INSPECTION AND REPORT OF CONDITIONS FOUND

M/V ISLANDER

Prepared For:

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1.0 INTRODUCTION

The M/V ISLANDER**,** a former Woods Hole Steamship Authority (SSA) ferry, was purchased by the Governor's Island Preservation and Education Corporation (GIPEC) in September 2007 to be the main ferry providing passenger and vehicle service to Governor's Island. The ISLANDER is a 200' all welded steel, double-ended passenger/vehicle ferry constructed in 1950 at the Maryland Dry Dock Company in Baltimore, Maryland. At the time of purchase, the ISLANDER had a valid United States Coast Guard (USCG) Certificate of Inspection (COI). The ISLANDER was not in operation when purchased and has not been in operation since being purchased by GIPEC. The ISLANDER must be rehabilitated and modified to make it suitable for the intended service. Turner Construction Company (TCC) issued an RFP in September 2007 on behalf of GIPEC for proposals to provide vessel survey and audio gauging, ship strength analysis and design and, owner representation during modification.

Seaworthy Systems, Inc. submitted a proposal in response to the RFP and in December 2007 Seaworthy Systems, Inc. was notified that they had been selected to provide the required engineering services to rehabilitate and modify the ISLANDER. The Seaworthy Proposal was divided into three phases; Phase I - Vessel survey, audio gauging and coatings assessment, Phase II - Ship strength analysis and design and Phase III – Owner's representation. As part of its Phase I efforts Seaworthy offered to provide a rough order of magnitude cost for steel replacement. At the end of January 2008 Seaworthy received approval to proceed with Phase I with the following modification; TCC would contract separately with Windward Marine to do the audio gauging instead of using the firm included in the Seaworthy proposal.

For Phase I, Seaworthy was tasked with overseeing Windward Marine's audio gauging efforts and with conducting an in-depth survey of the vessel while in the water at its berth, excluding any portion of the vessel that is inaccessible or below the water. This survey included inspecting all suspect areas that may require steel replacement or require modification for safety reasons and to report on the general overall condition of the vessel, the operating machinery and the safety equipment. The scope of the work for the inspections is as follows:

1. Perform a detailed structural inspection of the vessel in the water at her berth in Governors Island, NY.
2. Perform a safety inspection/survey of items needed to return the vessel to passenger service.
3. Oversee the audio gauge and coatings assessments being performed by Windward Marine and direct them to suspect areas of steel.
4. Review existing vessel documentation and drawings as available.
5. Prepare a comprehensive report on the conditions found on the vessel, a description of the location and amount of steel that needed to be replaced with a rough order of magnitude (ROM) cost estimate for steel replacement. Also included in the report are some very ROM costs for other modifications required to maintain the ISLANDER in a serviceable and operating condition but not for modifications needed to make it suitable for the Governor's Island service.

The most important part of the Phase I task was an assessment of steel needing replacement due to excessive corrosion and other damage. Original structural drawings of the vessel are normally required in order to make this type of determination. However, at the time of the inspection, not a single structural drawing of the ISLANDER could be found on the ship or in the many boxes of files received by TCC from the Woods Hole Steamship Authority. In the absence of these drawings, Seaworthy has had to assume the sizes of the original steel based on indirect information found in the records provided by TCC. These records included previous gauging reports, American Bureau of Shipping (ABS) requirements for steel replacement following hull damage, USCG documents requiring specific steel thicknesses, and the original 1950 Builders Specification for construction of the vessel. A search of the ship's records also revealed that in 1996, the SSA had performed a cost benefit analysis of the ISLANDER for the future use of the ship. In that report, Patton Marine, Inc. noted that "The ISLANDER is well past its anticipated useful life of approximately thirty years due in part to the heavy costs spent on maintaining and upgrading her."[1] As a result, an ISLANDER replacement study[2] was initiated in 1996 which recommended replacing the vessel by 2005.

This report provides detailed descriptions of the conditions as found on the ISLANDER between February 11 and February 28, 2008 by Captain Gerard M. McGovern and William A. Wood, Seaworthy's Chief Naval Architect and as determined by the steel audio gauge report prepared by Windward Marine.

2.0 SUMMARY ASSESSMENT of *M/V* ISLANDER

The ISLANDER was found to be in a generally poor and worn out condition consistent with a service life of 57 years in salt water and with lax maintenance in her later years. Extensive active corrosion and coating failure were found throughout the vessel from the bilges to the main vehicle deck and up to the top of the superstructure and deck houses. Inside the hull there is clear evidence of severe coating failure and steel corrosion with many sections of frames, floors, and girders wasted completely through. Some of the main water-tight bulkheads are buckled and severely corroded in their lower portions. There is ample evidence of repaired bottom damage from groundings throughout the vessel including some remaining unrepaired damage. An external inspection of the hull in dry dock may reveal further unrepaired damage. The whole main deck plating is heavily corroded and has no intact coatings. Most of the main deck plating is deformed downward between transverse frames due to vehicle wheel loading. There are many weld fractures between the main deck plating and the transverse beams. There is a portion of the main deck framing and plating near amidships that is severely buckled upwards from a grounding incident. The mezzanine deck and mezzanine longitudinal bulkheads show obvious signs of buckling and wasted steel. There are many cracked welds between the mezzanine longitudinal bulkheads and the frames. The mezzanine deck is corroded completely through in way of wet spaces like the bathrooms and door sills. The boat deck and house tops show significant coating failure and corroded plating. The superstructure sides show evidence of heavy pitting between all of the mezzanine deck windows.

[1] Patton Marine, Inc, "ISLANDER" Cost benefits Analysis, July 17, 1996, Page 1
[2] Art Anderson Associates, *Vessel Optimization Study for the Woods Hole Steamship Authority*, September 1996

The amount of steel on the ISLANDER needing renewal is extensive. The amount is estimated to range between 380,000 and 450,000 pounds to return the ISLANDER to service in its current configuration. This includes nearly 30 percent of the hull plating, 85 percent of the main deck and 90 percent of the boat deck. The estimated amount of steel requiring replacement is approximately 25% of the total structural steel in the ship. The estimated material and labor cost to install this much steel is approximately $4,100,000 to $4,900,000 and would require between 13 and 15 months to complete in a small to midsize (20 to 40 person) ship repair yard. This cost estimate does not include dry dock and other shipyard charges, coatings renewal, asbestos removal, safety equipment upgrade and renewal or machinery upgrades. When these costs are included the total restoration of the ISLANDER to return it to service in its existing configuration could range between $6,151,000 and $7,225,000 not including upgrades to make it fit for the Governor's Island service. Seaworthy believes that once the ISLANDER is dry docked and the lead ballast is removed, and the steel in the in-accessible spaces is surveyed from the exterior, much more steel replacement will be required than the amount noted above.

The ISLANDER's USCG Certificate of Inspection (COI) expires on May 9, 2008 and requires the hull be examined by April 30, 2008. It is Seaworthy's opinion that the ISLANDER would fail its USCG hull examination if conducted on April 30, 2008 and it would be impossible to make corrections by the May 9, 2008 expiration date. If the vessel fails the hull examination and repairs cannot be made by May 9, 2008 then the ISLANDER's COI will expire.

According to the USCG Marine Safety Manual, the ISLANDER may then have to be inspected as a "New Vessel" before it could return to service as a passenger ferry. The ISLANDER was built to 1950 USCG and ABS rules and regulations for passenger ferries. The rules and regulations today are quite different and place much more emphasis on safety. While the ISLANDER did receive mandatory USCG safety upgrades over the years, it was given grandfather status and was not required to meet many of the more recent and onerous USCG regulation changes. For the ISLANDER to meet the "New Vessel" USCG regulations for Sub Chapter H then it would be required to comply with the following:

- Two compartment standard of subdivision and damage stability instead of its existing one compartment standard (will require additional watertight bulkheads in the hull),
- New alarm systems, navigation equipment and electrical wiring requirements (will most likely require replacement of all related existing systems including any original electrical wiring),
- Complete removal of the below main deck crew accommodations and galley if they will not be utilized and the elimination of any sources of fire and combustible material (all ventilation, wiring and piping in these spaces must be removed and blanked off),
- Upgraded stability criteria including increased per passenger weight and a new stability test (this may reduce the total passenger capacity),
- Removal of all existing non-compliant watertight doors in the main watertight bulkheads (alternate means of access will be required down through the main deck),
- Any items that were previously grandfathered would be null and void (such as structural fire protection, ventilation systems, passenger space outfitting, etc.),

- Main engines must be replaced with new EPA Tier II, maybe Tier III, emission compliant engines[3] (approximate cost $1,000,000).

At this stage in the ISLANDER project it is not possible to provide an estimate of the cost if the ISLANDER must be inspected as a "New Vessel" other than to say that it could very easily exceed twice the above costs.

Conditions in the shipbuilding and repair industry today are extremely volatile. U.S. shipyards have been refusing to quote on many shipbuilding projects with complicated contract clauses, bonding requirements and excessive paperwork. The world wide price for steel has been increasing so rapidly that some Asian shipyards are refusing to provide fixed price quotes for new construction or for major repairs. The price for steel used to project the above renewal costs reflect the steel cost in early 2008. The price can be expected to increase 15 percent or more per year for the near future. Shipbuilding and ship repair costs in the United States have been increasing about 15 percent per year since hurricane Katrina and can be expected to increase this amount per year for at least the next several years.

The recent experiences of the Washington State ferry system and their problems with hull corrosion and cracking on the four 80 year old double ended ferries has brought the problems of aging ferries into very public view. As a result, increased oversight of the ferry industry by the USCG, State agencies and the public can be expected especially with regard to old vessels like the ISLANDER. When contemplating the repair of their 80 year old 256' long hulls Washington State stopped adding up the cost when they reached a steel replacement cost of about $8,000,000 and considered repair of these old ships impractical. For the smaller ISLANDER**,** a similar steel replacement cost limit would be equivalent to about $4,850,000.

3.0 GENERAL DESCRIPTION

The M/V ISLANDER, Official Number 259789 is an 1800 HP, 200' all welded steel, double-ended USCG sub-chapter "H" inspected passenger/vehicle ferry constructed in 1950 for the New Bedford, Woods Hole, Martha's Vineyard and Nantucket Steamship Authority by *The Maryland Drydock Company* of Baltimore, MD as hull number 130. The vessel was built according to the ABS *Rules for Building and Classing Steel Vessels 1950*[4]. The vessel characteristics are:

LOA	200' -6"	Draft	10' – 0"
Beam	58' – 0"	Gross Tons	855
Depth	17' – 0"	Net Tons	581
Passenger Capacity	771		

[3] 40 CFR, Chapter I Environmental Protection Agency, Part 94-2 Definitions, New Vessel section (1) (ii) July 7, 2007, Page 596

[4] Eads Johnson, ME, *Specifications For The Construction of A Double End Diesel Passenger Boat For The New Bedford, Woods Hole, Martha's Vineyard and Nantucket steamship Authority of New Bedford, Mass.*, September 8, 1949, Page 1

Crew	One Master, one Mate/1st Class Pilot, four Able Seaman, one Ordinary Seaman, one Chief Engineer, one Oiler
USCG COI Route	Lakes, Bays and Sounds, Nantucket and Vineyard sounds: Ferry routes between Hyannis, Nantucket Island, Martha's Vineyard and Woods Hole, Massachusetts, under reasonable conditions.
COI Certification Date	September 11, 2007
COI Expiration Date	May 9, 2008
Last Hull Exam	April 18, 2005
Next Exam due	April 30, 2008
USCG Stability	Partially Protected Waters (With one-compartment standard of subdivision and damage stability.)
Owner	Governor's Island Preservation and Education Corporation Battery Maritime Building Slip #7 10 South Street New York, NY 1004
Operator	Harbor Ferry Services, LLC 647 County Route 351 Medusa, NY 12120

The ferry has three decks. The main deck is an enclosed freight deck used for vehicles with loading doors at both ends and a centerline island that provides access to the engine room and the watertight compartments below the main deck. The mezzanine deck is split between port and starboard, is accessed from the main deck by stairways at either end, has fixed seating and four heads, two on each side located midship. The mezzanine deck also has four sets of double watertight passenger loading doors fore and aft on each side that allow access by way of a gangway or pedestrian bridge. Interior stairways located at either end of the mezzanine allow access up to the snack bar/salon located on the boat deck as well as outside access to the boat deck. The open boat deck is continuous from end to end and extends to the full beam, has fixed open air seating, a snack bar/salon, crew accommodations and two wheelhouses, one each end.

Access to the main deck and boat deck from the mezzanine is controlled by fire safety doors that have magnetic hold backs which are de-activated locally or remotely from the wheelhouses. The vessel is not ADA accessible.

Compartments below the main deck include the engine room amidships then three watertight compartments and a peak at each end. (Figure 1) There are no ballast tanks located in the vessel.

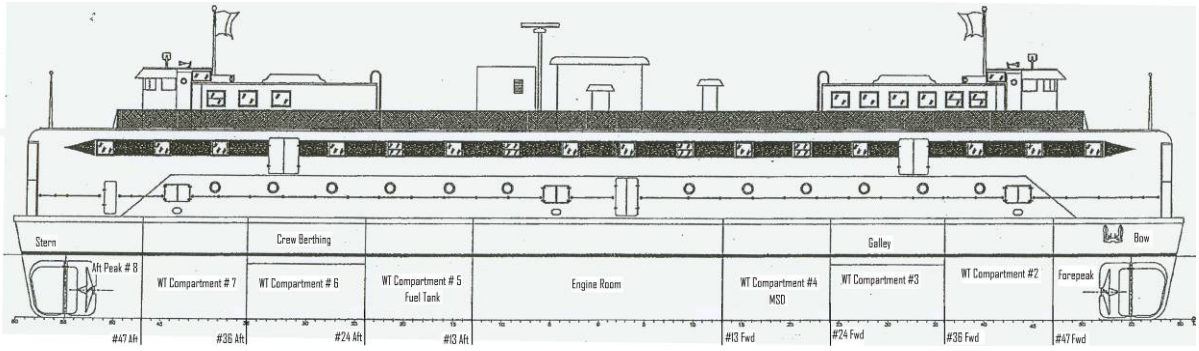


Figure 1

Forepeak compartment #1 and aft peak compartment #8 contain the steering gears. Compartments #2 and #7 contain the forward and after steering motors respectively. Within compartment #3 is a crew galley with access from the centerline trunk and a watertight door in the bulkhead at frame #36 fwd that accesses compartment #2. Within compartment #6 there is additional crew berthing with access from the centerline trunk and a watertight door in the bulkhead at frame #36 aft that accesses compartment #7. Compartment #4 contains the MSD system, black water tank and potable water tank. Compartment #5 contains the fuel tank and the fixed CO2 fire extinguishing system for the engine room.

The vessel was originally powered by a midship mounted, single 1600 HP Fairbanks-Morse direct reversing diesel[5] engine connected to a common shaft with a propeller at both ends. During the vessels service life, the original main engine was replaced with two separate 800 HP 10-cylinder Fairbanks-Morse opposed piston diesel engines with single reduction gears[6] on independent shafts. These engines were later replaced with two 900 HP EMD-8-645 diesel engines with reduction gears. Operation of the main engines and reduction gears is controlled by either wheelhouse with pneumatic controls as well as local control in the engine room. These items were tested at each location and found to be in good working order. Electrical power was originally provided by two 118kw, 125 volt DC generators[7]. The generators have been replaced and the electrical power has since been converted to 3 phase 220/440 volts AC, with 125 volt AC for lighting. The required emergency generator and automatic switchgear is installed on the boat deck. It was tested and found to be in good working condition. The wheelhouse electronics were tested and worked correctly except the GPS and one Raytheon radar in the forward wheelhouse which did not function correctly.

Shipyard repair orders and Steamship Authority (SSA) work orders found in the records provided to Seaworthy by TCC state that the vessel has had several serious grounding incidents[8] [9] which required plate and framing replacement.

[5] Johnson, Page 8
[6] ABS Report No. B28559, M/V ISLANDER, Boston, Mass., March 12, 1979, Page 3
[7] Johnson, Page 1-M
[8] SSA Records, *Grounding of Islander*, June 6, 1973
[9] SSA Records, *M/V Islander Grounding-Oak Bluffs*, March 19, 1980

M/V ISLANDER – Governor's Island 2/14/2008

This report will address the issue of replacement steel in areas where it has been identified as needing replacement through ultra-sonic testing.

4.0 INTERIOR HULL BELOW MAIN DECK – Steel, Coatings and General Assessment

4.1 WATERTIGHT COMPARTMENT #1 Frames 47 – 60 (Forepeak)

Access to this space is through a manhole in the main deck. Active corrosion, through film breakdown and extensive coating failure was found in the lower half of the space and along the lower half of the watertight bulkhead at frame #47. The coatings in the upper half of the space are delaminating with local coating failure.

The steering gear is located in this compartment. The steering cylinders appear to be fairly new and in good working condition. The rudder post and upper bearing appear to be in good condition. There is evidence of salt water leaking through the rudder post.

Forward Steering cylinders

Rudder Post

4.2 WATERTIGHT COMPARTMENT # 2 Frames 36 – 47

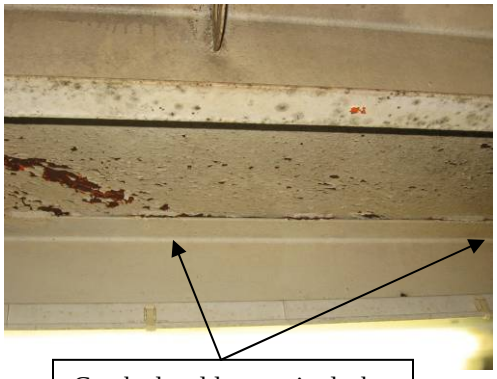
Access to this space is through a manhole in the main deck starboard side and a quick acting watertight door in bulkhead #36 from compartment # 3. Excessive coating failure and active corrosion was found throughout the space. Evidence of the original lead coatings exists under the steering motors with excessive coating failure in those areas. There are many cracks in the welds of the main deck beams to the deck plate. There is active corrosion and wastage of the steel at bulkhead #47 at the packing gland.

This compartment includes the forward end steering motors and switchgear, forward shaft and bearings, the Cruise-air air conditioning and the refrigeration compressor units for the galley. The air conditioning and refrigeration compressors are corroded from salt water. The shaft bearings appear to be in good operating condition. The steering motors are fairly new and are in good operating condition.

Coating failure – poor surface preparation

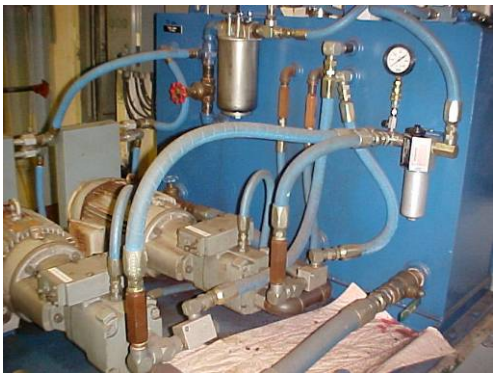
Shaft bearing

Coating Failure

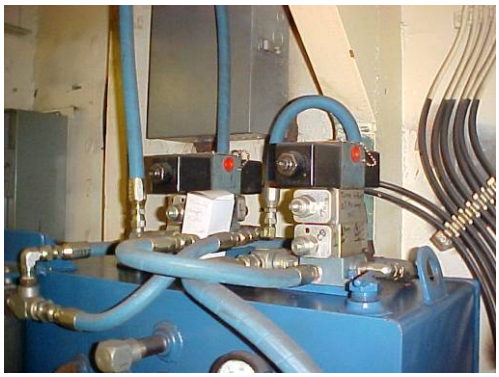


Corroded refrigeration compressors

Coating failure and wasted frames



Forward Steering motors



Steering Control Solenoids

4.3 WATERTIGHT COMPARTMENT #3 Frames 24 – 36

Access to this space is by the centerline trunk and an internal stairway down to the crew galley as well as an emergency escape hatch on the main deck at the end of the island on the centerline trunk. The crew galley includes two free standing refrigerators, two fixed freezers, dry food storage lockers, a dishwasher, sink, combination electric range and oven, coffee maker, microwave oven, stainless steel cabinets, toaster, hot and cold bottled water dispenser, food prep areas, two fixed tables and portable chairs. The galley equipment was not tested as TCC has indicated that this area will not be used. The coatings in the galley are fairly intact.

On either side of the galley are longitudinal bulkheads with bolted plate access to the voids behind them. The coatings in these compartments are fairly intact and the steel appears to be in fair shape.

Underneath the galley deck is a compartment with the forward shaft that is accessed through a hatch in the galley deck. There is a grey water tank and pump in this space. Some shell plating has been replaced in this compartment. The coatings appear to be original and may be lead paint. There is excessive coating failure and corroded steel.

At the forward end, starboard side of the galley at bulkhead #36, there is a quick acting watertight door which gives access to compartment #2 and the forward steering motors. There is evidence of a leak in the main deck by the coffee maker. The shaft and bearings appear to be in good working order.

Galley

Water tight door

Forward Shaft

Replaced plate in shell

Coating Failure – active corrosion

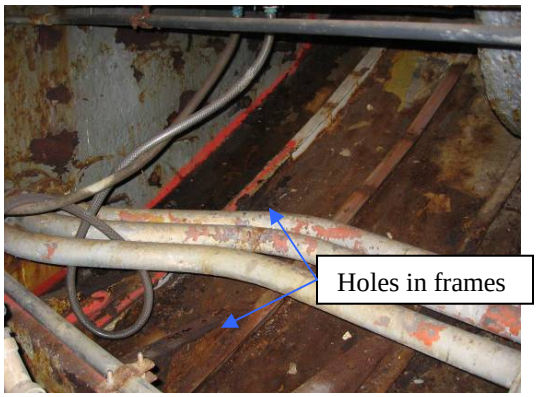
Wasted shell plating

4.4 WATERTIGHT COMPARTMENT #4 Frames 13 – 24

Access to this space is by the centerline trunk and an internal stairway. Compartment #4 is also the MSD room and has the black water tank, MSD system, potable water tank, and forward shaft. This compartment has excessive coating failure, active corrosion and wasted steel. The bulkhead at frame #24 is buckled and there is evidence of bottom damage on the starboard side shell plating, frames, floors and girders.

In the lower section of the space, many of the internals are wasted through. The black water tank (Original fuel tank[10]) is corroded from halfway down to the underside. The bulkhead at frame #13 is severely corroded in the lower half at the shaft packing gland. A plate is bolted into bulkhead #13 at the penetration of the main shaft that has gasket failure. There is extensive use of PVC in the new MSD system. Located in the center of the bilge is lead ballast. The plating and internals surrounding the ballast are in poor condition. The shaft and bearings appear to be in good working order.

Wasted Floors

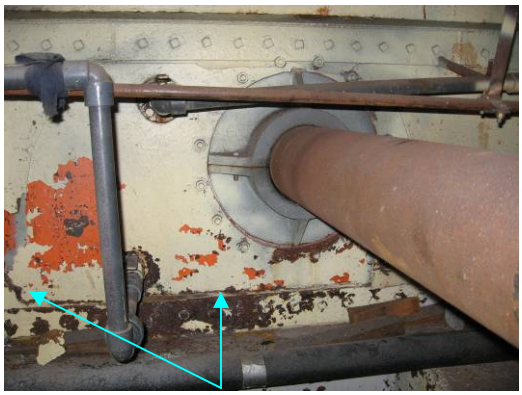


Wasted frames and shell plate

Holes in floors

Wasted web frame

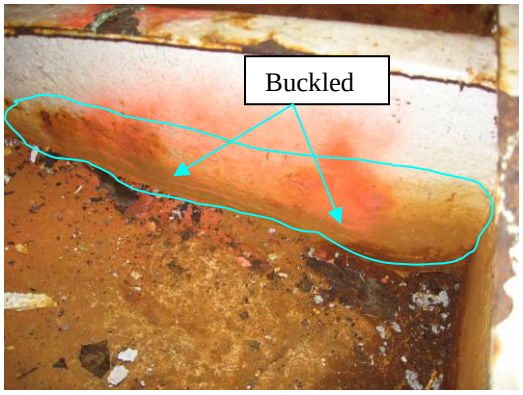
Corroded black water tank



Failed Bulkhead gasket

[10] Copy of original drawing showing fuel tank in this space.

Bulkhead at frame #24 wasted



Web frame buckled – bottom damage

4.5 ENGINE ROOM Frames 13 - 0 -13

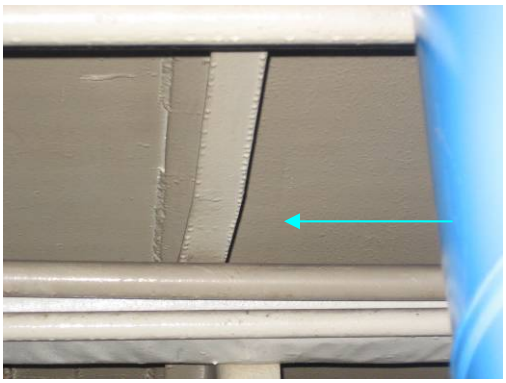
Access to the engine room is from either end of the centerline island and internal stairways leading down at either end of the space. Active corrosion and severe coating failure was found in the lower half of the space, equipment foundations, piping and along the lower half of the watertight bulkheads at frames #13 forward and #13 aft. The coatings in the upper half of the space are fairly intact with localized corrosion and coating failure.

There is a significant amount of shell plate and internals that have been replaced[11] as a result of previous groundings[12]. There are deck beams and frames that are buckled. The bottom plating is severely corroded with significant coating failure. The bottom plating around both of the sea chests is severely corroded with holes wasted through in the floors and web frames and there are signs of active water leaks through the seachest plating.

The machinery was found to be in generally good condition and well maintained. There is a mix of old and new equipment throughout the engine room as a result of various upgrades, repowering and changing of the electrical system. There is evidence that there has been wiring replaced since converting to AC power. However, the condition of the wiring cannot be determined at this time.

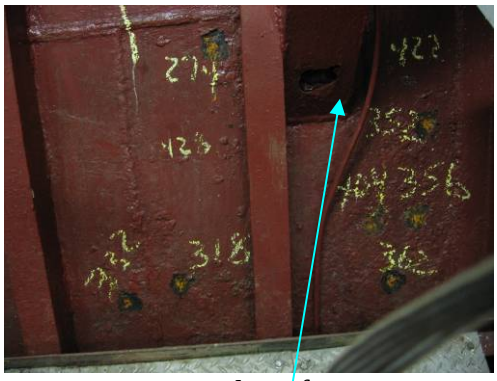
There are various piping systems that have been renewed and other systems that are in need of replacement. The fuel transfer system and oil pre-lube system are functioning normally. The fire/bilge, potable water and sanitation systems were winterized and out of service and could not be tested. All of the engine, bilge, general alarm and communication systems were tested and functioned normally.

[11] SSA Records, *Grounding of Islander*, June 6, 1973
[12] SSA Records, *M/V Islander Grounding-Oak Bluffs*, March 19, 1980



Engine room – Example of buckled deck beam

Corroded shell plating



Hole in frame

Main electrical distribution panels

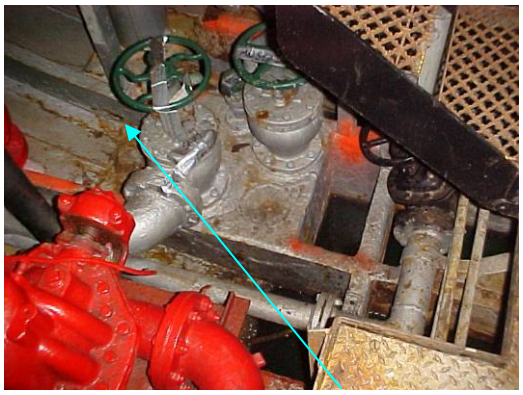
Corroded bottom plates

Plate inserted from previous bottom damage

Coating failure in overhead

Main Engine


New AC Generator


Seachest – Hole in frame

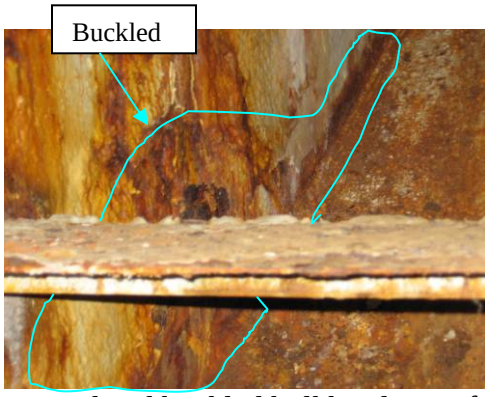
4.6 WATERTIGHT COMPARTMENT #5 Frames 13 – 24 aft

Access to this space is by the centerline trunk and an internal stairway. Compartment #5 is also the fuel tank room and has a 6,110 gallon fuel tank, another water tank and the aft shaft. This compartment has excessive coating failure, active corrosion and wasted steel. The bulkhead at frame #24 is buckled and severely wasted.

In the lower section of the space, many of the internals are wasted through. The bulkhead at frame #13 is severely corroded in the lower half at the shaft packing gland. Located in the center of the bilge is lead ballast. The plating and internals surrounding the ballast are in poor condition. The shaft and bearings appear to be in good working order.


CO2 system


Lead ballast blocks



Wasted and buckled bulkhead #24 aft


Wasted and buckled bulkhead #24 aft

Hole in girder

Fuel Tank

Wasted bottom plate next to lead ballast

Wasted girder

4.7 WATERTIGHT COMPARTMENT #6 Frames 24 – 36 aft

Access to this space is by the centerline trunk and an internal stairway down into the crew berthing as well as an emergency escape hatch on the main deck at the end of the island on the centerline trunk. On either side of the crew berthing are longitudinal bulkheads with bolted plate access to the voids behind them. There is localized coating failure and corrosion in these voids. The steel appears to be in fair shape.

The coatings in the berthing area are fairly intact. At the aft end, starboard side of the accommodations at bulkhead #36, there is a quick acting watertight door which gives access to compartment #7 and the aft steering motors.

Underneath the berthing area is a compartment with the aft shaft that is accessed through a hatch in the berthing deck. This space has been mechanically cleaned and recoated in the recent past. However, there is poor adhesion of the paint as a result of poor surface preparation with failed coatings along the lower half of the space. There is localized coating failure and corroded steel. The shaft and bearings appear to be in good working order.

Berthing Area

Watertight door in Bulkhead #36 aft

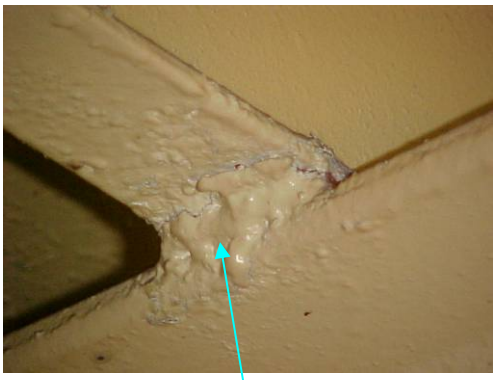
Aft shaft and bearing

Localized coating failure

4.8 WATERTIGHT COMPARTMENT #7 Frames 36 – 47 aft

Access to this space is through a manhole in the main deck starboard side and a quick acting watertight door in bulkhead #36 from compartment # 6. Coating failure and active corrosion was found throughout the space. This space has been mechanically cleaned and recoated in the recent past. However, there is poor adhesion of the paint and failed coatings along the lower half of the space. There is active corrosion and wastage of the steel at bulkhead #47 at the packing gland. There are many cracks in the welds in the deck beams.

This compartment contains the after end steering motors and switchgear, aft shaft and bearings. The steering motors are fairly new and are in good operating condition. The shaft bearings appear to be in good operating condition.



Crack in deck beam weld

Aft Steering motors

Wasted Steel bulkhead #47 aft

Coating failure

4.9 WATERTIGHT COMPARTMENT #8 Frames 47 – 60 (After Peak)

Access to this space is through a manhole in the main deck. Active corrosion and coating failure was found in the entire space and along the lower half of the watertight bulkhead at frame #47. The coatings in the upper half of the space are delaminating with local coating failure.

The aft steering gear is located in this compartment. The steering cylinders appear to be fairly new and in good working condition. The rudder post and upper bearing appear to be in good condition. There are signs of salt water leaking through the rudder post.

5.0 MAIN DECK

The main deck is buckled between the transverse beams along its entire length. The depth of the buckles range between 7/16” to 1-1/2”. Some of the deck beams are pushed up by more than ½” from a previous grounding or similar incident on the port side amidships at the side loading doors. Some of the deck plating and deck beams within these locations are buckled up in excess of 1-1/2”. There is substantial active corrosion and failed coatings on the entire deck. Some of the deck plating has been replaced forward of frame #47 to frame #54 along the centerline. There are wasted frames and stanchions along the superstructure base and wasted steel along the length of the centerline island from the main deck up as high as 12”.

Replaced deck plate

Buckled down – 1-3/8” depth

Buckled down – 13/16” depth

Buckled up 1-1/2”

Significant coating failure

Outline – main deck buckled up

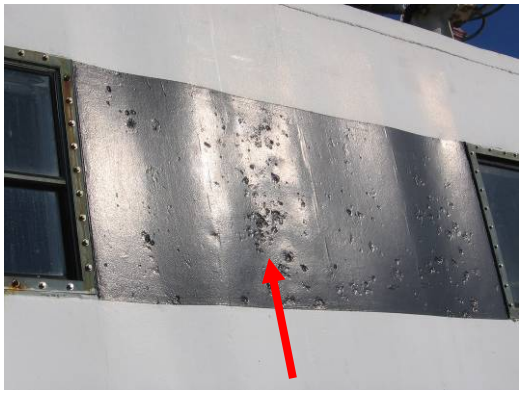
Wasted steel and coating failure

Superstructure with holes

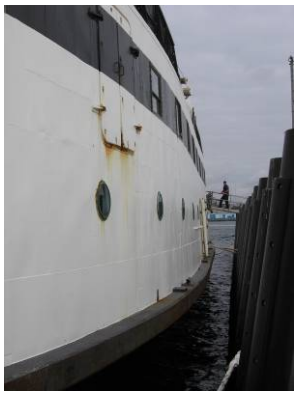
6.0 SUPERSTRUCTURE

The superstructure is the full length and beam of the vessel with hinged cargo loading doors at either end and watertight loading doors midship on the main deck, passenger loading doors fore and aft on both sides of the mezzanine deck, fixed portlights on the main deck and fixed windows the length of the mezzanine deck. The superstructure has signs of external deep pitting in the steel between the windows. The depth of the pits could not be measured as this area could not be reached. This area may need steel replacement.

Pitting in superstructure



Deep pitting



Passenger loading doors

Midship cargo doors

Superstructure

Bow loading doors

6.1 MEZZANINE

6.1.1 Mezzanine Interior

The mezzanine deck is split between port and starboard and is accessed from the main deck by stairways at either end. The port and starboard sides are further divided midship by fire safety doors. The decks and longitudinal bulkheads are generally buckled throughout. More significant buckling is found amidships. There are four sets of double watertight passenger loading doors fore and aft on each side that allow access by way of a gangway or pedestrian bridge. The starboard side forward doors are missing dogs at the bottom and do not close completely. The port side forward doors are bent and do not close completely. The midship port side fire safety door threshold is wasted.

The mezzanine coatings are in fair condition with localized delamination. There is fixed seating and tables on both sides of the deck. This seating is in need of replacement. The joiner work is in fair condition. The original asbestos ceiling has been removed and replaced[13]. The interior stairways located at either end leading up to the boat deck have active corrosion and coating failure and are in need of descaling and recoating.

There are four heads, two on each side located midship. The sinks, toilets and potable water system were turned off and winterized and they were not tested. The steel behind the toilets is wasted. The decks in the heads are covered in concrete which is buckled near the toilets and sinks. The steel deck below the toilets is wasted and holed. There is a leak in the boat deck into the starboard side men's head.

[13] Yard Log, *M/V Islander*, American Shipyard, Newport, RI, February 10, 1996, Page 4

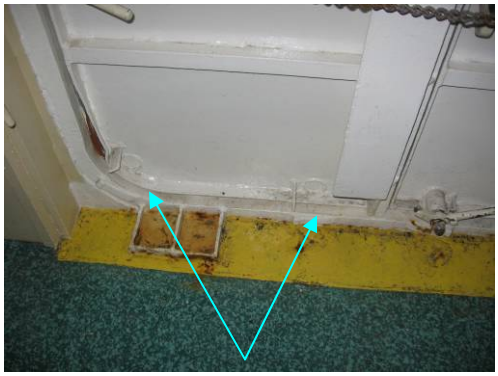
Wasted threshold

Wasted plate in heads

Worn out interior seating

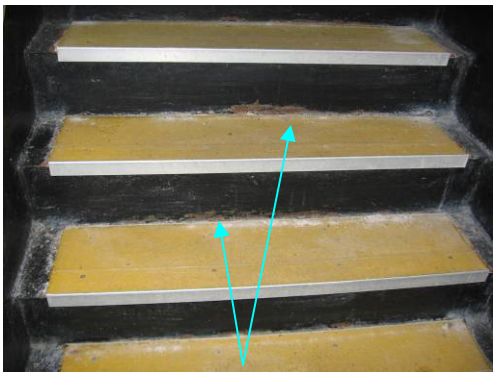
Bent watertight passenger loading door

Watertight loading door will not close



Watertight door missing dogs

Leak from boat deck



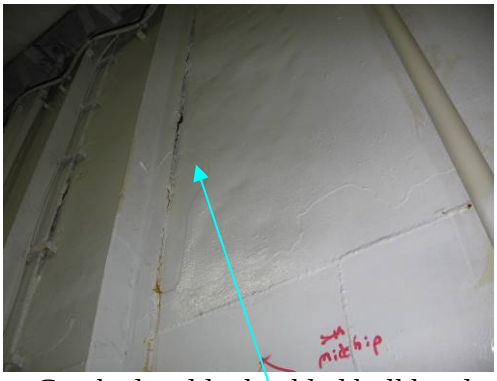
Active corrosion under stair treads

6.1.2 Mezzanine Exterior

The interior longitudinal bulkheads are significantly buckled with cracked welds in many of the frames. Each gusset at the main deck stanchions is buckled. The coatings have been renewed and are in fair condition. The deck is holed at the toilets and sinks.

Cracked Welds

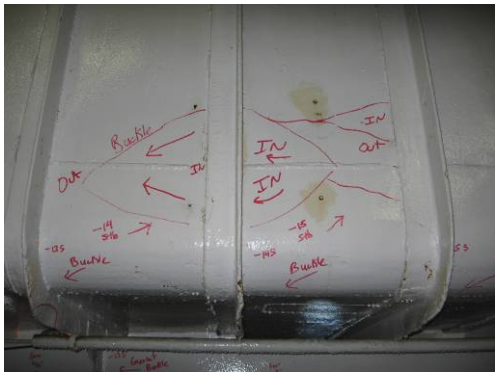
Cracked weld at frame



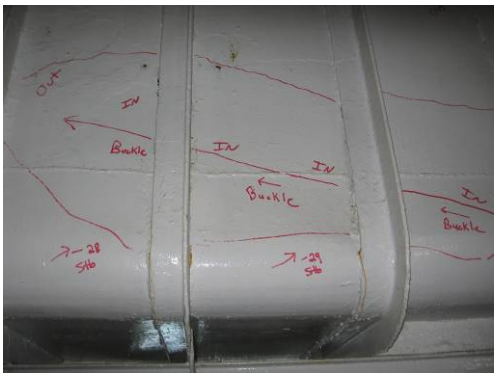
Cracked weld – buckled bulkhead

Example of buckled gusset


Buckled bulkhead - starboard midship



Buckled bulkhead - starboard aft



Buckled bulkhead - starboard aft


Buckled bulkhead – port midship


Deck wasted through in head at sink


Deck wasted through at toilets


Cracked weld at deck


More cracked welds

6.2 BOAT DECK

The open boat deck is continuous from end to end and extends to the full beam, has fixed open air seating, the emergency generator room, exhaust stack, a snack bar/salon, crew accommodations, launching stations for the inflatable buoyant apparatus (IBA), rescue boat plus davit and two wheelhouses, one each located fore and aft. There is significant coating failure and active corrosion on the deck. The fixed seating foundations are failing and several seats have been removed. The seats are molded plastic and have suffered significant sunlight

damage. This seating will need to be replaced. The IBA's certificates of operation expired in July 2007, and must be serviced or replaced. The rescue boat flotation tubes need to be inflated but the boat appears to be in fair condition. The rescue boat engine was not tested. The electrical wiring on the davit is chafed and broken and will need replacement.

Sun damaged seat

Wasted deck

Broken seats – wasted deck

Active corrosion

Emergency generator

Emergency switch gear

Rescue Boat

Broken conduit on davit wiring

Expired IBA's

Life jacket storage

7.0 HOUSES

7.1 Snack Bar/Salon

Interior stairways located at the forward end of the mezzanines allow access up to the snack bar/salon located on the boat deck. Stairways at the aft end provide access up to the boat deck. There is fixed seating and tables in the snack bar which are in good condition. The salon deck is in fair condition with some wasted steel at the sinks and places where water gathers. The galley equipment is out of service and was not tested. The ceiling is asbestos panels and will require removal. The coatings on the bulkheads are in good condition. The coatings on the deck in the food prep and service areas are failing.

Salon service equipment

Fixed tables


Worn deck in food service area


Food prep area


Hole in boat deck under salon


Wasted steel in salon deck


Galley service equipment


Asbestos ceiling in salon

7.2 Crew Accommodations

These areas are in fair condition. The showers have corroded steel in them. Under each of the port holes, the bulkheads are wasted and holed. The coatings are fairly intact. The housetops are corroded and have significant coating failure.

Housetop coating failure and active corrosion

Housetop

Active corrosion

Crew berthing

Captains room

Captains Office

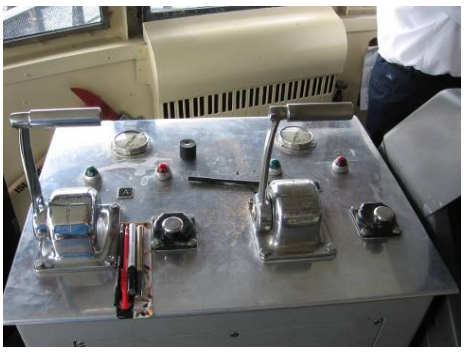
Hole in bulkhead under porthole

Corroded steel under porthole

7.3 Wheelhouses

There are two wheelhouses, one at either end of the boat deck. These wheelhouses have independent operating stations for the main engines, steering and navigational electronics. All systems found in the wheelhouse were tested and were found to be in good working condition including; the internal communications, general alarm, steering alarms, steering systems, magnetic fire door releases, ventilation system shutdowns, engine alarms and bilge alarms. The electronics were tested and functioned normally except the GPS and starboard side radar in the forward wheelhouse which will need repair or replacement. All navigational lights were tested and functioned normally. The line of sight from the wheelhouse down to the main deck is extremely poor making docking difficult.

There is a void space underneath the wheelhouses that is accessed by a hatch in the wheelhouse deck. These spaces have significant coating failure and active corrosion as a result of water lying in the space.



Main engine controls

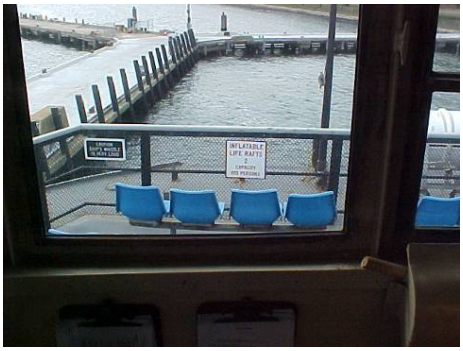
Alarm systems

Ventilation shutdowns

Navigational electronics

Void space under wheelhouse

Corroded steel and coating failure



Poor sight lines from wheelhouse

Antennas and searchlights and Housetop corrosion

8.0 STEEL REPLACEMENT

This task requires the assessment of steel which needs replacement. Original structural drawings of the vessel are normally required in order to properly make such a determination. At the time of the inspections, these drawings were not available. In the absence of these drawings, Seaworthy has made assumptions regarding the sizes of the original steel based on information found in the records of the ship that have been provided by TCC including but not limited to:

I. The original 1950 Builders specification for construction of the vessel, September 8, 1949.

II. Previous Gauging Reports – There were several gauging reports found from different years that give an indication of the size of the plates including:
- *M/V Islander* ABS Special Survey No. 5, April 3, 1974
- *M/V Islander* ABS Special Survey No. 6, March 23, 1979
- Ultrasonic Thickness Survey, M/V ISLANDER, March 1979
- J.G. Sylvester Associates, Inc, Thickness Readings on The Car Deck, March 5, 1980
- Newport Offshore *M/V Islander* UT Readings from 2/28/91, 4/17/93, 2/9/96
- SSA *M/V Islander* Replacement Analysis, January 24, 1995
- *M/V Islander* UT Hull readings performed at Thames Shipyard January 2000
- Preliminary Audio Gauge Report, Windward Marine, February 20, 2008

III. Requirements for steel replacement on this vessel following hull damage:
- P.E. Davidson Survey Report following the grounding of the *M/V Islander* on June 6, 1973
- Bethlehem Steel Corporation Repair Order, June 7, 1973
- M/V ISLANDER Shell Repairs Drawing, Bethlehem Steel Corporation, June 11, 1973
- ABS Damage Survey Report No. B28816, May 22, 1980

- Bethlehem Steel Corporation Repair Order, May 29, 1980

IV. USCG documents requiring specific steel thicknesses

Based on the earliest available information found in these records and the consistency to which steel thickness were required to be replaced by either ABS or USCG, a final determination of original steel sizes was made. Table 1 shows the original steel sizes as well as the original Builders Specification requirements. According to the original Builders Specification, the vessel was to be built according to the ABS *Rules for Building and Classing Steel Vessels 1950*[14].

M/V ISLANDER - ORIGINAL STEEL SIZES

ITEM	LOCATION	SIZE	TYPE	COMMENTS	Builders Spec	TYPE
FLOORS		3/8" x 3"	Flange plate	Depth varies	15# plates with 3" flange	Flange plate
HULL FRAMES		5" x 3" x 3/8"	Angles	On 20" centers	5" x 3" x 9.8#	Angles
HULL WEB FRAMES		12" x 3" x 3/8"	Channel		12" x 15# plate with 4" x 3/8" flat face bar welded to ea side	Channel
CENTERLINE KEELSON		26" x 3/8"	Web	intercostal from end to end with 12" x 3/8" rider	26" x 15# with 12" x15# rider	Web
WT BULKHEADS	Lower Half	5/16"	Plate		12# plate	Plate
	Upper Half	1/4"	Plate		10# plate	Plate
VERTICAL STIFFENERS	Center + 5 ea side of center	6" x 3 1/2" x 3/8"	Angles	on 24" centers	6" x 3 1/2" x 3/8"	Angles
ON BULKHEADS	Next 2 outboard	5" x 3" x 5/16"	Angles	on 24" centers	5" x 3" x 5/16"	Angles
	Balance	4" x 3" x 5/16"	Angles	on 24" centers	4" x 3" x 5/16"	Angles
SIDE KEELSONS	Intercostal	3/8" X 3"	Flange plate	Depth varies	15# plates with 3" flange	Flange plate
MAIN DECK		7/16"	Plate	Pattern steel	1/2"	Plain steel Plate
MAIN DECK BEAMS	Beams	8" x 2-1/4" x 3/8"	Channel		8" x 11.5#	Channel
	Girders - ER bulkheads to ends	10" x 3" x 7/16"	Channel	spaced 4' ea side of centerline	10" x 21.9#	Channel
	Additional girders - bkd 24 to ends	12" x 3-1/2" x 5/8"	Channel	with 3/8" rider	12" x 30.9#	Channel
	Girders - in Engineroom	18" x 3" x 3/8"	Flange plate		15# plate, 18" deep with 3" flange	Flange plate
SHELL	"A" strake - Garboard	1/2"	Plate	assumes full length	.44"	Plate
	"B" strake	1/2"	Plate	assumes full length	.44"	Plate
	"C" thru "E" strake	7/16"	Plate	assumes full length	.40"	Plate
	"F" strake - Sheer	1/2"	Plate	assumes full length	.47"	Plate
SIDE SHELL STRINGERS		12" x 3" x 3/8"	Flange plate		12" x 15# plate with 3" flange	Flange plate
TRUSSES	Deck Chord - top members	8" x 2-1/4" x 3/8"	Channel		8" x 15#	Channel
	Bottom members	15" x 4" x 3/8'	Flange plate		15" x 4" x 15#	Flange plate
	Deck chord in machinery space	12" x 3-1/2" x 3/8"	Channel		12" x 15#	Channel
	Chords in Steering Gear rooms	3/8" x 3"	Flange plate	slotted over frames with lightning holes	15# plate	Flange plate
	Vertical members - all	10" x 3-1/2" x 7/16"	Channel		10" x 21.9#	Channel
	Diagonal Braces between bulkheads	5" x 3" x 3/8"	Angles		5" x 3" x 9.8#	Angles
	Brackets to bulkhead	8" x 2-1/4" x 3/8"	Channel		8" x 15#	Channel
SEA CHESTS		1/2"	Plate		1/2"	Plate
SUPERSTRUCTURE	Side frames	6" x 4" x 7/16"	Angles	On 20" centers	6" x 4" x 11#	Tees
	Deep Frames	9" x 6"	Tee	cut from a 18" x 54.7# I- beam	9" x 6"	Tee
	Side plating	3/16"	Plate		7-1/2#	Plate
	Coaming	3/8"	Plate	30" from deck	12.5#	Plate
TRUNK - CENTERLINE	Frames	3" x 3" x 3/16"	Angles	On 20" centers	3" x 3" x 7.2#	Angles
	Brackets	6" x 2" x 5/16"	Channel		6" x 10.5#	Channel
	Side plating	1/4"	Plate		10#	Plate
	Coaming	3/8"	Plate	18" from deck	15#	Plate
BOAT DECK	Deck	1/4"	Plate		10#	Plate
	Beams	8" x 2-1/4" x 3/8"	Channel	On 20" centers - 8" camber in 56'	8" x 11.5#	Channel
DECKHOUSE	Deckhouse tops	3/16"	Plate		7-1/2#	Plate
	Deckhouse bulkheads	3/16"	Plate		7-1/2#	Plate
MEZZANINE	Deck	3/16"	Plate		7-1/2#	Plate
	Bulkheads - longitudinal & transverse	3/16"	Plate		7-1/2#	Plate
	Frames	3-1/2" x 3" x 3/8"	Angles	On 20" centers - bent to 6" radius	3-1/2" x 3" x 7.9#	Angles

TABLE 1

[14] Eads Johnson, ME, *Specifications For The Construction of A Double End Diesel Passenger Boat For The New Bedford, Woods Hole, Martha's Vineyard and Nantucket steamship Authority of New Bedford, Mass.*, September 8, 1949, Page 1

Since this vessel is not ABS classed, the USCG rules for wastage of steel must be followed. These guidelines are found in USCG Navigation Circular (NVIC) 7-68 *Note on Inspection and Repair of Steel Hulls.* The "General Rule" is to renew the steel to original thickness[15]. In section III of this NVIC, the methods of determining the need for replacement steel are defined.[16] One of the recommended methods is Belt Gauging, which was used to perform the audio gauge survey. This method involves taking readings around several complete transverse sections of the hull including deck, sides and bottom[17]. This method can be used to determine the general seaworthiness of the vessel. Belt gauging may also clearly indicate that extensive replacements are required.

Corrosion limits are indicated in section (C) and are listed as 20% to 30%, depending on location, of the original thickness before replacement is necessary[18]. Deck buckling in excess of the deck plate thickness will require corrective action which includes but is not limited to doublers or replacement of the plate. Based on the criteria outlined in NVIC 7-68, a table of wastage was developed.

M/V ISLANDER - WASTAGE ALLOWANCES

ITEM	LOCATION	SIZE	TYPE	COMMENTS	THICKNESS	USCG %	REMAINING ALLOWED	20 Year Estimate %	Replace for 20 Year
FLOORS		3/8" x 3"	Flange plate	Depth varies	0.375	30%	0.263	25%	0.281
HULL FRAMES		5" x 3" x 3/8"	Angles	On 20" centers	0.375	30%	0.263	25%	0.281
HULL WEB FRAMES		12" x 3" x 3/8"	Channel		0.375	30%	0.263	25%	0.281
CENTERLINE KEELSON		26" x 3/8"	Web	intercostal from end to end with 12" x 3/8" rider	0.375	30%	0.263	25%	0.281
WT BULKHEADS	Lower Half	5/16"	Plate		0.3125	30%	0.219	25%	0.234
	Upper Half	1/4"	Plate		0.25	30%	0.175	25%	0.188
VERTICAL STIFFENERS ON BULKHEADS	Center + 5 ea side of center	6" x 3 1/2" x 3/8"	Angles	on 24" centers	0.375	30%	0.263	25%	0.281
	Next 2 outboard	5" x 3" x 5/16"	Angles	on 24" centers	0.3125	30%	0.219	25%	0.234
	Balance	4" x 3" x 5/16"	Angles	on 24" centers	0.3125	30%	0.219	25%	0.234
SIDE KEELSONS	Intercostal	3/8" X 3"	Flange plate	Depth varies	0.375	30%	0.263	25%	0.281
MAIN DECK		7/16"	Plate	Pattern steel	0.4375	25%	0.328	20%	0.350
MAIN DECK BEAMS	Beams	8" x 2-1/4" x 3/8"	Channel		0.375	30%	0.263	25%	0.281
	Girders - ER bulkheads to ends	10" x 3" x 7/16"	Channel	spaced 4' ea side of centerline	0.4375	30%	0.306	25%	0.328
	Additional girders - bkd 24 to ends	12" x 3-1/2" x 5/8"	Channel	with 3/8" rider	0.625	30%	0.438	25%	0.469
	Girders - in Engineroom	18" x 3" x 3/8"	Flange plate		0.375	30%	0.263	25%	0.281
SHELL	"A" strake - Garboard	1/2"	Plate	assumes full length	0.5	20%	0.400	15%	0.425
	"B" strake	1/2"	Plate	assumes full length	0.5	20%	0.400	15%	0.425
	"C" thru "E" strake	7/16"	Plate	assumes full length	0.4375	25%	0.328	20%	0.350
	"F" strake - Sheer	1/2"	Plate	assumes full length	0.5	25%	0.375	20%	0.400
SIDE SHELL STRINGERS		12" x 3" x 3/8"	Flange plate		0.375	30%	0.263	25%	0.281
TRUSSES	Deck Chord - top members	8" x 2-1/4" x 3/8"	Channel		0.375	30%	0.263	25%	0.281
	Bottom members	15" x 4" x 3/8"	Flange plate		0.375	30%	0.263	25%	0.281
	Deck chord in machinery space	12" x 3-1/2" x 3/8"	Channel		0.375	30%	0.263	25%	0.281
	Chords in Steering Gear rooms	3/8" x 3"	Flange plate	slotted over frames with lightning holes	0.375	30%	0.263	25%	0.281
	Vertical members - all	10" x 3-1/2" x 7/16"	Channel		0.4375	30%	0.306	25%	0.328
	Diagonal Braces between bulkheads	5" x 3" x 3/8"	Angles		0.375	30%	0.263	25%	0.281
	Brackets to bulkhead	8" x 2-1/4" x 3/8"	Channel		0.375	30%	0.263	25%	0.281
SEA CHESTS		1/2"	Plate		0.5	20%	0.400	15%	0.425
SUPERSTRUCTURE	Side frames	6" x 4" x 7/16"	Angles	On 20" centers	0.4375	30%	0.306	25%	0.328
	Deep Frames	9" x 6"	Tee	cut from a 18" x 54.7# I- beam	0.5	30%	0.350	25%	0.375
	Side plating	3/16"	Plate		0.1875	25%	0.141	20%	0.150
	Coaming	3/8"	Plate	30" from deck	0.375	25%	0.281	20%	0.300
TRUNK - CENTERLINE	Frames	3" x 3" x 3/16"	Angles	On 20" centers	0.1875	30%	0.131	25%	0.141
	Brackets	6" x 2" x 5/16"	Channel		0.3125	30%	0.219	25%	0.234
	Side plating	1/4"	Plate		0.25	30%	0.175	25%	0.188
	Coaming	3/8"	Plate	18" from deck	0.375	30%	0.263	25%	0.281
BOAT DECK	Deck	1/4"	Plate		0.25	25%	0.188	20%	0.200
	Beams	8" x 2-1/4" x 3/8"	Channel	On 20" centers - 8" camber in 56'	0.375	30%	0.263	25%	0.281
DECKHOUSE	Deckhouse tops	3/16"	Plate		0.1875	25%	0.141	20%	0.150
	Deckhouse bulkheads	3/16"	Plate		0.1875	30%	0.131	25%	0.141
MEZZANINE	Deck	3/16"	Plate		0.1875	25%	0.141	20%	0.150
	Bulkheads - longitudinal & transverse	3/16"	Plate		0.1875	30%	0.131	25%	0.141
	Frames	3-1/2" x 3" x 3/8"	Angles	On 20" centers - bent to 6" radius	0.375	30%	0.263	25%	0.281

TABLE 2

[15] NVIC 7-68, USCG, October 1968, Page 2, section (D)
[16] NVIC 7-68, USCG, October 1968, Page 2, section (D)
[17] NVIC 7-68, USCG, October 1968, Page 4, section III.4
[18] NVIC 7-68, USCG, October 1968, Page 7, section (C), Corrosion Limits

Table 1 and Table 2 were used in conjunction with the gauging report from Windward Marine to make a preliminary estimate of the amount of steel that needs replacement. Figures 2 and 3 show the approximate amount of steel that needs to be replaced on the main deck based on the USCG requirement to replace steel that is 25% wasted. Additionally, more plate was identified as needing replacement on the main deck as a result of buckling between main deck beams in excess of the original plate thickness.

A final estimate was developed based on these tables and the actual conditions found as a result of the ultra-sonic testing. Table 3 includes an estimate of the required amount of steel that will need to be replaced and an estimate of the cost of the steel. This steel replacement estimate is based on the requirements found in NVIC 7-68 to return the vessel to service as is.

M/V Islander - Estimate of Required Steel Replacement
USCG Requirement to Return to Service

CURVED PLATE						**ESTIMATE**	**ROUGH ESTIMATE**	
LOCATION	**SIZE**	**SQUARE FEET**	**10% margin**	**Total**	**lbs per foot**	**Pounds**	**Cost per lb**	**Cost**
Hull	1/2"	2,599	260	2,859	20.40	58,322	$ 12.60	$ 734,653
Hull - Inaccessible	1/2"	600	60	660	21.40	14,124	$ 12.60	$ 177,914
Hull	7/16"	160	16	176	17.85	3,142	$ 12.60	$ 39,573
					TOTAL	**75,587**		**$ 952,141**

FLAT PLATE						**ESTIMATE**	**ROUGH ESTIMATE**	
LOCATION	**SIZE**	**SQUARE FEET**	**10% margin**	**Total**	**lbs per foot**	**Pounds**	**Cost per lb**	**Cost**
Bulkheads	5/16"	419	42	461	12.75	5,876	$ 12.60	$ 74,024
Seachests	1/2"	67	7	74	20.40	1,503	$ 12.60	$ 18,939
Main Deck	7/16"	7,719	772	8,491	17.85	151,563	$ 9.60	$ 1,454,485
Mezzanine Deck	3/16"	336	34	370	17.85	6,597	$ 9.60	$ 63,312
Boat Deck	1/4"	8,683	868	9,551	7.65	73,067	$ 9.60	$ 701,199
Deck Housetops	3/16"	1,200	120	1,320	10.20	13,464	$ 9.60	$ 129,209
Deckhouse Bulkeads	3/16"	300	30	330	7.65	2,525	$ 9.60	$ 24,227
					TOTAL	**254,596**		**$ 2,465,394**

HULL STIFFNERS - CURVED						**ESTIMATE**	**ROUGH ESTIMATE**	
LOCATION	**SIZE**	**SQUARE FEET**	**10% margin**	**Total**	**lbs per foot**	**Pounds**	**Cost per lb**	**Cost**
3" Flange Plate	3/8"	2,140	214	2,354	15.30	36,016	$ 11.02	$ 396,899
					TOTAL	**36,016**		**$ 396,899**

HULL STIFFNERS - CURVED						**ESTIMATE**	**ROUGH ESTIMATE**	
TYPE	**SIZE**	**FEET**	**10% margin**	**Total**	**lbs per foot**	**Pounds**	**Cost per lb**	**Cost**
5"X3"angle	3/8"	737	74	811	15.30	12,404	$ 11.02	$ 136,689
8"x2-1/4" channel	3/8"	10	1	11	15.30	168	$ 11.02	$ 1,855
					TOTAL	**12,572**		**$ 138,544**

Total Weight in pounds	**378,771**	**ROM**	**$ 3,952,977**
Labor to protect retained equipment and reassemble structures after steel replacement			**$ 120,000**
Total Estimate for Steel Replacement			**$ 4,072,977**

TABLE 3

The estimated cost per pound is based on the estimated man hours required to replace the steel in-kind including the cost to purchase the material. Table 4 includes the formula[19] and calculations used to arrive at this estimated cost.

CURVED PLATE	A	B	C	D	E	F
LOCATION	Weight divided by 1000	Man Hours per 1000 lbs	Shipyard Billing Rate	Weight of Steel	Costof Steel + 5%	Estimated Cost per pound
Hull	58.32	200	$ 60.00	58,322	$0.60	$ 12.60
Hull - Inaccessible	14.12	200	$ 60.00	14,124	$0.60	$ 12.60
Hull	3.14	200	$ 60.00	3,142	$0.60	$ 12.60
FLAT PLATE						
LOCATION	Weight divided by 1000	Man Hours per 1000 lbs	Shipyard Billing Rate	Weight of Steel	Costof Steel + 5%	Estimated Cost per pound
Bulkheads	5.88	200	$ 60.00	5,876	$0.60	$ 12.60
Seachests	1.50	200	$ 60.00	1,503	$0.60	$ 12.60
Main Deck	151.56	150	$ 60.00	151,563	$0.60	$ 9.60
Mezzanine Deck	6.60	150	$ 60.00	6,597	$0.60	$ 9.60
Boat Deck	73.07	150	$ 60.00	73,067	$0.60	$ 9.60
Deck Housetops	13.46	150	$ 60.00	13,464	$0.60	$ 9.60
Deckhouse Bulkeads	2.52	150	$ 60.00	2,525	$0.60	$ 9.60
HULL STIFFNERS - CURVED						
LOCATION	Weight divided by 1000	Man Hours per 1000 lbs	Shipyard Billing Rate	Weight of Steel	Costof Steel + 5%	Estimated Cost per pound
3" Flange Plate	36.02	170	$ 60.00	36,016	$0.82	$ 11.02
HULL STIFFNERS - CURVED						
TYPE	Weight divided by 1000	Man Hours per 1000 lbs	Shipyard Billing Rate	Weight of Steel	Costof Steel + 5%	Estimated Cost per pound
5"X3"angle	12.40	170	$ 60.00	12,404	$0.82	$ 11.02
8"x2-1/4" channel	0.17	170	$ 60.00	168	$0.82	$ 11.02

Formula = (A x B x C) + (D x E) % D = F

Labor to Reassemble Structures 2000 hours x $60 hr= $120,000

TABLE 4

GIPEC has indicated that it is their desire to have the vessel attain a service life of approximately 15 to 20 years. Seaworthy has reviewed the audio gauge report in an attempt to predict the corrosion rate of loss to achieve this lifespan. Based on the present condition of the steel and the rate of corrosion, an estimate of replacement steel was determined that would extend the service life of the vessel for approximately 10 years. Because of the age of the vessel and the present rate of corrosion, it is not possible to estimate the service life beyond 10 years. Figures 2 & 3 reflect the additional amount of main deck plates that will need replacement to attain an approximate 10 year life span of the vessel. As a result of the USCG required plate replacement and the estimate to produce a 10 year service life, nearly 90% of the main deck plates are in need of replacement.

[19] R.A Cady, *Marine Survey Practice Compendium*,1981, Page 25, Shell Plate renewal Cost

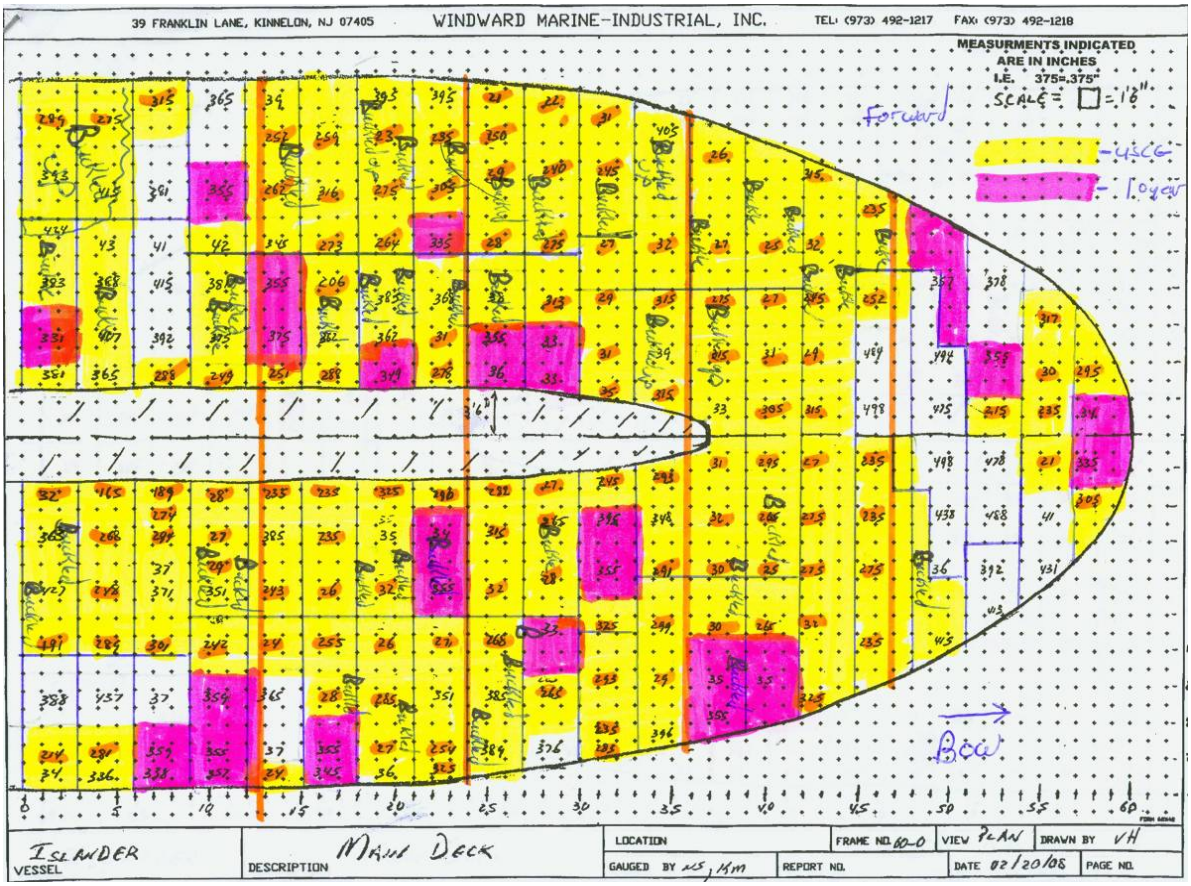


Figure 2 – Plate replacement on the main deck forward

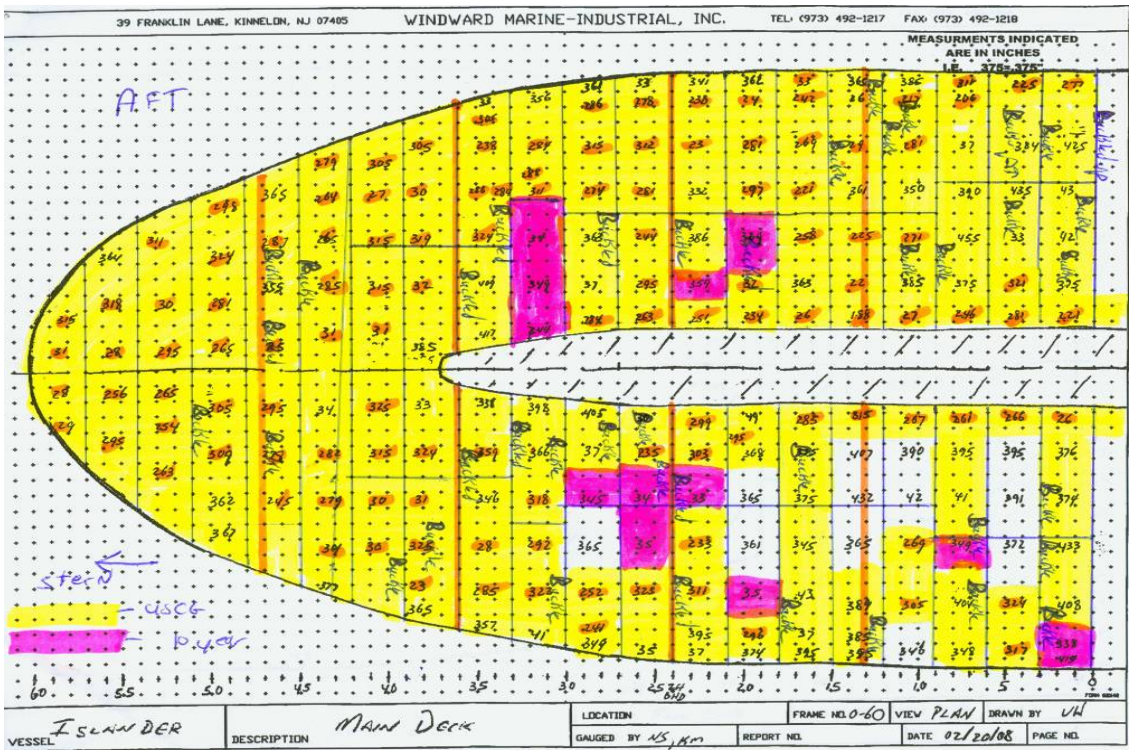


Figure 3 – Plate replacement on the main deck aft

Table 5 includes the original estimate of the required amount of steel that will need to be replaced plus an estimate of the additional steel that will need to be replaced to attain a 10 year lifespan including an estimate of the cost of the steel.

M/V Islander - Estimate of Required Steel Replacement
USCG Requirement to Return to Service plus the estimate for a 10 year Potential Service Life

CURVED PLATE						ESTIMATE	ROUGH ESTIMATE	
LOCATION	SIZE	SQUARE FEET	10% margin	Total	lbs per foot	Pounds	Cost per lb	Cost
Hull	1/2"	3,590	359	3,949	20.40	80,560	$ 12.60	$ 1,014,777
Hull - Inaccessible	1/2"	1,400	140	1,540	21.40	32,956	$ 12.60	$ 415,134
Hull	7/16"	251	25	276	17.85	4,928	$ 12.60	$ 62,081
					TOTAL	118,444		$ 1,491,992

FLAT PLATE						ESTIMATE	ROUGH ESTIMATE	
LOCATION	SIZE	SQUARE FEET	10% margin	Total	lbs per foot	Pounds	Cost per lb	Cost
Bulkheads	5/16"	419	42	461	12.75	5,876	$ 12.60	$ 74,024
Seachests	1/2"	67	7	74	20.40	1,503	$ 12.60	$ 18,939
Main Deck	7/16"	8,683	868	9,551	17.85	170,491	$ 9.60	$ 1,636,131
Mezzanine Deck	3/16"	336	34	370	17.85	6,597	$ 9.60	$ 63,312
Boat Deck	1/4"	9,165	917	10,082	7.65	77,123	$ 9.60	$ 740,123
Deck Housetops	3/16"	1,200	120	1,320	10.20	13,464	$ 9.60	$ 129,209
Deck Bulkeads	3/16"	300	30	330	7.65	2,525	$ 9.60	$ 24,227
					TOTAL	277,580		$ 2,685,964

HULL STIFFNERS - CURVED						ESTIMATE	ROUGH ESTIMATE	
LOCATION	SIZE	SQUARE FEET	10% margin	Total	lbs per foot	Pounds	Cost per lb	Cost
3" Flange Plate	3/8"	2,354	235	2,589	15.30	39,618	$ 11.02	$ 436,588
					TOTAL	39,618		$ 436,588

HULL STIFFNERS - CURVED						ESTIMATE	ROUGH ESTIMATE	
TYPE	SIZE	FEET	10% margin	Total	lbs per foot	Pounds	Cost per lb	Cost
5"X3"angle	3/8"	810	81	891	15.30	13,632	$ 11.02	$ 150,228
8"x2-1/4" channel	3/8"	15	2	17	15.30	252	$ 11.02	$ 2,782
					TOTAL	13,885		$ 153,010

Total Weight in pounds	449,527	ROM	$ 4,767,554
Labor to protect retained equipment and reassemble structures after steel replacement			$ 150,000
Total Estimate for Steel Replacement			$ 4,917,554

TABLE 5

9.0 SHIPYARD

Most of the steel replacement will be required to be performed with the vessel out of the water. This would require that the vessel be placed in dry-dock for the duration of the repairs. It is recommended that any equipment that needs removal from the crew accommodations or crew galley would be removed when the main deck plating is removed. Other items such as the black water tank may also require removal while in the shipyard.

Bottom plate replacement may require the temporary removal of the main engines and reduction gears so that the welders will be able to access the steel under the foundations. Reinstallation of the main engines and reduction gears will require shaft alignment to be performed.

The estimate for the shipyard includes an estimate of cost to haul, block, man hours to replace the steel and re-launch the vessel including lay time. Lay time, which is the period of days the vessel is in dry-dock, ranges between approximately 9 and 11 months. The cost for lay time normally includes the cost for each day in the dry-dock including week ends. Additionally, this cost estimate includes an estimate of charges for crane use, staging and other shipyard costs which could increase the total shipyard cost by up to 30% more than just the steel replacement costs alone. Table 6 and Table 7 illustrate these estimates.

M/V Islander - Estimate of Manhours for Steel Replacement
USCG Requirement to Return to Service

LOCATION	Pounds	Divided by 1000 lbs	Man Hours per 1000 lbs	Manhours
Hull	58,322	58	200	11,664
Hull - Inaccessible	14,124	14	200	2,825
Hull	3,142	3	200	628
Bulkheads	5,876	6	200	1,175
Seachests	1,503	2	200	301
Main Deck	151,563	152	150	22,734
Mezzanine Deck	6,597	7	150	990
Boat Deck	73,067	73	150	10,960
Deck Housetops	13,464	13	150	2,020
Deckhouse Bulkeads	2,525	3	150	379
3" Flange Plate	36,016	36	170	6,123
5"X3"angle	12,404	12	170	2,109
8"x2-1/4" channel	168	0	170	29
Total Weight	**378,771**		**Total Manhours**	**61,936**

Total Manhours	Divided By 8 Hour Days	Divided by 30 Man Work Crew	5 Day Work Weeks	Months
61,936	7,742	258	52	13

Shipyard Cost

Lay Days	$2000 per day	Haul	Launch	SubTotal
364	$ 728,000	$ 11,000	$ 11,000	**$ 750,000**
(52 weeks @ 7 days per week)		**Shipyard other items**	**50%**	$375,000
			Total	**$1,125,000**

Table 6

M/V Islander - Estimate of Manhours for Steel Replacement
USCG Requirement to Return to Service Plus 10 Year Potential Service Life

LOCATION	Pounds	Divided by 1000 lbs	Man Hours per 1000 lbs	Manhours
Hull	80,560	81	200	16,112
Hull - Inaccessible	32,956	33	200	6,591
Hull	4,928	5	200	986
Bulkheads	5,876	6	200	1,175
Seachests	1,503	2	200	301
Main Deck	170,491	170	150	25,574
Mezzanine Deck	6,597	7	150	990
Boat Deck	77,123	77	150	11,569
Deck Housetops	13,464	13	150	2,020
Deckhouse Bulkeads	2,525	3	150	379
3" Flange Plate	39,618	40	170	6,735
5"X3"angle	81	0	170	14
8"x2-1/4" channel	2	0	170	0
Total Weight	**435,724**		**Total Manhours**	**72,444**

Total Manhours	Divided By 8 Hour Days	Divided by 30 Man Work Crew	5 Day Work Weeks	Months
72,444	9,055	302	60	15

Shipyard Cost

Lay Days	$2000 per day	Haul	Launch	Total
420	$ 840,000	$ 11,000	$ 11,000	**$ 862,000**
(60 weeks @ 7 days per week)		**Shipyard other items**	**50%**	$431,000
			Total	**$1,293,000**

Table 7

10.0 SAFETY

The life saving and safety equipment found onboard is in various conditions. The life rings and fire axes were either missing or in a state of disrepair. The life jackets were checked and found to be old fashioned but usable. The IBA's were all expired and need to be serviced or replaced. Fire hoses, fire pumps, nozzles and the sprinkler system were not tested as a result of the water systems being drained and winterized. All of the fire extinguishers including the CO2 system are out of their service dates and need to be inspected and serviced. The First Aid kits are expired.

The COI expires on May 9, 2008. However, the COI requires that the hull be examined by April 30, 2008. If the vessel is not examined and the COI maintained, it will expire and according to the USCG Marine Safety Manual, Vol II[20], the vessel may then have to be inspected as a new vessel meeting all of the newest regulations for Sub chapter H including but not limited to:

- Two compartment standard of subdivision and damage stability instead of its existing one compartment standard (will require additional watertight bulkheads in the hull),
- New alarm systems, navigation equipment and electrical wiring requirements (will most likely require replacement of all related existing systems including any original electrical wiring),
- Complete removal of the below main deck crew accommodations and galley if they will not be utilized and the elimination of any sources of fire and combustible material (all ventilation, wiring and piping in these spaces must be removed and blanked off),
- Upgraded stability criteria including increased per passenger weight and a new stability test (this may reduce the total passenger capacity),
- Removal of all existing non-compliant watertight doors in the main watertight bulkheads (alternate means of access will be required down through the main deck),
- Any items that were previously grandfathered would be null and void (such as structural fire protection, ventilation systems, passenger space outfitting, etc.)

Excerpt from the USCG Marine Safety Manual:

> Certificates are normally issued for the maximum period specified in the applicable regulations. A vessel is certificated on its ability to meet the minimum safety standards set forth in the regulations. Under existing law, any vessel meeting these standards is entitled to a full-term certificate. A vessel unable to meet the minimum standards shall be required to correct its deficiencies prior to certification or, if the deficiencies are minor and do not make operation of the vessel unsafe, be granted reasonable time in which to make the necessary corrections. An owner may surrender the COI and apply for inspection for recertification at any time prior to the expiration date. The conditions under which certain vessels on foreign voyages may return to the U.S. with expired certificates are discussed in paragraph B1.C.7 below.
>
> A vessel for which the COI has lapsed, regardless of circumstances or reasons, may be required to undergo inspection for certification as a "new vessel" if the owner/operator desires to place the vessel back into certificated service. A determination as to the type and extent of inspection requirements appropriate will be made by the cognizant OCMI after having given due consideration to the circumstances giving rise to

[20] USCG Marine Safety Manual, Vol. II: Materiel Inspection, *SECTION B: DOMESTIC INSPECTION PROGRAM, CHAPTER 1:INSPECTION OF VESSELS FOR CERTIFICATION*, May 21, 2000, Page B1-3

> the vessel's out-of-service period. Environmental conditions such as fresh water, saltwater or Drydock lay-up as well as any structural modifications made to the vessel will be critically evaluated. The OCMI may, at his discretion, require a formerly certificated vessel to be inspected as a new vessel regardless of its former status as a certificated vessel. Such vessels would no longer be afforded exemption from regulatory requirements that may have been derived under "grandfather" provisions provided by law, regulation, or policy. A vessel that was once certificated does not qualify indefinitely as an "existing" vessel, especially when it has been structurally modified and/or out of service for an extended period. A vessel whose COI has lapsed will be required to meet those inspection for certification requirements determined to be appropriate by the issuing authority—the OCMI.

If the vessel is required to be "Inspected as New" as per the Marine Safety Manual, then the vessel will be required to meet additional EPA requirements. The EPA requirement[21] states that if the value of the vessel increases by more than 50% in value, that increase will require replacing the engines with new tier II or possibly tier III engines depending on when the actual conversion work takes place. The cost of removing and replacing the engines could exceed $1,000,000.

11.0 CONCLUSIONS

The ISLANDER is in very poor condition. The previous owners had used the vessel well beyond it's usable service life to the point were it was no longer able to serve as a viable passenger/vehicle ferry without investing millions of dollars on repairs and upgrades to keep it in service.

The vessels Certificate of Inspection (COI) is going to expire on April 30, 2008 if the ship is not dry-docked repaired and returned to service prior to May 9, 2008. If the COI is allowed to expire, then its repair, restoration and upgrade may have to be as a "New Vessel" requiring it to meet all of the most current subchapter H regulations.

This report provides an estimate of steel replacement weight and cost as well as some other rough order of magnitude (ROM) costs to return the vessel to service as is. The scope of this task does not include estimating the cost of reconstructing to "New Vessel" rules. This estimate also does not include any of the desired modifications required by GIPEC to upgrade the vessel for the Governor's Island service which would be addressed in phase II of the project.

The estimate of weight and cost for steel replacement has a high and low range that reflects the estimate of replacement steel in Windward Marine's audio gauge report and an estimate based on what Seaworthy believes will be required to replace in-kind according to NVIC 7-68. The higher price assumes in-kind replacement of the steel to original thickness plus the estimate for a 10 year life span based on its existing COI service without modifications. The lower price is the estimate of in-kind replacement to return the vessel to its existing COI service only without modifications. There are areas of the ship that could not be gauged or inspected and no one can accurately estimate what the exterior bottom of the ship is like until it is out of the water.

[21] 40 CFR, Chapter I Environmental Protection Agency, Part 94-2 Definitions, New Vessel section (1) (ii) July 7, 2007, Page 596

The estimate for the weight of steel requiring replacement ranges from 378,771 lbs to 449,527 lbs. The cost estimate for replacing the steel ranges from $4,100,000 to $4,900,000. This estimated cost is for the steel and labor to install. It does not include preparation, coatings and any surcharges by the shipyard and steel suppliers. Most of this steel replacement will be required to be performed with the vessel out of the water.

The estimate for the shipyard to haul, block, and re-launch plus lay time in the shipyard ranges between approximately 13 and 15 months on dry-dock. The cost estimate includes charges for crane use, staging and any other shipyard costs which could increase the cost by up to 50% more than just the steel replacement costs alone. This estimate ranges between $1,125,000 and $1,293,000.

The estimate for removal of failed paint coatings and repainting the vessel is estimated between $872,000 and $910,000. This estimate does not include the lay time for painting the vessel out of the water.

The snack bar/salon has an asbestos ceiling which must be removed at an estimated cost between $15,000 and $20,000.

An estimate has not been made on items that could not be tested and may need repair or replacement such as the plumbing systems, pumps and motors. Other items not included in the estimate are costs to replace seating, floor coverings, lighting, stair treads, doors or repairs to any item that the USCG may determine upon inspection of the vessel.

A summary of the estimated ROM costs to return the vessel to service without any upgrades before the expiration of the COI on April 30, 2008 is as follows:

Steel replacement	$4,100,000	to	$4,900,000
Coating renewal	$872,000	to	$916,000
Asbestos removal	$15,000	to	$20,000
Shipyard	$1,125,000	to	$1,293,000
Safety Equipment	$39,000	to	$96,000
Estimated Totals	$6,151,000	to	$7,225,000

GIPEC may want to consider other issues as well prior to making any final decision on steel replacement. The ISLANDER has not been re-zoned for service in New York. To return the ISLANDER to its existing COI service (which presently does not include Governor's Island) would require that all items onboard the vessel are in operating condition. That would include all of the HVAC, ventilation systems and galley equipment found below the main deck in the crew galley, crew accommodations and up in the salon/snack bar. If GIPEC chose not to use these spaces for the GI service, the equipment, wiring and piping would have to be removed in their entirety and the spaces be returned to void spaces. As a result of this change, a new stability test may be required. If the COI is allowed to lapse, as it surely will, then to return the ISLANDER to service, it must meet "New Vessel" regulations and the initial part of the recertification process if to submit a complete set of drawings and calculations to the USCG for approval. No such plans or calculations are known to exist for the ISLANDER so they must be created at considerable expense.