

Thruster full thrust failure

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DP emergency drill scenarios are included to assist DP vessel management, DPOs / Engineers, and ETOs in conducting 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 essential that the crew are familiar with various DP system set-ups, including their failure modes.

Refer to [IMCAM117](#) – Code of practice for the training & experience of key DP personnel, Appendix 6.

Exercise Scenario – Thruster Full Thrust 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.

1. Settle vessel on auto DP.
2. A second person to take the most powerful thruster into manual control.
3. 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.
4. Observe effects.

Observations During Drill

1. Does the DP control system compensate?
2. Is there an initial excursion?
3. What action would the DPO take?

4. 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 failure to full thrust?
 - Can a forward retractable azimuth thruster counteract two bow tunnel thrusters?
 - Powerful stern CPP propellers – if one fails 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 DPO's response be?
 - 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 program 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 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.

Correctly handling thruster system failures requires knowledge of the DP vessel control, how the DP system reacts to failures

and alarms and the human intervention needed, 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.

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.

IMCA makes every effort to ensure both the accuracy and reliability of the information, but it is not liable for any guidance and/or recommendation and/or statement herein contained.

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