

Marine Technology Society

Dynamic Positioning Conference

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Title:

**“Impact of the New USCG Requirements on DP
OSV Operations in the Gulf of Mexico”**

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PML

USCG D8(m) Policy Letter

“Use of Dynamic Positioning (DP) by Offshore Supply Vessels (OSVs) for Oil and Hazmat Transfers”

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Limited Scope of Application

- Offshore oil and mineral resources on OCS of Gulf of Mexico
- Oil and HAZMAT transfers
- OSVs operating in DP

Not FPSOs

Not shuttle tankers

Not crew boats

Status of USCG Policy Letter

- Guidance on minimum requirements
- No planned additional inspection measures
- Guidance will be considered in event of casualties

Scope of Content of USCG Policy Letter

- DP Equipment
- DP Operational Requirements
- DP Surveys and Testing
(All based on IMO MSC Circ 645)

- DP Operator Training

USCG Equipment Approach

USCG Hierarchy of Equipment Standards

- Alternative #1 – IMO DP Equipment Class 2 or 3.
- Alternative #2 – Classification Society DP Class Notation equivalent to Class 2 or 3.
- Alternative #3 – Minimum DP requirements less than above.
- Alternative #4 – Use of breakaway couplings where DP system does not meet any of the above standards.

Alternative #1 – IMO Class 2 or Class 3 DP System

- Not used as a DP Class Notation
- Intended to be used in FSVAD (Flag State Verification and Acceptance Document)
- Aspirational not actual

Alternative #2 – Classification Society Equivalences to IMO Class 2 or 3

- ABS DPS-2 or DPS-3
- DNV AUTR or AUTRO
- Lloyds DP(AA) or DP (AAA)

Assume that other Classification Societies with IMO based DP Class Notations will be acceptable;

- GL DP 2 or DP 3
- BV Dynapos AM/AT R or
 Dynapos AM/AT RS

DP FMEA Rules

- Classification Society FMEA Requirements
 - ◆ ABS Rules and Guidance Notes for FMEA – Draft Form, November 2003 for DPS-2 and DPS-3.
 - ◆ DNV Rules Part 6, Chapter 7, Section 1 for AUTR and AUTRO.
 - ◆ Lloyds Register Rules Part 3, Chapter 9 for DP(AA) and DP(AAA).

Note of Caution for Alternative #2

- Based on concept of redundancy.
- IMO Definition – *“Ability of a component or system to maintain or restore its function when a single failure has occurred”*.
- Achilles Heel – single failures are not the same as common cause failures.
- Does the current FMEA process adequately address all aspects of redundancy in a DP system? - If not, then the expectations of system redundancy are potentially wrong.

Some Common Cause Failures

- **Switching failures in a duplex system, where control is transferred in event of a failure.**
- **Cascade failures, where the failure of one component causes failure of other components.**
- **Partial failures, where a component operates incorrectly causing a system failure without triggering a switch to redundant components.**
- **Simultaneous failures, in particular computer networks.**
- **Other events, inc., environmental, voltage transients, water ingress which may cause simultaneous failure of independent components.**

Alternative #3 – Minimum DP Requirements

- Selective redundant features.
- Sufficient redundancy to ensure safe termination.

Recognition that there are many DP OSVs in the GOM that do not meet higher DP Class standards yet are considered acceptable.

Alternative #3 – Minimum Requirements – Power Systems

- Redundant generators and prime movers.
- 1 x main switchboard with *automatic* bus-tie breaker.
- Redundant power distribution system.
- 1 x UPS for each computer, but where multiple computers, one UPS is acceptable if supplying power to each computer.

Alternative #3 – Minimum Requirements – Thrusters

- Redundant arrangement of thrusters, but reduced requirements (2 stern thrusters and 1 bow thruster) are allowable, if vessel can hold station long enough to safely disconnect after losing any one of the thrusters.
- Any other arrangement of thrusters where the OSV can hold station long enough to safely disconnect on failure of a single thruster.

Alternative #3 – Minimum Requirements – Control

- Compliance with general guidelines for DP control systems as per IMO MSC Circ 645, section 3.4.1.
- 1 x DP computer, but 2 preferred. One computer is acceptable if there is manual control back up.
- 1 x manual control with integrated joystick/manual heading. Where computer controlled it must be;
 - ◆ **independent of DP computer and**
 - ◆ **have UPS.**
- Independent control levers for each thruster.

Alternative #3 – Minimum Requirements – References and Sensors

- 2 x position reference systems based on different principles of operation – separation of GPS based systems.
- 2 x external wind sensors.
- 1 x VRS/MRU, but not required if two years history of satisfactory operation without.
- 2 x gyro compasses, but may be reduced to one if heading information given by other sensors.
- 1 x consequence analyser, but may not be required if there are *operational controls* and will not be required if two years history of satisfactory operation without.

Alternative #4 – Breakaway Coupling with QCV

- Appropriate for OSVs with DP systems of lower standard than minimum requirements in Alternative #3.
- Standard not based on equipment redundancy but on ability to make safe withdrawal in event of DP failure.

Outstanding Question for Alternatives #3 and #4?

- Are Alternatives #3 and #4 required to have FMEAs?
- They should have;
 - ◆ Initial complete survey of DP system
 - ◆ Initial complete test of all systems, components, etc.
 - ◆ Periodic survey (5 years)
 - ◆ Annual survey and tests, etc.

Note of Caution for Alternatives #3 and #4

- Underlying Basis for USCG Approach
 - ◆ Drift off.
(Historically, loss of position can be dynamic - *drive on, drive off* - as well as passive - *drift off*.)
 - ◆ Remain on location to allow safe disconnection.
(Subjective and will require continuous assessment of station keeping capability in event of single failure.)

DP Operational Requirements – DP Capability

- From para 4.3 of IMO Guidance
 - ◆ For DP class 2 or 3 OSVs an automatic consequence analyser.
 - ◆ For DP class 1 OSVs an environmental envelope.
- USCG Application
 - ◆ Alt #1 or 2 – automatic consequence analyser.
 - ◆ Alt #3 – automatic consequence analyser or environmental envelope.
 - ◆ Alt #4 – environmental envelope.

DP Operational Requirements – Checklists and Instructions

- USCG apply sections 4 and 5 of IMO Guidance
 - ◆ DP operating instructions – (All encompassing DP operating manual).
 - ◆ Classification Society - varied requirements in rules.

DP Operations Manual

- Suggested Contents
 - ◆ DP organisation and responsibility
 - ◆ DP philosophy - definitions
 - ◆ Vessel data - general
 - ◆ Vessel specific DP system details
 - ◆ DP standing orders
 - ◆ DP checklists and verification
 - ◆ DP capability plots
 - ◆ DP incident reporting, investigation and close out

DP Surveys and Testing

- USCG apply section 5 of IMO Guidance
 - ◆ Once only initial survey and test (FMEA and DP FMEA proving trials).
 - ◆ Five year periodical survey and test (repeat FMEA trials).
 - ◆ Annual survey and test of DP system (annual DP trials or *equivalent?*).
 - ◆ As required targeted survey and test, e.g. following modifications or fault.

DP Operator Training

- USCG call for suitably trained and licensed deck officers on DP watch.
- USCG do not refer to IMO standard in MSC Circ 738 (Guidelines for DP Operator Training).

DP Operator Training

- Is there a recognised DP training standard?
 - ◆ Nautical Institute DP Operator Training Scheme
 - ★ Established 5 phase scheme (combination of shore based courses + sea-going).
 - ★ Differentiates between DP equipment class - full and limited DP certificates.
 - ★ Not restricted to licensed deck officers.

DP Operator Training

- Is the NI scheme the most appropriate for the DP OSV sector?
 - ◆ What sets DP OSVs apart from other DP sectors?
 - ★ Class 1 and Class 2 DP OSVs carry out the same work – unlike other sectors.
 - ★ Masters and licensed officers not judged on ability to keep position in joystick/manual control – OSVs are different to other DP vessels.
 - ★ Consequences of loss of position.

Impact on the DP OSV Fleet

- Self-regulation within regulatory authority guidance.
 - ◆ Assess vessels against four part guidance, if not already done.
 - ★ Identify relevant USCG Alternatives - #1, #2, #3, #4.
 - ★ Are the instructions for DP operations (DP ops manual) enough?
 - ★ Are the DP verification processes, (inc. FMEA, annual tests) enough?
 - ★ Is enough done to provide suitably trained licensed deck officers?