

Thruster full failure

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Explore our drill scenario on the action required to recover a vessel into a controllable condition following a thruster failure to full thrust.

DP emergency drill scenarios are included to assist DP vessel management and DPOs / Engineers and ETOs to conduct DP drills onboard. The intent is that the template can be used on any DP vessel, so specific details regarding the technical outcome are not included.

The benefit of using this template is to monitor and learn from the human reactions of key DP personnel. It is also important that the crew are familiar with various DP system set-ups including their failure modes.

Refer to Code of practice for the training and experience of key DP personnel – Appendix six (IMCA M117).

Exercise scenario: Thruster full failure

Objective:

To familiarise all vessel crew with what actions are required in order to recover the vessel into a controllable condition following a thruster failure to full thrust.

Method:

This test can be undertaken when the vessel is in a safe open space with no risk of excessive position excursion causing an unsafe condition.

If the vessel has CPP Main thrusters carry out using CPP:

- Settle vessel on auto DP.
- A second person to take the most powerful thruster into manual control.
- Ramp that thruster to 100% in a direction perpendicular (if azimuth thruster) to the Auto DP thrust. If carrying out for CPP, put CPP thrust in the opposite direction.
- Observe effects.

Observations during drill:

- Does the DP Control system compensate?
- Is there an initial excursion?
- What action would the DPO take?
- Is the degree of participation and diligence of Key DP Personnel as expected.

Discussion points (post-exercise):

Vessel:

- How are the thrusters placed on the vessel? Where single skeg thrusters are fitted, what are the implications of this failing to full thrust? This failure may still be within the FMEA Stated WCFDI.
- Can a forward retractable azimuth thruster, counteract two bow tunnel thrusters?
- Powerful stern CPP propellers – if one failed to full thrust, is position compromised?
- Where rudders are used for position control, consider if the prop fails to full thrust and the rudder still follows a DP command.

Human factors:

- What should the response of the DPO?
- What would be the worst-case scenario?
- Discuss the alternative actions/reactions that may occur in response to a similar scenario. Are there multiple paths to a successful resolution or is there a preferred solution? Why?

Review of DPO and other key DP personnel reaction:

- What potential gaps in the existing DP familiarisation programme have been highlighted as a result of the exercise?
- What changes/revisions should be considered for the training and familiarisation procedures?

Review the applicable checklists (ASOG CAM/TAM/DP operations Manual/bridge and engine room checklists/FMEA/DP Annual Trials programmes/etc.)

- What additional necessary actions and considerations should be addressed?
- What potential changes should be made to make the checklists more appropriate?
- What additional necessary operating conditions and parameters should be considered?
- What potential changes should be considered to make Decision Support Tools more applicable to the vessel and her equipment?
- How would these changes improve/affect the vessel's capabilities and limitations?

Conclusion:

Based on the results of the exercise and related discussions before and after, any suggestions for follow up including any corrective actions deemed appropriate should be accurately detailed and managed to close out.

Handling of thruster system failures in the correct manner requires knowledge of the DP vessel control, how the DP system reacts to failures and alarms and the human intervention required if necessary, to ensure station keeping.

Items to consider include:

- Awareness of the current thrust levels and directions.
- DP system reaction to failures.
- Appropriateness of communication.
- Training requirements.

Related IMCA Guidance

IMCA M117

The case studies and observations above have been compiled from information received by IMCA. All vessel, client, and operational data has been removed from the narrative to ensure anonymity. Case studies are not intended as guidance on the safe conduct of operations, but rather to assist vessel managers, DP operators, and technical crew.

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