



FMEA/FMECA SERVICES

Why Failure Modes and Effect Analysis (FMEA)?

**GLOBAL
MARITIME**
blue sea thinking

Why Failure Modes and Effect Analysis?

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Global Maritime FMEA/FMECA services

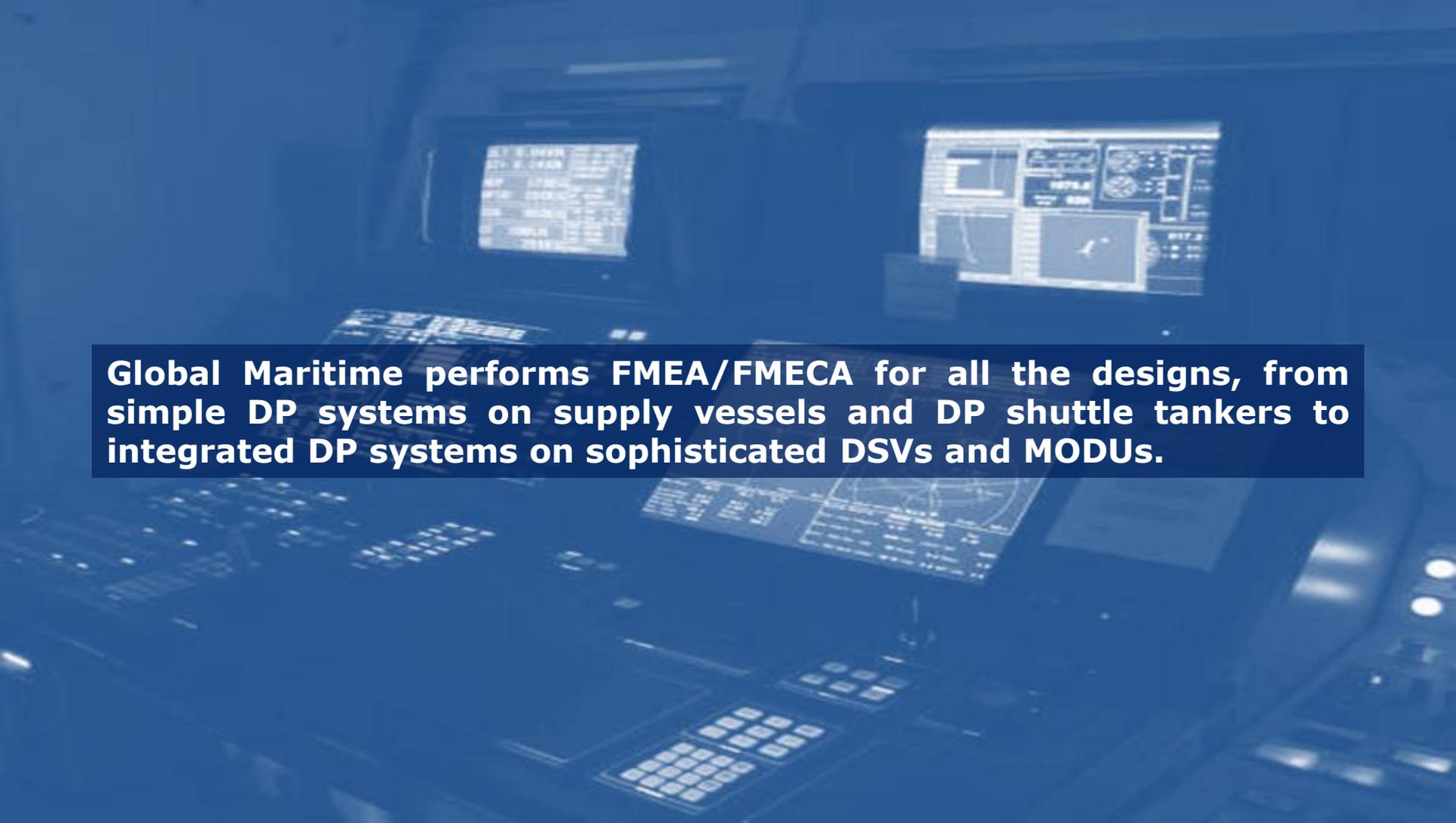
Nowadays modern vessels rely on complex integrated automation, propulsion and generation systems. PLCs, micro controllers and data communications networks control and connect numerous operational, alarm and emergency systems, with several layers of control levels between the operator and machineries under control.

Traditional design verification procedures were found to be ineffective when applied to these new advanced integrated technologies. For this reason Failure Mode Effects Analysis (FMEA), the analytical tool commonly used in the aeronautics and military industries, have been introduced to maritime oil and gas projects.

The Failure Mode and Effects Analysis is a qualitative reliability technique for systematically analyzing each possible failure mode within a hardware system, and identifying the resulting effect on that system, the mission and personnel.

The criticality analysis (CA) is a quantitative procedure, which ranks failure modes according to their probability and consequences.



A blue-tinted photograph of a ship's control room. The room is filled with various pieces of electronic equipment, including several large monitors displaying data and charts, and numerous control panels with buttons and dials. The overall atmosphere is technical and professional.

Global Maritime performs FMEA/FMECA for all the designs, from simple DP systems on supply vessels and DP shuttle tankers to integrated DP systems on sophisticated DSVs and MODUs.

FMEA/FMECA Study Applications

Failure modes and effects analysis can be applied to any type of installation where a comprehensive systematic approach is required.

These analysis are required by various authorities and are commonly used for vessels provided with dynamic positioning systems, redundant propulsion systems or redundant power systems.

FMEA/FMECA is a structured method used to analyze the failure modes or defects of a process, system or component: the use of FMEA/FMECA techniques facilitates the design verification process, highlighting possible improvement areas or identifying design deficiencies.

FMEA/FMECA can be required and applied during all stages of a projects: at early design phase, during the detailed design and being the vessel in operation.



Our vast skill set of marine engineers, master mariners and electrical engineers enables us to provide a wide variety of comprehensive FMEA/FMECA services including:

- FMEA/FMECA report for
 - Dynamic Positioning Systems,
 - Redundant Propulsion Systems,
 - Main and Emergency Power Systems,
 - Ballast and Bilge System,
 - Pipe Laying Systems,
 - Closed bus tie power and automation systems,
 - Jacking Systems,
 - Bow Loading Systems,
 - Lifting Appliances,,
 - Power Management Systems,
 - Other Cargo Systems
 - Passenger vessels safe return to port assessment.
- FMEA proving trials,
- DP system proving and annual trials.

FMEA/FMECA

Study Purpose

The purposes of FMEA studies are:

- to provide objective evidence of required redundancy and fault tolerance,
- to provide a comprehensive, systematic and documented analysis,
- to support the design process,
- to reduce project costs during new building or conversions,
- to identify weakest points in design,
- to identify, implement, and document the recommended actions,
- to assess the safety of various systems and components,
- to highlight any significant problem and avoid expensive modifications by identifying potential failures and preventing them.





FMEA/FMECA Study Benefits

The major benefits achieved from a FMEA are:

- to improve quality, reliability and safety of a product,
- to improve the company image and competitiveness,
- to reduce system development time and cost,
- to reduce the potential for warranty concerns,
- early identification and elimination of potential failure modes,
- to emphasize problem prevention,
- to minimize late changes and associated cost,
- catalyst for teamwork and idea exchange between functions,
- to minimize the reoccurrence of the same kind of failures in future projects,
- to reduce impact on company profit margin,
- to improve production yield.

Analysis for electric power systems with closed bus tie configuration

Diesel electric plant based on the power station concept are becoming more and more popular for operating different types of DP vessels.

The traditional interpretation of IMO 645 requires operation of electric power systems in highest possible integrity – open bus-tie breaker(s) configurations.

However systems which operates with closed bus-ties (including DP3) can also be accepted when advanced protection technology is utilized. The condition is that an equivalent safety level is to be achieved as for the operation with open bus tie configuration, supported by comprehensive FMEA analysis.

Global Maritime team of consulting engineers is specialized in performing the most advanced closed bus tie configuration analysis, which requires expertise with in-depth electrical power systems, protection and equipment knowledge.





DP FMEA/FMECA gap analysis

Part of services related dynamic positioning systems verification consist in FMEA/FMECA gap analysis.

Often Global Maritime is required to conduct gap analysis of FMEA/FMECA carried out by others. Such analysis is cost effective and provides the Customer with additional assurance and comfort that the vessel meets its intended standard of DP performances.

Gap analysis enables also to highlight which areas of existing FMEA need to be updated and reviewed.

Global Maritime engineers' wide experience enables to provide comprehensive FMEA/FMECA evaluation and gap analysis.

Vessel dynamic positioning system proving trials and annual trials

Global Maritime carries out DP FMEA proving trials and annual trials for dynamically positioned vessels.

FMEA proving trials prepared and witnessed by Global Maritime demonstrates that the operation of the DP vessel complies with the design concept.

Annual surveys carried out by Global Maritime records the ability of the vessel to keep position after single failures.

Test sheets are prepared in accordance with relevant Class, IMCA, MTS and IMO guidelines prior to witnessing the trials.

Findings are addressed in the follow up report and recommendations may be issued to ensure that the vessel is capable of carrying out class specific DP operations.





FMEA/FMECA Innovations



Analysis provided by the Global Maritime combine company long experience with an innovative concept.

The main features of Global Maritime analysis are:

- to follow the latest international guidelines and recommended practices (e.g. IMCA, MTS, ABS, DNVGL),
- to include detailed system description with narrative failure mode discussions,
- to outline functional block diagrams of redundancy groups, systems and sub-systems,
- to illustrate by logic diagrams the systems dependency,
- to list in tabulated form, failure modes detail analysis,
- to include comprehensive test programs that verify the analysis assumptions,
- to provide practical guidelines for the vessel operators,
- to provide additional supporting analytic studies



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