U.S. COAST GUARD MARINE SAFETY CENTER PLAN REVIEW GUIDELINE

REVIEW OF ELECTRICAL PLANT LOAD ANALYSIS

Procedure Number: E2-06
Revision Date: October 19, 2021

S. M. Peterson, CDR, Chief, Engineering Division

Purpose

This Plan Review Guideline (PRG) provides guidance to submit load analyses for approval under Subchapter J and other applicable requirements.

Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center (MSC) by e-mail or phone. Please refer to Procedure Number E2-06.

E-mail: msc@uscg.mil
Phone: 202-795-6729
Website: www.dco.uscg.mil/msc

Table of Contents

1. Applicability

This Plan Review Guideline (PRG) is applicable to all vessels to which 46 CFR Subchapter J applies. If your vessel does not fall under this Subchapter, see the Marine Safety Center's page on plan review guides to determine which guide applies to your vessel.

2. References

(a) MSC Plan Review Guideline E2-07, Electrical One-Line Diagram
(b) 46 CFR Subchapter J
(c) SOLAS (1974 incorporating all amendments in effect)
(d) Navigation and Vessel Inspection Circular (NVIC) 2-89, "Guide for Electrical Installations on Merchant Vessels and Mobile Offshore Drilling Units"
(e) D8(m) Policy Letter 01-03, "Use of Dynamic Positioning (DP) by Offshore Supply Vessels (OSVs) for Oil and Hazmat Transfers," dated January 22, 2003

3. Definitions

a. *Ship's service loads* are defined as all auxiliary services necessary for maintaining the vessel in a normal operational and habitable condition; these include, but are not limited to, safety, lighting, ventilation, navigational, communication, habitability, and propulsion auxiliary loads.

b. *Emergency loads* are vital loads necessary for the safety of passengers and crew.

c. *Drilling loads* are those associated exclusively with drilling operations, to include the drill table, mud system, and positioning equipment.

4. Contents

Adequate power must be provided to ship's service, emergency, and drilling loads. A load analysis that has been reviewed and found satisfactory will be marked **Examined.** Two types of loads are typically listed in the load analysis: the "connected" and "computed" load. The *connected load* is the power the equipment draws when energized at full capacity. The *computed load* takes into account the expected utilization of the equipment, and is found by multiplying the connected load and the load or demand factor. For OSVs operating in DP mode during oil and hazmat transfers, see reference (e).

The following items are needed to comply:

a. All the connected loads shown on the load analysis must match the one-line diagram.

b. Vessels may have various operating conditions, such as "Normal Sea Load," "Emergency," "At Anchor," or "Maneuvering." The largest computed load should be used to determine the required generation capacity.

c. Generators can sufficiently supply enough power to the ship's service loads. Particularly, ensure that the individual load factors are reasonable for the operation of equipment. See Appendix 2 Table 1 of reference (d) for typical operating load factors.

d. While the types of service conditions may vary from vessel to vessel, all vessels must consider emergency operating conditions.

e. A unity (1.0) load factor shall be used for all emergency switchboard connected loads. Refer to 46 CFR Table 112.05-5(a) or SOLAS II-1/42-2 or 43-2 to determine for how long the emergency loads must be powered.

f. Emergency loads must meet the requirements of 46 CFR 112. All emergency loads must be able to be supplied simultaneously, as per 46 CFR 112.05-5(a); reference (c) Appendix 2, paragraph (2)(n); and SOLAS II-1/42-2 or 43-2. If there is a temporary/transitional source of emergency power, it must have adequate capacity to meet the requirements of 46 CFR 112.05-5(a) and SOLAS II-1/42-4 or 43-4.

g. Only the loads identified in 46 CFR 112.15-1 & 112.15-5 are authorized for connection to the emergency power source. The emergency power source for other loads may be authorized by the MSC for use, if necessary, to maintain or restore the propulsion plant, such as control systems, controllable pitch propellers, hydraulic pumps, control air compressors, and machinery necessary for dead-ship start-up, as per 46 CFR 112.05-1(b) and SOLAS II-1/41-1.4. Other loads that enhance safety must be specifically authorized by the MSC, as per 46 CFR 112.05-1(c). The emergency generator must be shown to have enough spare capacity to support any non-emergency loads with a 1.0 load factor.

h. With the largest power source off, the remaining power sources must be able to supply the loads associated with normal operating conditions for propulsion, safety, and habitability, as per 46 CFR 111.10-4(b) and SOLAS II-1/41-1.2. This includes cooking, heating, air conditioning, refrigeration, ventilation, sanitation, and fresh water.

i. For passenger vessels greater than 120 m that are reviewed to SOLAS, verify loads are shown to meet the safe return to port and safe area criteria of Regulations II-2/21.4 and 21.5

5. Disclaimer

This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to, nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for complying with these requirements if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative, you may contact MSC, the unit responsible for implementing this guidance.