



U.S. Coast Guard Vessel Plan Review:

Vessel repowers, retrofits, and novel designs

MIKE BOYES

ELEVENTH COAST GUARD DISTRICT

INSPECTIONS AND INVESTIGATIONS BRANCH (DPI)

07 AUGUST 2024



Eleventh Coast Guard District

Outline



- Reasons for U.S. Coast Guard (USCG) oversight
- Vessel Repower Guidance
 - Plan Review
 - Items to Consider
 - Lightship Change
 - Diesel Particulate Filters
 - Design Verification
- Novel Vessel Designs





Eleventh Coast Guard District

Reasons for USCG Oversight



All items of equipment installed on vessels subject to Coast Guard inspection and certification are subject to some degree of inspection and approval. In judging the quality and suitability of equipment used on vessels, the primary considerations are as follows:

1. **Safety of the vessel**
2. **Safety of personnel**
3. **Performance of a safety function**
4. **Safety of the port/waterways**
5. **Environmental protection**





Eleventh Coast Guard District

Vessel Repower Guidance – Plan Review



- Plan review and inspections of new or existing vessels and/or engineering systems are required for commercial vessel certification.
- The Coast Guard concentrates on a global or 'whole of vessel' safety and engineering plan review with the expectation that all systems are integrated for safe operation.





Eleventh Coast Guard District

Vessel Repower Guidance – Plan Review



- The local Officer in Charge, Marine Inspection (OCMI) acts as the project manager for vessel repowers, retrofits, new construction, or repairs.
- The OCMI will determine which plans are required for the specific project and whether the approval authority will be the local OCMI or the Marine Safety Center (MSC).

** Additional guidance for Subchapter T vessels is provided in [Marine Safety Center Technical Note \(MTN\) 01-03](#).*

Plan Review Activity Checklist

Vessel Name:	Official Number	C.G. Number	Hull Number
Vessel Representative		OCMI Representative	
Name:			
Address:			
City/State/Zip:			
Email:			
Phone:			
Signature:			
Date:			

	Activity/Plan	Plan Review Guidance #	Activity/Plan Required?	MSC or Local Review
Machinery Branch Mechanical Systems, Tanks (202) 795-6795	Bilge and Ballast Systems	E1-02	-	-
	Compressed Air Systems	E1-04	-	-
	Engine Cooling Systems	E1-05	-	-
	Carbon Dioxide Fire Suppression Systems	E1-06	-	-
	Engine Exhaust Systems	E1-07	-	-
	Clean Agent Fire Suppression Systems	E1-08	-	-
	Fire Main Systems	E1-09	-	-
	Fuel Oil Systems	E1-10	-	-
	Fluid Power and Control Systems	E1-12	-	-
	Independent Tanks	E1-16	-	-
	Lubricating Oil Systems	E1-17	-	-
	Pressure Vessels	E1-19	-	-
	Potable Water Systems	E1-21	-	-
	Sanitary Sewage Systems	E1-24	-	-
	Steering Gear Piping Systems	E1-26	-	-
Vents and Sounds	E1-29	-	-	
Small Vessel Branch Structures, Stability Operations (202) 795-6734	General Arrangement Plans for Small Passenger Vessels: (1)	H1-07	-	-
	A Simplified Stability Test (SST) conducted by the cognizant OCMI	None	-	-
	If not conducting SST:		-	-
	1) Stability Test Procedures & 2) Stability for Small Passenger Vessels	GEN-05	-	-
Structure Operations (202) 795-6764	Steel and Aluminum Vessels	H1-01	-	-
	Fiberglass Reinforced Plastic Vessels	GEN-03	-	-
	Wooden Vessels	H1-12	-	-
	Wooden Vessels	H1-13	-	-
Electrical Branch Special Services (202) 795-6764	Fire Detection Systems	E2-09	-	-
	Steering Gear Controls and Alarms	E2-20	-	-
	Electrical Plans - Small Passenger Vessels	E2-23	-	-
	Dynamic Positioning Systems	E2-24	-	-

*Submit this form, along with an application for inspection (CG-3752A) to the MSC with initial plan submission to msc@uscg.mil or the mailing address found online at www.dco.uscg.mil/msc

Enclosure (1) to MTN 01-03, CH.2

Revised: 19 July 2018



Eleventh Coast Guard District

Vessel Repower Guidance – Plan Review



- The MSC assists the OCMI's by reviewing detailed plans for the design, construction, alteration, and repair of certificated commercial vessels to ensure they meet the minimum standards for hull structures, stability, engineering systems, etc., as set forth in the CFR.
- As the MSC only reviews plans that it receives, project management of any individual vessel is the responsibility of the cognizant OCMI.
- For vessel designs using unique or novel arrangements, it is recommended that the plans be discussed with the OCMI prior to submission to the MSC.



** Additional information and specific guidance pertaining to each type of review is available on [MSC's Plan Review Guides](#) page.*



Eleventh Coast Guard District



Vessel Repower Guidance – Items to Consider

Important to keep in mind that the size and horsepower of the engine is based on the size of the vessel. New engines should fit within the available space and allow suitable access around machinery to aid with inspection and preventative maintenance.

Items to consider for project planning include:

- Piping system
- Exhaust system
- Electrical system
- Propeller and propeller shaft
- Propulsion engine controls
- Performance checks
- Stability review





Eleventh Coast Guard District



Vessel Repower Guidance – Lightship Change

- Lightship change is the process for determining when weight changes to a vessel are significant enough to warrant a new deadweight survey or a full stability test.
- Total aggregate weight change of the currently approved lightship displacement –
 - **Does not exceed 2%** – Weight-Moment Calculations only required
 - **Between 2-10%** – Deadweight Survey only required.
 - **Exceeds 10%** – Full Stability Test required.



* For additional information, refer to [Marine Safety Center Technical Note \(MTN\) 04-95](#).



Eleventh Coast Guard District



Vessel Repower Guidance - Diesel Particulate Filters

- Coast Guard regulations do not explicitly address diesel particulate filter (DPF) installations onboard commercial vessels.
- Primary concerns with DPFs relate to their impact on engine performance, which affects vessel maneuverability, and potential as another “hot surface” that could be an ignition source.
- Plans for DPF installation will be reviewed and approved for proper design and materials in consideration of the whole system.
- MSC will review DPF installations on a case-by-case basis for each vessel but final approval of the DPFs are at the discretion of the cognizant OCMI.





Eleventh Coast Guard District

Vessel Repower Guidance – Design Verification




- Designated strictly for Subchapter M vessels.
- The process of reviewing individual plans, drawings, schematics, calculations, or other documents necessary to demonstrate compliance with the construction and arrangement design standards found in the appropriate Subchapter.
- The Coast Guard will refer to and, as appropriate, mark plans, drawings, schematics, calculations, or documents that have been verified to comply with the required standards as verified.

* Design Verification guidance for Subchapter M vessels provided in [Marine Safety Center Technical Note \(MTN\) 01-17](#).

Design Verification Activity Checklist

Vessel Information					
Vessel Name:		Shipyard:			
O/N / IMO / CG No.:		Hall No.:			
Intended Service:		Route:			
Vessel Representative		OCMI / Authorized Individual / Entity Representative			
Name:		Name:			
Email:		Email:			
	System or Component	Design Verification Guidance #	CG or MSC	ACS or P.E.	Verification Completed
Mechanical Branch Mechanical Systems, Tanks (210) 796-6755	Bidge and Ballast	E1-36			
	Cooling Water				
	Fixed Fire Suppression Systems (All Types)				
	Exhaust				
	Fire Main				
	Fuel Oil Piping				
	Fluid Power Control				
	Lube Oil Piping				
	Miscellaneous Piping				
	Propulsion Shafting				
	Potable Water				
	Sewage Piping				
	Steering Gear				
Ventilation					
Electrical Branch Electrical Systems (210) 796-6704	Fire Detection Systems	E2-31			
	Steering Gear Controls and Alarms				
	Electrical Plans				
	Dynamic Positioning Systems				
Small Vessel Branch Stowage, Stability, General Arrangement (210) 796-6734	General Arrangement Plans	H1-18			
	Stability Test Procedures	GEN-05			
	Towing Vessel Stability	H1-04			
	Steel and Aluminum Structures	GEN-03			

I, _____, certify that this vessel is suitable for the intended service and route specified in this form.


 144-140 Entity

Page 1 of 2 Enclosure (2) to MTN 1-17



Eleventh Coast Guard District

Novel Designs – Design Basis Agreement



- Coast Guard Office of Design and Engineering Standards (CG-ENG) has the authority to consider equivalents to regulatory design standards.
- Through the Design Basis Agreement (DBA) process, the Coast Guard will evaluate alternate arrangement or novel design proposals to ensure a level of equivalent safety.
- MSC has the authority to make interpretations of regulations and will coordinate with CG-ENG who will lead the review of any application for a DBA.
- CG-ENG considers each design concept on a case-by-case basis and not all equivalencies will need to go through a DBA process.

* For additional information, refer to the [Design Basis Agreement Submission Guidance Policy Letter, CG-ENG 01-23](#).

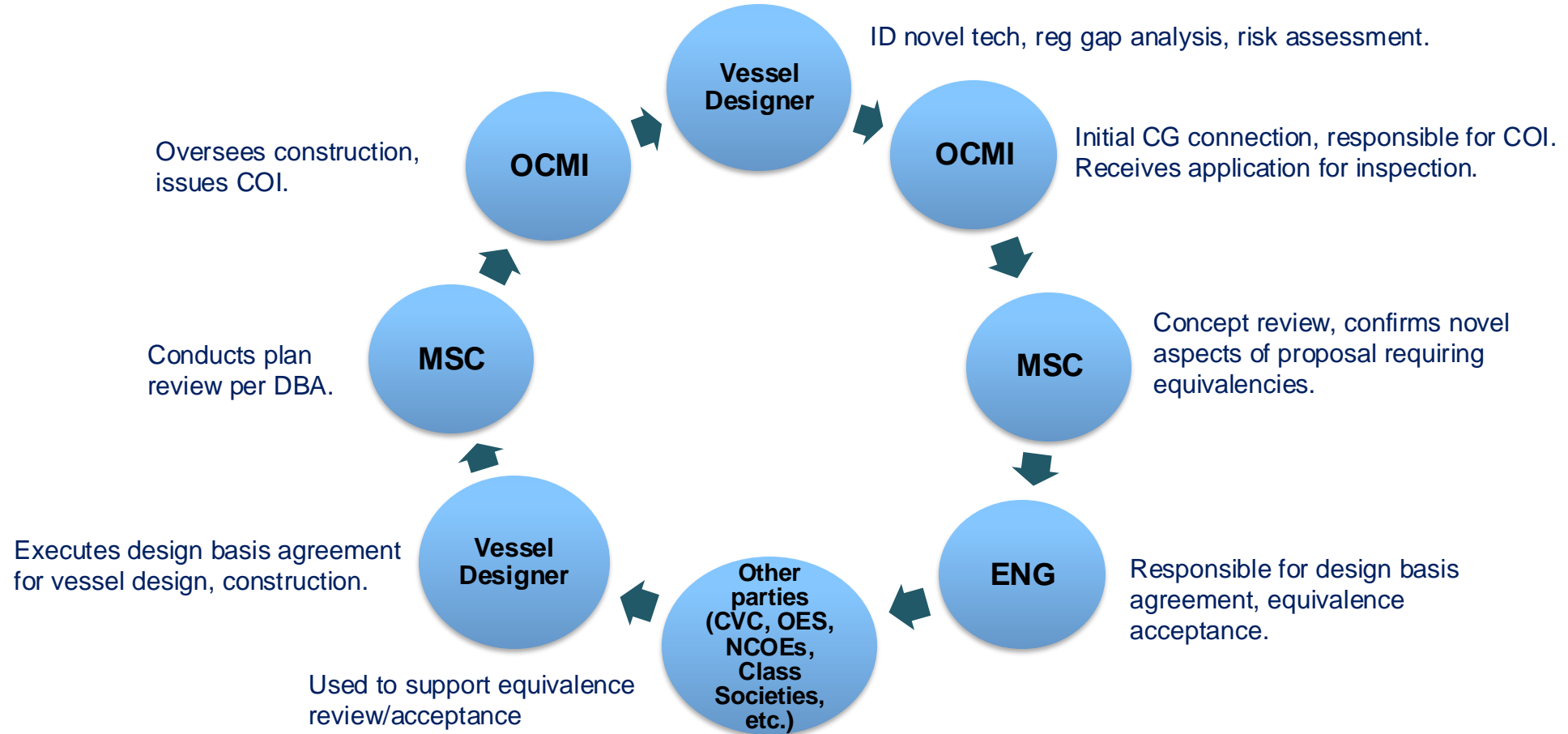


SEA CHANGE, hydrogen fuel cell passenger ferry. Source: SWITCH Maritime



Eleventh Coast Guard District

Novel Designs – Design Basis Process





Eleventh Coast Guard District



QUESTIONS