TRAINING

Advanced Training For DP Operators

Is it time? What Should it look like? How could it be used?

Doug Olson

Converteam, Inc.

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“Advanced Training For DP Operators”

Is it time? What should it look like? How could it be used?

Douglas C. Olson

CONVERTEAM
THE POWER CONVERSION COMPANY

WARNING !

This Presentation :

Does NOT Contain any Mathematical Formulae

Does NOT Contain any Technical Drawings

Does NOT Contain any Charts or Graphs

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Advanced Training For DP Operators

Dynamic Positioning Committee
Marine Technology Society

Is it time ?

What should it look like ?

How could it be used ?

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Terms Used To Describe The Capability Of A DP Operator

- **Qualified:**

  To make fit for occupation, meeting requirements, legally capable.

- **Competent:**

  Well qualified, capable, sufficient, adequate, legally qualified, authorized, or fit.

- **Experienced:**

  Having had much experience, as in a particular occupation or activity, having learned from experience, made wise, competent etc. by experience.

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Present Training Program Effect on Qualification & Competence

- Formal shore based training conducted near beginning of training program.
- No formal testing requirement upon completion of Induction or Simulator courses.
- Training Centers have essentially same curriculum – emphasis on any one portion may vary dramatically.
- Some Centers may provide very little information regarding power generation, power problems, or safe power plant operation.
- Large number of DPO trainees today may have very little sea time or vessel operations experience.

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Inadequate On Board Training

- DPO Trainee may be third member of watch team with Certified DPO and Senior DPO.
- DPO Trainee may be second member of watch team with Certified DPO.
- DPO Trainee may be second member of watch team with other Trainee.
- Little consistency on how and what training is conducted – emphasis mostly on control functions.
- Few Trainees attending DP Simulator Course have seen or reviewed FMEA or Capability Plots.
- Absence of DP operational procedures & policy on a company wide scale – confusion resulting from differing degrees of policy & safety between DP vessels in a particular fleet.

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DP Work Experience

- A 12 hour DP watch may consist of 3 hours DP operating time and 9 hours in transit.
- A 12 hour DP watch consisting of 6 hours monitoring displays and trends with little or no maneuvering, or interaction with DP system.
- DP operator spending 6 to 12 hours per watch monitoring, maneuvering, and interacting with DP system.
- DP operator transfers to vessel engaged in different type of DP operation – higher level of risk to operational safety without sufficient familiarization time or additional training.

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Changes in DP System Equipment and Functions

- New system control modes – enhanced control functions.
- Changes in system hardware & software.
- Different thruster configurations & modes.
- Diesel electric propulsion vs. engine driven thruster propulsion.

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What should it look like ?

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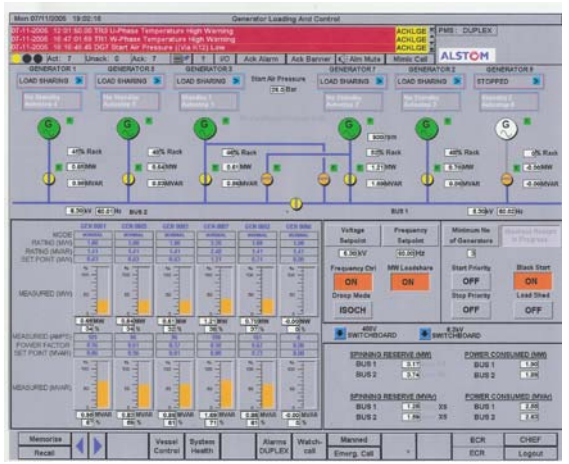
Course Subject Matter Outline



DAY ONE

- DP Operational Situations Written Exercise
- Power Management System
- Power System Faults, Failures, & Safe Operation
- AC Drives and Thrusters
- DP Incidents Review (IMCA) - loss of position cases

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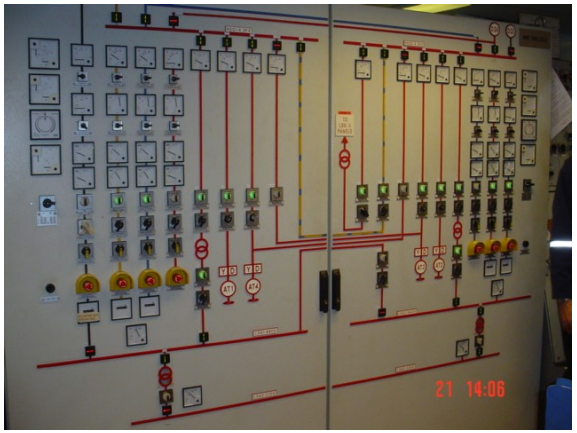
Course Subject Matter Outline

DAY TWO

- DP Operational Situations Written Exercise
- Position Measurement System Processing
- DP System Control Loops & Control Functions
- DP Operations
- DP System Familiarization
- Conduct of Simulator Exercises



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Dynamic Positioning Operational Situations Exercise
(DPOS - 3)

Date & Time:
2 July 2007, 1200 local

Operation Type & Location:
Accommodation Vessel
Gulf of Mexico

Vessel Type, length, beam & DP Class:
Semi-Submersible (class 2)
LOA: 75 m. Beam: 55m.

Vessel Heading (true):
180 deg

Water Depth:
72 m.

Mean Draft:
15.2 m.

Control Mode:
DP Mode
(auto heading & position)

COR Location:
Gangway Podestal

Wind Speed & Dir:
170 deg. 15 kts

Computed Sea Force:
320 deg. Relative, 7.8 T

Thrusters Available & Type
T-1 (AZ,CP) T-2 (AZ,CP)
T-3 (AZ,CP) T-4 (AZ,CP)

Thrusters Selected & (Mode):
T-1, T-2, T-3, T-4 (Free Mode)

Generators Available & (KW) rating:
G-1, G-5, G-3 (1880 KW each) Bus 1
G-6, G-2, G-7 (1880 KW each) Bus 2

Generators On Line & Bus Tie CB Position:
G-1, G-5 (bus 1)
G-6, G-2 (bus 2)
Bus Tie CB CLOSED

Control Gain Settings:
Surge (F/A) 50% (medium)
Sway (P/S) 50% (medium)
Yaw 50% (medium)

Sensors:	available	selected
Gyro's	1 & 2	1 & 2
Anemometers	1 & 2	1 & 2
VRU's	1	1

PME's:	available	selected
DGPS	1 & 2	1 & 2
Laser	1 & 2	1 & 2
Acoustics	N/A	
TW	N/A	
Gangway	Yes (not deployed)	

PME Weighting: manual / **auto**

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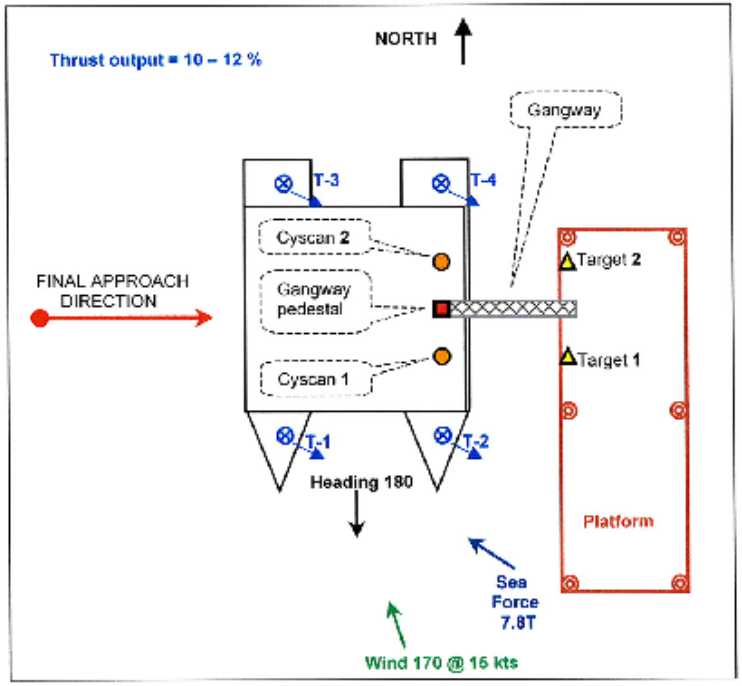
Situation Diagram



Additional DP System Functions

Environmental Force Fast Learn

Kalman Gain Settings

Minimum Power Mode

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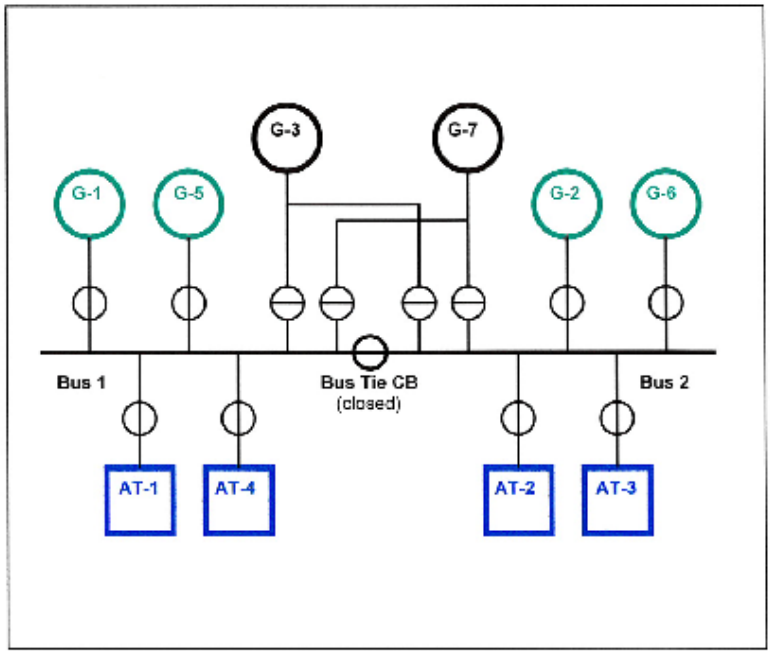
DPOS - 3 "Power Mimic"



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DP Operational Situations (DPOS – 3) Written Exercise

While completing the DP checklist, you are notified by the Engineer that Generator 3 is in standby, and Generator 7 is down for maintenance (ETR one hour).

The following questions are regarding the "final approach" to the platform which takes place between 1200 and 1230 local.

1. You are presently engaged in a "change position" maneuver and located approximately 40 m. from the structure. DGPS 1 fails due to position jumps outside the rejection limit. (failed median check). Which of the following would be the best course of action ?

   A. Deselect DGPS 2, while continuing the change position maneuver.

   B. Stop the vessel (present position), deselect DGPS 2, then continue change position maneuvers toward structure.

   C. Continue change position maneuver toward the structure while monitoring the "Position Fix Repeatability".

   D. Stop the vessel (present position), monitor DGPS 2 for several minutes on the "PME Median Check" mimic, and if good data, continue maneuvers toward structure while monitoring DGPS 2.

Additional remarks or comments:

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The1745 local time power plant and thruster status is as follows:

The Bus Tie CB is open. G-1 and G-5 are on line Kw load sharing at 39%, G-2 and G-6 are on line Kw load sharing at 46%. G-3 is in standby (engine not running). G-7 continues to be down for maintenance (ETR 18 more hours). Power plant "critical margin" is 10% of power available.

Thruster T-4 has been deselected and shut down for maintenance. T-1, T-2, & T-3 thrust demands are currently at 38%.

8. Based upon the time 1745 power plant and thruster status above, which of the following statements would be correct ?

   A. Should G-1 or G-5 fail, there would not be enough electrical power to provide the required thrust for T-1.

   B. Should G-2 or G-6 fail, there would be very little spinning reserve but no risk of "power chop" on Bus 2.

   C. There is enough "spinning reserve" on each Bus that any on line Generator failure would not create a station keeping problem.

   D. If G-2 or G-6 should fail, Bus 2 would "power chop" by about 40 Kw.

Additional remarks or comments:

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9. Considering the above time 1745 power plant and thruster status, what would be the result of generator failures with the Bus Tie CB closed ?

   A. A single generator failure would provide a 188 Kw power excess over the critical margin.

   B. There would be no difference in power available for thrusters whether the Bus Tie CB is opened or closed.

   C. Two generators could fail and still provide a small excess of power over the critical margin.

   D. A single generator failure would result in power available of only 3760 Kw.

Additional remarks or comments:

10. Considering the above time 1745 power plant and thruster status, which of the following would be the safest power plant configuration while maintaining an "open" Bus Tie CB ?

    A. Shut down thruster T-3 to reduce load on Bus 2.

    B. Start Generator 3, place on line, with CB closed to Bus 2.

    C. There can be no safer power plant configuration until Generator 7 is available.

    D. Shut down thruster T-2 to reduce load on Bus 2.

Additional remarks or comments:

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Course Subject Matter Outline

DAY THREE

- **DP System Simulator Exercise (6 hours)**

  Exercise vessel and operation consistent with work experience.

  Operation Planning -- Conduct Exercise – Critique

DAY FOUR

- **DP System Simulator Exercise (6 hours)**

  Exercise vessel and operation consistent with work experience.

  Operation Planning – Conduct Exercise – Critique

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Advanced Training For DP Operators

How could it be used ?

Advanced Training For DP Operators

General Refresher Training

- Certified and Senior DP Operators.
- Captains or Mates providing temporary watch relief.

Standard Operations Training

- Reinforce international guidelines specific to type of DP operations.
- Promulgate company specific DP operations policy and guidelines.

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Advanced Training For DP Operators

Operation Specific Training

- DP operation containing higher than normal risk element i.e. SIMOPS, CLOSEOPS, etc.
- Simulator exercises structured to specific operation.

DP Operator Knowledge & Skills Assessment

- Shortened format – possibly one or two days.
- Prospective or newly hired operator personnel.
- Written and simulator exercise assessment.
- Proper input, guidance, and evaluation criteria from participating companies.

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Conclusion

- "Qualified," "competent," and "experienced" are subjective terms – no absolute standard by which any operator is measured.
- We still have DP "incidents" – most of the time a qualified, competent, and experienced operator is on watch.
- Large number of DP vessels are under construction – more in planning stage – new operator manning may be an issue – critical question is how competent are the certified DP operators who will train them.
- Advanced training programs for DP Operators do exist – It is now up to DP vessel owners and operators to take advantage of them !!

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