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March 30, 2016
File No.: 16-0229

Town of Tisbury
Office of the Harbormaster
P.O. Box 1239
Vineyard Haven, MA 02568

Attn: Harbormaster Jay Wilbur

ULTRA-SONIC INSPECTION SURVEY REPORT

INTRODUCTION

Marine Safety Consultants, Inc. has undertaken an ultra-sonic survey of select points on the TASHMOO pump out boat and the VINEYARD HAVEN pump out boat while hauled ashore and trailered in TISBURY, MA on March 28, 2016, in accordance with our February 10, 2016 proposal.

ULTRA-SONIC GAUGING

In a manner analogous to a shipboard fathometer measuring depth (water thickness), an ultra-sonic gauge determines thickness by the "pulse-echo technique". A precise timing circuit clocks the interval required for a sound pulse to propagate through the test material, reflect from its back wall or inside surface, and return again to the front face of the object. The gauge logic then multiplies this interval by the sound velocity of the test material and converts the total sound path distance into a digital readout of the material thickness in English units. All gauge readings presented in the accompanying sketches are reported as thousandths of an inch (0.000").

The ultra-sonic instrumentation is calibrated for the type of material to be inspected by setting the sound velocity adjustment. This calibration can then be verified with a standard test block or a sample of known dimension. The test material is dabbed with a sound-conducting couplant and the transducer is held firmly in contact with that surface, producing a digital display of the measured thickness.

A satisfactory inspection surface must be prepared before any ultra-sonic measurement by removing marine growth, scale, rust or loose coating. Gauging can be conducted through a tightly bonded paint or epoxy coat, using equipment equipped with "echo-echo" and "multiple echo" measuring capabilities. In this case, external readings were taken through the vessel's bottom coatings.

INSPECTION PROCEDURE

Ultra-sonic measurements were made with a Dakota MMX-6 digital thickness gauge. This is a multi-mode Ultrasonic thickness gauge. The multi-mode allows the user to toggle between pulse-echo and echo-echo modes. The MMX-6 is capable of measuring the thickness of various materials with accuracy as high as $\pm$ 0.001 inches. All readings were made with Ultragel II couplant.

A standard block was used as a reference and the instrumentation readout adjusted to correspond to the exact measurement. Instrument calibration was continually verified by monitoring this reference standard. No instrument "drift" was detected.

Field work and data reduction were performed under the direction of an experienced surveyor fully qualified as an ultra-sonic technician.

TASHMOO pump out

Our external bottom ultra-sonic gauge of this vessel included 10 transverse stations. Readings were taken at each station from the centerline outboard along the bottom and up the vessel's sides. The transverse stations start at the stem and extend aft in 2' intervals. Additional readings were taken on the vessel's transom and around previously repaired areas on the starboard aft bottom plate.

VINEYARD HAVEN pump out

Our external bottom ultra-sonic gauge of this vessel included 10 transverse stations. Readings were taken at each station from the centerline outboard along the bottom and up the vessel's sides. The transverse stations start just aft the forward weld seam and extend aft in 2' intervals. Additional readings were taken on the vessel's transom and around previously repaired areas on the starboard aft bottom plate.

INTERPRETATION OF RESULTS

Although there are no published standards available to use as basis for evaluating this vessel, the usually recognized standards for steel hull vessels published by the American Bureau of Shipping, allows **up to 25%** wastage on steel vessels.

TASHMOO pump out

The original, as-built, plate thickness on the bottom and sides is unknown but appears to be mostly 5mm (.196") with a small section of 6mm (.236") plate on port aft bottom. Using these as base numbers, it was found that the amount of overall wastage suffered by this aluminum hull structure has been about **5%.**

The hull has had several external steel repairs "doublers" on the starboard aft bottom. It had been reported to us that the hull had pits in these areas. Our survey of the hull plate around these locations found the metal to be near full thickness and to be in very good condition with overall wastage near 7%.

The hull is configured to only have access to one internal compartment which is located below the helm station. A survey of this compartment found light corrosion and a trace amounts of water. We found evidence of light corrosion on aluminum bottom plate consistent with the observed bilge water. We located one (1) heavy pit below vessel wiring which had been repaired by an external doubler. No other heavy pitting was observed from the internal access.

Bilge access from helm hatch

Circular mark is location of old pit and external weld

VINEYARD HAVEN pump out

The original, as-built, plate thickness on the bottom and sides is unknown but appears to be ¼" (.250"). Using these as base numbers, it was found that the amount of overall wastage suffered by this aluminum hull structure has been about **5%.**

Our survey of the external hull found external paint coatings in very good condition with no evidence of past hull repairs or damage. Internal bilge access is limited. Where visible the internal hull plate was found to have typical light corrosion, but no heavy pitting.

REMARKS/ RECOMMENDATIONS

TASHMOO pump out

We found this hull to be in overall very good condition with approximately 5% overall wastage.

It has been our experience with aluminum hulled vessels that pitting similar to the pits experienced by this vessel in the past can be the result of many different factors including:

- Electrical problems
- Dissimilar metals in bilge
- Standing saltwater and debris in void spaces
- Defect in aluminum plate from manufacturer

It has been reported to us that this vessel was once powered by an inboard engine and that there may have been an electrical issue at that time. In addition it is reported that steel bolts had been removed from the bilge when the pits had been discovered. The pits experienced by this vessel in the past could have been directly related to these two (2) previously reported problems.

At the time of our survey we found some standing water in only accessible internal void just below the helm. We recommend you consider washing down this bilge space with freshwater and maintaining this space clean and dry to prevent future corrosion and pitting.

VINEYARD HAVEN pump out

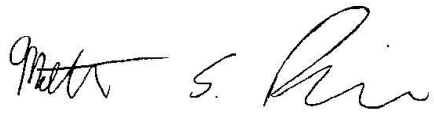
We found this hull to be in overall very good condition with approximately 5% overall wastage.

At the time of our survey we found the bilge dry with evidence of typical light corrosion. We recommend the internal spaces be maintained clean and dry.

With a continued focus on maintenance it is our opinion these pump out vessels will see many more years of useful service.

This report is based on examination of the vessel, and of those parts, spaces and equipment that could be sighted without removals or operation, and is rendered without bias or prejudice. In accepting same, it is agreed that the extent of obligation of this surveyor, with respect thereto, is limited to furnishing a competent survey, and in the making of this report, this surveyor is acting on behalf of the person or firm requesting same and no liability shall attach to this surveyor, for the accuracy, errors and/or omissions therefore.

Submitted without prejudice,
MARINE SAFETY CONSULTANTS, INC.



Matthew S. Pawlishen
Marine Surveyor

Enclosures: 1. Diagrams
2. MSC, invoice (under separate cover)

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VESSEL: **TASHMOO Pump Out** DATE OF SURVEY: 3/28/2016 FILE NO.: 16-0229

HULL READINGS

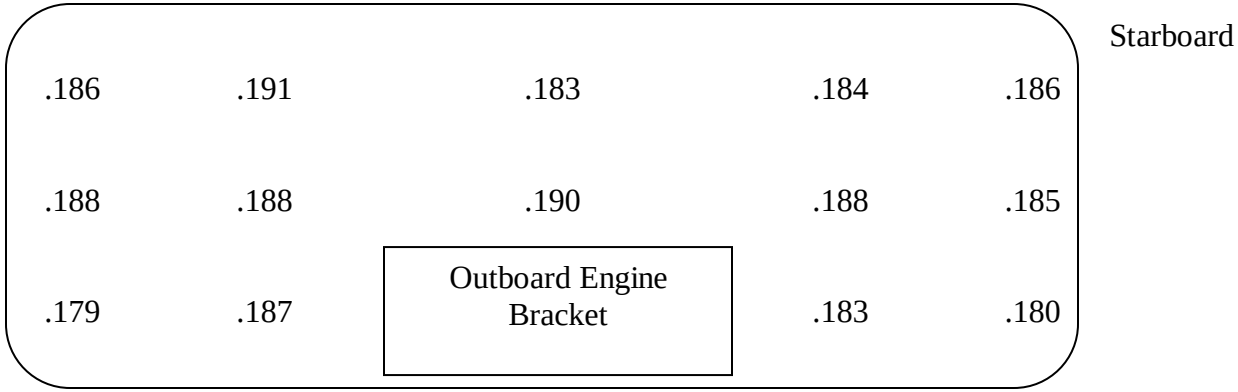
Starboard Side

Stem	2	3	4	5	6	7	8	9	10	
	.193	.191	.191	.192	.189	.191	.192	.191	.193	Side
.191	.193	.192	.192	.191	.189	.186	.186	.186	.194	Side
		.180	.187	.185	.184	.185	.187	.187	.183	Chine
			.180	.182	.184	.180	.184	.184	.178	Bottom
		.184	.180	.187	.187	.181	.182	.182	.181	Bottom
.181	.183	.184	.179	.182	.183	.183 .184	.179	.182	.178	Bottom
								.235	.237	Centerline
.185	.184	.185	.183	.183	.184	.184	.189	.238	.239	Bottom
		.184	.182	.181	.181	.184	.184	.182	.178	Bottom
		.192	.182	.184	.184	.180	.186	.182	.181 .181	Bottom
		.193	.182	.185	.190	.187	.188	.185	.185	Chine
.192	.192	.192	.192	.192	.192	.191	.194	.192	.195	Side
	.191		.194	.190	.190	.190	.190	.189	.191	Side

Portside

VESSEL: **TASHMOO Pump Out** DATE OF SURVEY: 3/28/2016 FILE NO.: 16-0229

STERN READINGS



VESSEL: **VINEYARD HAVEN Pump Out** DATE OF SURVEY: 3/28/2016 FILE NO.: 16-0229

HULL READINGS

Starboard Side

1 Just aft weld seam	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 At Rudder**	
.239	.238	.238	.239	.241	.240	.239	.239	.238	.241	Side
.237	.239	.239	.240	.241	.242	.240	.242	.245	.241	Side
.236	.240	.240	.240	.238	.236	.239	.238	.237	.236	Chine
	.242	.242	.240	.239	.241	.238	.242	.239	.240	Bottom
.240	.240	.240	.239	.240	.242	.242	.240	.239	.238	Bottom
	.239	.239	.238	.240	.241	.239	.236	.241	.238	Bottom
										Centerline
.240	.236	.237	.239	.237	.238	.240	.240	.241	.239	Bottom
.240	.239	.242	.238	.239	.238	.242	.240	.239	.240	Bottom
	.240	.240	.241	.237	.240	.240	.240	.238	.241	Bottom
.240	.236	.240	.242	.238	.238	.238	.237	.238	.238	Chine
.239	.232	.238	.239	.239	.238	.237	.237	.239	.240	Side
.240	.240	.238	.232	.240	.237	.236	.237	.239	.238	Side

Portside

VESSEL: **VINEYARD HAVEN Pump Out** DATE OF SURVEY: 3/28/2016 FILE NO.: 16-0229

BOW READINGS