

Translation. Only the Danish version has legal validity

*Order no. 1165 of 3 November 2014
issued by the Danish Maritime Authority*

Order on course in tanker operations

In pursuance of section 18(1)(iv), section 24b and section 25(4) of the act on the manning of ships (*lov om skibes besætning*), cf. consolidated act no. 74 of 17 February 2014, and following consultation with the shipowner and seafarer organisations, the following provisions are laid down:

Part 1

Definitions, etc.

Section 1. This order stipulates the purpose, goals and contents, etc. of courses on:

- 1) basic tanker operations for oil and chemical tankers;
- 2) basic tanker operations for gas tankers;
- 3) the management of oil tanker operations;
- 4) the management of chemical tanker operations; and
- 5) the management of gas tanker operations.

Section 2. For the purposes of this order, the following definitions shall apply:

- 1) “The IMO” means the United Nations’ International Maritime Organization.
- 2) “The STCW Convention” means the International Convention on Standard of Training, Certification and Watchkeeping for Seafarers, as it may be amended.
- 3) “The STCW Code” means the Seafarers’ Training, Certification and Watchkeeping (STCW) Code, as it may be amended.
- 4) “Oil tanker” means a ship designed and used for the carriage of crude oil and oil products in bulk.
- 5) “Chemical tanker” means a ship designed or altered and used for the carriage in bulk of one of the products listed in chapter 17 of the “International Bulk Chemical Code” (IBC Code).
- 6) “Gas tanker” means a ship designed or arranged and used for the carriage in bulk of liquefied gas or another product listed in chapter 19 of the “International Gas Carrier Code” (IGC Code).
- 7) “Level of qualification” means educational competence as well as documented theoretical, expert and professional competence.

Part 2

Purpose of the courses

Section 3. The purpose of the courses in tanker operations is to qualify the course participant to perform his tanker-related tasks in an appropriate manner in terms of health, safety and the environment.

Part 3

Goals and contents of the courses Course in basic oil and chemical tanker operations

Section 4. The goal of the course is for the course participant to acquire the knowledge, skills and qualifications related to oil and chemical tankers necessary to meet the training requirements in accordance with annex 1.

Course in basic gas tanker operations

Section 5. The goal of the course is for the course participant to acquire the knowledge, skills and qualifications related to gas tankers necessary to meet the training requirements in accordance with annex 2.

Course in the management of oil tanker operations

Section 6. The goal of the course is for the course participant to acquire the knowledge, skills and qualifications related to oil tankers necessary to meet the training requirements in accordance with annex 3.

Course in the management of chemical tanker operations

Section 7. The goal of the course is for the course participant to acquire the knowledge, skills and qualifications related to chemical tankers necessary to meet the training requirements in accordance with annex 4.

Course in the management of gas tanker operations

Section 8. The goal of the course is for the course participant to acquire the knowledge, skills and qualifications related to gas tankers necessary to meet the training requirements in accordance with annex 5.

Part 4

Qualifications

Section 9. In order to participate in the course on basic oil, chemical and gas tanker operations, the course participant shall meet the general provisions in accordance with the current order on the qualification requirements of seafarers and fishermen and on certificates of competency and proficiency needed to form part of the deck, machinery or general purpose crew on board a Danish ship.

Section 10. In order to participate in the course on the management of, respectively, oil, chemical and gas tanker operations, the course participant shall:

- 1) at least hold a valid Danish certificate of competency as a mate, 4th class, or a certificate of competency as a watchkeeping engineer officer;
- 2) have completed a course in basic oil, chemical and gas tanker operations;
- 3) hold a tanker certificate for completed approved introductory course; or
- 4) meet the provisions of regulation V/1 of the STCW Convention on basic tanker operations.

Part 5

Providers of courses in tanker operations and requirements for instructor qualifications and on the duration of courses

Section 11. Providers of courses in tanker operations as described in this order shall have been approved in accordance with the provisions on training and courses stipulated in the act on the manning of ships (*lov om skibes besætning*).

Subsection 2. The Danish Maritime Authority may approve a course provider when the Authority assesses that the training or the course is carried out in accordance with the current order on the approval and quality assurance, etc. of maritime training programmes.

Subsection 3. Instructors in courses on basic oil and chemical tanker operations as well as instructors in course on basic gas tanker operations shall, all in all, have a level of qualification superior to the professional level of the course.

Subsection 4. Instructors in courses on the management of oil tanker operations, courses on the management of chemical tanker operations and courses on the management of gas tanker operations must, all in all, have a level of qualification superior to the professional level of the course, including practical experience with tanker operations at management level, and be

- 1) a senior lecturer at a maritime training institution and have acquired special theoretical and practical knowledge about tankers and tanker operations through training voyages, etc.; or
- 2) a ship's officer with at least two years' work experience as a senior officer on board tankers and have completed training as an instructor.

Subsection 5. Course providers shall determine the duration of courses so that they, as a minimum, cover the requirements of the STCW Convention and in consideration of the course participants' qualifications.¹

¹ Course providers can find additional guidance in the IMO model courses 1.01, 1.02, 1.04 and 1.06 on tanker operations.

Part 6

Course certificates, recording and evaluation

Section 12. Course providers shall issue and record course certificates for course participants who complete a course in basic tanker operations with a satisfactory result.

Subsection 2. Course providers shall record course certificates for course participants who complete a course in management of oil, chemical and gas tanker operations with a satisfactory result. Furthermore, course providers may issue course certificates for completed courses.

Subsection 3. Course providers shall inform the Danish Maritime Authority about any courses completed by using the Danish Maritime Authority's system for digital reporting of examination and course results.

Section 13. At the end of the course, it shall be evaluated for each individual course participant whether he meets the purposes and goals laid down for the course in accordance with the current order on the holding of examinations and tests as well as on the evaluation of participants at the maritime training programmes.

Subsection 2. The course participants shall be informed about the type of evaluation and about the criteria for passing at the start of the course at the latest.

Part 7

Equipment requirements

Section 14. In connection with the course in basic tanker operations, the relevant equipment for practical exercises and demonstration shall be used so that it is possible to evaluate the course participant in accordance with column 3 of annexes 1 and 2.

Subsection 2. In connection with courses in the management of tanker operations, the relevant international and national codes and regulations, ship drawings with pipe arrangements and material for calculating the cargo, a suitable tanker simulator² (Liquid Cargo Handling Simulator) and other relevant equipment shall be used so that it is possible to evaluate the course participant in accordance with column 3 of annexes 3, 4 and 5.

Part 8

Right of appeal, etc.

Section 15. The one whom a decision concerns shall be entitled to appeal a decision made by a course provider pursuant to the current order on the holding of examinations and tests as well as on the evaluation of the participants at the maritime training programmes to the Danish Maritime Authority no later than two weeks after the giving of the decision.

² The tanker simulator shall be capable of simulating loading operations in "real time" for a relevant loading arrangement in consideration of the stress on the ship and the ship's stability. The simulator shall be capable of being used for planning and performing a loading operation where the control of pump systems, valves, load quantities, inert gas systems and pressure/temperature is included.

Section 16. The Danish Maritime Authority may allow deviations from the order as part of pilot projects. At the same time, the duration and type of reporting of the pilot project shall be determined.

Subsection 2. The Danish Maritime Authority shall permit approved course providers and maritime training institutions to coordinate courses in basic oil and chemical tanker operations and courses in basic gas tanker operations into a joint course on basic tanker operations.

Part 9

Entry into force provisions

Section 17. The order shall enter into force on 6 November 2014.

Section 17. The order shall not apply to the Faroe Islands and to Greenland.

Danish Maritime Authority, 3 November 2014
Per Sønderstrup / Benny Matsumoto-Gade Hansen

Course in basic oil and chemical tanker operations

Table A-V/1-1-1: Specification of minimum standard of competence in basic training for oil and chemical tanker cargo operations

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe cargo operation of oil and chemical tankers	<p>Basic knowledge of tankers:</p> <ul style="list-style-type: none"> .1 types of oil and chemical tankers; .2 general arrangement and construction. <p>Basic knowledge of cargo operations:</p> <ul style="list-style-type: none"> .1 piping systems and valves; .2 cargo pumps; .3 loading and unloading; .4 tank cleaning, purging, gas-freeing and inerting. <p>Basic knowledge of the physical properties of oil and chemicals:</p> <ul style="list-style-type: none"> .1 pressure and temperature, including vapour pressure/temperature relationship; .2 types of electrostatic charge generation; .3 chemical symbols. <p>Knowledge and understanding of tanker safety culture and safety management.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Communications within the area of responsibility are clear and effective.</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations.</p>
Take precautions to prevent hazards	<p>Basic knowledge of the hazards associated with tanker operations, including:</p> <ul style="list-style-type: none"> .1 health hazards; .2 environmental hazards; .3 reactivity hazards; .4 corrosion hazards; .5 explosion and flammability hazards; .6 sources of ignition, including electrostatic hazards; .7 toxicity hazards; .8 vapour leaks and clouds. <p>Basic knowledge of hazard controls:</p> <ul style="list-style-type: none"> .1 inerting, water padding, drying agents and monitoring techniques; .2 anti-static measures; .3 ventilation; 	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures.</p> <p>Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>.4 segregation;</p> <p>.5 cargo inhibition;</p> <p>.6 importance of cargo compatibility;</p> <p>.7 atmospheric control;</p> <p>.8 gas testing.</p> <p>Understanding of information on a Material Safety Data Sheet (MSDS).</p>		
Apply occupational health and safety precautions and measures	<p>Function and proper use of gas-measuring instruments and similar equipment.</p> <p>Proper use of safety equipment and protective devices, including:</p> <p>.1 breathing apparatus and tank-evacuating equipment;</p> <p>.2 protective clothing and equipment;</p> <p>.3 resuscitators;</p> <p>.4 rescue and escape equipment.</p> <p>Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to oil and chemical tankers, including:</p> <p>.1 precautions to be taken when entering enclosed spaces;</p> <p>.2 precautions to be taken before and during repair and maintenance work;</p> <p>.3 safety measures for hot and cold work;</p> <p>.4 electrical safety;</p> <p>.5 ship/shore safety Checklist.</p> <p>Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS).</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>Procedures for entry into enclosed spaces are observed.</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times.</p> <p>Appropriate safety and protective equipment is correctly used.</p>
Carry out fire-fighting operations	<p>Tanker fire response organization and action to be taken.</p> <p>Fire hazards associated with cargo handling and transportation of hazardous and noxious liquids in bulk.</p> <p>Fire-fighting agents used to ex-</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practicable,</p>	<p>Initial actions and follow-up actions on becoming aware of fire on board conform with established practices and procedures.</p> <p>Action taken on identifying muster signal is appropriate to the indicated</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>tinguish oil and chemical fires.</p> <p>Fixed fire-fighting foam system operations.</p> <p>Portable fire-fighting foam operations.</p> <p>Fixed dry chemical system operations.</p> <p>Spill containment in relation to fire-fighting operations.</p>	<p>in darkness.</p>	<p>emergency and complies with established procedures.</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations.</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions.</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents.</p>
Respond to emergencies	<p>Basic knowledge of emergency procedures, including emergency shutdown.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans.</p>
Take precautions to prevent pollution of the environment from the release of oil or chemicals	<p>Basic knowledge of the effects of oil and chemical pollution on human and marine life.</p> <p>Basic knowledge of shipboard procedures to prevent pollution.</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <ol style="list-style-type: none"> .1 report relevant information to the responsible authorities and persons; .2 assist in implementing shipboard spill-containment procedures. 	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Procedures designed to safeguard the environment are observed at all times.</p>

Course in basic gas tanker operations

Table A-V/1-2-1: Specification of minimum standard of competence in basic training for liquefied gas tanker cargo operations

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of a liquefied gas tanker	<p>Design and operational characteristics of liquefied gas tankers</p> <p>Basic knowledge of liquefied gas tankers</p> <ol style="list-style-type: none"> .1 types of liquefied gas tankers; .2 general arrangement and construction. <p>Basic knowledge of cargo operations:</p> <ol style="list-style-type: none"> .1 piping systems and valves; .2 cargo handling equipment; .3 loading, unloading and care in transit; .4 emergency shutdown (ESD) system; .5 tank cleaning, purging, gas-freeing and inerting. <p>Basic knowledge of the physical properties of liquefied gases, including:</p> <ol style="list-style-type: none"> .1 properties and characteristics; .2 pressure and temperature, including vapour pressure/temperature relationship; .3 types of electrostatic charge generation; .4 chemical symbols. <p>Knowledge and understanding of tanker safety culture and safety management.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Communications within the area of responsibility are clear and effective.</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations.</p>
Take precautions to prevent hazards	<p>Basic knowledge of the hazards associated with tanker operations, including:</p> <ol style="list-style-type: none"> .1 health hazards; .2 environmental hazards; .3 reactivity hazards; .4 corrosion hazards; .5 explosion and flammability hazards; .6 sources of ignition; .7 electrostatic hazards; .8 toxicity hazards; .9 vapour leaks and clouds; 	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures.</p> <p>Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>.10 extremely low temperatures;</p> <p>.11 pressure hazards.</p> <p>Basic knowledge of hazard controls:</p> <p>.1 inerting, drying and monitoring techniques;</p> <p>.2 anti-static measures;</p> <p>.3 ventilation;</p> <p>.4 segregation;</p> <p>.5 cargo inhibition;</p> <p>.6 importance of cargo compatibility;</p> <p>.7 atmospheric control;</p> <p>.8 gas testing.</p> <p>Understanding of information on a Material Safety Data Sheet (MSDS).</p>		practice.
Apply occupational health and safety precautions and measures	<p>Function and proper use of gas-measuring instruments and similar equipment.</p> <p>Proper use of safety equipment and protective devices, including:</p> <p>.1 breathing apparatus and tank evacuating equipment;</p> <p>.2 protective clothing and equipment;</p> <p>.3 resuscitators;</p> <p>.4 rescue and escape equipment.</p> <p>Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to liquefied gas tankers, including:</p> <p>.1 precautions to be taken when entering enclosed spaces;</p> <p>.2 precautions to be taken before and during repair and maintenance work;</p> <p>.3 safety measures for hot and cold work;</p> <p>.4 electrical safety;</p> <p>.5 ship/shore safety checklist.</p> <p>Basic knowledge of first aid with reference to a Material</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>Procedures for entry into enclosed spaces are observed.</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times.</p> <p>Appropriate safety and protective equipment is correctly used.</p> <p>First aid do's and don'ts.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	Safety Data Sheet (MSDS).		
Carry out fire-fighting operations	<p>Tanker fire organization and action to be taken.</p> <p>Special hazards associated with cargo handling and transportation of liquefied gases in bulk.</p> <p>Fire-fighting agents used to extinguish gas fires.</p> <p>Fixed fire-fighting foam system operations.</p> <p>Portable fire-fighting foam operations.</p> <p>Fixed dry chemical system operations.</p> <p>Basic knowledge of spill containment in relation to fire-fighting operations.</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g. simulated shipboard conditions) and, whenever possible and practicable, in darkness.</p>	<p>Initial actions and follow-up actions on becoming aware of an emergency conform with established practices and procedures.</p> <p>Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures.</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations.</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions.</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents.</p>
Respond to emergencies	<p>Basic knowledge of emergency procedures, including emergency shutdown.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans.</p>
Take precautions to prevent pollution of the environment from the release of liquefied gases	<p>Basic knowledge of the effects of pollution on human and marine life.</p> <p>Basic knowledge of shipboard procedures to prevent pollution.</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <ol style="list-style-type: none"> .1 report relevant information 	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; 	<p>Procedures designed to safeguard the environment are observed at all times.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>to the responsible authorities and persons;</p> <p>.2 assist in implementing shipboard spill-containment procedures;</p> <p>.3 prevent brittle fracture.</p>	.4 approved training programme.	

Course in management of oil tanker operations

Table A-V/1-1-2: Specification of minimum standard of competence in advanced training for oil tanker cargo operations

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p>Design and characteristics of an oil tanker</p> <p>Knowledge of oil tanker design, systems and equipment, including:</p> <ol style="list-style-type: none"> .1 general arrangement and construction; .2 pumping arrangement and equipment; .3 tank arrangement, pipeline system and tank venting arrangement; .4 gauging systems and alarms; .5 cargo heating systems; .6 tank cleaning, gas-freeing and inerting systems; .7 ballast system; .8 cargo area venting and accommodation ventilation; .9 slop arrangements; .10 vapour recovery systems; .11 cargo-related electrical and electronic control system; .12 environmental protection equipment, including Oil Discharge Monitoring Equipment (ODME); .13 tank coating; .14 tank temperature and pressure control systems; .15 fire-fighting systems. <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation.</p> <p>Proficiency in tanker safety culture and implementation of safety-management system.</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown.</p> <p>Loading, unloading, care and handling of cargo</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Communications are clear, understood and successful.</p> <p>Cargo operations are carried out in a safe manner, taking into account oil tanker designs, systems and equipment.</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment.</p> <p>Potential non-compliance with cargo-operation-related procedures is promptly identified and rectified.</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times.</p> <p>Actions taken and procedures followed are correctly applied and the appropriate shipboard cargo-related equipment is properly used.</p> <p>Calibration and use of monitoring and gas-detection equipment comply with operational practices and procedures.</p> <p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with estab-</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>Ability to perform cargo measurements and calculations.</p> <p>Knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity.</p> <p>Knowledge and understanding of oil cargo-related operations, including:</p> <ol style="list-style-type: none"> .1 loading and unloading plans; .2 ballasting and deballasting; .3 tank cleaning operations; .4 inerting; .5 gas-freeing; .6 ship-to-ship transfers; .7 load on top; .8 crude oil washing. <p>Development and application of cargo-related operation plans, procedures and checklists.</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment.</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities.</p>		<p>lished emergency procedures.</p> <p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices.</p>
Familiarity with physical and chemical properties of oil cargoes	<p>Knowledge and understanding of the physical and chemical properties of oil cargoes.</p> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS).</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Effective use is made of information resources for identification of properties and characteristics of oil cargoes and related gases, and their impact on safety, the environment and vessel operation.</p>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with oil tanker cargo operations, including:</p> <ol style="list-style-type: none"> .1 toxicity; .2 flammability and explosion; .3 health hazards; 	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; 	<p>Relevant cargo-related hazards to the vessel and to personnel associated with oil tanker cargo operations are correctly identified, and proper control measures are taken.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	.4 inert gas composition; .5 electrostatic hazards Knowledge and understanding of dangers of non-compliance with relevant rules/regulations.	.3 approved simulator training; .4 approved training programme.	
Apply occupational health and safety precautions	Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to oil tankers: .1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus; .2 precautions to be taken before and during repair and maintenance work; .3 precautions for hot and cold work; .4 precautions for electrical safety; .5 use of appropriate Personal Protective Equipment (PPE).	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme.	Procedures designed to safeguard personnel and the ship are observed at all times. Safe working practices are observed and appropriate safety and protective equipment is correctly used. Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns. Correct use of breathing apparatus. Procedures for entry into enclosed spaces are observed.
Respond to emergencies	Knowledge and understanding of oil tanker emergency procedures, including: .1 ship emergency response plans; .2 cargo operations emergency shutdown; .3 actions to be taken in the event of failure of systems or services essential to cargo; .4 fire-fighting on oil tankers; .5 enclosed space rescue; .6 use of a Material Safety Data Sheet (MSDS). Actions to be taken following collision, grounding, or spillage. Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experi-	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme.	The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans. The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem. Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly.

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>ence;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p> <p>Knowledge of medical first aid procedures on board oil tankers.</p>		The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines.
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the atmosphere and the environment.	Examination and assessment of evidence obtained from one or more of the following: <ul style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment.
Monitor and control compliance with legislative requirements	Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended, and other relevant IMO instruments, industry guidelines and port regulations as commonly applied.	Examination and assessment of evidence obtained from one or more of the following: <ul style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice.

Course in management of chemical tanker operations

Table A-V/1-1-3: Specification of minimum standard of competence in advanced training for chemical tanker cargo operations

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p>Design and characteristics of a chemical tanker</p> <p>Knowledge of chemical tanker designs, systems, and equipment, including:</p> <ol style="list-style-type: none"> .1 general arrangement and construction; .2 pumping arrangement and equipment; .3 tank construction and arrangement; .4 pipeline and drainage systems; .5 tank and cargo pipeline pressure and temperature control systems and alarms; .6 gauging control systems and alarms; .7 gas-detecting systems; .8 cargo heating and cooling systems; .9 tank cleaning systems; .10 cargo tank environmental control systems; .11 ballast systems; .12 cargo area venting and accommodation ventilation; .13 vapour return/recovery systems; .14 fire-fighting systems; .15 tank, pipeline and fittings' material and coatings; .16 slop management. <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation.</p> <p>Proficiency in tanker safety culture and implementation of safety management system.</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown system.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Communications are clear, understood and successful.</p> <p>Cargo operations are carried out in a safe manner, taking into account chemical tanker designs, systems and equipment.</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment.</p> <p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures.</p> <p>Loading, unloading, care and handling of cargo</p> <p>Ability to perform cargo measurements and calculations.</p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity.</p> <p>Knowledge and understanding of chemical cargo-related operations, including:</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times.</p> <p>Potential non-compliance with cargo-related proce-</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures.</p> <p>Loading, unloading, care and handling of cargo Ability to perform cargo measurements and calculations.</p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity.</p> <p>Knowledge and understanding of chemical cargo-related operations, including:</p> <ol style="list-style-type: none"> .1 loading and unloading plans; .2 ballasting and deballasting; .3 tank cleaning operations; .4 tank atmosphere control; .5 inerting; .6 gas-freeing; .7 ship-to-ship transfers; .8 inhibition and stabilization requirements; .9 heating and cooling requirements and consequences to adjacent cargoes; .10 cargo compatibility and segregation; .11 high-viscosity cargoes; .12 cargo residue operations; .13 operational tank entry. <p>Development and application of cargo-related operation plans, procedures and checklists.</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment.</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities.</p>		<p>dures is promptly identified and rectified.</p> <p>Actions taken and procedures followed are correctly identified and appropriate shipboard cargo-related equipment is properly used.</p> <p>Calibration and use of monitoring and gas-detection equipment are consistent with safe operational practices and procedures.</p> <p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices.</p>
Familiarity with physical and chemical properties of chemical cargoes	Knowledge and understanding of the chemical and the physical properties of noxious liquid substances, including:	Examination and assessment of evidence obtained from one or more of the follow-	Effective use is made of information resources for identification of properties and characteristics of

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>.1 chemical cargoes categories (corrosive, toxic, flammable, explosive);</p> <p>.2 chemical groups and industrial usage;</p> <p>.3 reactivity of cargoes.</p> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS).</p>	<p>ing:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>noxious liquid substances and related gases, and their impact on safety, environmental protection and vessel operation.</p>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with chemical tanker cargo operations, including:</p> <p>.1 flammability and explosion;</p> <p>.2 toxicity;</p> <p>.3 health hazards;</p> <p>.4 inert gas composition;</p> <p>.5 electrostatic hazards;</p> <p>.6 reactivity;</p> <p>.7 corrosivity;</p> <p>.8 low-boiling-point cargoes;</p> <p>.9 high-density cargoes;</p> <p>.10 solidifying cargoes;</p> <p>.11 polymerizing cargoes.</p> <p>Knowledge and understanding of dangers of non-compliance with relevant rules/regulations.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with chemical tanker cargo operations are correctly identified, and proper control measures are taken.</p>
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to chemical tankers:</p> <p>.1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus;</p> <p>.2 precautions to be taken before and during repair and maintenance work;</p> <p>.3 precautions for hot and cold work;</p> <p>.4 precautions for electrical safety;</p> <p>.5 use of appropriate Personal Protective Equipment (PPE).</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>Procedures designed to safeguard personnel and the ship are observed at all times.</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used.</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns.</p> <p>Correct use of breathing apparatus.</p> <p>Procedures for entry into enclosed spaces are ob-</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Knowledge and understanding of chemical tanker emergency procedures, including:</p> <ol style="list-style-type: none"> .1 ship emergency response plans; .2 cargo operations emergency shutdown; .3 actions to be taken in the event of failure of systems or services essential to cargo; .4 fire fighting on chemical tankers; .5 enclosed space rescue; .6 cargo reactivity; .7 jettisoning cargo; .8 use of a Material Safety Data Sheet (MSDS). <p>Actions to be taken following collision, grounding, or spillage.</p> <p>Knowledge of medical first aid procedures on board chemical tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG).</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>served.</p> <p>The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans.</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem.</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly.</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines.</p>
Take precautions to prevent pollution of the environment	<p>Understanding of procedures to prevent pollution of the atmosphere and the environment.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment.</p>
Monitor and control compliance with legislative requirements	<p>Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simula- 	<p>The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	Proficiency in the use of the IBC Code and related documents.	tor training; .4 approved training programme.	

Course in management of gas tanker operations

Table A-V/1-2-2: Specification of minimum standard of competence in advanced training for liquefied gas tanker cargo operations

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p>Design and characteristics of a liquefied gas tanker</p> <p>Knowledge of liquefied gas tanker design, systems, and equipment, including:</p> <ol style="list-style-type: none"> .1 types of liquefied gas tankers and cargo tanks construction; .2 general arrangement and construction; .3 cargo containment systems, including materials of construction and insulation; .4 cargo-handling equipment and instrumentation, including: <ol style="list-style-type: none"> 4.1 cargo pumps and pumping arrangements; 4.2 cargo pipelines and valves; 4.3 expansion devices; 4.4 flame screens; 4.5 temperature monitoring systems; 4.6 cargo tank level-gauging systems; 4.7 tank pressure monitoring and control systems; .5 cargo temperature maintenance system; .6 tank atmosphere control systems (inert gas, nitrogen), including storage, generation and distribution systems; .7 cofferdam heating systems; .8 gas-detecting systems; .9 ballast system; .10 boil-off systems; .11 reliquefaction systems; .12 cargo Emergency Shut Down system (ESD); .13 custody transfer system. <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation.</p> <p>Loading, unloading, care and</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Communications are clear, understood and successful.</p> <p>Cargo operations are carried out in a safe manner, taking into account liquefied gas tanker designs, systems and equipment.</p> <p>Pumping operations are carried out in accordance with accepted principles and procedures and are relevant to the type of cargo.</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment.</p> <p>Proper loading, stowage and unloading of liquefied gas cargoes ensures that stability and stress conditions remain within safe limits at all times.</p> <p>Potential non-compliance with cargo-related procedures is promptly identified and rectified.</p> <p>Actions taken and procedures followed correctly identify and make full use of appropriate shipboard equipment.</p> <p>Calibration and use of monitoring and gas-detection equipment is consistent with safe operational practices and procedures.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>handling of cargo</p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity.</p> <p>Proficiency in tanker safety culture and implementation of safety management requirements.</p> <p>Proficiency to apply safe preparations, procedures and checklists for all cargo operations, including:</p> <ul style="list-style-type: none"> .1 post docking and loading: <ul style="list-style-type: none"> 1.1 tank inspection; 1.2 inerting (Oxygen reduction, dewpoint reduction); 1.3 gassing-up; 1.4 cooling down; 1.5 loading; 1.6 deballasting; 1.7 sampling, including closed-loop sampling; .2 sea passage: <ul style="list-style-type: none"> 2.1 cooling down; 2.2 pressure maintenance; 2.3 boil-off; 2.4 inhibiting; .3 unloading: <ul style="list-style-type: none"> 3.1 unloading; 3.2 ballasting; 3.3 stripping and cleaning systems; 3.4 systems to make the tank liquid-free; .4 pre-docking preparation: <ul style="list-style-type: none"> 4.1 warm-up; 4.2 inerting; 4.3 gas-freeing; .5 ship-to-ship transfer. <p>Proficiency to perform cargo measurements and calculations, including:</p> <ul style="list-style-type: none"> .1 liquid phase; .2 gas phase; .3 On Board Quantity (OBQ); .4 Remain On Board (ROB); .5 boil-off cargo calculations; <p>Proficiency to manage and supervise personnel with cargo-</p>		<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures.</p> <p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices.</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	related responsibilities.		
Familiarity with physical and chemical properties of liquefied gas cargoes	<p>Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships, including:</p> <ul style="list-style-type: none"> .1 the chemical structure of gases; .2 the properties and characteristics of liquefied gases (including CO₂) and their vapours, including: <ul style="list-style-type: none"> 2.1 simple gas laws; 2.2 states of matter; 2.3 liquid and vapour densities; 2.4 diffusion and mixing of gases; 2.5 compression of gases; 2.6 reliquefaction and refrigeration of gases; 2.7 critical temperature of gases and pressure; 2.8 flashpoint, upper and lower explosive limits, auto-ignition temperature; 2.9 compatibility, reactivity and positive segregation of gases; 2.10 polymerization; 2.11 saturated vapour pressure/reference temperature; 2.12 dewpoint and bubble point; 2.13 lubrication of compressors; 2.14 hydrate formation; .3 the properties of single liquids; .4 the nature and properties of solutions; .5 thermodynamic units; .6 basic thermodynamic laws and diagrams; .7 properties of materials; .8 effect of low temperature – brittle fracture. <p>Understanding the information contained in a Material Safety Data Sheet (MSDS).</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme. 	<p>Effective use is made of information resources for identification of properties and characteristics of liquefied gases and their impact on safety, environmental protection and vessel operation.</p>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations, including:</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with liquefied gas tanker cargo operations are cor-</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	.1 flammability; .2 explosion; .3 toxicity; .4 reactivity; .5 corrosivity; .6 health hazards; .7 inert gas composition; .8 electrostatic hazards; .9 polymerizing cargoes. Proficiency to calibrate and use monitoring and gas-detection systems, instruments and equipment. Knowledge and understanding of dangers of non-compliance with relevant rules/regulations.	.1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme.	rectly identified, and proper control measures are taken. Use of gas-detection devices is in accordance with manuals and good practice.
Apply occupational health and safety precautions	Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers, including: .1 precautions to be taken when entering enclosed spaces (such as compressor rooms), including the correct use of different types of breathing apparatus; .2 precautions to be taken before and during repair and maintenance work, including work affecting pumping, piping, electrical and control systems; .3 precautions for hot and cold work; .4 precautions for electrical safety; .5 use of appropriate Personal Protective Equipment (PPE); .6 precautions for cold burn and frostbite; .7 proper use of personal toxicity monitoring equipment.	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience; .2 approved training ship experience; .3 approved simulator training; .4 approved training programme.	Procedures designed to safeguard personnel and the ship are observed at all times. Safe working practices are observed and appropriate safety and protective equipment is correctly used. Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns. Correct use of breathing apparatus.
Respond to emergencies	Knowledge and understanding of liquefied gas tanker emergency procedures, including: .1 ship emergency response plans; .2 cargo operations emergency shutdown procedure;	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience;	The type and impact of emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans.

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>.3 emergency cargo valve operations;</p> <p>.4 actions to be taken in the event of failure of systems or services essential to cargo operations;</p> <p>.5 fire-fighting on liquefied gas tankers;</p> <p>.6 jettisoning of cargo;</p> <p>.7 enclosed space rescue.</p> <p>Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour.</p> <p>Knowledge of medical first-aid procedures and antidotes on board liquefied gas tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (M FAG).</p>	<p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	<p>The order of priority and the levels and timescales of making reports and informing personnel on board are relevant to the nature of the emergency and reflect the urgency of the problem.</p> <p>Evacuation, emergency shutdown and isolation are appropriate to the nature of the emergency and implemented promptly.</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines.</p>
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the environment.	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment.
Monitor and control compliance with legislative requirements	<p>Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied.</p> <p>Proficiency in the use of the IBC and IGC Codes and related documents.</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 approved simulator training;</p> <p>.4 approved training programme.</p>	The handling of liquefied gas cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practices.