



DYNAMIC POSITIONING CONFERENCE
October 15-16, 2013

QUALITY ASSURANCE SESSION

IMO Guidelines for vessels with dynamic positioning
systems

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Introduction

It is nearly 20 years since the International Maritime Organization introduced guidelines for dynamic positioning in the form of Marine Safety Committee circular 645 (MSC/Circ.645) *Guidelines for vessels with dynamic positioning systems*. The dynamic positioning system industry had gone through significant development and growth in the seventies and eighties and the time seemed right to introduce international guidance.

Up to that point the guidance used tended to be that from the then UK Department of Energy (UK DoE) and the Norwegian Petroleum Directorate (NPD), the North Sea being the most significant area of operation of dynamic positioning vessels at that time. This guidance was supplemented by guidance from individual vessel owners and operators, oil companies and trade associations such as the Dynamic Positioning Vessel Owners Association (DPVOA), later to merge with the International Association of Dive Contractors (AODC) to form the International Marine Contractors Association.

These guidelines opened with the preamble which listed the following five points:

- 1 These Guidelines for vessels with dynamic positioning systems have been developed to provide an international standard for dynamic positioning systems on all types of new vessel.
- 2 Taking into account that dynamically positioned vessels are moved and operated internationally and recognizing that the design and operating criteria require special consideration, the Guidelines have been developed to facilitate international operation without having to document the dynamic positioning system in detail for every new area of operation.
- 3 The Guidelines are not intended to prohibit the use of any existing vessel because its dynamic positioning system does not comply with these Guidelines. Many existing units have operated successfully and safely for extended periods of time and their operating history should be considered in evaluating their suitability to conduct dynamically positioned operations.
- 4 Compliance with the Guidelines will be documented by a Flag State Verification and Acceptance Document (FSVAD) for the dynamic positioning system. The purpose of a FSVAD is to ensure that the vessel is operated, surveyed and tested according to vessel specific procedures and that the results are properly recorded.
- 5 A coastal State may permit any vessel whose dynamic positioning system is designed to a different standard than that of these Guidelines to engage in operations.

It should be noted that the first two points deal with the international nature of the dynamic positioning vessel operations but the fifth point affirmed coastal states right to make their own standards for operations within their own waters, something the industry has seen a lot of in recent years.

Another important point is that number four above required that vessels are operated, surveyed, tested and results recorded and that compliance with the guidelines should be documented in the Flag State Verification and Acceptance Document (FSVAD), something which has not usually been done. However we have seen a very significant upsurge in vessels gaining FSVADs in recent years although in some cases this work is being devolved by flag states to bodies better able to carry out this verification and acceptance such as classification societies. However responsibility for the FSVAD ultimately remains with the flag state.

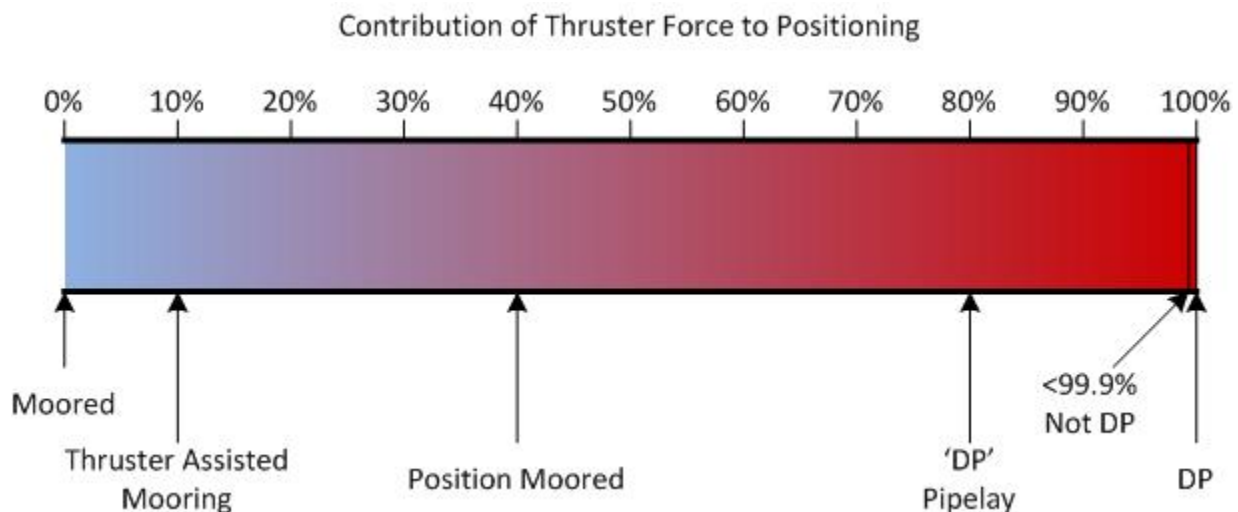
So we can see the drive behind this circular which remains valid to this day, in which case is there actually a need to revise this document? Here the industry seems to be split between those who say the document has served us well and continues to do so and thus does not need reviewing and those who say that the document has served us well but things have moved on and the document needs revisiting and refreshing.

For the 90th session of IMO's Maritime Safety Committee in February 2012 the United States of America, the International Association of Drilling Contractors (IADC) and IMCA submitted paper 90/25/17 *Proposed amendments to the Guidelines for vessels with dynamic positioning (DP) systems* (MSC/Circ.645). This paper was discussed at the session and it was agreed that the item should be added to the work programme of the appropriate committee. This would normally have been the sub-committee on Ship Design and Equipment (DE) however IMO is going through a process of change and this sub-committee together with those for Stability & Load Lines & Fishing Vessel Safety (SLF) and Fire Protection (FP) are being merged and rearranged into two new sub-committees, Ship Design and Construction (SDC) and Ships Systems & Equipment (SSE). At the time of writing this item does not appear on the agenda of either sub-committee.

Definition

One issue that the original document clarified was a definition of a dynamic positioning vessel, namely *Dynamically positioned vessel (DP-vessel) means a unit or a vessel which automatically maintains its position (fixed location or predetermined track) exclusively by means of thruster force.*

In the intervening years we have seen the development of such systems as Automatic Position Mooring (APM) and Thruster Assisted Mooring System (TAMS) where the position keeping of the vessel not only uses thruster force but components from the mooring system. Thus it does not maintain position exclusively by means of thruster force. The main component of such systems is the DP system itself and this has implications not only for the definition of a dynamically positioned vessel but also in the field of dynamic positioning operator (DPO) training, experience and certification.



Redundancy

Another definition contained within the existing document is that for redundancy which reads “Redundancy means the ability of a component or system to maintain or restore its function when a single failure has occurred.

Redundancy can be achieved for instance by installation of multiple components, systems or alternative means of performing a function.”

As this document is guidance this has led, in some cases, to interpretation, with various parties involved not always agreeing upon the interpretations. This can further be seen in the section dealing with position reference systems, which states “For equipment classes 2 and 3, at least three position reference systems should be installed and simultaneously available to the DP-system during operation” and “When two or more position reference systems are required, they should not all be of the same type, but based on different principles and suitable for the operating conditions.”

This has led to a practice where sometimes three position reference systems are available but only two are selected into the DP system. A further variation on this is to have two DGPS (Differential GPS) systems selected into the system with another position reference system available but not selected into the system.

Flag State Verification and Acceptance Document (FSVAD)

Until recently it has not been common place for flag states to issue the required FSVAD. This document, which should be issued by a flag state or an organisation duly authorised by it:

- Should be issued after survey and testing;
- Is issued for an unlimited period or one specified by the administration;
- Should cease to be valid if significant alterations are made to the DP system or its components;
- Should cease to be valid if the vessel is transferred to another flag.

This document will indicate the vessel’s DP equipment class using the criteria set out the Guidelines. However there can be some variation between these criteria and those used by classification societies to determine DP class, although not enough to place a vessel in a different class.

DP Class

At present MSC/Circ.645 identifies three DP equipment classes, namely classes 1, 2 and 3. However for a number of years some classification societies have been offering a DP class 0 classification, which raises the question of whether this should be included in the circular. Investigation of this area has indicated that the class societies no longer use this classification although it remains on their books. Thus this may not be an issue.

Furthermore some manufacturers and vessel owners and operators have suggested further additional classes and intermediate classes, such as DP Class 2+ from Rolls Royce and DP Class 4 for the vessel *North Sea Giant* amongst others. This raises the question is there a need to further review and revise the classes as contained in the circular. This also may not be an issue because it could be left to the DP system manufacturers and vessel owners and operators to demonstrate the increased capability and redundancy of the vessel to prospective clients rather than introduce more classes. Indeed retaining the three classes seem by far to be the simplest option.

New Equipment

Over the intervening years the technology used in or associated with dynamic positioning has changed and new innovative items have been added to the DP system, navigation bridge or control room. These include the use of data communications networks, one of the items identified within the Bibby Topaz incident, data loggers attached to the DP and voyage data recorders, the unified bridge where individual units have been replaced by monitors showing the readout from the appropriate instruments and data forwarded and operator station designation where operator stations can be set to be a station for whatever area is felt to be appropriate. This last item is of particular interest because we have already had a station keeping incident where an operator station in the engine control area managed to take control of the DP. Thus the question is do these items and any others of a similar nature need to be captured in the revised DP guidelines?

Other Issues

Within the existing document there are a number of items which are not referred to directly although some are there but not identified in the more familiar terminology. An example of this the Failure Modes and Effects Analysis (FMEA) which although not mentioned by that term within the document does appear within the section on surveys, testing and FSVAD. So here the question would be should FMEAs and their use be implicitly mentioned with the document?

Also capability plots are not mentioned and this may be an opportunity to bring uniformity to future capability plots. At the same time it may be an opportunity to ensure the terminology used throughout DP is identified and that the same terminology is used by all. Obviously this would have to be done, if it was going to be, without removing manufacturers' distinctive use of terms. However in such items as radar and ECDIS common terminology is used.

Finally for this section although there is guidance on bridge ergonomics from some classification societies, should incorporating some guidance on ergonomics for the dynamic positioning equipment be considered?

Human Element

Finally there is the consideration of the human element in dynamic positioning with the oft quoted statistic that two thirds of Dynamic Positioning Operators (DPOs) have less than two years' experience. This area has been addressed in the Standards of Training, Certification and Watchkeeping and is not a topic for the revision of the IMO document but is worth mentioning in passing.

As mentioned it is addressed in STCW but that does not deal with assessment and certification, the two areas which seem to be causing those involved the greatest concern at present. It is also mentioned in IMO Marine Safety Committee/Circ.738 Guidelines for Dynamic Positioning System (DP) Operator Training which in turn references IMCA's guidance.

Conclusion

The final point in the previous paragraph raises an interesting point, might it not be better for IMO to reference existing guidance. However here we encounter another difficulty in that there is so much guidance now available so which should be referenced?

So as mentioned above might it be easier to leave the document as it is but point through the appropriate means to guidance which would enable shipbuilders, ship-owners, ship operators and others to meet the requirements of IMO MSC/Circ.645?

Acknowledgements

I wish to acknowledge all who have given their assistance, both formally and informally, in the preparation of this paper.

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