Abstract 003 – Noble Denton Marine Services

MTS DP Conference 2018 – Thrusters

Title – 'Thruster Fail-Safe – Effective Validation and Verification' - ABSTRACT

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Despite the downturn in DP vessel activity in the last few years there has been a persistent and unacceptably high number of DP loss of position incidents associated with thrusters failing in such a way that they produce excess thrust or thrust in the wrong direction. The effect of this is either to drive the vessel off position directly or destabilise the DP control system to the point where large position excursions develop. Some of these incidents occurred on Diving Support Vessels and it is largely due to chance that the consequences were not more severe. The failure effects have been most severe in controllable pitch main propellers but tunnel thrusters and azimuthing thusters with fixed and controllable pitch propellers have also failed to unsafe-conditions.

Clear and unambiguous guidance on the fail-safe condition of thrusters was established in IMO MSC645 and further refined in MSC 1580 but traditional verification and validation processes intended to confirm the requirements in the guidance is complied with have failed to prevent incidents.

This paper explains:

- Why thusters fail in ways that do not comply with fail-safe requirements.
- Why traditional verification methods fail to detect these unacceptable failure modes.
- Why traditional mitigations are not fully effective in preventing drive-off.
- An alternative approach to the design and analysis of thruster control and protection systems which ensures thusters fail-safe.