Hybrid failure

Incident

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A malfunction in the battery converter system caused circuit breakers to trip.

Overview

A PSV was conducting DP operations within a 500m zone. The vessel had an energy storage system (ESS) fitted and was configured closed bus with a single generator connected as per below:

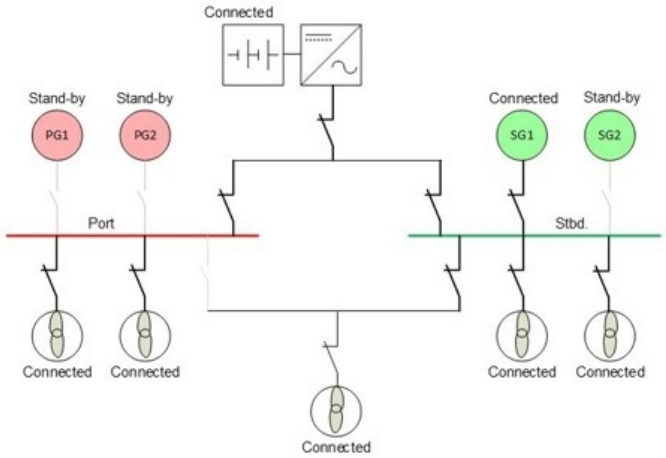

Figure: Initial setup

Three out of the five thrusters were powered from the starboard switchboard with a single generator connected. The port switchboard provided power to two of the five thrusters, with no generators connected. The two electrical systems were linked with the ESS connected to that link.

A malfunction in the battery converter system caused the battery incomer circuit breakers to trip, resulting in the separation of the switchboard, the loss of power to the port switchboard and the subsequent failure of two thrusters. The generators PG1, PG2 & SG2 automatically started and connected to restore power. There was no positional loss.

Conclusions

- The vessel was operating within its Worst Case Failure Design Intent (WCFDI) environmental constraints.
- The protection system operated as designed.

Lessons learned

- The vessel was conducting cargo operations beside a fixed asset.
- The vessel was operated as designed for DP redundancy but shows that failures can happen in the ESS ‘static’ power supply. i.e. failures are not just reserved for spinning (dynamic) machines.
- The significance of a proper FMEA, annual DP trials, and CAM-compliant setup. Understand your vessel for both DPOs and Engineers.
- Do not wait until the Consequence Analysis alarm has activated. Stay within the weather window of the present configuration, as partial blackouts can happen at any time.

Related IMCA Guidance

The following IMCA Guidance would be relevant to this DP incident:

IMCA M103

IMCA M166

IMCA M220

IMCA M250

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