



# PT-305 RESTORATION FOR OPERATIONAL PASSENGER SERVICE

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April 19, 2017

Mark Masor

Naval Architect, Gibbs & Cox, Inc.

Museum Volunteer

# Agenda

- Introduction
- History
- Project Timeline
- Restoration
- Underway





# Restoration Overview

- Objectives
  - Historically accurate
  - Operational
  - Passenger certification
- Volunteer workforce

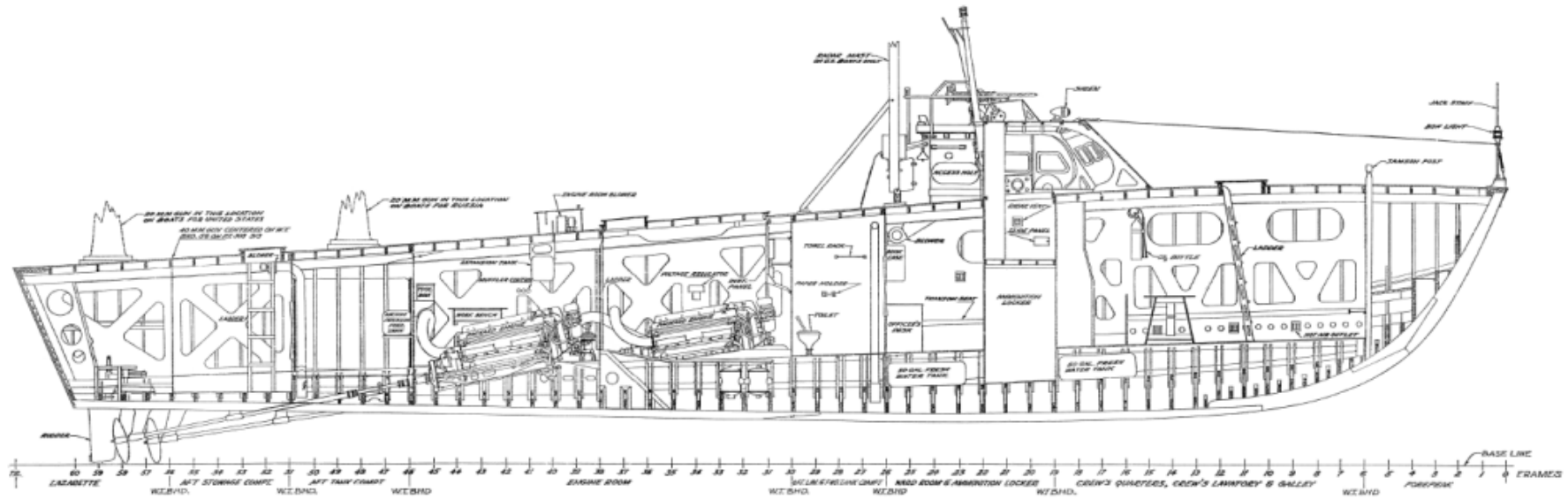


## PT-305 Vessel Particulars

- Motor Torpedo Boat
- Hull type: hard-chine planing
- Hull material: wood
- Length: 78'
- Beam: 20' 8"
- Draft: 6'
- Displacement, Full Load: 49 long tons
- Top Speed: 41 kts
- Cruise Speed: ~25 kts
- Propulsion: 3 x 1,500 HP engines
- Fuel: 3000 gal, 100 octane aviation gasoline
- Range:
  - >500 nm @ 25 kts
  - >250 nm @ 41 kts



# Inboard Profile



Lazarette
Aft Stow. Compt.
Aft Tank Compt.
Engine Room
Fwd Tank Compt.
Ward Rm and Ammo Locker
Crew's Quarters and Galley



# PT-305 HISTORY

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# Higgins Industries, City Park Plant



# Production



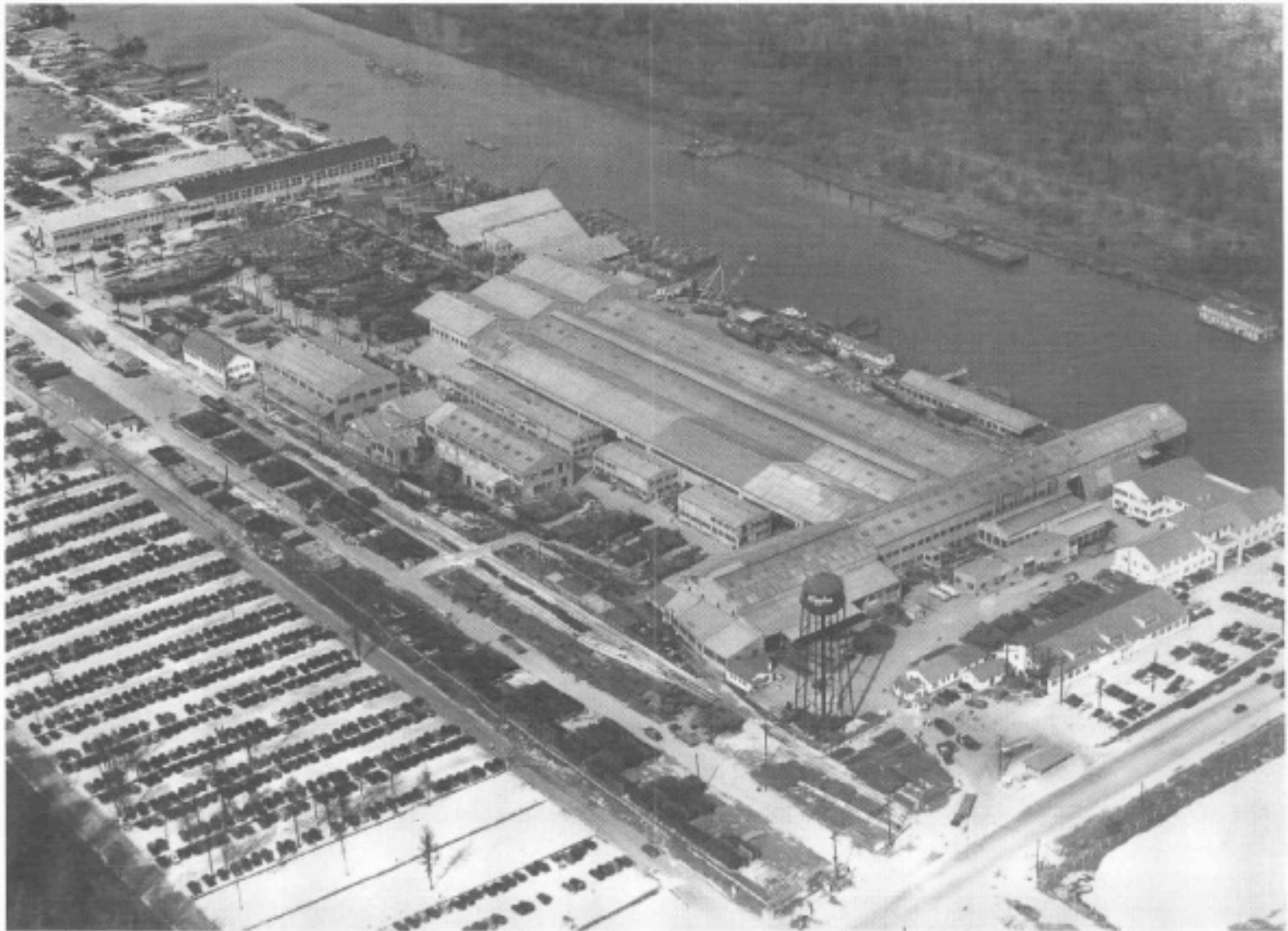


## From City Park to Bayou St John





## Higgins Industries, Industrial Canal Yard



## Higgins Industries, Industrial Canal Yard



# Higgins Industries WWII Production Data

Workforce	<ul style="list-style-type: none"><li>• 75 to 20,00 workers in 5 years</li><li>• First fully integrated working force of women and men, African Americans and Whites in New Orleans</li></ul>
Production Rates	<ul style="list-style-type: none"><li>• ~20,000 boats between 1940-1945</li><li>• 18 LCVP landing boats per day</li></ul>
PT Cost, lead hull	<ul style="list-style-type: none"><li>• \$124,000 or \$1.7 Million Current Dollars</li></ul>

## Further Reading :

- Graham Haddock and Robert Latorre “A Look Back on 1942 Combatant Production: An Example of Successful Employee Empowerment at Higgins Industries”
- Jerry E. Strahan, “Andrew Jackson Higgins and the Boats That Won World War II

# PT-305 SERVICE HISTORY

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# PT-305, aka "Half Hitch", "Barfly", "USS Sudden Jerk"

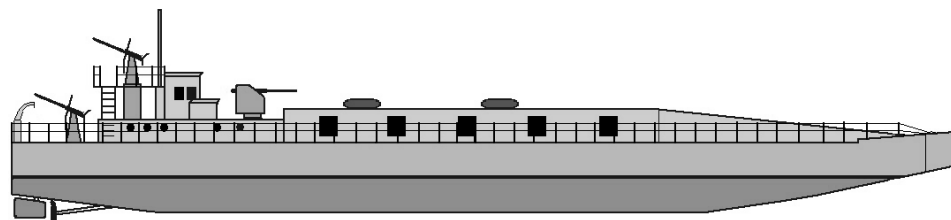


- Mediterranean Theater of Operations
- 12-ship squadron
- 1944 to end of war
- 15 men crew



# PT-305 and RON 22

June 18, 1944, Invasion of Elba

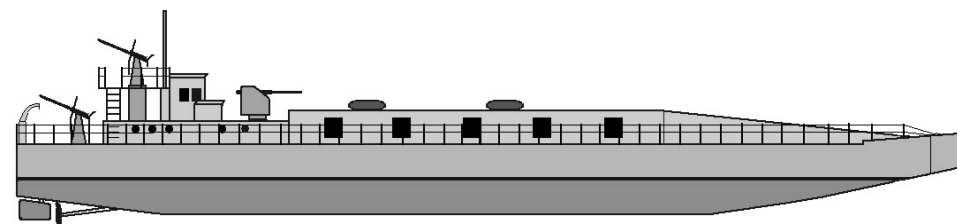
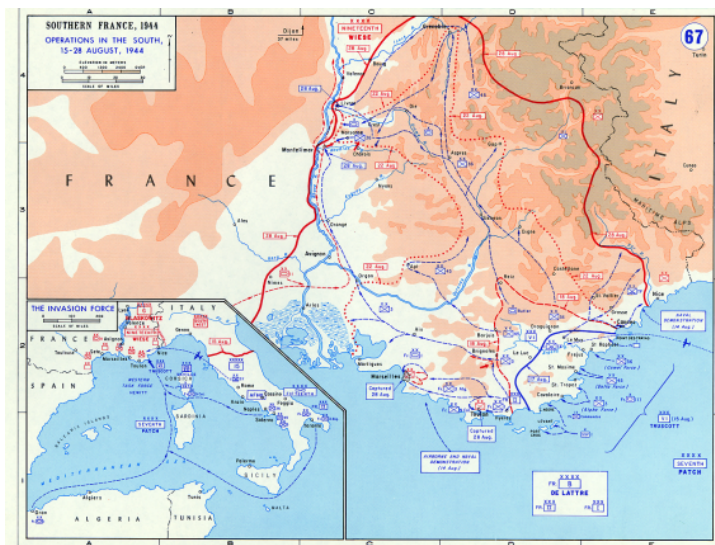


July 18, 1944

PT-305 sinks a German Flak-lighter  
Palamaria Island, Italy

# PT-305 and RON 22

**August 15, 1944, Operation Dragoon, the invasion of Southern France**

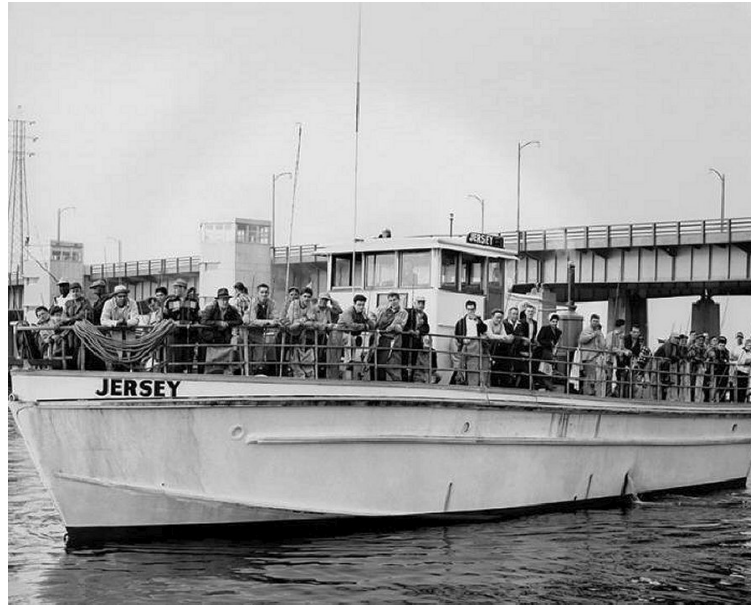


September 15, 1944  
PT-305 sinks a German Flack-lighter  
Point Del Mesco, Italy



April 24, 1945 –  
PT-305 sinks an Italian MAS boat  
Cape Della Arma, Italy

# Post-War





# PROJECT TIMELINE

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## 2007 Acquisition





# 2009 Restoration Begins





# 2011 Move to Kushner



# 2012 Full-rate Restoration



2012  
USCG  
Certification

10 June 2012

1

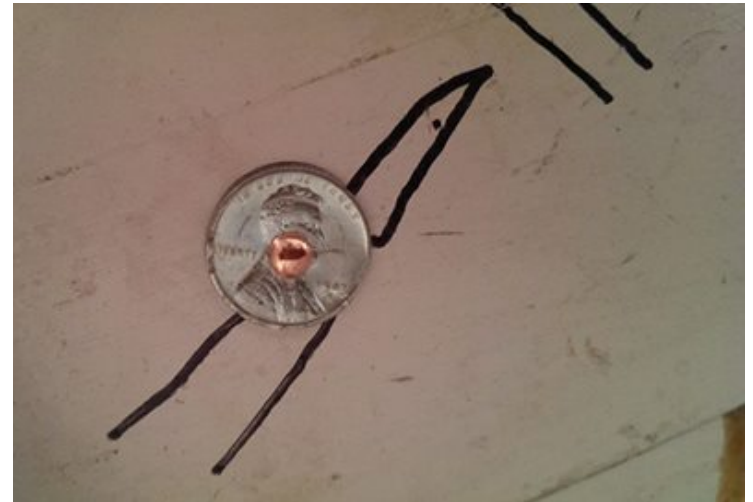


## PT-305 RESTORATION PROJECT VESSEL INSPECTION & CERTIFICATION

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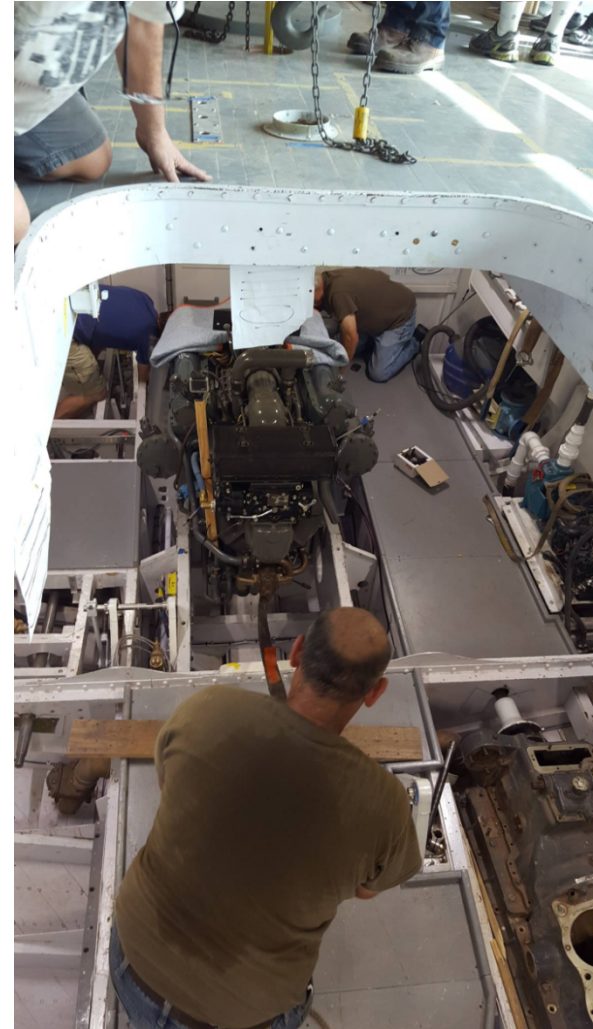
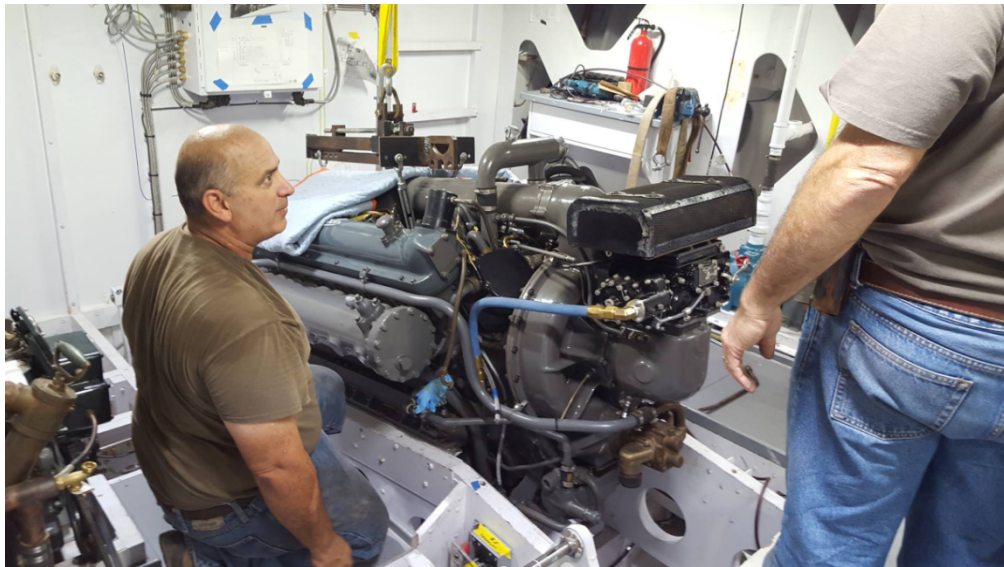
Kick-Off with U.S. Coast Guard Eighth District  
June 2012

2014  
Hull  
Complete





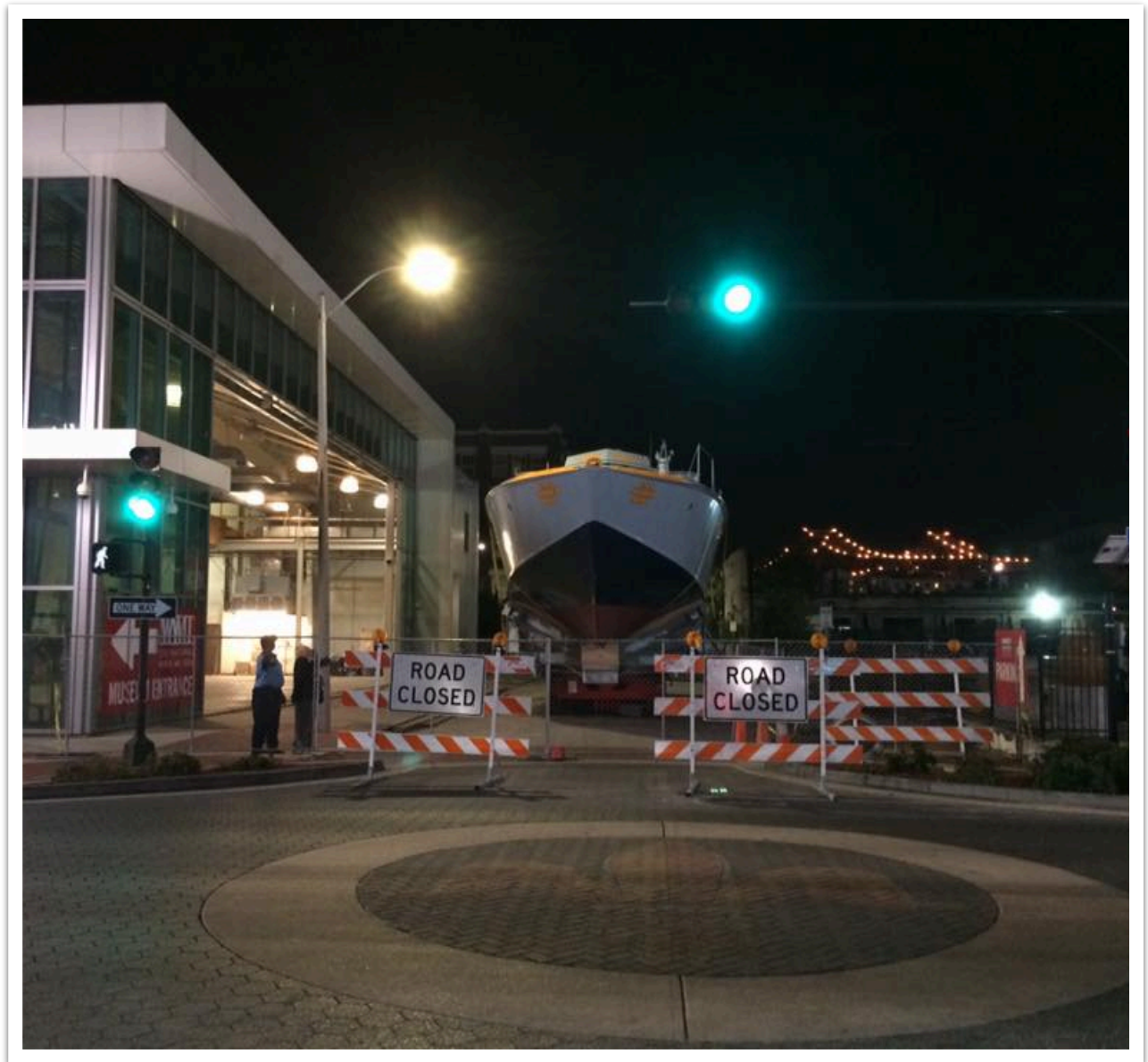
# 2015 Engine Installation



# 2016 Final Outfitting



November 18th  
2016  
Move from  
Kushner  
Restoration  
Pavilion





# Crawl to Port NOLA



# Transfer to Barge

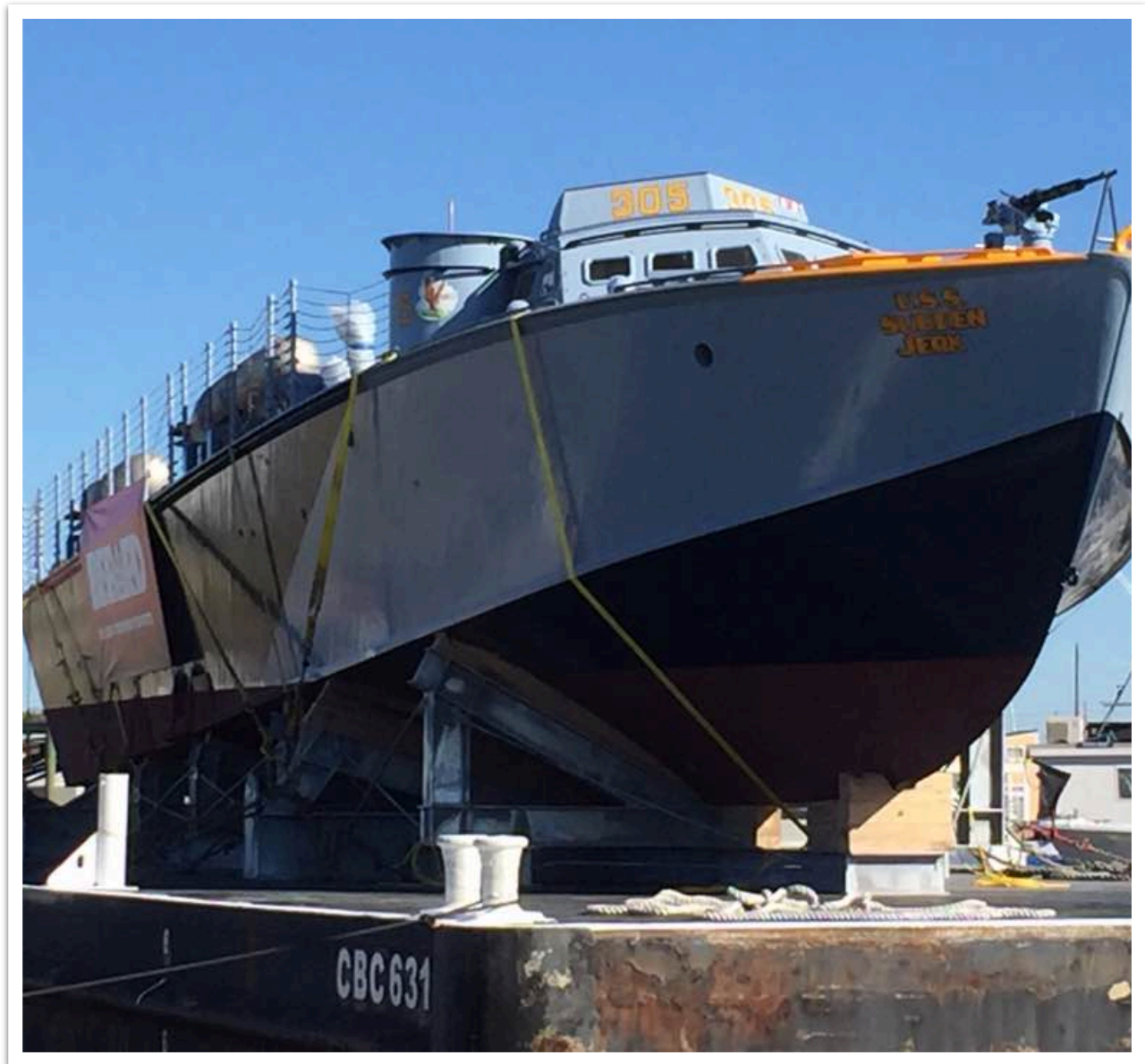




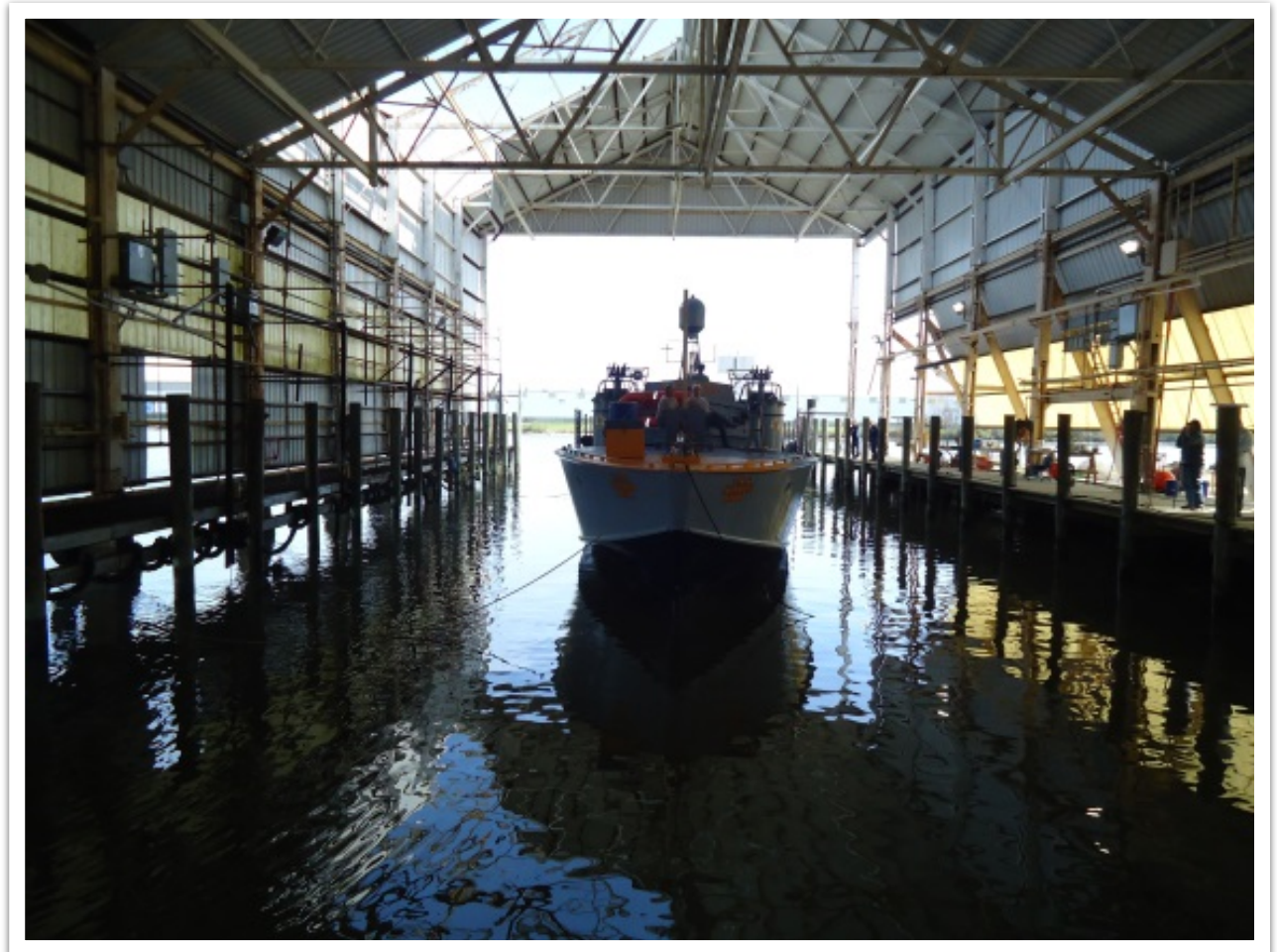
## Transit on Mississippi



# Arrival at Seabrook Marina



## Shakedown at Trinity Yachts





## Transit to Boat House



Boat House on  
Lake  
Pontchartrain



## Arrival at Boat House



# RESTORATION

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# What made the restoration of PT-305 uniquely challenging?

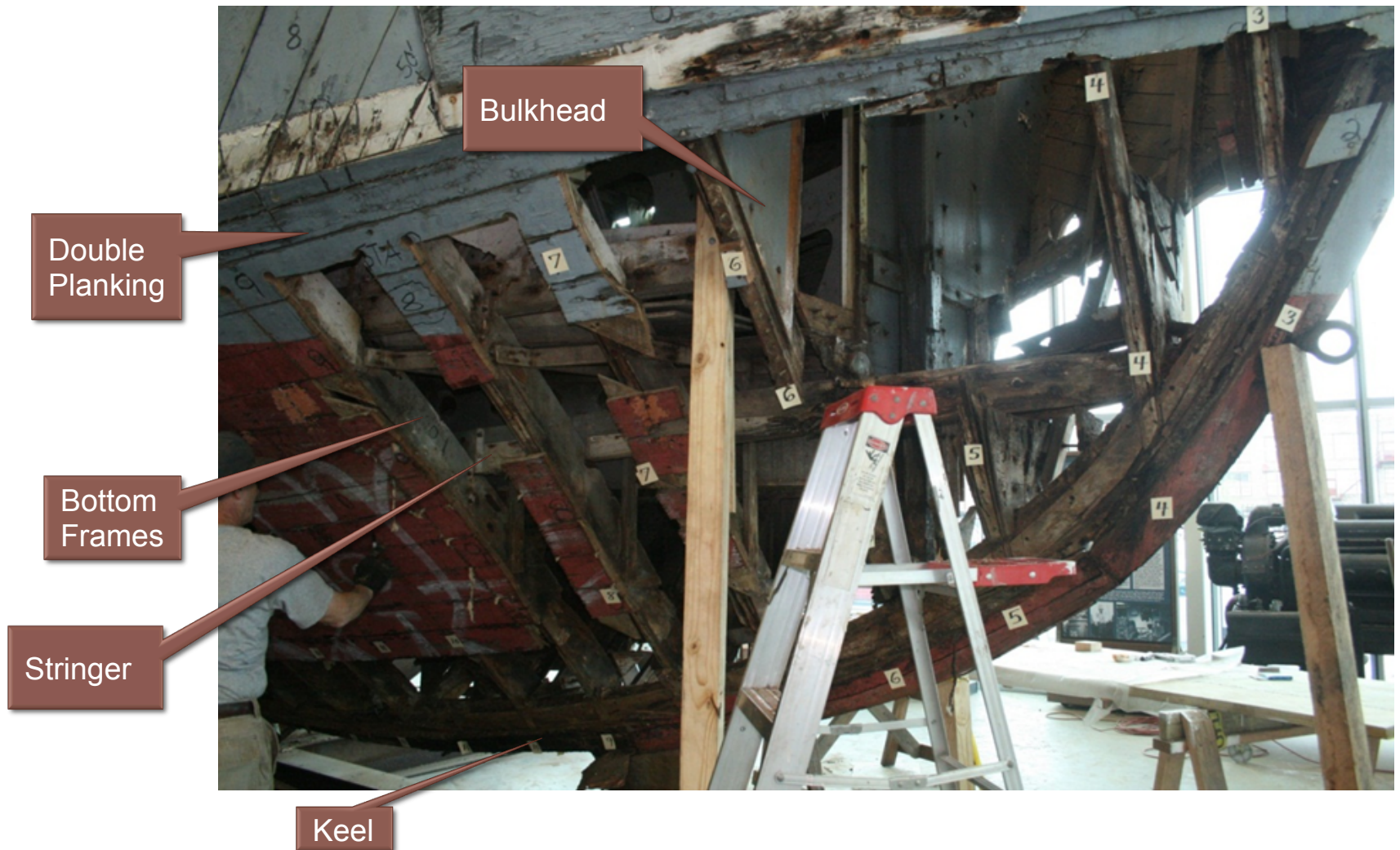
- Planing high performance vessel
- Aviation gasoline (Avgas)
- War boat to passenger boat
- Coast Guard certification
  - Subchapter T (small passenger vessels)





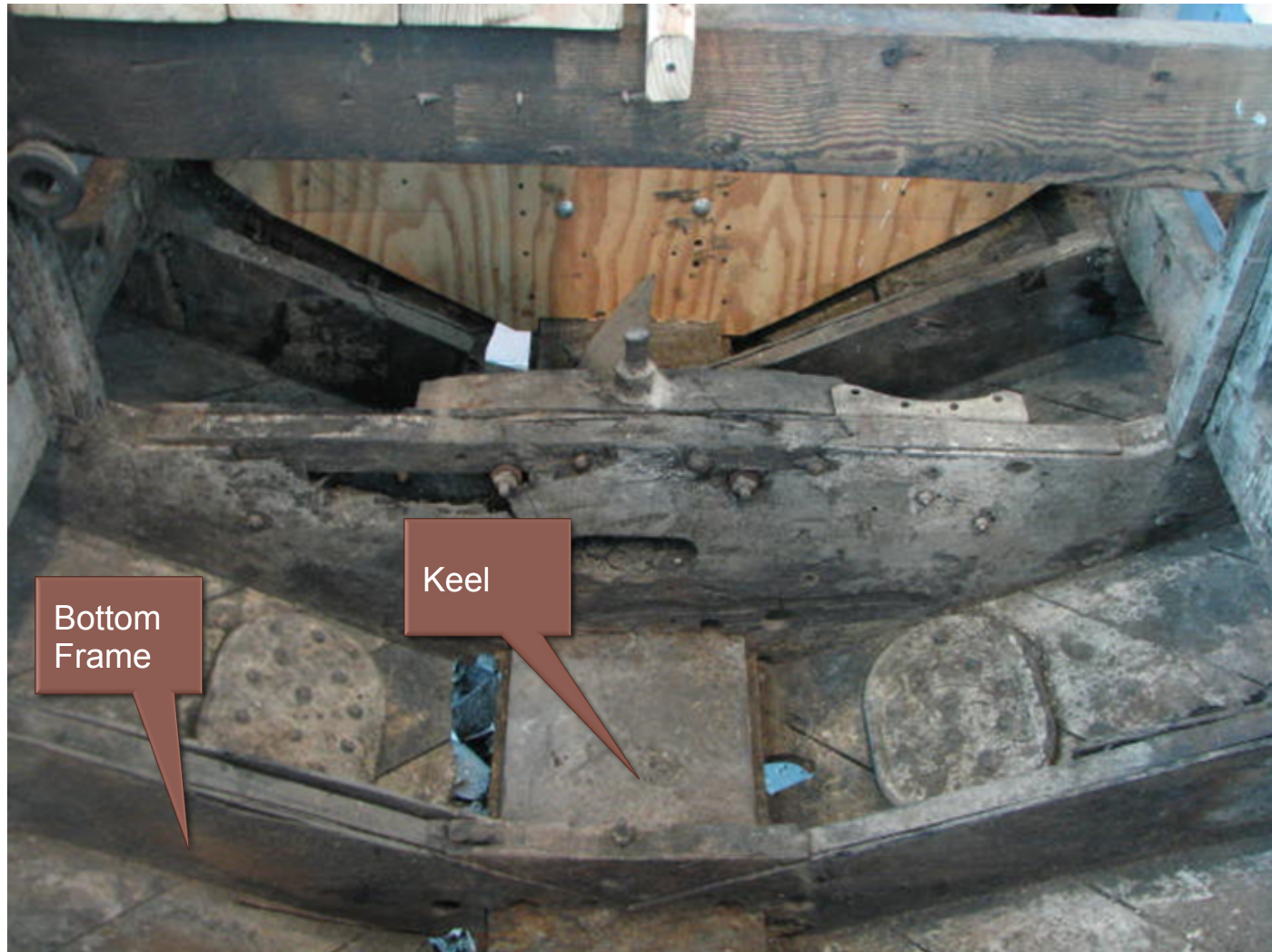


# Wood Construction

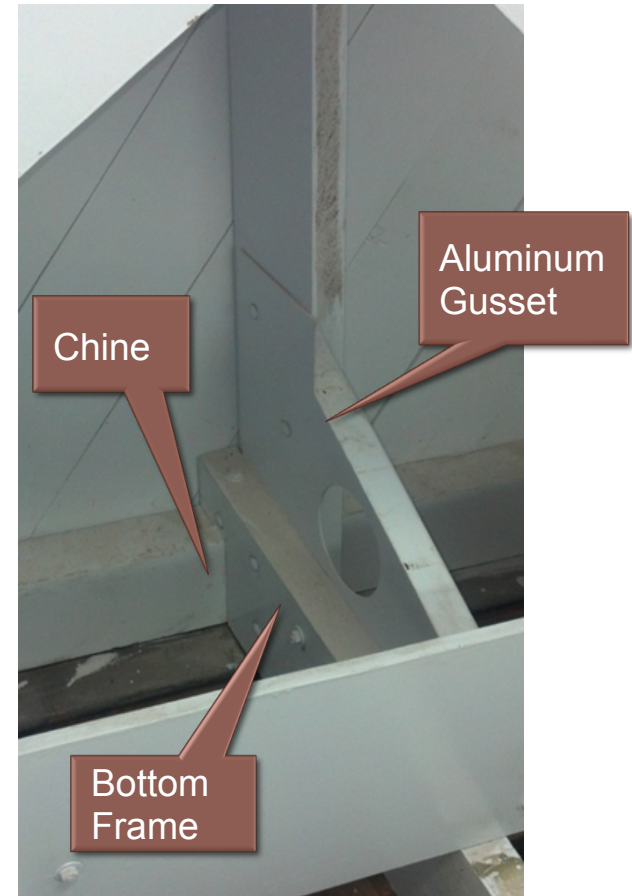
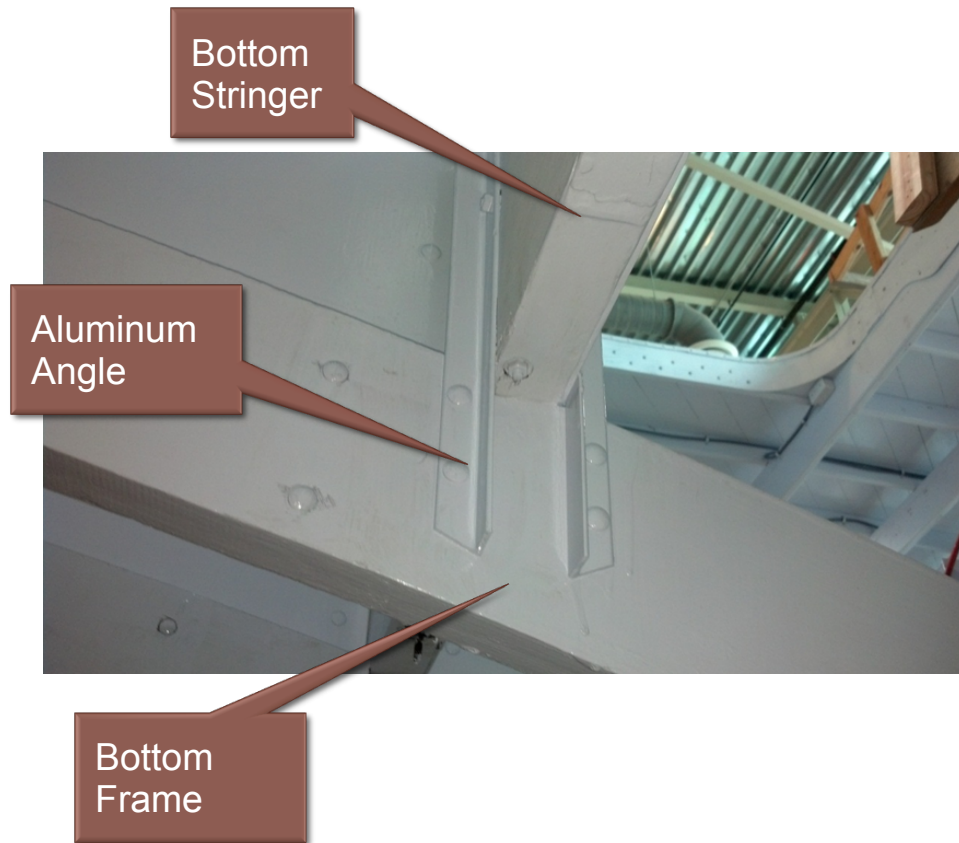




# Wood Construction



# Wood Construction



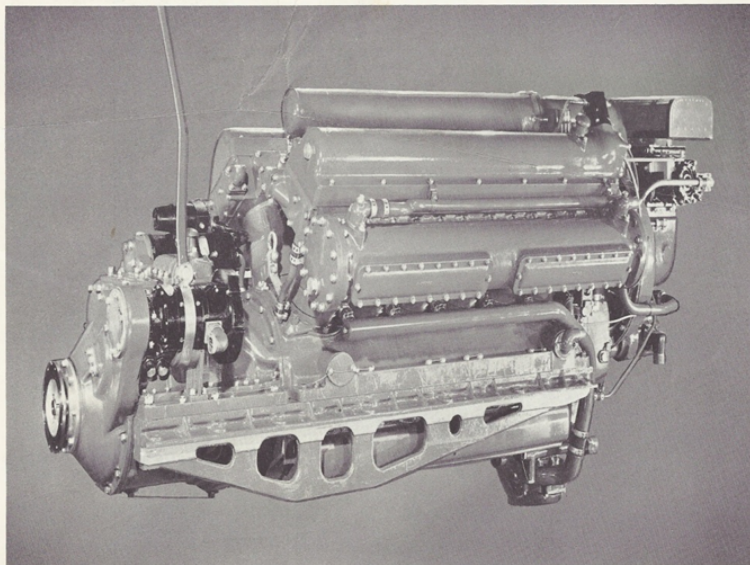


# Wood Construction



# Package 4M-2500 Engines

<b>Cylinders:</b>	12 - V angled arrangement
<b>Supercharger:</b>	Gear driven - centrifugal
<b>Cooling:</b>	Fresh water
<b>Maximum RPM:</b>	2400 rpm, 2000 rpm sustained
<b>Rating:</b>	1500 HP

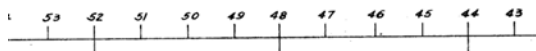
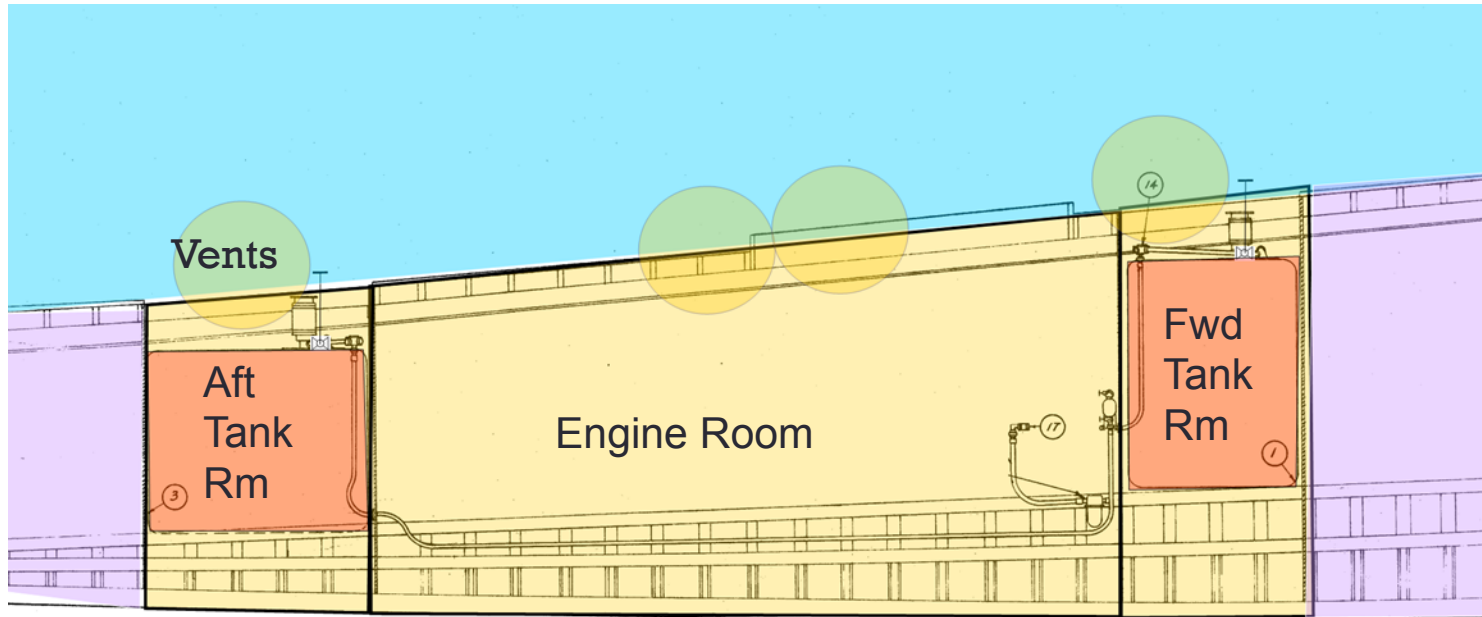


*The 4M-2500 Packard Marine Engine is a powerful, high-speed supercharged, light-weight engine of the aviation type, and requires the same exacting care in operation, maintenance and overhaul as would be given a modern aircraft engine. With its built-in reverse gear, the engine comprises a complete marine power plant.*



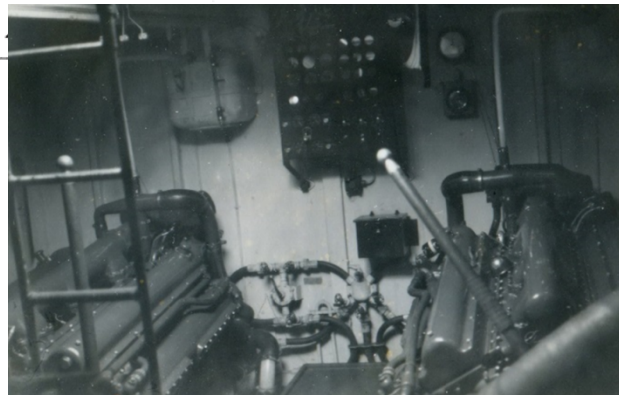


# Avgas Fuel System



**Hazardous Zone**

**Liquid Fuel Space**



# Avgas System Safety

Element	Existing Safeguards and Risk Mitigation	Added Safeguards for Passenger Service
Avgas Service System	Non-ferrous materials, flame screens	USCG A1 hoses, remote shut-off valves
Tanks	Aluminum vented tanks	Increased wall thickness and vent sizing
Ventilation	Powered bilge exhaust	Ignition Protected with increased CFM
Spark/ignition protection	Proximity only	Class 1 Division 2 components
Vapor Detection	Manual and portable “sniffers”	Bilge and ventilation system with remote monitoring and shut-offs
Fire detection	None	Smoke, flame, & heat detectors
Firefighting	CO <sub>2</sub> system	Modernized USCG approved engineered system
Operational	Procedures	Ops Manual and training



# Auxiliary Fluid Systems

- Seawater
- Bilge
- Firemain
- Potable
- Sewage
- Diesel



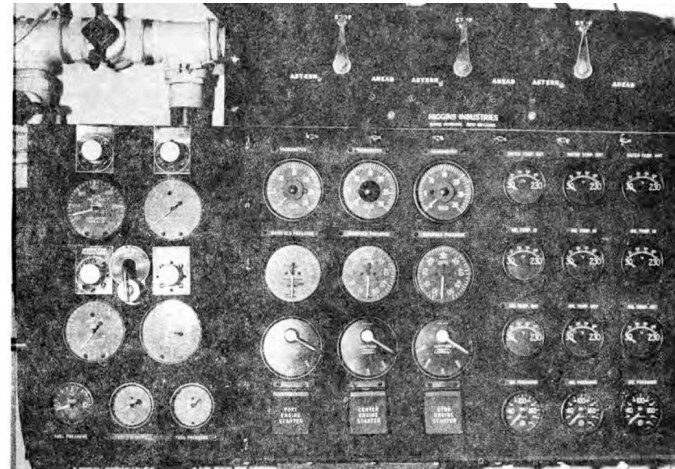
# Electric Power and Lighting Systems

- 24 VDC System
- 60 Hz AC System

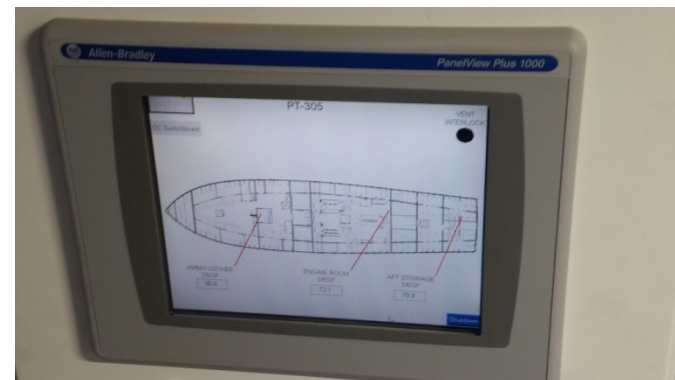


# Monitoring and Control

- Enhanced Monitoring:
  - Fire Alarm Control Panel
  - Smoke/Heat/Flame
  - Bilge
  - Flammable Gas
  - Watertight Doors
- Interlocks
  - Engine start and vent
  - CO<sub>2</sub> and vent



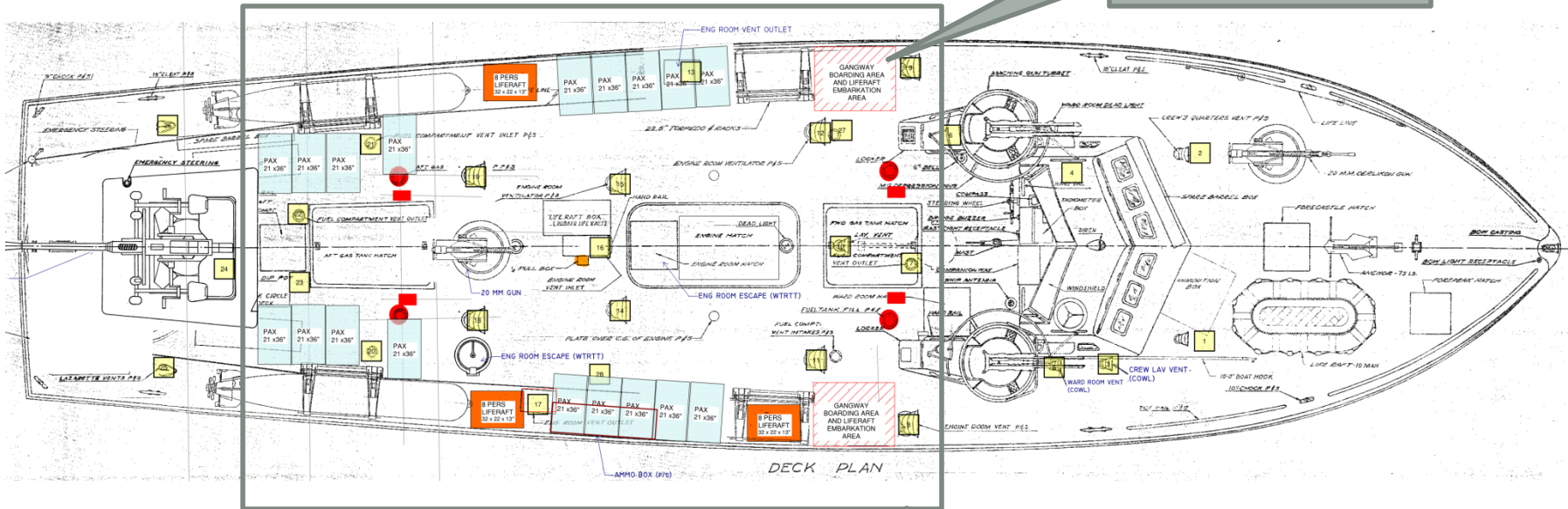
Original Instrument Panel



PLC Interface

# New Topside

Gangway Embarkation



Passenger area protected by lifelines

**Seating: 18 PAX**



# WRAP-UP

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# Operational Planning and Crew Training

COMMANDER MOTOR TORPEDO BOAT SQUADRON 22

SERIAL C-2 12 JUNE 1944

ACTION REPORT NO 2 - NIGHT OF 30/31 MAY 1944.

PT'S BASED AT BASTIA ATTACKED ENEMY DESTROYER AND CORVETTE WHEN 5 MILES S OF

80724

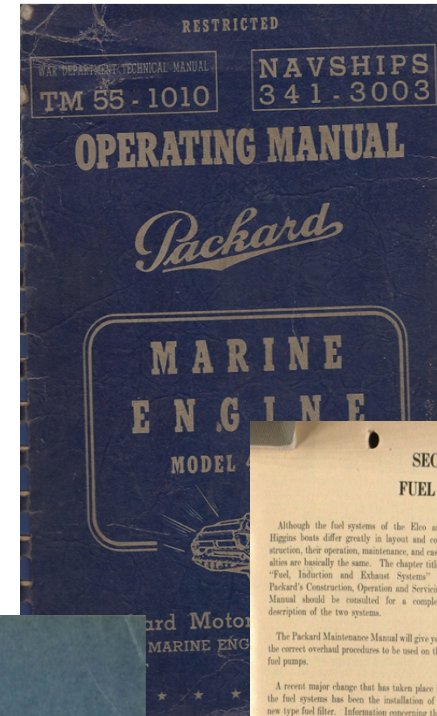
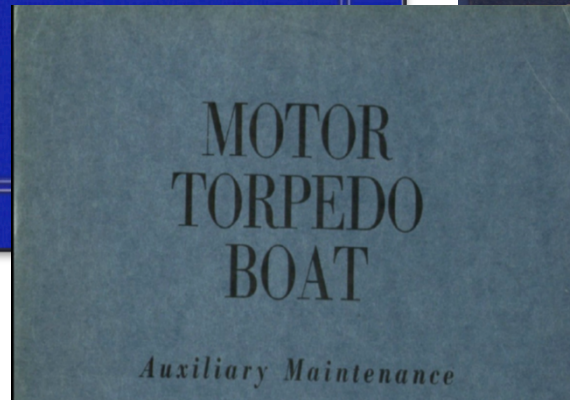
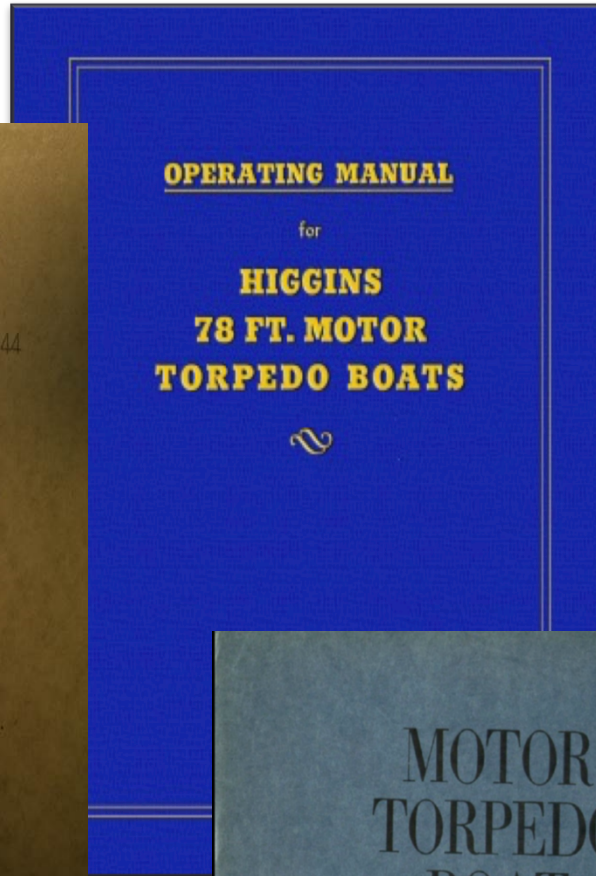
Time	Event	Remarks
1345	Passed through anti-submarine nets at idling speed	
1315	Moved portside to firing position	
1338	Underway to fuel dock	
1438	Moved starboard side to fueling dock, took on 1200 gallons of extra fuel	
1635	Underway from fueling dock	
1620	Moved starboard side to main deck	

REMARKS

Examined and found to be correct.

continued

E. R. Conacher



**SECTION X  
FUEL SYSTEMS**

Although the fuel systems of the Elio and Higgins boats differ greatly in layout and construction, their operation, maintenance, and casualties are basically the same. The chapter titled "Fuel, Induction and Exhaust Systems" in Packard's Construction, Operation and Servicing Manual should be consulted for a complete description of the two systems.

The Packard Maintenance Manual will give you the correct overhaul procedures to be used on the fuel pumps.

A recent major change that has taken place in the fuel systems has been the installation of a new type fuel filter. Information concerning this filter is contained in the manual titled "Instructions for Installing and Operating Skimmer Gasoline Filters, Motor Torpedo Boats."

This chapter will cover some of the common casualties that can be expected from normal wear and operation of the boats.

**Fuel Lines**

**Vapor Locks**

A vapor lock is a pocket of air in a gasoline line which will restrict the flow of gasoline to the carburetor. Vapor locks are usually caused by one of two things: (a) the turbulence set up by the passage of fuel through the many restrictions and elbows in the fuel system; (b) the formation of vapor in the hot gas lines. The recommended remedy is to force gasoline through the lines by using the wobble pumps. This will force the air pocket through the carburetor on into the engine.

To test for air leaks while the engines are running, squirt a little oil around all connections. If the oil is drawn in, you will know the location of the leak.

To test for leaks between the wobble pump and the engines when they are secured, use the following method. Operate the wobble pump on the Elio the electric pump; on the Higgins, have someone operate the hand pump and feel all connections. If there is a leak, gasoline will appear at the joint that is leaking. One hundred octane gasoline leaves a blue discoloration on the fuel lines; 87 or 91 octane leaves a brownish tint.

Often after inspecting all connections for leaks, and they have been found to be tight, a leak is still apparent. If this is the case, the leak is usually in the selector valve. To check this, shift the selector valve to find out which one is leaking.

**Liquid Gasoline Leaks**

Gasoline leaking from a fuel line is a major fire hazard, not to mention the hazard of having one or all of your engines cut out.

When such a leak occurs, an emergency repair must be made. The quickest repair is to use rubber tape and then cover with friction tape.

As soon as possible permanent repairs should be made by replacing the Rayboild seal or the gasket that is leaking. When replacing these, care should be taken not to crimp or dent the aluminum tubing by exerting too much force; just tighten the coupling up snug.

# List of industry supporters

- ABYC
- Battery World
- BBP
- Bender
- Berard Transport
- B-Line (Eaton)
- Bollinger Shipyards, LLC
- Brammer Machine Shop
- Byrne, Rice & Turner, Inc.
- Canal Barge.
- Carlisle & Finch Co.
- ControlWorx (John H. Carter)
- Coastal Cargo
- Cooper Crouse-Hinds (Eaton)
- Cospolich, Inc.
- Creative Systems, Inc.
- Cummins Mid-South
- Delta T Systems
- Detronics - John H. Carter
- Dometic Corp Marine Division
- Donovan Marine
- Eaton Corporation
- EngineWorx (John H. Carter)
- Federal Signal
- Gibbs & Cox, Inc.
- Hebert Steel
- Heinemann (Eaton)
- Hiller Companies
- Hochiki (John H. Carter)
- International Paint, LLC
- Jason's Cradle Man Overboard Solutions
- Jim-Buoy
- John H Carter Control Work
- Johnson SPX (Mac-Hugh & Assoc.)
- Karl Senner, Inc.
- Key Bank
- Lemoine Marine Refrigeration
- Lopolight
- Mac-Hugh & Associates, Inc.
- Marine Exhaust, Inc.
- Marquette Transportation
- Marsh Bellofram
- Moore Industries
- Nematron - John H. Carter
- New Wave Media
- Newmar
- NRE Power Systems
- Panduit
- Pelican Energy Consultants
- Phoenix Contact
- Quality Metal Works, Inc.
- Quality Signals
- Rockwell Automation
- Rose Point Navigation
- Seabrook Marina
- Seachest
- Seacoast Electric
- Sea-Trac Marine Electronics
- Shell Oil
- Stewart & Stevenson-Electro-Motive Diesel (EMD)
- Summit Electric Supply's Marine Division
- Survivatek
- Trinity Yachts
- Tyco Electronics
- Versabar
- VT Halter Marine, Inc.
- Wärtsilä Ship Power
- West Marine

# U.S. Coast Guard

Thank you for your continued support and guidance





# Passenger Experience



# Thank you

Mark Masor, Naval Architect/ Museum Volunteer

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504.265.8316 (office)

## Book Rides: [pt305.org](http://pt305.org)



Crew of PT-305



PT -305 Volunteer Restoration Crew