DYNAMIC POSITIONING CONFERENCE
October 14-15, 2014

TRAINING AND COMPETENCE ASSESSMENT SESSION

What is Our Position?

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Return to Session Directory

All of the students in the following examples are certified DP operators. Please note that some of this presentation is based on internal reports in Kongsberg Maritime, theoretical testing of DP operators and experience from DP Instructors worldwide.

Why are we concerned?

Example 1

For many years we have presented DPO's with a pre course test where the screen shot below is included (Figure 1) and asked them: What is the vessels deviation from the position set point in this situation? We believed that the vessels position deviation was one of the DPO' major expertise but more than 90% of the students got it wrong.

Less than 1 out of 10 considered the model error, i.e. the distance between the mathematical model and the position reference systems when they answered this question. (See explanation in figure 2)

In most situations this model error is not large enough to effect the operation in a bad way but it clearly show that most of the certified DP operators do not appreciate or understand what they see on the DP control system screen. This gives us the situation where 9 out of 10 are not able to give the correct answer when we ask where they are.

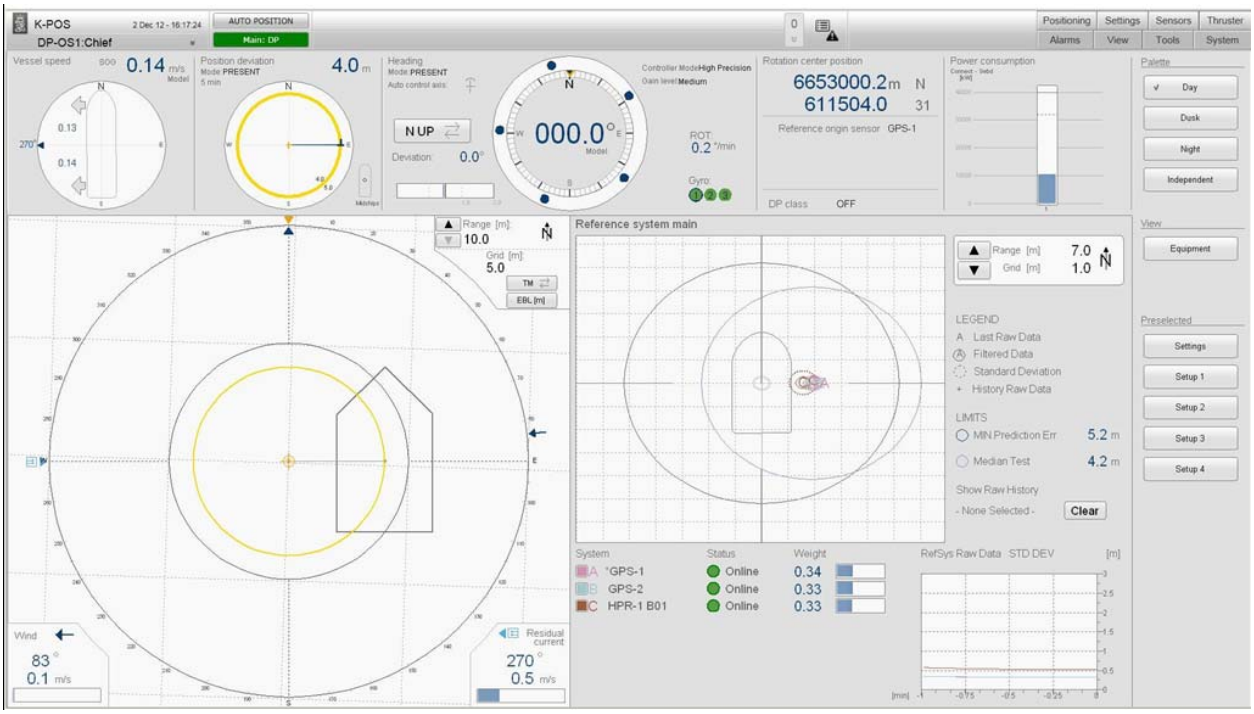

Figure 1

The actual position is the model position corrected for measured position, so in this case the actual position is 6 meter away from the setpoint.

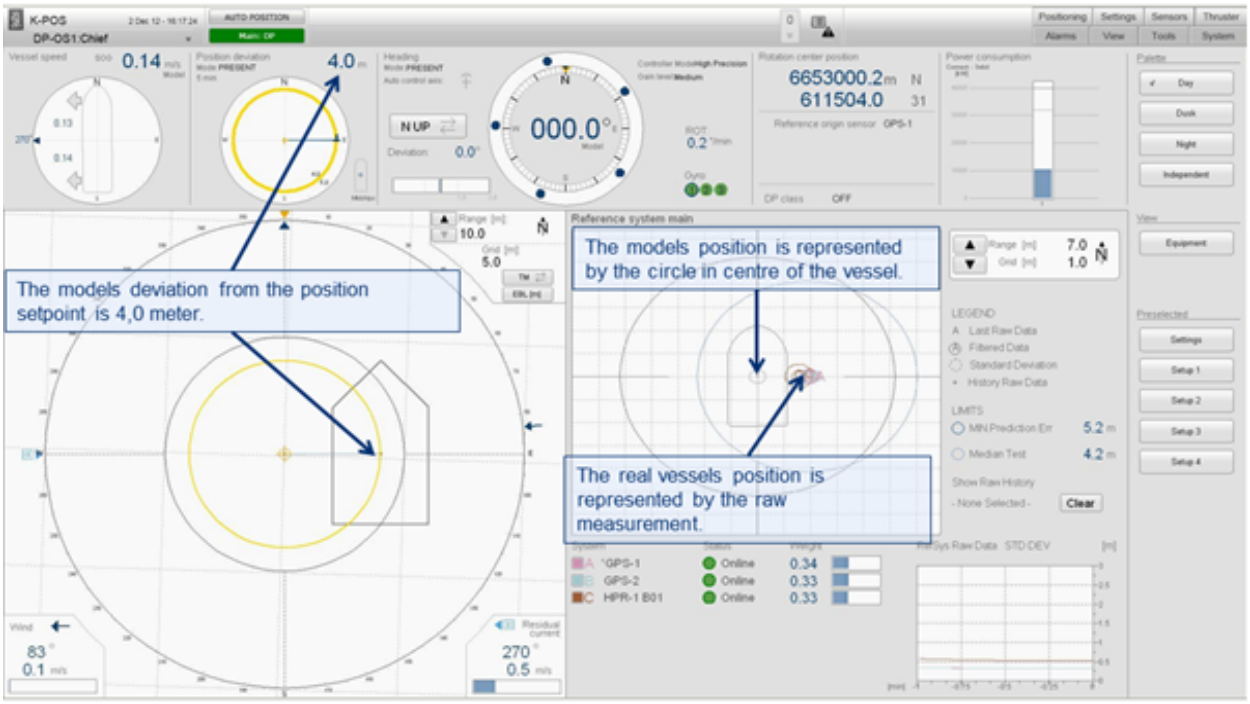

Figure 2

Example 2

Another issue we experience during simulator exercises is that the majority of the students are only checking the power view (figure 3) on the DP screen to decide the worst single failure. This view gives the DP operator limited information.

To be able to point out the worst case single failure the operator must make sure that the auxiliaries are set according to the design philosophy. The DP operator need to know if the engine room is not set up with redundancy in all systems to be able to decide if the operation can commence or need to stop.

Figure 3

Example 3

A number of incidents have revealed that some operators are not able to take control of the vessel in an emergency situation. It looks like use of independent joystick is rare when DP fails. Our impression is that the DP operator does not understand why the independent joystick is installed and how it works or are unaware if it works or not. This will cause them to use the manual levers, where they often fails to keep the vessel in a safe position until the job is terminated in a safe way due to lack of experience in maneuvering the vessel by hand.

Why is like this?

The situation we have today is a combination of many factors.

The majority of DP operators have received two types of training; generic training in a DP training center and training and practical experience received on-board vessels.

Generic training

Is the generic DP operator training good enough? We believe it is not.

In many operations the DP operator would need to respond correctly within 20 seconds to avoid escalation. Correct response requires:

- Correct apprehension of the situation.
- Decision of what counter measure to apply
- Ability to apply counter measures correctly

Is it possible to obtain this skill based on generic training only?

To obtain these skills, in-depth knowledge of the vessel design, the systems involved and the operation is necessary. In the certification scheme in operation today this competence is supposed to be built on-board the vessel. This requires that the competence already exists on-board. Does it?

Many DPO's believe that they know how to operate a DP system when they recognise the DP desk from a course or from a previous ship. We believe that the least challenging part is to push buttons. One of the most challenging parts is to understand how all the system on-board a modern DP vessel work together to achieve the functionality, capability and safety needed.

To avoid incidents the Key DP personnel need to fully know their system, know the consequences when something fail and be fully able to interact correctly.

In our opinion the generic training is not preparing the new DP operator for the work on-board, what competence he needs to build to become a good DPO. Studying the vessel system design, learning the different vessel systems involved, reading and understanding the FMEA, learn the company and vessel specific operation manuals, procedures and check lists.

On-board training

One of the major challenges we see as a training institution as well as a system manufacturer is to correct wrong learning based on myths and misunderstandings among the vessels crew. A trainee DPO will tend to trust the information given by superiors even though he learned different at the course.

In a conservative maritime industry there has been a long tradition where experience is one of the most important factors to gain knowledge and competence. It is only possible to gain competence from experience if it is based on facts.

How to splice a rope haven't changed much the last years, but the DP vessels are changing with the same speed as all other technology. Many DPO's which has logged thousands of hours DP time from older vessels will fall short when moving to a new vessel without proper familiarization and training.

Sending personnel to a vessel to learn from experience can give an excellent result, but not necessarily. It all depends on the trainer. If the officer responsible for the on-board training is out-dated the new DPO's will receive wrong information and continue to operate like they learned. This is how myths and tales are kept alive over a long time. We frequently meet operators using knowledge from the first generation of DP systems we made in the late 1970's. There are two places where this old information is kept alive, on-board vessels and in some of the DP training centers where the instructors has not received any training since they started many years ago.

Figure 4 Kongsberg ADP DP system from 1978

Figure 5 K-Master DP system 2014

Training of technical personnel.

One vessel owner claim that 16 out of 18 incidents last year (2013) were due to technical personnel.

The main focus in DP training is the DP operators. The majority of DP operators are licensed navigators with limited technical education.

The training given to technical DP personnel has mainly been as system maintenances courses where they learn to identify and replace faulty modules inside the DP control system and they have possibly not learn anything about what a DP system really is.

In the first official DP guidelines from the early 1980's it was recommended that the technical personnel should also attend the first part of the operators training. This recommendation is now back in STCW part B where it says "Training should not be limited to DPOs and DP masters only; other personnel on board, such as electro-technical and engineer officers, may require additional training and experience to ensure that they are able to carry out their duties on a DP vessel."

The lack of technical competence with the DPO's and the lack of operational competence with the technical crew can lead to unwanted situations.

When a team consisting of a supervisor from the company, the captain and a DPO writes the operation manual and the vessels procedures, the limited technical competence they possess can affect the result in a negative way. Including a properly trained and experienced chief engineer and electrical engineer into this work will improve the result and this will also increase the understanding between the deck and engine department.

We frequently see procedures and check lists in use on vessels which are not correct and often just a copy from another vessel in the fleet not corrected to fit that vessel.

How to improve

We do not suggest that the situation today is hopeless but we see room for improvement.

The number of incidents is not very high due to the increased reliability in the modern systems in use on-board vessels. This increased reliability can become a risk to the operation as the DP operator is only monitoring the system and may over time be insecure in what to do or how to operate the system.

We know that the consequences if something goes wrong could be catastrophic and there have been incidents costing this industry millions of dollars. How can we limit the number of human errors?

Generic training

It is important to realize the limitations of the generic DP operator training – it can only give the operator an overview of what is involved in DP and give the operator some guidance to what to look for when assigned to a vessel.

We believe the DPO must focus on acquiring vessel, system and operation competence on-board the vessel. To help in this the vessel owner must make sure that the operation manual and procedures are correct and up to date and that all other information shared between the operators also are correct.

Knowledge is not lasting forever. A DP operator is not challenged enough during normal operations especially in drilling vessels and they will need to be re-trained regularly.

Good and relevant on-board experience is invaluable but experience is not always relevant. A DPO who has logged thousands of hours DP time moving from one vessel to another to obtain better salary can be a hazard more than an asset. The only useful competence he might have is how to operate the DP panel and the DP screen. Everything else might be totally unknown to him.

Competence of vessels systems and operation is built over time and it is crucial for the safety of a vessels operation to keep the crew over time. Any newcomer is a risk and must be trained properly.

Training On-board

On-board training will continue to be the most important part of the DPO training. It must be realized that on-board training is valid for that vessel and any new operator must be properly trained when embarking a new vessel. To achieve the needed quality in the training it must be assured that the on-board personnel has up to date knowledge and the person responsible for training the new DP operators need to have the correct competence.

On-board experience is off course crucial to succeed with this but system or vessel specific courses and DP refresher courses could help the trainer being up to date. Without this focus we believe that we will continue to see that the on-board learning is based on myths and misunderstandings.

Time needed for on-board training and DP drills must be much more recognized in the industry. The client and the owner must allow the operators to practice emergency procedures. We will recommend using the vessel and the real system for the drills when possible. If the vessel cannot be made available for training, advanced simulator training which is properly tailored for the vessel and its operations can be an alternative.

It is also important to include the technical DP personnel in these drills to give them better understanding of the operation. The technical DP personnel do also bring other aspects to DP drills.

Training of technical personnel

The technical DP personnel should have understanding in the DP system design philosophy, functionality and redundancy principles and requirements. We believe it will increase the operational safety if the technical personnel have this competence.

A chief engineer must be able to explain to the DP operator how the worst single failure is effected when he open a crossover between two fuel systems, or when a cooling pump is down due to maintenance and the electrician must understand the consequences of leaving a UPS in manual.

Closing Words

To make DP operations safer is a responsibility all involved parties must take part in.

System manufacturers:

- To assist the operators to make the right decision in vessels with more and more complex design the manufacturers must develop better “decision making tools” to assist them.
- The documentation must be made more users friendly and the terms used in the systems should be made more understandable for the mariners.

Training institutions:

- Many of the training institutions must raise their level and change their focus. They must make sure that they have the latest learning material at all times and that they have the necessary knowledge of the systems and operations they teach.
- The training institutions must be able to give the technical DP personnel the correct education so they can take part in the important role they have on-board to make sure that all aspects of the vessels designs and functionality is used correctly.

DP Operator:

- After finishing generic training the DP operators must be much more focused on finding relevant information about the system they shall operate, and be able to use this information to take right decisions.
- Decision making is maybe one of the most important jobs for a DP operator, and therefore more simulator training should be used.

Key DP personnel:

- The key DP personnel need to make sure that they have the right information, knowledge and skills to operate the vessel in all situations.
- They also need to make sure that the DP personnel are working as a team and collaborate at all time.

The vessel owner:

- Must make sure that the crew is having the correct information, knowledge and skills to operate the vessel in all situations.
- They must together with their crew be better to pinpoint the needs regarding competence and training. The training institutions are deciding too much.
- When the vessel owner buys a training course from a training establishment he must make sure to clearly define the competence the course shall give and how the outcome of the course shall be verified or tested.
- The vessel owners must make sure that the crew get time to practice emergency procedures on-board.

Clients:

- Must give the vessel owner time to practice emergency procedures.
- Must make sure they get the required competence on-board the vessel.

Training recommendations

- Make a thorough on-board training scheme for new DP personnel
- Run on-board exercises regularly. Use table-top exercises during operation and use the opportunity to train maneuvering in-between operations.
- Send the key DP personnel to manufacturer's courses to update their competence on vessel specific systems when necessary. This will secure correct learning and avoid spreading myths.
- Use advanced simulator training if training on-board is impossible or to prepare for new operations.
- Assess the quality of the training both in-house and external.
- State the competence required after training and check that it is achieved.

We believe that training, re-training and testing in advanced full bridge simulators can make a great difference. The new simulators available now gives the possibility to do teamwork among all involved parties in an environment utilizing real systems, close to what you find on-board the vessel. Within a year or two we can come back and share our experiences.

We all need to make the DP personnel able to foresee what can go wrong and give them the ability to handle it.