

Consequence analysis Class DP2 & DP3

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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 [IMCA M117 Code of practice for the training & experience of key DP personnel, Appendix G](#).

Exercise Scenario – Consequence Analysis Class DP2 & DP3

Objective

To familiarise all vessel crew on how the consequence analysis will warn the operator that there will be a loss of position following a failure once the alarm has been activated.

Refer to [IMCA Information Note 1601 – DP Consequence Analysis – A Timely Reminder](#).

Method

With the vessel on full auto DP, all thrusters online, generators online on each switchboards as required – ensure the consequence analyser is active.

Position the vessel beam on to the environment such that more than the power of one generator is required to maintain position (Part 3 may be weather-dependent). Inhibit standby generators from auto-start and connection. (Make not standby.)

1 Deselect thrusters at the forward end of the vessel leaving a single fwd thruster operating. Alarm 'Consequence Analysis Drift Off Warning' will be issued by the DP system. Wait for a minimum of 3-4 minutes, as there is often a time delay.

Remove the remaining forward thruster and observe the effects on vessel position and heading.

Reinstate thrusters and stabilise DP position and heading.

2 Deselect thrusters at the aft end of the vessel leaving a single aft thruster until the alarm 'Consequence Analysis Drift Off Warning' is issued by the DP system. Wait for a minimum of 3-4 minutes, as there is often a time delay to generate this alarm.

Remove the remaining aft thruster and observe the effects on vessel position and heading.

Reinstate thrusters and stabilise DP position and heading.

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- 3 Deselect all thrusters from a redundant group until the alarm 'Consequence Analysis Drift Off Warning' is issued by the DP system. (If more than one redundant group then remove thrusters from all but one redundant group) Wait for a minimum of 3-4 minutes.

Observe the effects on vessel position and heading.

Reinstate thrusters and stabilise DP position and heading.

Repeat for all redundancy groups.
- 4 For vessels with multiple generators on a redundant Bus – Position the vessel beam on to the environment and shut down generators on any main bus until the alarm 'Consequence Analysis Drift Off Warning' is issued by the DP system.

Continue to shut down generators until drift off occurs note that DP gives priority to heading – reinstate generators.

Expected Results

- 1 'Consequence Analysis Drift Off Warning' is issued by the DP system – once all fwd. thrusters removed vessel position and heading is compromised.
- 2 'Consequence Analysis Drift Off Warning' is issued by the DP system – once all aft thrusters removed vessel position and heading is compromised
- 3 'Consequence Analysis Drift Off Warning' is issued by the DP system – if more than one redundant group removed vessel position and heading is compromised
- 4 'Consequence Analysis Drift Off Warning' is issued by the DP system – priority given to heading control when available power reduced

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Observations and Discussion Points (post-Exercise)

Vessel

- Are all effects understood?
- Once the Consequence Analysis Alarm has been activated, what would be the effect of a further loss of thruster/generator/bus?
- Is it desirable to keep working when the Consequence Analysis Alarm is being activated? – Should the DPO be ignoring and cancelling the alarm?
- Is the Consequence Analysis Alarm considered within your vessel's ASOG and decision-support tools?
- What is being observed in the ECR with regards the power plant – is the power plant under stress?

Human Factors

- Are all effects understood with regards Human intervention?
- What should be 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 essential DP systems in the correct manner requires knowledge of the Key DP Personnel and how the DP system reacts to human intervention.

Items to consider include:

- 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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