The Training and Experience of Key DP Personnel

IMCA M 117 – January 1996
The International Marine Contractors Association (IMCA) is the international trade association representing offshore, marine and underwater engineering companies. It was formed in April 1995 from the amalgamation of AODC (the International Association of Underwater Engineering Contractors) and DPVOA (the Dynamic Positioning Vessel Owners Association).

IMCA promotes improvements in quality, health, safety, environmental and technical standards through the publication of information notes, codes of practice and by other appropriate means.

There are two core committees that relate to all sectors of members’ operations, covering:
♦ Safety, Environment & Legislation
♦ Training, Certification & Personnel Competence

The Association is organised through four distinct divisions each covering a specific area of members’ interests: Diving, Marine, Offshore Survey, Remote Systems & ROV.

IMCA M 117

This document has been referenced by the International Maritime Organization (IMO) and if revised its Maritime Safety Committee must be informed.

www.imca-int.com/marine/

The information contained herein is given for guidance only and endeavours to reflect best industry practice/to accurately portray industry-provided data. For the avoidance of doubt, no legal liability shall attach to any opinion and/or recommendation and/or statement herein contained.
The Maritime Safety Committee, at its sixty-sixth session (28 May to 6 June 1996),
considered the issue of training of dynamic positioning system (DP) operators in relation to
paragraph 4.12 of the 1989 MODU Code and, noted that the International Marine Contractors'
Association (IMCA) had prepared a publication on the "Training and Experience of Key DP
Personnel (Issue I/Rev.1)" which could be used as a guideline for the training of DP operators.

The Committee, recalling the obligations contained in regulation I/14 of the 1978 STCW
Convention, as amended, and noting the importance of adequate training of DP operators and the
recommendation of the Sub-Committee on Ship Design and Equipment, at its thirty-ninth session
(22 to 26 January 1996), invited Member Governments to bring the aforementioned guidelines to the
attention of the bodies concerned and apply them to the training of key DP personnel employed on
dynamically positioned vessels defined in paragraph 1.3.1 of the annex to MSC/Circ.645.

The Committee also agreed to make a reference to the Guideline in the footnote to section

The Committee noted that the above-mentioned IMCA publication, which identifies training
programmes, levels of competency and experience for the safe operation of DP vessels, is available from:

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The Committee invited IMCA to keep IMO informed of future amendments to the IMCA
guidelines, as appropriate.
SUMMARY

This guideline presents the recognised and agreed industry standard for the training, competence and experience required of all key DP personnel on dynamically positioned vessels. It is designed as an expansion of the IMO document on the same subject.

The guidelines are designed for vessels engaged in operations where loss of position could cause one or more of the following severe pollution, loss of life, major damage and economic loss.

The formal training courses to be attended by DP operators are defined in content, verification and approval. The practical experience required and the certification is also defined. Training for ETOs, EROs and engineers is specified.

The training can be performed either at an approved institution, or onboard a vessel provided the training is equivalent.

In addition guidance is given on a structured familiarisation procedure for key DP personnel joining a DP vessel or commencing a new project.

The principles and practices for refresher training are provided as are the requirements for operators wishing to submit experience in lieu of formal training.

In general all formal training is to be assessed and all training is to be approved, so that a common standard exists internationally.

KEY WORDS

DP Training Simulators Onboard Instruction
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1 INTRODUCTION

1.1 Background

1.1.1 Every vessel owner/operator agrees that trained and experienced key DP personnel are essential for a safe and commercially successful operation. The problem is always to find the most cost effective method to achieve a satisfactory standard. It is accepted that a formal training course is part of the experience necessary for a DPO. Formal training can be provided either using shore based facilities, or onboard using an approved simulator and or the vessel itself. It is also accepted that vessel specific training and experience is essential.

1.1.2 However it must also be possible for vessel owners/operators to have flexibility of key DP personnel because movement between different vessels can be beneficial and is often unavoidable. Benefit should also accrue to vessel owners/operators who purchase and formally use simulators and similar exercises for practical training on board.

1.1.3 All key DP personnel will make mistakes and some mistakes will result in DP incidents. It is recognised that training alone will not eliminate mistakes and that most key DP personnel will be better operators after an incident. This is providing that their confidence is not destroyed by the incident or the reaction of client or management to it.

1.2 Operational

1.2.1 Vessel owners/operators will allocate time in their DP vessels' schedule for training, and clients should encourage this as suitable opportunities arise during periods of on hire.

1.2.2 Limitations of bed space, helicopter flights or other matters frequently prevent verbal hand-overs between relief key DP personnel. It is in the interest of a vessel owner/operator and his client to facilitate hand-overs without interrupting the work. A system should always be agreed prior to the event.

1.2.3 The key DP personnel not only have to be competent and vessel experienced but they have to be able to work together and communicate. Clients must respect vessel owners/operators advice in this area.

1.2.4 Some projects are unusual and key DP personnel with vessel experience alone may additionally need detailed project familiarisation.

1.3 Contractual

1.3.1 All the above problems should be fully resolved prior to the commencement of a contract either by the vessel owner/operator following his normal practice, and/or by discussions at or prior to contract award. This code should reduce the inclination of clients to name key DP personnel in contracts, thereby restricting the vessel owner’s/operator’s flexibility.
1.3.2 For a new vessel, or a vessel that is new to a particular owner/operator, special arrangements might be necessary to bring the key DP personnel up to an adequate standard of vessel familiarisation and experience.

1.4 Definitions

**Key DP Personnel**  Masters, OIMs, Chief Engineers, DPOs, Watchkeeping Engineers and ETO/EROs.

**DPO**  A trained operator of a dynamic positioning control system.

**DP Trainee**  Person who has not attained a DP certificate, and will serve as a supernumerary until satisfactorily trained.

**Approved DP Training Course**  A training course given approval by a recognised body such as the Nautical Institute or NMD (see Appendix 1).

**ETO/ERO**  Electrical Technical Officer/Electronic Radio Officer.

**High Voltage**  Electrical voltage in excess of 3kV or 1kV in Norway.

**Established vessel**  A vessel that has been operational with the same organisation and in the same sea area for about 6 months.

**Unfamiliar Vessel**  A vessel with an unfamiliar control system.

**Familiar Vessel**  A vessel with a familiar control system.

**DP System**  All systems and subsystems that directly or indirectly effect the dynamic positioning of a vessel, comprising the following sub-systems: power system, thruster system, and DP control system.

**ECR/ER**  Engine control room/Engine room.

**Controlled Document**  A document controlled and updated by the company or vessel operator.

**Installation**  A fixed offshore structure, a live pipeline, a drilling unit, an accommodation unit, a floating production or storage unit.
2 OBJECTIVES

2.1 Primary Objectives

To improve the safety of DP operations by defining minimum standards for:
♦ the formal training of key DP personnel;
♦ maintaining continuity of vessel experienced personnel on board a DP vessel;
♦ the familiarisation programme for key DP personnel new to a vessel.

2.2 Secondary Objectives

The primary objectives should assist in achieving the following secondary objectives:
♦ an internationally accepted standard for the training;
♦ training resources are spent where they are most effective;
♦ on board training, familiarisation programmes and simulators are encouraged;
♦ clients cease naming key DP personnel and penalties if they are changed out.
3 TRAINING

3.1 Types of Training

3.1.1 Training of key DP personnel is essential and can take several forms:

1) Formal shore based training courses;

2) On board training under the supervision of an experienced operator when on DP but not with the vessel working, e.g. on stand by in open water;

3) On board DP simulator instruction and exercises;

4) On board instruction and familiarisation particular to that vessel;

5) Supervised operation of the control system;

6) Manufacturer's training ashore and on board;

7) Seminars with open discussions on vessel operation;

8) Equivalent approved company schemes.

3.2 Training Records

3.2.1 The amount of training and experience necessary for key DP personnel should depend on the type of vessel and the consequences of the position loss during their work. It is in the interest of vessel owners/operators as well as the individuals on board to keep records of the training and experience of key DP personnel.

3.2.2 DP training logbooks are issued by several organisations, e.g. NMD and the Nautical Institute. DP Logbooks for all key DP personnel are issued by the Marine Division of IMCA (International Marine Contractors Association) and are designed to cover the experience of DPOs after normal training.

3.3 Training Courses for DPOs

3.3.1 Formal training courses for DPOs have been in operation for several years. These courses were structured and approved by the Nautical Institute and are revised and audited from time to time by the validation committee. Some of these courses are also approved in structure and content by the Norwegian Maritime Directorate. Details of courses and their locations are contained in Appendix 1.

3.3.2 The structure of the training course for DPOs is as follows:

**Phase 1** Attendance of a DP induction course at an approved institution or organised on board, where the course will provide an introduction to the functions and use of a dynamic positioning system, or as a trainee DPO with on board training under the supervision of an experienced
DP operator. The course should be based around the content outlined in Appendix 2 and approved, as required by section 8.

**Phase 2** Documented practical experience in the use of DP systems on DP vessels for a minimum period of 30 Days as a Trainee DPO.

**Phase 3** Attendance of DP simulator course at an approved training institution or on board the vessel, where the course will provide training in the use of DP systems including, simulator exercises and emergency operations. The course should be based around the content outlined in Appendix 3 and approved, as required by section 8.

**Phase 4** Documented confirmation of six months supervised DP watchkeeping in an approved DP Logbook from the Master/OIM, and that the above training programme has been followed and completed, will result in the issue of a DP certificate from an approved body.

3.3.3 Operators who have suitable DP experience operating class 1 DP vessels, but have not followed a formal course of training, may, after a period of six months experience, gain exemption from the DP induction course.

**3.4 Training Courses for ETO/ERO**

3.4.1 ETO/EROs should attend a DP control system manufacturers' maintenance course designed to enable understanding of the control system and the procedures necessary for fault finding. It is in the interest of vessel owners/operators to maximise the ability of the ETO/ERO to fault find and repair the control system.

3.4.2 ETO/EROs should attend a DP familiarisation course, either at an approved institution or organised on board the vessel. It is important that they have a full understanding of the risks and consequences of maloperation of the DP system. The course should be based around the content outlined in Appendix 4.

This course may also be useful for other personnel involved in DP, e.g. Dive Super or certain shore based personnel.

**3.5 Training Courses for Engineers**

3.5.1 There are no formal DP related training courses for Chief Engineers and watchkeeping engineers at the present time. Chief Engineers can be sent on the DP control system manufacturer's maintenance course. As control systems become integrated it will become essential for the Chief Engineer to attend such a course together with the engine room watchkeeper.

3.5.2 It is in the interest of vessel owners/operators to always have on board at least one engineer or electrician who has received formal training on any integrated control system from the system manufacturers/suppliers.

3.5.3 It is recommended that engineers should attend a DP familiarisation course either at an approved institution or organised on board. It is important that engineers have a full understanding of the risks involved and the consequences of maloperation of the DP system. They should also fully understand their role
in the successful DP operation of the vessel. The course should be based around the content outlined in Appendix 4 and approved, as required by section 8.

3.6 Training Courses for Electricians

3.6.1 Electricians on vessels with high voltage (HV) systems should attend a course in the safe operation of HV systems, as well as instruction on the system on their particular vessel. The course can be carried out by an equipment supplier at his premises or onboard a vessel.
4 COMPETENCE OF KEY DP PERSONNEL

4.1 Master/OIM

4.1.1 The Master or OIM should normally be trained, experienced and competent to singularly take a DP watch for any DP operation.

Where this is not the case the Master or OIM should still have the following detailed appreciation of the DP control system’s capabilities and limitations. The vessel should also have adequate senior and junior DPOs to effectively man the DP control system.

4.1.2 His/her knowledge and experience should include:

i) Controlling the vessel using manual controls and joystick

ii) Principles and planning of DP operations in depth

iii) DP information input systems

iv) Comprehensive understanding of the DP computer/control system(s). Including changing between systems and the various modes of operation

v) Thrust units

vi) Power supplies

vii) Equipment redundancy, availability and maintenance requirements

viii) Operational capabilities and footprints

ix) Comprehensive knowledge and detailed understanding of the vessel’s operations manuals and communication systems.

x) Detailed knowledge of emergency procedures and actions due to failures of:

a) Input systems

b) Computer

c) Commands

d) Feedback

e) Generator/power

f) Thrusters

xi) Knowledge of the vessel's Failure Mode and Effect Analysis (FMEA), and an understanding of the implications of all identified failure modes.

4.1.3 Hold as minimum a formal qualification to an approved STCW convention standard and holds a DP simulator certificate issued by the NI or NMD.
4.2 Senior DPO

4.2.1 A senior DPO will have the experience and competence to singularly take a DP watch for any DP operation.

4.2.2 His/her knowledge and experience should include:

i) Controlling the vessel using manual and joystick controls

ii) Principles and planning of DP operations in depth

iii) DP information input systems

iv) Detailed understanding of the DP computer/control system(s), including changing between systems and the various modes of operation

v) Thrust units

vi) Power supplies

vii) Equipment redundancy, availability and maintenance requirements

viii) Operational capabilities and footprints

ix) Comprehensive knowledge of vessel's operations manuals and communications systems

x) Knowledge of emergency procedures and actions due to failures of:
   a) Input systems
   b) Computer
   c) Commands
   d) Feedback
   e) Generator/power
   f) Thrusters.

xi) Knowledge of vessels FMEA and an understanding of the implications of all identified failure modes.

4.2.3 He/she should hold as a minimum a formal qualification to an approved STCW convention standard and have completed an approved DP simulator course. If this senior DPO does not have to also keep marine watch then he/she need not have a marine watchkeeping qualification to an approved STCW convention standard. (This enables engineers, ETOs and EROs to be DP watchkeepers).

4.3 Junior DPO

4.3.1 A junior DPO will have enough experience and competence to take a DP watch for any DP operation supervised by a senior DPO.
4.3.2 His/her knowledge and experience should include:

i) Controlling the vessel using manual and joystick controls

ii) Principles and planning of DP operation

iii) Basic knowledge of the practical operation of DP control system, including changing between systems and the various modes of operation

iv) Knowledge and use of reference systems and other peripheral equipment

v) System redundancy, alarms and warnings

vi) Knowledge of vessel systems and their limitations

vii) Knowledge of DP alarm sequences and communications with reference to operational condition

viii) Knowledge of vessel's operations manuals and communications system

ix) Knowledge of vessels FMEA and its implications.

4.3.3 He/she will hold a formal qualification to an approved STCW convention standard and completed an approved DP simulator course. If the junior DPO does not have to also keep the marine watch then he/she need not have a marine watchkeeping qualification to an approved STCW convention standard. (This enables engineers, ETOs and EROs to be DP watchkeepers).

4.4 Chief Engineer

4.4.1 The chief engineer will be experienced and competent to singularly take a watch in the E/R or ECR and understand the operational requirements of the vessel, the consequences of failures and the optimisation of the redundancy available in equipment such as:

i) Thrust units

ii) Power generation

iii) Power distribution

iv) Power management/logic

4.4.2 He will understand the need for good communications between the bridge and engine control room and have a comprehensive knowledge of vessel's operations manuals including the FMEA.

4.4.3 He/she will hold a formal qualification to an approved STCW convention standard and have attended the manufacturer's/supplier's formal training on any integrated DP/power management control system.
4.5 **ECR Watchkeepers**

4.5.1 ECR watchkeepers will be experienced and competent to singularly take a watch in the E/R or ECR and understand the operational requirements of the vessel, the consequences of various failures in important equipment such as:

i) Thrust units  
ii) Power generation  
iii) Power distribution  
iv) Power management/logic

4.5.2 They shall understand the need for good communications between the bridge and engine control room, and have a comprehensive knowledge of vessel's operations manuals including the FMEA with respect to the significance of machinery redundancy.

4.5.3 They shall hold a formal qualification to an approved STCW convention standard and should have attended a manufacturer's/supplier's formal instruction on any integrated DP/power management control system. This instruction could be carried out on board.

4.6 **ETO/ERO**

4.6.1 An ETO/ERO shall be experienced and competent to maintain the DP control system and associated systems and carry out routine checks and maintenance. He/she shall also have a comprehensive knowledge of the vessel's operations manuals and FMEA with respect to the following equipment:

i) DP control system interfaces  
ii) Computer functions, tests and fault finding  
iii) Thruster units electrical power and sensors  
iv) Power and UPS systems  
v) DP control system hardware  
vi) DP control system software.

4.6.2 He/she shall be able to carry out tests and hence effect maintenance, repairs and replacements to systems and components with reference to the manufacturer’s approved operation and maintenance procedures. He/she shall understand when such work is safe and sensible to carry out, and the necessity of good communication with bridge and engine control locations.

4.6.3 An ETO/ERO shall hold a DP control system maintenance course certificate, and if he/she is also an electrician she/he should have a comprehensive knowledge of all switchboards and power management/logic, and have attended manufacturers/suppliers formal training on any integrated DP/power management control system.
4.7 **Electrician**

4.7.1 On a DP vessel where the electrician is responsible for the DP control system hardware and software he/she shall meet the requirements for an ETO/ERO above (it is recognised that his knowledge may be less specialist than that of an ETO/ERO). In addition if the vessel has high voltage system, he/she shall hold a certificate for operating an electrical high voltage system and have had instruction on the particular high voltage system installed.

**Note:**

Shipboard instruction from manufacturers/suppliers can be replaced by instruction from experienced ships personnel, ie. personnel who have had more than six months operational experience of the relevant equipment.
5 EXPERIENCE

5.1 Established Vessel

5.1.1 When a vessel changes owners and/or operators, or is deployed in a new sea area, it is difficult to crew the vessel with adequately experienced and trained personnel. The vessel owner/operator will establish adequate vessel experience as fast as is reasonably practical. After six months such a vessel's key DP personnel should have the competence discussed in section 4 and in addition have the sum of the following vessel experience particularly if the vessel is engaged in diving support, drilling or operations close to installations.

<table>
<thead>
<tr>
<th>Key DP Personnel</th>
<th>Any DP Vessel</th>
<th>Present DP Vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours</td>
<td>Weeks</td>
</tr>
<tr>
<td>Master/OIM</td>
<td>250</td>
<td>10</td>
</tr>
<tr>
<td>Senior DPO</td>
<td>250</td>
<td>10</td>
</tr>
<tr>
<td>Junior DPO</td>
<td>150</td>
<td>3</td>
</tr>
<tr>
<td>Chief Engineer</td>
<td>250</td>
<td>10</td>
</tr>
<tr>
<td>ECR Engineer</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>ETO/ERO</td>
<td>250</td>
<td>10</td>
</tr>
<tr>
<td>Electrician</td>
<td>250</td>
<td>10</td>
</tr>
</tbody>
</table>

5.1.2 The table above gives the key DP personnel's experience that should be found on every DP vessel world-wide even if a large change to personnel has taken place because of ownership etc. In the six month period for a vessel to become established the present vessel experience should be never less than that required for a new or unfamiliar vessel.

5.2 New or unfamiliar Vessel

5.2.1 An unfamiliar vessel is a new or different vessel to some or all key DP personnel. A brand new or converted vessel generally has owner's/ operator's acceptance trials as well as commissioning trials and FMEA trials, which enables key DP personnel to become vessel experienced in less time than in normal vessel service. For a vessel with unfamiliar control system(s) that is an installation, or that is expected to carry out DP operations near installations, a supervised programme of on board training is essential. The minimum period of familiarisation/training/practice that has been found to be satisfactory in the past is as follows.

This assumes other vessel experience is as per 5.1.1 and that instruction from manufacturers/suppliers is called on board as appropriate during the following times:
### Key DP Personnel

<table>
<thead>
<tr>
<th>Key DP Personnel</th>
<th>Minimum Vessel Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master/OIM</td>
<td>50 hours</td>
</tr>
<tr>
<td>Senior DPO</td>
<td>50 hours</td>
</tr>
<tr>
<td>Junior DPO</td>
<td>50 hours</td>
</tr>
<tr>
<td>Chief Engineer</td>
<td>21 days</td>
</tr>
<tr>
<td>ECR Engineer</td>
<td>14 days</td>
</tr>
<tr>
<td>ETO/ERO</td>
<td>21* days</td>
</tr>
<tr>
<td>Electrician</td>
<td>21* days</td>
</tr>
</tbody>
</table>

* If both an ETO/ERO and an electrical engineer are normally on board at the same time the vessel time can be reduced to 14 days each.

5.2.2 The DP hours above can be reduced if a simulator of the DP control system is available together with a structured and supervised training programme. The maximum benefit will be half the required hours at a rate of 2 hours simulation to 1 hour of actual DP operation. This assumes that the actual DP operator has continuous active use of the DP control system and not just monitoring position keeping.

5.2.3 The days required for engineering staff assume that time is spent in port and on passage becoming familiar with the vessel’s engineering systems and their control.

5.2.4 If the personnel are moving from a class 1 to a class 2 or 3 vessel, and have a limited certificate, they should also have an additional 50 hours another 7 days and should then gain three months experience as a junior DPO.

### 5.3 DP Vessel with Familiar Control Systems

5.3.1 A vessel with familiar control systems is one that has the same DP control system or the same type of engines and switchboard manufacturer and is engaged in similar operations. If the equipment supplier is the same this will not necessarily mean that the control system is familiar because third and fourth generation DP control systems are quite different to operate although the concepts are the same. Vessel owners/operators will declare to clients which systems are similar within their fleet.

### 5.4 Familiar Vessel

5.4.1 For a vessel with a familiar control system that is an installation or that is expected to carry out DP activities near installations there is a minimum period of familiarisation/training necessary as outlined below:

- **Master/OIM**: 24 hours of active DP operations over a period of at least 3 days, with a vessel experienced operator providing instruction/supervision. Alternatively if DP operations are not in progress three days of instruction/demonstration of the vessel from an experienced DPO.
<table>
<thead>
<tr>
<th>Role</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Senior DPO</strong></td>
<td>24 hours of active DP operations over a period of at least 3 days, with a vessel experienced operator providing instruction/supervision. Alternatively if DP operations are not in progress three days of instruction/demonstration of the vessel from an experienced DPO.</td>
</tr>
<tr>
<td><strong>Junior DPO</strong></td>
<td>24 hours of active DP operations over a period of at least 3 days, with a vessel experienced operator providing instruction/supervision. Alternatively if DP operations are not in progress three days of instruction/demonstration of the vessel from an experienced DPO.</td>
</tr>
<tr>
<td><strong>Chief Engineer</strong></td>
<td>24 hours of active ship operation over a period of 3 days with experienced engineer of same position and discipline or alternatively, if DP operations are not in progress, 3 days of overlap with engineer of the same position and discipline.</td>
</tr>
<tr>
<td><strong>ECR Engineers</strong></td>
<td>24 hours of active ship operation over a period of 3 days with experienced engineer of same position and discipline or alternatively, if DP operations are not in progress, 3 days of overlap with engineer of the same position and discipline.</td>
</tr>
<tr>
<td><strong>ETO/ERO/Electrician</strong></td>
<td>24 hours of active ship operation over a period of 3 days with experienced engineer of same position and discipline or alternatively, if DP operations are not in progress, 3 days of overlap with engineer of the same position and discipline.</td>
</tr>
</tbody>
</table>

5.4.2 The above assumes that a familiarisation procedure is in place and that each of the above personnel have time to operate equipment prior to the vessel starting work.
Illustration of Relationship between DP Vessels Key DP Personnel Experience

New vessel control system

6 months

Established vessel

Sold

New or unfamiliar vessel (personnel change)

6 months

Established vessel

Familiar vessel

Sold

New vessel, similar DP control system

6 months

Established vessel

Major redeployment

New or unfamiliar vessel (personnel change)

6 months

Established vessel

Familiar vessel

New or unfamiliar vessel (personnel change)

6 months

Established vessel

Familiar vessel

Unfamiliar vessel

6 months

Established vessel

Familiar vessel

New or unfamiliar vessel (same personnel)

6 months

Established vessel

New or unfamiliar vessel (same personnel)

6 months

Established vessel
6 FAMILIARISATION

6.1 Procedure

6.1.1 All key DP personnel joining any DP vessel should have a structured familiarisation procedure which starts with the reading of appropriate manuals, DP incident reports, FMEA, DP operations manual and any documented DP history, e.g. annual DP trials reports, check lists etc. Vessel familiarisation requirements should be controlled on board to ensure relevant manuals and familiarisation routines are completed. There is no need for the joining personnel to read manuals that are the same as on other DP vessels, as is frequently the case for vessels of the same owner/operator. In addition a structured hand over procedure should exist to ensure continuity of operational and work site knowledge.

6.1.2 The vessel owner/operator is responsible for establishing, issuing and maintaining controlled documents on board the vessel. The overall responsibility for familiarisation lies with the vessel's master or OIM. The master or OIM is also responsible for the correct implementation of the familiarisation programme. The vessel owner/operator is responsible for checking that the procedure is followed.

6.1.3 On arrival onboard the vessel a guided tour and general familiarisation routine should be completed by all personnel and should include:

- The emergency plan and lifeboat stations
- The vessel's safety plan
- Escape routes
- Survival craft
- Fire fighting equipment location and use
- Protective clothing, equipment and its use
- Safety notices and signs
- Reporting forms
- Permit to work system
- Action in event of emergencies
- Restricted practices
- Personnel management system
- Helicopter routines and procedures
- Instruction on controlled documents
- Job descriptions
- Organisation chart and reporting lines
- Familiarisation of client procedures
6.1.4 In addition operators of the DP control system require instruction on the following:

   a) Control of vessel's movements about a set point using manual controls
   b) Control of vessel's movements about a set point using joystick controls
   c) Switching and changing between systems
   d) General understanding of DP system installed on vessel
   e) Set up vessel on DP, understand reasons for procedures
   f) Ability to use DP panel whilst on DP
   g) Use of desk facilities
   h) Use of reference input systems and the vessel specific limitations
   i) Power supplies for DP computers and thruster control units
   j) Emergency power supplies
   k) Alarm sequence and signals
   l) Loading and general use of DP control computers
   m) Familiar with system configurations thruster/m_eng/sensors expected in normal and emergency situations, and if all changeovers are manual or automatic
   n) Use, understanding and location of position reference sensors
   o) Use, understanding and location of:
       a) Gyros
       b) VRUs
       c) Anemometers
       d) Other data input systems.
   p) Ships power generation, distribution and propulsion together with fire and watertight subdivision
   q) Understanding of functions operation and limitations of the vessel, including vessel's capability plots.

6.1.5 In addition to 6.1.3 engineering personnel need instruction on the following:

   a) Be conversant with all vessel's engine room standing instructions concerning normal and emergency operations
   b) Be familiar with correct configuration of equipment in the normal mode of operations
   c) Be familiar with the correct configuration of equipment to allow changed operation to auxiliary units on any single failure
d) Be familiar with alarm equipment and the consequences of such alarms

e) Be aware of the importance of good, clear and early communications with bridge/control room in the event of any changes to normal mode of vessel's operating capabilities.

6.2 Project Familiarisation

6.2.1 Operational

There is a need to consider hazards arising from operational activities connected with the project. The need to provide information to the vessel concerning procedures and safety management of the project prior to the commencement of activities is vital. It is essential that the experience and knowledge gained through operational activity is retained. To ensure the continuity of operational and project experience is not lost through the rotation of personnel the following should be carried out:

♦ Project familiarisation
♦ Work site familiarisation
♦ Vessel familiarisation
♦ DP system familiarisation

Continuity of operational knowledge can be assured by:

♦ Project and workscope briefing
♦ Staggering of crew rotation
♦ Overlapping shift rota
♦ Allocating time for training and familiarisation

6.2.2 The vessel owner/operator has a responsibility for establishing and maintaining a system whereby operational knowledge and procedures are retained throughout the project in the event of personnel rotation.
7 REFRESH PRINCIPLES AND PRACTICE

7.1 Principles

7.1.1 It is essential that skills acquired through DP training are maintained. The maintenance and retention of such skills can be assured by:

- Continuous regular performance of DP operations;
- Frequent regular training and practice of DP skills;
- Formal refresher training.

7.1.2 In assessing if refresher training is required, the following questions should be addressed and considered for each case, as needs will vary between individuals.

- Has the subject matter changed?
- Has the DPO's past performance highlighted the need for re-training?
- Is the person regularly involved in performing the task?
- Is the level of in-house training provided by the company adequate?
- Will the individual and vessel safety benefit?

7.2 Suggested Practice

7.2.1 For persons who have not operated a DP system for more than 2 years, the provisions of 5.3 shall apply. If the whole vessel is to recommence DP operations then 3 days of re-familiarisation coupled with annual DP trials and instruction from equipment suppliers during the trials should be arranged.

This period can be reduced by half if 12 hours of a DP simulated operation spread over a period of 3 days is organised and executed.

7.2.2 For personnel returning to a vessel on which they formerly served more than 2 years previously with or without DP experience in between, the provisions of 5.3 shall apply.

7.2.3 After 3 years without operating a particular type of DP system, or not operating any DP system, a DP operator shall be deemed to be joining a vessel with an unfamiliar DP system and the provisions of 5.2 shall apply.

7.2.4 In addition to 7.2.3 above a DP operator who has not operated a DP control system for 5 years or more shall retake the DP simulator course or a special refresher course designed for such personnel.
8 VERIFICATION

8.1 Control of DP Training Courses

8.1.1 In order to ensure the quality of DP training every centre and company equivalent scheme, including on board training, shall be approved by the flag state administration and verified by the Marine Division of IMCA. This will apply to all formal courses.

8.1.2 All courses will require the provision of a clear statement of the training objective for:

i) The overall training program

ii) Each part of the training

iii) Skills and knowledge to be learned from each section of the training

8.1.3 The syllabus of each course should be submitted for approval. Any subsequent changes to the syllabus should also be submitted.

8.1.4 Documentation will also be required to show the method of testing and assessing the effectiveness of the section of training.

8.1.5 Details will be required defining the knowledge, skills and social skills required for each stage of the training. In particular the social skill required by a senior DPO to train future junior DPOs should be specified.

8.1.6 The assessor will require to see the following:

♦ a simplified statement of course objectives
♦ a sample feedback form that is given to all trainees
♦ analysis of trainees responses from the feedback form

The assessors will want to satisfy themselves that:

♦ Staff and guest lecturers are themselves well briefed in new developments
♦ The course uses information relating to near miss and critical situations for training purposes and draws on the latest incident information
♦ The training courses meet the intent of this document

8.1.7 Training centres and company training schemes shall be validated at regular intervals
9 CERTIFICATION

9.1 DP Operator Certificates

9.1.1 Training of DP operators is in four parts:

i) Attendance and satisfactory completion of an approved induction course

ii) Sea going DP familiarisation (30 days)

iii) Attendance and satisfactory completion of an approved simulator course

iv) Satisfactory completion of six months DP operations

9.1.2 Each trainee will be required to keep a logbook. This will record their progress through the training process as well as the items which will need to be learnt, understood and applied in the sea going phases.

9.1.3 Satisfactory performance at the induction and simulator course shall be formally assessed by an examination or equivalent method.

9.1.4 Satisfactory completion of six months at sea will be authenticated by the captain that the trainee has worked under. The Captain will recommend the trainee to the relevant authority for full certification. The Captain performing this task should be a fully qualified DPO, if not then the training should be authenticated by two senior DPOs that have supervised the trainee. In either case those who authenticate the logbook and recommend the trainee should be fully satisfied with the trainee's ability to become a senior DPO. If applicable the training shall also be endorsed by the company's appointed DP training authority.

9.1.5 Operators that gain a certificate through serving on a class 1 vessel will be issued with a certificate endorsed as "limited". To have the "limited" removed they require:

a) An additional 50 hours vessel's experience over 7 days as per section 5.2;

b) Three month experience acting as junior DPO on a class 2 or class 3 vessel;

c) Authentication as described in 9.1.4.

9.2 Engineering Staff Certificates

9.2.1 Following satisfactory completion of an HV course an electrician will be issued with a certificate to authentic this (see section 4.7.1).

Note: such a certificate does not exist at present but is under discussion in January 1996.
10 EXPERIENCE IN LIEU OF TRAINING

An experienced DP operator, who has not been through the formal training procedure can obtain a certificate provided that:

i) an authenticated log of their experience is submitted

ii) they satisfactorily complete the assessment outlined in 9.1.3. Where appropriate this assessment may be performed on board by an approved person.
APPENDIX 1 – DP TRAINING COURSES

Aberdeen College
Approved courses are as follows:
♦ DP Induction Course – 4 Days
♦ DP Simulator Course – 4 Days
♦ Familiarisation Course – 2 Days
♦ Thruster Assisted Mooring Systems (TAMS)

Simulator Courses can be offered on the following systems:
♦ Simrad ADP 503 MK II
♦ GEC GEM 80 Duplex System

Other services available are as follows:
♦ On board DP courses
♦ On board training exercises
♦ Assistance at DP trials
♦ Research of DP capabilities of vessel

Arrangements for courses contact:
IC Giddings
Aberdeen College, Marine and Offshore Technology Unit
Gallowgate, Aberdeen AB9 1DN
Telephone No: +44 (0) 1224 640 366

Lowestoft College
Approved courses are as follows:
♦ Induction Course – 4½ Days
♦ DP Simulator Course – 4½ days
♦ Introduction to DP – 2 Days
♦ DP Shuttle Tanker Course – 3½ Days

Simulator courses are offered on Simrad ADP 503 MK II simulator.

Other services include specialised training on most DP vessels tailored to the owners needs.

Arrangements for courses contact:
David Bray or Malcolm Brown
Lowestoft College, Maritime and Offshore Centre
St Peters Street, Lowestoft, Suffolk, NR32 2NB
Telephone: +44 (0) 1502 583 521
Cegelec Projects

Cegelec offers training on its systems as required – contact:

Steve Raynor, Chris Bannigan, Richard Bond
Cegelec Projects, Marine Systems
Boughton Road, Rugby, Warwickshire CV21 1BU
Telephone: +44 (0) 1788 563 563

Simrad Albatross AS

Simrad offers approved training on its systems as required – contact:

Rolf Skatvedt, Training Manager
Simrad Albatross AS, Training Department
PO Box 483, N-3601 Kongsberg, Norway
Telephone: +47 (0) 32 86 50 00

Nautronics Ltd

Nautronics offers training on its systems as required – contact:

Dave Maxwell
Nautronics Ltd, Sales and Marketing
Wookburn Road, Blackburn Industrial Estate, Aberdeen AB2 0RX
Telephone: +44 (0) 1224 791 000

Note 1 – ‘Approved’ means approved by Nautical Institute and NMD

Note 2 – The above was correct on the date of issue. For more up-to-date information on shore- and vessel-based courses please contact IMCA:

IMCA, Carlyle House, 235 Vauxhall Bridge Road, London SW1V 1EJ
Telephone: +44 (0) 20 7931 8171    Fax: +44 (0) 20 7931 8935
(IMCA details updated since original publication)
APPENDIX 2 – INDUCTION COURSE

The induction course should provide the trainee with:

♦ a knowledge of the principles of DP
♦ the ability to set up and operate DP equipment and position sensors
♦ the ability to recognise alarms and warnings
♦ a knowledge of the total DP system
♦ an understanding of capability plots and footprints

Induction training should detail the following:

i) A definition of dynamic positioning, the six degrees of freedom and the DP control function

ii) Elements of a DP system; power generation, power distribution, power management, thrusters, DP control system, sensors, communications and the operators

iii) Details of elements of the DP control system including processors, control consoles, and position, heading, vessel and environmental sensors. The use of position sensors e.g. pooling, voting, weighting. The principle of wind feed forward. The concept of power limiting

iv) The types of vessel using DP. Consideration of the various modes and functions available e.g. joystick, DP, follow sub, track follow, weather vane etc.

v) Thrusters and manoeuvring systems; their configuration, capabilities and limitations

vi) The principle of the action of DP control system controllers

vii) The requirement and provision of redundancy in vessel's systems and DP class notations

viii) Applying risk analysis and safe working limits to various operations

ix) Operational procedures including; work site approach, planning DP operations and planning for contingencies and emergencies

x) Procedures for operating the DP system including; maintaining a logbook record, use of checklists, communications and manning levels

xi) Assessment of vessel capabilities with respect to environmental conditions, shallow and deep water etc.

xii) Failure Mode and Effect Analysis, proving trials, annual trials and mobilisation trials.
APPENDIX 3 – SIMULATOR COURSES

The DP simulator course should provide the trainee with:

♦ a practical knowledge of the planning, conduct and execution of DP operations

♦ the ability to correctly use and interpret work site diagrams and plan in detail every stage of an operation, as well as planning for a variety of emergencies

♦ the ability to demonstrate understanding and competence in a variety of simulated scenarios using a DP simulator. This will include the handling of normal operations as well as a variety of emergency failure modes.

The course should include the following content:

i) A study of case histories in respect to vessel incidents and accidents, based on the incident data and newsletters.

ii) Construction and use of work site diagrams, charts and vessel templates for use in operations.

iii) Preparation of plans for a projected DP operation, contingency plans for expected deviations and emergencies.

iv) Participation in simulated situations in a variety of capacities while handling routine and emergency situations.

v) New developments in DP systems including position sensors and control systems.

vi) Applying risk and defining DP equipment classes.

vii) Other DP applications including pipelay, cable lay, shuttle tankers, etc.

The simulated situations should include failure modes drawn from the following list. If a particular failure cannot be covered by the simulator's features or due to insufficient time then they should be discussed with the trainee.

Classic Failure Modes for Simulation Course

1) Most useful thruster to 100% pitch, e.g. forward bow thruster or main propeller thruster trip only when overload is reached or emergency stop activated. Note: deselection of thruster does not stop thrust

2) Operator deselects thruster for engineering purposes (request from E/R) engineer trips another (critical) thruster.

3) Azimuth thruster giving thrust in 180° the wrong direction and no alarm for 20-30 seconds.

4) Wind shifts 30° in 5 seconds from ahead to bow when operating close to limits.

5) Wind sensor shielded then "sees" 25 knots during small position move in marginal conditions.
6) "Perfect" position reference drops out other sensors and accelerating drift off results.

7) TW and HPR drag simultaneously and fast position shift causes Artemis to lose lock.

8) "Off line" computer has different model and wanted position when "on line" computer fails.

9) Gyro selected drifts slowly operator to avoid jump in heading on alarm.

10) VRU selected jumps 5° static angle when using just HPR and TW.

11) Vessel rolls without VRU correction.

12) ½ blackout when working upwind of burning platform with inadequate thruster power because of fire monitors power demand. *Note:* Upwind essential for water to reach platform position selected must enable drift clear.
APPENDIX 4 – DP FAMILIARISATION COURSE CONTENT

The DP familiarisation course should provide trainees with the following:

i) An understanding of how the DP control system, vessel sensors and position references operate. Their limitations and importance should be covered.

ii) An understanding of redundancy and importance of the DP systems component parts; power generation, power distribution, thrusters, power management, DP control system, sensors and communications.

iii) A knowledge of the types of incidents that have occurred including: drift off, drive off, other losses of position caused by operator error, equipment failures or procedural matters, either singly or in combination.

iv) An understanding redundancy as applied to the DP system for classes specified by Lloyds, DNV/NMD, IMO and DPVOA guidelines.

v) In particular a knowledge of physical failures such as fire and flood.
## APPENDIX 5

<table>
<thead>
<tr>
<th>Reference</th>
<th>Instructed by</th>
<th>Instructor’s Sign</th>
</tr>
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<tbody>
<tr>
<td>Thrusters available</td>
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<tr>
<td>Switchboard feedings</td>
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<tr>
<td>Engine Room feedings</td>
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<td>Manual control of vessel</td>
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<td>Experience feedback report</td>
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</tbody>
</table>

Name of person instructed: ...............................................................

Position of person instructed: ...............................................................

Instructor signature: ...............................................................................

Master Signature: ...................................................................................

Date: ........................................................................................................

Vessel: ........................................................................................................
DP Training Courses

Publication IMCA M 117 - *The Training and Experience of Key DP Personnel* – includes guidance on the training of DP operators and has been referenced by IMO in MSC/Circ.738 and the MODU Code.

Appendix 1 of that document provides detailed information on specific DP training courses following the Nautical Institute scheme and/or approved by the Norwegian Maritime Directorate. More limited information has, from time-to-time, been made available to members, most recently via information note IMCA M 07/01.

We would draw members’ attention to the most up-to-date information copied overleaf, taken from the Nautical Institute website – [www.nautinst.org/training_sources/dptc.htm](http://www.nautinst.org/training_sources/dptc.htm)

The information includes full contact details for training providers. Each has its website listed, where members will be able to find more detailed information on the range of courses and specific equipment covered.

Those which are members of IMCA Marine Division (directly or as an affiliate of a member company) are highlighted with an asterisk. These establishments therefore benefit from receipt of IMCA reports, copies of safety flashes and information notes as they are produced.

This information will also shortly be referenced and linked to from the Marine Division website at [www.imca-int.com/marine/](http://www.imca-int.com/marine/)
Information Note IMCA M /02

DP Operator Training Information, from www.nautinst.org/training_sources/dptc.html

Maersk Training Centre, Denmark
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