THE NAUTICAL INSTITUTE

CERTIFICATION AND

ACCREDITATION STANDARD

Vol.1 – Training and

Certification

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DOCUMENT VERSION CONTROL

NI Certification and Accreditation Standard Vol 1 – Training and Certification		
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TABLE OF CHANGES

Page	Subject	Original content v2 (January 2019)	New content v1 (January 2020)	
5	Section 1: Introduction to the Dynamic Positioning Operator Training	***"Note for information*** Prospective DPOs who are not Officer Trainees or certified Officers will be able to apply for certification if they commenced training prior to the implementation date (1st January 2012) and all elements have been completed within a five-year period at the time of application."	Text removed from 1.6	
7	Section 1: Introduction to the Dynamic Positioning Operator Training	New content added	Text added in 1.8: "It should be noted that only the Induction (Basic) Course will remain valid when transferring schemes (no sea time or tasks), provided all training is then completed within four years."	
10	Section 2: Information Applicable for All DP Training Schemes	New content added	Text added in 2.2: "Providing all training has been completed within this timeframe, the time between the date the Statement of Suitability was signed and the date the application is received at the NI should not exceed three months."	
10	Section 2: Information Applicable for All DP Training Schemes	[2.2] "prior to submission of the application"	"prior to the date the Statement of Suitability is signed"	
15, 16	Section 3: Offshore Training Scheme	New content added	Updated flowcharts inserted in 3.3 and 3.4	
18	Section 3: Offshore Training Scheme	"This is because the DP sea time cannot be verified or validated with backdated signatures and stamps."	Text removed from 3.6	

22	Section 4: DP Self-Elevating Platform (Jack-up) Training Scheme	"This is because the DP sea time cannot be verified or validated with backdated signatures and stamps."	Text removed from 4.1	
26	Section 5: Shuttle Tanker Training Scheme	"… second offshore loading operation as required"	Text amended in 5.1 (PHASE 2; PATHWAY A): "… eighth offshore loading operation as required"	
30	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	New content added	Text added in 6.1: **"Any Certificates dated on or before this date that have not been revalidated by 31st December 2019 will be invalid from 1st January 2020. Full reference to NI Circular 003/2019 should be made if applicants are unsure how to revalidate from this date."**	
35	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	[ROUTE 2] "60 DP sea time days on board a DP2/3 classed vessel + Statement of Suitability upgrade form signed off by the Master + confirmation letter from the company. Any DP time previously used to obtain a DP Limited Certificate cannot be used towards the time required for the removal of the restriction from the DP Certificate. Only DP sea time days from after the issue date of the Limited Certificate can be used."	Text brought in line with 3.9	
35	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	"this is equivalent to 75% of active DP sea time days required for the Offshore training scheme"	Text removed from 6.1 (ROUTE 4)	
36	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	[ROUTE 9] "By the time the candidate applies for the conversion of the certificates, all the sea time in the logbook to be used must be within the past four years."	"At the time the candidate applies for the conversion of the certificate, all the DP sea time days in the logbook to be used towards the conversion must have been gained within the past four years. However, providing the application is made within three months of the date of signing of the Statement of Suitability, the four years can be counted up to that date of signing."	

37	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	[ROUTE 10] "Criteria to be confirmed in 2020 Standard"	"To revalidate a Restricted Self-Elevating Platform Certificate, applicants need to complete a minimum of 40 DP Operations. The option to complete a Revalidation Course is currently under review."	
37	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	New content added	Text added in 6.2: "**FOR OFFSHORE CERTIFICATE REVALIDATIONS**" "… and applies to all time logged on or after 1st January 2015."	
37	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	"The revalidation of DP Certificates will start on 1st January 2015 and will be phased as below: 2015: Revalidation of DP Certificates issued from 1984 to 2002, 2009 and 2010 2016: Revalidation of certificates issued from 2003 to 2004 and 2011 2017: Revalidation of certificates issued from 2005 to 2006 and 2012 2018: Revalidation of certificates issued from 2007 to 2008 and 2013 2019: Revalidation of certificates issued in 2014 and so on"	Text removed from 6.2	
37	Section 6: Revalidation Criteria and Conversion Routes for DP Certificates	Text added in 6.2	"Extenuating circumstances will be addressed on a case-by-case basis by the NI."	

Contents

SECTION 1

Introduction to the Dynamic Positioning Operator Training

1.1. Introduction to the Dynamic Positioning Operator Training Standard

This document provides guidance on the Dynamic Positioning Operator (DPO) training scheme for providers wishing to be accredited to deliver training and for prospective DPOs.

The DP Accreditation and Certification schemes were developed by The Nautical Institute (the NI); working in association with flag states, the oil industry, the diving industry and offshore contractors to establish internationally accepted standards. It has been operational for the past 30 years.

The NI's Dynamic Positioning Operator (DPO) training scheme is an industry recognised professional development route to becoming a qualified DPO. The scheme is managed by the NI for the benefit of the industry and includes the DPO certification criteria, certification processes, and the accreditation of the training providers against agreed standards. Until 2013, it was the only training scheme for DPOs accepted internationally by the offshore industry and DPOs certified by the NI are often stated as a requirement by DP vessel charterers.

In September 1983, the scheme was adopted as an internationally accepted standard for any DSV or other DP operated vessel working within 500 metres of any offshore installation by 105 out of 110 oil industry and major oil company representatives at a working conference in Aberdeen. It was rapidly recognised by the oil Industry on a worldwide basis. Less than a month after the Aberdeen conference, the scheme was accepted as an official guideline by the then Minister of Energy for the UK North Sea operations. Shortly after, it was also adopted by other North Sea operating flag states.

The NI has developed this Standard in view of the IMO including DP training within Part B of the STCW Code & Convention (see end of this section). These standards have been developed and kept up-to-date with the full engagement and cooperation of all key stakeholders by working through the Dynamic Positioning Training Executive Group (DPTEG) and its Regional Training Provider (RTP) groups.

1.2. The International Safety Management Code (ISM) and Dynamic Positioning (DP) Training

The scheme is considered as initial training towards the DP Certificate. Further training and experience should be provided by the company as per IMCA M117 guidelines and the ISM Code.

The objectives of the ISM Code are to ensure safety of life at sea, prevent human injury or loss of life and avoid damage to the environment, in particular to the marine environment.

All companies operating and/or owning ships must:

- Provide for safe practices in ship operations and a safe working environment.
- Establish safeguards against all identified risks.
- Continuously improve safety management skills of personnel ashore and on board ships, including preparing for emergencies related to both safety and environmental protection.
- Comply with all mandatory rules and regulations.
- Ensure that applicable codes, guidelines and standards recommended by IMO, Flag states, Classification Societies and marine organisations are taken into account.

Therefore, in regard to DP training, the ship operator, whether owner or charterer, *must* ensure that the DPO undertakes the required initial training, including shore courses (Induction and Simulator), and also that the operator is completely familiar with the equipment installed on the ship, both for normal operations and emergency situations.

The NI does not provide DP training; rather it accredits the training institutions to provide training to trainee DPOs. A list of accredited DP training providers can be found on the NI's website: http://www.nialexisplatform.org

The DP Operator training scheme is based upon the completion of a number of components and the participation of many parties, namely the prospective DPO, the vessel owner/operator, the Master and DPOs of DP vessels and the training centres. This document provides guidance to these parties on the requirements and operation of the scheme. The NI issues the final DP Certificate to prospective DPOs upon satisfactory completion of all training phases.

This certification scheme applies to prospective DPOs who started the new Offshore Scheme after 1st January 2015 and hold the Grey logbook, as well as trainees who have opted to transfer from the old to the new offshore scheme.

The old Offshore Scheme refers to those who started training before 1st January 2015 and who hold the A6 Blue/Green and A5 Black logbooks. Details are on the NI Alexis website.

1.3. The Composition and Role of DPTEG

In order to ensure that the scheme continues to meet current industry needs, DPTEG was established to facilitate communication and input from a broad range of stakeholders.

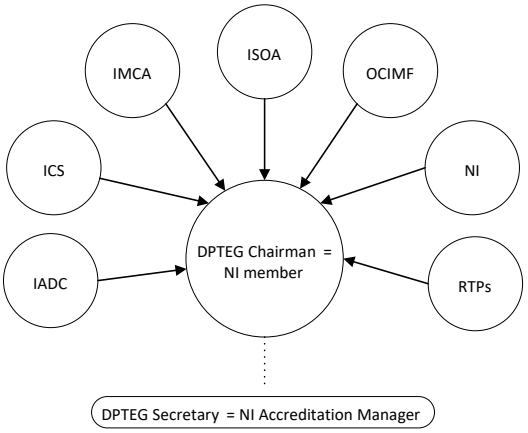
The group is a pan-industry forum of training providers, trade organisations and professional associations which have a remit or interest in DP training. It is self-funded by raising fees from accredited DP training providers, and currently meets twice a year.

The remit of DPTEG is to:

- Review and develop the DP Operator training scheme in respect to an ever-changing maritime industry and regulatory environment.
- Evaluate its effectiveness in providing the DP industry with trained DP Operators.
- Make decisions and implement actions to improve the DP Operator training scheme and promote best practice.
- Make decisions on a consensus basis.
- Promote the standing of the DPO training scheme in the best interests of the industry.

DPTEG Member organisations are:

- International Association of Drilling Contractors (IADC)
- International Chamber of Shipping (ICS)
- International Marine Contractors Association (IMCA)
- International Support Vessel Owners' Association (ISOA)
- Oil Companies International Marine Forum (OCIMF)
- Accredited DP training providers represented by their regional representative in the area (RTPs America, Europe and Asia) and The Nautical Institute.



Other organisations may be invited to join DPTEG, as appropriate. The DPTEG operates in accordance with the Terms of Reference for this group. See Annex 9 in Volume 2 of The Nautical Institute Certification and Accreditation Standard for guidance and procedures.

1.4. The Role of The Nautical Institute

The NI facilitates the accreditation of DP training centres, the certification of DPOs and consensus building among DPTEG members and administers the schemes in accordance with the criteria agreed by DPTEG.

1.5. The Role of Regional Training Providers (RTP)

The training providers are located throughout the world. Since they are widely dispersed and it would be unrealistic for all training providers to gather in one location, the centres were grouped into broad regions. These regions are:

- The Americas
- Europe and Africa
- Asia and Australia

Each region elects a group representative/coordinator whose job it is to inform the group of DPTEG developments and gather group concerns/responses in order to relay these to DPTEG or ask that they be included in the DPTEG meeting agenda. Communication with training providers in their region is accomplished by email or web forum contact and relayed using the same means to the DPTEG Chairman or other people/groups as appropriate.

Every year each of the three regions holds one face-to-face meeting and one online RTP meeting. Each training centre must send a representative to a meeting at least once every three years as a condition of accreditation. If a training centre does not send a representative, the centre can relay its concerns/responses through the regional representative/coordinator. Not sending a representative at least once every three years is grounds for withdrawal of accreditation.

RTPs operate in accordance with The Terms of Reference for this group. See Annex 10 in Volume 2 of the Nautical Institute Accreditation and Certification Standard for guidance and procedures.

1.6. Minimum Requirements

Following the 2010 Manila amendments to the STCW Convention and Code, The Nautical Institute (the NI) has implemented the following criteria for entry into the DP Operators training scheme:
The minimum qualification is set at STCW Regulation II/1 - II/2 - II/3 Deck, Regulation III/1 – III /2 – III/3 – III/6 Engine and Regulation III/6 for ETOs

STCW	DEFINITION
II/1 Deck	Officers in charge of a navigational watch on ships of 500 GRT or more.
II/2 Deck	Master or chief mate on ships of 3,000 GRT or more.
II/3 Deck	Officers in charge of a navigational watch and Masters on ships of less than 500 GRT.
III/1 Engine	Officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room.
III/2 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000kW propulsion power or more.
III/3 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 750kW and 3,000kW propulsion power.
III/6 ETO	Electro-Technical Officer

Alternative appropriate Marine Vocational Qualifications (MVQs) will be considered on a case by case basis. The NI defines an MVQ as *a non-STCW Certificate of Competency issued by a white list Maritime Administration for use in the administration's local waters only.*

Naval Officers with appropriate watch keeping qualifications and those whose qualification can be found on the approved list may be accepted into the training scheme without pre-approval or reference to NI. The approved list can be found on the website: www.nialexisplatform.org. It is recommended that training centres and prospective DPOs check the qualifications with the NI in case of any doubt.

Officer trainees (Cadets or ratings on a defined training programme)

- Prospective Offshore DPOs on the new scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase A), the 60 DP sea time days (Phase B) and the DP Simulator Course (Phase C). The remaining 60 DP sea time days (Phase D) and the subsequent suitability sign-off (Phase E) shall only be completed after they hold an appropriate STCW Certificate of Competency.
- Candidates who completed Phase B when they were a Cadet are not allowed to claim for STR in Phase D of the training scheme and must complete a minimum of 60 DP sea time days in Phase D.
- Prospective DPOs on the DP Self-Elevating Platform (Jack-up) Scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase A), the 60 days on board with 15 DP Operations (Phase B) and the DP Simulator Course (Phase C). The remaining 60 days on board and 15 DP Operations (Phase D) and the subsequent suitability sign-off (Phase E) shall only be completed after they hold an appropriate STCW Certificate of Competency.
- Prospective DPOs on the Shuttle Tanker Scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase 1), the 24 sea time days and two offshore loading operations (Phase 2), the task section (Phase 2) and the Simulator Course (Phase 3). The remaining phases shall only be completed after they hold an appropriate STCW Certificate of Competency.

These rules are effective from 1st January 2015 and reflect changes introduced from 1st January 2016 and apply to those who have already commenced training on the new scheme as well as new starters. The time permitted to complete the training scheme for those who commenced the Induction Course after 1st January 2015 is four years.

Centres should keep electronic copies of students' documentation for a minimum of 5 years (or longer if required by local policies) for audit purposes as well as for reference should any questions arise at a later stage in the student's application process.

MARINE VOCATIONAL QUALIFICATION (MVQ):
Before starting the Induction Course, the candidate shall present his/her documents to the training centre. If these do not meet the minimum requirements as set out in this document, training centres will advise the candidate to contact the NI for official approval to attend the course. The candidate shall provide a copy of the documents of competency or proficiency and/or any other relevant document as evidence of qualification. The NI will assess those and may or may not issue an authorisation letter to the candidate to start the course. This procedure shall be undertaken before the candidate starts the Induction Course. Some MVQs do not require an authorisation letter these are listed on the website www.nialexisplatform.org/certification/.

STCW CERTIFICATE OF COMPETENCY:
Training centres are required to ask for, and keep, a copy of the Certificate of Competency of their students before accepting them onto the Induction Course and the DP scheme. The Certificate of Competency number should be noted and properly recorded by the centre in the student record as well as in the logbook provided to them. The NI will require a copy of the Certificate of Competency when receiving their application to cross-check the information.

OFFICER TRAINEES
(Cadets or ratings on a defined training programme): Officer Trainees should present proof, such as a letter from the company employing them or the college they are attending, indicating that they are on STCW or MVQ training before joining the Induction Course.

1.7. STCW Limitations on Certificate

From 1st January 2012 to 31st December 2014, DP Certificates were endorsed with the following:

Valid for use in accordance with the privileges of the holder's Certificate of Competency.

From 1st January 2015 DP Certificates were issued with the revised sentence:

'DP Certificate valid for use in accordance with the privileges of the holder's Certificate of Competency and/or Certificate of Proficiency'

From 1st January 2017 this endorsement will be used on all new and revalidated DP Certificates.

This means that the holder can only use the DP Certificate within the limitations allowed by their Certificate of Competency or Proficiency. This is to allow operators who possess non-STCW local Certificates of Competency or Proficiency to operate small DP vessels to the limits allowed on those certificates, i.e. within restricted areas/limits from the coast of the issuing state on vessels of a certain size only.

1.8. Old and the New Training Scheme Rules

The old scheme and its policies will remain valid for those who started training prior to 1st January 2015. All trainee DPOs who started the training scheme before January 2015 will have their training assessed according to the old DP scheme rules, unless the trainee has opted to transfer to the new offshore scheme. It should be noted that only the Induction (Basic) Course will remain valid when transferring schemes (no sea time or tasks), provided all training is then completed within four years.

Trainee DPOs who started the training scheme from 1st January 2015 (i.e. the Induction Course) will carry on training under the criteria and conditions set up for the new training scheme.

1.9. STCW Part B[1] - Guidance on the Training and Experience for Personnel Operating Dynamic Positioning Systems

Section B-V/f*

1. Dynamic positioning is defined as the system whereby a self-propelled vessel's position and heading is automatically controlled by using its own propulsion units.

2. Personnel engaged in operating a Dynamic Positioning (DP) system should receive relevant training and practical experience. Theoretical elements of this training should enable Dynamic Positioning Operators (DPOs) to understand the operation of the DP system and its components. Knowledge, understanding and experience gained should enable personnel to operate vessels safely in DP, with due regard for safety of life at sea and protection of the marine environment.

3. The content of training and experience should include coverage of the following components of a DP system:
    a. DP control station;
    b. power generation and management;
    c. propulsion units;
    d. position reference systems;
    e. heading reference systems;
    f. environmental reference systems; and
    g. external force reference systems, such as hawser tension gauges.

4. Training and experience should cover the range of routine DP operations, as well as the handling of DP faults, failures, incidents and emergencies, to ensure that operations are continued or terminated safely. Training should not be limited to DPOs and DP Masters only; other personnel on board, such as electrotechnical and engineer officers, may require additional training and experience to ensure that they are able to carry out their duties on a DP vessel. Consideration should be given to conducting appropriate DP drills as a part of onboard training and experience. DPOs should be knowledgeable of the type and purpose of documentation associated with DP operations, such as operational manuals, Failure Modes and Effects Analysis (FMEAs) and capability plots.

5. All training should be given by properly qualified and suitably experienced personnel.

[1] STCW Including 2010 Manila Amendments: STCW Convention and STCW Code. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. IMO International Maritime Organization, 2011, p 341

6. Upon appointment to a vessel operating in DP mode, the Master, DPOs and other DP-trained personnel should be familiarised with the specific equipment fitted on and the characteristics of the vessel. Particular consideration should be given to the nature of the work of the vessel and the importance of the DP system to this work.

*Note there are no corresponding regulations in the Convention or sections in part A of the Code for sections B-V/a, B-V/b, B-V/c, B-V/d, B/Ve, B-V/f and B-V/g

SECTION 2

Information Applicable for All DP Training Schemes

2.1. Statement of Suitability

The attention of Masters is drawn to this statement: the suitability of the officer to undertake full DP watchkeeping responsibility on board a DP vessel.

This is the final assessment of the trainee DPO and Masters should carefully consider whether they are able to affirm the statements within this section before signing.

The Statement of Suitability should be completed at the end of final period of sea time prior to a certificate application being made.

Masters signing this should enter their own DP Certificate number if held. The signature and the ship's stamp should correspond to the final entry in Phase D (for Offshore Scheme) or in Phase 4 (for Shuttle Tanker Scheme). If the Master is not a DPO, the Statement of Suitability will need to be countersigned by a certified DPO on board.

If the Master is the holder of the logbook he/she should have this section signed by a certificated DPO or the Relief Master on board who should enter his/her own DP Certificate number.

2.2. Time to Complete the Training Scheme

In order to avoid deterioration of skills during the training period, all elements of the DP training scheme shall be completed within four years. The four year rule applies for those who enter into the schemes from 1st January 2015.

When applying for a new Certificate and submitting documents to The Nautical Institute (The NI), **ALL** components of the programme (shore-based courses, DP sea time, task sections, Statement of Suitability form and other elements) must have been completed within four years prior to the date the Statement of Suitability is signed. In the event any of the training phases fall outside of the four year validity period, the trainee will be required to repeat the expired training phase. Providing all training has been completed within this timeframe, the time between the date the Statement of Suitability was signed and the date the application is received at the NI should not exceed three months.

2.3. Company Confirmation Letter

Trainee DPOs are required to provide a confirmation or testimonial letter from the shipping companies for all the DP sea time in Phases B and D of the Offshore and DP Self-Elevating Platform (Jack-up) Scheme, or for all the sea time and offshore loading of the Shuttle Tanker Scheme. This is also valid for those revalidating using any DP sea time dated after 1 January 2014. This letter shall follow the conditions below:

- Be written on original headed paper from the shipping company.
- Be signed and stamped by the Operations Manager or Marine Superintendent or equivalent. Letters signed by Masters or agency staff are not acceptable.
- Be written and dated only after the DPO has completed the DP sea time claimed.
- Confirm the total time the applicant has performed as a trainee DPO on board the vessel(s).
- Offshore Scheme: recorded DP sea time must only include actual DP time served on board the vessel(s), not time on leave, attending courses, etc. This DP sea time must be broken down and listed as individual trips and days.

- Offshore Scheme POSMOOR/TAM DP vessels: Time claimed on board POSMOOR/TAM DP vessels must be confirmed by the company through a confirmation letter. The company must confirm that the DP training was completed while anchors were not deployed. The NI reserves the right to ask for further and more detailed information, such as the deck log, if applicable.
- DP Self-Elevating Platform (Jack-up) Scheme: recorded days on board, number dates and locations of the DP Operations
- Shuttle Tanker Scheme: recorded sea time, number, dates and location of the offshore loading operations.
- Limited DPO Certificate holders upgrading to Unlimited Certificates only need to provide confirmation of DP sea time days gained after their Limited Certificates were issued.
- DP sea time (for Offshore Scheme), offshore loading operations (for Shuttle Tanker Scheme) and DP operation (for Self-elevating Scheme): experience not covered by a letter will not be considered for the DP application unless the candidate can prove extenuating reasons.
- The confirmation letter shall be obtained by the candidate and sent to the NI with their application, not after. Applications received by the NI without a confirmation letter for all the DP sea time claimed will be treated as a query which will delay issuing a certificate.
- It is the company's responsibility to cross-check the DP sea time claimed by the trainee DPO to ensure that the candidate has completed the proper training and undertaken the correct amount of DP sea time. Should any false statement be received, the NI reserves the right to take actions as necessary. The company should check the information that they are confirming against deck/DP logs and internal information.
- The NI reserves the right to undertake spot checks directly with the company to confirm the signees and any other relevant information for verification of sea time. This includes the daily report of the vessel and the crew list.

2.4. Certification Application

The attention of trainee and Masters is drawn to the Logbook and Application guides that are available on the NI's Alexis Platform website (http://www.nialexisplatform.org/) and on request from the NI.

It is strongly recommended that the relevant guides are read before making an application in order to avoid incorrect completion of the logbook. Failure to meet the requirements for application of a certificate will cause a delay in issuing a certificate.

The logbook has been designed so that all elements of the training scheme can be completed and entered. In order to apply for a DP Certificate, the applicant is required to register his/her personal details and DP sea time online, through the NI's Alexis Platform website.

It is important that every period of service on board a DP vessel should have a start and finish date and be authenticated by the Master's signature. Entries without a finish date will not be counted towards the required DP sea time.

If the trainee DPO wishes to submit his/her logbook while still on board the DP vessel he/she should have an appropriate date entered and that date may not be in the future. Entries should not be block signed or stamped.

The trainee DPO may decide to stay on board after submitting their logbook to be assessed and verified by the NI. In that case this sea time cannot be used or counted towards DP sea time to obtain the DP Certificate and/or a future upgrade of their DP Certificate. The NI will only consider sea time gained after the issue date of the DP Certificate.

After completing the online application, the applicant shall send the following documents to the NI:

- Copy of the STCW or NVQ certificate (page with personal details, validity date and CoC number); Original DP logbook
- Copy of passport personal details page
- Original Company confirmation letter/s confirming all DP sea time;
- Signed and dated PDF checklist available on the candidate's account after payment. It is compulsory for the trainee DPO to sign the declaration of data contained in the online application Any other supporting documentation.

The NI reserves the right to return the logbook and application to candidates who do not apply online or if anything is found to be incorrect or incomplete in the application or training.
Companies which verify their candidates to ensure requirements have been met before an application is made to the NI tend to be more successful. This also assists the company in the management of their DP personnel and their training and progression.

2.5. Loss of Certificate or Logbook

Certificates and logbooks are considered official and controlled documents by the NI and cannot exist in more than one copy. If the new logbook (grey or burgundy) is lost, the trainee is required to provide an affidavit and police report to the NI. Only the NI can replace the logbook. The logbook will be allocated the same individual number as the lost one and will bear a stamp on the appropriate pages indicating it is a duplicate.

If the trainee DPO holds an old version of the DP logbook, two situations will be considered:

Holders of blue or green logbooks:

- These logbooks are not numbered and only the training centre where the trainee DPO undertook the Induction Course will be able to replace this document on condition of receiving a copy of the affidavit and police report from the trainee DPO. Please note some training centres may no longer hold stock of these logbooks. If this is the case please contact the NI.

Training centres are required to inform the NI of every logbook replaced and a note is put into the trainee DPO's Institute account for future verification. If a DP Certificate has been issued, then the duplicate logbook and certificate can only be replaced by the NI.

Holders of black logbooks issued in 2013:

- These logbooks are numbered and only The NI can replace them. The original affidavit and police report need to be sent to the NI.

The logbook will be allocated the same individual number as the lost one and each page will bear a stamp indicating it is a duplicate.

2.6. False Information or Fraudulent Applications

The NI continues to receive a number of fraudulent DP applications so staff and training centres are being extra vigilant and cross-check directly with companies to verify DP sea time claimed by trainee DPOs. Applications and certificates that are found to be fraudulent may be revoked and the individual banned from the NI's DP training scheme for a period of up to five years. Others found involved in the fraud cases may also have their DP Certificates removed and banned from the system for a period of time. The NI reserves the right not to accept applications or letters from companies involved in fraudulent cases.

SECTION 3

Offshore Training Scheme

3.1. The DP Offshore Training Scheme

By completing the Offshore training scheme within four years the DP Operator may receive one of the 3 types of DP Certificate:

- Unlimited Certificate: for training completed on board vessels classed DP 1/2/3 where at least 60 DP sea time days have been completed on vessels of DP Class 2 or 3.
- Limited Certificate: for training completed on board vessels classed DP1/2/3 where less than 60 DP sea time days have been completed on vessels of DP Class 2 or 3.
- Restricted to Unclassed vessels: for training completed on board vessels of Unclassed DP, DP Class 0 or a mix of experience on board classed and Unclassed vessels where insufficient time has been completed to be eligible for one of the other certificates.

3.2. Dynamic Positioning Offshore Scheme Courses

INDUCTION COURSE (See Annex A)
This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP
- Elements of the DP system
- Practical operation of the DP system
- Position reference systems
- Environment sensors and ancillary equipment Power generation and supply and propulsion DP operations.

SIMULATOR COURSE (See Annex B)
This course principally involves simulated DP operations including errors, faults and failures, giving the participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

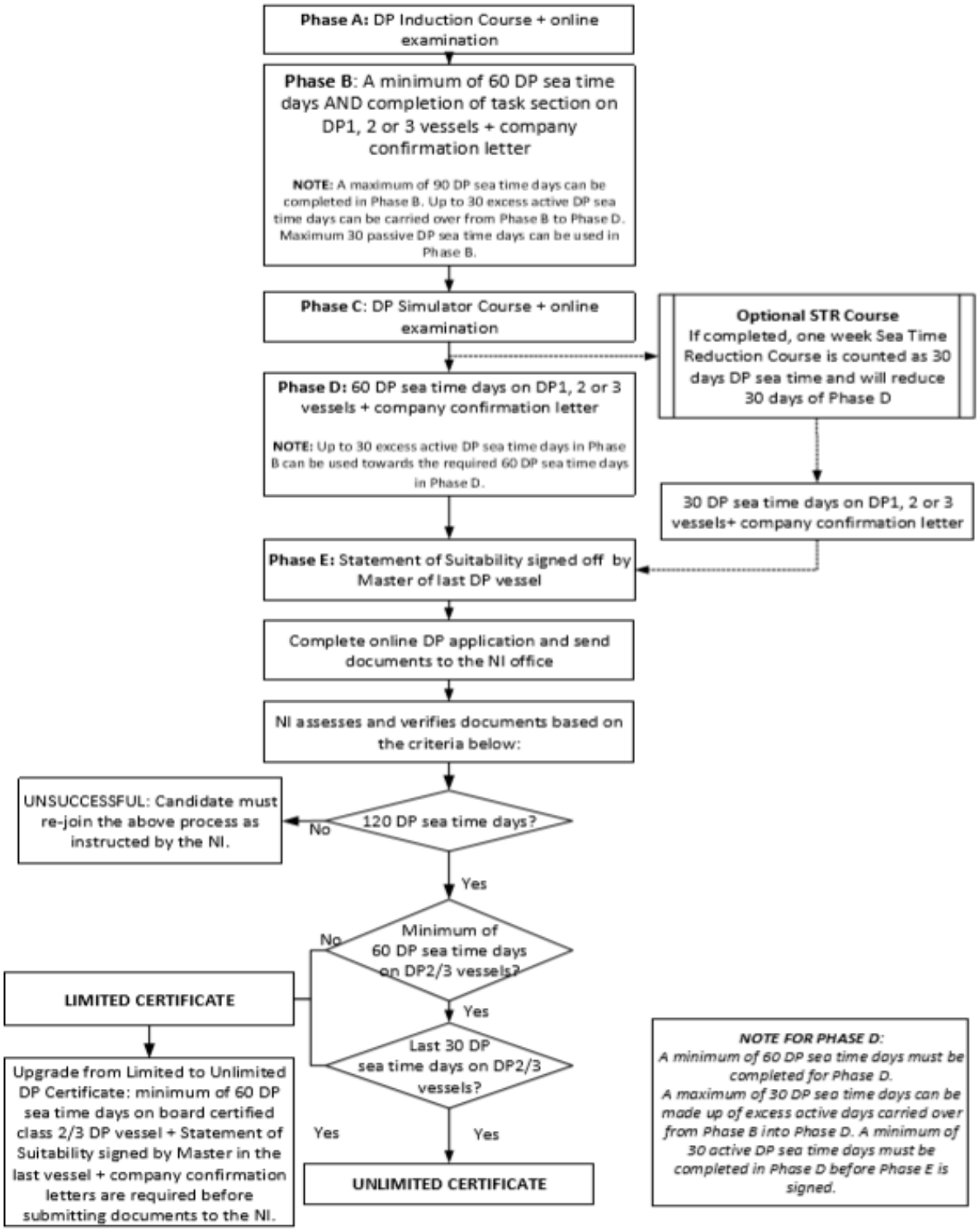
- Practical operation of the DP system
- DP operations
- DP alarms, warnings and emergency procedures.

SEA TIME REDUCTION COURSE (STR) (See Annex C)
The period of supervised DP watchkeeping during the second block of DP sea time may be reduced on the satisfactory completion of an intensive DP Simulator training course.

REVALIDATION COURSE (See Annex F)
This course allows a certified DPO to revalidate without the sea time requirement when taken for the first time, or when taken after a subsequent revalidation with 150 DP sea time days.

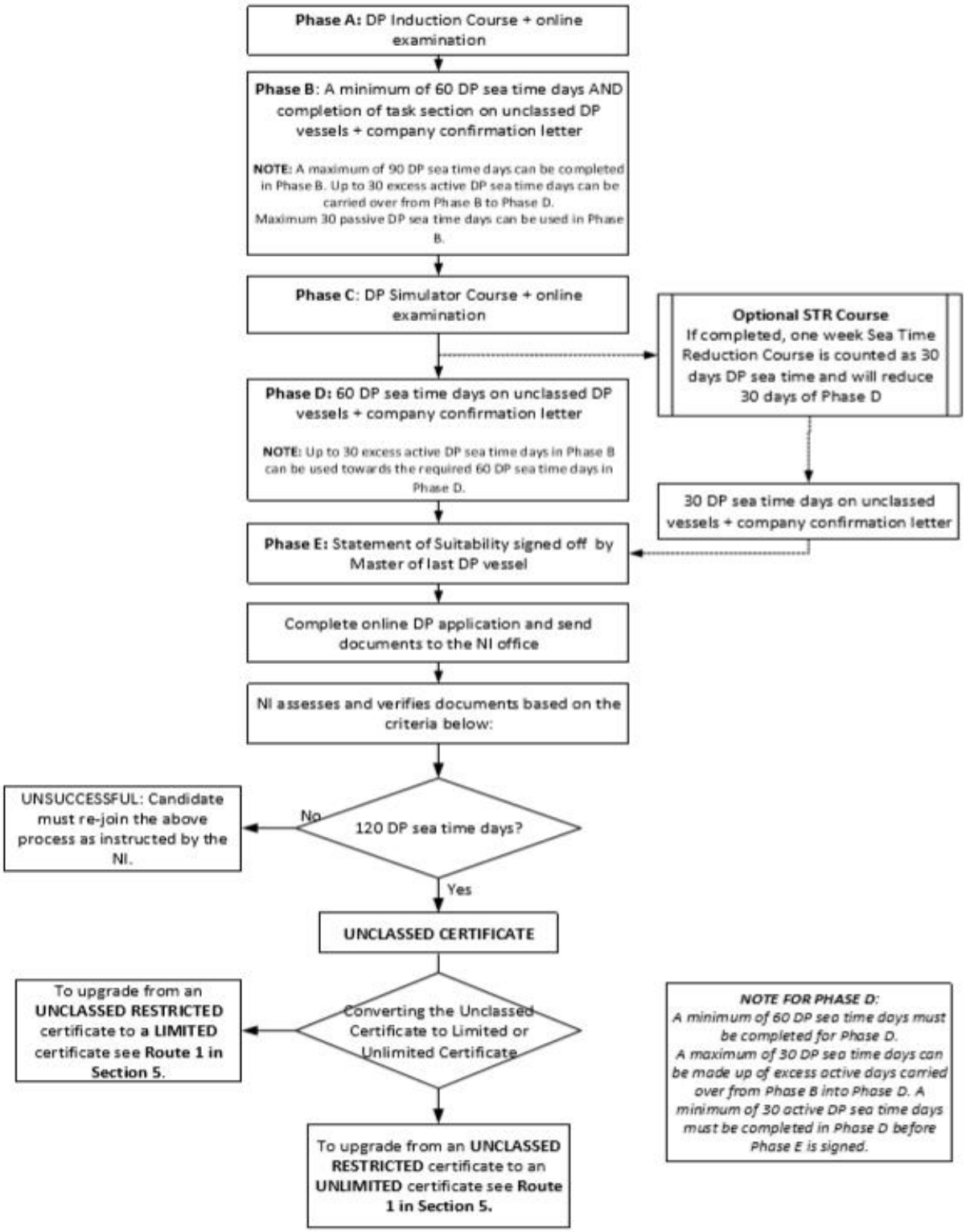
3.3. Offshore Limited/Unlimited DP Certificate Flowchart

The components of the scheme are set out in the following flowchart. To obtain a DP Operator Certificate (Limited and Unlimited) the route outlined below must be followed. The old scheme route to obtain a DP Operator Certificate can be found on our website on the DP Help Page.



3.4. Offshore Unclassed DP Certificate Flowchart

The route that must be followed in order to obtain a DP Operator Certificate (restricted to Unclassed vessels):



3.5. Phases B and D - DP Sea Time and Tasks

DEFINITION OF DP SEA TIME DAY
One DP sea time day can be counted if the trainee DPO is involved with active or passive DP training for a minimum of two hours per day claimed. The allowance of up to 25% of ***total*** qualifying time, in passive mode may only be completed during Phase B (***Up to a maximum of 30 days***). A minimum of 75% of the total DP sea time claimed must be done in active mode.

Note
The wording concerning the amount of passive sea time allowed, has been changed to clarify the rules for both the Trainee DPOs and for the Training Centres.

Active – with propulsion under the guidance of a NI certified DPO

- Using the DP system to control the ship
- Setting up on DP
- Completing task sections combined with DP operations
- Time on watch as part of a member of the DP watch or monitoring DP watch (Master)
- FMEA trials
- Annual trials
- Class trials
- Charterer trials
- Field arrival trials
- DP proving trials
- Emergency ship handling training using manual controls using ONLY the thrusters available after worst case failure

Passive – without propulsion under the guidance of a NI-certified DPO

- Training on in-built ship-based DP Simulator on a vessel with simulator mode in the DP system or a standalone DP Simulator.
- Task sections training and assessments by a NI-certified DPO and countersigned by the Master.

Notes about the DP sea time definition

- Not all DP training has to be completed monitoring the DP system with the vessel in a high-risk position.
- Passive DP sea time allows DPOs to gain DP training and familiarisation with a vessel without exposing the vessel to risk.
- Passive DP sea time can only be claimed between the Induction and Simulator Courses.
- Most of the tasks in the task section of the logbook can be completed using passive DP sea time. The task section of the NI DP logbook clearly states what training can be conducted in passive mode.
- The NI DP sea time days allow for many different DP vessel types and operations and specify the minimum number of hours that will count as a day. If the ship and trainee DPO is engaged in DP for more than two hours in the day, only one day may still be claimed.
- DP sea time cannot be counted in any circumstances when using the DP auto pilot mode.
- It is the duty of the senior DPO (NI certified DPO on board) to verify and sign off DP tasks.
- DP sea time must be verified and signed off by the Master.
- The definition of DP sea time and the active and passive concept is not valid for the Shuttle Tanker training scheme.
- Position Mooring or THRUSTER-ASSISTED MOORING (TAM): The time on board a vessel with the classification of POSITION MOORING or THRUSTER-ASSISTED MOORING (TAM) and DP Class notation can be counted as DP sea time for initial DP training. The NI requires the candidate to present

evidence that the anchor was not deployed for the DP sea time claimed during DP operations when applying for a DP certificate.

There is one page for each embarkation for recording DP sea time in the logbook. These pages will hold the information for 10 DP days so additional pages may need to be used to record all DP days for the embarkation. The DP sea time dates shall be recorded individually each day according to the DP operation of the vessel. This is to be signed off by the certificated DPO/Master.

Practical training with manual ship-handling is not counted except as stated above. Every trainee DPO must be able to manually control a vessel, but manual ship handling training shall be conducted in addition to DP training.

The allowance of up to 25% of qualifying time in passive mode may only be completed during Phase B. Further information regarding the definition of a DP sea time day can be found on the "Clarification Note from The Nautical Institute – Guidance to Masters and DPOs" which is available on our website.

Note
Certified Senior DPO is the DP Operator holding a valid NI DP Certificate with delegated responsibility from the Master as the senior person in charge of the DP watch.

3.6. DP Sea Time Between the Induction and Simulator Courses, Task Section

A minimum of 60 DP sea time days between these courses is required for completion of the task sections of the logbook. Candidates are only eligible for admission on to the Simulator Course provided that the Induction Course and task section is in date. Training centres are not permitted to accept students onto the Simulator Course if the task sections are not fully completed.

Any time gained in excess of the 60 DP sea time days in Phase B, between the Induction and the Simulator Course, (***to a maximum of 30 days)***, will normally be counted towards the total requirement of 120 DP sea time days. However, the candidate must complete at least 30 DP sea time days after the Simulator Course and obtain the Statement of Suitability signed by the Master of the last vessel the candidate has served on before submitting his/her documents to the NI.

The DP sea time should be carefully and accurately entered in this section. It is important that the DP Class and the DP system are entered. The dates of joining and leaving the vessel may be confirmed through the discharge book, but not the DP sea time, which shall be confirmed by the company to verify the DP sea time logged.

Any DP sea time gained while the logbook is at the NI for verification will now be counted towards gaining certification or applying for an upgrade.

The task section can only be signed off by a certificated DPO on board the vessel. Those responsible for signing this section of the logbook should adhere to high professional standards and appropriately rigorous assessments of trainees before signing that a training task has been completed.

The tasks must not be block signed; each task must be signed and dated individually.

The Master is required to countersign each section once all tasks in that section have been completed and signed by a certified DPO on board. If the Master is a certified DPO on board, then a note shall be made in the logbook and the Master's DP Certificate number must be annotated for verification. The Master can then sign both sections.

If the trainee DPO is the Master, he/she is permitted to sign off the task sections once the certified DPO on board has signed off the tasks for that section individually.

3.7. DP Sea Time Reduction

The period of supervised DP sea time days after the Simulator Course may be reduced by a maximum of 30 days by the satisfactory completion of an intensive DP Simulator Course.

This course can be done straight after the Simulator Course, but trainee DPOs are required to do a minimum of 30 DP sea time days on board a classed DP vessel and have the Statement of Suitability signed by Master after the course. A company confirmation letter is required for verification of that DP sea time.

As with the other components of the scheme, all DP time or courses leading to reduction of DP time must have been completed within the previous four years.

The Sea Time Reduction training cannot be used for upgrading a certificate from Limited to Unlimited.

3.8. Calculation of Sea Time to Issue an Unlimited Certificate, Limited Certificate or Unclassed Restricted Certificate

UNLIMITED CERTIFICATE will be gained if the trainee DPO has:

- 120 DP sea time days entirely done on board a DP2/3 classed vessel, or
- 120 DP sea time days of which a minimum of 60 DP sea time days should be on board a DP2/3 vessel which must include the final 30 DP sea time days before the Phase E sign-off.

LIMITED CERTIFICATE will be gained if the trainee DPO has:

- 120 DP sea time days on board a DP1/DP2/DP3 classed vessel where less than 60 required DP sea time days are completed on board a DP2/3 vessel.

UNCLASSED DP VESSEL RESTRICTED CERTIFICATE will be gained if the trainee has:

- 120 DP sea time days on board a DP Unclassed vessel, or
- 120 DP sea time days on board a DP Class 0, or
- 120 DP sea time days with a mix of experience on board classed and Unclassed DP vessels where the conditions identified above have not been met.

Note
DP certified classed vessel means the vessel must have a DP Class 1, 2 or 3 notations with a certificate issued by a classification society and not simply be fitted with DP equipment or capability.

Unclassed vessel: mean those with a DP capability but not classified or certified by a classification society. The NI also considers DP Class 0 vessels under this definition.

3.9. Upgrading from Limited to Unlimited Certificate

To upgrade from a LIMITED to an UNLIMITED Certificate, the DPO will need to obtain a minimum of 60 DP sea time days on board a DP2/3 classed vessel. This sea time must be recorded in the NI DP logbook.

Any DP time on board DP Class 2 or 3 vessels previously used to obtain a Limited Certificate cannot be used towards the time required for the issuance of an Unlimited Certificate.

When applying to upgrade to an Unlimited Certificate, the NI will require the logbook, a new Statement of Suitability upgrade form signed by the Master of the last Class 2 or 3 vessel, the original Limited Certificate and the confirmation letter from the shipping company for the new sea time experience to be sent in with the application.

The online application for an upgrade should be carried out before sending in the documents listed above to the NI. The applicant shall use the same candidate customer account number that was issued prior to his/her first DP Certificate. Once all qualification requirements have been confirmed, an Unlimited Certificate will be issued by the NI.

3.10. Upgrading from Unclassed to Limited/Unlimited

Information on how to convert from a restricted to Unclassed vessel DP Certificate to a Limited/Unlimited DP Certificate can be found in Annex E.

SECTION 4

DP Self-Elevating Platform (Jack-up) Training Scheme

4.1. The DP Self-Elevating Platform (Jack-up) Training Scheme

By completing the DP Self-Elevating Platform (Jack-up) training scheme the DP Operator will receive a 'Restricted to Self-Elevating **Platform'** DP Certificate. This type of certification is restricted to DPOs who have completed their DP training on board self-elevating vessels.

DP Self-Elevating Platform (Jack-up) training is completed differently to the Offshore training scheme and trainees should look carefully at these differences. The training scheme uses the same Offshore logbook for recording the time on board the vessel, but additional documents are required to be completed.

Using the same lettered Phases as the Offshore, trainee's record days on board the DP vessel and the number of DP Operations. A minimum of 60 days on board a DP classed vessel plus 15 DP operations must be completed in Phase B along with the task sections and then 60 days on board a DP classed vessel and 15 DP operations are also required for Phase D. The days on board in Phases B and D are to be recorded within these sections of the logbook. The DP operations which are completed during this time on board will be recorded on an additional form. The DP sea time should be carefully and accurately entered in these sections. It is important that the DP Class and the DP system are entered.

The task section for DP Self-Elevating Platform (Jack-up) scheme is also different from the Offshore training scheme. A separate task section document has been produced which will replace the task sections within the logbook.

The task section can only be signed off by a certificated DPO on board the vessel. Those responsible for signing this section of the logbook should adhere to high professional standards and appropriately rigorous assessments of trainees before signing that a training task has been completed.

The tasks must not be block signed; each task must be signed and dated individually.

The Master is required to countersign each section once all tasks in that section have been completed and signed by a certificated DPO on board. If the Master is a certified DPO on board, then a note shall be made in the logbook and the Master's DP Certificate number must be annotated for verification. The Master can then sign both sections. The signature confirming the time on board the DP vessel in the logbook should match the Master's signature for the tasks for the dates that they were on board.

If the trainee DPO is the Master, he/she is permitted to sign off the task sections once the certified DPO on board has signed off the tasks for that section individually.

Copies of the additional documents required for the DP Self-Elevating Platform (Jack-up) scheme can be obtained from the training centre and from the NI Alexis Platform website.

Company confirmation letters are required for all DP operations and sea time.

Any DP sea time gained while the logbook is at the NI for verification will now be counted towards gaining certification or applying for an upgrade.

4.2. Dynamic Positioning Offshore Scheme Courses

INDUCTION COURSE (See Annex A)
This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP
- Elements of the DP system

- Practical operation of the DP system
- Position reference systems
- Environment sensors and ancillary equipment Power generation and supply and propulsion DP operations.

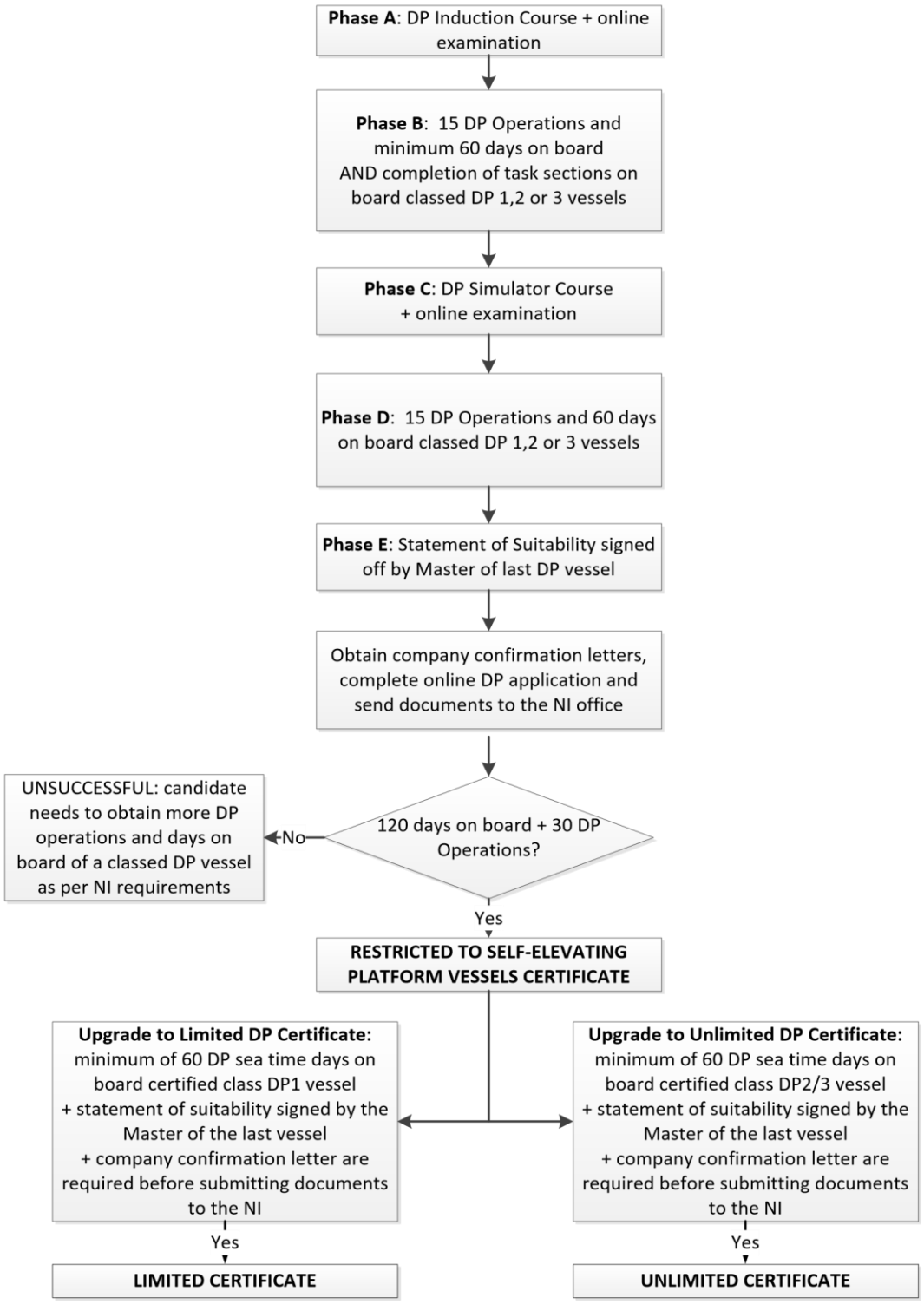
SIMULATOR COURSE (See Annex B)
This course principally involves simulated DP operations including errors, faults and failures, giving the participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

- Practical operation of the DP system
- DP operations
- DP alarms, warnings and emergency procedures.

4.3. Converting from Restricted to Self-Elevating Platform DP Certificate to a Limited/Unlimited DP Certificate

Information on how to convert from a Restricted to Self-Elevating DP Certificate to a Limited or Unlimited DP Certificate can be found in Section 6.

4.4. Self-Elevating Platform (Jack-up) DP Certificate Flowchart



Definition of a self-elevating DP operation: Site arrival, set-up on DP, approach and elevation

SECTION 5

Shuttle Tanker Training Scheme

5.1. DP Shuttle Tanker Training Scheme

By completing the Shuttle Tanker training scheme the DP Operator will receive a Restricted Shuttle Tanker Certificate. This type of certification is restricted to DPOs who have completed their DP training on board DP shuttle tanker vessels.

Shuttle Tanker training and the definition of sea time is completely different to the Offshore training scheme and trainees should look carefully at these differences. Shuttle Tanker training has a total of 4 phases to be completed by the trainee DPO as described below:

PHASE 1: DP Induction Course + online examination.

PHASE 2: The activities in Phase 2 can be done in any order*

PATHWAY A: Minimum 96 days as practical time on board a shuttle tanker with participation in at least eight offshore loading operations (field arrival, set-up approach, connection, loading, disconnection and departure). Both criteria must be achieved, i.e. if the trainee completes only seven offshore loading operation within 96 days, it will be necessary for the trainee to undertake more sea time until he/she completes the eighth offshore loading operation as required OR

PATHWAY B: Minimum of 96 days on board with participation of six approved on board simulation loading operations and four real loading operations (field arrival, set-up approach, connection, loading, disconnection and departure). The on board simulators are able to simulate a real experience of approach to Buoys and positioning during loading operations. The engine and bridge team work together to simulate problems with thrusters and power management.

ACTIVITIES (Same required for both Pathways)

- ACTIVITY 1: DP Simulator Course to help consolidate general DP theory and understanding as well as coping with errors, faults and failures + practical assessment + online examination *(a minimum of 24 days sea time and 2 offshore loading operations must be completed before the attendance of the DP Simulator Course)*
- ACTIVITY 2: Training Course A - Position Reference System Course
- ACTIVITY 3: Training Course B – Shuttle tanker specific simulator course

PHASE 3: Minimum of 24 sea time days as practical time on board a shuttle tanker with participation in at least two complete offshore loading operations to include field arrival, set-up approach, connection, loading, disconnection and departure. Both criteria to be achieved.

PHASE 4: Statement of Suitability signed off by the Master of the last shuttle tanker vessel. Applicants must also provide confirmation letters for all sea time and offshore loading operations.

* A minimum of 24 days sea time and 2 offshore loading operations must be completed before the attendance of the DP Simulator Course.

The shuttle tanker vessel Master and the vessel operating company are both required to confirm that the trainee's practical experience and understanding is satisfactory. This provides the assurance that the trainee's recorded entries are legitimate and that they have achieved at a recognised level of competence.

The shuttle tanker scheme gives an aggregate minimum of 120 days on board and a minimum of 10 loading operations as the pre-certification practical experience. Phase 3 practical experience stage must comply with

24 days on board and two complete loading operations – whichever limit is reached last. There is no option for any sea time reduction within this programme i.e. the Sea Time Reduction and Offshore Loading Courses will not reduce the sea time required, but will be counted for training purposes only.

Note
Offshore loading operations not conducted with the DP system in use shall not be counted as Offshore Loading Operations within the training and certification scheme.

Definition of shuttle tanker days: Shuttle tanker sea service days are not the same as those in the Offshore scheme. Shuttle tanker sea time days are considered the days from embarking to disembarking the shuttle tanker. However, the times recorded for the offshore loading operations should be done while the vessel is operating in DP mode.

Submission of an application to the NI for the Shuttle Tanker DPO Certificate shall be made upon satisfactory assessment of performance. Appropriate confirmations and details from the Master and company that the training regime has been complied with are required with the application. Training entries are to specify the location and type of installations experienced.

5.2. Shuttle Tanker Training Scheme Courses

The Shuttle Tanker training scheme requires the trainee to complete the same DP Induction and DP Simulator Courses required of all other DP trainees. In addition, Shuttle Tanker trainees must complete two additional courses:

INDUCTION COURSE (See Annex A)
This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP
- Elements of the DP system
- Practical operation of the DP system
- Position reference systems
- Environment sensors and ancillary equipment Power generation and supply and propulsion DP operations.

SIMULATOR COURSE (See Annex B)
This course principally involves simulated DP operations including errors, faults and failures, giving the participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

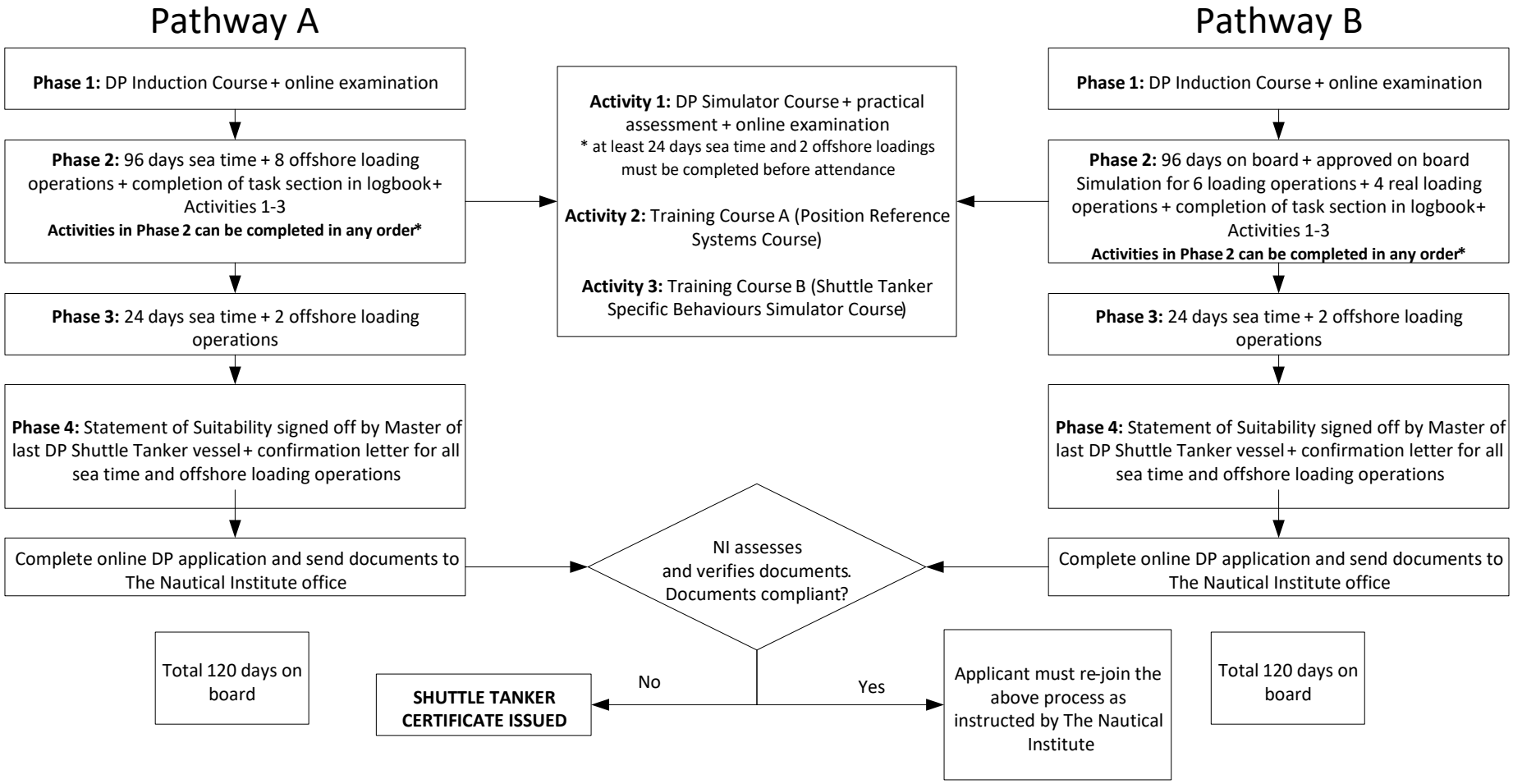
- Practical operation of the DP system
- DP operations
- DP alarms, warnings and emergency procedures.

COURSE A (See Annex D)
One or two day training courses which are provided by either the training centres or the manufacturers of Position Reference Systems (PRS). These courses are recognised, not accredited, by the NI. More information regarding recognition of a course can be found on our website http://www.nialexisplatform.org/recognition/.

COURSE B (See Annex E)
This is a five-day simulator training course with a minimum of 30 hours of instruction that concentrates on shuttle tanker specific behaviours and includes exercises for a range of offshore loading installation types. This course is accredited by the NI.

5.3. Shuttle Tanker DP Certificate Flowchart

The components of the scheme are set out in the following flowchart. The route that must be followed in order to obtain a Shuttle Tanker Certificate (restricted to Shuttle Tankers).



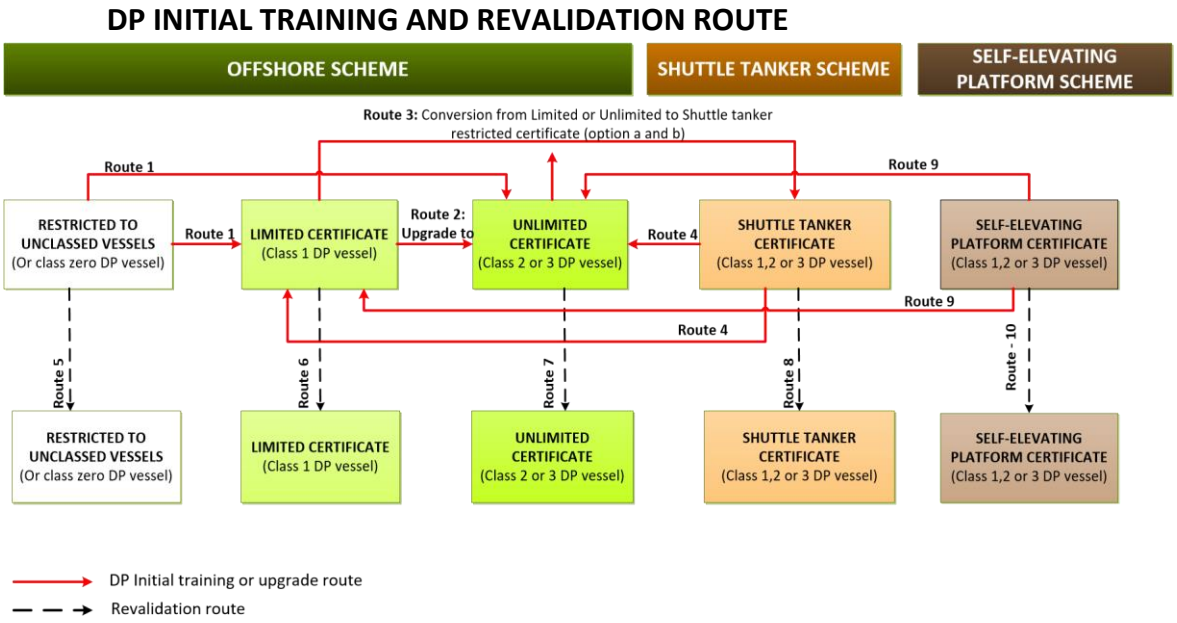
SECTION 6

Revalidation Criteria and Conversion Routes for DP Certificates

6.1. Validity of DP Certificates and Revalidation Routes

Until 31st December 2014, a DPO's Certificate remained valid for as long as the holder regularly operated DP systems. 'Regularly' was defined as a minimum of six months DP watchkeeping experience within the previous five years or work as a DP instructor at an NI-accredited training centre. **Any Certificates dated on or before this date that have not been revalidated by 31st December 2019 will be invalid from 1st January 2020. Full reference to NI Circular 003/2019 should be made if applicants are unsure how to revalidate from this date.**

From 1st January 2015, all DP Certificates issued by The Nautical Institute (the NI) shall be revalidated every five years. Based on STCW standards and best practices, the NI will consider any **one of the following routes** for revalidation or conversion:



ROUTE 1: CONVERTING FROM UNCLASSED VESSELS TO LIMITED OR UNLIMITED DP CERTIFICATES

To convert from an UNCLASSED Restricted Certificate to a LIMITED or UNLIMITED Certificate, the trainee DPO shall obtain a minimum of 120 DP sea time days on board a DP1 or 2/3 classed vessel + completion of a new task section + Statement of Suitability form signed off by the Master + confirmation letter from the company. DP1, 2 or 3 classed sea time used in the application before the issue of the UNCLASSED Restricted Certificate may be re-used in the conversion process provided a minimum of 60 DP sea time days is served on the relevant classed vessel after the issue date of the UNCLASSED Certificate. This DP sea time must be recorded in the NI DP logbook in the conversion pages. 75% of sea time gained must be active DP sea time and the remaining 25% can be passive DP sea time.

When applying for the removal of the restriction from the certificate, the NI will require the NI DP logbook, a new task section (*a printable version can be found on the website*), a new Statement of Suitability form signed by the Master of the last Class 1, 2 or 3 vessel, the original 'RESTRICTED TO UNCLASSED VESSEL' certificate and the confirmation letter from the shipping company for the new sea time experience to be sent in with the application.

The conversion DP sea time training shall be logged into the NI DP logbook and no other logbooks. The conversion request shall be completed through the online system, where the applicant shall use the same candidate customer account number that was issued with his/her first DP Certificate. At the end of this process, and if appropriate, a new Limited or Unlimited Certificate will be issued.

A simulation of how this conversion is calculated by the NI is explained below.

Example	Initial application where person gained Unclassed Certificate				New DP Time presented for Upgrade			How much DP sea time this person has done in total on board classed vessel, summing up time for initial certificate and upgrade? (B+B1+RR+SS)	NI verification of new DP sea time towards Limited/Unlimited certificate	
	DP sea time on Unclassed vessel (A)	DP sea time on classed vessel DP1 (B) This is equivalent to TCVDP 1	DP sea time on classed vessel DP2/3 (B1) This is equivalent to TCVDP 23	Total DP sea time (C)	New DP sea time logged on a classed vessel DP1 (RR)	New DP sea time logged on a classed vessel DP2/3 (SS)	Total DP sea time on classed vessels (E)		Result for a LIMITED Certificate (B+B1) + (RR+SS) >= 120 days. (E) >= 60 days? SS>=60 days? Certificate issued?	Result for a FULL Certificate a. (B+B1) + (RR+SS) >= 120 days. b. (E) >= 60 days? c. SS>=60 days? d. Certificate issued?
1	90	20	40	150	60	0	60	120	a) Yes b) Yes c) Yes d) Cert. issued	a) Yes b) Yes c) No d) No
2	43	52	40	135	25	20	45	137	a) Yes b) No c) No d) No. Candidate needs another 15 days on classed vessel to reach a minimum of 60 days.	a) Yes b) No c) No. Candidate needs another 40 days on classed vessel to reach a minimum of 60 days required for full certificate

										d) No
3	28	70	30	128	50	28	78	178	a) Yes b) Yes c) No d) Cert issued	a) Yes b) Yes c) No d) No
4	52	28	40	120	24	40	64	132	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
5	80	22	20	122	18	41	59	101	a) No b) No c) No d) No. Candidate needs 19 day on classed vessel to reach a minimum of 120 days	a) No b) No c) No d) No. Candidate needs 19 day on classed vessel to total the 120 days required, being these 19 days to be done on DP Class 2/3 vessel
6	15	65	55	135	0	81	81	201	a) Yes b) Yes c) Yes d) No	a) Yes b) Yes c) Yes d) Cert. issued

7	22	35	63	120	30	5	35	133	a) Yes b) No c) No d) No. Candidate needs 25 days on classed vessel to reach a minimum of 60 days as required	a) Yes b) No c) No d) No. Candidate needs 55 days on classed vessel to reach a minimum of 60 days as required
8	102	21	0	123	40	10	50	71	a) No b) No c) No d) No. Candidate needs 49 more days on classed vessel to total 120 days and 10 to total a minimum of 60 days required for LIMITED Certificate.	a) No b) No c) No d) No. Candidate needs 49 more days on classed vessel to total 120 days and a minimum of 50 days on Class 2/3
9	95	21	39	155	65	0	65	125	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
10	32	80	15	127	45	35	75	175	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
11	60	25	45	130	40	23	63	133	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No

12	35	90	80	205	10	0	10	215	a) Yes b) No c) No d) No. Although the candidate meets the 120 days required, another 50 days on a classed vessel is needed to meet the minimum 60 for upgrade	a) Yes b) No c) No d) No. Although the candidate meets the 120 days required, another 60 days on classed 2/3 vessel is needed to meet the minimum for upgrade
13	28	70	30	128	20	55	75	175	a) Yes b) Yes c) No d) Certificate issued	a) Yes b) Yes c) No d) No. candidate needs another five days to reach a minimum of 60 days on Class 2/3 vessel to obtain the full certificate

ROUTE 2: UPGRADE FROM LIMITED TO UNLIMITED CERTIFICATES

To upgrade from a LIMITED to an UNLIMITED Certificate, the DPO will need to obtain a minimum of 60 DP sea time days on board a DP2/3 classed vessel. This sea time must be recorded in the NI DP logbook.
Any DP time on board DP Class 2 or 3 vessels previously used to obtain a Limited Certificate cannot be used towards the time required for the issuance of an Unlimited Certificate.

When applying to upgrade to an Unlimited Certificate, the NI will require the logbook, a new Statement of Suitability upgrade form signed by the Master of the last Class 2 or 3 vessel, the original Limited Certificate and the confirmation letter from the shipping company for the new sea time experience to be sent in with the application.

The online application for an upgrade should be carried out before sending in the documents listed above to the NI. The applicant shall use the same candidate customer account number that was issued prior to his/her first DP Certificate. Once all qualification requirements have been confirmed, an Unlimited Certificate will be issued by the NI.

ROUTE 3: CONVERSION FROM LIMITED OR UNLIMITED TO SHUTTLE TANKER RESTRICTED CERTIFICATE

For those DP Operators **holding a Limited or Unlimited Certificate** already issued by The Nautical Institute (the NI) and who wish to convert to the Shuttle Tanker Restricted Certificate shall follow the specifications in Route 8.

ROUTE 4: CONVERSION FROM SHUTTLE TANKER RESTRICTED CERTIFICATES TO THE OFFSHORE CERTIFICATE (OUTSIDE OF THE REVALIDATION PERIOD)

To convert a DP Certificate from Shuttle Tanker Restricted to an Offshore DP Certificate, applicants need to complete Course C (See Annex C) and 90 DP sea time days (not on board a shuttle tanker), Statement of Suitability sign-off and a company confirmation letter after the issue date of the Shuttle Tanker Certificate. All tasks in the task section would have been completed as mandatory during the Shuttle Tanker training and therefore do not need to be repeated for this conversion.

In this case, the type of DP Certificate will be determined by the class of the vessel on which the DP Operator has completed the DP sea time. This means that a Limited or Unlimited Certificate may be issued. In order to gain the Unlimited Certificate, the candidate must have undertaken a minimum of 60 DP sea time days on board a DP 2 or 3 classed vessel.

By the time the candidate applies for the conversion of the certificates, all the sea time in the logbook must be within the past four years. This means that if any sea time phase is out of date, he/she will be required to re-undertake that part of the training.

ROUTE 5, 6 and 7: REVALIDATION OF 'UNCLASSED' (ROUTE 5), LIMITED (ROUTE 6) AND UNLIMITED (ROUTE 7) CERTIFICATES

Please note: For revalidation, DP sea time for Route 6 and 7 must be obtained on a DP classed vessel unless an Unclassed Certificate is held (Route 5).

The following rules apply to revalidating DP Certificates (Offshore Scheme) currently held. To revalidate a certificate one of the following criteria should be met:

- If 150 days or more DP sea service is done within a period of five years, then the person needs to resend the documents to the NI to receive a certificate with a new validity date.
- If the DPO has less than 150 days of DP sea service within the preceding five years, then the person needs to do a Simulator Course and a minimum of 30 days DP sea service.
- If no DP sea service was obtained within the period of the last five years, then the person would have to undertake a Simulator Course and do a minimum of 60 DP sea time days on a DP vessel to have his/her licence revalidated.

- The DPO can take the Revalidation Course with or without sea time to revalidate. Conditions relating to the Revalidation Course are specified in Annex F.
- If the DP professional has been engaged in an occupation the NI considers as being equivalent to the sea service (i.e. DP lecturer/instructor, DP surveyor, DP consultant, DP auditor, DP superintendent, DP supervisor), revalidation of his/her DP Certificate will require a minimum of 150 days in the activity claimed in the preceding five years.
- The Nautical Institute may also consider any other equivalent activities on a case by- case basis such as writing FMEAs and other DP documents, proving/annual trials, suitability surveys on DP vessels, or OVID inspections with a DP variant**.**

The entries to prove the activity shall be made in an NI or IMCA logbook and signed by the accredited training centre (in the case of a DP lecturer), the vessel's Operations Manager (in the case of a DP superintendent, DP consultant, or DP supervisor) where the person has performed the work/activity or by NI's authorised person (in the case of a DP auditor). The sea time for this route must be obtained on a classed vessel unless an Unclassed Certificate is held.

If the person decides to apply with a mix of experience in the last five years that involves DP activities and DP sea time days this experience will be totalled e.g. 20 days DP activities and 130 DP sea time days will equal the required 150 days. However if the total experience is less than 150 days then the criteria above shall be met. Masters holding a DP Certificate can claim for the DP sea time due to their direct responsibility for and supervision of, DP operations. In this case, the DP sea time shall be recorded in the NI or IMCA logbook, signed and stamped as the DP Master.

Holders of NMD Certificates are eligible for the award of an NI Certificate. Upon successful completion of the criteria in this section, they will be issued with the NI DPO Certificate.

NOTE: Passive DP sea time will not be accepted for revalidation purposes as it can only be counted for initial training in the task section of the logbook.

POSITION MOORING (POSMOOR) or THRUSTER-ASSISTED MOORING (TAM): The time on board a vessel with the classification POSITION MOORING or THRUSTER-ASSISTED MOORING (TAM) and DP class notation can be counted towards the DP sea time obtained for revalidation purposes.

ROUTE 8: REVALIDATION OF SHUTTLE TANKER RESTRICTED CERTIFICATES

The following criteria shall be used for revalidating the DP Certificates for shuttle tankers:

- Revalidation of a Shuttle Tanker DPO Certificate requires participation in at least 18 offshore loading operations and one set of annual trials (or FMEA) within a five-year period.
- If less than 18 offshore loading operations but more than six, within the past five years. Complete Course B, followed by Phases 3 and 4 of the Shuttle Tanker Scheme.
- If fewer than six offshore loading operations have been conducted in the five year period, the DPO should restart the Shuttle Tanker Scheme process at Phase 2 and complete all subsequent phases. Due to conversion, 24 days sea time can be deducted from the requirements of Phase 2, but all offshore loading operations in Pathway A or B must be completed.
- Where these revalidation requirements specify participation in annual trials or a FMEA test within a five-year period, in exceptional circumstances this requirement may be fulfilled by participation in an additional Simulator Course (such as Offshore Loading Phase 3) in lieu of the trials, completed during this five-year period.

ROUTE 9: CONVERSION FROM RESTRICTED SELF-ELEVATING PLATFORM CERTIFICATE TO THE OFFSHORE CERTIFICATE

To convert a Certificate from a Restricted Self-Elevating Platform DP Certificate to an Offshore DP Certificate, applicants need to complete 60 DP sea time days and a new Statement of Suitability form signed off after the DP sea time dates have been completed after the issue date of the Restricted Self-Elevating Platform DP Certificate. A company confirmation letter will also be required. The tasks do not need to be repeated.

The type of DP Certificate will be determined by the class of the vessel on which the DP Operator has completed the DP sea time days. This means that a Limited or Unlimited may be issued. In order to gain the Unlimited DP Certificate, the candidate must have undertaken the 60 DP sea time days on board a DP2 or DP3 classed vessel. If the time is completed on board a DP1 classed vessel, a Limited DP Certificate will be issued.

At the time the candidate applies for the conversion of the certificate, all the DP sea time days in the logbook to be used towards the conversion must have been gained within the past four years. However, providing the application is made within three months of the date of signing of the Statement of Suitability, the four years can be counted up to that date of signing.

ROUTE 10: REVALIDATION OF RESTRICTED SELF-ELEVATING PLATFORM CERTIFICATES

To revalidate a Restricted Self-Elevating Platform Certificate, applicants need to complete a minimum of 40 DP Operations. The option to complete a Revalidation Course is currently under review.

6.2. Converting and Revalidating from 1st January 2015 While Working on Shuttle Tankers

Those issued with a Limited or Unlimited Certificate by the NI and who do not have sufficient DP sea time days to revalidate their certificates at the end of the five-year period, may choose to have their certificate revalidated as a Shuttle Tanker Restricted Certificate. In such cases, the conditions of Route 8 will apply. Those converting from the Offshore Certificate to Shuttle Tanker Certificate will require a Statement of Suitability signed off.

Where these revalidation requirements specify participation in annual trials or a FMEA test within a five-year period, in exceptional circumstances this requirement may be fulfilled by participation in an additional Simulator Course (such as Offshore Loading Ph3) in lieu of the trials, completed during this five-year period.

All offshore loading operations, FMEA and trials must be confirmed by the company through a confirmation letter. The confirmation letter shall only be signed by the Operations Manager or person of NOTES: The DP Certificate issued during revalidation will be the same type equivalent position of the certificate initially issued, irrespective of the class of the vessel the candidate has served on within the previous five years.

Candidates wishing to remove the limitation of their certificates or change to the Shuttle Tanker Scheme should take the conversion route to obtain a new certificate from the NI.

FOR OFFSHORE CERTIFICATE REVALIDATIONS:

Candidates are required to apply for revalidation of their DP Certificates in the same month that the original certificate was issued (as shown on the DP Certificate). Extenuating circumstances will be addressed on a case-by-case basis by the NI.

IMCA logbooks can be used towards revalidation only. The hours recorded in an individual's IMCA logbook will be divided by two to get the number of DP days that the person has obtained in the last four years. This is shown in the formula below:

(Total number of hours for each embark / 2h) =< X, Where X cannot be more than the number of days embarked.

The 2 hours comes from the definition of DP sea time for the offshore industry and applies to all time logged on or after 1st January 2015.

Annex A

DP Induction Course

January 2020

DISCLAIMER

Whilst every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. The Nautical Institute cannot be held responsible for any damage to property, trainers or operators whilst following these guidelines. This information is produced in good faith, but we cannot guarantee the accuracy and/or completeness of the information which is produced for guidance purposes only.

THE NAUTICAL INSTITUTE DP INDUCTION COURSE

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DOCUMENT VERSION CONTROL

NI DP Induction Course		
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Contents

1. Introduction

The list of training centres approved for the delivery of these courses may be found on The Nautical Institute's (the NI) website.

The following courses cannot be taken in consecutive weeks (back-to-back) unless they are being repeated. This is because the DP sea time after each course gives the prospective DPO the opportunity to reinforce, consolidate and put into practice skills learned during the courses.

Induction and Simulator Courses must be undertaken within four years of the date of the application and submission of documents to the NI. In the event that any of these courses fall outside of the four year period, the trainee will be required to repeat the expired course.

2. Minimum Entry Qualification Requirements

On successful completion of both the Induction Course and Induction online exam, the trainee DPO will be issued with a NI DP logbook in which the courses, DP sea time, tasks and the Statement of Suitability are recorded. The subsequent DP sea time following the Induction Course provides the opportunity to complete the task sections in the logbook.

The new grey logbook is issued to trainee DPOs that started their training after 1st January 2015. Trainee DPOs who have entered into the training scheme before this date or are repeating the Induction Course shall continue to use their existing logbooks. Trainee DPOs who have transferred to the new offshore scheme will also be issued with a grey logbook

Trainee DPOs attending an Induction Course after 1st January 2015 will only be permitted to count DP sea time gained after attending the course. Applications received at the NI under the old scheme rules will be evaluated and honoured by the previous regulation.

3. Number of Hours

A minimum of 28 hours teaching time is required for this course; if additional time is required to run exams or deal with paperwork, this time shall be added to the 28 hours. It is expected that 80% of the time is spent on teaching DP theory and 20% on practical exercises. Usually the Induction Course is delivered over four or five days. There is an option to deliver the course over a maximum six-week period, with instruction taking place on a given day in each of those weeks. This option is particularly suited to cadet training institutions as it allows the training to fit into the already existing class schedule. In all other aspects the course must conform to all other training scheme standards.

4. Ratio of students/instructors/equipment

The number of students attending the Induction Course must be regulated so that each student obtains sufficient 'hands-on' experience of operating the system to ensure adequate familiarisation with the principles of DP operation. In order to achieve this, the NI allows a maximum of eight students per class being taught by one instructor. If more than eight students are enrolled on the course, a second instructor will be required to assist with practical exercises. In this case, the name and signature of the second instructor should be reflected in the attendance list of the course and practical exercises.

Centres are allowed to seat two students per DP console, which is sufficient to reconcile the availability of equipment and the need to provide sufficient hands on experience. If this is the case, the ratio for the Induction Course is one instructor to eight students and four DP consoles.

5. Delivery Method

At the start of the Induction Course the NI DP Operator training scheme is to be outlined, including the need to maintain the logbook and the procedure for obtaining a DP Operator Certificate.
The Induction Course is predominantly theory-based with guided practical exercises that introduce the trainee to various DP operational modes. The topics to be covered on the Induction Course are to include:

5.1. General principles of dynamic positioning.
5.2. The elements of a DP system:
  (i) Computers and control elements
  (ii) Position reference systems
  (iii) Heading reference systems
  (iv) Wind sensors and other environment reference systems
  (v) Power generation elements. The UPS
  (vi) Thrusters and manoeuvring systems.
5.3. Position reference systems and other sensors; their principles of operation, their use, operational merits and limitations.
5.4. Practical demonstration and operation of a typical DP system.
5.5. DP vessel operations: hazards associated with certain types of operation, e.g. shallow water and strong tides.
5.6. Power generation, distribution and management.
5.7. DP watch keeping and watch handover procedures, documentation and communications.

The practical element of this course requires the use of a DP system installed in the training centre and delivered with an adequate level of simulation. This equipment must meet the requirements set out in Annex 5 of the Accreditation and Certification Scheme Standard Volume 2. The minimum equipment required for the Induction Course is Class C simulators.

6. Course Aims

At the end of the course the student should:

6.1 Have acquired knowledge of the principles of DP.
6.2 Have acquired a basic understanding of how to set up a DP system.
6.3 Have an understanding of the practical operation of associated equipment, including position reference systems.
6.4 Be able to recognise the various alarm, warning and information messages.
6.5 Be able to relate the DP installation to the ship system, including (but not limited to) power supply, manoeuvring facility, available position reference systems and nature of work.
6.6 Be able to relate DP operations to the existing environmental conditions of wind, sea state, current/tidal stream and vessel movement.

7. Course Objectives

The following is a list of the objectives to be attained by trainee DPOs by the successful completion of the Induction Course.

By the completion of the training session or period for the DP control station the trainee should be able to:

7.1 Define Dynamic Positioning.
7.2 Explain the need for Dynamic Positioning in various types of vessel.
7.3 Describe the six freedoms of movement of a vessel.
7.4 State which of the six freedoms of movement are controlled under DP and which are monitored.
7.5 Describe the following aids to manoeuvring commonly fitted to DP vessels, including their practical and operational advantages and disadvantages: fixed and controllable-pitch propellers, azimuth thrusters, Azipod thrusters and tunnel thrusters.
7.6 List the seven main components of a DP system; DP Operator, DP computer (or controller), DP

Operator station, position reference systems, sensors, power supply and thrusters.

7.7 Describe the various modes of DP operation, including manual control, semiautomatic control and automatic control. In addition, describe the following common specialist functions: ROV follow (follow sub), follow target, track follow (autotrack), minimum power (weathervane) and riser angle mode.

7.8 Discuss the concept of mathematical modelling of vessel behaviour characteristics and appreciate the advantages and limitations/disadvantages of this technique.

7.9 Outline the power requirements of a DP vessel system and describe a typical diesel-electric power installation.

7.10 Describe the following position reference systems commonly associated with DP installations: INS, Differential GNSS, hydroacoustic, taut wire, Artemis, FMCW Radar and laser-based systems.

7.11 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and manual draught input sensor.

7.12 Describe the concept of centre of rotation and the provision of alternative centres of rotation.

7.13 Describe consequence analysis as carried out by a Dynamic Positioning system.

By the completion of the training session or period, for the <u>power generation and management</u> the trainee should be able to:

7.14 Describe the power generation and distribution arrangements in a typical diesel-electric DP vessel, with particular reference to system redundancy as described in IMO MSC Circ. 645 and vessel FMEA.

7.15 Describe the power supply and distribution arrangements in a typical hybrid diesel/diesel-electric DP vessel. (Main CPP or Az drive which are direct drive)

7.16 Recognise the power requirements of DP vessels and explain the concept of available power and spinning reserve in worst case failure.

7.17 Describe the functions of a power management system as installed on Class 2 and Class 3 DP vessels.

7.18 Describe the provision of uninterruptible power supply to the DP system, with particular reference to power shortages, failures and system redundancy.

By the completion of the training session or period for the <u>propulsion units</u> the trainee should be able to:

7.19 Describe the following types of propulsion system commonly installed in DP equipped vessels: main propellers and rudders, azimuth thrusters, Azipod thrusters and tunnel thrusters, Waterjet, Voith Schnieder, etc.

7.20 Describe the importance of monitoring the displayed values of setpoint and feedback data for thruster and propeller rpm, pitch and/or azimuth.

7.21 Describe the operational characteristics and common failure modes of the different types of propulsion systems as described in 19 above.

By the completion of the training session or period for the <u>position reference systems (PRS)</u> the trainee should be able to:

7.22 Describe the operation of hydroacoustic position reference (HPR) systems.

7.23 Describe the principles of position-fixing using underwater acoustic systems working in SSBL/USBL, LBL and SBL modes.

7.24 Describe the various types of hydroacoustic beacon: transponder, responder and pinger/Beacon.

7.25 Describe the layout of a typical Hydroacoustic system including operator station, transceiver, transducer pole and transducer.

7.26 List the operational advantages and limitations of acoustic systems as a position reference for DP.

7.27 Describe the principle and operation of the Artemis position reference system.

7.28 List the operational advantages and limitations of the Artemis position reference system.

7.29 List the different types of taut wire position reference system: vertical lightweight, vertical deep water, vertical moon pool, horizontal and horizontal gangway.

7.30 Describe the display of taut wire reference data in the DP system.

7.31 Describe the principle of position reference using the taut wire system.

7.32 List the advantages and limitations of the taut wire position reference systems.

7.33 Describe the principles of the Differential GNSS (DGNSS) system.

7.34 Outline the operation of a typical commercial DGNSS network where corrections are delivered by satellite communications.

7.35 List the sources of error and inaccuracy associated with the DGNSS system, describing the effects on

the quality of positioning.

7.36 List the available quality data associated with the DGNSS system.

7.37 List the advantages and limitations of the DGNSS system when compared with other PRS.

7.38 Describe the principles used in relative DGNSS systems.

7.39 Describe the principles of position reference using laser-based systems.

7.40 Outline the method of setting up a laser system to provide best position information.

7.41 List the advantages and limitations associated with a laser-based PRS.

7.42 Describe the principles of position reference using FMCW Radar-based systems.

7.43 List the advantages and limitations associated with FMCW Radar-based PRS.

7.44 Describe the principle of Inertial Navigation (INS) and the methods of using INS to enhance existing PRS performance.

7.45 Discuss the relative accuracy and reliability of the aforementioned PRS, together with the methods used to apply weighting and pooling and voting when more than one PRS is used. Median rejection of PRS when three or more are used and the importance of monitoring the position reference page.

7.46 Describe other PRS that may be used in conjunction with a DP system.

By the completion of the training session or period for the <u>heading and motion reference systems</u> the trainee should be able to:

7.47 Describe the function of gyro compasses and their redundancy within a DP system.

7.48 Describe how to obtain pitch, roll and heave information for input into a DP system.

7.49 Describe the reason for inputting pitch, roll and heave into a DP system.

By the completion of the training session or period for the <u>environmental reference systems</u> the trainee should be able to:

7.50 Describe the provision of wind sensors within the DP system.

7.51 Describe the wind feed-forward facility and its importance within the DP system.

7.52 Recognise the limitations of wind sensor inputs. Explain the reasons for and the consequences of deselecting wind sensor inputs.

7.53 Describe the method by which the DP system determines the value for DP current or Sea Force (the residual error resulting from unmeasured errors & unmeasured forces acting on the vessel).

7.54 List the reasons for discrepancy between the displayed value of DP current (or Sea Force) on the DP system and the true current or tidal stream value.

By the completion of the training session or period for the <u>external force reference systems</u> the trainee should be able to:

7.55 Describe the use of external force reference systems such as hawser tension, plough cable tension and pipe tension monitoring.

By the completion of the training session or period for the <u>DP operations</u> the trainee should be able to:

7.56 Describe the procedures to be followed when approaching a worksite and transferring from conventional navigation to DP control.

7.57 Discuss the need for completing pre-DP and other checklists prior to and during DP operations.

7.58 Explain the need for keeping logbook records of all DP operations, failures and incidents.

7.59 Explain the need for keeping records of operation, maintenance and repairs of DP and ancillary equipment.

7.60 Describe the need for effective communications during the conduct of DP operations.

7.61 Outline the procedures to be followed by the DPO when taking over the control of the vessel's positioning and manoeuvring.

7.62 Describe the structure of alarm / warning and information messages provided on the DP system displays and on the DP printer.

7.63 Recognise the alarms/warnings associated with loss of redundancy after worst case failure and the possible loss of heading or position if another failure occurs after a worst case failure (part loss of some thrusters and power) and catastrophic failure (loss of heading and/or position control). ASOG, TAM and CAM.

7.64 Outline the navigational projections, spheroids and datums that may be used in operations involving Dynamic Positioning.

7.65 Explain the use of worksite diagrams using Universal Transverse Mercator (UTM) coordinates.
7.66 Explain the need for planning DP operations, including emergency and contingency situations ASOG, TAM and CAM.
7.67 List the various following providers of documents containing statutory requirements and guidance relating to DP operations, including:
7.68 IMO (including IMO MSC/Circ. 645 of 1994 Guidelines for Vessels with Dynamic Positioning Systems)
7.69 Classification society DP rules (example from classification society which is member of IACS)
7.70 International Marine Contractors Association (IMCA)
7.71 Marine Technology Society (MTS)
Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots. ASOG, TAM and CAM.
Describe the IMO (DP) equipment classes and their application, with reference to the IMO *Guidelines for Vessels with DP Systems*.
Understand that classification societies use either numbers (e.g. ABS DPS-2) or letters {e.g. Lloyd's Register DP (AA) to denote the DP Class allocated to the vessel.
Describe in outline the DP operations conducted by the following vessel types:
7.72 Diving and underwater support vessels
7.73 Drilling ships and semi-submersibles
7.74 Cable lay and repair vessels
7.75 Pipelay vessels
7.76 Rock dumping and dredging vessels
7.77 Shuttle tanker and FPSO/FSO operations
7.78 Flotel (accommodation) vessels
7.79 Crane barges and construction vessels
7.80 Anchor-handling and platform supply vessels
7.81 Cruise ships and luxury yachts
7.82 State and describe the hazards associated with DP operations conducted in areas of shallow water and/or strong tidal conditions.
7.83 Describe the hazards associated with DP operations in very deep water.

By the completion of the training session or period for the <u>practical operation of a DP system</u> the trainee should be able to:

7.84 Demonstrate the use of the joystick to manoeuvre the vessel and bring the vessel to a stop in a seamanlike manner.
7.85 Demonstrate the correct procedure for setting up the DP system in both manual and automatic modes.
7.86 Demonstrate position and heading change manoeuvres, using both automatic and manual DP facilities.
7.87 Demonstrate the use of commonly provided functions on the DP control panel. As a minimum, including Gain, Fixed Azimuth mode and Thruster bias.
7.88 Demonstrate the use of common modes found on a DP system, as a minimum Track Follow, Minimum Power and ROV Follow.

8. Course Assessment

Not Applicable

9. Online Assessment

In order to be awarded a certificate of completion for the Induction Course the trainee must pass an online assessment at the training centre. The exam is composed of multiple choice questions and shall be completed in 1 hour 15 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the Induction Course and undertake the assessment again.

On successful completion of the Induction Course and online assessment, the trainee Dynamic Positioning Operator will be issued with a Nautical Institute Dynamic Positioning Operator's logbook in which his/her courses, DP sea time, task completion and Statement of Suitability as a DPO are recorded.

10. Practical Assessment

Not applicable

11. Blended Learning for Induction Course Only

Definitions:

- CBT: a computer course that completely replaces face-to-face training.
- Blended learning: a methodology that combines CBT with face-to-face and/or practical training.

CBT courses are not recommended for DP courses because the trainee DPO must learn skills that cannot be taught via computer only, including communication, delegation and emergency response. Trainee DP Operators learn from each other during a face-to-face course as they participate in discussions and debrief after exercises.

Blended learning can be accepted as a delivery method for the DP Induction Course only, not the Simulator Course. CBT may be used to deliver the theoretical portion of the Induction Course after which a minimum of two and a half days will be required in a traditional class. At least two full days should be used for exercises, not theory, and a half day should be used to administer the external online assessment.

The course must comply with the aims and objectives and shall be assessed by the NI on a case by case basis.

During the CBT portion of the course, computer assessments for each unit of material covered will be administered to verify that the trainee understands that material. The pass mark will be 70% for these interim assessments. Once the CBT is complete, the training centre shall administer a further assessment to ensure that the trainee is ready for the practical portion of the course and is at a level of understanding aligned with other trainees in the class.

One instructor should be allocated to support each student and support should be given seven days a week and cover all parts of the world.

Annex B

DP Simulator Course

January 2020

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DOCUMENT VERSION CONTROL

NI DP Simulator Course		
Title NI DP Simulator Course	Version 1	Date 02/01/2020

Page	Subject	Original content v2 (January 2019)	New content v1 (January 2020)	
58	Section 8: Course Assessment	**"Re-Test Policy** The DP Set-up Practical Assessment may not be retaken; it must be passed on the first attempt. If test is failed, student must repeat the Simulator Course. (At 20th Jan 2016, - Not adopted – under review)."	Brackets removed	
69	Section 14: DP Set-up Practical Assessment Skills Form (Assessor)	New content added	Form added	

Contents

1. Introduction

DP Simulator Course has a three part assessment process:

1.1. DP Set Up Practical Assessment, undertaken as course progresses. This must be successfully completed and competence to perform tasks is a requirement to pass the course.

1.2. Online Exam at completion of course which needs to be passed.

1.3. Formative Assessment, which is a feedback given to students throughout the course. This may vary from centre to centre but should consist of :

(i) briefing, consisting of Scenario Objects (SMART) and feedback criteria (how to measure a participants obtaining a correct level)

(ii) debriefing, consisting of two parts, feedback from students and feedback from the instructor, specifically after simulator exercises.

The debriefing note from the instructor must be retained for a period of at least three years.

2. Minimum entry qualification requirements

The course is a key element of the DPO training programme. As such participants will have completed the Induction Course and gained the specified experience before enrolment.

3. Number of hours

A minimum of 28 hours teaching time is required for this course; if additional time is required to deal with paperwork or administer exams this time shall be added to the 28 hours. It is suggested that a split of 30% of the course time is spent on theory and 70% on practical exercises (including the time spent on briefing and debriefing).

4. Ratio of students/instructors/equipment

The number of students attending the Simulator Course must be regulated so that each student obtains sufficient hands-on experience of operating the system when having to react to various failure scenarios.
In order to achieve this, the NI allows a maximum ratio of four students taught by one instructor per one Class B or A Simulator.

By exception, and where justified, a ratio of five or six students may be considered at the discretion of the NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two simulator systems are available in a training centre, "best practice" is to keep each trainee on the same simulator throughout the Simulator Course.

5. Delivery Method

The training will be predominantly practical/operational in nature. Exercises and case studies will be carried out in a facility that meets the provisions set out in the document NI DP Simulator specification (Annex 5 of the Accreditation and Certification Standard Volume 2).
In addition to exercise briefing/debriefing, students will be given an opportunity to give feedback on their training needs during classroom tuition.

This course is intended for those who have completed the Induction Course and a minimum of 60 DP sea time days. These students should already have a good grounding in the practice and principles of dynamic positioning through their experiences in class and at sea.

The DP Simulator Course is intended to build on that experience and to provide realistic DP-based scenario work. These scenarios should provide the opportunity to practice all aspects of the planning and conduct of typical DP operations, including the handling of emergencies. Particular emphasis should be placed upon teamwork within the role-play scenarios.

A typical installation will consist of a redundant DP system interfaced with a simulator system coordinated by the instructor's input. Other facilities will include a realistic communications suite, suitable chartroom facilities and support documentation.

DP scenarios must closely match the situation on board a vessel. Communications form an important part of any DP situation; so they must be adequately simulated in any training facility, with several different means of communication between the instructor station and the DPO/trainee facility. Communications to be simulated include:

- VHF on emergency and working channels. A useful addition is a listing of the various channels monitored by the various installations and vessels taking part in the simulations.
- Talk-back to areas such as ROV control, dive control.
- Telephone to areas such as the MCR.
- DP status alarms (red, amber, blue/ white and green traffic lights).
- DP status board. This facility may form part of a planned crisis; the instructor may mark up the status board incorrectly at the beginning of a scenario to discover if the trainees are completing their checklists meticulously.

The training establishment must provide materials to support the hardware simulator facility. This will mainly consist of relevant documentation which will include:

- Plans and drawings showing the oilfield or operating area used in the simulations.
- Drawings of the various installations within the operating areas, together with any specifications or other necessary details.
- Drawings and data sheets relating to the vessel or vessels under simulation; these drawings to include DP capability plots.
- Operational instructions, checklists and standing orders associated with the vessel or vessels.
- A set of scenario information sheets. Each scenario should be designed to provide at least one specific, planned crisis or problem for the trainees to react to. Other problem areas should be kept in hand for use in the event of the trainees coping with the primary planned crisis in short order.

Training centres must ensure all sources of time keeping are aligned and synchronised. Especially for the recording of time during DP Simulator based exercises.

6. Course Aims

On completion of the Simulator Course the student should be able to:

6.1. Carry out operational planning, risk assessment and hazard identification tasks
6.2. Set up the DP system for a particular task
6.3. Operate the communications
6.4. Analyse the trends
6.5. Discuss systems failures
6.6. Decide on courses of action because of systems failures
6.7. React to alarms and printer readout
6.8. Initiate DP Alert status alarms
6.9. React to all events occurring
6.10. Operate the desk under normal and pressured conditions
6.11. Practice effective teamwork
6.12. Apply the lessons learned to date.
6.13. ASOGs

7. Course Objectives

OPERATION OF A DP SYSTEM

7.1. Demonstrate ability through participation in exercises to set up, operate and carry out manoeuvres using the DP system under the following control modes:

Manual mode	Joystick control of surge, sway and yaw
Mixed manual/automatic mode	Automatic control of yaw with joystick control of surge and sway Automatic control of surge and sway with joystick control of yaw
Automatic mode	Automatic control of surge, sway and yaw

7.2. Demonstrate ability through group exercises to set up, operate and carry out manoeuvres using the DP system under the following control modes:

Follow-target mode	ROV follow and working other DP vessels
Track follow mode	

7.3. Demonstrate within the DP Simulator the operation of position reference systems, sensors and peripheral equipment associated with the DP system.

7.4. Understand the operation of heading modes where the DP system continuously determines and automatically sets vessel heading to minimize power/thrust requirements.

DP OPERATION

7.5. Interpret vessel plans and specifications.

(i) Interpret information found on paper or electronic field charts relevant to the planning and conduct of DP operations.

7.6 Using vessel and other data such as capability plots (paper or electronic), footprint plots to assess the capability of the vessel to complete successfully any proposed operation without a loss of position after worst case failure.

7.6.1 Review power management systems considering the following:

(i) Open and closed tie breaker
(ii) Number of generators online
(iii) Available Power/Spinning reserve
(iv) Preferential tripping- /-Load sharing
(v) Redundancy
(vi) Concept of Auto blackout recovery
(vii) How power management systems prevent blackouts
(viii) Power management with the DP program

7.6.2 Review FMEA and Annual DP Trials:

(i) Define the two main sections of an FMEA
(ii) Explain reason why Class 2 and 3 vessel need FMEA
(iii) Identify Worst Case Failure
(iv) Explain the reason for using the FMEA to develop Activity Specific Operation Guidelines (ASOG)
(v) Identify and understand the reason for annual DP trials

7.7 Carry out a risk assessment exercise on proposed operations and determine the level of redundancy appropriate.

7.7.1 Understand a DP alert table or ASOG, what will trigger a change of status and the action required

7.7.2 Understand a CAM and TAM table and decide on which mode to operate under, based on a risk assessment of proposed operations

7.8. Make appropriate contingency plans to cover foreseeable system failure or operational requirement. Contingency planning to include:

7.8.1. Escape routes
7.8.2. Position reference failures
7.8.3. Sensors
7.8.4. Weather
7.8.5. Power
7.8.6. Propulsion
7.8.7. Worst case failure.

7.9. Describe appropriate procedures to be followed when approaching a work site and transferring from manual/ joystick to DP control, taking into account:

7.9.1. Speed
7.9.2. Distance
7.9.3. Drift test
7.9.4. Location of surface and sub-sea structures
7.9.5. Drift-on/drift-off
7.9.6. Testing manual control
7.9.7. Independent joystick control
7.9.8. Current/tide changes
7.9.9. Weather forecasts
7.9.10. Worst case failure testing
7.9.11. Testing of the DP alert status system.

7.10. Demonstrate effective completion of setup/location and change of watch checklists and task specific checklists as required.

7.11. Demonstrate the effectiveness of closed-loop communications needed during DP operations and task specific communications as per IMCA 103, for the exercise being conducted.

7.12. Conduct vessel positioning manoeuvres and station keeping functions following operational plan and procedures.

7.13. Organise DP watchkeeping procedures:

7.13.1. Manning of DP console
7.13.2. Maintaining lookout
7.13.3. Internal and external communications
7.13.4. Observing recognised safe working practices.

7.14. Conduct appropriate watch handover procedures, to include but not limited to:

7.14.1. Status board
7.14.2. Weather forecasts
7.14.3. Vessel status
7.14.4. DP status
7.14.5. Field operations
7.14.6. Vessel operations
7.14.7. Completing appropriate checklists.

7.15 Maintain the appropriate logbooks and records pertaining to DP operations including IMCA incident report form, fault logs, position reference systems logs.

7.16 Evaluate the various information, warning and alarm messages communicated to the operator.

7.17 Relate the content of the messages in 2.12 above to the actions necessary in relation to the DP operation.

7.18 Understand Activity Specific Operational Guidelines.

EMERGENCY PROCEDURES

7.19 Recognise the conditions (as per main headings in failure mode check list – see final section of this annex – thrusters, sensors, position references, power, environment and miscellaneous) that will degrade operational or emergency status.

7.20 Recognise the warnings and alarms associated with conditions as per 3.1.

7.21 Evaluate the various factors to be taken into account subsequent to any system failure, determine and carry out appropriate corrective actions, including:

7.21.1. Changing DP status
7.21.2. When to terminate work
7.21.3. Monitoring stability of position and heading
7.21.4. Communication.

8 Course Assessment

Each candidate is required to demonstrate their competence to perform the tasks listed in the DP Set-up Practical Assessment Table.

The Control Sheet establishes the conditions under which the practical assessment occurs and the criteria against which the student's performance will be measured.

8.1. The Simulator Assessment Form for the practical assessment is to be used by the instructor/assessor when conducting assessments of the practical skills demonstration on the simulator.

8.2. The instructor/assessor will observe how the candidate demonstrates the skills listed in the NI's DP Set-up Practical Assessment Table and determine if the candidate passes or fails.

Re-Test Policy

The DP Set-up Practical Assessment may not be retaken; it must be passed on the first attempt. If test is failed, student must repeat the Simulator Course.

9 Online Assessment

In order to be awarded a certificate of completion for the Simulator Course the trainee must pass an online assessment at the training centre. The exam is composed of multiple choice questions and shall be completed in 1 hour. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the Simulator Course and undertake the assessment again.

10. Practical Assessment

Assessment

Each candidate is required to demonstrate their competence to perform the tasks listed in the DP Set-up Practical Assessment Table.

The Control Sheet establishes the conditions under which the practical assessment occurs and the criteria against which the student's performance will be measured.

10.1. The simulator Assessment Form for the practical assessment is to be used by the instructor/assessor when conducting assessments of the practical skills demonstration on the simulator.

10.2. The instructor/assessor will observe how the candidate demonstrates the skills listed in the NI's DP Set-up Practical Assessment Table and determine if the candidate passes or fails.

11. Failure Mode Checklist

FAILURE MODE CHECKLIST

The Nautical Institute
DP Simulator Course
Failure Modes checklist

Course dates:
From: _____
To: _____
Instructor: _____

No.	FAILURE MODE (Thrusters)	CORRECTIVE ACTION	COMPLETED	EXERCISE No.
1	Most useful thruster fails to 100% pitch/rpm. (Feedback indicates 100%)	Detect fault. Emergency stop Thruster. (Deselection of thruster does not stop thrust.)		
2	Most useful thruster feedback indicates 100% pitch/rpm but thruster is working normally.	Detect fault. Is heading or position changing? Emergency stop thruster if required. (Deselection of thruster does not stop thrust.) DP should continue to operate thruster, stop operation and move to safe location and check thruster.		
3	Most useful thruster fails to 0% pitch/rpm	Consider vessel capability after loss of thruster. Take action as required.		
4	Operator deselects thruster for engineering purposes (request from E/R) engineer trips another (critical) thruster.	Detect mistake. Inform engine room. Determine effect of the loss of this thruster has on vessel capability.		
5	Thruster having setpoint or feedback error. The magnitude of the error can be set to either cause a thruster alarm or be set so that the error is below alarm limits and only detectable by DPO observation of setpoint/feedback data.	Detect fault. Consider vessel capability. Have thruster checked and take corrective action as required. (Non alarm event might not be noticed by DPOs) The DPO must monitor the thruster setpoint / feedback and understand the information.		
6	Freeze a thruster (setpoint) after the vessel has settled on position and heading. (If a good model has built up there may be no alarm until weather conditions change or a move is input.)	Detect fault. (There may be no alarm if weather conditions are constant and the current model is built up.)		

7	Present a situation where thruster/thrusters down for maintenance. Vessel has sufficient remaining thrusters to hold position and complete the task assigned. However, when ½ blackout occurs, there will be insufficient thrusters online to maintain position control. (Vessel does not have redundancy with thruster/thrusters down.)	Project should not progress until adequate thrusters are available.		
8	Any of the thrusters down for maintenance.	Consider effect of thruster loss on vessel capability.		
9	Downline, umbilical, cargo hose, etc., fouls a thruster causing it to fail.	Consider vessel capability after loss of thruster. If required, alter operational status to reflect loss of thruster.		
10	ROV power failure while underneath vessel. ROV has sufficient tether out to reach surface and has positive buoyancy. Vessel may be secured to bottom by a pipe, cable or umbilical.	Shutdown thrusters or move vessel (as required) to prevent ROV contacting thrusters. Give consideration to DP operation and redundancy while doing so. (Was umbilical length considered during planning of operation? Does ROV have positive or negative buoyancy?**)**		
11	Thrusters in fixed azimuth mode in light weather conditions. Increase environmental loads to the point where vessel will not maintain position in fixed mode.	Thrusters should be switched to free slew as required to prevent loss of position.		
No.	**FAILURE MODE (Sensors)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
12	Wind sensor shielded by platform and then sees an increase in wind (15 knots) after vessel move. (Wind increase can vary.)	Position vessel at a distance from platform such that excursion caused by an increase in wind will not cause a collision. (Be aware that wind sensor is not registering actual wind.)		
13	Wind sensor sees at extra wind (50 knots) for a short period due to helicopter arrival.	Deselect wind sensor before helicopter arrival. Reselect after departure. Note some DP systems will just reject the wind from the system, this is a problem if the wind is from a storm front.		
14	False high wind reading registering in DP system (in period when real wind is less than 5 knots) but not on anemometer direct readouts.	Ascertain real order of magnitude of wind, deselect wind sensors, and monitor any vessel movement and correction.		
15	Anemometer fouled (possibly by halyard). Gives fixed wind direction and speed error.	Determine cause of fault. Initiate action to have fault corrected.		

16	Single Anemometer Failure.	Initiate repairs. Check remaining anemometer/anemometers for quality of data to determine if operation can continue.		
17	Selected Gyro drifting slowly three Gyros online.	Investigate gyro error. (If all three gyros are selected, voting should eliminate faulty gyro.) Consider effect on vessel operational status.		
18	Selected Gyro drifting slowly two Gyros online.	Investigate gyro error. Attempt to determine which gyro is in error. (If difference becomes too large and faulty gyro cannot be determined, consideration must be given to stopping DP operation.)		
19	Single Gyro Failure	Consider effect on redundancy. Initiate repairs. Check remaining Gyro/Gyros.		
20	Fail gyros (dependant on number selected) to cause position dropout/model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required.		
21	MRU/VRS/VRU selected jumps 5° static angle.	Investigate alarm. Determine effect, if any, sensor fault has on position references.		
22	Single MRU/VRS/VRU Failure.	Consider effect on redundancy. Initiate repairs. Check remaining sensors.		
No.	**FAILURE MODE (Position References)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
23	A perfect (frozen) position reference updating DP with constant position. Requires a situation where only one reference or two of the same type are selected (i.e. DGPS).	(Vessel likely to drift of due to frozen reference.) Detect fault. Enable stable references, if available, and deselect faulty references.		
24	GPS signals/ DGPS correction signals blocked because of close proximity to platform.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference, if required/available. Consider loss during operation planning. Should have been picked up during planning, change to a different correction source.		
25	DGPS correction signals blocked/ become noisy due to atmospheric/scintillations interference.	Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
26	Artemis signal lost due to object (cranes, other vessel, etc.) passing between fixed and mobile antennas.	Determine cause (line of sight blocked). Check standing orders/field procedures for minimum references.		

	Also could be for Fanbeam/Cyscan/RADius/Radascan.	Activate standby reference if required/available. Consider loss during operation planning.		
27	Fail RADius/Radascan due to battery failure in transponder.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
28	Fanbean/Cyscan signal fails due to rain showers, snow or fog..	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
29	Fail HPR beacons due to excessive noise.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
30	HPR interference due to another vessel in the area using the same beacon.	Check with other vessels in area before deploying beacons.		
31	Fail HPR beacons due to battery failure.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
32	Making position moves while working in shallow water using Taut Wire and/or HPR as references.	Take shallow water into account and expect large number of replumbs and possibly noisy HPR. If possible, deploy surface references as backups.		
33	Taut Wire fouled by ROV, diver, downlines, air lines etc.	Monitor divers/ROV closely. Make all parties aware of Tautwire/HPR locations. Deploy standby reference or fix problem with fouled reference.		
34	Taut Wire failure due to mechanical problems.	Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
35	Conducting operation with using the minimum number of references required as per standing orders or field procedures. Fail one of the references.	Have standby reference available for activation/deployment. If no standby reference, consider effect on vessel operational status.		

36	Fail references (dependent on number and type selected) to cause position dropout/model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required. Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
37	Increase noise on a reference to the point where it is still accepted by DP but weight is alternating between very low and/or 0.	Detect fault. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. (With no weight the reference is not acceptable.)		
38	Drop-out of DGPS signals resulting in loss of Absolute reference within DARPS system, and subsequent loss of "Reaction Box" function. (Shuttle Tanker, Tandem Loading)	Monitor movement of both FPSO and Shuttle tanker to ensure relative movement does not become out of phase. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
39	Failure of all relative position reference systems, with only Absolute DGPS functioning. (Shuttle Tanker, Tandem Loading)	Use all means to assess change in relative position – such as hawser catenary and/or tension. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
No.	**FAILURE MODE (Power)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
40	Vessel equipped with switchboard that can be divided into at least 2 sections with a bus tie breaker. ½ the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Vessel working upwind of platform and near capability limits (with 1 Bus section offline).	This would be a worst case failure and vessel need to go to Yellow alert, safely stop operations and then move vessel to a drift off position and move outside 500m		
41	Complete blackout due to failure of bus tie breaker to work properly. (When operating with common bus.)	Monitor position while drifting. Prepare for immediate action on return of power supply.		
42	Start operation with minimum number of generators. Increase environmental loads. (Power management system fails to react to increased demand.)	Monitor power usage and request start of extra generators as required.		
43	Generator/generators fail during operation.	Consider effect of reduced power capacity on capability of vessel. Bring extra generators online (if available) to replace those lost. Move vessel to safe location if required.		

44	Generator/generators out of service either due to failure or for maintenance.	Consider effect of reduced power capacity on capability.		
45	Vessel equipped with switchboard that can be divided into at least 2 sections with a bus tie breaker. ½ the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Without the failed switchboard, vessel doesn't have required redundancy to conduct the operation.	Discontinue operation until redundancy is restored. Move vessel to safe location if required.		
46	Start exercise with common Bus and all online generators on either Bus 1 or Bus 2. (Blackout on that side will cause complete blackout)	Generators in use should be set so that power is available on both Bus.		
47	Complete blackout. Then make all thrusters available and give back only 1 generator or multiple generators that have insufficient power to meet thrust requirements.	Monitor position while drifting. Prepare for immediate action on return of power supply. Decide how best to utilize available power/thrust so as to minimize loss of heading/position and the possibility of further blackout.		
No.	**FAILURE MODE (Environment)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
50	Change weather conditions and/or current such that work must be terminated or vessel position/heading changed.	Observe degrading weather closely and take action before vessel loses redundancy or ability to safely conduct operation.		
51	Change current and/or wind 180° causing a Ablow off@ situation to become a Ablow on situation. (Possibly use in conjunction with item 52)	Determine effect on vessel capability. Determine if it is still safe to conduct operation.		
52	Increase current and/or wind to a point beyond limits for redundancy.	Change vessel heading/position to reduce current load. Suspend operation if heading/position change not possible.		
53	Wind shift from ahead to the beam. (Wind speed such that redundancy limits are exceeded.)	Determine effect on vessel capability. Adjust heading or position if required.		
54	Sudden wind shifting in both speed and direction due to thunder storm activity. (10 knots on bow to 50 knots on beam in 45 seconds.)	Determine effect on vessel capability. Adjust heading or position if required.		

No.	**FAILURE MODE (Miscellaneous)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
55	Vessel is conducting subsea operations (Diving, Pipe lay, ROV, etc.) on the lee side of a platform. There is then a serious gas leak at the platform. Also applicable to DP Shuttle Tanker when connected to an FPSO during tandem loading operations.	Consider the effect of the leak on the vessel and the dangers it presents. Take action to immediately suspend operations and prepare to move the vessel to a safe location.		
56	Unknown external force causes position excursion (vessel alongside comes in contact, thruster wash, load on crane becomes fouled, crane lift was not vertical, tension on cargo hose winching line, etc.)	Determine cause of excursion and take action to remove force. Consider possibility of excursion during planning.		

OFFSHORE SCHEME

MANDATORY: It is compulsory for training centres to apply at least one item from each section (Thrusters, Sensors, Position Reference, Power, Environment and Miscellaneous) during the Simulator Course and its exercises. Other failures are subject to the training centre's choice, either to apply them through the exercises or discuss them during the debriefing. In the case of debriefing, a note should be made in the failure mode table to specify that.

Items recommended:

Item 1, 2, 3, 5 and 6
Item 20
Item 25
Item 40, 41, 43 and 47
Item 50

SHUTTLE TANKER: All items below are MANDATORY during Course C of the Shuttle Tanker scheme.

Item 1, 3, 4
Item 14 and Item 20
Item 23, 25, 26, 35, 36, 38 and 39
Item 42 and 45
Item 52 and 54
Item 55

12. Summary of Simulation

Team 1	Team 2	Team 3
Team Members	Team Members	Team Members
Wind:	Wind:	Wind:
Current:	Current:	Current:
Final Approach Heading:	Final Approach Heading:	Final Approach Heading:
500 M Checklist Completed:	500 M Checklist Completed:	500 M Checklist Completed:
Dive Checklist Complete:	Dive Checklist Complete:	Dive Checklist Complete:
Communications Check Completed:	Communications Check Completed:	Communications Check Completed:
DP Events Induced by Instructor	DP Events Induced by Instructor	DP Events Induced by Instructor

13. Recording Student Performance

STUDENT PERFORMANCE **DP ADVANCED COMPETENCE CHECKLIST** NI Competence			Participant name: Date: Course:	
1. OPERATION OF A DP SYSTEM		Tax code	Checked	Comment:
1.1	Demonstrate an ability to set up and operate the DP system under the various control modes, and to carry out manual, mixed manual/automatic manoeuvres.	A		
1.2	Demonstrate the operation of position reference systems, sensors and peripheral equipment associated with the DP system.	A		
2. DP OPERATION				
2.1	Interpret vessel plans and specifications, capability diagrams and other data relevant to the planning and conduct of DP operations.	A		
2.2	Using vessel and other data assess the capability of the vessel to complete successfully and proposed operation.	A		
2.3	Carry out risk assessment exercise on proposed operations and determine the level of redundancy appropriate.	A		
2.4	Make appropriate contingency plans to cover any foreseeable system failure or operational requirement. Contingency planning to include appropriate "escape routes" for the vessel.	A		
2.5	Demonstrate compliance with appropriate procedures to be followed when approaching any work site and transferring from conventional vessel control to DP control.	A	N/A	
2.6	Demonstrate effective completion of Pre DP and other checklists.	A		
2.7	Demonstrate effective communication needed during DP operations and the testing procedures.	A		
2.8	Conduct vessel positioning manoeuvres and station keeping functions following operational plan and procedures.	A		
2.9	Organize DP watchkeeping procedures observing recognized safe working practices.	I	N/A	
2.10	Conduct appropriate watch handover procedures, completing appropriate checklists.	A	N/A	
2.11	Maintain the appropriate logbooks and records pertaining to DP operations.	A		
2.12	Evaluate the various information, warning and alarm messages communicated to the operator.	I		
2.13	Relate the content of the messages in 2.12 above to the actions necessary in relation to the DP operation.	I		

3. EMERGENCY PROCEDURES				
3.1	Recognise the conditions that will cause degraded operational status or emergency status.	K		
3.2	Recognise the warnings and alarms associated with catastrophic failure.	K		
3.3	Evaluate the various factors to be taken into account subsequent to any system failure and determine appropriate actions.	I		
3.4	Carry out procedures to stabilize the vessel position and heading subsequent to a variety of system failures and take appropriate decisions and actions relating to the continuance or abandonment of the operation.	I		

Levels of Cognition
Level 1: Knowledge (K) To remember to r to reproduce on basis of appropriate, previously learned information.
Level 2: Understanding (U) To give meaning to new situations and or new material by recollection and using necessary present information. To give evidence of insight in certain activities.
Level 3: Application (A) To use previously acquired information in new and concrete situations to solve problem that have single or best answers.
Level 4: Integration (I) To separate information into their component parts, to examine such information to develop divergent conclusions by identifying motives or causes, making inferences and or finding evidence to support generalisations.

Instructor Name:
Date:
Sign:

To creatively apply prior knowledge and skills to produce a new or original whole.
To judge the value of material based on personal values or opinions, resulting in an end product, with given purpose, without real right or wrong answers.

14. DP Set-up Practical Assessment Skills Form (Assessor)

Training Centre Name:	
Student Name	**NI Customer Number**
Assessor Name	**Date**

***Objective**: This assessment is meant to assess the DP Simulator Course students on the minimum standards of competence, by the Nautical Institute approved instructor/assessor by observation of the demonstrable tasks according to the following table.*

Notes:
- The students are able to use scenario and vessel descriptions and the DP set-up checklist provided by the Training Centre, however, the use of personal notes during the assessment is not allowed.
- The instructor's role is to monitor for assessment purposes and shall not assist, coach or lead the student
- The student must pass every item on the list below to be successful. If the student does not pass this DP Set-up Practical Assessment, he/she must repeat the DP Simulator Course

Knowledge, Understanding and Proficiency	**Pass/Fail**	**Observations by Assessor**
Competency	**Take control on the DP operator station**	
1. Change the vessel manoeuvre switch from manual control to DP control (if available)		
2. Take command on the DP operator station		
3. Enable all propellers, thrusters and rudders available		
4. Check available power		
Competence	**Check / enable the sensors**	
1. Check/enable the gyro/compasses in accordance with the vessel's DP classification		
2. Check/enable the wind sensors in accordance with the vessel's DP classification		
3. Check/enable the motion sensors in accordance with the vessel's DP classification		
Competence	**Enable position reference system(s)**	
1. Select/enable at least one reference system		
2. Verify it is acquired by the system		
Competence	**Change to DP joystick manual control mode**	
1. Select DP joystick manual control		

2. Stabilise position and heading Select DP joystick auto heading mode			
Competence	**Change from DP joystick manual control to DP auto position control mode**		
1. Control the vessel using auto heading/yaw mode			
2. Control the vessel using auto sway/athwart mode			
3. Control the vessel using auto heading/yaw mode			
4. Control the vessel using auto sway/athwart mode			
Competence	**Select and verify DP settings using a provided DP set-up checklist**		
This checklist shall include but not be limited to: 1. Selects an appropriate unit 2. Selects an appropriate coordinate system 3. Selects an appropriate gain setting 4. Set up warnings and alarms 5. Check if the power system configuration is in accordance with the vessel's DP classification 6. Check thrusters settings			

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Student Signature **Assessor Signature**

Annex C

Sea Time Reduction Course

January 2020

DISCLAIMER

Whilst every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. The Nautical Institute cannot be held responsible for any damage to property, trainers or operators whilst following these guidelines. This information is produced in good faith, but we cannot guarantee the accuracy and/or completeness of the information which is produced for guidance purposes only.

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DOCUMENT VERSION CONTROL

NI Sea Time Reduction Course		
Title NI Sea Time Reduction Course	Version 1	Date 02/01/2020

Contents

1. Introduction

The period of supervised DP sea time days after the Simulator Course may be reduced by a maximum of 30 days by the satisfactory completion of an intensive DP Simulator Course.

This course can be done straight after the Simulator Course, but trainee DPOs are required to do a minimum of 30 DP sea time days on board a classed DP vessel and have the Statement of Suitability signed by Master after the course. A company confirmation letter is required for verification of that DP sea time.

As with the other components of the scheme, all DP time or courses leading to reduction of DP time must have been completed within the previous four years.

The Sea Time Reduction training cannot be used for upgrading a certificate from Limited to Unlimited.

2. Minimum entry qualification requirements

The course is an optional element of the DPO training programme and as such successful completion of the DP Simulator Course is required before attendance. Candidate must hold a certificate of competency.

3. Number of hours

A minimum of 37.5 hours of instruction time is required for this course.

4. Ratio of students/instructors/equipment

The number of students attending a STR Course must be regulated such that each student obtains the maximum amount of 'hands-on' experience of operating the system to ensure the validity of awarding six DP sea time days for each day spent in the simulator. In order to achieve this, the NI allows a maximum of three students per class being taught by one instructor in a Class A Simulator.

5. Delivery Method

The training will be predominantly practical/operational in nature.
In addition to the opportunities that arise during the exercise briefing and debriefing sessions, provisions will be made during classroom tuition to facilitate student feedback of training needs.

Exercise scenarios and case studies will be carried out on a facility that effectively replicates the working environment the trainee will meet on board. Simulator equipment for the DP Sea Time Reduction training should incorporate facilities that:

- Create a real time operating environment that includes navigation control, manoeuvring and communications instruments replicating that found on a typical dynamically controlled vessel, that will allow trainees to carry out DP watchkeeping and station keeping tasks
- Provide a realistic visual scenario for day and night, including variable visibility, with a minimum horizontal and vertical field of view in viewing sectors appropriate to the DP watchkeeping and station keeping tasks
- Realistically simulate own ship dynamics in open water conditions, including the effects of weather, tidal stream, shallow water and interaction with other vessels
- Realistically simulate faults in the dynamic positioning control system, power generation and distribution systems, propulsion systems, position reference equipment, other sensor equipment and the machine/human interface.

6. Course Aims

The Sea Time Reduction Course should be an opportunity for the trainee to spend extended and intense periods of time on DP station keeping and must challenge the trainee to enhance, consolidate and demonstrate their:

6.1. Knowledge of the DP system and additional equipment and instruments,
6.2. Situational awareness,
6.3. Communication and teamwork skills,
6.4. Ability to analyse trends and pre-empt problems before they arise,
6.5. Ability to evaluate and respond to alarms, faults and emergencies with calm, reason and confidence, and
6.6. Ability to complete such administrative and safety-related procedures as completing checklists, filling in logs and performing thorough watch handovers.

The range of exercises a centre develops to achieve these aims should be appropriate to the intended target group. The following are examples of the typical operational areas that should be considered:

6.7. Saturation and air dive support
6.8. Sub-sea construction and heavy lift
6.9. ROV operations
6.10. OSV operations
6.11. Cable and pipe laying operations
6.12. Drilling operations
6.13. Offshore loading operations
6.14. Shuttle tanker.

7. Course Objectives

Operation of a DP System

7.1. Demonstrate the ability to set up and operate the DP system under the various control modes, and to carry out manual, mixed manual and automatic and fully automatic manoeuvres.
7.2. Demonstrate within the DP Simulator the operation of position reference systems, sensors and peripheral equipment associated with the DP system.

DP Operation

7.3. Interpet vessel plans and specifications, capability diagrams and other data relevant to the planning and conduct of DP operations.
7.4. Using vessel and other data, assess the capability of the vessel to successfully complete any proposed operation.
7.5. Carry out a risk assessment exercise on proposed operations and determine the level of redundancy appropriate.
7.6. Make appropriate contingency plans to cover any foreseeable system failure or operational requirement. Contingency planning to include appropriate escape routes for the vessel.
7.7. Demonstrate compliance with appropriate procedures to be followed when approaching any work site and transferring from conventional vessel control to DP control.
7.8. Demonstrate effective completion of pre-DP and other checklists.
7.9. Demonstrate the effective communications necessary during DP operations and the testing procedures.
7.10. Conduct vessel positioning manoeuvres and station keeping functions following operational plan and procedures.
7.11. Organise DP watchkeeping procedures observing recognised safe working practices.
7.12. Conduct appropriate watch handover procedures, completing appropriate checklists.
7.13. Maintain the appropriate logbooks and records pertaining to DP operations.
7.14. Evaluate the various information, warning and alarm messages communicated to the operator.
7.15. Relate the content of the messages in 2.12 above to the actions necessary in relation to the DP operation.

Emergency Procedures

7.16. Recognise the conditions that will cause degraded operational status or emergency status.

7.17. Recognise the warnings and alarms associated with worst case failure.

7.18. Evaluate the various factors to be taken into account subsequent to any system failure and determine appropriate actions.

7.19. Carry out procedures to stabilise the vessel position and heading subsequent to a variety of system failures and take appropriate decisions and actions relating to the continuance or abandonment of the operation. This to include the following:

7.19.1. Thruster fail to max pitch
7.19.2. Setpoint/feedback offset
7.19.3. Loss of all position reference system, entering move into DP system when in DR mode
7.19.4. Worst case failure and action to be taken
7.19.5. Movement of position reference systems.

In 7.4 one exercise should be in the form of a table top analysis. An FMEA should be used along with other appropriate documentation to evaluate a vessels capability to carry out a given operation.

8. Course Assessment

Training centre are required to develop an effective assessment procedure to ensure that only suitable applicants are deemed to have successfully completed the course.

9. Online Assessment

Not Applicable

10. Practical Assessment

To be arranged by the centre

11. Failure Mode Checklist

The Nautical Institute
DP Sea Time Reduction Course
Failure Modes checklist

Course dates:
From: _____
To: _____
Instructor: _____

No.	FAILURE MODE (Thrusters)	CORRECTIVE ACTION	COMPLETED	EXERCISE No.
1	Most useful thruster fails to 100% pitch/rpm. (Feedback indicates 100%)	Detect fault. Emergency stop Thruster. (Deselection of thruster does not stop thrust.)		
2	Most useful thruster feedback indicates 100% pitch/rpm but thruster is working normally.	Detect fault. Is heading or position changing? Emergency stop thruster if required. (Deselection of thruster does not stop thrust.) DP should continue to operate thruster, stop operation and move to safe location and check thruster.		
3	Most useful thruster fails to 0% pitch/rpm	Consider vessel capability after loss of thruster. Take action as required.		
4	Operator deselects thruster for engineering purposes (request from E/R) engineer trips another (critical) thruster.	Detect mistake. Inform engine room. Determine effect of the loss of this thruster has on vessel capability.		
5	Thruster having setpoint or feedback error. The magnitude of the error can be set to either cause a thruster alarm or be set so that the error is below alarm limits and only detectable by DPO observation of setpoint/feedback data.	Detect fault. Consider vessel capability. Have thruster checked and take corrective action as required. (Non alarm event might not be noticed by DPOs) The DPO must monitor the thruster setpoint / feedback and understand the information.		
6	Freeze a thruster (setpoint) after the vessel has settled on position and heading. (If a good model has built up there may be no alarm until weather conditions change or a move is input.)	Detect fault. (There may be no alarm if weather conditions are constant and the current model is built up.)		
7	Present a situation where thruster/thrusters down for maintenance. Vessel has sufficient remaining thrusters to hold position and complete the task assigned. However, when ½ blackout occurs, there will be insufficient thrusters online to maintain position control. (Vessel does not have redundancy with thruster/thrusters down.)	Project should not progress until adequate thrusters are available.		
8	Any of the thrusters down for maintenance.	Consider effect of thruster loss on vessel capability.		

9	Downline, umbilical, cargo hose, etc., fouls a thruster causing it to fail.	Consider vessel capability after loss of thruster. If required, alter operational status to reflect loss of thruster.		
10	ROV power failure while underneath vessel. ROV has sufficient tether out to reach surface and has positive buoyancy. Vessel may be secured to bottom by a pipe, cable or umbilical.	Shutdown thrusters or move vessel (as required) to prevent ROV contacting thrusters. Give consideration to DP operation and redundancy while doing so. (Was umbilical length considered during planning of operation? Does ROV have positive or negative buoyancy?**)**		
11	Thrusters in fixed azimuth mode in light weather conditions. Increase environmental loads to the point where vessel will not maintain position in fixed mode.	Thrusters should be switched to free slew as required to prevent loss of position.		
No.	**FAILURE MODE (Sensors)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
12	Wind sensor shielded by platform and then sees an increase in wind (15 knots) after vessel move. (Wind increase can vary.)	Position vessel at a distance from platform such that excursion caused by an increase in wind will not cause a collision. (Be aware that wind sensor is not registering actual wind.)		
13	Wind sensor sees at extra wind (50 knots) for a short period due to helicopter arrival.	Deselect wind sensor before helicopter arrival. Reselect after departure. Note some DP systems will just reject the wind from the system, this is a problem if the wind is from a storm front.		
14	False high wind reading registering in DP system (in period when real wind is less than 5 knots) but not on anemometer direct readouts.	Ascertain real order of magnitude of wind, deselect wind sensors, and monitor any vessel movement and correction.		
15	Anemometer fouled (possibly by halyard). Gives fixed wind direction and speed error.	Determine cause of fault. Initiate action to have fault corrected.		
16	Single Anemometer Failure.	Initiate repairs. Check remaining anemometer/anemometers for quality of data to determine if operation can continue.		
17	Selected Gyro drifting slowly three Gyros online.	Investigate gyro error. (If all three gyros are selected, voting should eliminate faulty gyro.) Consider effect on vessel operational status.		
18	Selected Gyro drifting slowly two Gyros online.	Investigate gyro error. Attempt to determine which gyro is in error. (If difference becomes too large and faulty gyro cannot be determined, consideration must be given to stopping DP operation.)		

19	Single Gyro Failure	Consider effect on redundancy. Initiate repairs. Check remaining Gyro/Gyros.		
20	Fail gyros (dependant on number selected) to cause position dropout/model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required.		
21	MRU/VRS/VRU selected jumps 5° static angle.	Investigate alarm. Determine effect, if any, sensor fault has on position references.		
22	Single MRU/VRS/VRU Failure.	Consider effect on redundancy. Initiate repairs. Check remaining sensors.		
No.	**FAILURE MODE (Position References)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
23	A perfect (frozen) position reference updating DP with constant position. Requires a situation where only one reference or two of the same type are selected (i.e. DGPS).	(Vessel likely to drift of due to frozen reference.) Detect fault. Enable stable references, if available, and deselect faulty references.		
24	GPS signals/ DGPS correction signals blocked because of close proximity to platform.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference, if required/available. Consider loss during operation planning. Should have been picked up during planning, change to a different correction source.		
25	DGPS correction signals blocked/ become noisy due to atmospheric/scintillations interference.	Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
26	Artemis signal lost due to object (cranes, other vessel, etc.) passing between fixed and mobile antennas. Also could be for Fanbeam/Cyscan/RADius/Radascan.	Determine cause (line of sight blocked). Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
27	Fail RADius/Radascan due to battery failure in transponder.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
28	Fanbean/Cyscan signal fails due to rain showers, snow or fog..	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
29	Fail HPR beacons due to excessive noise.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		

30	HPR interference due to another vessel in the area using the same beacon.	Check with other vessels in area before deploying beacons.		
31	Fail HPR beacons due to battery failure.	Determine cause. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. Consider loss during operation planning.		
32	Making position moves while working in shallow water using Taut Wire and/or HPR as references.	Take shallow water into account and expect large number of replumbs and possibly noisy HPR. If possible, deploy surface references as backups.		
33	Taut Wire fouled by ROV, diver, downlines, air lines etc.	Monitor divers/ROV closely. Make all parties aware of Tautwire/HPR locations. Deploy standby reference or fix problem with fouled reference.		
34	Taut Wire failure due to mechanical problems.	Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
35	Conducting operation with using the minimum number of references required as per standing orders or field procedures. Fail one of the references.	Have standby reference available for activation/deployment. If no standby reference, consider effect on vessel operational status.		
36	Fail references (dependent on number and type selected) to cause position dropout/model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required. Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
37	Increase noise on a reference to the point where it is still accepted by DP but weight is alternating between very low and/or 0.	Detect fault. Check standing orders/field procedures for minimum references. Activate standby reference if required/available. (With no weight the reference is not acceptable.)		
38	Drop-out of DGPS signals resulting in loss of Absolute reference within DARPS system, and subsequent loss of “Reaction Box” function. (Shuttle Tanker, Tandem Loading)	Monitor movement of both FPSO and Shuttle tanker to ensure relative movement does not become out of phase. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
39	Failure of all relative position reference systems, with only Absolute DGPS functioning. (Shuttle Tanker, Tandem Loading)	Use all means to assess change in relative position – such as hawser catenary and/or tension. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		

No.	FAILURE MODE (Power)	CORRECTIVE ACTION	COMPLETED	EXERCISE No.
40	Vessel equipped with switchboard that can be divided into at least 2 sections with a bus tie breaker. ½ the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Vessel working upwind of platform and near capability limits (with 1 Bus section offline).	This would be a worst case failure and vessel need to go to Yellow alert, safely stop operations and then move vessel to a drift off position and move outside 500m		
41	Complete blackout due to failure of bus tie breaker to work properly. (When operating with common bus.)	Monitor position while drifting. Prepare for immediate action on return of power supply.		
42	Start operation with minimum number of generators. Increase environmental loads. (Power management system fails to react to increased demand.)	Monitor power usage and request start of extra generators as required.		
43	Generator/generators fail during operation.	Consider effect of reduced power capacity on capability of vessel. Bring extra generators online (if available) to replace those lost. Move vessel to safe location if required.		
44	Generator/generators out of service either due to failure or for maintenance.	Consider effect of reduced power capacity on capability.		
45	Vessel equipped with switchboard that can be divided into at least 2 sections with a bus tie breaker. ½ the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Without the failed switchboard, vessel doesn't have required redundancy to conduct the operation.	Discontinue operation until redundancy is restored. Move vessel to safe location if required.		
46	Start exercise with common Bus and all online generators on either Bus 1 or Bus 2. (Blackout on that side will cause complete blackout)	Generators in use should be set so that power is available on both Bus.		
47	Complete blackout. Then make all thrusters available and give back only 1 generator or multiple generators that have insufficient power to meet thrust requirements.	Monitor position while drifting. Prepare for immediate action on return of power supply. Decide how best to utilize available power/thrust so as to minimize loss of heading/position and the possibility of further blackout.		
No.	**FAILURE MODE (Environment)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
50	Change weather conditions and/or current such that work must be terminated or vessel position/heading changed.	Observe degrading weather closely and take action before vessel loses redundancy or ability to safely conduct operation.		

51	Change current and/or wind 180° causing a Ablow off@ situation to become a Ablow on situation. (Possibly use in conjunction with item 52)	Determine effect on vessel capability. Determine if it is still safe to conduct operation.		
52	Increase current and/or wind to a point beyond limits for redundancy.	Change vessel heading/position to reduce current load. Suspend operation if heading/position change not possible.		
53	Wind shift from ahead to the beam. (Wind speed such that redundancy limits are exceeded.)	Determine effect on vessel capability. Adjust heading or position if required.		
54	Sudden wind shifting in both speed and direction due to thunder storm activity. (10 knots on bow to 50 knots on beam in 45 seconds.)	Determine effect on vessel capability. Adjust heading or position if required.		
No.	**FAILURE MODE (Miscellaneous)**	**CORRECTIVE ACTION**	**COMPLETED**	**EXERCISE No.**
55	Vessel is conducting subsea operations (Diving, Pipe lay, ROV, etc.) on the lee side of a platform. There is then a serious gas leak at the platform. Also applicable to DP Shuttle Tanker when connected to an FPSO during tandem loading operations.	Consider the effect of the leak on the vessel and the dangers it presents. Take action to immediately suspend operations and prepare to move the vessel to a safe location.		
56	Unknown external force causes position excursion (vessel alongside comes in contact, thruster wash, load on crane becomes fouled, crane lift was not vertical, tension on cargo hose winching line, etc.)	Determine cause of excursion and take action to remove force. Consider possibility of excursion during planning.		

OFFSHORE SCHEME

MANDATORY: It is compulsory for training centres to apply at least one item from each section (Thrusters, Sensors, Position Reference, Power, Environment and Miscellaneous) during the Simulator Course and its exercises. Other failures are subject to the training centre's choice, either to apply them through the exercises or discuss them during the debriefing. In the case of debriefing, a note should be made in the failure mode table to specify that.

Items recommended:

Item 1, 2, 3, 5 and 6
Item 20
Item 25
Item 40, 41, 43 and 47
Item 50

<u>SHUTTLE TANKER</u>: All items below are MANDATORY during Course C of the Shuttle Tanker scheme.

Item 1, 3, 4
Item 14 and Item 20
Item 23, 25, 26, 35, 36, 38 and 39
Item 42 and 45
Item 52 and 54
Item 5

Annex D

Shuttle Tanker Course A

January 2020

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DOCUMENT VERSION CONTROL

NI Shuttle Tanker Course A		
Title NI Shuttle Tanker Course A	Version 1	Date 02/01/2020

Contents

1. Introduction

Course A is an NI Recognition Course (not an Accredited Course) and refers to the completion of appropriate Position Reference System (PRS) course offered by Recognised Position Reference System manufacturers or their approved agents. This course may be offered by accredited DP Training Centres having facilities to conduct the course with the approval of system manufacturers.

Evidence of course completion must be provided by appropriate documentary evidence issued by the organization conducting the course. Based on the evidences, Training centres should complete, sign and stamp the appropriate entry in the Shuttle Tanker Logbook.

The Course A PRS training requirement may also be satisfied by a participant undertaking training at a centre approved by The NI for PRS training. Such training must be conducted over a period of 4-5 days and cover instruction in a minimum of 3 different PRS arrangements.

At the end of the course, the trainee should obtain a certificate of attendance. The NI Recognition Logo may be used. The NI recognizes these courses but does not accredit them.

2. Minimum Entry Qualification Requirements

There are no minimum entry requirements but completion of a DP Induction Course or a suitable “DP Awareness” course is recommended.

3. Number of Hours

The duration of each individual PRS course should be as per the Manufacturers recommendations.

The entire course duration is to be planned by the training number of PRS centre depending on their course content, number of PRS they wish to teach and the time they wish to allocate for each PRS as per manufacturer’s recommendation.

It is however recommended that the full course should be run for a minimum of four days (6 hours per day) to adequately cover all the aspects and requirements of the training.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of ten students per class being taught by one instructor.
Simulators used for this training could be the actual equipment or be PC based.

5. Delivery Method

The duration of each course should be as per the individual PRS manufacturer’s recommendations. Courses should be aligned with existing practices in regards to course duration. The contents of the course should be appropriate to the complexity and risk of each type of PRS.

Vessel owners are required to ensure onboard familiarization of current software version with structured familiarization program. Theory may be used to support the practical exercises either as a briefing, a de-briefing or for demonstration purposes.

The following PRS Systems are mandatory:

- Artemis operator course

- (HPR/HiPAP (or other HPR PRS) operator course
- DGNSS/DARPS (or other relative GPS PRS) operator course

The following are optional:

- Parker PMS System operator course
- RadaScan , RADius (or other FMCW PRS) operator course
- Cyscan, Fanbeam (or other laser based PRS) operator course

It is understood that the list above is not exhaustive and refers to the major systems currently in use. Other systems may be included if so desired or if newer systems are introduced.

Each position reference course should cover as a minimum the following:

- Principle of operation
- Advantages and disadvantages (limitations)
- Failure Modes
- Quick Reference Guides
- Interaction with other PRS

6. Course Aims

On completion of the course, the student should be able to:

6.1. Have an understanding of the practical operations of the various Position Referencing Systems.
6.2. Be able to recognize the various alarms, warnings and information messages.
6.3. Be able to assess the strength, capability and dependability of the PRS System.
6.4. Be able to assess the weaknesses and limitations of the PRS System.
6.5. Recognise conditions that will cause degraded operational status of the PRS.
6.6. Take remedial action in the event of system failure due to loss of PRS.
6.7. Take emergency action, which may involve suspension of operations.

7. Course Objectives

The following is a list of the objectives which should be attained by the candidates upon completion of Course A. The trainee should be able to:

7.1 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydro acoustic, Artemis, FMCW Radar and laser-based systems. (Taut wire and PRS interfaced with INS may also be described in basic terms)
7.2 Describe the failure modes of the following position reference systems: Differential GNSS, hydro acoustic, Artemis, FMCW Radar and laser-based systems. (Also Taut Wire and INS briefly)
7.3 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.
7.4 Understand the importance of ASOG, TAM and CAM.
7.5 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.
7.6 Recognise the advantages as well as the limitations of the various systems.
7.7 Recognise that multiple PRS systems may be in use in Shuttle Tanker Operations, their balance and weighting, safe operating limits and how these may be degraded by failure of a single PRS.

8. Course Assessment

Appropriate assessment will depend on the PRS being taught and will be made by the training centre.

9. Online Assessment

There are no on line assessments for this course

Annex E

DP Shuttle Tanker Course B

January 2020

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DOCUMENT VERSION CONTROL

NI Shuttle Tanker Course B		
Title NI Shuttle Tanker Course B	Version 1	Date 02/01/2020

Page	Subject	Original content v2 (January 2019)	New content v1 (January 2020)	
94	7. Course objectives	New content added	Text added in 7.3 (7.3.2): "(vii) Demonstrate use of DP modes which monitor and control heading differences between FPSO/FSU and shuttle tanker, during tandem loading operations. (viii) Demonstrate use of DP modes which monitor and control the relative position of the shuttle tanker, in relation to the FPSO/FSU, during tandem loading operations."	

Contents

1. Introduction

The shuttle tanker operation simulator training course relates to the offshore loading Phase 2 type course. To concentrate on shuttle tanker specific behaviours and include a range of offshore loading installation types.

2. Minimum entry qualification requirements

3. Number of hours

Five days x six hours per day, totalling 30 hours.

4. Ratio of students/instructors/equipment

Three students maximum on a Class A Simulator only.

5. Delivery Method

As per training centre.

6. Course Aims

The focus of the exercises should be on the practical handling of shuttle tankers in the vicinity of offshore installations. This should include approach to the operational zones, safe interaction with the offshore terminal facilities, including the effects of mooring systems, hose connections, emergency shutdowns, interaction with tanker assist vessels and field communications. All functions of propulsion, power generation and position reference systems should be included in the discussions and exercises, as well as effects and instances of equipment and system errors/failures. Students will also acquire knowledge of offtake tanker operational procedures.

A separate basic ship handling course should have been completed prior to attending this course, as the revision section is limited to a refresher on basic shiphandling techniques.

Such a shiphandling course should cover:

6.1. Effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances
6.2. Effects of wind and current on ship handling; application of rate of turn (ROT) techniques
6.3. Manoeuvring in shallow waters, including under-keel clearance caused by squat, rolling and pitching
6.4. Interaction between ships and between own ship and nearby banks (bank effect)
6.5. Berthing and unberthing under various wind, tide and sea-current conditions with and without tugs
6.6. Ship and tug interaction, various types of tugs
6.7. Use of propulsion and manoeuvring systems
6.8. Where possible, use of tunnel and azimuth thrusters

A suitable course format is currently available as Offshore Loading Phase 1 at some training establishments.

7. Course Objectives

The reasons for the majority of incidents related to vessel handling operations can be traced to human error or lack of professional problem mitigation. The main objective of the courses is for Masters and DPOs to achieve

optimal understanding and skills in DP mode, DP manual mode and in traditional manual modes, where appropriate. This will further improve the safety of the tanker's manoeuvring and loading operations.

Vessel handling exercises should be carried out on simulators. Approaches to offshore terminal should be carried out primarily by using DP systems, but a manual mode approach should be included for comparison. Simulations should also include reconstruction of known DP incidents involving offtake tankers. The complexity and value of these exercises will be enhanced by appropriate previous experience of the person in charge of the simulator.

Course Content

The following sections outline content of a typical training course designed to provide the competence required to achieve a satisfactory understanding and skill level.

7.1 Ship Handling Refresher Section:

7.1.1. Repetition of rate of turn (ROT) techniques and other theoretical items from basic Ship handling course noted in Purpose (above).

7.1.2. Practical exercise on simulator to confirm adequate understanding of MCRM principles and practices

7.1.3. Further practical exercises on simulator if the instructor considers it necessary, based on responses from above two assessments

7.2 Offshore Loading specific section:

7.2.1. Gain knowledge of requirements and guidelines that apply to offtake tanker DPOs. Achieve increased skills in operating the DP system and the manual manoeuvring of vessels under normaland severe/marginal environmental conditions, with systems intact and with system errors, such as loss of position reference systems, thruster failure and sensor failures, etc.

7.2.2. Gain a good understanding of the DP system's possibilities and limitations.

7.2.3. Gain good understanding of field operator's offshore loading manuals for various fields.

7.2.4. Gain good understanding of the correct use of position reference systems for DP.

7.3 General section:

7.3.1. Review and updates in latest industry best practice including new legislation, new recommendations/guidance, new systems, new fields and terminal types.

7.3.2. Revision of DP Systems and Operation, to include Tandem FPSO (active and passive); STL; OLS; and taut hawser options:

(i) Interpret vessel specifications, field specifications and other data relevant to planning approach and offloading operations.

(ii) Using capability plots and environmental data to assess the capability of the vessel to complete the planned operation safely.

(iii) Ensure correct level of redundancy is available and that risks are assessed adequately.

(iv) Develop contingency plans and escape criteria/routes.

(v) Demonstrate compliance with appropriate procedures for different stages of the operation.

(vi) Demonstrate use of the Approach Mode, controlling the vessel speed and movement.

(vii) Demonstrate use of DP modes which monitor and control heading differences between FPSO/FSU and shuttle tanker, during tandem loading operations.

(viii) Demonstrate use of DP modes which monitor and control the relative position of the shuttle tanker, in relation to the FPSO/FSU, during tandem loading operations.

7.3.3. Relative and Absolute Position reference systems such as DARPS, Artemis, Radius, Radascan, Fanbeam, and HiPap:

(i) Demonstrate correct set-up and use of such systems.

(ii) Demonstrate awareness of errors and failures – how they occur, develop and need to be handled.

7.3.4. Discuss and learn from recent and important past incidents from industry sources.

Simulator exercises should include appropriate Failure Modes selected from the NI checklist, and:

7.4. Manoeuvring according to field procedures and DP best practice.

7.5. Approach and departure with and without tanker assist vessels.
7.6. Ship handling in changing wind speed and direction
7.7. Ship handling in changing current speed and direction
7.8. Ship handling with variable wind and current
7.9. Tandem positioning – free weathervane; operator selected heading; spread moored operation and taut hawser operations
7.10. Escape manoeuvring
7.11. Engine, propeller and rudder errors/failure
7.12. Thruster errors/failure
7.13. DP errors
7.14. PRS errors
7.15. ESD 1 and 2 processes.

8. Course Assessment

A theoretical and practical test should be held at the end of each course and an assessment report handed to the participant.

9. Online Assessment

Not applicable.

10. Practical Assessment

As per training centre.

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Annex F

DP Revalidation Course

January 2020

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THE NAUTICAL INSTITUTE DP REVALIDATION COURSE

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DOCUMENT VERSION CONTROL

NI DP Revalidation Course		
Title NI DP Revalidation Course	Version 1	Date 02/01/2020

Page	Subject	Original content v2 (January 2019)	New content v1 (January 2020)	
102	7. Course Objectives	(7.1, 7.1.1) "IMO (including IMO MSC/Circ. 645 of 1994 Guidelines for Vessels with Dynamic Positioning Systems)"	"IMO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems)"	
103	7. Course Objectives	(7.41) "Identify the procedures for when to change DP Alert status (e.g. from green to amber/yellow, or red)."	"Identify the procedures for when to change DP Alert status (e.g. from green to amber/yellow, blue/white or red)."	

Contents

1. Introduction

The Nautical Institute (the NI) has introduced an alternative route to revalidation through the implementation of a Revalidation Course. The requirements for the Revalidation Course are established through this document.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is a DPO Certificate issued by the NI. The original DPO Certificate should be presented at the DP Centre where the Revalidation Course is completed.

The Revalidation Course may be completed up to six months before the revalidation date set by the NI. The course will be valid for a period of 12 months only, in which the DPO must send in an application into the NI.

If the participant is completing the course for the first time, there is no minimum DP sea time requirement.

If the participant is completing the course for a second or subsequent time, a minimum of 28 DP sea time days will be required to revalidate. This DP time may be completed prior to or after the Revalidation Course.

Where a participant subsequently revalidates after taking the course by completion of the full sea time requirement of 150 DP sea time days that participant can then take the Revalidation Course again without a DP sea time requirement.

Legacy and Grandfathered certificate holders will be able to take the course to revalidate until 31st December 2019. After this date, previous Legacy and Grandfathered certificate holders will need to complete DP sea time days towards revalidation.

Please Note: Shuttle Tanker Certificate holders will be unable to revalidate their certificates with the Revalidation Course. For information on how to revalidate a Shuttle Tanker Certificate or convert to the Offshore Scheme please see Section 6.

3. Number of hours

A minimum of 34 hours of teaching and simulator time is required for this course which includes the time needed for the examination and assessments. The course must schedule both practical and theoretical aspects with about 50% of the time assigned to each. The course is to be delivered over five days.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of four students per class being taught by one instructor per one Class B or A Simulator.

By exception and where justified, five or six students may be considered at the discretion of the NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two different types of simulator systems ASOG/CAM are available in a training centre, the best practice is to keep the trainee on the same simulator throughout the course.

A minimum requirement is to use an NI DP Class B Simulator to correspond with the training objectives for the Revalidation Course.

5. Delivery Method

Training will be split equally between theory and practical exercises. Theory may be used to support the practical exercises either as a briefing, a de-briefing or for demonstration purposes.

6. Course Aims

The course is intended for those who have already been issued a DPO Certificate from the NI but are unable to revalidate their DPO Certificate if they have not gained sufficient DP sea time. The overall course aim is to update the DPOs with the latest rules and regulations, position references and sensors, known DP incidents and lessons learned. At the end of the course, the student should:

6.1. Have acquired knowledge of the latest rules and regulations
6.2. Have acquired knowledge of the latest developments within sensors and PRS
6.3. Have acquired knowledge of the latest relevant DP incidents and why they occurred
6.4. Be able to recognise the various alarm, warning and information messages
6.5. Carry out operational planning, risk assessment and hazard identification tasks
6.6. Set up the DP system for a particular task/operation
6.7. Decide on courses of action because of systems failure

7. Course Objectives

The following is a list of the objectives which should be attained by the DPOs upon completion of the Revalidation Course.

By the completion of the training session or period for <u>DP Rules and Regulations</u> the trainee should be able to:

7.1 List the various providers of documents containing statutory requirements and guidance relating to DP operations, including:
  7.1.1. IMO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems)
  7.1.2. Classification society DP rules
  7.1.3. International Marine Contractors Association (IMCA)
  7.1.4. Marine Technology Society (MTS)
  7.1.5. IMCA and MTS guidelines for ASOG
7.2 Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots
7.3 Describe the IMO (DP) equipment classes and their application, with reference to the IMO Guidelines for Vessels with DP Systems.
7.4 Understand the importance of reporting DP incidents knows where to find DP incident reports and knows how to report DP incidents.

By the completion of the training session or period for <u>DP Sensors and PRS</u> the trainee should be able to:

7.5 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydro acoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.
7.6 Describe the failure modes of the following position reference systems: Differential GNSS, hydro acoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.
7.7 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor. ASOG, TAM and CAM.
7.8 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

By the completion of the training session or period for <u>DP Set Up</u> the trainee should be able to:

7.9 Ensure the vessel is on DP in accordance with the vessel's class and the vessel's operation manual. Class approved FMEA and ASOG (Complete DP Checklist)
7.10 Determine and set alarm and warning limits
7.11 Evaluate most appropriate PRS for specific DP-operations
7.12 Select the number of position reference systems required in accordance with the DP class
7.13 Use correct thruster allocation for a specific operation and weather conditions
7.14 Test vessel's manoeuvring capability during prevailing weather conditions
7.15 Determine a Safe Position and minimum distances to stabilize the vessel in DP
7.16 Obtain information and clearance from e.g. installation, on issues important for the safe operation of the vessel under DP.

By the completion of the training session or period for <u>DP Bridge Watchkeeping</u> the trainee should be able to:

7.17 Demonstrate a continuous awareness of the vessel's status, operation and impact of operating under DP
7.18 Recognise the importance of maintaining lookout and awareness of the external situation including weather when controlling a vessel close to installations or other objects
7.19 Recognise situations in which to call the Master to the bridge
7.20 Log and report DP station keeping events
7.21 Monitor position reference systems, sensors and signal quality in anticipation of the possibility of failure causing instant/violent reaction from main engines/thrusters
7.22 Monitor power output and thrust
7.23 Monitor thruster efficiency for station-keeping at different headings and drafts, which may affect DP Class
7.24 Recognise DP-related changes in vessel systems and technical equipment which may affect DP Class
7.25 Recognise technical and operational issues which may limit or stop DP operations
7.26 Monitor that the DP operating parameters of continuous operating power are not exceeded.

By the completion of the training session or period for <u>Position Keeping</u> the trainee should be able to:

7.27 Recognise alarms related to the incorrect operation of the DP-system and maintaining position
7.28 Acknowledge alarms within time constraints
7.29 Discuss alarms with relevant department
7.30 Evaluate the possible consequences of each alarm and possibility to continue the operation
7.31 Analyse the consequence analysis alarm
7.32 Interpret visual indicators, indicating conditions which may result in malfunction of DP
7.33 Monitor movement of the vessel and changes in the position and heading, in keeping with safe excursion limits depending upon the ongoing task/operations
7.34 Monitor movement of the object / installation / target
7.35 Monitor by various means, changes in distance/heading between object and own vessel (if applicable)
7.36 Recognise limitations of vessel movement when having equipment or divers deployed.

By the completion of the training session or period for <u>Environmental Conditions</u> the trainee should be able to:

7.37 Recognise changes in environmental conditions
7.38 Recognise when environmental conditions become critical with reference to station keeping
7.39 Recognise increased importance of situational awareness when operating close to floating objects.

By the completion of the training session or period for <u>Alarms and Indicators</u> the trainee should be able to:

7.40 Identify the procedures to follow for DP and non-DP alarms
7.41 Identify the procedures for when to change DP Alert status (e.g. from green to amber/yellow, blue/white or red).

By the completion of the training session or period for <u>Change of DP Watch</u> the trainee should be able to:

7.42 Prepare a hand-over checklist

7.43 Transfer vessel's status and DP-details when handing over the watch (where not covered by the watch- keeping checklist)
7.44 Provide an update on the ongoing operation and planned operational activities
7.45 Review a hand-over checklist
7.46 Verify vessel's position or movement and status
7.47 Interpret all necessary information of vessel and operation
7.48 Take-over / hand over DP-watch in a formal and clear manner
7.49 Determine the DP-status and recent occurrences which may have an effect on the DP-operation during the watch.

By the completion of the training session or period for <u>Normal Completion of a DP Operation</u> the trainee should be able to:

7.50 Identify safe departure route and best vessel heading for departure
7.51 Recognise external dangers prior to departure
7.52 Identify an Emergency Escape route which may or may not be the same as the normal departure route
7.53 Retrieve Position Reference System Equipment from e.g. the installation or seabed (if applicable and as part of a Departure checklist)
7.54 Demonstrate moving to a safe position in appropriate steps
7.55 Recover / retract deployed equipment (if applicable).

By the completion of the training session or period for <u>Operating in Joystick Mode (DP Joystick)</u> the trainee should be able to:

7.56 Stop the vessel at a pre-determined position
7.57 Determine the need to stop the vessel completely before switching to DP control (system specific)
7.58 Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner
7.59 Operate the DP Joystick to change position and/or heading in a controlled and safe manner
7.60 Demonstrate DP Joystick station-keeping of the vessel under prevailing weather conditions.

By the completion of the training session or period for <u>Emergency Situation</u> the trainee should be able to:

7.61 Move the vessel to a safe position in a safe and controlled manner
7.62 Demonstrate an awareness of the Emergency Escape Route.

By the completion of the training session or period for <u>Emergency Performance/Response the student must demonstrate at least two</u> of the following:

7.63 Demonstrate actions in case of unstable Position Reference System(s)
7.64 Demonstrate actions when losing Position Reference System(s)
7.65 Demonstrate actions if Position Reference System(s) suddenly indicate significant changes in position/range/bearing data
7.66 Demonstrate actions in case of error in wind input
7.67 Demonstrate actions in case of a DP drive-off
7.68 Demonstrate actions in case of a DP drift-off
7.69 Demonstrate actions in case of a DP force-off
7.70 Demonstrate actions in case of one thruster runoff
7.71 Demonstrate actions in case of error in sensor input
7.72 Demonstrate the proper sequence of actions if experiencing an onboard emergency which may influence DP-control during DP-operations
7.73 Explain actions when losing all DP control functions
7.74 Explain the proper sequence of actions if colliding or about to collide with an installation, nearby objects or vessels during DP-operations.

8. Course Assessment

The assessment for the Revalidation Course includes a theoretical (NI online) exam and a practical assessment. Each component must be completed successfully. There is no specific order in which they must be completed. After the course is completed, an entry will be made in the appropriate logbook.

9. Online Assessment

In order to be awarded a certificate of completion for the Revalidation Course the DPO must pass an online assessment at the training centre.

The exam is composed of multiple choice questions that have already been developed from the Induction Course and the Simulator Course. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. If the student fails these three attempts, then the student is required to repeat the Revalidation Course and undertake the assessment again.

10. Practical Assessment

The practical assessment must be done individually. The practical assessment shall include the following items which the student must pass to be awarded a certificate of completion for the Revalidation Course:

(i) Complete a DP Checklist
(ii) Set up the vessel on DP
(iii) Move the vessel from setup position to a worksite
(iv) Deal with a system/sensor/thruster failure or environmental change (at least two)

The training centres must develop their own practical exams based upon the course objectives listed above.

The student must pass all the four items listed above. The training centre is responsible to ensure that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of the NI.

10.1 Practical Assessment Guidance for Training Centres

Below you will find guidance for the development and the examination process for the practical assessment for the Revalidation Course.

10.1.1 General Guidance

a. Duration of practical assessment: Between one and two hours
b. Pass or fail criteria: This item will be the most challenging. The student performance is evaluated by the instructor and in an ideal world; such an evaluation should be objective. Although the student must pass all items it could be that some items are performed as a “pass” whilst other items could be defined as “fail”. It will be the overall performance of the student which determines if the practical assessment is a pass or fail. Failing for example, to identify a small position deviation from one of the PRS inputs would not necessarily mean that the student failed. Failing to identify that the vessel has lost DP Class and that the vessel is now operating without redundancy, would. Depending on the nature of the fail it is up to the DP Training Centre to determine if the student should be allowed to retake the practical assessment. If the fail is related to safety critical items, as determined by the Training Centre, the student should not be allowed to retake the assessment, but should retake the course.

Reason(s) for failing the student should be given to the student in writing.

c. Students who fail at the first attempt, and are allowed to retake the practical assessment, can do this only once. The second attempt must be agreed with the DP Training Centre and carried out at their convenience.

10.1.2 Practical Assessment Scenario Guidance

(i) Exam Scenario

After passing the written exam, each student will randomly draw a number linked to the scenario he/she will be examined on.

Scenarios are to be based on the course training objectives. All scenarios should be equal in complexity.

Each scenario will end with the vessel located at a worksite in close proximity to a platform/structure. This could be a fixed platform, a semi-submersible rig, another vessel, etc.

Based on the task to be performed by the vessel (at the worksite), there should be at least two possible locations where the vessel can be positioned to complete the task (one drift on and one drift off). The student will be expected to choose the better of the two. The following are two examples of scenarios that could be used. The vessel might be required to do an ROV inspection of a platform where there is sufficient tether available to work at both locations. The vessel might be required to position under a crane for cargo operations where there are two cranes available (one upwind and one downwind).

Each centre shall develop its own practical exam scenarios based on the DP equipment fitted and the simulated platforms/structures it has available.

The centre will have 10 to 15 scenarios available for exam purposes. This will permit all students to have a random selection. Multiple scenarios can be created by using the same structure/vessel/task and simply changing the environmental conditions.

Time for planning the practical assessment shall be allocated to the student. Before the exam (20 minutes), each student will be presented with his/her scenario. This will permit the student time to develop a plan as to how they will proceed. One student can carry out the exam while the other is planning, this will save time during the exam process.

Prior to starting the exam, the student will be asked to state the planned vessel position and heading when at the final worksite. The student will also state the direction from which (bearing) he/she will approach the worksite and the desired heading at exercise start. All students will start at the same distance from the worksite. Before starting the exam, the instructor will place the vessel (exercise start position) on the bearing and heading specified by the student.

(ii) Checklist/Set up on DP

The DP checklist below is a sample only. It indicates the extent to which checks are to be conducted and the content required. Each centre will develop its own checklist based on DP equipment fitted, vessel power plant, thrusters, reference systems fitted, etc. The flow and layout of the checklist would also be as required by the individual centre. The centre may wish to increase the content of the checklist and is free to do so.

There are items that may be omitted i.e. the below sample has two means of determining vessel capability after worse case failure (DP capability plot and deselecting thrusters). Only one means would be required.

The sample below would take approximately 20 to 25 minutes for someone who is familiar with the DP system/vessel. Ability of the individual student will vary. The students are to use the same checklist for the exam as they do during course exercises. They will also be informed that the checklist is part of the exam.

Some items on the checklist will require the vessel to be set up on DP. Therefore at some point during completion of the checklist, the student will place the vessel in DP mode.

Based on the results of the checklist, the student can request changes to generator, power, switchboard or thruster configurations. The student may also alter the planned approach route and final worksite heading/position, based on the results of the checklist.

(iii) Approach to Worksite

After completing the checklist and set up on DP, the student will move the vessel to the worksite. The speeds and methods used by the individual student will vary. If the vessel is outside the 500m zone at the start, this could take considerable time. As a benchmark, a single move of 500m at 0.25m/sec would require 33 minutes. The actual moves during the exam will be undertaken in increments and at varying speeds, making it difficult to indicate an actual time for this item. To reduce time requirements, for exam purposes, the exam may start at distance of 250 to 300m from the worksite.

(iv) At the Worksite

The actual vessel task at the worksite can be as determined by the training centre. This might be diving operations, ROV operations, cargo operations, etc.

The type of practical assessment (i.e. DP operation) should have been reflected or revised during the Revalidation Course.

The last stage of the exam will be introducing a DP fault/failure or environmental change for the student to deal with.

This specification identifies possible faults and indicates that at least two must be utilised. Both can be introduced after the vessel is on location at the worksite but one must be introduced at this stage. The other can be introduced at any stage in the exam, after the vessel is set up on DP. Considering the above, the exact timing of fault injection and the faults to be used, with a particular scenario, will be determined by the training centre.

(v) Exam Time Required

If the exam starts at a distance of 250m from the worksite, the total time required for the practical exam should be one to two hours per student. The extent to which the simulated DP operation progresses (after positioning at the worksite) is determined by the training centre.

The first student will require more time as he/she would require time to plan (20 minutes). Subsequent students would get the same amount of planning time but would be doing so while another is being examined.

10.1.3 Practical Assessment Mark Sheet Example

Each Training Centre must ensure that the training objectives are assessed in a proper manner. It might be difficult to assess each student on all training objectives. Therefore, it would be recommended that a selection of training objectives should be covered during the assessment.

The tables on the following page show the items to be evaluated during the practical assessment. Exercises are to be structured to enable evaluation for the items listed below.

11. Mark Sheet Exam Number 1

Practical Assessment DP Revalidation Course

Name of student:	Exercise name/number:	Overall Pass/Fail	Instructor sign
	1		

Task no:	Task description: DP Planning	Pass	Fail
1	Carry out operational planning, risk assessment and hazard identification tasks.		
2	Evaluate most appropriate PRS for the DP operation, in accordance with the DP class.		
3	Determine the most appropriate final working position and heading.		
4	Identify emergency escape route.		
	Additional Comments:		

Task no:	Task description: DP Set Up	Pass	Fail
1	Complete DP checklist with accurate recording of data.		
2	Select DP joystick mode. Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner.		
3	Set up the vessel on DP in a controlled and safe manner.		
4	Use correct thruster allocation for the operational and environmental conditions.		
5	Ensure the vessel is on DP in accordance with the vessel's required class; for the operation being conducted (determine capability).		
6	Determine and set appropriate alarm and warning limits for the operation being conducted.		
7	Select appropriate gain setting.		
	Additional Comments:		

Task no:	Task description: DP Operations	Pass	Fail
1	Move the vessel to the final working location using appropriate movement steps.		
2	Move the vessel to the final working location at safe speed/speeds.		
3	At the final working location, select appropriate and reliable PRS in accordance with the DP class.		
4	Monitor and recognise any changes in position reference system or sensor performance.		
5	Monitor and recognise any change in power or thrust output.		
6	Monitor and recognise any changes in environmental conditions.		
7	Continue to ensure the vessel is on DP in accordance with the vessel's required class, for the operation being conducted (monitor capability).		
	Additional Comments:		

Task no:	Task description: DP Failure Modes	Pass	Fail
1	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode: ____		
2	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode: ____		
3	Evaluate the possible consequences of each alarm and the effect on continuing the operation.		
4	Change DP Alert status (e.g. from green to amber/yellow, blue/white or red) to reflect operational condition.		
	Additional Comments:		

12. Revalidation Course Timetable

Below is a ***suggested*** timetable, which can be used for the Revalidation Course.

Day 1

Time	**Subject**	**Comments**
AM	Registration, Introduction – Experience mapping Familiarisation with centre equipment.	Experience mapping would be a vital part of the Course. The previous experience and knowledge of the participants must be addressed and acknowledged during the course.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 2

Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 3

Time	Subject	Comments
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 4

Time	Subject	Comments
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 5

Time	Subject	Comments
AM	Practical and theoretical examination	Practical examination on a minimum NI Class B Simulator. Theoretical On-Line examination.
Lunch		
PM	Examination continued, if required.	

13. DP Checklist

Below is a *suggested* DP Checklist, which can be used for the Revalidation Course.

DP Checklist

Date _____ Time _____ Location

Position N_____E _____

Water Depth _____

Lights / Shapes (On/Up) Y / N

Read Latest Forecast Y / N Lamp/Alarm Test Completed & O.K. Y / N

System Setup

Controller Online A B

Operator Station in Use 1 2

Centre of Rotation Selected _____

Speed Setting _____Knots

Turn Rate Setting _____°/minute

High Precision Gain Selected_____ Setting: Low Medium High

Customised Gain Selected_ Setting: Surge___Sway___Yaw ____

Alarm Limits

Position Alarm Settings Warning Alarm__Enabled Y / N

Heading Alarm Settings Warning Alarm__Enabled Y / N

Power

Generators Available #1 __ #2 __ #3 __ #4 __ #5_ #6

Generators Online #1 __ #2 __ #3 __ #4 __ #5_ #6

Main Switchboard Split Y / N

UPS Checked & O.K. Y / N

Propulsion

Thrusters Available for DP Control #1 __ #2 __ #3 __ #4 __ #5 __ #6_ #7

Thrusters Selected #1 __ #2 __ #3 __ #4 __ #5 __ #6_ #7

Thruster #3 on Bus 1_ Bus 2

Rudders Available for DP Control Port_ Stbd.

Rudders Selected Port_ Stbd.

Thruster Mode Selected _____

Sensors

Gyros Available #1 __ #2__ #3

Gyro in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Vessel Heading in Use _____°

Wind Sensors Available #1 __ #2__ #3

Wind Sensor in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Wind Speed & Direction in Use _____Knots _____° True

VRS Available #1 __ #2__ #3

VRS in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Values Used Heave __Pitch ___Roll ____

Draught Sensor Available Y / N

Draught Input Sensor __ Manual __ Operational __ Transit

Draught Input Checked & Acceptable Y / N Draught in Use _____m

Position Reference Systems

Available	In Use (Accuracies Checked & Acceptable)
Artemis Y / N	Y / N
DGPS 1 Y / N	Y / N
DGPS 2 Y / N	Y / N
Fanbeam Y / N	Y / N
HPR 1 Y / N	Y / N Transponders _____ _____ _____
HPR 2 Y / N	Y / N Transponders _____ _____ _____
Radius Y / N	Y / N Transponders _____ _____
Taut Wire Port Y / N	Y / N
Taut Wire Stbd. Y / N	Y / N

Gate Valves Port: Open / Closed Stbd.: Open / Closed

HPR Poles Port: Down / Up Stbd.: Down / Up

ROV Transponder_____

Co-ordinate System set to Display UTM Y / N Datum Settings Checked & O.K. Y / N

Joystick

Joystick Thrust Reduced_ Full

Joystick Precision High Speed

General

Low Speed

Joystick Environmental Comp. Surge___ Sway___ Yaw ___

Joystick Operational Y / N

Propulsion Status

Thruster Setpoint/Feedback O.K. Y / N

Rudder Setpoint/Feedback O.K. Y / N

Power Status

Power (if Bus is Common): Used___Available _____

Power (if Bus is Split): Bus 1 Used___Available _____

Bus 2 Used___Available _____

Communications Tested & O.K. (as applicable)

Crane Cab/Cabs Y / N

Deck (Pipe/Cable Lay) Y / N DP Status Lights Y / N

Dive Control Y / N DP Status Lights Y / N

Engine Control Room Y / N

ROV Control Y / N DP Status Lights Y / N

Checklists

Dive Checklist Complete Y / N

ROV Checklist Complete Y / N

Engine room Checklist Complete Y / N

Vessel Capability

Consequence Analysis Enabled Y / N

Capability Plot Setup & Checked Y / N

Deselect Thrusters #1**, (#3)**, #5 & #7 (When #3 is connected to BUS 1)

Position Maintained Y / N Reselect Thrusters

Deselect Thrusters #2, **(#3)**, #4 & #6 (When #3 is connected to BUS 2)

Position Maintained Y / N Reselect Thrusters

Vessel on Auto DP for 30 Minutes Y / N

DP Current _____

Alarms Page Checked Y / N

Printer Online Y / N

Print Status Y / N

Signed_____ Date_____

Signed_____ Date_____

Annex G

Refresher and Competency Assessment Course

January 2020

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DOCUMENT VERSION CONTROL

NI DP Refresher and Competency Assessment Course		
Title NI DP Refresher and Competency Assessment Course	Version 1	Date 02/01/2020

Contents

1. Introduction

The Nautical Institute (the NI) has introduced a DP Refresher and Competency assessment course as a result of NI Training centres running the NI DP revalidation course reporting the benefit of using the NI DP Revalidation course as a DP refresher course and competency assessment.

(i) The Course is an accredited course with the course content and notes controlled by the Nautical Institute. This will ensure an excellent standard across the DP Industry.
(ii) Course content is to match exactly the NI DP Revalidation course.
(iii) Course certificate will have the same logo as the NI DP Revalidation course.
(iv) Certificate name "Nautical Institute DP Refresher and Competency assessment"
(v) Course is only available for DPOs with current DPO certificates.
(vi) The course allow DPOs who have not been on working DP vessel a method to refresh their knowledge about DP operations, DP Bridge team work, Emergency DP resource Management and to stay current with the latest industry guidelines.
(vii) The course has a significant component of simulations which include failures, and this will be of particular benefit to DPOs who work on vessels which are on DP 24/7.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is a DPO Certificate issued by the NI. The original DPO Certificate should be presented at the DP centre where the DP Refresher Course is completed.

The DP Refresher and Competency Assessment Course may be completed at any time as required.

3. Number of Hours

A minimum of 34 hours of teaching and simulator time is required for this course which includes the time needed for the examination and assessments. The course must schedule both practical and theoretical aspects with about 50% of the time assigned to each. The course is to be delivered over five days.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of four students per class being taught by one instructor per one Class B or A Simulator.

By exception and where justified, five or six students may be considered at the discretion of the NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two different types of simulator systems are available in a training centre, the best practice is to keep the trainee on the same simulator throughout the course.

A minimum requirement is to use an NI DP Class B Simulator to correspond with the training objectives for the DP Refresher and Competency Assessment Course.

5. Delivery Method

Training will be split equally between theory and practical exercises. Theory may be used to support the practical exercises either as a briefing, a de-briefing or for demonstration purposes.

6. Course Aims

The course is intended for those who have already been issued a DPO Certificate from the NI and required to refresh their knowledge about DP or need to completed high DP simulator because they are on DP 24/7 The overall course aim is to update the DPOs with the latest rules and regulations, position references and sensors, known DP incidents and lessons learned. At the end of the course, the student should:

6.1. Have acquired knowledge of the latest rules and regulations
6.2. Have acquired knowledge of the latest developments within sensors and PRS
6.3. Have acquired knowledge of the latest relevant DP incidents and why they occurred
6.4. Be able to recognise the various alarm, warning and information messages
6.5. Carry out operational planning, risk assessment and hazard identification tasks
6.6. Set up the DP system for a particular task/operation
6.7. Decide on courses of action because of systems failure

7. Course Objectives

The following is a list of the objectives which should be attained by the DPOs upon completion of the DP Refresher and Competency Assessment Course.

By the completion of the training session or period for <u>DP Rules and Regulations</u> the trainee should be able to:

7.1 List the various providers of documents containing statutory requirements and guidance relating to DP operations, including:
  7.1.1. IMO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems)
  7.1.2. Classification society DP rules
  7.1.3. International Marine Contractors Association (IMCA)
  7.1.4. Marine Technology Society (MTS)
  7.1.5. IMCA and MTS guidelines for ASOG
7.2 Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots
7.3 Describe the IMO (DP) equipment classes and their application, with reference to the IMO Guidelines for Vessels with DP Systems.
7.4 Understand the importance of reporting DP incidents knows where to find DP incident reports and knows how to report DP incidents.

By the completion of the training session or period for <u>DP Sensors and PRS</u> the trainee should be able to:

7.5 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydroacoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.
7.6 Describe the failure modes of the following position reference systems: Differential GNSS, hydroacoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.
7.7 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor. ASOG, TAM and CAM.
7.8 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

By the completion of the training session or period for <u>DP Set Up</u> the trainee should be able to:

7.9 Ensure the vessel is on DP in accordance with the vessel's class and the vessel's operation manual. Class approved FMEA and ASOG (Complete DP Checklist)
7.10 Determine and set alarm and warning limits
7.11 Evaluate most appropriate PRS for specific DP-operations
7.12 Select the number of position reference systems required in accordance with the DP class
7.13 Use correct thruster allocation for a specific operation and weather conditions

7.14 Test vessel's manoeuvring capability during prevailing weather conditions
7.15 Determine a Safe Position and minimum distances to stabilize the vessel in DP
7.16 Obtain information and clearance from e.g. installation, on issues important for the safe operation of the vessel under DP.

By the completion of the training session or period for <u>DP Bridge Watchkeeping</u> the trainee should be able to:

7.17 Demonstrate a continuous awareness of the vessel's status, operation and impact of operating under DP
7.18 Recognise the importance of maintaining lookout and awareness of the external situation including weather when controlling a vessel close to installations or other objects
7.19 Recognise situations in which to call the Master to the bridge
7.20 Log and report DP station keeping events
7.21 Monitor position reference systems, sensors and signal quality in anticipation of the possibility of failure causing instant/violent reaction from main engines/thrusters
7.22 Monitor power output and thrust
7.23 Monitor thruster efficiency for stationkeeping at different headings and drafts, which may affect DP Class
7.24 Recognise DP-related changes in vessel systems and technical equipment which may affect DP Class
7.25 Recognise technical and operational issues which may limit or stop DP operations
7.26 Monitor that the DP operating parameters of continuous operating power are not exceeded.

By the completion of the training session or period for <u>Position Keeping</u> the trainee should be able to:

7.27 Recognise alarms related to the incorrect operation of the DP-system and maintaining position
7.28 Acknowledge alarms within time constraints
7.29 Discuss alarms with relevant department
7.30 Evaluate the possible consequences of each alarm and possibility to continue the operation
7.31 Analyse the consequence analysis alarm
7.32 Interpret visual indicators, indicating conditions which may result in malfunction of DP
7.33 Monitor movement of the vessel and changes in the position and heading, in keeping with safe excursion limits depending upon the ongoing task/operations
7.34 Monitor movement of the object / installation / target
7.35 Monitor by various means, changes in distance/heading between object and own vessel (if applicable)
7.36 Recognise limitations of vessel movement when having equipment or divers deployed.

By the completion of the training session or period for <u>Environmental Conditions</u> the trainee should be able to:

7.37 Recognise changes in environmental conditions
7.38 Recognise when environmental conditions become critical with reference to station keeping
7.39 Recognise increased importance of situational awareness when operating close to floating objects.

By the completion of the training session or period for <u>Alarms and Indicators</u> the trainee should be able to:

7.40 Identify the procedures to follow for DP and non-DP alarms
7.41 Identify the procedures for when to change DP Alert status (e.g. from green to amber/yellow, or red).

By the completion of the training session or period for <u>Change of DP Watch</u> the trainee should be able to:

7.42 Prepare a hand-over checklist
7.43 Transfer vessel's status and DP-details when handing over the watch (where not covered by the watch- keeping checklist)
7.44 Provide an update on the ongoing operation and planned operational activities
7.45 Review a hand-over checklist
7.46 Verify vessel's position or movement and status
7.47 Interpret all necessary information of vessel and operation
7.48 Take-over / hand over DP-watch in a formal and clear manner
7.49 Determine the DP-status and recent occurrences which may have an effect on the DP-operation during the watch.

By the completion of the training session or period for Normal Completion of a DP Operation the trainee should be able to:

7.50 Identify safe departure route and best vessel heading for departure
7.51 Recognise external dangers prior to departure
7.52 Identify an Emergency Escape route which may or may not be the same as the normal departure route
7.53 Retrieve Position Reference System Equipment from e.g. the installation or seabed (if applicable and as part of a Departure checklist)
7.54 Demonstrate moving to a safe position in appropriate steps
7.55 Recover / retract deployed equipment (if applicable).

By the completion of the training session or period for Operating in Joystick Mode (DP Joystick) the trainee should be able to:

7.56 Stop the vessel at a pre-determined position
7.57 Determine the need to stop the vessel completely before switching to DP control (system specific)
7.58 Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner
7.59 Operate the DP Joystick to change position and/or heading in a controlled and safe manner
7.60 Demonstrate DP Joystick station-keeping of the vessel under prevailing weather conditions.

By the completion of the training session or period for Emergency Situation the trainee should be able to:

7.61 Move the vessel to a safe position in a safe and controlled manner
7.62 Demonstrate an awareness of the Emergency Escape Route.

By the completion of the training session or period for Emergency Performance/Response the student must demonstrate at least two of the following:

7.63 Demonstrate actions in case of unstable Position Reference System(s)
7.64 Demonstrate actions when losing Position Reference System(s)
7.65 Demonstrate actions if Position Reference System(s) suddenly indicate significant changes in position/range/bearing data
7.66 Demonstrate actions in case of error in wind input
7.67 Demonstrate actions in case of a DP drive-off
7.68 Demonstrate actions in case of a DP drift-off
7.69 Demonstrate actions in case of a DP force-off
7.70 Demonstrate actions in case of one thruster runoff
7.71 Demonstrate actions in case of error in sensor input
7.72 Demonstrate the proper sequence of actions if experiencing an onboard emergency which may influence DP-control during DP-operations
7.73 Explain actions when losing all DP control functions
7.74 Explain the proper sequence of actions if colliding or about to collide with an installation, nearby objects or vessels during DP-operations.

8. Course Assessment

The assessment for the DP Refresher and Competency assessment Course includes a theoretical (NI online) exam and a practical assessment. Each component must be completed successfully. There is no specific order in which they must be completed. After the course is completed, an entry will be made in the appropriate logbook.

9. Online Assessment

In order to be awarded a certificate of completion for the DP Refresher and Competency assessment Course the DPO must pass an online assessment at the training centre.
The exam is composed of multiple choice questions that have already been developed from the Basic

/Induction Course and the Simulator Course. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. If the student fails these three attempts, they are student is required to repeat the Refresher course and competency Assessment Course and undertake the assessment again.

10. Practical Assessment

The practical assessment must be done individually. The practical assessment shall include the following items which the student must pass to be awarded a certificate of completion for the Course:

(i) Complete a DP Checklist
(ii) Set up the vessel on DP
(iii) Move the vessel from setup position to a worksite
(iv) Deal with a system/sensor/thruster failure or environmental change (at least two)

The training centres must develop their own practical exams based upon the course objectives listed above.

The student must pass all the four items listed above. The training centre is responsible to ensure that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of the NI.

10.1 Practical Assessment Guidance for Training Centres

Below you will find guidance for the development and the examination process for the practical assessment for the DP Refresher and Competency Assessment Course.

10.1.1 General Guidance

- Duration of practical assessment: Between one and two hours
- Pass or fail criteria: This item will be the most challenging. The student performance is evaluated by the instructor and in an ideal world; such an evaluation should be objective. Although the student must pass all items it could be that some items are performed as a “pass” whilst other items could be defined as “fail”. It will be the overall performance of the student which determines if the practical assessment is a pass or fail. Failing for example, to identify a small position deviation from one of the PRS inputs would not necessarily mean that the student failed. Failing to identify that the vessel has lost DP Class and that the vessel is now operating without redundancy, would. Depending on the nature of the fail it is up to the DP Training Centre to determine if the student should be allowed to retake the practical assessment. If the fail is related to safety critical items, as determined by the Training Centre, the student should not be allowed to retake the assessment, but should retake the course. Reason(s) for failing the student should be given to the student in writing.
- Students who fail at the first attempt, and are allowed to retake the practical assessment, can do this only once. The second attempt must be agreed with the DP Training Centre and carried out at their convenience.

10.1.2 Practical Assessment Scenario Guidance

<u>(i) Exam Scenario</u>
After passing the written exam, each student will randomly draw a number linked to the scenario he/she will be examined on.

Scenarios are to be based on the course training objectives. All scenarios should be equal in complexity.

Each scenario will end with the vessel located at a worksite in close proximity to a platform/structure. This could be a fixed platform, a semi-submersible rig, another vessel, etc.

Based on the task to be performed by the vessel (at the worksite), there should be at least two possible locations where the vessel can be positioned to complete the task (one drift on and one drift off). The student will be expected to choose the better of the two. The following are two examples of scenarios that could be used. The vessel might be required to do an ROV inspection of a platform where there is sufficient tether available to work at both locations. The vessel might be required to position under a crane for cargo operations where there are two cranes available (one upwind and one downwind).

Each centre shall develop its own practical exam scenarios based on the DP equipment fitted and the simulated platforms/structures it has available.

The centre will have 10 to 15 scenarios available for exam purposes. This will permit all students to have a random selection. Multiple scenarios can be created by using the same structure/vessel/task and simply changing the environmental conditions.

Time for planning the practical assessment shall be allocated to the student. Before the exam (20 minutes), each student will be presented with his/her scenario. This will permit the student time to develop a plan as to how they will proceed. One student can carry out the exam while the other is planning, this will save time during the exam process.

Prior to starting the exam, the student will be asked to state the planned vessel position and heading when at the final worksite. The student will also state the direction from which (bearing) he/she will approach the worksite and the desired heading at exercise start. All students will start at the same distance from the worksite. Before starting the exam, the instructor will place the vessel (exercise start position) on the bearing and heading specified by the student.

(ii) Checklist/Set up on DP

The DP checklist below is a sample only. It indicates the extent to which checks are to be conducted and the content required. Each centre will develop its own checklist based on DP equipment fitted, vessel power plant, thrusters, reference systems fitted, etc. The flow and layout of the checklist would also be as required by the individual centre. The centre may wish to increase the content of the checklist and is free to do so.

There are items that may be omitted i.e. the below sample has two means of determining vessel capability after worse case failure (DP capability plot and deselecting thrusters). Only one means would be required.

The sample below would take approximately 20 to 25 minutes for someone who is familiar with the DP system/vessel. Ability of the individual student will vary. The students are to use the same checklist for the exam as they do during course exercises. They will also be informed that the checklist is part of the exam.

Some items on the checklist will require the vessel to be set up on DP. Therefore at some point during completion of the checklist, the student will place the vessel in DP mode.

Based on the results of the checklist, the student can request changes to generator, power, switchboard or thruster configurations. The student may also alter the planned approach route and final worksite heading/position, based on the results of the checklist.

(iii) Approach to Worksite

After completing the checklist and set up on DP, the student will move the vessel to the worksite. The speeds and methods used by the individual student will vary. If the vessel is outside the 500m zone at the start, this could take considerable time. As a benchmark, a single move of 500m at 0.25m/sec would require 33 minutes.

The actual moves during the exam will be undertaken in increments and at varying speeds, making it difficult to indicate an actual time for this item. To reduce time requirements, for exam purposes, the exam may start at distance of 250 to 300m from the worksite.

(iv) At the Worksite

The actual vessel task at the worksite can be as determined by the training centre. This might be diving operations, ROV operations, cargo operations, etc.

The type of practical assessment (i.e. DP operation) should have been reflected or revised during the DP Refresher and Competency Assessment Course.

The last stage of the exam will be introducing a DP fault/failure or environmental change for the student to deal with.

This specification identifies possible faults and indicates that at least two must be utilised. Both can be introduced after the vessel is on location at the worksite but one must be introduced at this stage. The other can be introduced at any stage in the exam, after the vessel is set up on DP. Considering the above, the exact timing of fault injection and the faults to be used, with a particular scenario, will be determined by the training centre.

(v) Exam Time Required

If the exam starts at a distance of 250m from the worksite, the total time required for the practical exam should be one to two hours per student. The extent to which the simulated DP operation progresses (after positioning at the worksite) is determined by the training centre.

The first student will require more time as he/she would require time to plan (20 minutes). Subsequent students would get the same amount of planning time but would be doing so while another is being examined.

10.1.3 Practical Assessment Mark Sheet Example

Each Training Centre must ensure that the training objectives are assessed in a proper manner. It might be difficult to assess each student on all training objectives. Therefore, it would be recommended that a selection of training objectives should be covered during the assessment.

Below are the items to be evaluated during the practical assessment. Exercises are to be structured to enable evaluation for the items listed below.

11. Mark Sheet Exam Number 1

Practical Assessment DP Refresher and competency assessment Course

Name of student:	Exercise name/number:	Overall Pass/Fail	Instructor sign
	1		

Task no:	Task description: DP Planning	Pass	Fail
1	Carry out operational planning, risk assessment and hazard identification tasks.		
2	Evaluate most appropriate PRS for the DP operation, in accordance with the DP class.		
3	Determine the most appropriate final working position and heading.		
4	Identify emergency escape route.		
	Additional Comments:		

Task no:	Task description: DP Set Up	Pass	Fail
1	Complete DP checklist with accurate recording of data.		
2	Select DP joystick mode. Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner.		
3	Set up the vessel on DP in a controlled and safe manner.		
4	Use correct thruster allocation for the operational and environmental conditions.		
5	Ensure the vessel is on DP in accordance with the vessel's required class; for the operation being conducted (determine capability).		
6	Determine and set appropriate alarm and warning limits for the operation being conducted.		
7	Select appropriate gain setting.		
	Additional Comments:		

Task no:	Task description: DP Operations	Pass	Fail
1	Move the vessel to the final working location using appropriate movement steps.		
2	Move the vessel to the final working location at safe speed/speeds.		
3	At the final working location, select appropriate and reliable PRS in accordance with the DP class.		
4	Monitor and recognise any changes in position reference system or sensor performance.		
5	Monitor and recognise any change in power or thrust output.		
6	Monitor and recognise any changes in environmental conditions.		
7	Continue to ensure the vessel is on DP in accordance with the vessel's required class, for the operation being conducted (monitor capability).		
	Additional Comments:		

Task no:	Task description: DP Failure Modes	Pass	Fail
1	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode:		
2	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode:		
3	Evaluate the possible consequences of each alarm and the effect on continuing the operation.		
4	Change DP Alert status (e.g. from green to amber/yellow, or red) to reflect operational condition.		
	Additional Comments:		

12. DP Refresher Course Timetable

Below is a ***suggested*** timetable, which can be used for the DP Refresher and Competency Assessment Course.

Day 1

Time	Subject	Comments
AM	Registration, Introduction – Experience mapping Familiarisation with centre equipment.	Experience mapping would be a vital part of the Course. The previous experience and knowledge of the participants must be addressed and acknowledged during the course.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 2

Time	Subject	Comments
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 3

Time	Subject	Comments
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 4

Time	Subject	Comments
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

Day 5

Time	Subject	Comments
AM	Practical and theoretical examination	Practical examination on a minimum NI Class B Simulator. Theoretical On-Line examination.
Lunch		
PM	Examination continued, if required.	

13. DP Checklist

Below is a *suggested* DP Checklist, which can be used for the Refresher Course.

DP Checklist

Date _____ Time _____ Location

Position N_____E _____

Water Depth _____

Lights / Shapes (On/Up) Y / N

Read Latest Forecast Y / N Lamp/Alarm Test Completed & O.K. Y / N

System Setup

Controller Online A B

Operator Station in Use 1 2

Centre of Rotation Selected _____

Speed Setting _____Knots

Turn Rate Setting _____°/minute

High Precision Gain Selected_____ Setting: Low Medium High

Customised Gain Selected_ Setting: Surge___Sway___Yaw ____

Alarm Limits

Position Alarm Settings Warning Alarm__Enabled Y / N

Heading Alarm Settings Warning Alarm__Enabled Y / N

Power

Generators Available #1 ___ #2 ___ #3 ___ #4 ___ #5_ #6

Generators Online #1 ___ #2 ___ #3 ___ #4 ___ #5_ #6

Main Switchboard Split Y / N

UPS Checked & O.K. Y / N

Propulsion

Thrusters Available for DP Control #1 ___ #2 ___ #3 ___ #4 ___ #5 ___ #6_ #7

Thrusters Selected #1 ___ #2 ___ #3 ___ #4 ___ #5 ___ #6_ #7

Thruster #3 on Bus 1_ Bus 2

Rudders Available for DP Control Port_ Stbd.

Rudders Selected Port_ Stbd.

Thruster Mode Selected _____

Sensors

Gyros Available #1 __ #2__ #3

Gyro in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Vessel Heading in Use _____°

Wind Sensors Available #1 __ #2__ #3

Wind Sensor in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Wind Speed & Direction in Use _____Knots _____° True

VRS Available #1 __ #2__ #3

VRS in Use #1 __ #2__ #3

Differences Checked & Acceptable Y / N

Values Used Heave __Pitch ___Roll ____

Draught Sensor Available Y / N

Draught Input Sensor __ Manual __ Operational __ Transit

Draught Input Checked & Acceptable Y / N Draught in Use _____m

Position Reference Systems

Available		In Use (Accuracies Checked & Acceptable)	
Artemis	Y / N	Y / N	
DGPS 1	Y / N	Y / N	
DGPS 2	Y / N	Y / N	
Fanbeam		Y / N	Y / N
HPR 1	Y / N	Y / N	Transponders _____ _____ _____
HPR 2	Y / N	Y / N	Transponders _____ _____ _____
Radius	Y / N	Y / N	Transponders _____ _____
Taut Wire Port		Y / N	Y / N
Taut Wire Stbd.		Y / N	Y / N

Gate Valves Port: Open / Closed Stbd.: Open / Closed

HPR Poles Port: Down / Up Stbd.: Down / Up

ROV Transponder_____

Co-ordinate System set to Display UTM Y / N Datum Settings Checked & O.K. Y / N

Joystick

Joystick Thrust Reduced_ Full

Joystick Precision High Speed

General

Low Speed

Joystick Environmental Comp. Surge___ Sway___ Yaw ___

Joystick Operational Y / N

Propulsion Status

Thruster Setpoint/Feedback O.K. Y / N

Rudder Setpoint/Feedback O.K. Y / N

Power Status

Power (if Bus is Common): Used___Available _____

Power (if Bus is Split): Bus 1 Used___Available _____

Bus 2 Used___Available _____

Communications Tested & O.K. (as applicable)

Crane Cab/Cabs Y / N

Deck (Pipe/Cable Lay) Y / N DP Status Lights Y / N

Dive Control Y / N DP Status Lights Y / N

Engine Control Room Y / N

ROV Control Y / N DP Status Lights Y / N

Checklists

Dive Checklist Complete Y / N

ROV Checklist Complete Y / N

Engine room Checklist Complete Y / N

Vessel Capability

Consequence Analysis Enabled Y / N

Capability Plot Setup & Checked Y / N

Deselect Thrusters #1**, (#3)**, #5 & #7 (When #3 is connected to BUS 1)

Position Maintained Y / N Reselect Thrusters

Deselect Thrusters #2, **(#3)**, #4 & #6 (When #3 is connected to BUS 2)

Position Maintained Y / N Reselect Thrusters

Vessel on Auto DP for 30 Minutes Y / N

DP Current _____

Alarms Page Checked Y / N

Printer Online Y / N

Print Status Y / N

Signed_____ Date_____

Signed_____ Date_____

Annex H

DP Emergency Shiphandling Course

January 2020

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DOCUMENT VERSION CONTROL

NI DP Emergency Shiphandling Course		
Title NI DP Emergency Shiphandling Course	Version 1	Date 02/01/2020

Contents

1. Introduction

The Nautical Institute (The NI) DP Emergency Shiphandling Course has been designed to provide industry guidance for participants who engage in manual ship handling activities in vessels operating in Dynamic Positioning mode. The course will enhance the safety of navigation in confined water and in close quarter to oilfield structure to increase the O.O.W. / DPO situation awareness, risk assessment and management under different emergency situation and environmental conditions. It covers the learning objectives, practical assessment, the assessment skills tables and information about continuous assessment.

The expectation is that the participant will have successfully completed a Dynamic Positioning Operator training programme. The course is suitable for DPOs seeking to enhance their skills and suitable for experienced DPOs who may require to refresh their manual shiphandling skills and Officers new to offshore vessels

The course will cover shiphandling duties on DP vessels.

The programme involves a course of study with continuous assessment during the course. The overall emphasis of the course is:

1.1. To provide emergency shiphandling training for certificated and prospective DPOs
1.2. DP vessel ship handling knowledge and practical exercises for deck officers and Masters.
1.3. To use this course in compliance with on-board competency assessment as per:
  1.3.1. IMCA M117 The training and experience of key DP Personnel,
  1.3.2. IMCA C002 IMCA Guidance on Competency Assurance and Assessment – Marine Division
  1.3.3. C007 Guidance on Assessor Training.
  1.3.4. STCW Table A-II/1
1.4. Ensure that candidates are prepared for emergency situations in which manual ship handling techniques are required AND the circumstances in which the change to manual should not be made.
1.5. The course is comprised of two parts
  1.5.1. Class room – Instruction (Theoretical part maybe conducted on the Navigational Bridge (Simulator) to have more ship like atmosphere and to have descriptive materials at hand, immediate use of material during briefing and debriefing of theory and exercise) and;
  1.5.2. Simulator - Upon successful completion of the course the participants will be able to demonstrate competence in a number of ship handling emergency scenarios. The participants will be proficient in the conning of the vessel in different operational situations and loss of equipment.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is that participants should hold a deck Officer Certificate (Officer of the watch (OOW), Chief Mate, Master or Cadets) **or** DPO qualification.

3. Course Aims

The aims of the course are to give the student the following:

3.1. Confidence to respond appropriately to major failure in the Dynamic Positioning control systems
3.2. To be able to make the decision when to change to Manual control
3.3. An improved understanding of shiphandling in the context of offshore operations
3.4. Experience of keeping the vessel safe through manual shiphandling skills in a range of conditions

4. Course Objectives

The course includes conventional and azimuth propulsion simulation, use of thrusters, manoeuvring in sheltered waters and offshore environments including close quarters manoeuvring, holding a vessel in the one position after an emergency and operating with reduced machinery capability.

The theory content will revise basic principles of ship handling including:

4.1. Discussion of wind/current, and their influence on the operation in adverse weather/wind

condition

4.2. Planning of (safe) operation
4.3. Manoeuvring theory with focus on Offshore Support Vessels
4.4. The effects of displacement, draught, trim, speed, velocity, kinetic energy and under-keel clearance on various manoeuvres, squat effect, turning circles and stopping distance.
4.5. The importance of the pivot point and effecting ship handling on vessels that are moving and not steaming.
4.6. The effect of current, wind and waves on the vessel's capabilities when vessel is on different headings.

Specific focus on offshore activities will include:

4.7. The effect and interaction between different type of rudders and propellers, thrusters and their operational advantages and limitations
4.8. Advantages and Disadvantages of different types of thrusters;
4.9. Contingency planning in case of thruster, rudder and/or propeller failure.
4.10. Contingency operation in the event of a partial blackout
4.11. Correct procedures for changeover between manual, joystick and dynamic positioning manoeuvring mode
4.12. Effect of a loss of heading when on DP and vessel turning beam on to conditions
4.13. Safe operation in different weather conditions
4.14. Thruster loss at low speed
4.15. Manoeuvring without bow thrusters
4.16. Emergency ship handling after a worst case failure.
4.17. Stopping distance when maintaining heading.
4.18. Effect of external forces on a vessel.

Documentation

Relevant ship characteristics and capabilities will be provided for vessels used for exercises on the simulator. Students will have access to examples of sea trial reports, pilot cards, capability plots and other relevant manoeuvring information.

Safety

The course will cover critical safety-related aspects including:

4.19. Use of emergency backup systems.
4.20. Holding position in open water and in channels after system failure.
4.21. Thruster emergency stops
4.22. Alarm associated with propulsion systems

5. Learning objectives

The expected learning outcome is that the students will be able to describe or demonstrate the following:

Vessel Machinery Characteristics

5.1. Types of Main Propulsion
  5.1.1. Describe use of the major types of main propulsion systems including:
    (i) Conventional twin/single-screw
    (ii) Azimuthing propulsion
  5.1.2. Compare the advantages and disadvantages of the major types of main propulsion systems.
  5.1.3. Utilise the features of various azimuth type propulsion systems.
5.2. Propellers
  5.2.1. Understand the difference between fixed-pitch and controllable pitch propulsion (CPP) propellers.
  5.2.2. Compare the advantages and disadvantages of fixed-pitch and controllable pitch propellers.
5.3. Azimuthing Bow Thrusters
  5.3.1. Describe the benefits of using azimuthing bow thrusters including their use in pulling power and maneuverability when pivot point is on the stern.
5.4. Tunnel Thrusters

5.4.1. Describe the advantages and disadvantages of tunnel thrusters.
5.4.2. Describe the differences between fixed-pitch and controllable pitch tunnel thrusters.
5.4.3. Identify how the characteristics of water flow, hull design and speed of the vessel affect the efficiency and effectiveness of a tunnel thruster.

5.5. Rudders
5.5.1. Describe the use of different configurations and types of rudders including: high-lift rudder, fishtail, conventional rudders and split rudders to increase side thrust.
5.5.2. Understand the advantages and disadvantages of each rudder type.

5.6. Power Management Systems (PMS)
5.6.1. Describe the functionality of a PMS.
5.6.2. Describe and understand how the PMSs may affect power availability in an emergency shiphandling situation.

Vessel Manoeuvring Characteristics

5.7. Pivot Point of the vessel
5.7.1. Describe the effect that the use of different thrusters located at different positions on the hull has on the pivot points.
5.7.2. Describe the effect that trim has on a vessel's Manoeuvring characteristics.

5.8. Environmental Forces
5.8.1. Describe an understanding of the effect that Wind, Sea and Current has on a vessel's Manoeuvring characteristics
5.8.2. Describe an understanding of the forces of wind and current based on the ship's hull coefficient and wind and current force and relative direction.

5.9. Other Factors
5.9.1. Describe the ability to maneuver a vessel under varying environmental, hydrodynamic and ship pivot point conditions

Vessel Manoeuvring Modes

5.10. Traditional Manoeuvring
5.10.1. Describe the process of manual ship handling and station-keeping using individual thrusters.
5.10.2. Describe proper use of thrusters, rudders and Azimuthing propulsion systems to maneuver a vessel in varying sea conditions with no defects.
5.10.3. Describe the use of fixed pitch and CPP Azimuth thrusters with and without biasing
5.10.4. Describe the standard Offshore use of the aft control to berth and unberth

5.11. Heading Control and Joystick Manoeuvring
5.11.1. Describe changing center of rotation and power requirements
5.11.2. Describe advantages of a set heading
5.11.3. Describe an understanding of the difference between an Independent Joystick and a DP system joystick
5.11.4. Describe the importance of setting center rotation to the center of the vessel
5.11.5. Describe the correct use of weather and data inputs as these relate to heading control.

5.12. DP Manoeuvring
5.12.1. Describe changing rotation centres and power requirements of a DP system
5.12.2. Describe advantages of set heading when using a DP system
5.12.3. Describe the ability to maneuver using Joystick under varying environmental, hydrodynamic and ship pivot point conditions.

Operating Procedures & Risk Assessment

5.13. Operating Procedures & Risk Assessment:
5.13.1. Describe the importance of procedures and safety guidelines as they apply to offshore marine operations. IMCA, MTS and Guidelines for Offshore Marine Operations (GOMO)
5.13.2. Describe the importance of industry best-practice in establishing a safe working environment.
5.13.3. Understand the use of risk assessment processes and the benefits of assessing the risks in mitigating hazards.

5.14. Company Specific Procedures with respect to industry best practices
5.14.1. Discuss the procedural considerations for operating alongside a platform

5.14.2. Describe scenarios when an operation may be suspended
5.14.3. Define risk assessment and management of change as applied to a company's procedures
5.14.4. Describe the ability to apply procedures and risk assessments for a specific operation.
5.14.5. Describe ASOG, CAM and TAM modes

Special Manoeuvring Scenarios including Emergency Shiphandling

5.15. Working alongside an installation
5.15.1. Define the information required before approaching an installation.
5.15.2. Define the information that may be found on a rig data card
5.15.3. Utilise the information from current and detailed weather reports
5.15.4. Describe the importance of crane information
5.15.5. Describe the process for setting up on "Drift ON" and "Drift OFF" side working.
5.15.6. Describe the ability to follow approach and departure procedures.
5.15.7. Describe the effect of changing trim and excessive trim
5.16. Operating with reduced equipment due to equipment failure
5.16.1. Describe the effect that a loss of bow thrusters on a azimuth propulsion ship may have on maneuverability and station keeping
5.16.2. Describe the effect that a loss of stern thrusters on conventional twin-screw vessel may have on maneuverability and station keeping
5.16.3. Manoeuvre using only azimuth thrusters (biasing and non-biasing techniques)
5.16.4. Describe the use of engines and rudders in the event of thruster failure.
5.16.5. Describe the ability to overcome equipment failure while maintaining safety of vessel.
5.16.6. Describe actions to be taken after DP failures with the simulator in DP auto mode. Important the student does not change to manual unless a complete failure of the DP system. i.e. vessel to be left in DP control after worst case failure and only change to manual if vessel is not holding heading and position.

6. Number of hours

The course will be of at least 4 days' duration with a minimum of 32 hours' instruction, with at least 65% of the time assigned to practical ship handling exercises[1].

7. Ratio of Students/Instructors/Equipment

The course will be run in English. The student-to-instructor/simulator ratio will be a maximum of 3 students to one instructor/simulator.

Course to be conducted at a Nautical Institute accredited Training centre. The Instructor must be appropriately qualified and experienced including qualifications as a simulation instructor and relevant seagoing professional qualifications

The instructor may be assisted by a Ship's Master experienced in offshore vessel shiphandling.

[1] The Nautical Institute will consider submissions for a shorter course with fewer students provided that a minimum of 9 hours actual bridge exercise time in control of the ship is assigned to each participant

8. Instructor Qualifications

Instructors must be approved instructors under the NI DPO Scheme and must have a minimum of 150 days documented DP time

The instructor/s delivering the course must be approved as an instructor at a NI accredited training centre. He/she must be able to demonstrate that they possess the adequate ship handling knowledge which affirms them to be sufficiently competent to deliver the course.

9. Delivery Method

The course will be a blend of learning provided by theory-based instruction with guided practical simulator-based exercises giving a balance of lectures, instruction and practical assessments. This will be achieved through a concentrated period of exercises on a DP equipped ship handling simulator, supported by a program of lectures and instruction. This course may also be delivered, in part, using individual computers for training.

10. Course Assessment

The course will include both a theoretical and practical assessment.

11. Online assessment

An NI multiple-choice online assessment will be completed by each student at the end of the course.

12. Practical assessment

Practical assessments will be based on the conduct of each exercise and will determine the candidate's preparedness for manual shiphandling in emergency situations.
The training centres must develop their own practical exams based upon the course objectives listed above and Course Skills Table below.

The practical assessment must be done individually. As a minimum, the exam must require the student to hold station after a DP emergency (for a specified period of time) and then move the vessel to a safe location under manual control. The time period for holding station will be dependent on the time required to abandon the operation underway at the time of the failure.

The training centre is responsible to ensure that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of the NI. Candidates who successfully complete the online examination and practical assessments will receive a completion certificate. Unsuccessful candidates will be advised to seek further training to meet the particular needs.

13. Specific Equipment Requirements

Simulator equipment required to run the course:

13.1 Nautical Institute Shiphandling Simulator OR a simulator that will match the requirement of NI Shiphandling simulator

14. Appendix 1 to DP Emergency Shiphandling - Learning and Proficiency Outcomes

S= Skilled K=Knowledgeable A= Aware

DP Emergency Manoeuvring Course Skills Table

The course will include exercises using a variety of propulsion control techniques including:

- Change over procedures from DP to manual
- Emergency on DP controller
- Joystick
- Manual manoeuvring
- Emergency operation
- Thruster emergency stops
- Emergency Bridge resource management

Training and practical sessions should address skills in a variety of environmental conditions including daylight and darkness.

Knowledge, understanding and proficiency	**Methods for demonstrating competence (To be completed by the Centre)**	**Criteria for evaluating competence (To be completed by the Centre)**
Control		
Familiar with the operation and testing procedures of all bridge manoeuvring equipment		
Steering, main engine and thruster control systems fully operational in manual control only.		
Bring the vessel to a complete stop so she is making no way through the water in minimum time without over use of engines.		
Knowledge of propulsion/steering systems and their controls including partial blackout or loss of power contingencies and emergency control systems.		
Controlling the vessel with independent propulsion units		
Controlling the vessel with joystick		
Maintaining the vessel in one position without changing the heading, in the vicinity of a fixed reference point/object with full and restricted propulsion availability		
Manoeuvring the vessel to Port and Starboard or fore and aft keeping the heading within 10 degrees, in the vicinity of a fixed reference point/object with full and restricted propulsion		

Transferring in and out of DP to joystick to manual control.		
Manoeuvring and controlling the vessel as listed above, after (WCF) Worst Case failure of propulsion		
Manoeuvring the vessel in DP DR Mode after loss of all position reference systems.		
Demonstrate how to allow for prevailing wind, currents, tidal stream and expected changes		
Demonstrate situational awareness in respect of subsea pipelines, wellhead and platform risers locations		
Emergency planning		
Partial loss of propulsion power		
Sudden changes in wind direction/strength		
Aware of the actions in case of emergency when vessel is in DP auto mode i.e. WCF, Thruster, generators and Steering Failure etc.		
Manoeuvring and controlling the vessel (box patterns/heading changes) in the vicinity of a fixed reference point/object or by using DGNSS with full or restricted propulsion availability		

EXAMPLE SIMULATOR EXERCISES FOR SHIP HANDLING

Trainee must be able to demonstrate:

14.1 Setup a vessel ready for emergency departure from installations

14.2 Appropriate initial actions in response to system failure

14.3 Holding the vessel in the one position and keeping the heading within 10 degrees in good and adverse weather/wind condition only using CPP/FPP Azimuths and thrusters after a worst case failure. Monitor vessel speed with DGPS or DP screen.

14.4 Moving the vessel sideway away from danger only using CPP/FPP Azimuths and thrusters after a worst case failure

14.5 The importance of situational awareness both visually and with electronic aids

14.6 Emergency DP Bridge Resource Management

15. Appendix 2 to DP Emergency Shiphandling - Course Structure

The course must be a minimum of 32 hours duration including the assessment periods and must have a minimum of 20 hours assigned to exercises in the simulator.[2]

[2] The Nautical Institute will consider submissions for a shorter course with fewer students provided that a minimum of 9 hours actual bridge exercise time in control of the ship is assigned to each participant

Annex I

DP Knowledge for Technical Staff Course

TRAINING SCHEME
RECOGNITION STANDARD

January 2020

DISCLAIMER

Whilst every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. The Nautical Institute cannot be held responsible for any damage to property, trainers or operators whilst following these guidelines. This information is produced in good faith, but we cannot guarantee the accuracy and/or completeness of the information which is produced for guidance purposes only.

THE NAUTICAL INSTITUTE DP KNOWLEDGE FOR TECHNICAL STAFF COURSE

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DOCUMENT VERSION CONTROL

NI DP Knowledge for Technical Staff Course		
Title NI DP Knowledge for Technical Staff Course	Version 1	Date 02/01/2020

Contents

1. Introduction

This standard comprises the following:

(A)
Part A Course, which provides training to help meet the continuing professional development needs for technical staff engaged in operations aboard vessels with dynamic positioning equipment

(B)
Part B course which provides training on vessel/manufacturer specific equipment

Training Centres may run courses which meet the requirements of Part A only, or Parts A and B as set out in this standard.

DP technical staff should take either Part A or Parts A and B, according to their identified training needs. Training Centres should facilitate the training of those who only wish to complete Part A.

Certificates of Training issued on successful completion of a recognised course will record which Part(s) have been completed. A certificate for a Part B course will reflect the specific manufacturer and equipment for which the training was provided.

This course has been developed to help meet the continuing professional development needs for technical staff engaged in operations aboard vessels with dynamic positioning equipment.

Training on vessel-specific equipment is necessary if the equipment is sufficiently unique that training on similar equipment does not provide an adequate level of skill, knowledge and ability. A good understanding of the DPO's responsibilities by technical DP personnel and on board familiarisation with the DPO's task in controlling specific DP operations will aid quick and appropriate response to problems associated with any equipment that affects DP. Effective training should enable key DP technical personnel to respond quickly and appropriately to equipment failures and faults that may result in DP incidents, to identify when the vessel removed from the 500 metre zone and to effectively recover the vessel to a safe DP equipment state[2].

Many courses run by manufacturers only cover their equipment and not the interaction of the whole DP system. This course can be run on a standalone basis for all technical staff and for any DPO. It is recommended that a type specific course states that it only covers the manufacturer's equipment. This course will suit all technical staff and help refresh the DP knowledge of technical staff that have not worked on a DP vessel due to the industry down turn.

Training centres or organisations which have developed a training programme that is compliant with these requirements may submit an application for Recognition by The Nautical Institute (the NI) for the course. When the organisation and course is Recognised it will be authorised to issue certificates bearing the logo of the NI and to promote their course as being compliant with the standard of the NI.

The course has been designed to:

- Help ensure Safe Engine Room DP operations via training and assessment
- Provide a foundation for ongoing on-board competency assessment as per IMCA M117, IMCA 002 and IMCA 007
- Compliance with the intent of STCW Section B-V/f* that electro-technical and engineer officers may require additional training.

[2] Extract from IMCA M117

2. Minimum Entry Qualification Requirements

Participants should be an Engineer Officer / ETO or shore based Technical Staff.

Participants should have a knowledge of their employers' company procedures and vessel safety management system (SMS), particularly relating to DP operations.

The course may also be useful to Deck Officers and Masters who require a greater technical understanding of the operation of DP equipment.

3. Course Aims

To give the student the following:

3.1. Understanding of the theoretical and practical operation of DP systems;
3.2. Technical understanding of the component parts of the DP and associated systems;
3.3. An understanding of the limitations of equipment and the effects of equipment failures;
3.4. An understanding of the limitations and the effects of incorrect operation of the systems;
3.5. An understanding of work which can safely be undertaken with and without the help of equipment manufacturers, and more importantly, when to stop before affecting the vessels capability to perform DP operations or redundancy;
3.6. The ability to fault find the DP system and its components;
3.7. Familiarisation with FMEAs and the philosophy of system redundancy;
3.8. An improved ability to operate the Engine Room and DP equipment in a safe and competent manner
3.9. This course covers DP knowledge and can be combined with a Type Specific equipment training.

4. Delivery Method

The course will be theory and NI "B" class simulator based and will give the participant an overview of DP operation and the effects of system and component failures. On completion of this course participants will understand the general arrangements for DP systems and the principles of operation of the equipment. Participants will gain an understanding of the importance of the interaction between the system components and the modes of operation.

The elements of maintenance and operation of a DP system will be covered by the following sections.

4.1. Power System
4.2. Thruster System
4.3. DP Control System
4.4. Documentation
4.5. Manning and Training
4.6. DP Support
4.7. Safety
4.8. Essential Non-DP Systems
4.9. Future Trends including automation and Integrated Bridge Management Systems
4.10. Simulator Exercises

The course is set up to allow developing some of the course contents into computer-based training. The student-to-instructor ratio will be a maximum of eight students to one instructor in order to ensure proper learning.

However a case may be made for up to 12 students depending on the equipment available and extra support staff.

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to operators. Writing is required to the level of completing workplace forms. The course is delivered in English.

5. Course Duration and Setup

Part A

5.1. Part A shall be a minimum duration of four days with a minimum of 28 hours instruction, simulator time and assessments.
5.2. Part A is generic training and may be delivered by any training centre approved to do so by the NI.
5.3. The required course content for Part A is shown in an outline below and in more detail in Annex 1.

Part B

5.4. Part B shall be of a duration determined by the manufacturers.
5.5. Part B is system specific training and may only be delivered by manufacturers or their approved representatives. The NI will only approve training centres for delivery of Part B training where evidence of manufacturer approval is submitted.
5.6. The required course content for Part B is shown in Annex 2.
5.7. Where Part B is delivered on its own arrangements should be made to ensure sufficient generic background is provided to ensure operational context of the content of Part B.

Participants will be awarded Certificate of Training on successful completion of Part A and/or Part B of the course.

The course can be run as a combined DP Knowledge for Technical staff and a type specific course over five days. If the course is conducted as a combined course then two certificates may be issued or a single certificate affirming Part A and Part B have been completed.

100% attendance and participation in the course is required.

6. General Course Content and Competencies

The general course content and competencies comprises of the following outline:

6.1. General Overview of DP
6.2. The Power System
6.3. The Thruster System
6.4. Control Systems and Sensors
6.5. Documentation
6.6. DP Operation and effects on DP system
6.7. Lessons Learned

See Appendix 1 for more detail.

7. Simulator Equipment Required

Simulator equipment required to run the standalone course:

- The minimum simulator requirement is an NI Class B simulator in an accredited NI Training Centre.
- Course contents shall have an assortment of photos of real equipment and DP installations. Photos must cover all parts of DP System:

(i) Controller
(ii) I/O units
(iii) Opt isolators
(iv) Switchboard
(v) UPS
(vi) Different makes of equipment

Photos should preferably be supplemented with a real hardware and associated equipment.

Simulator exercises

7.1. Demonstrate a problem of command signal
7.2. Demonstrate a problem with the feedback signal
7.3. Demonstrate a thruster failing to full thrust
7.4. Demonstrate a reject problem with Gyro and wind sensor
7.5. Demonstrate a slow spread of position reference system, then deselect one position reference system to show how a vessel can have a drive off with all equipment working correctly
7.6. Demonstrate a slow spread of position reference sensors until one position reference system is rejected by median test
7.7. Demonstrate the high loads caused if the set point speed is set too high.
7.8. Demonstrate the high load caused when changing heading when centre of rotation is set away from the centre of the vessel
7.9. Demonstrate having the bow into high wind and current, then turn the vessel 90 degrees and show high load and loss of position
7.10. Demonstrate if the DP is unstable
7.11. Demonstrate if a NEMA string of data is being received by the DP controller and information contained
7.12. Monitor input serial strings into the DP system if the string is simulated' or use computer program to generate serial string.

8. Course Assessment

An online assessment using multiple-choice questions will be completed by each student at the end of the course. The NI will administer an online assessment. Participants successfully completing the assessment will be issued with a course certificate.

The following are to be part of a practice exam on the Class "B" simulator. Using the DP system display:

8.1. Identify a thruster pitch feedback / rpm error
8.2. Identify a thruster command error
8.3. Identify a position reference system fault, failure or degradation.
8.4. Identify a sensor fault or failure.
8.5. Identify a power plant configuration where the redundancy concept could be defeated.
8.6. Identify a scenario where the vessel is being operated beyond its redundant limits so the WCFDI is defeated.
8.7. Identify an alternative thruster or power configuration (thruster or generator not available) and determine whether or not the redundancy concept is intact or defeated. Can operations be conducted?
8.8. Describe actions with reference to ASOG/CAMO/TAM in response to an equipment status change

9. Instructor Qualifications

The Part A course shall be conducted by an NI DP instructor (Induction and Simulator Course). The instructor should have completed a manufacturer's Type Specific equipment training course within the last 5 years.

The course may be delivered by one or two instructors.

The course shall have a suitably qualified ETO, Chief Engineer or DP Service Engineer support training for a minimum of one day of the four days. This engineer is available to provide technical input and need not necessarily provide the formal instruction. If the NI Instructor is an Engineer, then extra support is not required

10. Course Notes and Resources

The notes and backup information will be a major part of this course, and will be supplied to each participant on a USB drive/ DVD.

All course PowerPoints will be in pdf form or there will be online access to training notes.

Each student is to be supplied with a copy of “NI DP Operator Handbook” and have access to other learning resources identified in Appendix 1 Section 5.

11. Appendix 1 to DP Knowledge for Technical Staff - Main Technical course details contents and competencies

The following minimum specification identifies the required content for the course.
Training centres may also use this course for refresher and updating training of technical staff and further indicative content advice is provided in Appendix 3.

General Overview of DP

11.1 Brief history of DP system development.
- 11.1.1. Development of DP Systems and what is needed for offshore drilling
- 11.1.2. Brief discussion on the way DP is used

11.2 Reasons why DP is used extensively; Client requirements; Safety etc.
- 11.2.1. DP can be used when water is too deep for Anchors
- 11.2.2. Hold Control of vessel
- 11.2.3. Removes the need to make fast to offshore installation and improves the safety for crews
- 11.2.4. Quick deployment of any type of vessels
- 11.2.5. Increasingly difficult to manually operate multi-thruster vessels
- 11.2.6. Provides a stable platform for crane ops, gangway ops, ROV ops etc.

11.3 Types of DP vessels
- 11.3.1. Course to discuss brief type of vessels using DP. OSV, drilling units, constructions vessels, dive vessels, pipe lay vessels, wind farm vessel, passenger vessels

11.4 Theory of DP control; Explanation of how the system positions the vessel; Heading; Feedback; Wind; Modelling, Kalman filter, controllers and DP current etc.
- 11.4.1. To be able to discuss briefly the main elements of a DP System, DP Computer/Controller, Thruster and propulsion, Power systems, position reference and environmental sensors
- 11.4.2. Describe why the DP system requires a wind input
- 11.4.3. Describe why the DP system requires a heading input
- 11.4.4. Describe why the DP system requires an input for roll, pitch and possibly heave
- 11.4.5. Describe full Joystick mode
- 11.4.6. Describe joystick auto heading mode
- 11.4.7. Describe 2 axis control
- 11.4.8. Describe full auto DP mode
- 11.4.9. Describe the difference between DP Joystick, remote joystick and independent Joystick
- 11.4.10. Describe modelling
- 11.4.11. Describe the function of filters
- 11.4.12. Describe how DP current is calculated

11.5 DP equipment classes as defined in IMO guidelines and Classification Society rules.
- 11.5.1. Describe Class 1, Class 2 and Class 3 DP vessels
- 11.5.2. Describe enhanced notation.
- 11.5.3. Review DP system generic one line drawing for Class 1, 2 and 3 vessels
- 11.5.4. Describe redundancy
- 11.5.5. Describe Worst Case Failure (WCF) in terms of redundancy
- 11.5.6. Loss of redundancy effecting class of the vessel
- 11.5.7. Describe the over use of powers and the effect on WCF redundancy
- 11.5.8. Describe what class of vessel is best suited for each industry mission
- 11.5.9. Describe consequence analysis alarm and requirement for the use during class 2 operation
- 11.5.10. Describe what would trigger a consequence analysis alarm

11.6 Typical elements of a generic DP system

The Power System

All components and systems necessary to supply the DP system with power. The power system includes:

11.7 Auxiliary Systems and Redundancy Concepts

11.7.1. Fuel Systems

(i) Describe a generic redundancy fuel system
(ii) Describe potential failures and associated impact on DP Class

11.7.2. Cooling systems, Fresh and Sea Water

(i) Describe a generic redundant cooling system for fresh and sea water
(ii) Describe the impact of system failures on DP Class

11.7.3. Compressed Air System

(i) Describe the layout of a typical redundant compressed air system
(ii) Describe the possible effects of compressed air failure on DP operations

11.7.4. Ventilation system

(i) Describe layout of a redundant ventilation system
(ii) Describe the possible effects of inadvertent closure of ventilation dampers during DP operation

11.7.5. HVAC

(i) Describe layout of HVAC systems for redundant equipment operation
(ii) Describe the effect of loss of HVAC to Equipment rooms, switchboard rooms, control rooms and bridge could have on the DP system

11.7.6. Lubrication system

(i) Describe a typical layout of a redundant lubrication system for an engine
(ii) Describe a typical layout of a redundant lubrication system for propulsion system

11.8. Generators and Main Engines

11.8.1. Main engines

(i) Describe typical generation plant layout redundant power generation arrangements.

11.8.2. Main Switchboard

(i) Describe a typical layout and functionality of a redundant switchboard for a diesel electric power plant
(ii) Describe potential failures and the impact on DP Class
(iii) Describe the term “designed to test”
(iv) Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip

11.8.3. Generators

(i) Describe typical arrangements on a DP2 vessel
(ii) Discuss the arrangements required to ensure redundancy remains in place and what factors influence redundancy
(iii) Describe spinning reserve and power available
(iv) Describe how the use of more than 45% utilisation can affect redundancy

11.9 Bus-tie requirements

11.9.1. IMO, Class and FMEA requirements

(i) Describe open and closed bus tie as per IMO 645
(ii) Describe traditional concepts for bus tie operation
(iii) Describe how open bus tie can ensure a fault on one switchboard will not affect other switchboard
(iv) Describe with an example how the main bus-tie breaker and all other breaker is set setup as per FMEA
(v) Describe benefit of closed bus tie systems
(vi) Describe that after WCF on a closed bus tie system the bus tie is to remain open if trip during WCF

until fault is found.

11.10 Electrical Systems and Cabling Communications

11.10.1. UPS

(i) Describe a typical UPS arrangement for DP2 operations
(ii) Describe the function of an Uninterrupted Power Supply
(iii) Describe how to operate the bypass of a UPS
(iv) Describe test requirements for a UPS
(v) Describe typical alarms from a UPS
(vi) Describe maintenance and life of UPS batteries

11.10.2. AC supplies

(i) Identify on a one line drawing the redundancy setup and ensure there is no cross connections
(ii) Identify what is connected to the AC circuits and possible loads
(iii) Describe a typical one line diagram for distribution and supply of AC circuits on a DP vessel
(iv) Identify what is connected to the AC circuits and which are critical to DP operations.
(v) Describe all sub tie breakers need to stay open regardless if the main tie breaker is open or closed
(vi) Discuss circuit protection and fuses
(vii) Discuss testing of auto standby circuits for pumps, steering etc.

11.10.3. DC supplies

(i) Describe a typical 24v DC Redundant supply one line diagram
(ii) Describe the various arrangements for backup supplies to engine control systems and switchboards
(iii) Describe the risk of cross connections 24v supplies
(iv) Describe the problem of earth faults on two redundant systems and the use of DC/DC isolated supplies
(v) Discuss the importance of clearing DC earth faults promptly for safe operation
(vi) Describe procedures for testing and maintenance of battery backup systems
(vii) Describe what could happen if there is a loss of charging power
(viii) Describe typical alarms from 24v DC systems

11.10.4. Digital interface

(i) Describe a typical digital interface arrangement to a DP controller
(ii) Describe why a digital input is required by a DP controller and what system inputs normally use this type of input
(iii) Describe where a digital output may be used in a DP controller
(iv) Describe how a digital signal may be transmitted over a network from a remote I/O station
(v) Discuss fail safe modes for digital signals and networks
(vi) Describe the loss of redundancy upon failure of one multi-channel interface unit (I/O) with input connected signal from two different redundancy groups
(vii) Discuss testing of digital signals

11.10.5. Analogue interface

(i) Describe the different analogue signals associated with DP control systems and their use
(ii) Describe the benefit of 4 to 20 mA signals for control and feedback of thrusters and main drives
(iii) Discuss testing of analogue signals
(iv) Describe the purpose and use of optical isolator units

11.10.6. Serial interface

(i) Describe the concept of serial data transmission and its use in DP control systems
(ii) Describe the various types of serial connections, RS232 & RS422
(iii) Discuss baud rates, parity, data bits, stop bits, handshake and their importance in serial data transmission
(iv) Describe the different types of NMEA protocol sentence formats and how to read them
(v) Discuss the terms “talkers” and “listeners” as used in NMEA
(vi) Describe how to monitor NMEA string using the DP display, laptop OR meters

(vii) Describe a simple check for NMEA string data errors
(viii) Describe the benefit of using RS422 serial connections over RS232
(ix) Discuss serial isolators and serial signal convertors
(x) Discuss cable requirements for interconnection of serial units
(xi) Discuss / show examples on different NMEA strings (i.e. GNSS, wind, gyro etc)

11.10.7. Power Management System custom systems and IMO DP equipment class 2/3 requirements
(i) Maintaining continuity of electrical power under all defined load and failure conditions

11.10.8. General system functions
(i) Describe typical power management systems for a DP vessel
(ii) Describe why a breaker selective study is required and the importance.
(iii) Describe the difference between DP power limiting and Generator power management
(iv) Describe the reason to disable load dependant stop while in DP mode
(v) Describe a generator monitoring system and the important information supplied.

11.10.9. Extra loads on switchboard with different operation, Drilling, ROV etc.
(i) Describe the need for a new load balance study when connect extra equipment. i.e. ROV
(ii) Describe the possible reduced power to thrusters
(iii) Describe the possible effect on the vessels Capability plot
(iv) Describe the problem of only supply from one switchboard and the loss of the switchboard
(v) Describe the possible of transferring fault and completes after failure of a piece of industrial equipment

11.10.10. Extra redundancy required for working “drift on”.
(i) Describe allow more spinning reserve when working drift on

The Thruster System

All components and systems necessary to supply the DP system with thrust force and direction. The thruster system includes:

11.11 Thruster Drive and Auxiliary Systems

11.11.1. Azimuth thrusters, Tunnel thrusters, Propellers and other systems

11.11.2. Thruster Control Concepts
(i) Describe how a DP system typically is connected to a thruster control system, including normal control and back-up control (on thruster control system).
(ii) How will emergency operation of thrusters affect the DP control of the thrusters?

11.11.3. Thruster redundancy
(i) Thruster supply change over
(ii) Describe how changing over a thruster that has failed could transfer the fault to a second redundancy group

11.11.4. Thruster failure modes
(i) Describe “Fail as set”
(ii) Describe “Fail to zero”
(iii) Describe “Fail to full”
(iv) Describe why you would lose the ready signal.
(v) Describe that emergency stops will still work when vessel is in DP control
(vi) Effect on the DP system of a failed thruster
(vii) Describe the counter balance effect of other thrusters when a thruster fails and the vessel is left in full auto DP mode

Control Systems and Sensors

All control components and systems, hardware and software necessary to dynamically position the vessel. The DP control system consists of the following:

11.12 DP Computer System/Joystick System

11.12.1. DP operator workstation

(i) Describe a typical operator workstation and the various hardware components.
(ii) Describe the management for change for software
(iii) Describe the DP system must be full tested to check operation after software upgrade
(iv) Describe typical maintenance and testing that should be carried out on workstation
(v) Describe a typical procedure for total shut down and re-starting of a DP control system
(vi) Discuss ability to download log files for analysis

11.12.2. Control processor(s)

(i) Describe the function of the control processor in the DP control system
(ii) Describe the redundant design incorporated into the control system
(iii) Describe the redundant interconnections between the control processor and the I/O units
(iv) Describe how a failure on a DP controller is typically handled to maintain position-keeping
(v) Describe how some DP systems use a PLC as part of the control system

11.12.3. Independent joystick system (IJS)

(i) Describe why IJS is needed
(ii) Describe the difference between IJS and portable / wing joysticks
(iii) Describe the class requirement for IJS
(iv) Describe that some older vessel the IJS can use the same controllers
(v) Describe how a IJS is powered
(vi) Describe which DP sensors and references are also typically used for the IJS

11.13 Peripherals

11.13.1. Printer

(i) Describe the DP printer and requirements for it to be online during DP operations
(ii) Discuss DP Data Loggers as independent to the DP system
(iii) Discuss ability to download log files for analysis

11.13.2. Change-over switch, manual controls/DP/joystick

(i) Describe the design of a typical changeover switch as a multi-gang switch on a single operating spindle and are not electrical connected
(ii) Describe that a common changeover switch removes the ready signal from the thruster to DP system
(iii) Describe the changeover switch in a Network thruster control system
(iv) Describe emergency to manual on a network control system
(v) Describe wire break monitoring on emergency change over DP to manual and on a DP to Manual network control system.
(vi) Describe that the emergency stop and backup/emergency controls will still work with changeover switch set to manual or DP mode or IJS Mode

11.13.3. DP Software

(i) Describe the six degrees of freedom and which of these the DP system controls
(ii) Describe hydrodynamic model
(iii) Describe aeronautical model
(iv) Describe DP mathematical model
(v) Describe DP current
(vi) Describe error affecting the DP current
(vii) Describe the problem caused by entering a speed that is too fast for the vessel to move.
(viii) Describe reason for the mathematical model to become unstable
(ix) Describe auto swap on the operator station and controllers

(x) Describe DP modes
(xi) Describe backup copy and reloading program under instructions for manufactures.

11.13.4. Alarms
(i) Describe the need to set alarms to activate to warn at any early stage
(ii) Describe that the DPO and engineer must understand what the alarm is and what caused the alarm
(iii) Describe how to find information about an alarm in vessels documents and on screen help

11.13.5. Position Reference Systems; Hardware Software and Sensors
(i) Describe why position reference systems are used by the DP program
(ii) Describe the minimum number of position reference systems required to meet class 1, 2 and 3
(iii) Describe position reference system voting
(iv) Describe the difference between “Fixed” and “Mobile” relative position reference systems
(v) Describe what happens when all position reference systems are lost from the DP system

11.13.6. DGPS/DGNSS
(i) Describe principle of GNSS systems
(ii) Describe DGNSS and the use of correction to improve the quality of position fix
(iii) Describe the different way DGNSS corrections are received
(iv) Describe the disadvantages of DGNSS system
(v) Describe the advantages
(vi) Describe the use of INS to improve the reliability of position
(vii) Describe how to identify an antenna problem
(viii) Describe the blocking of correction signal
(ix) Describe the Azimuth and elevation of a corrections satellite
(x) Describe failure modes
(xi) Describe maintenance and logical fault finding

11.13.7. Acoustic
(i) Describe principle of an acoustic system.
(ii) Describe why the speed of sound through the water is required
(iii) Describe advantages
(iv) Describe disadvantages
(v) Describe failure modes
(vi) Describe maintenance and logical fault finding
(vii) Discuss transponder types and use, charging of transponders

11.13.8. Taut wire
(i) Describe principle of a Taut wire system
(ii) Describe advantages
(iii) Describe disadvantages
(iv) Describe failure modes
(v) Describe maintenance and logical fault finding

11.13.9. Laser - CyScan
(i) Describe principle of a CyScan system
(ii) Describe advantages
(iii) Describe CyScan AS targets
(iv) Describe disadvantages
(v) Describe failure modes
(vi) Describe maintenance and logical fault finding
(vii) Describe the different types of Fanbeam targets, use and maintenance

11.13.10. Laser - Fanbeam
(i) Describe principle of a Fanbeam system
(ii) Describe advantages

(iii) Describe disadvantages
(iv) Describe failure modes
(v) Describe maintenance and logical fault finding

11.13.11. Laser - SpotTrack
(i) Describe principle of a Spot track system
(ii) Describe advantages
(iii) Describe disadvantages
(iv) Describe failure modes
(v) Describe maintenance and logical fault finding

11.13.12. Microwave - Radius
(i) Describe principle of a Radius system
(ii) Describe the positioning of Interrogator units
(iii) Describe advantages
(iv) Describe disadvantages
(v) Describe failure modes
(vi) Describe maintenance and logical fault finding
(vii) Describe transponders and battery maintenance requirements

11.13.13. Microwave - RadaScan
(i) Describe principle of a RadaScan system
(ii) Describe advantages
(iii) Describe disadvantages
(iv) Describe failure modes
(v) Describe maintenance and logical fault finding

11.13.14. Microwave - Artemis
(i) Describe principle of an Artemis system
(ii) Describe advantages
(iii) Describe disadvantages
(iv) Describe failure modes
(v) Describe interface from other vessel radars
(vi) Describe maintenance and logical fault finding

11.13.15. Inertial Navigation Systems
(i) Describe principle of INS Inertial Navigation system
(ii) Describe advantages
(iii) Describe disadvantages
(iv) Describe how INS is used with DGNSS and hydro acoustic systems.
(v) Describe failure modes
(vi) Describe maintenance and logical fault finding

11.14 DP Sensor Systems

11.14.1. Gyro
(i) Describe the principle of a standard gyro compass
(ii) Describe the principle of a fibre optic Gyro compass
(iii) Describe failure modes
(iv) Describe why a Gyro might need to be set to manual speed and latitude
(v) Describe maintenance and logical fault finding

11.14.2. Environment Sensors - MRU/VRU
(i) Describe the principle of a VRS/VRU
(ii) Describe why a DP system needs a MRU/VRS input
(iii) Describe failure modes
(iv) Describe maintenance logical fault finding and calibration required

(v) Describe that some MRU/VRS have internal batteries

11.14.3. Environment Sensors - Wind Sensor

(i) Describe principle of propeller and ultrasonic wind sensors.
(ii) Describe wind feed forward
(iii) Describe the effect on DP from wind sensor outputting a too high speed and effect on Model
(iv) Describe the effect on DP from wind senor outputting a too low speed and effects on DP model.
(v) Describe advantages and disadvantages of sensor types
(vi) Describe maintenance and logical fault finding
(vii) Describe simple checks, flags,
(viii) Describe problem with the poor positioning of wind sensors.

Documentation

11.15. DP Manual

11.15.1. Describe every DP vessel must have DP Manual which outline DP Operations, Company DP policy, onboard documents, training and vessel hardware. Some Classifications require the DP Manual to be class approved.

11.16. FMEA

11.16.1. Describe what FMEA stand for
11.16.2. Describe why an FMEA is required and the legislation associated with FMEA
11.16.3. Describe what is contain in the two main section of an FMEA
11.16.4. Describe the content of the vessel study
11.16.5. Describe the process of developing an FMEA and the international guidelines that are recommended
11.16.6. (vi)Describe the overall contents of the proving trials section
11.16.7. Describe the meaning of A, B and C findings
11.16.8. Describe the requirement for FMEA to be Class approved
11.16.9. Describe what WCFDI worst case failure is and why is it important
11.16.10. Describe how to conduct FMEA trials safely
11.16.11. Describe why a copy of the FMEA must be in the engine room and control room
11.16.12. Study of an actual Vessel FMEA to illustrate the process of redundant system review
11.16.13. Describe action to take if errors are found in FMEA
11.16.14. Describe the use of FMEA functional description and block diagrams for fault finding and tracing of faults.

11.17. DP Annual Trials

11.17.1. Describe annual trials are made up of 25% of the test on the FMEA
11.17.2. Describe CPP and thruster wire breaks need to be tested every year
11.17.3. Describe that the redundancy group are to be tested each year

11.18. Capability Plots

11.18.1. Describe what a capability plot is
11.18.2. Describe what is meant by WCF and WCFDI
11.18.3. Describe the difference between a capability plot and a foot print plot
11.18.4. Describe why a foot print plot cannot be used to check a capability plots
11.18.5. Describe the errors that can occur within Capability plots
11.18.6. Describe how to use max thruster limit of 45% utilisation to safe guard against error in Capability plots
11.18.7. Describe online capability plot
11.18.8. Describe why reducing the number of generator and power available will affect the Capability plot

11.19. Management of Change Procedures

11.19.1. Describe what is meant by Management of change
11.19.2. Describe why Management of change is important
11.19.3. Describe what management of change is required for changes of Hardware, software, FMEA

11.20. System and Equipment Manuals
11.20.1. Discuss the importance of having a full set operating and maintenance manuals for all DP related systems.
11.20.2. Discuss the importance of having a full set of up to date "as built" technical drawings for the vessel.
11.20.3. Discuss the use and development of bridge and engine room DP checklists.

11.21. Hazards
11.21.1. Describe the importance of not carrying out unauthorised maintenance during any DP operation and permit to work.
11.21.2. Describe Managing risk during reinstatement of equipment

11.22. Incident Reporting - IMCA and MTS schemes
11.22.1. Discuss incident reporting forms for IMCA and MTS.
11.22.2. Discuss recent and relevant incident reports.

11.23. Planned Maintenance System
11.23.1. Discuss the importance of an effective planned preventative maintenance system for all machinery and equipment related to DP.
11.23.2. Discuss the importance of maintaining good record keeping and equipment histories.
11.23.3. Discuss the importance of record keeping of service reports and technical bulletins relating to the DP equipment.
11.23.4. Describe the process and responsibilities of planning maintenance activities which may affect DP operations.
11.23.5. Discuss the requirements to carry critical spares for all DP equipment

11.24. IMO Documents
11.24.1. Describe IMO 645
11.24.2. Describe IMO 738 and links to IMCA 117

11.25. Use of IMO 645 by Class, IMCA and MTS
11.25.1. Discuss Class use of IMO 645 and IMCA/MTS documents to formulate Class rules.

11.26. MTS Documents available and what they contain
11.26.1. MTS Design Philosophy
Offshore Tech. Guidance DP- classed vessels with closed bus-tie(s)
DP Vessel Design Philosophy Guidance Part 1
DP Vessel Design Philosophy Guidance Part 2
11.26.2. (ii) MTS DP Operation Guidance
DP_Guidance_Part2_Appendix3_Logistics_July 2012
DP_Guidelines on Testing of DP Systems
DP_Tech_Committee_DP Operations Guidance_part1
11.26.3. MTS tech ops
Techop Annual DP Trials and Gap Analysis_Dec. 2013
Techop FMEA Gap Analysis_Sept. 2012
Techop FMEA Testing_Sept. 2012
All other tech ops

11.27. CA Documents available and what they contain
11.27.1. IMCA M103-The design & Operation of DP vessels-rev.2_April 2016
11.27.2. IMCA M117-Guidelines for the training & experienced of key DP personnel _September 2016
11.27.3. IMCA M125-Safety Interface Document for a DP vessel working near an Offshore Platform

11.27.4. IMCA M140-Specification for DP Capability Plot-Rev.1-June 2000
11.27.5. IMCA M151-Basic principles & use of Hydro acoustic PRS system in the Offshore Environment _April 1999
11.27.6. IMCA M163-Guidelines for Quality Assurance & quality control of software _September 2016
11.27.7. IMCA M166-Guidance on Failure Modes and Effects Analysis (FMEA)-rev.1_April 2016
11.27.8. IMCA M182-MSF International Guidelines for the Safe Operation of DP OSV-Rev.2-April 2015
11.27.9. IMCA M190-Guidance for Developing and Conducting Annual DP Trails Program for DP vessels-June 2011
11.27.10. IMCA M191-Guidelines for Annual DP trials for DP mobile offshore drilling unit's _February 2008
11.27.11. IMCA M196-The Design Selection Ins. and Use of Uninterruptible power supp. onboard vess-rev.1_Sep. 2016
11.27.12. IMCA M206-A guide to DP electrical power and control systems-rev.1_September 2016
11.27.13. IMCA M220-Guidance on Operational Activity Planning _November 2012
11.27.14. IMCAM109-DP Related Documentation for DP vessels-rev.2_June 2016
11.27.15. IMCA 04- 04 Methods of Establishing the Safety and Reliability of Dynamic Positioning Systems

11.28. Manning and Training
11.28.1. Describe engine room manning and watch-keeping principals for DP operations
11.28.2. Describe requirements for good communication between bridge and engine room at all times
11.28.3. Describe the use of checklists and need to promptly report to Bridge of any changes in operational status
11.28.4. Describe the need to keep the Chief Engineer updated with any operational problems
11.28.5. Describe the operation of the status alert system
11.28.6. Describe the requirement for comprehensive engine room standing orders
11.28.7. Describe the requirement for a comprehensive handover during change of watch-keepers
11.28.8. Describe the Planning of on-board drills, real and desktop
11.28.9. Describe the use of "Mobilisation" and "start of project" DP trials to ensure system operational readiness
11.28.10. Describe the development of standard engine room DP procedures for vessel
11.28.11. Describe the need for performing DP drills and their different types

DP Operation and effects on DP system

11.29 ASOG – Principle, layout and use of Activity Specific Operational Guidelines
11.29.1. Describe IMCA 220 and MTS Tech Ops documents outline ASOG in detail
11.29.2. Describe ASOG list how the vessel equipment is setup for the current industry mission
11.29.3. Describe ASOG should match the FMEA
11.29.4. Describe ASOG will state what action to take after a failure
11.29.5. Describe ASOG needs to be approved Charterer, shore management and vessel
11.29.6. Describe how the ASOG will be use as a decision making tool after a failure
11.29.7. Describe the use of an ASOG as a decision making tool for action to take after a failure
11.29.8. Describe the ASOG is used for the safe setup of DP vessel
11.29.9. Describe the ASOG is the bridging document between the vessel and charterer and layout how the DPO must have their vessel setup and operational limits
11.29.10. Describe the alignment of alert light system and ASOG
11.29.11. Describe how the ASOG/CAM is use to reduce risk
11.29.12. Describe the origin and development of the ASOG, CAMO and TAM documents
11.29.13. Describe the CAMO must match class approved FMEA
11.29.14. Describe the use of 'status light' system on DP vessels
11.29.15. Describe the ASOG/CAMO is a standalone document
11.29.16. Describe the ASOG/CAMO is a bridge document between vessel documentation and charterer working limits and equipment setup requirements

11.29.17. Describe ASOG/CAMO needs to be approved by Charterer
11.29.18. Describe ASOG/CAMO list actions required after a failure

11.30 CAMO – Principle and layout of Critical Activity Mode of operation
11.30.1. Describe IMCA 220 and MTS Tech Ops documents outline CAMO in detail
11.30.2. Describe that CAMO mode set is setup as redundancy mode of operation
11.30.3. Describe how the CAMO must match the vessel FMEA

11.31 TAM – Principle and layout of Task Appropriate Mode
11.31.1. Describe IMCA 220 and MTS Tech Ops documents outline TAM in detail
11.31.2. Describe that TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position
11.31.3. Describe TAM can be used to reduce fuel when the loss of position would not affect safety of vessel

11.32. TAGOS – Principle and layout of Thruster and Generator Operating Strategy
11.32.1. Describe how the TAGOS can be used to list what combination of generators can be online, setting of all tie breakers and maximum percentage of load used
11.32.2. Describe the TAGOS arrangements

11.33 Limitations of different type of DP operations
11.33.1. Describe the mode of operation will depend on the modes supplied with DP system
11.33.2. Describe the reason DP vessel cannot be used for anchor handling with tension meter is feed into DP and the problem if tension meter fails

11.34 SIMOPS
11.34.1. Describe Limitations and extra redundancy required when vessel is in Close proximity and drift on
11.34.2. Describe that extra redundancy and generators may be requested by DPO in a high-risk drift on
11.34.3. Describe at times the main watch-keeping engineer might need to stay in the control room
11.34.4. Describe how vessel can be affected by thruster wash from other vessels
11.34.5. Describe how working in close proximity to other vessels might limit the options for manoeuvring the vessel in event of a failure

11.35 Operating in open water
11.35.1. Describe how in open water the vessel might be drift on to a subsea asset.
11.35.2. Describe which position reference system will not work

11.36 Possible effects of subsea operation on DP vessels.
11.36.1. Underwater current on drilling risers, Lars, tether and ROV leading force on DP
11.36.2. Launch and recovery high risk operation
11.36.3. Danger of tether becoming entangled in thrusters

11.37 Possible effects of remote access
11.37.1. Describe using Remote diagnostics and the danger of use during DP

Lessons Learned

11.38 Common causes of DP incidents (past incident case studies)
11.38.1. Review IMCA DP incident flowcharts
11.38.2. Review of various published Incident report. (IMCA, MTS, Coastguard)

11.39 Information required when reporting system problems
Remote diagnostics – what information is required, where to find and how to communicate.

11.39.1. Describe common methods of copying system log files from operator station computer for fault analysis by equipment maker.
11.39.2. Describe the use of screen shots and photos of the equipment to aid fault finding. Also copies of the alarm printouts of both DP and machinery alarms when fault occurred.
11.39.3. Discuss the importance of maintaining records of correspondence of any fault with the equipment maker's service department and including in all relevant company technical and operations departments.
11.39.4. Discuss the trend in remote access via satellite link of some equipment makers. Highlight the security risks of this type of arrangement.

12. Appendix 2 to DP Knowledge for Technical Staff - Type Specific Hardware/Ship Specific Training

Minimum Entry Qualification Requirements

Participants should be an Engineer Officer / ETO / DPO or shore based Technical Staff.

Type Specific hardware / Ship specific training – Recommend Course outline

The NI recommends Type Specific training should be at two levels:

12.1. Able to carry out repairs with the support of phone support by manufactures
12.2. Full technician, allowed to complete repairs without the need of Manufacturer's support.

The NI recommends Type Specific DP Hardware Training content to be setup by the equipment manufacturer. The following should be used as a guide for setting up Type Specific training:

12.3. Overview of DP hardware layout (DP console, DP computer, DP controller, remote joystick panel, UPS, sensors, PRS, printer... etc.)
12.4. Identify every element of DP hardware (equipment, component and sub-component), installation location and specific PRS blind spots or shadow
12.5. Understand basic function of each DP hardware and component
12.6. Arrangement for the types of thrusters and rudder system on board, interface type and their possible failures on electrical, control, mechanical and hydraulic and how different failures can result in drive-off or drift-off
12.7. Arrangements for shaft generator, aux generator and switchboard arrangement on board for DP operation
12.8. Identify and understand manufacturer instruction manual for hardware and component
12.9. Interpret and proper use of cable layout, cable details, IO specification, and identify types of power input and power redundancy
12.10. Identify types of interface in use for sensors, PRS, thrusters, switchboard etc. (serial, NMEA, digital, Analog and Ethernet)
12.11. Alarms, shut-downs and interlock arrangements
12.12. Identify worst case failure and understand failure effect and corrective measures
12.13. Use of proper tools, safe and non-intrusive troubleshooting on failure of equipment, component and interface, and when you should not go further
12.14. Fault identification
12.15. Reporting of failure and troubleshooting result or finding
12.16. Maintenance measures - Preventive, Predictive, periodic and Corrective
12.17. Basic spare parts inventory, inspection, storage and maintenance
12.18. Use of spare parts and components
12.19. Start up, shut down and rebooting computer and system
12.20. Communication arrangements for technical support – remote diagnostics/email address
12.21. Engineer's role in annual survey – to know all information of vessel prior to survey

Course Assessment

A Type Specific Course shall have an assessment at the end of the type specific training to ensure the training is fully understood. The type of assessment shall be determined by the manufacturer.

Simulator Equipment Required

To run Type Specific equipment the equipment manufacturer shall specify the equipment required for training – which could be a simulator or equipment on board the actual Ship on which the Engineers will be working.

Instructor Qualifications for Type Specific Course

The instructor shall be trained by the equipment manufacturer to a “manufacturer service technician level” OR to the satisfaction of the equipment manufacturer.

When appropriate shipboard instruction from manufacturers/suppliers can be replaced by instruction from experienced ship’s personnel, that is, for example, personnel who are certified by their company [and the manufacturer] to conduct such training on the relevant equipment[3].

Course Notes & Resources

Type Specific Course reference material to be supplied as recommended by manufacturer.

[3] Extract from IMCA M117

13. Appendix 3 to DP Knowledge for Technical Staff - Supplementary Technical Content Options

In addition to the content specified in Annex 1, centres may wish to include elements of refresher or additional training. This section provides a source of reference for additional content and may be presented as additional notes, pre-course reading or other solution that meets the particular need of the learner.

13.1. Fuel Systems

- 13.1.1. Describe the importance of using fuel purifiers at all times
- 13.1.2. Describe how contaminated fuel can affect redundancy
- 13.1.3. Describe how the cross connection of a fuel system will defeat redundancy
- 13.1.4. Describe the need to drain fuel day tanks
- 13.1.5. Describe the effects of inadvertent operation of fuel tank Quick Closing Valves.
- 13.1.6. Describe alarm and monitoring of fuel systems

13.2. Cooling systems, Fresh and Sea Water

- 13.2.1. Describe cooling pipework separation required for redundancy
- 13.2.2. Describe the effect of a hose failure in a cooling system
- 13.2.3. Describe maintenance on non-redundant cooling systems for Class 1 and 2 vessels.
- 13.2.4. Describe the requirement to keep plate coolers clean and the effects of overheating leading to a reduction of power available and effect on redundancy.
- 13.2.5. Describe the use of two sea suction valves in a system
- 13.2.6. Describe the effect of weed and jelly fish blocking sea suctions
- 13.2.7. Describe the effect of ballast pump if connected to the same sea water system suction as the cooling system
- 13.2.8. Describe the use of antifouling system requirements in sea water systems
- 13.2.9. Describe alarm and monitoring of cooling systems

13.3. Compressed Air System

- 13.3.1. Describe alarm and monitoring of compressed air systems

13.4. Ventilation system

- 13.4.1. Describe layout of a redundant ventilation system
- 13.4.2. Describe the possible effects of inadvertent closure of ventilation dampers during DP operation
- 13.4.3. Describe possible effects of gas detection and fire detection equipment could have on ventilation systems

13.5. HVAC

- 13.5.1. Describe issues which could arise from the operation of fire protection systems

13.6. Lubrication system

- 13.6.1. Describe the important of a pre lubrication system on a standby generator engine to allow quick start up
- 13.6.2. Describe the consequence of loss of lubrication system for thrusters, CPPs and gearboxes
- 13.6.3. Describe planned maintenance requirements for lubrication systems
- 13.6.4. Describe the use of lubrication oil purifiers on engine systems and problems which can arise from system failure or operating errors
- 13.6.5. Describe the importance of Oil sampling and testing as part of the maintenance routines
- 13.6.6. Describe alarm and monitoring of lubrication systems

GENERATORS AND MAIN ENGINES

13.7. Main generators

13.7.1. Describe the typical plant layout for a diesel electric DP vessel, compare the layout to a conventional vessel with twin CPP propellers. Discuss the advantages and disadvantages of both systems

13.7.2. Describe Engine shutdown and protection systems

13.8. Main Switchboard

13.8.1. Discuss the generated voltage options and limitations with regard to main switchboard short circuit design

13.8.2. Describe interlocks on main switchboards

13.8.3. Describe switchboard protection systems

13.8.4. Describe problem with main switchboard, under and over voltage, under and over cycles, short circuits

13.8.5. Describe why you would have thermal imaging conducted on switchboard on DP vessels

13.8.6. Describe cooling systems options for main switchboards

13.8.7. Describe the function of automatic change-over systems

13.8.8. Discuss the problems with connecting mission equipment to a redundant main switchboard

13.8.9. Discuss DC main switchboard concepts

13.8.10. Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip

13.8.11. Discuss monitoring equipment on main switchboard

13.9. Generators

13.9.1. Describe generator protection systems

13.9.2. Describe Spinning reserve and power available

13.9.3. Describe the use of standby generators and at what load should generator auto start

13.9.4. Describe the reason to disable auto stop on low load when on DP

13.9.5. Describe how the use of more than 45% utilization can affect redundancy

13.9.6. Describe how the electrical power available will affect thruster output

13.9.7. Describe how the electrical power available will affect the vessel capability plot

13.9.8. Describe load shedding

13.9.9. Be able to discuss a one line electrical drawing

13.9.10. Describe how generator monitoring systems are different to power management systems

13.9.11. Describe AVR control principal and result of AVR failure

13.9.12. Describe Governor Control and failure

BUS-TIE REQUIREMENTS

13.10. IMO, Class and FMEA requirements

13.10.1. Describe examples of how the main bus-tie breaker and all other breaker must be setup as per FMEA

13.10.2. Describe breaker selective study, fault ride through and that the main bus tie is to open before the generator breakers

13.10.3. Discuss new requirements for testing of bus tie breakers on high voltage systems

ELECTRICAL SYSTEMS AND CABLING COMMUNICATIONS

13.11. UPS

13.11.1. Describe how a UPS can be 220 v AC or 24 volts DC

13.12. Cable routing

13.12.1. Describe the need to keep cables away from heat, exhaust flow

13.12.2. Describe the physical cable routing for Class 2 and 3 vessels as per IMO 645 and Classification Society requirements

13.12.3. Describe the importance of separation between power cables and control and data cables.

13.12.4. Discuss use of separate cable trays and physical routing to maintain redundancy

13.12.5. Describe the use and grounding arrangements for screened signal cables

13.12.6. Describe the problem of replacing cable with the wrong type, not twist pairs
13.12.7. Describe the problem of network cable near radio transmitters
13.12.8. Discuss the use of fibre optic cable and its advantages over conventional types

13.13. Analogue interface

13.13.1. Describe the use of + and - 10v DC and the disadvantages for control and feedback of thruster in older vessels
13.13.2. Describe other analogue input used, UPS voltage

POWER MANAGEMENT SYSTEM CUSTOM SYSTEMS AND IMO DP EQUIPMENT CLASS 2/3 REQUIREMENTS

General system functions

13.13.3. Describe what a load balance study is
13.13.4. Describe what the term "designed to test" means
13.13.5. Describe auto blackout recovery
13.13.6. Describe load dependant start and the fact that the vessel could be passed the WCF load before extra generator start
13.13.7. Discuss why there may be different parameters in the PMS for DP operation and Sea Mode
13.13.8. Discuss system failures that can affect the operation of the PMS and backup operating modes that are available
13.13.9. Discuss advanced generator supervisory systems and their independent operation from the PMS

13.14. Extra redundancy required for working "drift on".

13.14.1. Describe allow more spinning reserve when working drift on

THE THRUSTER SYSTEM

All components and systems necessary to supply the DP system with thrust force and direction. The thruster system includes:

13.15. Thruster Drive and Auxiliary Systems

13.15.1. Azimuth thrusters, Tunnel thrusters, Propellers and other systems

(i) Describe standard fixed pitch propeller advantages and disadvantages
(ii) Describe standard CPP advantages and disadvantages
(iii) Describe tunnel thruster advantages and disadvantages
(iv) Describe Drop down and fixed in position azimuth thruster
(v) Describe Fixed pitch thrusters advantages and disadvantages
(vi) Describe CPP Az thruster advantages and disadvantages
(vii) Describe flap / becker rudders and advantages and disadvantages
(viii) Describe fishtail rudders and their advantages and disadvantages
(ix) Describe propeller nozzles advantages and disadvantages
(x) Describe Variable frequency drives and advantages and disadvantages
(xi) Describe Direct drive and advantages and disadvantages
(xii) Describe constant speed RPM motors for CPP thrusters and advantages and disadvantages
(xiii) Describe Az thruster biasing and when biasing is used

13.15.2. Thruster Control Concepts

(i) Describe the thruster ready signal and what parameters are required for it to be present.
(ii) Describe auto start-up of thrusters and auto selection into the DP system if a full blackout auto recovery system is programmed into the power management system
(iii) Describe command and feedback signals (mA and V)
(iv) Describe emergency stop on thruster
(v) Describe wire break monitoring
(vi) Describe remote I/O concepts used in thruster control network or canbus systems.
(vii) Describe backup redundancy on control systems
(viii) Describe typical alarms on thruster controls and DP systems
(ix) Describe testing of thruster signals for DP trials

13.15.3. Thruster redundancy

(i) Describe typical thruster main power supply systems for redundancy

(ii) Describe typical backup hydraulic pumps, steering motors, cooling pumps, filters, cooling systems and fans fitted to rudder and thruster systems

13.15.4. Thruster failure modes

(i) Describe what would indicate the following on a DP system – Fail as set, fail to zero, fail to full, loss of ready signal

(ii) Describe at hydraulic problem with CPP thrusters

(iii) Describe a thruster could always have a mechanical problem

CONTROL SYSTEMS AND SENSORS

All control components and systems, hardware and software necessary to dynamically position the vessel. The DP control system information may be supplemented by specific content related to recent incidents.

DOCUMENTATION AND PROCEDURES

13.16. Describe how to conduct a Partial blackout drill

13.17. Describe how to conduct Outline a full blackout drill

13.18. Describe how to conduct Outline a drill for a broken fuel line

13.19. Describe how to conduct a drill for a broken cooling pipe

13.20. Describe how to conduct a fire drill when on DP