INTERNATIONAL MARITIME ORGANIZATION

E

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6th session
Agenda item 5

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AMENDMENTS TO THE IMSBC CODE AND SUPPLEMENTS

Draft new model course on Safe Handling and Transport of Solid Bulk Cargoes

Note by the Secretariat

SUMMARY

Executive summary:	This document provides the draft new model course on Safe Handling and Transport of Solid Bulk Cargoes
Strategic direction, if applicable:	Other work
Output:	OW 9
Action to be taken:	Paragraph 6
Related documents:	CCC 5/13, paragraphs 5.15 to 5.17 and annex 7, and MSC-MEPC.2/Circ.15/Rev.1

General

1 The draft new model course on Safe Handling and Transport of Solid Bulk Cargoes referred to in document CCC 6/5/1 is set out in the annex.

Action requested of the Sub-Committee

2 The Sub-Committee is invited to consider the draft new model course on Safe Handling and Transport of Solid Bulk Cargoes, as set out in the annex, together with the report of the Review Group, as set out in document CCC 6/5/1, and take action, as appropriate.

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ANNEX[1]

DRAFT NEW MODEL COURSE ON SAFE HANDLING AND TRANSPORT OF SOLID BULK CARGOES

Model Course X.XX

SAFE HANDLING AND TRANSPORT OF SOLID BULK CARGOES

2019 Edition

INTERNATIONAL MARITIME ORGANIZATION

London, 2019

1 The annex is reproduced in English only.

ACKNOWLEDGEMENTS

The International Maritime Organization (IMO)

wishes

to express its sincere appreciation to China for the

valuable assistance and cooperation in the

development of this model course.

Foreword

[To be inserted by the Secretariat]

KITACK LIM
Secretary-General

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INTRODUCTION

Purpose of the model courses

The purpose of the IMO model courses is to assist maritime training institutes and their teaching staff in organizing and introducing new training courses or in enhancing, updating or supplementing existing training material where the quality and effectiveness of the training courses can be improved.

It is not the intention of the model course programme to present instructors with a rigid "teaching package" which is expected to be "strictly followed", nor is it the intention to substitute audio-visual or "programmed" material for the instructor's presence. As in all training endeavours, the knowledge, skills and dedication of the instructor are the key components in the transfer of knowledge and skills to those being trained through IMO model course material.

Rather, this document should be used as a guide with the course duration given as indicative of the time expected to cover the required outcomes. The parties may modify this course to suit their respective training schemes.

For those following planned training schemes approved by the administration, it is intended that this training may form an integral part of the overall training plan and be complementary to other studies. The training may be undertaken in progressive stages; for these candidates, it is not appropriate to specify the duration of the learning, provided achievement of the specified learning outcomes is properly assessed and recorded.

Since educational systems and the cultural backgrounds of trainees in maritime subjects vary considerably from country to country, the model course material has been designed to identify the basic entry requirements and trainee target groups for each course in universally applicable terms, and to specify clearly the technical content, levels of knowledge and skills necessary to meet the intent of IMO conventions and related recommendations.

Use of the model course

To use the model course the instructor should review the course plan and detailed syllabus, taking into account the information provided under the entry standards specified in the course framework. The actual level of knowledge and skills and the prior technical education of the trainees should be kept in mind during this review, and any areas within the detailed syllabus which may cause difficulties, because of differences between the actual trainee entry level and that assumed by the course designer should be identified. To compensate for such differences, the instructor is expected to delete from the course, or reduce the emphasis on, items dealing with knowledge or skills already attained by the trainees. The instructor should also identify any academic knowledge, skills or technical training which they may not have acquired.

By analysing the detailed syllabus and the academic knowledge required to allow training in the technical area to proceed, the instructor can design an appropriate pre-entry course or, alternatively,

insert the elements of academic knowledge required to support the technical training elements concerned at relevant points within the technical course.

Adjustment of the course objectives, scope and content may also be necessary if the trainees completing the course are to undertake duties in the national maritime industry which may differ from the course objectives specified in the model course.

Within the course plan, the course designers have indicated their assessment of the time that should be allotted to each learning area. However, it must be noted that these allocations assume that the trainees have fully met all entry requirements of the course. The instructor should therefore review these assessments and may need to reallocate the time required to achieve each specific learning objective.

This model course is based on the IMSBC Code, incorporating amendment 05-19. As the Code is updated every two years, the instructor has to check the course compendium, PowerPoint presentation and exercises to see if any considerable changes have been made in later editions.

Lesson plans

Having adjusted the course content to suit the trainee intake and any revision of the course objectives, the instructor should draw up lesson plans based on the detailed syllabus. The detailed syllabus contains specific references to the textbook or teaching material proposed for use in the course. Where no adjustment has been found necessary in the learning objectives of the detailed syllabus, the lesson plans may simply consist on the detailed syllabus with key words or other reminders added to assist the instructor in making his or her presentation of the material.

Presentation

The presentation of concepts and methodologies must be repeated in various ways until the instructor is satisfied that the trainee has attained each specified learning objective. The syllabus is laid out in learning-objective format and each objective specifies what the trainee must be able to do as the learning outcome.

Task-based exercises

As an ancient Chinese philosopher-Hsun Tzu says "Tell me and I will forget, show me and I might remember, involve me and I will understand", the purpose of using task-based exercises in training is to get trainees fully involved in classroom activities in which they can learn by doing.

Instructors are encouraged to use "task-based exercises" to allow trainees to develop and demonstrate competence related to safe handling and transport of solid bulk cargoes. Examples of task-based exercises are given in 6.2 (shipboard test method), 14 (appendices 1, 3, 4 and 5 of the IMSBC Code), 16.2 (BLU Code and BLU Manual) and 18 (Integrated and practical application) of Part D.

Implementation

For the course to run smoothly and to be effective, considerable attention must be paid to the availability and use of:

- Properly qualified instructors
- Room with movable desks and chairs and other work spaces
- Test equipment, such as cans and breathing apparatus
- References, textbooks and technical papers
- Other reference materials

Thorough preparation is the key to a successful implementation of the course. IMO has produced "Guidance on the Implementation of IMO Model Courses", which deals with this aspect in greater detail. The text of this booklet is included as an attachment to this course.

PART A – COURSE FRAMEWORK

Scope

The course is intended for seafarers working on board ships carrying solid bulk cargoes, as well as all personnel involved in the transport chain of solid bulk cargoes, such as relevant government officials of the competent authorities, port authorities, port terminals, mine operators, shippers, related technicians (e.g. laboratories) and possibly shipping company's representatives, and all personnel involved in the existing processes of the assessment of acceptability of consignments for solid bulk cargoes according to the IMSBC Code.

This model course is designed in accordance with the requirements for seafarers in section A-II/1, A-II/2 and B-V/b of the Seafarers' Training, Certification and Watchkeeping Code (STCW Code).
When this model course is used for seafarer training, all sections in the "Course outline" of Part B should be covered.

When this model course is used for shore-based personnel training, the "Subject area for shore-based personnel training" of Part B should be referred to, and the specific training content should be adjusted with change of the needs.

Objectives

The objectives of this course include ensuring that trainees understand the potential dangers that may occur in the process of loading, carriage and unloading of solid bulk cargoes, enhancing their awareness in safety and environmental protection, improving their awareness and ability in using the IMSBC Code, helping them learn standardized operations, so as to reduce potential safety hazards, to ensure the safety of personnel, ships and cargoes and to prevent marine environmental pollution.
A trainee successfully completing this course will be able to:

- identify risks associated with the carriage of solid bulk cargoes by sea;
- assess acceptability of consignments for safe shipment, especially Group A solid bulk cargoes;
- observe safe working practices in loading and carriage of solid bulk cargoes;
- observe ship and port security regulations related to the loading, carriage and unloading of solid bulk cargoes; and
- supervise the operation process of a certain cargo following regulations in the IMSBC Code.

Entry standards

This model course is mainly aimed at training of seafarers and shore-based personnel engaged in carriage of solid bulk cargoes by sea; therefore uniform entry standards are not necessary. For the training of seafarers with specific responsibilities listed in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) as amended, including the 1995 and 2010 Manila Amendments, the trainees should have the educational background required by the Convention; for the training of shore-based personnel, it is up to their organizations to decide what personnel should receive the training and what basic knowledge the trainees should have.
Instructors are advised to adjust the course content and time allocation to suit different trainees and the specific training objective(s).

Course certificate

Upon successful completion of the course, an appropriate certificate or a similar document should be issued to the trainees to prove that they have received training in using the IMSBC Code in maritime practice.

Course intake limitations

The maximum number of trainees shall be determined according to the aims and objectives of the course as well as the teaching facilities and equipment available. The scale of training should ensure that every trainee has a copy of the IMSBC Code and its amendments (the latest edition released by IMO that is currently in force) that are available at the time, and that the discussion in groups during the course of teaching will not be affected by the number of groups or the number of trainees in each group. It is suggested that the proportion of instructors and trainees should be controlled at 1:20. When group discussions are necessary, the class can be divided into 3-5 groups with 3- 5 trainees in each group.

Instructor requirements

Instructors who are responsible for actually conducting this training course should understand the specific objectives of the course, know the IMSBC Code well, have necessary knowledge of the IMDG Code and understand related requirements in the International Convention for the Safety of Life at Sea (SOLAS) 1974, as amended, the International Convention for the Prevention of Pollution from

Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997 (MARPOL) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) as amended, including the 1995 and 2010 Manila Amendments. At the same time, the instructors should have practical experience in the safe loading, stowage, carriage, unloading and shore-based operations involving solid bulk cargoes.

Teaching facilities and equipment

Multimedia classrooms equipped with audio-visual aided teaching equipment can be used for theoretical teaching of this course. To facilitate group discussion, the desks and chairs in the classrooms should be movable and arranged according to the needs of teaching activities.
If conditions permit, it should be arranged for trainees to visit laboratories, ports, ships and other places related to the course activities during the training session. Since such visits are not included in the proposed timetable, the timetable should be adjusted accordingly if such visits are to be included.

Teaching aids (A)

A1	Instructor Manual (Part D of the course) and PPT
A2	Cylindrical cans for testing and applicable samples
A3	Document Samples Used in the Transportation of Solid Bulk Cargoes
A4	Portable thermometer
A5	Portable Gas Measuring Instrument
A6	White board
A7	Digital projector
A8	Flask
A9	Rough-textured paper
A10	Protractor

Optional videos (V)

In addition to the PowerPoint presentation, one or several of the videos listed below may be used. The instructor can decide whether any of these videos should be used to supplement the theoretical training. The videos may become out of date very quickly and instructors are advised firstly to review any videos that are to be used.

V1	Dangerous and Difficult Bulk Cargoes - Part 1 Best Practice and the IMSBC Code (Edition 2) (Videotel Code No. 1230)
V2	Dangerous and Difficult Bulk Cargoes - Part 2 Minerals and Man-Made Derivatives (Edition 2) (Videotel Code No. 1231)
V3	Bulk Carriers - Handle With Care (Edition 2) (Videotel Code No. 1126)
V4	Bulk Carrier Losses (Videotel Code No. 532)
V5	Bulk Carrier Safeguards (Videotel Code No. 746)

V1 to V5 are available from:

Videotel Marine International Ltd
Add: 84 Newman Street, London, W1T 3EU, UK
Tel: +44 (0)20 7299 1800
Fax: +44 (0)20 7299 1818
Email: mail@videotel.com
URL: https://videotel.com/

Textbook (T)

T1 *International Maritime Solid Bulk Cargoes Code (IMSBC Code) and Supplement, as amended*

IMO references (R)

R1 International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended

R2 International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and by the Protocol of 1997 (MARPOL)

R3 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) as amended, including the 1995 and 2010 Manila Amendments

R4 Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code), as amended

R5 *Manual on loading and unloading of solid bulk cargoes for terminal representatives (BLU Manual)*, MSC/Circ.1160 as amended by MSC.1/Circ.1356

R6 International Maritime Dangerous Goods Code (IMDG Code) and Supplement, as amended

R7 International Code for Fire Safety Systems (FSS Code), as amended

R8 IMO Resolution A.851(20): *General Principles for Ship Reporting Systems and Ship Reporting Requirements, including Guidelines for Reporting Incidents involving Dangerous Goods, Harmful Substance and/or Marine Pollutants*

R9 IMO Resolution A.1050(27): *Revised Recommendations for Entering Enclosed Spaces aboard Ships*

R10 IMO Resolution A.866(20): *Guidance to Ships' Crews and Terminal Personnel for Bulk Carrier Inspections*

R11 IMO Resolution MSC.23(59): *International Code for the Safe Carriage of Grain in Bulk*

R12 IMO MSC.1/Circ.1454/Rev.1: *Guidelines for Developing and Approving Procedures for Sampling Testing and Controlling the Moisture Content for Solid Bulk Cargoes Which May Liquefy*

R13 IMO MSC/Circ.857: *Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)*

R14 IMO MSC.1/Circ.1395/Rev.4: *Lists of Solid Bulk Cargoes for Which a Fixed Gas Fire-extinguishing System may be Exempted or for which a Fixed Gas Fire-extinguishing System is Ineffective*

R15 IMO MSC/Circ.908: *Uniform Method of Measurement of the Density of Bulk cargoes*

R16 IMO MSC.1/Circ.1264: *Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds*, as amended by MSC.1/Circ.1396

R17 IMO MSC.1/Circ.1216: *Revised Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas, 2007*

R18 IMO MSC.1/Circ.1453: *Guidelines for the Submission of information and completion of the format for the properties of cargoes not listed in the International Maritime Solid Cargoes (IMSBC) Code and their conditions of carriage*

R19 International Ship and Port Facility Security Code (ISPS Code), as amended

Bibliography (B)

B1 United Nations Recommendations on the Transport of Dangerous Goods-Model Regulations as amended

B2 United Nations Recommendations on the Transport of Dangerous Goods-Manual of Tests and Criteria as amended

B3 Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as amended

B4 IEC 60092-506: 2003 Electrical installations in ships-Part 506: Special features-Ships carrying specific dangerous goods and materials hazardous only in bulk

B5 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)

B6 SKULD Pocket Guide for Masters and Officers: Bulk Mineral Cargo Liquefaction 2018

B7 Class LR Guidance for crews on the IMSBC Code: Carrying solid bulk cargoes safely, 2nd Edition 2016

B8 UK P&I CLUB: Bulk Matters

B9 Class NK: Guidelines for the Safe Carriage of Nickel Ore, 2nd Edition

Websites

W1 http://www.imo.org/

W2 http://89.234.30.81/stcw_training_catalogue/

W3 http://www.lr.org/

W4 http://www.classnk.or.jp/

W5 http://www.ccs.org.cn/

W6 http://www.intercargo.org/

W7 http://www.skuld.com/

W8 http://www.nepia.com/

W9 http://www.ukpandi.com/

W10 http://www.cpiweb.org/

W11 http://www.standard-club.com/

W12 http://www.ttclub.com/

W13 http://www.londonpandi.com/
W14 http://www.piclub.or.jp/
W15 http://www.gard.no/

PART B – GENERAL OUTLINE

This section provides an outline of lectures in a suggested sequence. As far as possible, lectures should be presented within a familiar context and should make use of practical examples. An effective manner of presentation is to develop a technique of giving information and then reinforcing it. For example, first tell the trainees briefly what you are going to present to them; then cover the topic in detail; and, finally, summarize what you have taught them. Task-based exercises and other classroom activities are recommended for trainees' better intake of knowledge.

The use of audio-visual aids such as video/DVD/media players, digital projectors and multi-media presentations will all contribute to the learning process, on the condition that the trainees' handouts and trainee notes are relevant.

Course Outline

Instructors should note that the hours for lectures and exercises are suggestions only for sequence and length of time allocated to each objective. These factors may be adapted by lecturers to suit individual groups of trainees depending on their experience, ability, equipment and staff available for teaching.

Chapter	Approximate time (Hours)		
	Presentation	Workshop	Total
0. IMO and the IMSBC Code 0.1 Purpose of the course 0.2 IMO 0.3 The IMSBC Code	0.5		0.5
1. General provisions 1.1 Cargoes listed in this Code 1.2 Cargoes not listed in this Code 1.3 Application and implementation of this Code 1.4 Exemptions and equivalent measures 1.5 Definitions	0.5	0.25	0.75
2. General loading, carriage and unloading precautions 2.1 Cargo distribution 2.2 Precautions for loading and unloading	0.5		0.5
3. Safety of personnel and ships 3.1 Hazards to personnel and ships caused by cargoes 3.2 Ventilation	0.25	0.5	0.75

Chapter	Approximate time (Hours)		
	Presentation	Workshop	Total
4. Assessment of acceptability of consignments for safe shipment 4.1 Identification and classification of cargoes 4.2 Assessment of acceptability 4.3 Documentation required on board the ship carrying dangerous goods	1.0	0.5	1.5
5. Trimming procedures 5.1 General provisions for trimming 5.2 Special provisions for trimming	0.25		0.25
6. Methods for determining the angle of repose	0.25	0.25	0.5
7. Cargoes which may liquefy 7.1 Influence of liquefaction on ship safety 7.2 Provisions for cargoes which may liquefy	0.5	0.5	1.0
8. Test methods for cargoes which may liquefy	0.25	0.5	0.75
9. Materials possessing chemical hazards 9.1 Classification of dangerous goods and materials hazardous only in bulk (MHB) 9.2 Stowage and segregation requirements	1.5	0.5	2.0
10. Carriage of solid wastes in bulk	0.25		0.25
11. Security provisions	0.5		0.5
12. Stowage factor conversion tables	0.25		0.25
13. References to related information and recommendations	0.25		0.25
14. Appendices 1, 3, 4 and 5 of the IMSBC Code	0.75	1.0	1.75
15. Appendix 2 of the IMSBC Code	0.75	0.25	1.0
16. Supplement 16.1 BLU Code and BLU Manual 16.2 Enclosed space entry	1.5	0.5	2.0
17. Relevant international conventions 17.1 SOLAS 17.2 MARPOL	0.5		0.5
18. Integrated and practical application	0.5	2.5	3.0
Summary	1.0		1.0
Examination	2.0		2.0
Subtotal	13.75	7.25	21.0
Total	21.0		

Subject area for shore-based personnel training

	Government officials	Port authorities	Port terminals	Mine operators	Shippers	Related technicians	Shipping company's representatives
0. Introduction	√	√	√	√	√	√	√
1. General provisions	√	√	√	√	√	√	√
2. General precautions for loading, carriage and unloading	√	√	√		√		√
3. Safety of personnel and ships	√	√	√		√	√	√
4. Assessment of acceptability of consignments for safe shipment	√	√	√	√	√	√	√
5. Trimming procedures	√		√		√		√
6. Methods for determining the angle of repose	√				√	√	√
7. Cargoes which may liquefy	√	√	√	√	√	√	√
8. Test methods for cargoes which may liquefy	√		√	√	√	√	√
9. Materials possessing chemical hazards	√	√	√	√	√	√	√
10. Carriage of solid wastes in bulk	√	√	√	√	√		√
11. Security provisions	√	√	√		√		√
12. Stowage factor conversion tables							√
13. References to related information and recommendations	√						√
14. Appendices 1, 3, 4 and 5 of the IMSBC Code	√		√		√		√
15. Appendix 2 of the IMSBC Code	√				√	√	√
16.1. BLU Code and BLU Manual	√		√		√		√
16.2. Enclosed spaces entry	√		√		√		√
17.1. SOLAS	√				√		√
17.2. MARPOL	√	√	√		√		√
18. Integrated and practical application	√						√

Course Timetable

This model course has been developed providing a recommended range in duration of four to five days for lectures, demonstrations, laboratories or simulator exercises and assessment. No formal timetable is included in this model course.

Instructors must develop their own timetable depending on:

.1 the level of skills of trainees;

.2 the number of persons to be trained;

.3 the number of instructors; and

.4 simulator facilities and equipment available,

and normal practices at the training establishment.

Day 1	**First part (3 hours)**	**Second part (3 hours)**
	0. Introduction to IMO and the IMSBC Code 1. General provisions 2. General loading, carriage and unloading precautions 3. Safety of personnel and ships	4. Assessment of acceptability of consignments for safe shipment 5. Trimming procedures 6. Methods for determining the angle of repose 7. Cargoes which may liquefy
Day 2	**First part (3 hours)**	**Second part (3 hours)**
	8. Test methods for cargoes which may liquefy 9. Materials possessing chemical hazards 10. Carriage of solid wastes in bulk	11. Security provisions 12. Stowage factor conversion tables 13. References to related information and recommendations 14. Appendices 1, 3, 4 and 5 of the IMSBC Code
Day 3	**First part (3 hours)**	**Second part (3 hours)**
	15. Appendix 2 of the IMSBC Code 16. Supplement 16.1 BLU Code and BLU Manual 16.2 Enclosed space entry	17. Relevant international conventions 17.1 SOLAS 17.2 MARPOL 18. Integrated and practical application
Day 4	**First Part (3 hours)**	
	Summary Examination	

Field trip: the training institution is encouraged to include a one-day field trip in the training course depending on availability. Proposed options: sampling in mines or stockpiles, testing in laboratories and loading operations in ports and terminals.

PART C – DETAILED OUTLINE

The detailed teaching syllabus is presented as a series of learning objectives. The objectives, therefore, describe what the trainee must do to demonstrate that the specified knowledge or skill has been transferred.

Each competence is listed in the order as detailed in Part B. Thus each training outcome is supported by a number of related performance elements in which the trainee is required to be proficient. The teaching syllabus shows the required performance expected of the trainee in the tables that follow.
In order to assist the instructor, references are shown to indicate IMO references and publications, textbooks and teaching aids that instructors may wish to use in preparing and presenting their lessons. The materials listed in the course framework have been used to structure the detailed teaching syllabus; in particular:

- Teaching aids (indicated by A);
- Optional videos (indicated by V);
- Textbooks (indicated by T);
- IMO references (indicated by R);
- Bibliographies (indicated by B); and
- Websites (indicated by W).

These will provide valuable information to instructors.

Note

Throughout the course, safe working practices are to be clearly defined and emphasized with reference to current international requirements and regulations.

It is important that the provisions of the IMO conventions are rendered into domestic legislation as this defines the rights and obligations of those to whom the convention is made applicable. More importantly, it is the law which allocates among the various agencies the responsibility of enforcing, implementing and monitoring the requirements of the convention.

It is envisaged that the agency responsible for IMSBC Code implementation will require the institution conducting the model course to include in the KUP learnings, the different regulations, agencies and competent authorities involved.

Knowledge, Understanding and Proficiency	IMO Reference	Textbook, Bibliography	Teaching Aid
0. Introduction to IMO and the IMSBC Code			
0.1 Purpose of the course .1 List the main issues taken into account in devising the course .2 List personal objectives for the course	**R3**	**T1**	**A1, A6, A7**
0.2 International Maritime Organization（IMO） .1 Explain the purpose of IMO .2 Explain the IMO structure and working scope of the Sub-Committee on Carriage of Cargoes and Containers .3 Describe SOLAS .4 Describe MARPOL 73/78	**R1, R2, R3, R6**	**T1**	**A1, A6, A7**
0.3 IMSBC Code .1 Explain the inception purpose of the IMSBC Code .2 Describe the structure of the IMSBC Code .3 Describe the main content of the IMSBC Code .4 Explain the relevance between SOLAS and the IMSBC Code .5 Explain the relevance between MARPOL and the IMSBC Code	**R1, R2, R3, R6**	**T1**	**A1, A6, A7**
1. General provisions			
1.1 Cargoes listed in the Code Describe the content, source and requirements on information about the typical solid bulk cargo		**T1**	**A1, A3, A6, A7**
1.2 Cargoes not listed in the Code .1 Describe methods for obtaining the information on cargoes not listed in this Code .2 Identify the format and content of the application form submitted to IMO	**R18**	**T1**	**A1, A3, A6, A7**
1.3 Application and implementation of this Code .1 Explain the application of the Code and its non-mandatory provisions		**T1**	**A1, A6, A7**
1.4 Exemptions and equivalent measures .1 Briefly state conditions for applying for exemptions and equivalent measures and their authorization .2 Briefly state period of validity of the exemption and related document maintained on board		**T1**	**A1, A6, A7**
1.5 Definitions .1 State the definitions in the IMSBC Code	**R6**	**T1, B2**	**A1, A6, A7**
2. General loading, carriage and unloading precautions			
2.1 Cargo distribution .1 Explain the principles on preventing the structure being overstressed .2 Explain the operational method to aid stability		**T1**	**A1, A6, A7, V3**
2.2 Precautions for loading and unloading .1 List preparations before loading and unloading	**R10, R17**	**T1**	**A1, A6, A7**
3. Safety of personnel and ships			

Knowledge, Understanding and Proficiency	IMO Reference	Textbook, Bibliography	Teaching Aid
3.1 Hazards to personnel and ships by cargoes .1 Describe poisoning, corrosive and asphyxiation hazards .2 Describe dust hazards to health .3 Describe hazards of flammable gases .4 Explain hazards of cargo under in-transit fumigation	**R6, R9, R13, R16, R17**	**T1**	**A1, A3, A6, A7**
3.2 Ventilation .1 Describe purpose, types and conditions of cargo hold ventilation	**R9**	**T1**	**A1, A6, A7**
4. Assessment of acceptability of consignments for safe shipment			
4.1 Identification and classification of cargoes .1 Describe the importance of using BCSN to identify cargoes .2 Describe the standards and requirements on solid bulk cargo classification	**R2, R6**	**T1, B2**	**A1, A3, A6, A7**
4.2 Assessment of acceptability .1 Describe the information on the cargo that the shipper shall provide to the master .2 Describe the requirements on certificates of test that the shipper shall provide to the ship's master or his representative when carrying cargoes which may liquefy .3 Describe the factors to be considered and methods to be used during sampling	**R1, R2, R12**	**T1**	**A1, A3, A6, A7**
4.3 Documentation required on board the ship carrying dangerous goods .1 Identify documentation required on board the ship carrying dangerous goods	**R1**	**T1**	**A1, A3, A6, A7**
5. Trimming procedures			
5.1 General provisions for trimming .1 Explain the purpose for trimming		**T1**	**A1, A6, A7**
5.2 Special provisions for trimming .1 Describe special provisions for trimming of multi-deck ships .2 Describe special provisions for trimming of cohesive bulk cargoes .3 Describe special provisions for trimming of non-cohesive bulk cargoes	**R11**	**T1**	**A1, A6, A7**
6. Methods for determining the angle of repose			
6.1 Tilting box test .1 State the application of tilting box test .2 Briefly describe the test procedure		**T1**	**A1, A6, A7**
6.2 Shipboard test method .1 Briefly describe the test procedures and precautions		**T1**	**A1, A6, A7 A8, A9, A10**
7. Cargoes which may liquefy			
7.1 Influence of liquefaction on ship safety .1 Explain the conditions for liquefaction .2 Explain the hazards of liquefaction		**T1, B6, B7, B8, B9**	**A1, A3, A6, A7, V2**

Knowledge, Understanding and Proficiency	IMO Reference	Textbook, Bibliography	Teaching Aid
7.2 Provisions for cargoes which may liquefy .1 Describe the requirements for general cargo ships to transport cargoes which may liquefy .2 Describe the requirements for specially constructed or fitted cargo ships .3 Describe the requirements for specially constructed cargo ships for dry powdery cargoes		**T1**	**A1, A3, A6, A7**
8. Test methods for cargoes which may liquefy			
8.1 Laboratory methods for determining transportable moisture limit .1 Describe laboratory methods for determining transportable moisture limit	**R12**	**T1**	**A1, A3, A6, A7**
8.2 Complementary test methods for determining the possibility of liquefaction .1 Describe the procedures of using the methods and perform the can test		**T1**	**A1, A2, A3, A6, A7**
9. Materials possessing chemical hazards			
9.1 Classification of dangerous goods and materials hazardous only in bulk (MHB) .1 Explain hazard classification .2 Explain the classification of cargoes in Group B	**R6**	**T1, B1, B2, B3**	**A1, A3, A6, A7**
9.2 Stowage and segregation requirements .1 Describe general requirements .2 Describe special requirements .3 Explain the segregation terms	**R6**	**T1, B4**	**A1, A3, A6, A7, V1, V2**
10. Carriage of solid wastes in bulk			
10.1 Definitions, classification and applicability of solid wastes in bulk .1 State definitions, classification and applicability of solid wastes in bulk	**R2**	**T1, B5**	**A1, A6, A7**
10.2 Transboundary movements and requirement under the Basel Convention .1 State the definition of transboundary movement and describe under what conditions the transboundary movement of solid bulk wastes can be permitted under Basel Convention and what documents shall be carried on board during a transboundary movement of solid bulk wastes	**R2**	**T1, B5**	**A1, A3, A6, A7**
10.3 Requirements for stowage and segregation of wastes .1 Describe requirements for stowage and segregation of wastes	**R2**	**T1, B5**	**A1, A6, A7**

Knowledge, Understanding and Proficiency	IMO Reference	Textbook, Bibliography	Teaching Aid
10.4 Accident procedures of wastes .1 Describe the action the master should take when, during transport, a waste will constitute a danger for the carrying ship or the environment	**R2**	**T1, B5**	**A1, A6, A7**
11. Security provisions			
11.1 General provisions for companies, ships and port facilities .1 Describe relevant security provisions that the company, ships and port facilities should observe	**R8, R19**	**T1**	**A1, A6, A7, V5**
11.2 General provisions for shore-side personnel .1 Describe the general security provisions for shore-side personnel, except those provided otherwise in section 11.1 .2 Describe the general security provisions on training of shore-side personnel, except those provided otherwise in section 11.1	**R8, R19**	**T1**	**A1, A6, A7**
11.3 Provisions for high consequence solid bulk cargoes .1 Describe the security plan related to the transportation of high consequence solid bulk cargoes	**R6, R8, R19**	**T1**	**A1, A6, A7, V4**
12. Stowage factor conversion tables			
.1 Use stowage factor conversion tables		**T1**	**A1, A6, A7**
13. References to related information and recommendations			
.1 Describe the sources of the following items: dangerous cargo and its classification, stability, fire-extinguishing arrangements, ventilation, personnel protection, gas detection, fumigation, segregation, entering enclosed spaces, avoidance of excessive stresses	**All**	**T1**	**A1, A6, A7**
14. Appendices 1, 3, 4 and 5 of the IMSBC Code			
14.1 Explain the structure and contents of appendix 1 by giving examples	**R13, R14**	**T1, B2**	**A1, A6, A7**
14.2 Explain the use of appendices 3, 4 and 5 by giving examples	**R13, R14**	**T1, B2**	**A1, A6, A7**
15. Appendix 2 of the IMSBC Code			
15.1 Describe the methods of testing for TML of materials which may liquefy and scope of application thereof	**R12**	**T1**	**A1, A6, A7**
15.2 Describe the requirements for determining the angle of repose		**T1**	**A1, A6, A7**
16. Supplement			

Knowledge, Understanding and Proficiency	IMO Reference	Textbook, Bibliography	Teaching Aid
16.1 BLU Code and BLU Manual .1 Describe the procedure(s) that must be observed by ship and shore about loading and unloading .2 Explain loading, unloading and ballasting .3 Describe the procedure(s) that must be observed by ship and shore about loading and unloading in BLU Manual	**R4, R5**	**T1**	**A1, A3, A6, A7**
16.2 Enclosed space entry .1 Identify enclosed spaces aboard ships .2 Describe the permission for enclosed spaces entry .3 State the preventative measures and precautions when entering the enclosed spaces .4 Explain the risks associated with specific types of ships and cargoes	**R9**	**T1**	**A1, A3, A4, A5, A6, A7**
17. Relevant international conventions			
17.1 SOLAS .1 Identify contents related to solid bulk cargoes in regulation II-2/19 and chapter XII	**R1**	**T1**	**A1, A6, A7**
17.2 MARPOL .1 Identify contents related to solid bulk cargoes in MARPOL Annex V	**R2**	**T1**	**A1, A6, A7**
18. Integrated and practical application			
.1 List the major stages of the transport process .2 Explain the work at each stage of the transport process	**All**	**T1**	**A1, A3, A6, A7**

PART D – INSTRUCTOR MANUAL

The model course is intended to give the trainees knowledge on how to consult the IMSBC Code and its associated documents.

This model course, from Part A to Part E, provides guidance including detailed learning objectives for the instructors who will conduct the training course. In Part C, the teaching syllabus and learning objectives are described in detail and substantive materials are provided. Together with the IMSBC Code, Part C and Part D constitute the textbook for training courses on the IMSBC Code and provide supporting materials for the designated tasks which the instructors may need.

Instructors should still prepare their own materials for the training course, in spite of this Instructor Manual, the compendium of course presentations and teaching aids which should facilitate the course planning may vary for the external factors. The structure may vary for each training session due to differences in the trainee's needs and experience. Therefore, the instructors should adjust their teaching materials in accordance with specific circumstances to accomplish the training goals.

To create the learning objectives the instructor should identify the competencies and specific knowledge that the trainees will gain during the course. The trainees should familiarize themselves with the learning objectives at the beginning of the training course to better facilitate their learning.

Generally speaking, the documents on solid bulk cargoes are undergoing more frequent revisions and updates in recent years, among which the IMSBC Code is published once every two years. Therefore, instructors responsible for conducting the training course should check if the materials they are going to use are the latest editions and make adjustments accordingly.

Instructors are recommended to improve teaching quality with the assistance of classroom exercises, workshops, task-based exercises and case studies, in order to stimulate trainees' autonomy and interests and to accelerate their process of knowledge acquisition, consolidation and application. For classroom exercises, instructors are recommended to appropriately arrange their time according to the course contents and types of exercises.

0. Introduction to IMO and the IMSBC Code

0.1 Purpose of the course

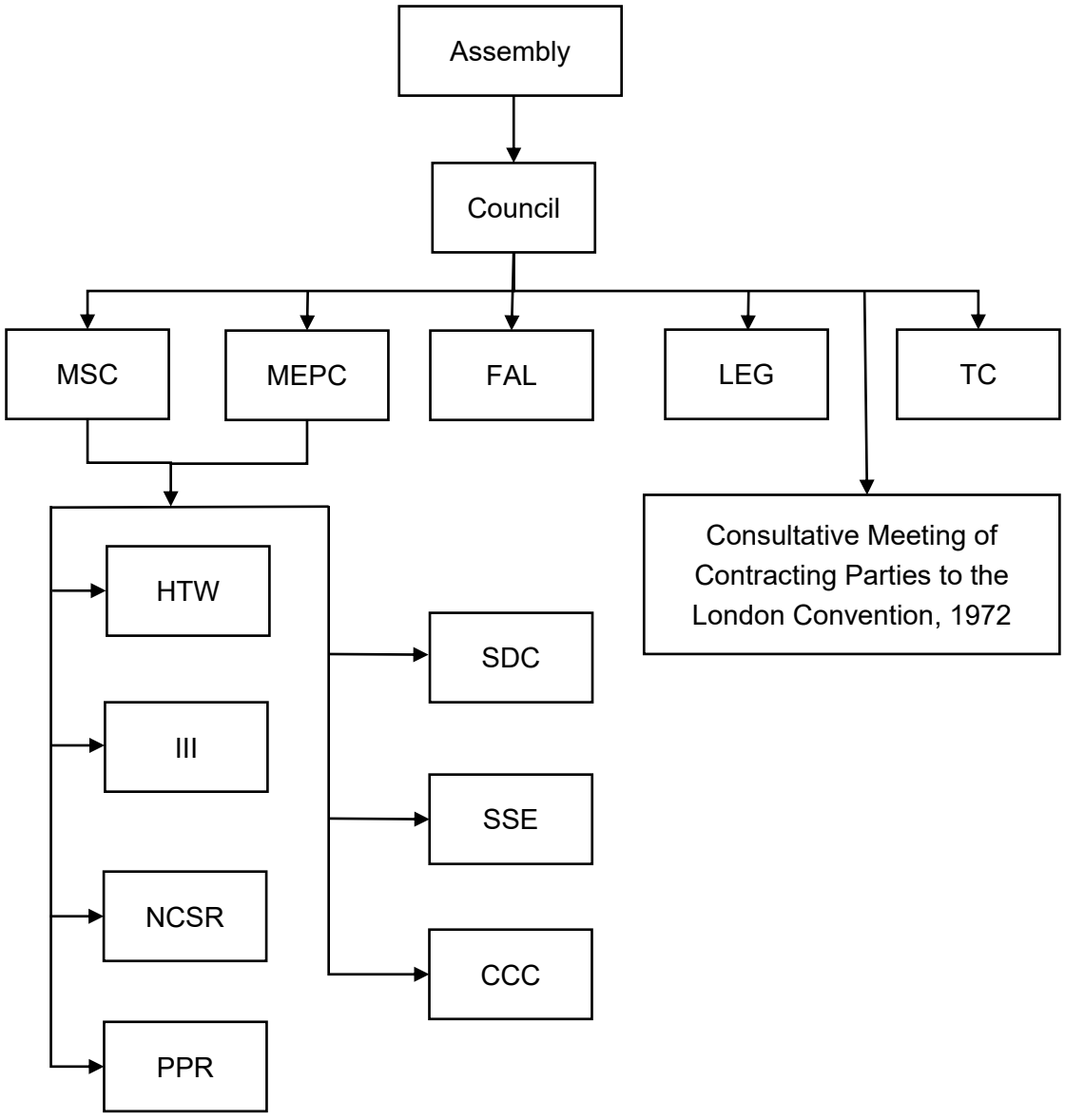
.1 Instructors should give a general introduction to the course outline and highlight the importance of the training course to raise the trainees' awareness and emphasize the importance of learning objectives; and

.2 Instructors should assist the trainees in setting up their individual learning objectives in line with their job requirements via workshops or one-on-one interviews.

0.2 International Maritime Organization (IMO)

.1 Instructors should introduce IMO and its structure including its sub-committees. Moreover, instructors should emphatically give the trainees a clear picture on the work of the relevant sub-committees whose scope covers safe handling and transport of solid bulk cargoes. The following figure shows the structure of IMO after 2013.

Structure of IMO



Note: IMO consists of an Assembly, a Council, five main Committees and seven Sub-Committees: the Maritime Safety Committee (MSC); the Marine Environment Protection Committee (MEPC); the Legal Committee (LEG); the Technical Cooperation Committee (TC) and the Facilitation Committee (FAL).

The Sub-Committee on Human Element, Training and Watch-keeping (HTW); the Sub-Committee on Implementation of IMO Instruments (III); the Sub-Committee on Navigation, Communications and Search & Rescue (NCSR); the Sub-Committee on Pollution Prevention and Response (PPR); the Sub-Committee on Ship Design and Construction (SDC); the Sub-Committee on Systems and Equipment (SSE); and the Sub-Committee on Carriage of Cargoes and Containers (CCC).

The Sub-Committee on Carriage of Cargoes and Containers (CCC) deals with the carriage of packaged dangerous goods, solid bulk cargoes, bulk gas cargoes, and containers. The Sub-Committee keeps updated the International Maritime Solid Bulk Cargoes Code (IMSBC Code) and other relevant codes.

The E&T Group is an editorial and technical group of the Sub-Committee on Carriage of Cargoes and Containers (CCC), which is in charge of preparing and finalizing relevant documents for amending the IMSBC Code.

.2 Instructors, in their presentations on SOLAS, should highlight contents related to the transportation of solid bulk cargoes in chapters VI and VII of SOLAS so as to make the trainees aware of the mandatory nature of the IMSBC Code; and

.3 Instructors, in their presentations on MARPOL, should highlight contents related to the IMSBC Code in MARPOL Annex V.

Exercise 1: What is regulation 6 in chapter VI of SOLAS about?

Key: It is about the acceptability for shipment of solid bulk cargoes.

Exercise 2: What is regulation 7 in chapter VI of SOLAS about?

Key: It is about the loading, unloading and stowage of solid bulk cargoes.

Exercise 3: What is the application of section A-1 in chapter VII of SOLAS?

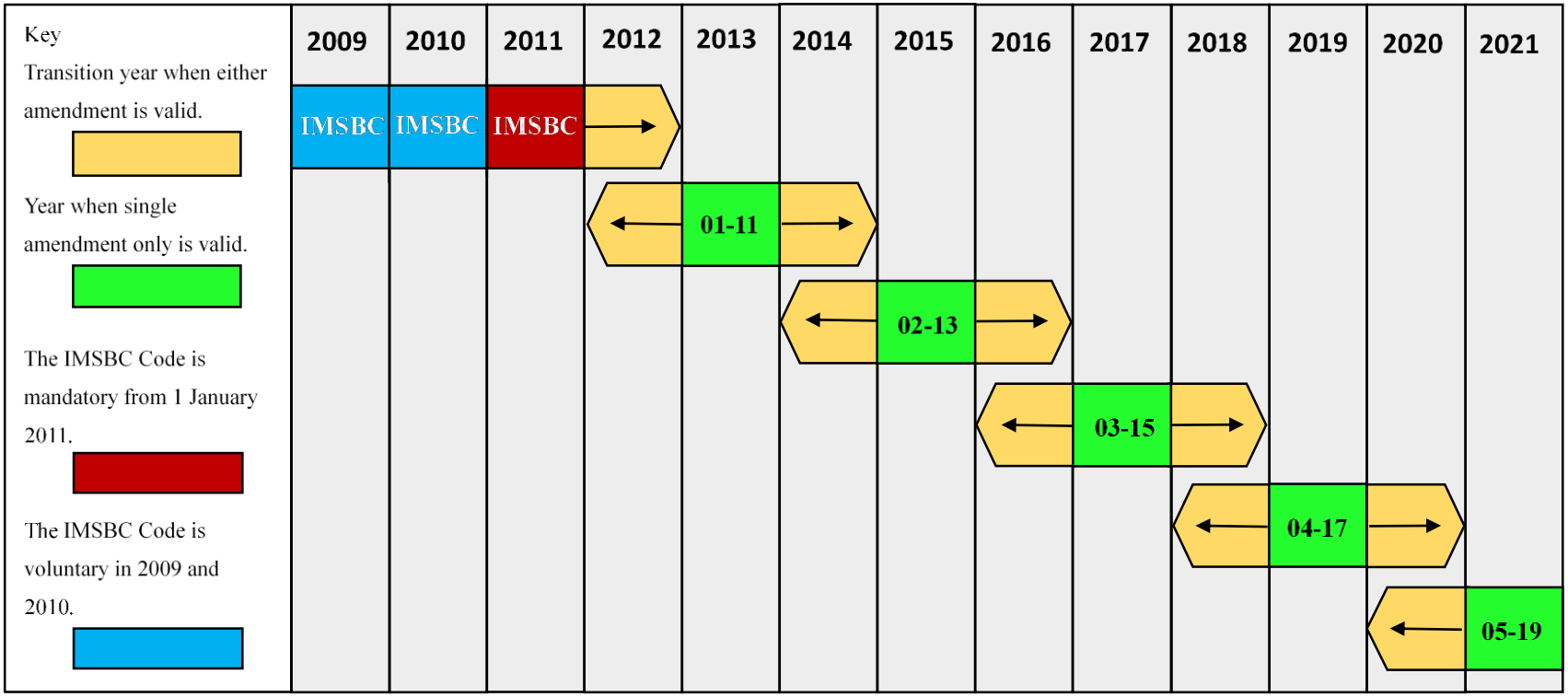
Key: Unless expressly provided otherwise, section A-1 applies to the carriage of dangerous goods in solid form in bulk in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage.

0.3 The International Maritime Solid Bulk Cargoes Code (the IMSBC Code)

.1 Instructors, in their presentations of the history and evolvement of the IMSBC Code, should focus on those amendments with great impact instead of being all-inclusive.

IMSBC Code Amendment cycle

2009-2021



1 General provisions

1.1 Cargoes listed in the IMSBC Code

.1 Describe the sources and contents of information on representative solid bulk cargoes

.1 Instructors should assist trainees in learning to consult the cargo information by their bulk cargoes shipping names (BCSN) and familiarize trainees with the locations in the IMSBC Code and the use of appendices 1 and 4 of the IMSBC Code by making use of examples and classroom exercises.

.2 Instructors, in presentations of appendix 1, should highlight the cargo characteristics in the "8" aspects as in the amendment (05-19) of the IMSBC Code rather than the "6" aspects as in the previous amendments, not necessarily elaborating on the meanings of information in the schedules of various cargoes. Additional attention should be given to cargoes with multiple schedules due to different hazard classifications or contents, for instance, metal sulphide concentrates and seed cake, because these schedules may lead to confusion.

.3 Instructors should make use of discussion on specific cases in their presentations to enhance the trainees' safety awareness and make them realize the importance of obtaining current valid cargo information; and the trainees should understand that accurate cargo information should be obtained from the shipper even if the information related to that cargo has been listed in appendix 1 of the IMSBC Code.

Exercise 1: Identify cargoes listed in the IMSBC Code.

.1 direct reduced iron (B), lumps, pellets, cold-moulded briquettes
.2 ammonium nitrate based fertilizers UN 2071
.3 bauxite
.4 coal
.5 ferrosilicon UN 1408
.6 fishmeal, stabilized UN 2216
.7 nickel concentrate
.8 iron ore
.9 fluorspar
.10 seed cake UN 2217

Key: The above 10 cargoes are all listed in the IMSBC Code.

Exercise 2: Select 3 from the following 10 cargoes listed in the IMSBC Code and tell their groups, and where applicable, their classes and angles of repose.

.1 direct reduced iron (B), lumps, pellets, cold-moulded briquettes
.2 ammonium nitrate based fertilizers UN 2071
.3 bauxite
.4 coal
.5 ferrosilicon UN 1408
.6 fishmeal, stabilized UN 2216
.7 nickel concentrate
.8 iron ore
.9 fluorspar
.10 seed cake UN 2217

Key:

.1 Direct reduced iron, Group B, class not applicable, angle of repose not applicable;
.2 Ammonium nitrate based fertilizer UN 2071, Group B, class 9, angle of repose 27° to 42°;
.3 Bauxite, Group C, class not applicable, angle of repose not applicable;
.4 Coal, Group B (and A), class not applicable, angle of repose not applicable;
.5 Ferrosilicon UN 1408, Group B, class 4.2, angle of repose not applicable;
.6 Fishmeal, stabilized UN 2216, Group B, class 9, angle of repose not applicable;
.7 Nickel concentrate, Group A, class not applicable, angle of repose not applicable;
.8 Iron ore, Group C, class not applicable, angle of repose not applicable;
.9 Fluorspar, Group A and B, class not applicable, angle of repose not applicable;
.10 Seed cake UN 2217, Group B, class 4.2, angle of repose not applicable.

1.2 Cargoes not listed in the IMSBC Code

.1 Explain the procedures for assessment of acceptability of consignments for safe shipment

.1 After completing their presentations, instructors should arrange "classroom exercises" and "workshops" to consolidate the knowledge learned and to enhance the awareness and competency of the trainees in using the IMSBC Code in the actual working scenarios.

.2 Instructors should, by noting the trainees' performance, assess the trainees in a timely manner with respect to mastering and using of the knowledge and adjust the teaching plan accordingly.

.2 Explain the format and content of the application form to be submitted to IMO

.1 If the trainees work in the competent authorities concerned, instructors should appropriately allocate the class hours in elaborating on the format and content of the application form to be submitted to IMO by the competent authorities of the loading ports within a time frame.

Workshop: If a solid bulk cargo is not listed in the IMSBC Code, please identify the acceptability of consignments for safe shipment.

Tips: The acceptability of consignments for safe shipment should be discussed in terms of the cargo group, competent authorities concerned and procedures for reporting to IMO.
Refer to the relevant content in sections 1 and 4 of the IMSBC Code.

1.3 Application and implementation of the IMSBC Code

.1 Explain the application of the IMSBC Code and its non-mandatory provisions

.1 Instructors, after completing their presentations, should use "classroom exercises" to consolidate the trainees' understanding, and assess in time the trainees with respect to mastering and using of the knowledge so as to adjust the teaching plan accordingly.

Exercise 1: Which provisions of the IMSBC Code are mandatory?

.1 Section 4 "Assessment of acceptability of consignments for safe shipment"
.2 Section 7 "Cargoes which may liquefy"
.3 Section 9 "Materials possessing chemical hazards"
.4 Section 12 "Stowage factor conversion tables"
.5 Section 13 "References to related information and recommendations"
.6 Appendix 2 "Laboratory test procedures, associated apparatus and standards"
.7 Appendix 3 "Properties of solid bulk cargoes"

Key: 1, 2, 3

Exercise 2: Which sections in appendix 1 of the IMSBC Code are non-mandatory?

Key: The texts are found in the sections for "Description", "Characteristics (other than Hazard classification)", "Hazard" and "Emergency procedures" of individual schedules of solid bulk cargoes in appendix 1 of the IMSBC Code.

Exercise 3: Tell whether the provisions in section 11 "Security provisions" of the IMSBC Code are non-mandatory or not.

Key: All the provisions in section 11 are non-mandatory, except those in subsection 11.1.1.

1.4 Exemptions and equivalent measures

.1 Briefly state the conditions for applying for exemptions and equivalent measures and their authorization

Instructors, in their presentations to the trainees, should state that:

.1 a competent authority may authorize any other provision by exemption if it is satisfied that such a provision is at least as effective and safe as that required by the IMSBC Code;

.2 a competent authority which has taken the initiative with respect to the exemption shall send a copy of such exemption to the Organization, which shall bring it to the attention of the Contracting Parties to SOLAS and shall take actions to amend the IMSBC Code to include the provisions covered by the exemption, as appropriate.

.2 Briefly state the period of validity of the exemption and related documents that should be maintained on board

Instructors, in their presentations to the trainees, should state that:

.1 the period of validity of the exemption shall be not more than five years from the date of authorization;

.2 a copy of the exemption or an electronic copy thereof shall be maintained on board each ship transporting solid bulk cargoes in accordance with the exemption, as appropriate.

1.5 Definitions

.1 State the definitions in the IMSBC Code

.1 Instructors, after completing their presentations, should use classroom exercises to help the trainees become familiar with the knowledge they acquired in this session.

Exercise:

Please give definitions of the following terms in the IMSBC Code.

.1 angle of repose
.2 cargoes which may liquefy
.3 non-cohesive materials
.4 flow moisture point
.5 high-density solid bulk cargo
.6 incompatible materials
.7 materials hazardous only in bulk (MHB)
.8 transportable moisture limit (TML)

Key:

.1 *Angle of repose* means the maximum slope angle of non-cohesive (i.e. free-flowing) granular material. It is measured as the angle between a horizontal plane and the cone slope of such material;

.2 *Cargoes which may liquefy* means cargoes which contain a certain proportion of fine particles and a certain amount of moisture. They may liquefy if shipped with moisture content in excess of their transportable moisture limit;

.3 *Non-cohesive material* means dry materials that readily shift due to sliding during transport, as listed in appendix 3, paragraph 1, "Properties of dry bulk cargoes".

.4 *Flow moisture point* means the percentage of moisture content (wet mass basis) at which a flow state develops under the prescribed method of test in a representative sample of the material (see paragraph 1 of appendix 2);

.5 *High-density solid bulk cargo* means a solid bulk cargo with a stowage factor of 0.56 m^3/t or less;

.6 *Incompatible materials* means materials that may react dangerously when mixed. They are subject to the requirements of subsection 9.3 and the schedules for individual cargoes classified in Group B;

.7 *Materials hazardous only in bulk (MHB)* means materials which may possess chemical hazards when carried in bulk other than materials classified as dangerous goods in the IMDG Code;

.8 *Transportable moisture limit (TML) of a cargo which may liquefy* means the maximum moisture content of the cargo which is considered safe for carriage in ships not complying with the special provisions of subsection 7.3.2.

2 General loading, carriage and unloading precautions

2.1 Cargo distribution

.1 Explain the principles on preventing the structure from being overstressed

.1 Instructors should elaborate on the principles with the help of the loading manual, loading instrument and pictures/graphs to make it easier for the trainees to understand the hazards of overstress due to improper cargo distribution on either the structure or the entire hull.

.2 Explain the operational methods to aid stability

Instructors should:

.1 elaborate on the operational methods with the help of the stability information booklet, loading instrument and pictures/graphs to make it easier for the trainees to understand the hazards of improper cargo distribution on ships stability and learn to use the method for calculating stability for the anticipated worst conditions during the voyage; and

.2 emphasize the precautions that should be taken when it is necessary to carry high-density cargoes in 'tween-decks or higher cargo spaces, with help of classroom exercises or workshops prepared for the session.

Exercise: A multi-deck ship plans to carry 8,000 M/T of iron ore fines (stowage factor 0.5 m^3/t) with 1,500 M/T of iron ore fines to be stowed in the 'tween-deck cargo spaces, what precautions should be taken to ensure safety?

Key:

.1 Due consideration shall be given to ensure that the deck area below the 'tween-deck cargo spaces is not overstressed, and that the ship's stability is not reduced below the minimum acceptable level, when loading a small quantity of cargoes in the 'tween-deck cargo spaces;

.2 Adequate trimming should be arranged; and

.3 High-density cargoes should be loaded in the lower hold cargo spaces in preference to the 'tween-deck cargo spaces.

2.2 Precautions for loading and unloading

Instructors should:

.1 enhance the trainees' safety awareness and make them understand better the precautions in loading and unloading by introducing appendix 3 "ship/shore safety checklist for loading or unloading dry bulk cargo carriers" to the BLU Code; and

.2 state briefly that cargo hold inspection before loading should refer to the Guidance to Ships' Crews and Terminal Personnel for Bulk Carrier Inspections, adopted by IMO resolution A.866(20).

3 Safety of personnel and ships

3.1 Hazards to personnel and ships caused by cargoes

.1 Instructors, after completing their presentations, should use classroom exercises to reinforce the knowledge of the trainees and enhance their awareness and competency in using the information in appendix 1 of the IMSBC Code in the actual working scenarios.

.2 Instructors should introduce *Recommendations on the Safe Use of Pesticides in Ships Applicable to the Fumigation of Cargo Holds (MSC.1/Circ.1264)*, as amended by MSC.1/Circ.1396, and elaborate on the hazards caused by fumigants (toxic to personnel, emitting flammable gas, etc.) with real cases in marine practices as well as the precautionary measures to raise the trainees' safety awareness. Instructors should also introduce types of fumigation methods and fumigants used and cargoes for which fumigation may be applied.

.3 Instructors should in their presentations emphasize the hazards associated with entering enclosed spaces.

Workshop: Analyse the hazards to personnel and ships by ammonium nitrate based fertilizer (UN 2067, UN 2071) when it is in bulk shipment, as well as necessary precautions to be taken.

Tips: Hazards to personnel and ships caused by ammonium nitrate based fertilizer (UN 2067, UN 2071) in bulk shipment may be expounded in terms of risk in explosion, poisoning and dust.

3.2 Ventilation

.1 Instructors, after completing their introduction to the purpose and types of ventilation and conditions for use of ventilation systems, should organize workshops to consolidate the knowledge of the trainees, timely assess the trainees' ability in mastering and using the knowledge, and adjust the teaching plan accordingly.

Workshop: A bulk carrier was loaded with 12,000 M/T of coal in bulk, which was declared by the shipper as a solid bulk cargo of Group B and liable to emit a significant amount of methane. What should the crew do for ventilation to ensure safety?

Tips:

.1 surface ventilation for the first 24 hours after departure from the loading port;

.2 stop ventilation for an appropriate period (recommended period is four hours) and measure the methane concentrations;

.3 surface ventilation, monitor the atmosphere in the cargo spaces by stopping ventilation for the above-mentioned period, on a daily basis; and

.4 apply special precautions when observing methane in unventilated cargo spaces.

Refer to requirements on ventilation for "coal" in appendix 1 of the IMSBC Code for details.

4. Assessment of acceptability of consignments for safe shipment

4.1 Identification and classification of cargoes

.1 In their presentations, instructors should place emphasis on the requirements of identifying the solid bulk cargo carried by sea by its Bulk Cargo Shipping Name (BCSN) in the transport documentation.

.2 In their presentations, instructors should point out the fact that correct identification of a solid bulk cargo facilitates identification of the conditions necessary to safely carry the cargo and the emergency procedures, if applicable, and use examples to make the trainees know what the BCSN of a solid bulk cargo carried by sea shall consist of,

a. when the cargo is dangerous goods and not identified with a generic Proper Shipping Name, or not otherwise specified (N.O.S) in the IMDG Code; or

b. when the cargo is dangerous goods identified with a generic Proper Shipping Name and/or not otherwise specified (N.O.S) in the IMDG Code with three relevant exceptions.

Exercise 1: Which of the following is not the BCSN for dangerous goods?

.1 AMMONIUM NITRATE UN 1942

.2 LEAD NITRATE UN 1469

.3 COAL

.4 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. UN 3077

Key: 3.

Exercise 2: According to the IMSBC Code, if a solid bulk cargo to be carried by sea is dangerous goods identified with CORROSIVE SOLID, FLAMMABLE, N.O.S. in the IMDG Code, what shall the BCSN consist of?

Key: The BCSN shall consist of, in the following order:

.1 a chemical or technical name of the material;

.2 a specific description to identify the properties of the material; and

.3 the UN number.

4.2 Assessment of acceptability

.1 Describe the information on the cargo that the shipper shall provide to the master

Instructors should:

.1 familiarize the trainees with the identification of cargo information in the shipping documents with help of classroom exercises and workshops;

.2 timely assess the trainees' achievements in using the knowledge they have acquired by observing the trainees' performance in the "classroom exercise" and "workshop" sessions.

Exercise 1: Describe the information on the cargo that the shipper shall provide to the master.

Key: The information is listed but not limited to that in the form below.

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN</td></tr>
<tr><td>Shipper</td><td>Transport document number</td></tr>
<tr><td>Consignee</td><td>Carrier</td></tr>
<tr><td>Name/means of transport
Port/place of departure</td><td rowspan="2">Instructions or other matters</td></tr>
<tr><td>Port/place of destination</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)</td><td>Gross mass (kg/tonnes)</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor:
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td>Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☐ not harmful to the marine environment
Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td>Additional certificate(s)*
☐ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☐ other (specify)
*If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory

Place and date

Signature on behalf of shipper</td></tr>
</table>

Exercise 2: Fill in the Form for Cargo Information (for Solid Bulk Cargoes) with the information in the following passage.

M/V XX would carry 80,000 M/T iron ore fines from Port P to Port V on 23 December, XXXX. Cargo information: Iron ore fines, natural, non-concentrate, nominally sized up to 12.5 mm, stowage factor 0.38 m³/t, Group A, moisture content 6.88%, transportable moisture limit 9.55%; no harm to the marine environment.

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN:</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier:</td></tr>
<tr><td>Name/means of transport:
/OCEAN TRANSPORT
Port/place of departure:</td><td rowspan="2">Instructions or other matters
REFER TO THE IMSBC CODE FOR FURTHER INFORMATION</td></tr>
<tr><td>Port/place of destination:</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)</td><td>Gross mass (kg/tonnes)</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor:
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td>Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☐ not harmful to the marine environment</td><td rowspan="2">Additional certificate(s)*
☐ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☐ approval certificate for the procedures for sampling, testing and controlling the moisture content for a solid bulk cargo that may liquefy (see 4.4.3 of the IMSBC Code)
☐ other (specify)
*If required</td></tr>
<tr><td>Relevant special properties of the cargo
(e.g., highly soluble in water)</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory ABC LTD
Place and date PORT P / 12 DECEMBER XXXX
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

Key: Refer to the parts in bold in the form below.

FORM FOR CARGO INFORMATION
For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN: IRON ORE FINES</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier: XX</td></tr>
<tr><td>Name/means of transport:
XX/OCEAN TRANSPORT
Port/place of departure: P</td><td rowspan="2">Instructions or other matters
REFER TO THE IMSBC CODE FOR FURTHER INFORMATION</td></tr>
<tr><td>Port/place of destination: V</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)
IRON ORE FINES, NATURAL, NON-CONCENTRATE, NOMINALLY SIZED UP TO 12.5 MM</td><td>Gross mass (kg/tonnes)
80,000 M/T</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor: 0.38m³/t
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☒ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit
9.55%

Moisture content at shipment
6.88%</td></tr>
<tr><td>Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☒ not harmful to the marine environment
Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td>Additional certificate(s)*
☒ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☒ approval certificate for the procedures for sampling, testing and controlling the moisture content for a solid bulk cargo that may liquefy (see 4.4.3 of the IMSBC Code)
☐ other (specify)
*If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory ABC LTD
Place and date PORT P / 12 DECEMBER XXXX
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

Exercise 3: Confirm whether the information in the Form for Cargo Information (for Solid Bulk Cargoes) is correct or not. If it is not correct, cross out the incorrect items and replace them with the correct ones.

M/V MM would carry 33,000 M/T coal from Port O to Port W on 16 July, XXXX. The cargo information: particle size 0.3 mm, moisture content 13.60%, transportable moisture limit 19.80%, stowage factor 0.9 m³/t, MHB [CB] [SH] [WF] [CR], as appropriate and no harm to the marine environment.

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN: COAL</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier: MM</td></tr>
<tr><td>Name/means of transport:
MM/OCEAN TRANSPORT
Port/place of departure: O
Port/place of destination: W</td><td>Instructions or other matters
REFER TO THE IMSBC CODE FOR FURTHER INFORMATION</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)
Coal / 0.3 mm</td><td>Gross mass (kg/tonnes)
54,000 M/T</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor: 0.9 m³/t
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☒ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit
19.80%

Moisture content at shipment
13.60%</td></tr>
<tr><td>Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☐ not harmful to the marine environment
Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td>Additional certificate(s)*
☐ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☐ approval certificate for the procedures for sampling, testing and controlling the moisture content for a solid bulk cargo that may liquefy (see 4.4.3 of the IMSBC Code)
☐ other (specify)
*If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory
ABC LTD
Place and date PORT O / 12 JUNE XXXX
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

Key: Refer to the parts in bold in the form below.

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN: COAL</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier: MM</td></tr>
<tr><td>Name/means of transport:
MM/OCEAN TRANSPORT
Port/place of departure: O
Port/place of destination: W</td><td>Instructions or other matters
REFER TO THE IMSBC CODE FOR FURTHER INFORMATION</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)
Coal / 0.3 mm</td><td>Gross mass (kg/tonnes)
33,000 M/T</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor: 0.9 m³/t
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*: MHB [CB] [SH] [WF] [CR], as appropriate
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☒ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit
19.80%

Moisture content at shipment
13.60%</td></tr>
<tr><td>Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☒ not harmful to the marine environment
Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td>Additional certificate(s)*
☒ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☒ approval certificate for the procedures for sampling, testing and controlling the moisture content for a solid bulk cargo that may liquefy (see 4.4.3 of the IMSBC Code)
☐ other (specify)
*If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory ABC LTD
Place and date PORT O / 12 JUNE XXXX
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

.2 Describe the requirements on certificates of test that the shipper shall provide to the ship's master or his representative when carrying cargoes which may liquefy

.1 Instructors should help the trainees to become familiar with the certificates of tests that should be obtained when loading and carrying concentrates or any other cargoes which may liquefy, with help of "classroom exercises". The trainees should understand that the certificates are issued by an entity recognized by the competent authority of the port of loading.

.2 Instructors should make trainees aware that the master shall be provided with a document issued by the competent authority of the port of loading, stating that the procedures for sampling, testing and controlling moisture content to ensure the moisture content is less than the TML have been approved.

Exercise: Which certificates should the shipper provide to the ship's master or his representative when shipping a cargo of Group A?

Key: Certificates of moisture content and transportable moisture limit.

.3 Describe the factors to be considered and methods to be used during sampling

.1 Instructors should get the trainees familiarized with the procedural steps and factors that should be considered, using a workshop.

Workshop: A bulk carrier is consigned to load 52,000 M/T of nickel concentrate in bulk. The shipper shall arrange for the cargo to be properly sampled and tested prior to loading. Please describe the proper sampling procedure and precautions.

Tips:

.1 A plan of the stockpile is drawn and divided into areas, each of which contains approximately 250 t. Such a plan will indicate the number of subsamples required

and where each is to be taken.

	1	2	3	4	5	6	7	8	
9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28
29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58
59	60	61	62	63	64	65	66	67	68
	69	70	71	72	73	74	75	76	

As an example, the figure shows the plan of one of stockpiles which is approximately 19,000 t.

.2 When the cargo does not contain large lumps such as head of infant, one 200 g subsample is taken for each 250 t cargo to be shipped. Depending on the maximum particle size, the amount of sample should be increased. Each subsample taken is drawn from approximately 50 cm below the surface of the designated area.

.3 Subsamples for moisture content determination are placed in sealed containers immediately on withdrawal for conveyance to the testing laboratory, where they are thoroughly mixed in order to obtain a fully representative sample.

.4 A fully representative sample for test will be obtained through thorough mixing of subsamples in the testing laboratory.

.5 The sampling scheme discussed here is not intended to replace sampling procedures, such as the use of mechanical and/or automatic samplers if they are available and reliable.

Note: There are standardized sampling procedures (such as ISO 3082, which is referenced in the IMSBC Code) that prohibit in situ sampling of ships and stockpiles, as these approaches cannot provide representative samples. In situ sampling shall be considered only when there is no other way of sampling.

4.3 Documentation required on board the ship carrying dangerous goods

.1 Instructors should use "classroom exercises" in their presentations to make the trainees clear about the documentation required on board the ship carrying

dangerous goods, and emphasize that cargo ships, subject to SOLAS regulation II-2/19.4, shall have a Document of compliance when carrying dangerous goods in solid form in bulk except class 6.2 and class 7.

Exercise: List the documentation that should be prepared by a bulk carrier with 57,000 DWT, built in March 2017, which carries 13,700 M/T of SEED CAKE (a) UN 1386 in bulk.

Key:

.1 a special list or manifest setting forth the dangerous goods on board and the location in accordance with SOLAS regulation VII/7-2.2;

.2 appropriate instructions on emergency response to incidents involving the cargoes; and

.3 Document of compliance.

5. Trimming procedures

5.1 General provisions for trimming

.1 Explain the purpose for trimming

.1 Instructors should use "classroom exercises" in their presentations to make the trainees understand the purpose of trimming when imparting the knowledge.

Exercise 1: A bulk carrier carrying 35,000 M/T of coal in bulk which is a self-heating cargo on its voyage, for which the shipper specifically required trimming to make the cargo piles compact. What are the main purposes of the trimming?

Key: Trimming a cargo reduces the likelihood of cargo shifting and prevents the air from entering the cargo. Air entering the cargo could lead to spontaneous heating. To minimize these risks, cargoes shall be trimmed to a reasonable level, as necessary.

Exercise 2: A bulk carrier carrying 55,000 M/T of high-density cargoes was loaded with the help of two bulldozers during the handling process. What is the main purpose of the trimming?

Key: Cargo trimming helps to equalize the mass distribution on the bottom structure by lowering the height of stockpiles.

Exercise 3: A bulk carrier carrying 40,000 M/T grain screening pellets (stowage factor 1.5 m^3/t, angle of repose 28°) was loaded with the help of two bulldozers. What are the main purposes of the trimming?

Key：

.1 Trimming could make the cargo spaces as full as practicable so as to prevent cargo shifting.

.2 Trimming a cargo reduces the likelihood of cargo shifting so as to improve the stability.

5.2 Special provisions for trimming

.1 Describe special provisions for trimming of multi-deck ships

.1 Instructors should put emphasis on how trimming will affect the structure of the tank top and that of the deck when loading takes place only in the lower holds and the 'tween-decks, with illustrations or pictures in the PPT presentations.

.2 Describe special provisions for trimming of cohesive bulk cargoes

.1 Instructors should explain to the trainees the special provisions for trimming of cohesive bulk cargoes with examples and classroom exercises to help the trainees better understand those special trimming requirements.

Exercise 1: Which of the following statements about the special trimming requirements of cohesive bulk cargoes is incorrect?

.1 all damp cargoes possess cohesion

.2 provisions for trimming in section 5 of the IMSBC Code do not apply to cohesive cargoes

.3 the angle of repose is not an indicator of the stability of a cohesive bulk cargo

.4 the angle of repose is not included in the individual schedules for cohesive cargoes

Key: 2.

Exercise 2: What are the trimming requirements for fluorspar (angle of repose inapplicable) in accordance with the IMSBC Code?

Key: Cohesive bulk cargoes shall be trimmed according to subsection 5.1 "General provisions for trimming" of the IMSBC Code.

.3 Describe special provisions for trimming of non-cohesive bulk cargoes

Instructors should:

.1 clarify that the angle of repose is a characteristic of non-cohesive bulk cargoes, which is not applicable to cohesive bulk cargoes; and

.2 use classroom exercises in their presentations to make trainees understand the relationship between angle of repose and the trimming requirements.

Exercise 1: What are the trimming requirements for ammonium sulphate (angle of repose 32°) in accordance with the IMSBC Code?

Key: Non-cohesive bulk cargoes having an angle of repose greater than 30° to 35° inclusive shall be trimmed by using trimming equipment approved by the competent authority. The unevenness of the cargo surface measured as the vertical distance (Δh) between the highest and lowest levels of the cargo surface shall not exceed B/10, where B is the beam of the ship in meters, with a maximum allowable Δh = 1.5 m.

Exercise 2: What are the trimming requirements for urea (angle of repose 28°) in accordance with the IMSBC Code?

Key: Non-cohesive bulk cargoes having an angle of repose less than or equal to 30º shall be carried according to the provisions applicable to the stowage of grain cargoes (International Code for the Safe Carriage of Grain in Bulk adopted by IMO resolution MSC.23(59)).

6 Methods for determining the angle of repose

6.1 Tilting box test

.1 State the application of the tilting box test

.1 Instructors should make the trainees understand the application of the tilting box test with help of "classroom exercises" and pictures or other visual aids.

Exercise: What is the scope of the tilting box test in accordance with the IMSBC Code?

Key: The tilting box test method is suitable for non-cohesive granular materials with a grain size not greater than 10 mm.

.2 Briefly describe the test procedure

.1 Instructors should help the trainees understand the test procedure and its operation by using videos or other visual aids.

6.2 Shipboard test method

.1 Briefly describe the test procedures and precautions

.1 Instructors should show the trainees how to conduct the test using classroom exercises and task-based exercises.

Exercise: Identify the trimming requirements for a bulk carrier carrying potassium chloride, which has an angle of repose of 30° obtained by using the shipboard test method.

Key: According to subsection 2.2.5 in appendix 2 of the IMSBC Code, the figure can be converted to the tilting box value as follows: 30° + 3° = 33°.

Besides, according to subsection 5.4.4 of the IMSBC Code, the trimming of non-cohesive bulk cargoes having an angle of repose greater than 30° to 35° inclusive shall be conducted according to the following criteria:

.1 The unevenness of the cargo surface measured as the vertical distance (Δh) between the highest and lowest levels of the cargo surface shall not exceed B/10, where B is the beam of the ship in metres, with a maximum allowable h = 1.5 m; or

.2 Loading is carried out using trimming equipment approved by the competent authority.

Task-based exercise: Determine the angle of repose by using the shipboard test method.
Instructors should prepare necessary equipment (flasks, sheets of rough-textured paper and protractors) and samples and arrange the trainees in several groups who are required to practice the determination of the angle of repose according to the procedures in subsection 2.2 of appendix 2 of the IMSBC Code.

7. Cargoes which may liquefy

7.1 Influence of liquefaction on ship safety

.1 Explain the conditions for liquefaction

.1 Instructors should make the trainees understand the various phenomena during the process of liquefaction of cargoes with assistance of pictures or any other visual aids as well as classroom exercises.

Exercise 1: Which of the following listed in appendix 1 to IMSBC Code are cargoes which may liquefy?

.1 fluorspar
.2 iron concentrate
.3 iron ore
.4 zinc sulphide
.5 nickel concentrate
.6 clay

Key: 1, 2, 4, 5.

Exercise 2: In an iron ore fine, particles with diameter less than 1 mm account for 10% and particles with diameter less than 10 mm account for 50%. Which group does this cargo belong to?

Key: Group A.

Exercise 3: In an iron ore fine, particles with diameter less than 1 mm account for 8% and particles with diameter less than 10 mm account for 55%. Which group does this cargo belong to?

Key: Group C.

Exercise 4: In an iron ore the total goethite content is 39% in mass. Which group does this cargo belong to?

Key: Group C.

Exercise 5: In a bauxite fine, particles with diameter less than 1 mm account for 35% and particles with diameter less than 2.5 mm account for 50%. Which group does this cargo belong to?

Key: Group A.

Exercise 6: For a bauxite cargo the shipper provides the master with a certificate, in accordance with the result of the test approved by the competent authority of port of loading, stating that the moisture of the cargo freely drains from the cargo so that the degree of saturation is not liable to reach 70%. May the bauxite cargo be carried as a Group C cargo?

Key: Yes.

Exercise 7: Which group does nickel ore belong to?

Key: Group A.

Exercise 8: Which group does nickel concentrate belong to?

Key: Group A.

.2 Explain the hazards of liquefaction

.1 Instructors should make the trainees understand the hazards of liquefaction under the conditions of both MC＞TML and MC＜TML, with the help of pictures and video demonstrations as well as classroom exercises.

Exercise: Which of the following statements are correct?

.1 Cargo shift caused by liquefaction may occur when the moisture content exceeds the TML.

.2 Some cargoes are susceptible to moisture migration and may develop a dangerous wet base even if the average moisture content is less than the TML.

.3 In the resulting viscous fluid state, cargo may flow to one side of the ship with a roll but not completely return with a roll the other way. Consequently, the ship may capsize quite suddenly.

.4 Liquefaction does not occur when the cargo consists of large particles or lumps and water passes through the spaces between the particles and there is no increase in the water pressure.

Key: Correct statements are 1, 2, 3 and 4.

7.2 Provisions for cargoes which may liquefy

.1 Describe the requirements for general cargo ships to transport cargoes which may liquefy

.1 Instructors should make the trainees understand the safe transport conditions of cargoes which may liquefy and the precautions when stowing the cargoes which may liquefy, with pictures and video demonstrations as well as "classroom exercises".

.2 Instructors should emphasize that concentrates or other cargoes which may liquefy shall only be accepted for loading when the actual moisture content of the cargo is less than its TML.

Exercise 1: Which of the following statements are correct?

.1 Concentrates or other cargoes which may liquefy shall only be accepted for loading when the actual moisture content of the cargo is less than its TML.

.2 Cargoes having moisture content in excess of the TML may be carried on a specially constructed or fitted cargo ship for confining cargo shift.

.3 Cargoes having moisture content in excess of the TML should not be carried.

.4 Adequate measures shall be taken to prevent liquids entering the cargo space in which these solid bulk cargoes are stowed during the voyage.

.5 Caution about the possible danger of using water to cool these cargoes may bring the moisture content of these cargoes to a flow state while the ship is at sea.

.6 Introducing water to cool cargoes may bring the moisture content of these cargoes to a flow state. When necessary, due consideration shall be given to apply water in the form of spray.

Key: Correct statements are 1, 2, 4, 5 and 6.

.2 Describe the requirements for specially constructed or fitted cargo ships

.1 Instructors should explain the structural design, the installation of the equipment which can confine any cargo shift and approval certificate of the specially constructed or specially fitted cargo ships. The ship concerned shall carry evidence of approval by the Administration.

.2 When the actual moisture content of the cargo is more than its TML, the cargo can only be carried by the specially constructed or fitted cargo ships, and only if the ship concerned shall carry evidence of approval by the Administration.

.3 Describe the requirements for specially constructed cargo ships for dry powdery cargoes

.1 Instructors should explain that specially constructed cargo ships for dry powdery cargoes exist. On such ships, cargoes are handled by means of closed type systems using pneumatic equipment which prevents the cargo from exposure to the weather. The ship concerned shall carry evidence of approval by the Administration.

8 Test methods for cargoes which may liquefy

8.1 Laboratory methods for determining transportable moisture limit

.1 Instructors should briefly describe the laboratory methods for determining the transportable moisture limit with the help of pictures, videos and any other visual aids.

Exercise 1: List the different laboratory methods for determining the transportable moisture limit as recommended by the IMSBC Code.

Key:

.1 Flow table test
.2 Penetration test
.3 Proctor/Fagerberg test
.4 Modified Proctor/Fagerberg test procedure for iron ore fines
.5 Modified Proctor/Fagerberg test procedure for coal
.6 Modified Proctor/Fagerberg test procedure for bauxite

8.2 Complementary test methods for determining the possibility of liquefaction

Instructors should：

.1 describe to the trainees under what conditions the complementary test methods are used and what the procedures are.

.2 make use of the workshop method to make the trainees able to carry out the "can test" with ease.

.3 emphasize that the "can test" does not determine moisture or TML, which are the proper variables to assess whether a Group A cargo is safe to be shipped or not. The actual moisture content and transportable moisture limit shall be determined in accordance with a procedure determined by the appropriate authority, thus the "can test" is applicable only when there is evidence that the determination of moisture and TML has not been properly conducted.

Workshop: Determine the actual moisture conditions of the cargo with a "can test".
Divide the class into groups, prepare test equipment and some samples and then follow the correct procedure for determining the actual moisture conditions of the cargo samples. Refer to section 8.4 of the IMSBC Code for details.
Test equipment: a number of cylindrical cans or similar containers (0.5 to 1 litre capacity) and some samples of the cargo.

9. Materials possessing chemical hazards

9.1 Classification of dangerous goods and materials hazardous only in bulk (MHB)

.1 Explain hazard classification

Instructors, in their presentations to the trainees, should:

.1 emphasize that hazard classification is the basis for the classification of cargoes in Group B and that for the same kind of hazard, MHB is of lower risk compared to dangerous goods;

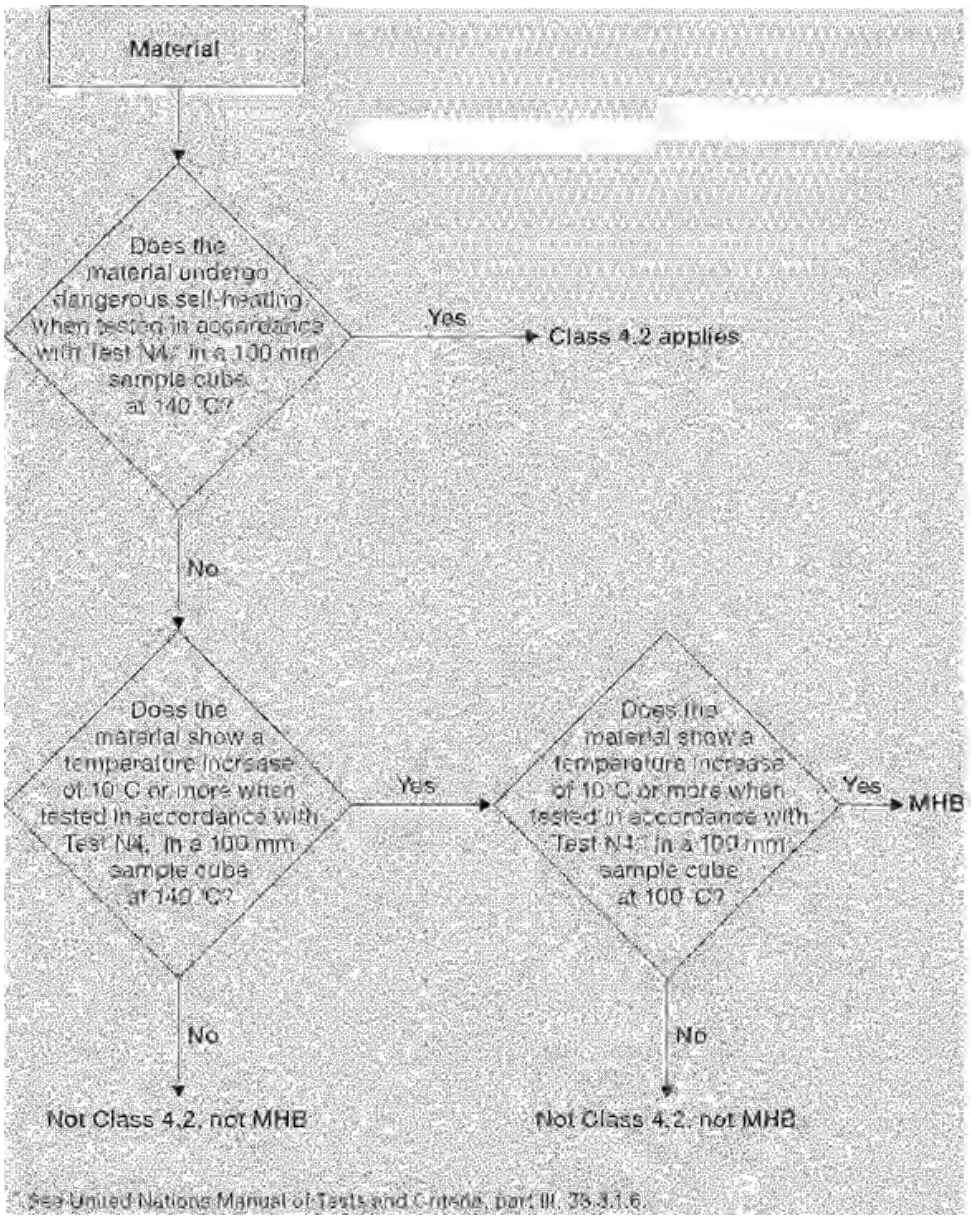
.2 briefly explain that for the purpose of the IMSBC Code, dangerous goods shall be classified in accordance with part 2 of the IMDG Code and that dangerous goods of classes 4.1, 4.2, 4.3, 5.1, 6.1, 7, 8 and 9 are included in the IMSBC Code;

.3 briefly describe that a material shall be classified as MHB if the material possesses one or more of the chemical hazards (excluding those hazards which are covered by the classification system of the IMDG Code) as defined to be MHB (CB), MHB (SH), MHB (WF), MHB (WT), MHB (TX), MHB (CR) and MHB (OH);

.4 introduce the following a workshop to help the trainees develop a better understanding of the relation between hazards of dangerous goods and those of MHB.

Workshop: Describe the classification procedure for ascertaining whether the hazard of being self-heating of a self-heating material is class 4.2, MHB (SH) or neither of the two.

Tips: Refer to the flow chart below.


Material
Does the material undergo dangerous self-heating when tested in accordance with Test N4, in a 100 mm sample cube at 140 °C?
Yes
Class 4.2 applies
No
Does the material show a temperature increase of 10 °C or more when tested in accordance with Test N4, in a 100 mm sample cube at 140 °C?
Yes
Does the material show a temperature increase of 10 °C or more when tested in accordance with Test N4, in a 100 mm sample cube at 100 °C?
Yes
MHB
No
Not Class 4.2, not MHB
No
Not Class 4.2, not MHB
* See United Nations Manual of Tests and Criteria, part III, 33.3.1.6.

.2 Explain the classification of cargoes in Group B

Instructors should:

.1 explain the classification of the cargoes in Group B, and point out the differences between classifications in different editions of the IMSBC Code;

.2 ask the trainees to give examples of dangerous goods also possessing additional MHB hazards by looking up schedules of cargoes in Group B, and describe the hazards and transport requirements thereof; and

.3 help the trainees understand the contents well by using classroom exercises.

Exercise 1: Which classes can the following cargoes in Group B be further divided into according to the IMSBC Code?

.1 Dangerous cargoes listed in the IMDG Code but not possessing MHB hazards;
.2 Materials hazardous only in bulk;
.3 Cargoes which are neither liable to liquefy nor to possess chemical hazards;
.4 Dangerous cargoes listed in the IMDG Code and also possessing MHB hazards.

Key: 1, 2, 4.

Exercise 2: Of the following solid bulk cargoes listed in the IMSBC Code, which are regulated by the IMDG Code when transported in packaged form?

.1 class 4.1
.2 class 4.2
.3 class 4.3
.4 MHB (WT)
.5 class 5.1
.6 class 6.1
.7 MHB (CR)
.8 class 7
.9 class 8
.10 class 9
.11 class 7 & MHB (TX and CR)

Key: 1, 2, 3, 5, 6, 8, 9, 10, 11.

Exercise 3: Of the following classes of cargoes listed in the IMDG Code, which are cargoes listed in the IMSBC Code?

.1 class 2.1
.2 class 2.2
.3 class 3
.4 class 4.1
.5 class 4.2
.6 class 4.3
.7 class 5.1
.8 class 6.1
.9 class 7
.10 class 8
.11 class 9

Key: 4, 5, 6, 7, 8, 9, 10, 11.

Exercise 4: Of the following solid bulk cargoes, which are regulated by the IMDG Code when transported in packaged form?

.1 coal
.2 ammonium nitrate based fertilizer UN 2067
.3 seed cake UN 2217
.4 bauxite
.5 fluorspar
.6 direct reduced iron

Key: 2, 3.

Exercise 5: Where could the specific hazard(s) possessed by cargoes, in whose schedules a notational reference of OH is provided in the "MHB" cell of the characteristics table, be found?

Key: In the section for "Hazard" in the individual schedules of appendix 1.

Exercise 6: Which of the following are used as notational references of "hazards" for MHB?

.1 CB
.2 SH
.3 WF
.4 WT
.5 TX
.6 CR
.7 OH

Key: 1, 2, 3, 4, 5, 6, 7.

Exercise 7: Which group(s) does brown coal briquette belong to and what hazards does it possess?

Key: Brown coal briquette is an MHB cargo of Group B; this cargo is easily ignited and/or is liable to heat spontaneously.

Exercise 8: A coal cargo has the following particle size distribution: 8% by weight of particles less than 1 mm and 39% by weight of particles less than 10 mm. Which group does this cargo belong to and what hazards does it possess?

Key: This cargo is an MHB cargo of Group B; it may create flammable atmosphere, may heat spontaneously, may deplete the oxygen concentration, and may corrode metal structures.

Exercise 9: A coal cargo has the following particle size distribution: 12% by weight of particles less than 1 mm and 53% by weight of particles less than 10 mm. Which group(s) does this cargo belong to?

Key: Group A and B.

Exercise 10: Regarding "sand, mineral concentrate, radioactive material, low specific activity (LSA-I) UN 2912", identify which group(s) or class(es) does this cargo belong to and what hazards does it possess?

Key: This cargo belongs to both Group A and Group B (dangerous goods of class 7 also possessing hazards of MHB (TX and CR)).

9.2 Stowage and segregation requirements

.1 Describe general requirements

.1 Instructors should explain the general requirements for stowage and segregation of cargoes in Group B, with examples and classroom exercises, to help the trainees understand the requirements well.

Exercise 1: Which of the following statements about the general requirements for stowage and segregation of cargoes in Group B is/are correct?

.1 Incompatible materials shall not be handled simultaneously;

.2 Where different grades of a solid bulk cargo are carried in the same cargo space, the most stringent segregation provisions applicable to any of the different grades shall apply to all of them;

.3 To avoid contamination, all foodstuffs shall be stowed "separated from" corrosive materials;

.4 Materials which present corrosive hazards of such intensity as to affect either human tissue or the ship's structure shall only be loaded after adequate precautions and protective measures have been taken.

Key: 1, 2, 4.

.2 Describe special requirements

.1 Instructors should explain the special requirements for stowage and segregation of cargoes in Group B, with examples and classroom exercises, to help the trainees clearly understand those special requirements.

Exercise 1: According to subsection 9.3 in the IMSBC Code, materials of classes 4.1, 4.2 and 4.3 shall be stowed _____ all sources of heat or ignition.

.1 "away from"
.2 "separated from"
.3 "separated by a complete compartment or hold from"
.4 "separated longitudinally by intervening a complete compartment or hold from"

Key: 1.

Exercise 2: According to subsection 9.3 in the IMSBC Code, materials of class 5.1 shall be stowed _____ all sources of heat or ignition. They are also stowed _____ other combustible materials.

.1 "away from"/"away from"
.2 "separated from"/"separated from"
.3 "away from"/"separated from"
.4 "away from"/"separated by a complete compartment or hold from"

Key: 3.

.3 Explain the segregation terms

.1 Instructors, in their presentations, should explain to the trainees that unless otherwise required in section 9 or in the individual schedules of the IMSBC Code, segregation between solid bulk cargoes in Group B and dangerous goods in packaged form shall be based on the following table and should also explain to the class the meanings of the numbers therein, and at the same time help the trainees to identify and use the provisions concerning segregation using classroom exercises.

	Dangerous goods in packaged form																
Bulk cargo (classified as dangerous goods)	Class/ division	1.1 1.2 1.5	1.3	1.4	2.1	2.2 2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Flammable solids	4.1	4	3	2	2	2	2	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	2	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	2	1	2	2	X	2	1	3	1	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Radioactive materials	7	2	2	2	2	2	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	1	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Materials hazardous only in bulk (MHB)	MHB	X	X	X	X	X	X	X	X	X	X	X	X	3	X	X	X

.2 In their presentations to the trainees, instructors should explain that unless otherwise required in section 9 or in the individual schedules of the IMSBC Code for cargoes in Group B, segregation between different solid bulk cargoes possessing chemical hazards shall be based on the following table and should also explain to the class the meanings of the numbers therein, and at the same time assist the trainees in identifying and using the provisions concerning segregation, with the help of classroom exercises.

Solid bulk materials										
	Class/ division	4.1	4.2	4.3	5.1	6.1	7	8	9	MHB
Flammable solids	4.1	X								
Substances liable to spontaneous combustion	4.2	2	X							
Substances which, in contact with water, emit flammable gases	4.3	3	3	X						
Oxidizing substances	5.1	3	3	3	X					
Toxic substances	6.1	X	X	X	2	X				
Radioactive materials	7	2	2	2	2	2	X			
Corrosive substances	8	2	2	2	2	X	2	X		
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	2	X	X	
Materials hazardous only in bulk (MHB)	MHB	X	X	X	X	X	2	X	X	X

Exercise 1: Are there any segregation requirements for MHB?

Key: Yes, there are segregation requirements between cargoes in Group B, including MHB.

Exercise 2: Explain which segregation term shall apply between lead nitrate (class 5.1, subsidiary risk class 6.1) in bulk and the two kinds of cargoes, i.e., sodium methylate/methoxide (UN 1431, class 4.2, subsidiary risk class 8) in packaged form and arsenic tribromide (UN 1555, class 6.1) in packaged form, when they are shipped on the same ship.

	Dangerous goods in packaged form																
Bulk cargo (classified as dangerous goods)	Class/ division	1.1 1.2 1.5	1.3	1.4	2.1	2.2 2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Flammable solids	4.1	4	3	2	2	2	2	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact with water, emit flammable gases	4.3	4	4	2	2	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	2	1	2	2	X	2	1	3	1	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Radioactive materials	7	2	2	2	2	2	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	1	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Materials hazardous only in bulk (MHB)	MHB	X	X	X	X	X	X	X	X	X	X	X	X	3	X	X	X

Key: Segregation term 2 - "Separated from", the most stringent requirement of the values in table 1 below applies.

Table of segregation 1

Dangerous goods in packaged form / Bulk materials (classified as dangerous goods)	Sodium methylate (class 4.2)	Sodium methylate (subsidiary risk class 8)	Arsenic bromide (class 6.1)
Lead nitrate (class 5.1)	2	2	1
Lead nitrate (subsidiary risk class 6.1)	1	×	×

Exercise 3: Which segregation terms shall apply between aluminium ferrosilicon powder (UN 1395, class 4.3, subsidiary risk class 6.1) in bulk and sulphur (crushed lump and coarse grained, UN 1350, class 4.1) in bulk when they are shipped on the same ship?

Key: Segregation term 3 - "Separated by a complete compartment or hold from", the most stringent requirement of the values in table 2 below applies.

Table of segregation 2

Bulk materials (classified as dangerous goods) / Bulk materials (classified as dangerous goods)	Aluminium ferrosilicon powder (class 4.3)	Aluminium ferrosilicon powder (subsidiary risk class 6.1)
Sulphur (crushed lump and coarse grain, class 4.1)	3	×

10 Carriage of solid wastes in bulk

10.1 Definitions, classification and applicability of solid wastes in bulk

Instructors, in their presentations to the trainees, should:

.1 introduce the definition, the classification of solid wastes and the application of the provisions of section 10 of the IMSBC Code; and

.2 emphasize that solid cargoes containing or contaminated with radioactive materials shall be subject to the provisions applicable to the transport of radioactive materials and shall not be considered as wastes for the purposes of section 10.

10.2 Transboundary movements and requirement under the Basel Convention

.1 Instructors, in their presentations, should put emphasis on the conditions for transboundary movements of solid wastes in bulk.

10.3 Requirements for stowage and segregation of wastes

.1 Instructors, in their presentations, should put emphasis on the relationship of stowage and segregation of solid wastes in bulk and related contents in other sections of the IMSBC Code.

10.4 Accident procedures of wastes

.1 Instructors should use classroom exercises to assist the trainees in understanding the contents of this section well.

Exercise 1: Under what conditions can the transboundary movement of solid bulk wastes be permitted?

Key: A transboundary movement of wastes shall be permitted to commence only when:

.1 notification has been sent by the competent authority of the country of origin, or by the generator or exporter through the channel of the competent authority of the country of origin, to the country of final destination; and

.2 the competent authority of the country of origin, having received the written consent of the country of final destination stating that the wastes will be safely incinerated or treated by other methods of disposal, has given authorization for the movement.

Exercise 2: What documents shall be carried on board for a transboundary movement of solid bulk wastes?

Key:

.1 required documentation for the transport of solid bulk cargoes; and

.2 a waste movement document (from the point at which a transboundary movement commences to the point of disposal).

Exercise 3: As to the stowage and segregation of solid bulk wastes, which provisions shall be complied with?

Key:

.1 follow the provisions of sections 1 to 9 of the IMSBC Code; and

.2 follow any additional provisions included in the individual schedules for cargoes in Group B applicable to the constituents presenting the hazards.

Exercise 4: When, during transport, a waste will constitute a danger for the carrying ship or the environment, whose competent authorities shall the master inform and receive advice from on the action to be taken?

Key: The competent authorities of the countries of origin and destination.

11 Security provisions

.1 Instructors, in their presentations to the trainees, should use "classroom exercises" to help them understand the importance of security training and become aware of the security provisions.

.2 The trainees should be aware of the provisions of chapter XI-2 of SOLAS and the ISPS Code and other security requirements related to solid bulk cargoes, commensurate with their responsibilities.

.3 After presentations, instructors should use the "classroom exercises" on "the security plan related to carriage of high-consequence solid bulk cargoes" to make the trainees able to tell the differences between this security plan and the security plans for ship and port in the ISPS Code.

Exercise 1: Which of the following provision(s) is/are mandatory as per section 11 of the IMSBC Code?

.1 11.1.1
.2 11.1.2
.3 11.2
.4 11.3

Key: 1.

Exercise 2: Which of the following cargo(es) is/are high-consequence solid bulk cargoes?

.1 ammonium nitrate UN 1942
.2 ammonium nitrate based fertilizer UN 2067
.3 ammonium sulphate
.4 coal
.5 nickel concentrate

Key: 1, 2.

12 Stowage factor conversion tables

.1 Instructors, in their presentations, should first explain to the trainees what the stowage factor conversion tables for solid bulk cargoes in the metric system/ imperial system are, and then help the trainees learn how to apply the stowage factor conversion tables by using classroom exercises.

Exercise 1: Please convert the stowage factor (SF) from ft^3/LT to m^3/t for a solid bulk cargo with SF = 42 ft^3/LT.

Key: SF = 1.1710 m^3/t.

Exercise 2: Please convert the stowage factor (SF) from m^3/t to ft^3/LT for a solid bulk cargo with SF = 0.56 m^3/t.

Key: SF = 20.09 ft^3/LT.

13 References to related information and recommendations

.1 Instructors should introduce to the trainees IMO instruments and other international standards related to requirements in the IMSBC Code, making the trainees aware of the sources of important requirements to the carriage of solid bulk cargoes.

14 Appendices 1, 3, 4 and 5 of the IMSBC Code

.1 Instructors should explain to the trainees the structure and contents of appendices 1, 3, 4 and 5 of the IMSBC Code based on an introduction to the IMSBC Code and help them practice using the appendices when necessary, and the trainees should each have one copy of the IMSBC Code in hand.

.2 Instructors should select representative cargoes, such as direct reduced iron, seed cake, metal sulphide concentrate, iron ore fines and coal to illustrate the most important contents of appendix 1.

.3 Instructors should emphasize that some cargo names listed in appendix 4 are not BCSNs, however they are under certain BCSNs.

.4 After presentations, instructors should help the trainees deepen their understanding and raise their awareness and ability to solve problems using IMSBC code by using classroom exercises, workshops and task-based exercises.

Exercise 1: If you need to know the group of nickel ore in bulk, which section will you go to in the IMSBC Code?

Key: Appendices 1 or 4.

Exercise 2: How do you find the individual schedule for calcium oxide in bulk by using appendices of the IMSBC Code?

Key: First, find the name of calcium oxide in appendix 4 and get the instruction "see LIME (UNSLAKED)"; then, find the individual schedule for LIME (UNSLAKED) in appendix 1.

Exercise 3: In which section of the IMSBC Code can you find the information that tapioca in bulk is a non-cohesive solid bulk cargo when dry?

Key: In appendix 3.

Exercise 4: Explain how to judge if the solid bulk cargo carried is non-cohesive when dry or cohesive using appendix 1 of the IMSBC Code.

Key: If there is a value in the "angle of repose" column in the characteristics table of the schedule for this cargo in appendix 1, the cargo is non-cohesive, otherwise it is cohesive.

Exercise 5: According to appendix 1 of the IMSBC Code, which of the following types of seed cake can be shipped in bulk only with permission of the competent authority?

.1 Seed cake, containing vegetable oil UN 1386(a) mechanically expelled seeds, containing more than 10% of oil or more than 20% of oil and moisture combined.

.2 Seed cake, containing vegetable oil UN 1386(b) solvent extractions and expelled seeds, containing not more than 10% of oil and when the amount of moisture is higher than 10%, not more than 20% of oil and moisture combined.

.3 Seed cake UN 2217, with not more than 1.5% oil and not more than 11% moisture.

.4 Seed cake, solvent extracted soya bean meal, containing not more than 4% of oil, not more than 15% of oil and moisture combined and being substantially free from flammable solvents.

Key: 1.

Workshop 1: Consult the schedules for iron concentrate, ferrosilicon and talc in appendix 1 and tell which group(s) and class(es) they belong to and what the differences are in structure and contents of the three schedules and explain the reasons.

Tips: Iron concentrate is a cargo of Group A, ferrosilicon is a cargo of Group B (of which, ferrosilicon UN 1408 is class 4.3 and its subsidiary risk class is 6.1; ferrosilicon is an MHB, WF and /or WT), and talc is a cargo of Group C. There are 12 sections in the schedules of both iron concentrate and talc. There are 13 sections in the schedules of both ferrosilicon and ferrosilicon UN 1408, with an extra "emergency procedure" added.

Workshop 2: (1) How many types of direct reduced iron are there and what are they?
(2) Describe the group and class each type belongs to.
(3) State their major hazard(s) and emergency actions in the event of fire.

Tips: There are three types of direct reduced iron, namely, direct reduced iron (A), direct reduced iron (B) and direct reduced iron (C), all of which are MHB of Group B (SH and/or WF). For major hazard (s) and emergency actions in the event of fire, refer to schedules of direct reduced iron in appendix 1 of the IMSBC Code.

Workshop 3: Consult appendix 1 for schedules related to metal sulphide concentrates and tell which groups and class these cargoes belong to.

Tips:

(1) Schedules: metal sulphide concentrates; metal sulphide concentrate, corrosive, UN 1759; metal sulphide concentrate, self-heating, UN 3190.
(2) Group and class:
Metal sulphide concentrates: cargo of Group A and B, MHB (SH and/or TX and/or CR).
Metal sulphide concentrates, corrosive, UN 1759: cargo of Group A and B, class 8 (MHBSH and / or WT).
Metal sulphide concentrates, self-heating, UN 3190: cargo of Group A and B, class 4.2 (MHB WT and/or TX and/or CR).

Task-based exercise: Instructors, acting as a shipper, should prepare a cargo information list and necessary sample paper documentation for the groups of trainees; the trainee groups, acting as a master, should make use of the cargo information found in appendices 1, 3, 4 and 5 to judge whether the cargo information the shipper supplies is correct, and then judge whether the master can accept the cargo for carriage.

Example:
A bulk carrier plans to carry 40,000 M/T of coal on a voyage. The Shipper's Declaration provided by the shipper and Attachment to the ship's Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code issued by the classification society are as shown below. Please confirm whether the cargo information provided by the shipper is correct and judge whether the ship can accept the consignment.

SHIPPER'S DECLARATION

This form meets the requirements of SOLAS 1974, Chapter VI, Reg 2 (for general cargo, cargo in cargo units, cargo carried in solid bulk) and the IMSBC Code, section 4.2.

General Information

Shipper: XXXXXX	Transport document number: XXXXXX
Consignee: TO ORDER	Carrier: M.V. XXX
Name/means of transport: MOTHER VESSEL	Instructions or other matters
Port/place of departure: XXXXXX	REFER To IMSBC CODE
Port/place of destination: XXXXXX	

Cargo Information

General description of the cargo (For solid bulk cargo – type of material particle size)	
Gross mass (kg/tonnes): 40,000 MT +/- 10% General cargo: Cargo unit(s): METRIC TONNES Bulk cargo: COAL	Relevant special properties of the cargo (eg highly soluble in water. For solid bulk cargo, see section 4 of the IMSBC Code)

Solid Bulk Cargo Information

BCSN: COAL	
Specification of bulk cargo (if applicable): Stowage factor: 42.5 CUFT/MT-WOG (without guarantee) Size crush coal: MM Size (5-50 MM): 75% approx. Size (+50 MM): 5% Size (0-5MM): 20% approx. Angle of repose : Trimming procedures: If potential hazard - chemical properties*: *eg: Class, UN number or MHB ☑ This commodity is not considered a cargo which may liquefy during the voyage	Group of the cargo ☐Group A and B* ☐Group A* ☑Group B ☐Group C *For cargoes which may liquefy (Group A and Group A and B cargoes)

<table>
<tr><td colspan="2">☑ The cargo is not considered liable to emit significant amounts of methane
☑ The cargo is considered not liable to spontaneous combustion</td><td></td></tr>
<tr><td>Transportable moisture limit: 35%
Sulfur Content at Shipment: 0.7%</td><td>Moisture content at shipment: 16%</td><td rowspan="2">Additional certificate(s) (if required)
☐Certificate of moisture content and
☐transportable moisture limit.
☐Weathering certificate
☐Exemption certificate
☐Other (specify):</td></tr>
<tr><td colspan="2">EHS/HME (see Chapters 2.10 and 2.9.3 of the IMDG Code and MARPOL Annex V) Cargo residues must be disposed of in accordance with MARPOL Annex V
EHS/Marine Pollutant ☐Yes ☑No
Human Health Criteria Met ☐Yes ☑No ☐Not available
Rubber/Plastic ☐Yes ☑No
Note: Human Health Criteria data may not be available only until 31 December 2014. From 1 January 2015 Human Health Criteria data must be available.</td></tr>
<tr><td colspan="3">Declaration</td></tr>
<tr><td colspan="3">I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td></tr>
<tr><td>Name/status, company/organization of signatory
XXXXXX</td><td>Place and date
XXXXXX</td><td>Signature on behalf of shipper
XXXXXX</td></tr>
</table>

Shippers' may deliver this declaration by fax or other electronic means. In any electronic transmission, where the signature of the declarant cannot be transmitted, full name of the declarant in capital letters must be provided on the form.

Attachment to the Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code

List of cargoes permitted to be carried

CARGOES	IMO CLASS	UN NO.	NOTE (See .following page)
All cargoes of Group A and Group C	–	–	1,2
AMORPHOUS SODIUM SILICATE LUMPSI	MHB	-	-
BORIC ACID	MHB	-	-
BROWN COAL BRIQUETTESI	MHB	-	-
COAL	MHB	-	-
FLUORSPAR	MHB	-	-
LIME (UNSLAKED)	MHB	-	-
MAGNESIA (UNSLAKED)	MHB	-	-
METAL SULPHIDE CONCENTRATES	MHB	-	11
PEAT MOSS	MHB	-	-
PYRITES, CALCINED (Calcined Pyrites)	MHB	-	-
VANADIUM ORE	MHB	-	-
WOODCHIPS	MHB	-	10
WOOD PELLETS NOT CONTAINING ADDITIVES AND/OR BINDERS	MHB	-	-
WOOD PRODUCTS-GENERAL	MHB	-	-

Note

1.	Except AMMONIUM NITRATE BASED FERTILIZER (non-hazardous).
2.	CHOPPED RUBBER AND PLASTIC INSULATION, COARSE CHOPPED TYRES and GRANULATE TYRE RUBBER are not permitted to be loaded when the planned interval between the commencement of loading and the completion of discharge of the cargoes exceeds 5 days.
3.	AMMONIUM NITRATE BASED FERTILIZER (non-hazardous) is to be stowed out of direct contact with a metal engine room boundary.
4.	(blank)
5.	To be stowed at least 3m horizontally away from engine room boundaries.
6.	CASTER MEAL, CASTER POMACE and CASTER FLAKE shall not be carried in bulk.
7.	Consideration shall be given to providing the ship with the means to top up the cargo spaces with additional supplies of inegas taking into account the duration of the voyage. The ship's fixed CQ fire extinguishing system shall not be used for this purpose.
8.	Except Seedcake containing solvent extractions.
9.	Fine grained sulphur (flowers of sulphur) shall not be transported in bulk.
10.	With moisture content of 15% or more.
11.	Only low fire risk cargoes.

Tips:

.1 It can be found that "Group" for the cargo is B (and A) by checking appendix 4 of the IMSBC Code by the cargo's BCSN "COAL" supplied in the Shipper's Declaration.

.2 By checking appendix 1 of the IMSBC Code for the schedule of "coal" by the cargo's BCSN "COAL", the group, class, angle of repose, stowage factor and other related information of the cargo can be achieved, (and if there is any doubt about the information for angle of repose, appendix 3 of the IMSBC Code could be consulted and it can be ascertained that "COAL" is cohesive). The particle size distribution of the cargo in the Shipper's Declaration is found not in compliance with that in the schedule which will make the cargo Group B only. Furthermore, the TML is declared. The shipper is incorrect in declaring the cargo to be a cargo of Group B. Instead, the shipper should declare the cargo as Group A and B.

.3 The master should require the shipper to provide a new Shipper's Declaration. If the shipper declares that the cargo is Group B only, the shipper should provide a certificate that proves that the cargo "coal" is classified as Group B only and modified cargo information appropriate for Group B only without TML.

4. If the declaration is correct, the ship can carry the coal, because of coal listed in the above list of cargoes permitted to be carried in the Attachment to the ship's Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code. However, it should be noted that such certificate is non-mandatory and ship may carry solid bulk cargoes without such certificates when complying with the relevant requirements of the IMSBC Code. The compliance to the IMSBC Code should be evaluated by other means.

15 Appendix 2 of the IMSBC Code

Instructors, in their presentations, should:

.1 make use of pictures or videos to introduce the test procedures and associated apparatus for materials which may liquefy and the requirements for determining angle of repose;

.2 make sure that the trainees understand the test methods for determining the moisture content and transportable moisture limit of materials which may liquefy and their scopes, using classroom exercises; and

.3 make sure that the trainees understand the scope and test principles of tilting box test, using exercises.

Exercise 1: Six methods of testing for the transportable moisture limit are currently in general use in appendix 2 of the IMSBC Code. Tell how the test methods for a cargo in Group A should be selected.

Key: As each method has its advantages and scope, the selection of test methods should be determined by local practices or by the appropriate authorities.

Exercise 2: Explain the scope of the flow table test according to appendix 2 of the IMSBC code.

Key: The flow table is generally suitable for mineral concentrates or other fine materials with a maximum grain size of 1 mm. It may also be applicable to materials with a maximum grain size up to 7 mm.

Exercise 3: Identify the scope of the penetration test according to appendix 2 of the IMSBC Code.
Key: The penetration test is generally suitable for mineral concentrates, similar materials, and coals up to a top size of 25 mm.

Exercise 4: Explain the standards for judging liquefaction of samples in the preliminary test for the penetration test.

Key: For this procedure, fill the appropriate cylindrical vessel with subsample (B) in four distinct stages and tamp. Place the penetration bit on the surface of the material through the holder. Operate the vibrator at a frequency of 50 Hz or 60 Hz with an acceleration of 2g rms ± 10% for 6 minutes. After 6 minutes of vibration, read the depth of penetration. When the depth of penetration is greater than 50 mm, it is judged that liquefaction took place.

Exercise 5: Specify the transportable moisture limits for the following 4 cargoes which may liquefy. Cargo A has a flow moisture point of 16% after doing the flow table test, cargo B has a flow moisture point of 20% after doing the penetration test, the critical moisture content at 70% degree of saturation of cargo C is 10.5% after doing the Proctor/Fagerberg test, and the critical moisture content at 80% degree of saturation of cargo D (iron ore fines) is 9.6% after doing the modified Proctor/Fagerberg test for iron ore fines.

Key: Cargo A: 14.4%; Cargo B: 18%; Cargo C: 10.5%; Cargo D: 9.6%.

16 Supplement

16.1 BLU Code and BLU Manual

.1 Instructors should use classroom exercises to help with their presentations, and after presentations, they should make use of workshops to enhance the trainees' awareness of their responsibilities in loading or unloading of solid bulk cargoes and train the trainees to get familiar with the loading and unloading procedures as well as necessary precautions.

.2 Instructors should use "task-based exercises to help the trainees understand the contents of the ship/shore safety checklist for loading or unloading dry bulk cargo carriers and learn how to fill in the checklists.

Exercise 1: Tell what responsibilities the master should shoulder during loading and unloading of solid bulk cargoes based on the BLU Code.

Key: The master is responsible at all times for the safe loading and unloading of the ship, the details of which should be confirmed with the terminal operator in the form of an agreed loading or unloading plan.

Exercise 2: The recommendations in the BLU Code provide guidance to shipowners, masters, shippers, operators of bulk carriers, charterers and terminal operators for the safe handling, loading, and unloading of solid bulk cargoes. Tell the relationship between the recommendations and terminal and port requirements, or the national regulations.

Key: The recommendations in the BLU Code are subject to terminal and port requirements, or the national regulations.

Exercise 3: How long should the ship and the terminal keep the loading plan according to the BLU Code?

Key: 6 months.

Exercise 4: How should a loading or unloading plan be changed according to the BLU Code?

Key: The loading or unloading plan should only be changed when a revised plan has been prepared, accepted and signed by ship party and terminal party.

Workshop: Discuss the important procedures in respect of cargo loading that should be observed by ship side and terminal side according to the relevant requirements of the BLU Code and the BLU manual.

Tips:

.1 Both sides should indicate agreement to the loading plan before commencement of loading;

.2 The master should state the relevant information on the agreed loading plan;

.3 The terminal representative should advise the master of loading rate and estimated time required to complete each pour;

.4 Both sides should agree the times at which loading may need to be suspended and the duration of such suspensions;

.5 The loading plan should consider the effect of the ballast pumping rates and loading rates on the hull stress;

.6 The terminal representative should advise the master of the nominal tonnage contained on its conveyor system and any requirements for clearing the conveyor system;

.7 Communication arrangements between ship and terminal should be capable of responding to requests for information on the loading process.

Refer to subsection 4.2 of the BLU Code for details.

Task-based exercise: Divide the class into several groups and design one task for each group with different roles and ask the trainees to practice filling in the ship/shore safety checklist by the different roles they play. Instructors should prepare information about the ship, the cargo and the port as well as a printed ship/shore safety checklist for loading or unloading dry bulk cargo carriers for each group. After the trainees complete the checklist of appendix 3 of the BLU Code following the guidelines of appendix 4 of the BLU Code, they should be arranged for cross-checking of the checklists.

A practical example of ship/shore safety checklist for loading dry bulk cargo is as follows.

Ship/Shore safety checklist for loading dry bulk cargo carriers

Date XXX		
Port XXXX	Terminal/Quay XXXX	
Available depth of water in berth ***19.7 m - 1.0 m UKC + Tide (m)***	Maximum air draught at berth ***20.5 m for all loading hatches***	
Ship´s name XXXX		
Arrival draught(read) ***F 7.02 m/M 7.96 m/A 8.66 m***	Air draught ***19.50 m***	
Calculated departure draught ***F 18.24 m/M 18.31 m/A 18.35 m***	Air draught **9.82 m**	
The master and terminal manager, or their representatives, should complete the checklist jointly. Advice on points to be considered is given in the accompanying guidelines. The safety of operations requires that all questions should be answered affirmatively and the boxes ticked. If this is not possible, the reason should be given, and agreement reached upon precautions to be taken between ship and terminal. If a question is considered to be not applicable write "N/A"，explaining why if appropriate.		
	SHIP	TERMINAL
1. Is the depth of water at the berth, and the air draught, adequate for the cargo operations to be completed?	√	√
2. Are mooring arrangements adequate for all local effects of tide, current, weather, traffic and craft alongside?	√	√
3. In emergency, is the ship able to leave the berth at any time? ***Tidal.***	√	√
4. Is there safe access between the ship and the wharf? *Tended by ship/terminal(cross out as appropriate)*	√	√
5. Is the agreed ship/terminal communication system operative? Communication method ***Hand-held Radio*** Language ***English*** Radio channels/phone numbers ***Channel 98 Shore Radio***	√	√

In an EMERGENCY ***Channel 11 or 16 Shore Radio***		
6. Are the liaison contact persons during operations positively identified? Ship contact person(s) ***Chief / Duty Officer*** Shore contact person(s) ***Ship Loader 1 Operator*** Location ***Ship Loader***	√	√
7. Are crew on board, and staff in the terminal adequate for emergency?	√	√
8. Have any bunkering operations been advised and agreed?	√	√
9. Have any intended repairs to wharf or ship whilst alongside been advised and agreed? ***No main engine immobilisation or hot work permitted***	N/A	√
10. Has a procedure for reporting and recording damage from cargo operations been agreed?	√	√
11. Has the ship been provided with copies of port and terminal regulations, including safety and pollution requirements and details of emergency services?	√	√
12. Has the shipper provided the master with the properties of the cargo in accordance with the requirements of chapter VI of SOLAS? ***Master to receive by electronic submission***	√	√
13. Is the atmosphere safe in holds and enclosed spaces to which access may be required, have fumigated cargoes been identified, and has the need for monitoring of atmosphere been agreed by ship and terminal?	√	√
14. Have the cargo handling capacity and any limits of travel for each loader/unloader been passed to the ship/terminal? Loader ***9,000 Tonnes per Hour***	√	√
15. Has a cargo loading or unloading plan been calculated for all stages of loading/deballasting or unloading/ballasting? *Copy lodged with* ***the Surveyor, terminal & ship***	√	√
16. Have the holds to be worked been clearly identified in the loading or unloading plan, showing the sequence of work, and the grade and tonnage of cargo to be transferred each time the hold is worked?	√	√
17. Has the need for trimming of cargo in the holds been discussed, and have the method and extent been agreed? ***Surveyor will attend for trimming***	√	√
18. Do both ship and terminal understand and accept that if the ballast programme becomes out of step with the cargo operation, it will be necessary to suspend cargo operation until the ballast operation has caught up?	√	√
19. Have the intended procedures for removing cargo residues lodged in the holds while unloading been explained to the ship and accepted?	√	√
20. Have the procedures to adjust the final trim of the loading ship been decided and agreed? Tonnage held by the terminal conveyor system ***350-450 Tonnes***	√	√
21. Has the terminal been advised of the time required for the ship to prepare for sea, on completion of cargo work?	√	√

THE ABOVE HAS BEEN AGREED:	
Time XXX	Date XXXX
For ship XXXX	For terminal XXXX
Rank XXXXX	Position/Title XXXX

16.2 Enclosed space entry

.1 Instructors should, in their presentations, with help of pictures, videos and instruments, emphasize the requirements on using the enclosed space entry permit system and the need for taking preventive measures and necessary precautions; and in the meanwhile, make use of "classroom exercises", "workshops" and "case studies" to help the trainees understand what procedures should be followed to avoid hazards associated with entry into enclosed spaces in order to ensure safety. (Refer to *Revised Recommendations for Entering Enclosed Spaces aboard Ships,* IMO resolution A.1050(27))

Exercise 1: Which of the following are enclosed spaces for a ship?

.1 spaces with limited openings for entry and exit
.2 spaces with inadequate ventilation
.3 spaces not designed for continuous worker occupancy

Key: 1, 2, 3.

Exercise 2: For a bulk carrier, which of the following spaces are enclosed spaces?

.1 cargo hold
.2 double bottom
.3 fuel tank
.4 ballast tank
.5 anchor chain bin
.6 cargo space accessway

Key: 1, 2, 3, 4, 5, 6.

Exercise 3: For entering enclosed spaces, steady readings of which of the following should be obtained?

.1 21% of oxygen by volume by oxygen content meter;

.2 Not more than 1% of lower flammable limit (LFL) on a suitably sensitive combustible gas indicator, where the preliminary assessment has determined that there is potential for flammable gases or vapours;

.3 Not more than 50% of the occupational exposure limit (OEL) of any toxic vapours and gases; and

.4 All of the above three conditions should be met.

Key: 4.

Exercise 4: Which of the following precautions for entering enclosed spaces are correct?

.1 Ventilation should continue during the period when the space is occupied and during temporary breaks. Before re-entry after a break, the atmosphere should be re-tested;

.2 In the event of an emergency, under no circumstances should the attending crew member enter the space before help has arrived and the situation has been evaluated to ensure the safety of those entering the space to undertake rescue operations;

.3 Only properly trained and equipped personnel should perform rescue operations in enclosed spaces in the event of an emergency;

.4 Spaces that have not been tested should be considered unsafe for persons to enter; and

.5 If the atmosphere in an enclosed space is suspected or known to be unsafe, rescue harnesses should be worn and (unless impractical) lifelines should be used.

Key: 1, 2, 3, 4, 5.

Workshop: Discuss the procedures and precautions for testing the atmosphere of enclosed spaces before personnel enter the spaces.
Tips: Refer to section 7 of *Revised Recommendations for Entering Enclosed Spaces aboard Ships* (IMO resolution A.1050(27)).

Case study:
A bulk carrier was on a laden voyage to the Far East. During the voyage, the crew had been inspecting the vessel's topside ballast tanks, noting conditions of its structure and paintwork. The crew was now about to inspect the last ballast tank, the No.1 port. The air pipes of the tank had been closed off for some time. To air the tank, the crew had opened both manholes on deck, one forward and one in the aft end of the tank. An electric fan normally used to air the tanks was faulty and could not be used. Three crew members were preparing to carry out the inspection. One OS was positioned on deck as a guard and attendant, while the Second Officer and one AB were to inspect the tank. As the Second Officer entered the tank, he complained about the hot, damp air and that he could hardly see anything in the poor light of his torch. He asked the AB to get a stronger light before entering the tank, and to bring new batteries as well.

The Second Officer remained in the tank, while the OS remained on deck awaiting the AB's return. After a while the OS tried to look into the tank but saw nothing at first. He called to his colleague but received no answer. Entering the manhole to get a better view, he discovered the Second Officer lying motionless at the bottom of the tank. He climbed down the rest of the ladder to try to shake him awake. When he reached the bottom of the tank, he also lost consciousness.

It took the AB 10 minutes to return, and he found no one on deck upon his return. Looking into the tank, he saw two lifeless bodies. His first thought was to enter but remembered previous advice about such accidents and rushed instead to raise the alarm.

The Chief Officer took charge and ordered a set of breathing apparatus belonging to the fire-fighter's outfit to be brought forward, along with a rope and a stretcher. He also sent for an oxygen content meter.

It was discovered that the air bottles were empty, as they had not been refilled after a previous fire exercise. Spare air bottles were sent for and once they had been replaced a rescuer was sent into the tank.

It was very difficult to get the two persons out of the narrow manhole. The OS regained consciousness when he was brought up to the deck but it was discovered that the Second Officer was not breathing. Several attempts were made to revive the Second Officer without success. The OS said that he had felt no bad smell, no pain, had no warning of lack of oxygen before his legs gave way and he felt a need to sit down.

Analyse why the accident took place, point out the mistakes that should have been avoided by the Second Officer and the OS during the process of the inspection work, and explain how this inspection should be carried out correctly, based on the *Revised Recommendations for Entering Enclosed Spaces aboard Ships (IMO resolution A.1050(27)*).

Tips：The analysis should consider the following:

.1 the procedures to air the tank and test the atmosphere prior to entering the tank;

.2 emergency evacuation of crew members in tanks;

.3 duties and role for guarding or taking the role as "attendant" on deck;

.4 which senior (officer) aboard to be notified prior to entering tanks;

.5 testing procedures of equipment prior to entering tanks;

.6 awareness of the expiry date on oxygen content meter; and

.7 available safety equipment prior of entering (breathing apparatus, oxygen meter, air bottles, torches, security lines, etc.).

Correct procedures:

.1 preliminary assessment of any potential hazards in the space to be entered;

.2 authorization of entry;

.3 general precautions taken;

.4 testing of the atmosphere; and

.5 precautions during entry.

Refer to IMO resolution A.1050(27) for details.

17 Relevant international conventions

.1 To help the trainees to better understand the most important regulations related to carriage of solid bulk cargoes in SOLAS and MARPOL, instructors should make use of "classroom exercises" in their presentations.

Exercise 1: Which regulation in SOLAS requires that a ship carry a document of compliance (DOC) for carrying dangerous goods?

Key: SOLAS regulation II-2/19.4.

Exercise 2: Which regulation in chapter XII of SOLAS requires that prior to loading bulk cargoes on bulk carriers of 150 m in length and upwards, the shipper shall declare the density of the cargo?

Key: SOLAS regulation XII/10.

Exercise 3: What are the requirements for loading instruments in SOLAS regulation XII/11?

Key: Bulk carriers of 150 m in length and upwards shall be fitted with a loading instrument capable of providing information on hull girder shear forces and bending moments, taking into account the recommendations adopted by the Organization, and this regulation applies to bulk carriers regardless of their date of construction, unless provided otherwise.

Exercise 4: Which items are relevant to Annex V of MARPOL in the Form for Cargo Information below?

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

<table>
<tr><td colspan="2">BCSN:</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier:</td></tr>
<tr><td>Name/means of transport:
/OCEAN TRANSPORT
Port/place of departure:</td><td rowspan="2">Instructions or other matters
REFER IMSBC CODE FOR FURTHER INFORMATION</td></tr>
<tr><td>Port/place of destination:</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)</td><td>Gross mass (kg/tonnes)</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor:
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td>Classification relating to MARPOL
Annex V
☐ harmful to the marine environment
☐ not harmful to the marine environment</td><td rowspan="2">Additional certificate(s)*
☐ certificate of moisture content and transportable moisture limit
☐ weathering certificate
☐ exemption certificate
☐ other (specify)
*If required</td></tr>
<tr><td>Relevant special properties of the cargo
(e.g., highly soluble in water)</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory
ABC LTD
Place and date
PORT P / 12 DECEMBER, 2017
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

Key: See the italic and underlined sections in the form below.

FORM FOR CARGO INFORMATION

For Solid Bulk Cargoes

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<tr><td colspan="2">BCSN:</td></tr>
<tr><td>Shipper: ABC LTD</td><td>Transport document number: XXXXXXXX</td></tr>
<tr><td>Consignee: XYZ LTD</td><td>Carrier:</td></tr>
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<tr><td colspan="2">Specifications of bulk cargo, if applicable
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Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
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☐ Group A*
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Moisture content at shipment</td></tr>
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I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory
ABC LTD
Place and date
PORT P / 12 DECEMBER 2017
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

18. Integrated and practical application

1 List the major stages of the transport process

.1 Instructors, in their presentations to the trainees, should divide the cargo transport process from request of transport to delivery of the cargo into different stages and describe each one of them.

.2 The recommended division of the whole transport process is as follows: (1) request of transport; (2) assessment of acceptability of the consignments; (3) preparation before loading; (4) loading & trimming; (5) carriage & care; (6) unloading.

.2 Explain the work at each stage of the transport process

.1 Instructors, in their presentations to the trainees, should require the trainees to describe the operational methods and precautions at each stage of the shipment of cargoes and emphasize the importance of referring to individual schedules for the cargoes.

.2 Following the above process of description, instructors should appoint some trainees as the persons in charge (PICs) of each stage, ask them to show to the class what should be done at each stage of shipment of cargoes, using proper teaching aids as listed in Part A of this model course, and together with the PICs, answer the questions raised during the show by other trainees. The following task-based exercises could be used as references.

.3 Task-based exercises

This task-based exercise is divided into three phases: the pre-task, the task cycle and the post-task. Instructors are responsible for setting up the scenarios, designing tasks for the different groups and supervising the whole process while the trainees are trying to complete the tasks.

In the pre-task phase, the instructor should introduce the task involved, the methods to use, the process for completing the task and prepare ship and terminal information; provide copies of Shipper's Declaration, copies of Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code, blank ship/shore safety checklists for loading dry bulk carriers and the loading plan, and at the same time explain the functions of the four documents, so that the trainees can be very clear about the task to do and understand the process and methods for doing it.

In the task cycle phase, the trainees should be grouped according to the requirements of the task, while the instructor should keep an eye on their performance, record it and give necessary guidance; finally, each group should report back to the whole class for a general discussion.

In the post-task phase, the instructor should make comments on the problems that have been revealed to help trainees correct their mistakes, so that they would better digest what has been learned and practiced.

Example 1: A bulk carrier plans to load 30,000 M/T of "metal sulphide concentrates, corrosive UN 1759" in bulk. Finish the task: discuss in groups and describe the operational methods and precautions for each stage of the transport process according to the information, documents and the IMSBC Code provided.

The Shipper's Declaration and Attachment to the Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code issued by the classification society are as follows. See appendices A and B attached in this section

Tips:

The cargo information is as follows:

.1 BCSN: METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759

.2 Group: Group A and B

.3 Class: 8

.4 MHB: SH and/or WT

.5 Moisture Content (MC): 8.5%

.6 Transportable Moisture Limit (TML): 10.6%

.7 The cargo is in the List of Cargoes of the ship's certificate of compliance for the carriage of solid bulk cargoes.

.8 The cargo is harmful to the marine environment (HME).

.1 Consignment

.1 Has the shipper delivered all required cargo information?

.2 Has the cargo been listed in the IMSBC Code?

Refer to sections 1 and 4 of the IMSBC Code.

.2 Assessment of acceptability of the consignments

Find which group(s) the cargo belongs to.

.1 Group A
Is MC less than TML?

.2 Group B

a. Dangerous goods (class 4.1, 4.2, 4.3, 5.1, 6.1, 8 and 9)
If Document of compliance is available on board, is the cargo listed therein? If the answer is positive, the cargo can be carried; if the answer is negative, the cargo cannot be carried.

If Document of compliance is not available on board, the cargo cannot be carried.
b. MHB
If Document of compliance is available on board, is the cargo listed therein? If the answer is positive, the cargo can be carried; if the answer is negative, the advices should be sought from the relevant competent authorities.

c. If Document of compliance is not available on board, the advices should be sought from the relevant competent authorities.
Whatever, once it is ascertained that the cargo can be carried, the ship's master should ensure that the requirements for the cargo by the IMSBC code should be met.

.3 Material harmful to the marine environment

If the shipper's declaration indicates that the cargo is harmful to the marine environment, then disposal of the cargo residues after unloading shall be considered.
Refer to section 4, 7, 9 and appendix 1 of the IMSBC Code.

Note: For convenience, the check flow chart is designed to help the trainees follow the steps to confirm if the cargo can be accepted for carriage. See appendix C attached in this section.

.3 Preparation before loading

.1 Personnel preparation
Personnel in charge of the work should be well acquainted with the characteristics of the cargo and work load should be allocated properly to ensure the smooth progress of cargo preparation and loading.

a. Group A
The crew members aboard responsible for supervising loading should be well aware of the characteristics and hazards of the cargo with the key points for supervision in mind, in particular with regard to precipitation.
b. Group B
Understand the requirements for stowage and segregation of solid bulk cargoes possessing chemical hazards.

.2 Preparation of hold
a. Provisions on entry into enclosed spaces are to be complied with;
b. Requirements on hold cleanliness specified in the individual schedule should be satisfied;
c. The ventilation and hold bilge system should be fully operational.

.3 Preparation of equipment
Refer to schedules of the cargo information provided by the shipper to determine whether additional equipment or materials are needed, such as special personnel protective apparatus, designated gas detectors for monitoring the cargo when en-route, and submerged pumps for draining free water above the cargo.

.4 Making the loading plan
What factors should be considered when making loading plan?
Refer to schedules in appendix 1, sections 7, 8 and 9 of the IMSBC Code, IMO resolution A.1050(27).

Note: For convenience, the safety check loading flow charts are designed to help the trainees follow the steps to see if it is safe to load the cargo. They are applicable for Group A cargoes, Group B cargoes and Group A and B cargoes. See appendices D and E attached in this section.

.4 Loading & trimming

.1 Complete ship/shore safety checklist for loading or unloading dry bulk cargo carriers' and timely communication between ship side and terminal side should be well maintained on ship/shore procedure before loading;

.2 Make sure the moisture content of the cargo to be loaded is lower than TML;

.3 Observe weather precautions concerning loading in the schedule;

.4 Officers on watch should be well acquainted with the stowage plan, loading plan and C/O' standing order in port (operational instructions concerning loading), so as to have them make efficient monitoring on the actual loading process;

.5 Instruction on trimming in the cargo information should be observed (it should be noted that even if the cargo is cohesive, there may also be provisions on trimming). Refer to the BLU Code, BLU Manual, schedule in appendix 1 and section 5 of the IMSBC Code.

.5 Carriage and care

During watchkeeping en-route, requirements in the section for ventilation and carriage of cargoes in the schedule of appendix 1 of the IMSBC Code should be followed; special requirements for care of cargoes in Group A and in Group B should be strictly observed.
Refer to appendix 1 of the IMSBC Code and IMO resolution A.1050(27).

.6 Unloading & hold clean-up

During unloading, requirements in the section for unloading and clean-up in the schedule of the IMSBC Code should be followed; provisions for prevention of pollution by cargo residues from ships in MARPOL Annex V should be strictly observed.
Refer to appendix 1 of the IMSBC Code, IMO resolution A.1050(27) and MARPOL Annex V.

Example 2: Instructors will present representative Group A cargoes, such as nickel ore, mineral concentrates, iron ore fines, bauxite fines, fluorspar, etc. Each group of trainees will be asked to select one from the above-mentioned cargoes, discuss and write down its operation procedures and precautions for safe shipment. They may refer to the IMSBC Code and other relevant materials during the discussion.

Tips:

.1 Ensure that the shipper's declaration is provided by the shipper to the master.
Refer to subsection 4.2 of the IMSBC Code.

.2 Ensure that the cargo to be carried is identified and that the name of the cargo is described by using BCSN, as detailed in the IMSBC Code.
Refer to subsection 4.1 of the IMSBC Code.

.3 The following factors should be considered when the acceptability of the cargo to be carried is assessed

a. A certificate of TML. The test to determine the TML shall be carried out within six months before loading.

b. A certificate of moisture content. The interval between sampling/testing and the date of commencement of loading shall never exceed seven days. If it rains after the certificate has been provided, the shipper should provide evidence that the moisture content of the cargo is still less than TML. Due consideration shall be given to the weather precautions in the Individual schedule.

c. The signed certificates to be provided to ship's master shall be issued by an entity recognized by Competent Authority of the port of loading. The ship's master shall be provided with a document by the competent authority stating the procedures for sampling, testing and controlling moisture content.

d. Ensure that the moisture content is less than the TML.
Refer to subsections 4.3, 4.5 and 7.3 of the IMSBC Code.

.4 Ensure that the cargo holds are properly and appropriately cleaned, and ready for the cargo to be loaded.

.5 Make an appropriate loading plan, following relevant requirements stipulated in the SMS (the Safety Management System) and the BLU Code as well as other applicable instructions. Ensure that stability and strength of the ship, trimming procedures and the loading sequence meet the relevant requirements.
Refer to subsections 2.1, 2.2, 5.1 and 5.3 of the IMSBC Code and the BLU Code.

.6 Finish the ship/shore safety checklist for loading dry bulk cargoes before loading.
Refer to the BLU Code.

.7 Before loading, the crew should check the cargo condition by using the following methods.
a. visual inspection
b. can test
If the cargo condition is unsatisfactory or in doubt, loading should not commence and further advice should be sought.
Refer to subsection 8.4 of the IMSBC Code.

.8 During loading, the master should ensure that:
a. the loading operation is strictly followed as per the loading plan;
b. the cargo is loaded in accordance with the provisions in both the IMSBC Code and the BLU Code;
c. visual monitoring for the cargo condition is carried out;
d. the moisture content of the cargo is kept less than TML,
e. the cargo shall not be handled during precipitation, unless expressly provided otherwise in appendix 1 of the IMSBC Code; concretely speaking, the loading is suspended and the cargo is covered as appropriate during precipitation according to the established proceduer as required in subsection 4.3.3 of the IMSBC Code;
f. the trimming procedure meets the relevant requirements of the IMSBC Code when loading completes.
Refer to appendix 1 of the IMSBC Code and the BLU Code.

.9 During voyage, the appearance of cargo surface shall be checked regularly. If free water above the cargo or fluid state of the cargo or flattening out of the surface is observed, the master shall take appropriate actions to prevent the cargo from shifting and potential capsizing of the ship and give due consideration to seeking emergency entry into a place of refuge.

.10 If cargo shift happens, the following measures are recommended.
a. A reduction in speed will help to minimise rolling and/or pitching, and engine/hull vibrations. In addition, sharp helm movements should be avoided;
b. Avoid passing through the swell and/or wind wave areas, as this may cause rolling and additional shifting of the cargo;
c. Seek an appropriate port of refuge according to the current heading, prevailing weather conditions and ship's position.
Refer to appendix 1 of the IMSBC Code.

Note: If the list is to be corrected by ballast operations, keep in mind that a more serious consequence may result.

Appendix A

SHIPPER'S DECLARATION

<table>
<tr><td colspan="2">BCSN: METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759</td></tr>
<tr><td>Shipper: XXX</td><td>Transport document number: XXX</td></tr>
<tr><td>Consignee: XXX</td><td>Carrier: XXX</td></tr>
<tr><td>Name/means of transport: XXX
Port/place of departure: XXX</td><td rowspan="2">Instructions or other matters
Low fire risk cargo</td></tr>
<tr><td>Port/place of destination: XXX</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)
Refined ores/particle size small</td><td>Gross mass (kg/tonnes)
30,000 M/T +/- 10 %</td></tr>
<tr><td colspan="2">Specifications of bulk cargo, if applicable
Stowage factor: 0.50 m³/t
Angle of repose, if applicable:
Trimming procedures: FREE POURING
Chemical properties if potential hazard*: Class 8 MHB
*e.g. class & UN No. and/or MHB hazard(s)</td></tr>
<tr><td>Group of the cargo
☐ Group A and B*
☒ Group A*
☐ Group B
☐ Group C
*For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit
10.6%

Moisture content at shipment
8.5%</td></tr>
<tr><td rowspan="2">Classification relating to MARPOL Annex V
☐ harmful to the marine environment
☒ not harmful to the marine environment

Relevant special properties of the cargo
(e.g., highly soluble in water)</td><td rowspan="2">Additional certificate(s)*
☐ certificate of moisture content and transportable
☒ moisture limit
☐ weathering certificate
☐ exemption certificate
☐ other (specify)
*If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory
XXX
Place and date XXX
Signature on behalf of shipper
HANDWRITTEN SIGNATURE</td></tr>
</table>

Appendix B

ATTACHMENT OF CERTIFICATE OF COMPLIANCE FOR THE CARRIAGE OF SOLID BULK CARGOES

LIST OF CARGOES

Bulk Cargo Shipping Name	UN No.	IMO Class	Group	Note	Cargo Space
ALUMINIUM NITRATE	1438	5.1	B	4*	All Cargo Holds
AMMONIUM NITRATE	1942	5.1	B	1,2,4*,6	All Cargo Holds
AMMONIUM NITRATE BASED FERTILIZER (TYPE A)	2067	5.1	B	1,2,4*,7	All Cargo Holds
AMMONIUM NITRATE BASED FERTILIZER (TYPE B)	2071	9	B	1,2,4*,7	All Cargo Holds
BARIUM NITRATE	1446	5.1	B	4*	All Cargo Holds
BROWN COAL BRIQUETTES		MHB	B	2,14	All Cargo Holds
CALCIUM NITRATE	1454	5.1	B	4*	All Cargo Holds
CASTOR BEANS or CASTOR MEAL or CASTOR POMACE or CASTOR FLAKE	2969	9	B	9	All Cargo Holds
CHARCOAL		MHB	B	5	All Cargo Holds
COAL		MHB	B (and A)	2, 14	All Cargo Holds
COPRA (dry)	1363	4.2	B	6	All Cargo Holds
DIRECT REDUCED IRON (A) Briquettes, hot-moulded		MHB	B	2	All Cargo Holds
FERROUS METAL BORINGS, SHAVINGS, TURNINGS or CUTTINGS	2793	4.2	B		All Cargo Holds
FISHMEAL (FISHSCRAP), STABILIZED	2216	9	B		All Cargo Holds
FLUORSPAR		MHB	A and B		All Cargo Holds
IRON OXIDE, SPENT or IRON SPONGE, SPENT	1376	4.2	B	2	All Cargo Holds
LEAD NITRATE	1469	5.1	B	4*	All Cargo Holds
LIME (UNSLAKED)		MHB	B		All Cargo Holds
LINTED COTTON SEED		MHB	B		All Cargo Holds
MAGNESIA (UNSLAKED)		MHB	B		All Cargo Holds
MAGNESIUM NITRATE	1474	5.1	B	4*	All Cargo Holds
METAL SULPHIDE CONCENTRATES		MHB (SH) and/or (CR) and/or (TX)	A and B		All Cargo Holds
METAL SULPHIDE CONCENTRATES, CORROSIVE	**1759**	**8**	**A and B**		**All Cargo Holds**
MONOAMMONIUM PHOSPHATE (M.A.P.), MINERAL ENRICHED COATING		MHB (CR)	B		All Cargo Holds
MONOCALCIUMPHOSPHATE (MCP)		MHB (CR)	A and B		All Cargo Holds
PEAT MOSS		MHB	A and B		All Cargo Holds
PETROLEUM COKE (calcined or uncalcined)		MHB	B		All Cargo Holds
PITCH PRILL		MHB	B	6	All Cargo Holds
POTASSIUM NITRATE	1486	5.1	B	4*	All Cargo Holds

Bulk Cargo Shipping Name	UN No.	IMO Class	Group	Note	Cargo Space
PYRITES, CALCINED (Calcined Pyrites)		MHB	A and B		All Cargo Holds
SAWDUST		MHB	B		All Cargo Holds
SEED CAKE, containing vegetable oil (a)	1386	4.2	B		All Cargo Holds
SODIUM NITRATE	1498	5.1	B	4*	All Cargo Holds
SODIUM NITRATE AND POTASSIUM NITRATE MIXTURE	1499	5.1	B	4*	All Cargo Holds
SUGARCANE BIOMASS PELLETS		MHB (CB,WT,WF and OH)	B		All Cargo Holds
SULPHUR (crushed lump and coarse grained)	1350	4.1	B	2,8	All Cargo Holds
TANKAGE		MHB	B		All Cargo Holds
VANADIUM ORE		MHB	B		All Cargo Holds
WOOD PELLETS CONTAINING ADDITIVES AND/OR BINDERS		MHB (WF)	B		All Cargo Holds
WOOD PELLETS NOT CONTAINING ANY ADDITIVES AND/OR BINDERS		MHB (OH)	B		All Cargo Holds
WOOD PRODUCTS-GENERAL		MHB	B		All Cargo Holds
WOODCHIPS		MHB	B	10	All Cargo Holds

Note:

1	Bulkhead between the cargo space and the engine-room to be insulated to class A-60 standard.
2	Electrical equipments and cables in the cargo spaces shall be the safe type for use in dangerous environments.
4*	Alternatively, water supplies defined in SOLAS Reg.Ⅱ-2/19.3.1.2 to be provided for cargo spaces.
5	Charcoal in class 4.2 not to be carried in bulk and the moisture content not to be more than 10%.
6	This cargo shall not be loaded in cargo spaces adjacent to fuel oil tank (s), unless heating arrangements for the tank (s) are disconnected and remain disconnected during the entire voyage.
7	There are means to monitor and control the temperature of boundary, where cargo is adjacent to, not exceeding 50℃.
8	Fine grained sulphur (flowers of sulphur) not to be transported in bulk.
9	Castor meal, castor pomace and castor flakes not to be carried in bulk.
10	If the ship is exempted from the requirement of SOLAS Ch.II-2/R.10.7.1.3, the cargo with moisture content of 15% or more can be carried, but below 15% cannot.
14	The cargo shall not be stowed adjacent to hot areas. (For interpretation of hot areas, see MSC.I/Circ.1351)

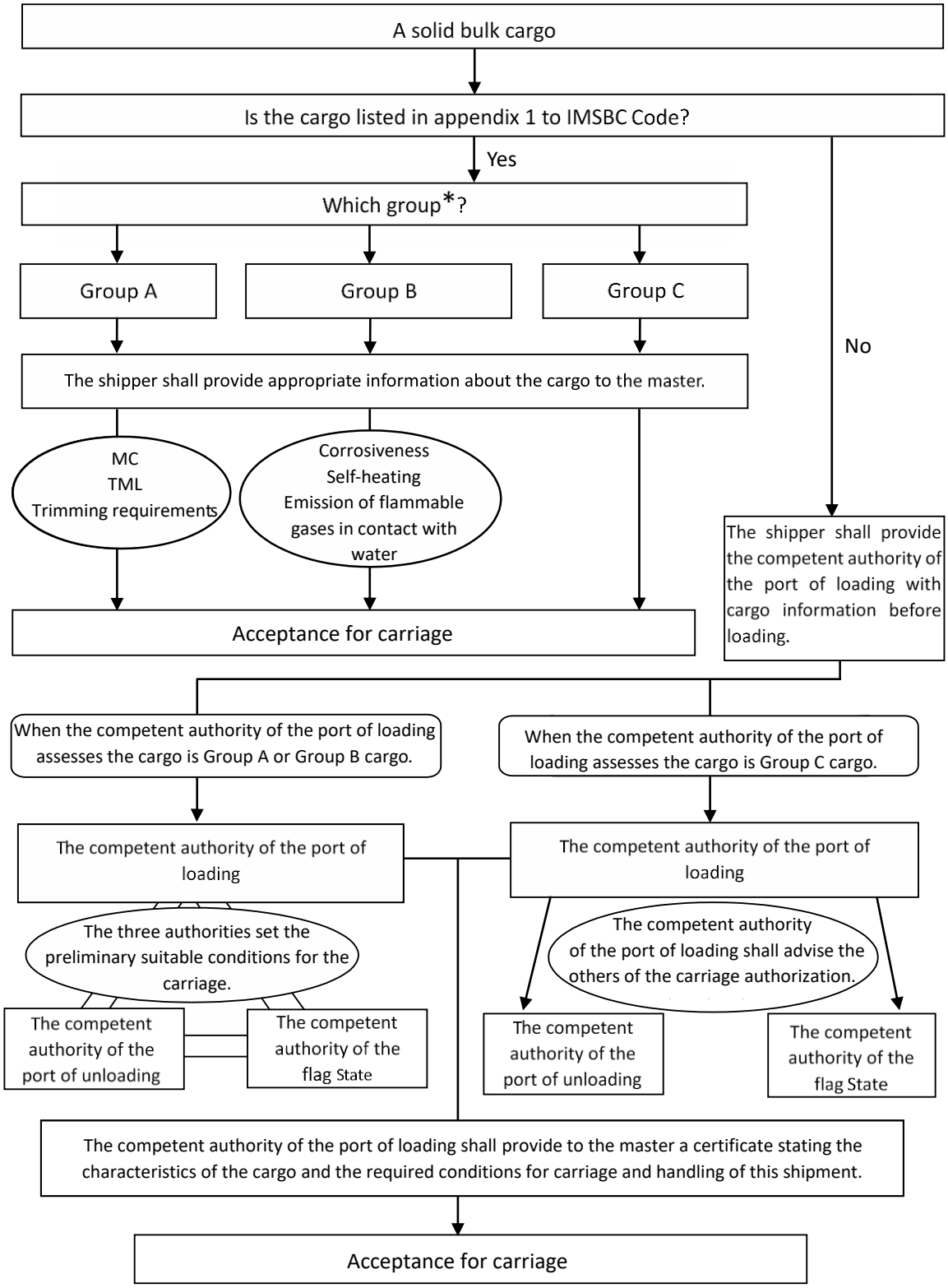
Remarks:

A) METAL SULPHIDE CONCENTRATES, CORROSIVE UN 1759:

This material may also meet MHB criteria of self-heating solids and/or solids that evolve toxic gas when wet. This cargo may have a tendency to self-heat and or emission of toxic fumes if moisturized like MHB cargoes.

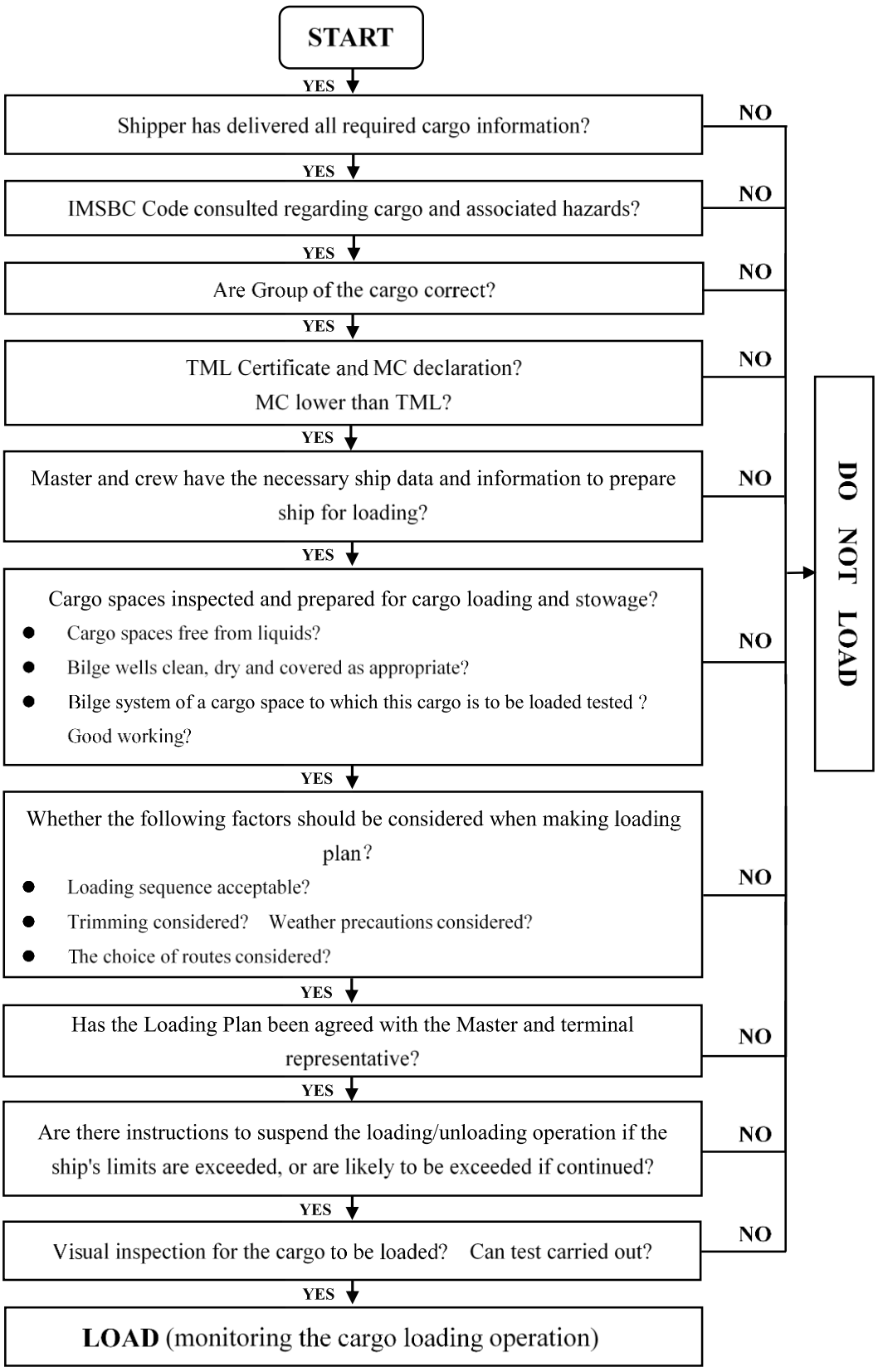
Appendix C

Check Flow Chart for Acceptance for Carriage of the Solid Bulk Cargo



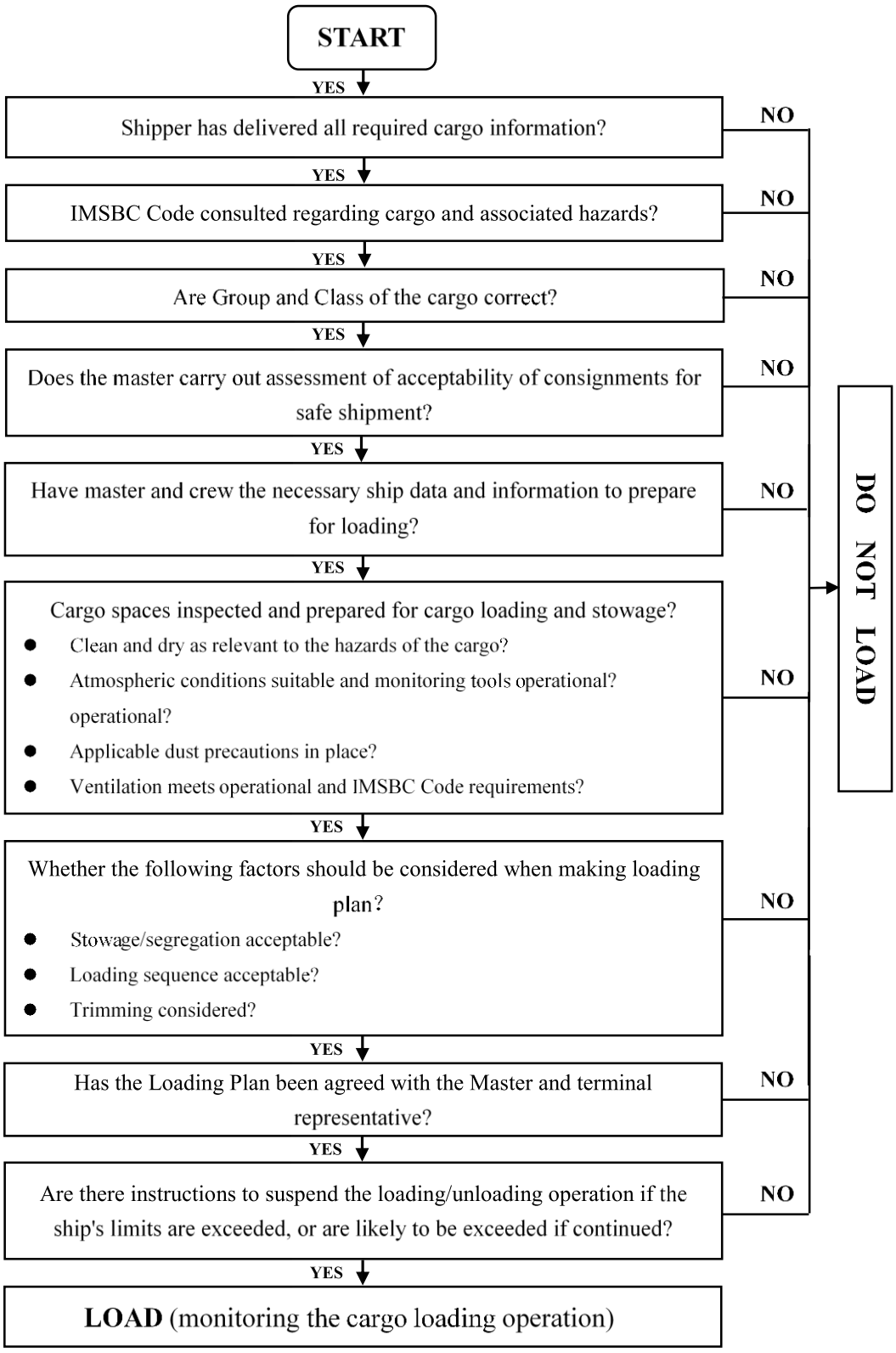
* If the cargoes belong to Groups A and B, the check flow should be carried out according to the requirements of Group A and those of Group B respectively.

Appendix D
Safety Check Loading Flow Chart for Group A Cargoes



Appendix E

Safety Check Loading Flow Chart for Group B Cargoes



PART E – EVALUATION AND ASSESSMENT

Introduction

The effectiveness of any evaluation depends to a great extent on the precision of the description of what is to be evaluated. The learning objectives in the detailed syllabus will provide a sound base for the construction of suitable tests for evaluating trainee progress.

Evaluation/assessment is a way of finding out if learning has taken place. It enables the assessor (instructor), to ascertain if the trainee has gained the required skills and knowledge needed at a given point towards a course or qualification.

The purpose of evaluation/assessment

- To assist trainees in learning.
- To identify trainees' strengths and weaknesses.
- To assess the effectiveness of a particular instructional strategy.
- To assess and improve the effectiveness of curriculum programs.
- To assess and improve teaching effectiveness.

Methods of evaluation

The evaluation methods must be based on clearly defined objectives, and they must truly represent what is meant to be assessed, for example only the relevant criteria and the syllabus or course guide. There must be a reasonable balance between the subject topics involved and also in the testing of trainees' KNOWLEDGE, UNDERSTANDING AND PROFICIENCY of the concepts.

The evaluation methods should also be reliable. To be reliable, an evaluation procedure should produce reasonable consistent results no matter which set of papers or version of the test is used. It is important to note that no single method can satisfactorily measure knowledge and skill over the entire spectrum of matters to be tested for the assessment of competence.

Care should therefore be taken to select the method most appropriate to the particular aspect of competence to be tested, bearing in mind the need to frame questions which relate as realistically as possible to the requirements on an officer's job at sea.

The methods for evaluation suggested by developers of this model course can be objective testing, including multiple choice questions and true or false questions.

STCW Code

The training and assessment of seafarers, as required under the STCW, is administered, supervised and monitored in accordance with the provisions of section A-II/1 and A-II/2 of the STCW Code.

Column 3 (methods for demonstrating competence) and Column 4 (criteria for evaluating competence) of the competence tables of STCW Code set out the methods and criteria for evaluation of trainee seafarers, and with respect to the competence standards set by the Convention as amended. In the case of this model course, instructors should refer to these tables when designing the assessment.
Instructors can also refer to the guidance as given in Part B-V/b of the STCW Code.

Subjective testing

Traditional methods of evaluation require the trainees to demonstrate what has been learned by stating or writing formal answers to questions. Such evaluation invariably depends upon the judgment of the assessor (instructor). Different assessors (instructors) can produce quite different scores when evaluating answers. In addition, subjective testing may be time-consuming. It is therefore suggested that such evaluation should not be used in the course.

Objective testing

A variety of objective tests have been developed over the years. Their common feature is that the evaluation does not require a judgment by the assessor (instructor). The response is either right or wrong.

Multiple choice question

The multiple-choice question is a form of objective testing in which the correct response must be selected from several given alternatives by trainees.
When designing multiple choice questions, instructors can design various test items and different number of alternatives for each question based on types of trainees, teaching objectives and trainees' knowledge and skills.

Marking or scoring is easier if multiple choice questions are used as assessing questions. But in some cases, difficulties may arise in creating plausible distracters.
The incorrect alternatives in multiple choice questions are called "distracters". Their purpose is to distract the uninformed participant from the correct answer. The distracter must be realistic and should be based on misconceptions commonly held, or on mistakes commonly made. Care must be exercised to ensure that distracters are not plausible for more than one reason if the nature of the error made (and hence the distracter chosen) is to affect the scoring of the test item.
The options "none of the above" or "all of the above" are used in some tests. These can be helpful but should be used sparingly.

Distracters should distract the uninformed, but they should not take the form of "trick" questions that could mislead the knowledge participants (for example, do not insert "not" into a correct response to make it a distracter).

True or false question

The true or false question is also a kind of objective testing. It requires trainees to judge whether the demonstration of the question is correct or not, that is, the answer to the question is either true or false.

Quality of test items

No matter which type of test is used, it is essential that all questions or test items used should be as brief as possible, since the time taken to read the questions themselves lengthens the examination. Questions must also be clear and complete. To ensure this, it is necessary that they should be reviewed by a person other than the originator. In all cases, the questions should be checked to ensure that they measure an objective which is essential to the job concerned.

Assessment scheme

Developers suggest that instructors adopt only objective testing for assessment. All candidates are allowed to refer to the IMSBC Code throughout.
Instructors can decide the proportion of multiple choice questions and true or false questions in test items and their respective score depending upon the knowledge of trainees, teaching objectives, quality of teaching, etc. Similarly, the number of alternative answers in multiple choice questions also can be decided by instructors based on reality. For example, if the trainees are seafarers, instructors could design 4 alternatives for each multiple choice question, while if the trainees are stevedores in port terminals, the number of alternatives may be reduced to 3.

APPENDIX I – IMPLEMENTATION OF IMO COURSES

Contents

Part 1 Preparation

Part 2 Notes on teaching technique

Part 3 Curriculum development

Annex A1 Preparation checklist

Annex A2 Example of a Model Course syllabus in a subject area

Annex A3 Example of a lesson plan for Annex A2

Part 1 – Preparation

1 Introduction

1.1 The success of any enterprise depends heavily on sound and effective preparations.

1.2 Although the IMO model course "package" has been made as comprehensive as possible, it is nonetheless vital that sufficient time and resources are devoted to preparation. Preparation not only involves matters concerning administration or organization, but also includes the preparation of any course notes, drawings, sketches, overhead transparencies, etc., which may be necessary.

2 General considerations

2.1 The course "package" should be studied carefully; in particular, the course syllabus and associated material must be attentively and thoroughly studied. This is vital if a clear understanding is to be obtained of what is required, in terms of resources necessary to successfully implement the course.

2.2 A "checklist", such as that set out in annex A1, should be used throughout all stages of preparation to ensure that all necessary actions and activities are being carried out in good time and in an effective manner. The checklist allows the status of the preparation procedures to be monitored and helps in identifying the remedial actions necessary to meet deadlines. It will be necessary to hold meetings of all those concerned in presenting the course from time to time in order to assess the status of the preparation and "trouble-shoot" any difficulties.

2.3 The course syllabus should be discussed with the teaching staff who are to present the course, and their views received on the particular parts they are to present. A study of the syllabus will determine whether the incoming trainees need preparatory work to meet the entry standard. The detailed teaching syllabus is constructed in "training outcome" format. Each specific outcome states precisely what the trainee must do to show that the outcome has been achieved. An example of a model course syllabus is given in annex A2. Part 3 deals with curriculum development and explains how a syllabus is constructed and used.

2.4 The teaching staff who are to present the course should construct notes or lesson plans to achieve these outcomes. A sample lesson plan for one of the areas of the sample syllabus is provided in annex A3.

2.5 It is important that the staff who presents the course conveys, to the person in charge of the course, its assessment of the course as it progresses.

3 Specific considerations

3.1 Scope of course

In reviewing the scope of the course, the instructor should determine whether it needs any adjustment in order to meet additional local or national requirements (see Part 3).

3.2 Course objective

.1 The course objective, as stated in the course material, should be very carefully considered so that its meaning is fully understood. Does the course objective require expansion to encompass any additional task that national or local requirements will impose upon those who successfully complete the course? Conversely, are there elements included which are not validated by national industry requirements?

.2 It is important that any subsequent assessment made of the course should include a review of the course objectives.

3.3 Entry standards

.1 If the entry standard is not met by your intended trainee intake, those entering the course should first be required to complete an upgrading course to raise them to the stated entry level. Alternatively, those parts of the course affected could be augmented by inserting course material which will cover the knowledge required.

.2 If the entry standard is exceeded by your planned trainee intake, you may wish to abridge or omit those parts of the course the teaching of which would be unnecessary, or which could be dealt with as revision.

.3 Study the course material with the above questions in mind and with a view to assessing whether or not it will be necessary for the trainees to carry out preparatory work prior to joining the course. Preparatory material for the trainees can range from refresher notes, selected topics from textbooks and reading of selected technical papers, through to formal courses of instruction. It may be necessary to use a combination of preparatory work and the model course material in modified form. It must be emphasized that where the model course material involves an international requirement, such as a regulation of the International Convention on Standards of Training, Certification and Watchkeeping (STCW) 1978, as amended, the standard must not be relaxed; in many instances, the intention of the Convention is to require review, revision or increased depth of knowledge by candidates undergoing training for higher certificates.

3.4 Course certificate, diploma or document

Where a certificate, diploma or document is to be issued to trainees who successfully complete the course, ensure that this is available and properly worded and that the industry and all authorities concerned are fully aware of its purpose and intent.

3.5 Course intake limitations

.1 The course designers have recommended limitations regarding the numbers of trainees who may participate in the course. As far as possible, these limitations should not be exceeded; otherwise, the quality of the course will be diluted.

.2 It may be necessary to make arrangements for accommodating the trainees and providing facilities for food and transportation. These aspects must be considered at an early stage of the preparations.

3.6 Staff requirements

.1 It is important that an experienced person, preferably someone with experience in course and curriculum development, is given the responsibility of implementing the course.

.2 Such a person is often termed a "course co-ordinator" or "course director". Other staff, such as lecturers, instructors, laboratory technicians, workshop instructors, etc., will be needed to implement the course effectively. Staff involved in presenting the course will need to be properly briefed about the course work they will be dealing with, and a system must be set up for checking the material they may be required to prepare. To do this, it will be essential to make a thorough study of the syllabus and apportion the parts of the course work according to the abilities of the staff called upon to present the work.

.3 The person responsible for implementing the course should consider monitoring the quality of teaching in such areas as variety and form of approach, relationship with trainees, and communicative and interactive skills; where necessary, this person should also provide appropriate counselling and support.

3.7 Teaching facilities and equipment

.1 Rooms and other services
It is important to make reservations as soon as is practicable for the use of lecture rooms, laboratories, workshops and other spaces.

.2 Equipment

Arrangements must be made at an early stage for the use of equipment needed in the spaces mentioned in 3.7.1 to support and carry through the work of the course.

For example:

.1 blackboards and writing materials.

.2 apparatus in laboratories for any associated demonstrations and experiments.

.3 machinery and related equipment in workshops.

.4 equipment and materials in other spaces (e.g. for demonstrating fire-fighting, personal survival, etc.).

3.8 Teaching aids

Any training aids specified as being essential to the course should be constructed or checked for availability and working order.

3.9 Audio-visual aids

Audio-visual aids (AVA) may be recommended in order to reinforce the learning process in some parts of the course. Such recommendations will be identified in Part A of the model course. The following points should be borne in mind:

Overhead projectors

Check through any illustrations provided in the course for producing overhead projector (OHP) transparencies and arrange them in order of presentation. To produce transparencies, a supply of transparency sheets is required; the illustrations can be transferred to these via photocopying. Alternatively, transparencies can be produced by writing or drawing on the sheet. Coloured pens are useful for emphasizing salient points. Ensure that spare projector lamps (bulbs) are available.

Slide projectors

If you order slides indicated in the course framework, check through them and arrange them in order of presentation. Slides are usually produced from photographic negatives. If further slides are considered necessary and cannot be produced locally, OHP transparencies should be resorted to.

Projector

If films are to be used, check their compatibility with the projector (i.e. 16 mm, 35 mm, sound, etc.). The films must be test-run to ensure there are no breakages.

Video equipment

It is essential to check the type of video tape to be used. The two types commonly used are VHS and Betamax. Although special machines exist which can play either format, the majority of machines play only one or the other type. Note that VHS and Betamax are not compatible; the correct machine type is required to match the tape. Check also that the TV raster format used in the tapes (i.e. number of lines, frames/second, scanning order, etc.) is appropriate to the TV equipment available. (Specialist

advice may have to be sought on this aspect.) All video tapes should be test-run prior to their use on the course.

Computer equipment
If computer-based aids are used, check their compatibility with the projector and the available software.

General note
The electricity supply must be checked for voltage and whether it is AC or DC, and every precaution must be taken to ensure that the equipment operates properly and safely. It is important to use a proper screen which is correctly positioned; it may be necessary to exclude daylight in some cases. A check must be made to ensure that appropriate screens or blinds are available. All material to be presented should be test-run to eliminate any possible troubles, arranged in the correct sequence in which it is to be shown, and properly identified and cross-referenced in the course timetable and lesson plans.

3.10 IMO references
The content of the course, and therefore its standard, reflects the requirements of all the relevant IMO international conventions and the provisions of other instruments as indicated in the model course. The relevant publications can be obtained from the Publication Service of IMO, and should be available, at least to those involved in presenting the course, if the indicated extracts are not included in a compendium supplied with the course.

3.11 Textbooks
The detailed syllabus may refer to a particular textbook or textbooks. It is essential that these books are available to each trainee taking the course. If supplies of textbooks are limited, a copy should be loaned to each trainee, who will return it at the end of the course. Again, some courses are provided with a compendium which includes all or part of the training material required to support the course.

3.12 Bibliography
Any useful supplementary source material is identified by the course designers and listed in the model course. This list should be supplied to the participants so that they are aware where additional information can be obtained, and at least two copies of each book or publication should be available for reference in the training institute library.

3.13 Timetable
If a timetable is provided in a model course, it is for guidance only. It may only take one or two presentations of the course to achieve an optimal timetable. However, even then it must be borne in mind that any timetable is subject to variation, depending on the general needs of the trainees in any one class and the availability of instructors and equipment.

Part 2 - Notes on Teaching Technique

1 Preparation

1.1 Identify the section of the syllabus which is to be dealt with.

1.2 Read and study thoroughly all the syllabus elements.

1.3 Obtain the necessary textbooks or reference papers which cover the training area to be presented.

1.4 Identify the equipment which will be needed, together with support staff necessary for its operation.

1.5 It is essential to use a "lesson plan", which can provide a simplified format for coordinating lecture notes and supporting activities. The lesson plan breaks the material down into identifiable steps, making use of brief statements, possibly with keywords added, and indicating suitable allocations of time for each step. The use of audio-visual material should be indexed at the correct point in there with an appropriate allowance of time. The audio-visual material should be test-run prior to its being used in the lecture. An example of a lesson plan is shown in annex A3.

1.6 The syllabus is structured in training outcome format and it is thereby relatively straightforward to assess each trainee's grasp of the subject matter presented during the lecture. Such assessment may take the form of further discussion, oral questions, written tests or selection-type tests, such as multiple-choice questions, based on the objectives used in the syllabus. Selection-type tests and short-answer tests can provide an objective assessment independent of any bias on the part of the assessor. For certification purposes, assessors should be appropriately qualified for the particular type of training or assessment.

REMEMBER - POOR PREPARATION IS A SURE WAY TO LOSE THE INTEREST OF A GROUP

1.7 Check the rooms to be used before the lecture is delivered. Make sure that all the equipment and apparatus are ready for use and that any support staff are also prepared and ready. In particular, check that all blackboards are clean and that a supply of writing and cleaning materials is readily available.

2 Delivery

2.1 Always face the people you are talking to; never talk with your back to the group.

2.2 Speak clearly and with sufficient volume to reach everyone.

2.3 Maintain eye contact with the whole group as a way of securing their interest and maintaining it (i.e.do not look continuously at one particular person, nor at a point in space).

2.4 People are all different, and they behave and react in different ways. An important function of a lecturer is to maintain interest and interaction between members of a group.

2.5 Some points or statements are more important than others and should therefore be emphasized. To ensure that such points or statements are remembered, they must be restated a number of times, preferably in different words.

2.6 If a blackboard is to be used, any writing on it must be clear and large enough for everyone to see. Use colour to emphasize important points, particularly in sketches.

2.7 It is only possible to maintain a high level of interest for a relatively short period of time; therefore, break the lecture up into different periods of activity to keep interest at its highest level. Speaking, writing, sketching, use of audio-visual material, questions, and discussions can all be used to accomplish this. When a group is writing or sketching, walk amongst the group, looking at their work, and provide comment or advice to individual members of the group when necessary.

2.8 When holding a discussion, do not allow individual members of the group to monopolize the activity, but ensure that all members have a chance to express opinions or ideas.

2.9 If addressing questions to a group, do not ask them collectively; otherwise, the same person may reply each time. Instead, address the questions to individuals in turn, so that everyone is invited to participate.

2.10 It is important to be guided by the syllabus content and not to be tempted to introduce material which may be too advanced or may contribute little to the course objective. There is often competition between instructors to achieve a level which is too advanced. Also, instructors often strongly resist attempts to reduce the level to that required by a syllabus.

2.11 Finally, effective preparation makes a major contribution to the success of a lecture. Things often go wrong; preparedness and good planning will contribute to putting things right. Poor teaching cannot be improved by good accommodation or advanced equipment, but good teaching can overcome any disadvantages that poor accommodation and lack of equipment can present.

Part 3 - Curriculum Development

1 Curriculum

The dictionary defines *curriculum* as a "regular course of study", while *syllabus* is defined as "a concise statement of the subjects forming a course of study". Thus, in general terms, a curriculum is simply a course, while a syllabus can be thought of as a list (traditionally, a "list of things to be taught").

2 Course content

The subjects which are needed to form a training course, and the precise skills and depth of knowledge required in the various subjects, can only be determined through an in-depth assessment of the job functions which the course participants are to be trained on to perform job analysis. This analysis determines the training needs, hence the purpose of the course (course objective). After ascertaining this, it is possible to define the scope of the course.

(NOTE: Determination of whether or not the course objective has been achieved may quite possibly entail assessment, over a period of time, of the "on-the-job performance" of those completing the course. However, the detailed learning objectives are quite specific and immediately assessable.)

3 Job analysis

Job analysis can only be properly carried out by a group whose members are representative of the organizations and bodies involved in the area of work to be covered by the course. The validation of results, via review with persons currently employed in the job concerned, is essential if undertraining and overtraining are to be avoided.

4 Course plan

Following definition of the course objective and scope, a course plan or outline can be drawn up. The potential trainees for the course (the trainee target group) must then be identified, the entry standard to the course decided and the prerequisites defined.

5 Syllabus

The final step in the process is the preparation of the detailed syllabus with associated time scales; the identification of those parts of textbooks and technical papers which cover the training areas to a sufficient degree to meet, but not exceed, each learning objective; and the drawing up of a bibliography of additional material for supplementary reading.

6 Syllabus content

The material contained in a syllabus is not static; technology is continuously undergoing change and there must therefore be a means for reviewing course material in order to eliminate what is redundant and introduce new material reflecting current practice. As defined above, a syllabus can be thought of as a list and, traditionally, there has always been an "examination syllabus" and a "teaching syllabus"; these indicate, respectively, the subject matter contained in an examination paper, and the subject matter a teacher is to use in preparing lessons or lectures.

7 Training outcomes

7.1 The prime communication difficulty presented by any syllabus is how to convey the depth of knowledge required. A syllabus is usually constructed as a series of "training outcomes" to help resolve this difficulty.

7.2 Thus, curriculum development makes use of training outcomes to ensure that a common minimum level and breadth of attainment is achieved by all the trainees following the same course, irrespective of the training institution (i.e. teaching/lecturing staff).

7.3 Training outcomes are trainee-oriented, in that they describe an end result which is to be achieved by the trainee as a result of a learning process.

7.4 In many cases, the learning process is linked to a skill or work activity and, to demonstrate properly the attainment of the objective, the trainee response may have to be based on practical application or use, or on work experience.

7.5 The training outcome, although aimed principally at the trainee to ensure achievement of a specific learning step, also provides a framework for the teacher or lecturer upon which lessons or lectures can be constructed.

7.6 A training outcome is specific and describes precisely what a trainee must do to demonstrate his knowledge, understanding or skill as an end product of a learning process.

7.7 The learning process is the "knowledge acquisition" or "skill development" that takes place during a course. The outcome of the process is an acquired "knowledge", "understanding", "skill"; but these terms alone are not sufficiently precise for describing a training outcome.

7.8 Verbs, such as "calculates", "defines", "explains", "lists", "solves" and "states", must be used when constructing a specific training outcome, so as to define precisely what the trainee will be enabled to do.

7.9 In the IMO model course project, the aim is to provide a series of model courses to assist instructors in developing countries to enhance or update the maritime training they provide, and to allow a common minimum standard to be achieved throughout the world. The use of training outcomes is a tangible way of achieving this desired aim.

7.10 As an example, a syllabus in training-outcome format for the subject of ship construction appears in annex A2. This is a standard way of structuring this kind of syllabus. Although, in this case, an outcome for each area has been identified - and could be used in an assessment procedure - this stage is often dropped to obtain a more compact syllabus structure.

8 Assessment

Training outcomes describe an outcome which is to be achieved by the trainee. Of equal importance is the fact that such an achievement can be measured OBJECTIVELY through an evaluation which will not be influenced by the personal opinions and judgments of the examiner. Objective testing or evaluation provides a sound base on which to make reliable judgments concerning the levels of understanding and knowledge achieved, thus allowing an effective evaluation to be made of the progress of trainees in a course.

Annex A1 - Preparation checklist

Ret.	Component	Identified	Reserved	Electricity supply	Purchases	Tested	Accepted	Started	Finished	Status OK
1	Course plan									
2	Timetable									
3	Syllabus									
4	Scope									
5	Objective									
6	Entry standard									
7	Preparatory course									
8	Course certificate									
9	Participant numbers									
10	Staffing Co-ordinator_____ Lecturers_____ Instructors_____ Technicians_____ Other_____									

Annex A1 - Preparation checklist (continued)

Ret.	Component	Identified	Reserved	Electricity supply	Purchases	Tested	Accepted	Started	Finished	Status OK

11		Facilities	
	(a)	Rooms	
		Lab	_____
		Workshop	_____
		Other	_____
		Class	_____
	(b)	Equipment	
		Lab	_____
		Workshop	_____
		Other	_____
12		AVA Equipment and materials	
		OHP	_____
		Slide	_____
		Cine	_____
		Video	_____
13		IMO reference	
14		Textbooks	
15		Bibliography	

Annex A2 - Example of a Model Course syllabus in a subject area

Subject area: Ship construction

Prerequisite: Have a broad understanding of shipyard practice

General aims: Have knowledge of materials used in shipbuilding, specification of shipbuilding steel and process of approval

Textbooks: No specific textbook has been used to construct the syllabus, but the instructor would be assisted in preparation of lecture notes by referring to suitable books on ship construction, such as Ship Construction by Eyres (T12) and Merchant Ship Construction by Taylor (T58)

Course outline

Knowledge, understanding and proficiency	Total hours for each topic	Total hours for each subject area of required performance
Competence:		
3.1 CONTROL TRIM, STABILITY and STRESS		
3.1.1 FUNDAMENTAL PRINCIPLES OF SHIPCONSTRUCTION, TRIM AND STABILITY		
.1 Shipbuilding materials	3	
.2 Welding	3	
.3 Bulkheads	4	
.4 Watertight and weathertight doors	3	
.5 Corrosion and its prevention	4	
.6 Surveys and dry-docking	2	
.7 Stability	83	102

Part C3: Detailed teaching syllabus

Introduction

The detailed teaching syllabus is presented as a series of learning objectives. The objective, therefore, describes what the trainee must do to demonstrate that the specified knowledge or skill has been transferred.

Thus each training outcome is supported by a number of related performance elements in which the trainee is required to be proficient. The teaching syllabus shows the *Required performance* expected of the trainee in the tables that follow.
In order to assist the instructor, references are shown to indicate IMO references and publications, textbooks and teaching aids that instructors may wish to use in preparing and presenting their lessons.

The material listed in the course framework has been used to structure the detailed teaching syllabus; in particular:

- Teaching aids (indicated by A)
- IMO references (indicated by R) and
- Textbooks (indicated by T)

will provide valuable information to instructors.

Explanation of information contained in the syllabus tables

The information on each table is systematically organized in the following way. The line at the head of the table describes the **FUNCTION** with which the training is concerned. A function means a group of tasks, duties and responsibilities as specified in the STCW Code. It describes related activities which make up a professional discipline or traditional departmental responsibility on board.

The header of the first column denotes the **COMPETENCE** concerned. Each function comprises a number of competences. For example, the Function 3, Controlling the Operation of the Ship and Care for Persons on board at the Management Level, comprises a number of COMPETENCES. Each competence is uniquely and consistently numbered in this model course.

In this function the competence is **Control trim**, **stability and stress**. It is numbered 3.1, that is the first competence in Function 3. The term "competence" should be understood as the application of knowledge, understanding, proficiency, skills, experience for an individual to perform a task, duty or responsibility on board in a safe, efficient and timely manner.

Shown next is the required TRAINING OUTCOME. The training outcomes are the areas of knowledge, understanding and proficiency in which the trainee must be able to demonstrate knowledge and understanding. Each COMPETENCE comprises a number of training outcomes. For example, the above competence comprises three training outcomes. The first is concerned with the fundamental principles of FUNDAMENTAL PRINCIPLES OF SHIP CONSTRUCTION, TRIMAND STABILITY. Each training outcome is uniquely and consistently numbered in this model course. That

concerned with fundamental principles of Ship GUIDANCE ON THE IMPLEMENTATION OF MODEL COURSES Construction, Trim and Stability is uniquely numbered 3.1.1. For clarity, training outcomes are printed in black type on grey, for example TRAINING OUTCOME.

Finally, each training outcome embodies a variable number of required performances - as evidence of competence. The instruction, training and learning should lead to the trainee meeting the specified required performance. For the training outcome concerned with fundamental principles of ship construction, trim and stability there are three areas of performance. These are:

3.1.1.1 Shipbuilding materials
3.1.1.2 Welding
3.1.1.3 Bulkheads

Following each numbered area of required performance there is a list of activities that the trainee should complete and which collectively specify the standard of competence that the trainee must meet. These are for the guidance of teachers and instructors in designing lessons, lectures, tests and exercises for use in the teaching process. For example, under the topic 3.1.1.1, to meet the required performance, the trainee should be able to:

- state that steels are alloys of iron, with properties dependent upon the type and amounts of alloying materials used;
- state that the specifications of shipbuilding steels are laid down by classification societies; and
- state that shipbuilding steel is tested and graded by classification society surveyors who stamp it with approval marks.

and so on.

IMO references (Rx) are listed in the column to the right-hand side. Teaching aids(Ax), videos (Vx) and textbooks (Tx) relevant to the training outcome and required performances are placed immediately following the TRAINING OUTCOME title.

It is not intended that lessons are organized to follow the sequence of required performances listed in the tables. The Syllabus tables are organized to match with the competence in the STCW Code table A-II/2. Lessons and teaching should follow college practices. It is not necessary, for example, for shipbuilding materials to be studied before stability. What is necessary is that all of the material is covered and that teaching is effective to allow trainees to meet the standard of the required performance.

FUNCTION 3: CONTROLLING THE OPERATION OF THE SHIP AND CARE FOR PERSONS ON BOARD AT THE MANAGEMENT LEVEL

COMPETENCE 3.1	Control trim, stability and stress	IMO reference

3.1.1 FUNDAMENTAL PRINCIPLES OF SHIP CONSTRUCTION, TRIM AND STABILITY

Textbooks: T11, T12, T35, T58, T69
Teaching aids: A1, A4, V5, V6, V7

Required performance:

1.1 Shipbuilding materials (3 hours) R1

· states that steels are alloys of iron, with properties dependent upon the type and amounts of alloying materials used
· states that the specifications of shipbuilding steels are laid down by
· states that shipbuilding steel is tested and graded by classification society surveyors, who stamp it with approval marks
· explains that mild steel, graded A to E, is used for most parts of the ship
· states why higher tensile steel may be used in areas of high stress, such as the sheer strake
· explains that the use of higher tensile steel in place of mild steel results in a saving of weight for the same strength
· explains what is meant by:
  - tensile strength ductility
  - hardness
  - toughness
· defines strain as extension divided by original length
· sketches a stress-strain curve for mild steel - explains:
  - yield point
  - ultimate tensile stress
  - modulus of elasticity
· explains that toughness is related to the tendency to brittle fracture
· explains that stress fracture may be initiated by a small crack or notch in a plate
· states that cold conditions increase the chances of brittle fracture
· states why mild steel is unsuitable for the very low temperatures involved in the containment of liquefied gases
· lists examples where castings or forgings are used in ship construction
·explains the advantages of the use of aluminium alloys in the construction of superstructures
·states that aluminium alloys are tested and graded by classification society surveyors
· explains how strength is preserved in aluminium superstructures in the event of fire
· describes the special precautions against corrosion that are needed where aluminium alloy is connected to steelwork

Annex A3 - Example of a lesson plan for Annex A2

Subject area: 3.1 Control trim, stability and stress **Lesson number: 1** **Duration: 3 hours**

Training Area: 3.1.1 Fundamental principles of ship construction, trim and stability

Main element Specific training outcome in teaching sequence, with memory keys	Teaching method	Textbook	IMO reference	A/V aid	Instructor guidelines	Lecture notes	Time (minutes)
1.1 Shipbuilding materials (3 hours)							
States that steels are alloys of iron, with properties dependent upon the type and amounts of alloying materials used	Lecture	T12, T58	STCW 11/2, A-II2	V5 to V7	A1	Compiled by the lecturer	10
States that the specifications of shipbuilding steels are laid down by classification societies	Lecture	T12, T58	STCW 11/2, A-II2	V5 to V7	A1	Compiled by the lecturer	20
Explains that mild steel, graded A to E, is used for most parts of the ship	Lecture	T12, T58	STCW 11/2, A-II2	V5 to V7	A1	Compiled by the lecturer	15
States why higher tensile steel may be used in areas of high stress, such as the sheer strake	Lecture	T12, T58	STCW 11/2, A-II2	V5 to V7	A1	Compiled by the lecturer	10
Explains that use of higher tensile steel in place of mild steel results in a saving of weight for the same strength	Lecture	T12, T58	STCW 11/2, A-II2	V5 to V7	A1	Compiled by the lecturer	15

Appendix II – Instructor Feedback on Model Course

In order to ensure the update and validity of this model course, it is essential that users provide comments and feedbacks that are useful for further training on safety at sea and marine environment protection. Appendix II gives some specific questions regarding this model course. Delivery and responses from the users are welcome. Contact information is also included.

This questionnaire covers three parts as follows:

.1 Degree of satisfaction regarding the design of the KUPs of the model course with IMO references (STCW, SOLAS);

.2 Feedbacks in the teaching process; and

.3 Feedbacks in the learning process.

It is very important for the developer that the trainees take part in this questionnaire and provide some useful feedbacks on the learning process.

1 Degree of satisfaction of the KUPs in the model course with IMO references (STCW, SOLAS)

.1 Is there enough detailed information in the items of the "KUP" in the model course? Please justify your answers.

.2 Do the KUPs satisfy the relevant IMO requirements? Please justify your answers.

.3 Are there any other "KUP" items that should be added in the model course? If so, please list them and justify.

.4 Is there any "KUP" that is not required on board in the model course? If so, please list them and justify.

2 Feedback in the teaching process

.1 Is the instructor manual in Part D helpful for your lessons?

.2 Are there any difficult points or problems in your teaching process? In what ways can the model course help you to solve them?

.3 Are there any other key points or issues to be added in the teaching process besides those in Part D of this model course?

.4 Do you think it is necessary to increase the class hours of certain topics or subtopics in this model course? If so, please specify.

.5 Do you know any recent trends or development in the areas to be covered but not included in this model course? If so, please specify.

.6 Are there any ambiguities that may cause misunderstanding? If so, please specify.

3 Feedback in the learning process

.1 How do you evaluate the course sequence and timetable of this model course?

.2 In the view of trainees, are the sub-items of the required performance reasonable? If not so, please justify.

.3 In the part of "assessment and evaluation", do you think there are any other effective ways to prove that the trainees have met the competency requirements?

.4 What are the trainees' reflections and feedbacks regarding this model course? Please give some examples.

Contact information

For questions, comments and suggestions to the model course, please send to
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Your involvement and contribution would be very important for further improvement and would be much appreciated.