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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USCG D8(m) Policy Letter

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

Issue date: 22 January 2003

Implementation: 22 January 2005

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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

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Status of USCG Policy Letter

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

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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

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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.

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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

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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

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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).

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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.

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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.**

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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.

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Alternative #3 – Minimum Requirements – Power Systems

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

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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.

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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.

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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.**

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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.

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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.

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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.)

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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.

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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

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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.

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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).

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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.

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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.

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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?

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