboats engaged in international voyages must meet the International Ship & Port Facility Security Code (ISPS), as applicable, Chapter XI-2 of SOLAS.

RECOMMENDED LIFTBOAT JACKING SYSTEM INSPECTION

This enclosure lists the minimum recommended inspections and maintenance of liftboat jacking system components to be conducted by Coast Guard marine inspectors at 5 and 10-year intervals for those vessels operated on exposed waters routes (Coastwise, Oceans). This document is a best industry practice developed in consensus with representatives of the Offshore Marine Service Association (OMSA) Liftboat Subcommittee. Vessels operated exclusively on protected waters (L, B & S) are not subject to routine removal of the legs for inspection and should repeat the 5 year inspection items, unless the marine inspector determines that it is necessary to pull legs based upon other inspection results or observed damage. The recommended cycle for pulling of legs should normally commence when the vessel is 10 years old (as measured from the delivery date) with the first recommended leg removal normally occurring 20 years from the vessel's delivery date. However, the marine inspector may determine that it is necessary to remove a liftboat's leg(s) at any time based upon other inspection results or observed damage, if he or she determines it is necessary to assure a vessel's safety or seaworthiness.

Five (5) & ten (10) year liftboat leg inspections should be documented on the vessel's COI to show "*last completed*" for each leg.

1. Five (5) Year Drydock Inspection Items

   a. Rack - Visually inspect rack length equal to twice tower height, but not less than 20 feet above tower and one random location (rack must be free of all coatings). If unable to make the required length available for inspection, then the owner or operator should provide an alternative inspection plan.

   b. Rack Butts - Clean and inspect (NDT required) rack end butts on all legs.

   c. Pinion - Inspect pinion and adjust (as needed) pinion to rack clearance, and record results.

   d. Gearbox Oil - Draw oil sample/analyze from every gearbox, and record results.

   e. Gearbox Disassembly – Disassemble and inspect lower-most gearbox per leg; additional inspection based on results.

   f. Bearings – Bearing and cap inspection on gearbox pulled for disassembly; additional inspection based on results

   g. Brakes - Inspect brake assembly of pulled gearbox per leg; additional inspection based on results.

   h. Tower Guides - Inspect tower and rack guide's clearances, and compare with manufacturers recommendations.

   i. Leg to Pad Connection – Clean and NDT all leg to pad connection welds; evaluate connection integrity.

   j. Hydraulic Hoses - Replace all external hydraulic jacking system hoses that are exposed to weather.

2. Ten (10) Year Drydock Inspection Items

   a. Rack – Conduct visual inspection and NDT of entire rack length, rack must be free of all coatings, record completion. Conduct NDT of rack to leg welds, entire length of rack and record results.

   b. Rack Butts - Clean and inspect (NDT required) rack end butts on all legs.

   c. Pinion - Check and adjust (as needed) pinion to rack clearance, and record results.

   d. Gearbox Oil - Draw oil sample and analyze from every gearbox, and record results.

   e. Gearbox Disassembly - Disassemble and inspect lower and uppermost gearbox on each leg; additional inspection based on results.

   f. Bearings – Inspect bearings and caps on gearboxes pulled for disassembly; additional inspection based on results.

   g. Brakes - Pull and inspect two brake assemblies on gearboxes pulled for disassembly; additional inspection based on results.

   h. Tower Guides - Inspect tower and rack guides' clearances, and compare with manufacturers recommendations.

   i. Tower Roundness - Inspect tower roundness at several locations to ensure within manufacturer tolerances.

   j. Tower Thickness - Evaluate tower wall thickness by conducting grid on tower using NDT (UT), and record results.

   k. Leg to Pad Connection – Clean and NDT all leg to pad connection welds; evaluate connection integrity.

   l. Pad Plate Thickness - Evaluate pad shell plate thickness by performing UT grid; inspect all plug welds.

   m. Hydraulic Hoses - Replace all external hydraulic jacking systems hoses in exposed to weather locations.

   n. Legs External - Clean entire leg of coatings, NDT all leg butt weld joints, and record completion. Conduct UT bands of leg plate thickness in minimum of four (4) places, and record results.

   o. Legs Internal - Remove pad from leg, visually inspect all leg internals, ladder points, butt welds, etc.; if visual inspection reveals areas of concern, appropriate means of nondestructive testing should be utilized to further inspect these areas.