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Observed “Human Factors” in DPS Simulator Training

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Abstract

Of all the factors to consider when assessing a persons ability to successfully operate a DP control system, or to determine to particular cause of a DP incident, perhaps one of the most overlooked is the "human factor". The term "human factor" as used in this paper, may be described as "an inappropriate action, mistake, or error that can be attributed to something other than a lack of knowledge or experience". The purpose of this paper is to bring to light some of the more common adverse human factors as observed by the author after having conducted more than eighty DP Induction & Simulator courses over the past four years.

Introduction

In every occupation skilled, trained and experienced people make mistakes, or have errors in judgment. In some of these occupations the results can be disastrous, such as the airline pilot who makes the decision to take off or land during a severe thunderstorm, attempts to land on the wrong runway due to poor communication with the tower, or misinterprets flight instrument data. Or the hospital patient who dies after receiving the wrong medication or dosage from a prescription poorly written by a doctor.

Although personnel who operate DP systems may not have the same degree of responsibility as those above, certainly death, injury, major pollution, or high cost due to equipment destruction and down time can be the result.

Some may argue that simulator training is not "real world" and therefore operator reactions are not accurately represented. To those I would say; when the systems are running, the background noise starts, the simulator compartment door is closed, the communication starts to flow, the occasional alarm sounds, and the system printer starts to chatter, its as close to real world as we need to get!

The remainder of this paper will deal with seven major adverse human factor areas as "observed" during simulator training. Post exercise critiques, especially near the end of a training course, will consistently focus more on mistakes and errors resulting from some human factor than from a lack of system familiarization or DP system knowledge.

The following information may be of particular value to DP vessel Managers, and onboard operating personnel such as vessel Masters, and DP Supervisors in dealing with onboard training programs as well as operational and watch standing procedures.

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Adverse Human Factors

1. Poor Operational Planning

While poor operational planning may not involve significant risk to personnel or equipment, it may cause loss of income due to down time.

Example; Three PME's required for DP operation….four PME's available on vessel….two PME's used to make final approach to platform….prior to arrival, third PME deployed….commenced DP operation….one PME fails….fourth PME cannot be deployed due to proximity of structure. Result; operation secured….vessel repositioned….operation resumed.

At the start of a simulator training course, students are required to produce, check, and have instructor review and evaluate the operational plan & diagram. Toward the end of the course with less instructor coaching required, the plans and diagrams often become less than adequate, and many time even when plans and diagrams are done well, they may not be referred to or followed during the exercise.

2. Reactive vs. Proactive System Operation (if it ain't broke, don't fix it?)

Successful DP system operation does not usually lend itself well to waiting until something fails, particularly since a vast number of system problems may give early warning signs. Notorious examples are PME and thruster problems. Critical data is often not viewed, or not viewed long enough to give the historical data necessary to understand the full scope of the problem, or to make good operational decisions.

3. High Speed Operation of Console Switches or Trackball Mouse.

High-speed selection of console switches or display windows becomes habit-forming, I call it the "video game syndrome".

Errors made during high-speed operation often create undesired results from which the operator may have to quickly recover. If these errors are made during maneuvers, or during critical alarm conditions, the results created may be confusing or not realized. There have been many observed situations where confusion / frustration resulting from high-speed operation have caused the operator to go into a mild panic mode. Often the consequences have been failure to indicate an appropriate yellow or red alert condition, or an unnecessary alert condition resulting in down time.

Window displays may be left open to speed up a heading and position data change process there by "masking" certain other critical displays such as; present set / actual heading or position information, station keeping display, or alarm data. The result is that developing problems or errors may not be observed.

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4. Failure to Read, Interpret, or Properly Respond to Alarm Messages.

One of the most frequently observed problems in simulator training is dealing with alarm messages. The assumption (by conditioning) is that any alarm (outside of perhaps a few nuisance alarms) must be serious and require immediate action. After all, alarms are initially indicated in bold "red" type!

Most alarm messages are very short in length. Time, equipment or system affected, and a very brief description of the type of problem is usually all that is, or needs to be given. If the message is not properly read, then there is little left but luck in attempting to interpret or properly respond to the situation.

Failure to interpret or understand the alarm message is usually the product of system inexperience, however there are many alarms indicating failures that may be rarely, if ever, seen by even experienced operators. All system operating manuals have a section that clearly indicates almost all alarm messages by message text, possible causes, as well as some indication as to operator action. This may be a good subject for an on board training program, in addition to keeping an extra copy of all system alarms within an arms reach of the consoles.

Proper response to an alarm condition normally requires additional investigation by the operator in the form of reviewing the appropriate system displays as well as vessel station keeping data and display. The operator must then give some measure of thought as to the consequences of any further action such as the deselecting of PME's and sensors, the shutdown of thrusters, or operational mode changes, etc.

Far to many incidents have been observed created by the mishandling of alarm messages, where the operator did not fully realize a potentially serious problem, a loss of redundancy requiring an alert condition, or the loss of station keeping through an improper response. Yes, there are cases where, if the operator had just done nothing, everything would have been fine.

5. Failure to Properly Communicate

Proper communication will always be essential to conducting successful DP operations. Most observed voice communication problems fall into three categories: (1) Not enough; (2) Too much; and (3) Miscommunication of critical data.

A common example of not enough information is when DP control does not keep the main operating station informed as to the possibility of system problems or worsening environmental conditions, until the situation becomes critical.

Too much information often causes a voice communication overload. Confusion results from the main point being lost, resulting in the need of additional information for clarification, or an improper reaction.

The following are examples of miscommunicating critical data.

a. DP to deck crew…"lower the taut wire"…(the vessel has two taut wires)….the wrong one is lowered…..positioning problems may be the result. (DP not specific)

b. DP to Engine room…..."shut down thruster T-2" (failed thruster)…..Eng. rm. shuts down thruster T-1…..loss of heading / position control….(no repeat for verification).

6. Poor decision making skills

Operational decisions made during severe system failures and / or loss of station keeping ability will normally be somewhat reactionary, and based upon the operators back round and experience level.

Under normal conditions, operators should take the time necessary to obtain additional information, weigh the expected result against a worse case scenario, and finally determine whether a potential risk is worth taking, or perhaps consider other options before a final decision is made.

Classic example:

- During early stages of initial approach to a platform, a blackout condition with loss of thrust occurs when the engineer places the last remaining generator on line.
- The vessel recovers….last generator remains offline …..engineer investigating problem…remaining generators sufficient to meet thrust, operational, and hotel loads with redundancy.
- Vessel on DP 12 meters off platform…..diving bell deployed….divers working inside structure.
- Engineer contacts DPO on bridge….indicates with reasonable high probability that the generator problem has been corrected…..requests permission to place the generator on line.

Observed results:

- 50% of the time, the DPO will give permission immediately with no further consideration or questions.
- 20% of the time the DPO will give permission after a short discussion with the engineer as to his faith that the problem has been corrected. (engineer gives a factor of 8 on a scale of 10).

7. Pressure From Clients

Often, clients may pressure (even inadvertently) vessel Masters and / or DPO's to commence, or continue operations under questionable conditions, primarily environmental conditions. This is true particularly after the vessel has endured considerable down time due to operational problems even unrelated to the DP system.

There is also the natural tendency for Masters and operators to want to please the client, if for no other reason than good public relations. This is fine up to the point of clouding one's good judgement.

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This operational pressure can be duplicated, to a reasonable degree, and observed during simulator exercises with predicted results. Post exercise critique will invariably bring comments like; “I was just trying to give them a little more time” or “I really didn’t feel good about the situation” or “I thought they understood the problem, and would shut down the operation”.

DP Operators are then encouraged to do the following:

a. Educate clients as to DP system limitations as well as capabilities.
b. Fully assess the level of risk based upon the vessels present operating condition.
c. Review, (with the client) and revise as necessary, the DP alert criteria.
d. Inform client in a timely manner as to impending problems as well as deteriorating environmental conditions. Continue to up date client.
e. Be prepared to shut down the operation if warranted.

Conclusion

Successful operation of DP control systems require more than knowledge and experience. Human factors will always play a major role in the success or failure of any DP operation. We must not only recognize that these factors exist, but train operators in how to deal with them.

DP training centers can, and do expose operators to some of the major adverse human factors in a limited amount of time, through simulator training. DP Vessel Managers and onboard supervisory personnel would be well advised to incorporate human factors as part of an onboard training program as well as in establishing operational and watch standing procedures.