



IALA MODEL COURSE

C0103-2 VTS SUPERVISOR TRAINING

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CONTENTS

PART A	MODEL COURSE OVERVIEW	5
1	Introduction	5
2	PURPOSE OF THE MODEL COURSE.....	5
3	Course Objective	6
4	Course Curriculum Outline.....	6
5	Entry Requirements	8
6	Recognition of Prior Learning	8
7	Course Intake - Limitations	8
8	Training Staff Requirements	8
9	Facilities and Equipment.....	8
10	Delivery of the Model Course	9
10.1	Developing course content.....	9
10.2	Competence levels	9
10.3	Competence tables, teaching aids and references	10
10.4	Training course references	10
10.5	Course review and updating.....	13
11	Assessment	13
12	Course Certificates	13
13	Acronyms	13
PART B	Modules	14
MODULE 1	Communication and Leadership	14
1.1	SUBJECT FRAMEWORK.....	14
1.2	SUBJECT OUTLINE OF MODULE 1.....	15
MODULE 2	Managing the Watch	19
2.1	SUBJECT FRAMEWORK.....	19
2.2	SUBJECT OUTLINE OF MODULE 2 – Managing the Watch	20
MODULE 3	Provision of VTS	24
3.1	SUBJECT FRAMEWORK.....	24
3.2	SUBJECT OUTLINE OF module 3 – provision of VTS	25
MODULE 4	Emergency Situations	29
4.1	SUBJECT FRAMEWORK.....	29
4.2	SUBJECT OUTLINE OF MODULE 4 –Emergency Situations	30
MODULE 5	Human Factors	34
5.1	SUBJECT FRAMEWORK.....	34
5.2	SUBJECT OUTLINE OF MODULE 5 – Human Factors.....	35



CONTENTS

List of Tables

Table 1	Summary of C0103-2 Training.....	7
Table 2	Competence Level Taxonomy for VTS Training.....	12
Table 3	Subject outline – Communication and Leadership.....	15
Table 4	Competence Table – Communication and Leadership.....	16
Table 5	Subject outline – Managing the Watch.....	20
Table 6	Competence Table – Managing the Watch.....	21
Table 7	Subject outline – Provision of VTS.....	25
Table 8	Competence Table – Provision of VTS.....	26
Table 9	Subject outline –Emergency Situations.....	30
Table 10	Competence Table – Responding to Emergencies.....	31
Table 11	Subject outline – Human Factors.....	35
Table 12	Competence Table – Human Factors.....	36



PART A MODEL COURSE OVERVIEW

1 INTRODUCTION

IALA Model Courses have been developed to provide guidance on the level of training and knowledge needed to reach levels of competence defined by IALA. They provide IALA National members and other appropriate authorities with guidance on the training of VTS Personnel.

IALA's contribution to the development of internationally harmonized guidance for vessel traffic services is recognized in IMO Resolution *A.1158(32) Guidelines for Vessel Traffic Services* and the Annex to the resolution states:

- *Contracting Governments are encouraged to take into account IALA standards and associated recommendations, guidelines and model courses (Section 9.2)*
- *VTS personnel should only be considered competent when appropriately trained and qualified for their VTS duties. This includes, inter alia:*
 - *satisfactorily completing generic VTS training approved by a competent authority.*
 - *satisfactorily completing on-the-job training at the VTS where the personnel are employed.*
 - *undergoing periodic assessments and revalidation training to ensure competence is maintained; and*
 - *being in possession of appropriate certification.*

IALA recommendations, guidelines and model courses specifically related to the establishment and operation of VTS include:

- *Recommendation R0103 Training and Certification of VTS personnel* specifies the practices associated with the training and certification of VTS personnel to assist authorities when recruiting, training and assessing VTS personnel to ensure the harmonized delivery of vessel traffic services world-wide.
- *Guideline G1156 Recruitment, training, and certification of VTS personnel* states that “Model courses provided by accredited training organizations should be approved by the competent authority.”
- *Guideline G1014 Accreditation of VTS training organizations and approval to deliver IALA VTS model courses* sets out the process by which a training organization can be accredited to deliver approved VTS training courses.
- IALA model courses including:
 - Model Course C0103-1 VTS Operator Training
 - Model Course C0103-2 VTS Supervisor Training
 - Model Course C0103-3 VTS On-the-Job Training
 - Model Course C0103-4 VTS On-the-Job Training Instructor
 - Model Course C0103-5 VTS Revalidation Process for VTS Qualification and Certification

2 PURPOSE OF THE MODEL COURSE

The model course describes the knowledge, skills and competences required to be certified as a VTS Supervisor. It also provides a framework for:

- training organizations to ensure their C0103-2 curriculum meets IALA standards; and
- competent authorities to approve C0103-2 courses provided by a training organization.



It is not the intention of the model course to present instructors with a rigid 'teaching package'. Rather, this model course provides the curriculum content for the training for VTS Supervisor. It is intended to be used by accredited training organizations in preparing their C0103-2 training programs.

VTS Providers may identify additional on-the-job training for VTS supervisors to address specific local requirements.

3 COURSE OBJECTIVE

To successfully complete this course the student will demonstrate the requisite knowledge, skills and attitude to undertake the duties of a VTS Supervisor. This role assists in day-to-day coordination and management activities associated with a VTS / VTS centre, particularly in larger centres or centres with multiple sectors.

A VTS Supervisor may undertake additional activities to those of a VTS Operator, for example:

- Provide leadership and supervision of VTS Operators.
- Carry out administrative duties such as managing the roster, ensuring reporting activities are completed (shift handovers, incident logs/reports).
- Co-ordinate effective interaction between the VTS, allied and emergency services.
- Support on-the-job and proficiency training.
- Provide guidance during the response to developing unsafe situations and internal / external emergencies.

4 COURSE CURRICULUM OUTLINE

The model course comprises five modules, each of which deals with a specific subject representing a requirement or function of a VTS Supervisor. Each module contains a subject framework stating its scope and aims, a subject outline, learning objectives, teaching points and recommended hours.

The recommended hours are indicative and based on the assumption that the students have no or little previous knowledge of the subject. Instructors should revise as required to address the requirements of the students to ensure the learning outcomes are achieved based on the competence levels detailed in each module (Table 1 refers). Time for assessments is in addition to the range of duration is included in the model course.

Training activities, simulated exercises and assessments undertaken during the course are intended to represent the role of the VTS Supervisor and reflect events or incidents that may be experienced at a VTS.

No timetable is included in this model course. Working within the normal practices of the training establishment, instructors should allow time during the course for revision of course content and develop their own timetable depending on the:

- level of skills of students;
- number of persons to be trained;
- number of instructors; and
- simulator facilities and equipment available.



Table 1 *Summary of C0103-2 Training*

Module Title	Recommended Duration in Hours		Overview
	Presentations / Lectures	Exercises / Simulation	
1. Communication and Leadership	7-12	7-12	This module covers the transition from an operations (VTSO) role to a leadership role, including leadership qualities and styles, communicating effectively, and preparing reports.
2. Managing the Watch	4-10	4-9	This module focuses on the higher-level responsibilities of a VTS Supervisor, including watchkeeping responsibilities, shift management and performance management.
3. Provision of VTS	6-11	10-16	This module addresses enhanced responsibilities of the VTS Supervisor, including the regulatory framework, interaction with allied and other services, prioritising and delegating work and maintaining a safe waterway.
4. Responding to Emergency Situations	4-8	6-10	This module builds on the existing training and experience, with a focus on contingency plans and emergency management.
5. Human Factors	5-11	7-15	This module addresses the leadership role of the VTS Supervisor in recognising and implementing factors between humans, technology, systems and procedures that affects operational performance.
Total time range	26-52	34-62	<i>Note: Hours are based on the assumption that the students have no or little previous knowledge of the subject.</i>



5 ENTRY REQUIREMENTS

Every candidate for a VTS Supervisor endorsement should be in possession of a valid VTS Operator certificate. The VTS provider should determine the experience required before identifying candidates for a VTS Supervisor course.

The training organization may determine, and document, any additional course entry requirements for example, due to national requirements or tailoring the course for the student intake.

6 RECOGNITION OF PRIOR LEARNING

It is recognized that some students may have experience, knowledge, skills, attitudes, and competencies acquired through formal or informal learning in some modules or subject elements associated with the VTS model course. In such cases, consideration should also be given to the recognition of prior learning (RPL), which may reduce the time requirement to meet the level required for certification.

IALA Guideline G1017 - Assessment for recognition of prior learning in VTS training provides further guidance assessing and recognizing the prior learning of students.

7 COURSE INTAKE - LIMITATIONS

The training organization should determine the number of students enrolled on the course and provide information on the student to staff ratio. The class/group size should allow the instructor(s) to give adequate individual attention to students as required to meet the learning objective(s).

In general, it is recommended that 8-10 students is the maximum that a single instructor can be expected to train satisfactorily to the level of competence involved. Larger numbers may be admitted depending on the method of delivery.

During practical sessions such as simulations, there may be additional restraints on class/group size. Where the use of a simulator or similar teaching aid is involved, it is recommended that no more than two students be trained simultaneously on any individual piece of equipment.

8 TRAINING STAFF REQUIREMENTS

All instructors and assessors should be appropriately qualified for the training being provided and the assessment required for the model course.

As well as instructors and assessors, additional staff may be required for the maintenance of equipment, for the preparation of materials and training areas as well as support for simulation and other practical activities.

IALA Guideline G1156 - Recruitment, training, and assessment of VTS Personnel provides further guidance on the qualifications for instructors.

9 FACILITIES AND EQUIPMENT

The teaching aids, facilities and equipment students will utilise during the course should be fit for purpose and of a sufficient standard to reflect the training methodologies used in the course delivery. Examples of training methodologies may include:

- Classroom sessions, presentations and facilitated discussion
- Group based learning activities
- Case studies and recordings



- Remote learning (e.g., e-learning, online, distance, hybrid, blended)
- Simulation training

Training should be managed in a manner consistent with IALA Guideline *G1027* in order to provide sufficient behavioural realism to allow students to acquire the knowledge and skills appropriate to the training objectives.

The training organization should provide for safe learning environment consistent with any national health and safety requirements.

10 DELIVERY OF THE MODEL COURSE

To make effective use of the model course, training staff should review the course outline, including the competence tables for each module, and prepare a detailed teaching syllabus.

The instructor should take into consideration existing knowledge, skills, and attitudes of students to support the assessment and recognition of prior learning. A gap analysis should be carried out to identify any differences between the level of skills and competencies of the student and those identified within the curriculum tables, and teaching strategies to address these gaps should be implemented.

All VTS training should be:

- 1 structured in accordance with written programmes, including such methods and means of delivery; procedures and course material as are necessary to achieve the prescribed standard of competence; and
- 2 conducted, monitored, assessed, and supported by qualified persons.

Teaching programmes should ensure that all listed elements are addressed in some manner, and that this is clearly documented.

If students are required to meet additional requirements, then the module objectives, scope and content for each subject may be adjusted to ensure the additional elements are covered. All changes to the training should be clearly documented.

The presentation of concepts and methodologies may be repeated as necessary in various ways until the instructor is satisfied that the student has attained the required competence in each subject.

Thorough preparation is key to successful implementation of the course.

10.1 Developing course content

The modular presentation enables the instructor to adjust the course content to suit the student intake and provide any revisions of the subject objectives as required. The instructor should develop lesson plans and detailed learning objectives based on the competence tables, references, and materials as suggested (see Part B).

It is not intended that the modules be presented in the order provided in this model course. It is expected that, to address effective training and learning methodologies, the content of modules will be grouped as appropriate for the learning environment. Presentation of the material should be tailored to reflect specific training objectives and include practical exercises, assessments, etc. When developing lesson plans, the instructor should use a teaching method or combination of methods that will ensure students can achieve the required learning objectives.

Depending on the student intake, the recommended hours may need to be adjusted as necessary. For example, it is normal for different students to require different lengths of time to cover the same content, and minor adjustments may be needed to the course timetable.

10.2 Competence levels

To assist in the development of lesson plans, five levels of competence are used in the model courses for VTS personnel. In general, levels 2 to 5 are used in the model course for the training of VTS Supervisors. Higher level



learning objectives are provided within the model course. Verb taxonomies have been provided to assist with the creation of detailed learning objectives (Table 2 refers).

IALA Guideline G1103 – Train the trainer assists instructors with the preparation and development of training courses and is aimed at courses delivered an accredited training organization.

10.3 Competence tables, teaching aids and references

Detailed competence tables are provided, including competence levels and proposed teaching aids and references. The training materials prepared (e.g., course notes, course presentations and reference documents etc) should be consistent with IALA standards and up to date, taking into account recent changes and industry developments. These training materials should be available to the student for their reference.

Where remote learning delivery is proposed, training organizations should consider the necessary adjustments that may be required.

IALA Guideline G1014 – Accreditation of VTS training organizations and approval to deliver IALA model courses provides further detail on remote learning.

10.4 Training course references

Course development and delivery should take into consideration the following references. Where required, additional references are identified in specific modules.

- United Nations Convention on the Law of the Sea (UNCLOS)
- Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS)
- International Convention for the Safety of Life at Sea (SOLAS) Chapter V:
 - Regulation 7 – Search and Rescue Services
 - Regulation 10 – Ships’ Routeing
 - Regulation 11 – Ship Reporting Systems
 - Regulation 12 – Vessel Traffic Services
 - Regulation 13 – Aids to Navigation
- IMO/ICAO Publication - International Aeronautical and Maritime Search and Rescue (IAMSAR) manual, three volumes:
 - Vol 1 – Organization and management (IMO 960)
 - Vol 2 – Mission co-ordination (IMO 961)
 - Vol 3 – Mobile facilities (IMO 962)
- IMO GMDSS Manual
- IMO Resolution A.1158(32), Guidelines for Vessel Traffic Services
- IALA Vessel Traffic Services Manual
- IALA S1040 Vessel Traffic Services
- IALA S1050 Training and Certification
- IALA R0103 Training and Certification of VTS Personnel
- IALA Guideline G1132 VTS Voice Communications and Phraseology
- IALA Guideline G1141 Operational Procedures for Delivering VTS



- IALA Guideline G1156 Recruitment, Training and Certification of VTS Personnel
- IALA model courses on VTS:
 - C0103-1 (VTS Operator Training)
 - C0103-2 (VTS Supervisor Training)
 - C0103-3 (VTS On-the-job Training (OJT))
 - C0103-4 (VTS OJT Instructor Training)
 - C0103-5 (Revalidation Process for VTS Qualification and Certification)
- IALA International Dictionary of Marine Aids to Navigation
- National, regional, and local legislation and regulations on VTS, ports, harbours, pilotage and allied services
- National Notices to Mariners pertaining to VTS
- National procedures and standards for operation of a VTS
- National and local contingency plans.



Table 2 *Competence Level Taxonomy for VTS Training*

Level	Knowledge and/or Attitude	Skill	Verbs (examples)
Level 1 Work of a routine and predictable nature generally requiring supervision	Comprehension Understands facts and principles; interprets verbal/written material; interprets charts, graphs and illustrations; estimates future consequences implied in data; justifies methods and procedures	Guided response The early stages in learning a complex skill and includes imitation by repeating a demonstrated action using a multi-response approach (trial and error method) to identify an appropriate response	Arrange, define, list, locate, label, identify, select
Level 2 More demanding range of work involving greater individual responsibility. Some complex/non-routine activities	Application Applies concepts and principles to new situations; applies laws and theories to practical situations; demonstrates correct usage of methods or procedures	Autonomous response The learned responses have become habitual, and the movement is performed with confidence and proficiency	Comply (with), describe, display, give examples, recognise, operate, perform (an action), participate in
Level 3 Skilled work involving a broad range of work activities. Mostly complex and non-routine	Analysis Recognises un-stated assumptions; recognises logical inconsistencies in reasoning; distinguishes between facts and inferences; evaluates the relevancy of data; analyses the organizational structure of work	Complex observable response The skilful performance of acts that involve complex movement patterns. Proficiency is demonstrated by quick, smooth, accurate performance. The accomplishment of acts at this level includes a highly co-ordinated automatic performance	Analyse, apply, categorise, classify, compare, differentiate, explain, justify, operate, solve
Level 4 Work that is often complex, technical and professional with a substantial degree of personal responsibility and autonomy	Synthesis Integrates learning from different areas into a plan for solving a problem; formulates a new scheme for classifying objects or events	Adaptation Skills are so well developed that individuals can adapt rapidly to special requirements or problem situations	Adapt, coach, construct (build), demonstrate, devise, interpret, intervene, organize, plan, predict, resolve, respond to, support (as in teamwork), use
Level 5 Complex techniques across wide and often unpredicted variety of contexts. Professional/senior managerial work	Evaluation Judges the adequacy with which conclusions are supported by data; judges the value of a work by use of internal criteria; judges the value of a work by use of external standards of excellence	Creation The creation of new practices or procedures to fit a particular situation or specific problem and emphasizes creativity based upon highly developed skills	Construct, compose, coordinate, create, criticise, draw conclusion, evaluate, formulate, improve, judge, modify, synthesize



10.5 Course review and updating

The course content should be reviewed on a regular basis to ensure it reflects the current IALA standards, recommendations, guidelines and consider recent changes and industry developments.

On conclusion of the course, a review should be undertaken based on course feedback and observations during course delivery to identify ongoing improvements and training materials that may need updating.

11 ASSESSMENT

Student progress should be continually monitored and assessed, and regular reviews undertaken. Any problems that may arise should be addressed so that the student can attain the required levels of competence and has the opportunity to meet the course objectives.

Assessments should reflect the level of competence required, as provided in the competence tables for each module.

The training organization should determine the assessment methods to be used to ensure competence levels have been attained for each subject of the module course. In addition, the training organization should have procedures in place to address instances where the student is unable to attain the required competence.

Assessment results should be recorded and retained in accordance with national and/or organizational requirements as evidence to indicate the competence levels that have been attained for each subject of the model course.

12 COURSE CERTIFICATES

A course certificate should be issued by the training organization where a student:

- demonstrates they have the theoretical and practical knowledge; and
- has passed the appropriate assessments to ensure the student has met the required competency as outlined in this model course.

13 ABBREVIATIONS

AI	Artificial Intelligence
CPD	Continuous Professional Development
HTO	Human-technology-organization
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities - AISM
IMO	International Maritime Organization
MASS	Maritime Autonomous Surface Ships
ML	Machine Learning
OJT	On-the-Job Training
PDCA	Plan- Do- Check- Act
RPL	Recognition of Prior Learning
SAR	Search and Rescue
SOPs	Standard Operating Procedures
SWOT	Strengths/Weaknesses/Opportunities/Threats
VTS	Vessel Traffic Services



PART B MODULES

MODULE 1 Communication and Leadership

1.1 SUBJECT FRAMEWORK

1.1.1 Scope

This module covers the strategies and techniques to communicate effectively in a leadership role.

1.1.2 Objective of Module 1

On completion of the module the student will understand the characteristics of being an effective leader and how to communicate with influence, including:

- Leadership qualities and styles
- Transitioning from an operational to a leadership role
- Strategies to communicate effectively
- Preparation of reports

1.1.3 Additional references relevant to this module

The following references may assist in the planning and delivery of this module:

- IALA Guideline G1118 Marine Casualty/Incident Reporting and Recording, Including Near Miss Situations
- Interpersonal diagnosis of personality: A functional theory and methodology for personality evaluation. (Timothy Leary, 1957)
- Five Dysfunctions of a Team (Patrick Lencioni, 2002)
- Followership: How followers are creating change and changing leaders (Center for Public Leadership). (Barbara Kellerman, Harvard Business School Press, 2008)

1.2 SUBJECT OUTLINE OF MODULE 1

Table 3 *Subject outline – Communication and Leadership*

Element	Recommended Competence Level	Recommended Hours	
		Presentations and Lectures	Exercises and Simulations
Leadership qualities and styles		2 to 3	1 to 2
Characteristics of effective leaders	Level 1		
Leadership styles	Level 3		
Individual leadership styles(s)	Level 4		
Transitioning to supervisor role		1 to 2	1 to 2
Roles and responsibilities of a VTS Supervisor	Level 3		
Transition to leadership role	Level 3		
Communicating effectively		2 to 4	4 to 6
Communication strategies	Level 4		
Active listening skills	Level 4		
Communicating as a leader	Level 4		
Overcoming barriers to communication	Level 4		
Preparing reports		2 to 3	1 to 2
Types of reports	Level 2		
Content of reports	Level 3		
Process for reporting	Level 5		
	<i>Total time range</i>	<i>7 to 12</i>	<i>7 to 12</i>



1.2.1 DETAILED COMPETENCE TABLE FOR MODULE 1 – COMMUNICATION AND LEADERSHIP

Table 4 *Competence Table – Communication and Leadership*

Element	Session Objective	Sub-element	Subject Elements	Level of Competence
1.1	Leadership qualities and styles			
1.1.1	Identify characteristics of effective leaders	1.1.1.1	Characteristics of effective leaders	1
		1.1.1.2	Diplomacy	1
		1.1.1.3	Motivation	1
		1.1.1.4	Credibility	1
1.1.2	Compare leadership styles	1.1.2.1	Different leadership styles, i.e.: <ul style="list-style-type: none">• Autocratic• Democratic• Laissez-Faire• Transformational• Adaptive	3
		1.1.2.2	Leadership and followership	3
1.1.3	Adapt individual leadership styles	1.1.3.1	Leaders in an operational environment	4
		1.1.3.2	Influences on leadership style	4
		1.1.3.3	Leading in different situations	4
1.2	Transitioning to leader/supervisor role			
1.2.1	Explain roles and responsibilities of a VTS Supervisor	1.2.1.1	Responsibilities of a leader/supervisor in VTS	3
		1.2.1.2	Building resilience	3



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
		1.2.1.3	Values and vision	3
1.2.2	Explain the strengths and challenges of transitioning from an operational to leadership role	1.2.2.1	Trust and respect	3
		1.2.2.2	Time management	3
		1.2.2.3	Expectations and interactions	3
1.3	Communicating effectively			
1.3.1	Demonstrate effective communication strategies	1.3.1.1	Communicate with clarity <ul style="list-style-type: none">• Wording• Voice inflection• Timing of communications	4
		1.3.1.2	Building resilience	3
		1.3.1.3	Values and vision	3
1.3.2	Demonstrate active listening skills	1.3.2.1	Active listening strategies	4
		1.3.2.2	Barriers to active listening	4
		1.3.2.3	Challenge and response	4
		1.3.2.4	Bias and communications (conscious / unconscious)	4
1.3.3	Adapt communication skills to the leadership role	1.3.3.1	Impact of fatigue and stress on communications in the team	4
		1.3.3.2	Communications and leadership in different operations	4
		1.3.3.3	Clear and concise communications as a leader	4
1.3.4	Demonstrate techniques to recognise and overcome barriers to communication	1.3.4.1	Expectations of communications: <ul style="list-style-type: none">• VTS team members• VTS Manager / Harbour Master	4



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
			<ul style="list-style-type: none">Allied and other services	
		1.3.4.2	Barriers to communication	4
		1.3.4.3	Techniques to overcome barriers	4
		1.3.4.4	Matching techniques to recipient expectation	4
1.4	Prepare reports			
1.4.1	Describe the types of reports	1.4.1.1	Requirements for reporting	2
		1.4.1.2	Routine reports	2
		1.4.1.3	Non-routine reports (incident, near miss, and other reports)	2
		1.4.1.4	Technical reports	2
1.4.2	Explain the contents of reports	1.4.2.1	Structure of report	3
		1.4.2.2	Use of language in reports	3
		1.4.2.3	Objective of the report	3
1.4.3	Create reports based on a structured process for reporting	1.4.3.1	Report outline base on type of report	3
		1.4.3.2	Data to support report	3
		1.4.3.3	Matching the report to the audience	4
		1.4.3.4	Language, structure and grammar reflect report requirements based on type and audience.	5



MODULE 2 Managing the Watch

2.1 SUBJECT FRAMEWORK

2.1.1 Scope

This module focuses on the higher-level responsibilities of how a VTS Supervisor manages a VTS watch and supports the team members.

2.1.2 Objective of Module 2

On completion of the module the student will understand watchkeeping responsibilities at a supervisor level, including:

- Importance of the handovers
- When to intervene to assist in VTS operations
- Learn the principles of setting and managing a shift schedule
- Understand how to assess performance, coach, and provide feedback to team members

2.1.3 Additional references relevant to this module

The following references relevant and may assist in the planning and delivery of this module:

- IMO MSC.1/Circ.1598 Guidelines on fatigue
- Project Martha (Final Report)

2.2 SUBJECT OUTLINE OF MODULE 2 – MANAGING THE WATCH

Table 5 *Subject outline – Managing the Watch*

Element	Recommended Competence Level	Recommended Hours	
		Presentations and Lectures	Exercises and Simulations
Watchkeeping responsibilities		1 to 3	2 to 4
Responsibilities of an effective team leader / supervisor / watch manager	Level 4		
Leadership in VTS operations	Level 4		
Log keeping functions	Level 3		
Equipment and systems	Level 2		
Watch leadership during difficult situations	Level 4		
Shift management		1 to 2	1 to 2
Shift schedules	Level 2		
Changes in shift schedules/requirements	Level 3		
VTS team workload	Level 4		
Performance management		2 to 4	2 to 4
Team and team member performance	Level 2		
Coach team members	Level 4		
Instructions and feedback	Level 4		
Conflict in the workplace	Level 4		
	<i>Total time range</i>	<i>4 to 9</i>	<i>5 to 10</i>



2.2.1 DETAILED COMPETENCE TABLE FOR MODULE 2 – MANAGING THE WATCH

Table 6 *Competence Table – Managing the Watch*

Element	Session Objective	Sub-element	Subject Elements	Level of Competence
2.1	Watchkeeping responsibilities			
2.1.1	Demonstrate the responsibilities of an effective team leader / supervisor / watch manager	2.1.1.1	Delineating responsibilities between different team roles	4
		2.1.1.2	Handovers <ul style="list-style-type: none">• Watch handovers• Vessel handovers	4
2.1.2	Intervene to assist in VTS operations	2.1.2.1	When to intervene (normal vs extraordinary behaviour) <ul style="list-style-type: none">• Within the VTS watch team• With allied services	4
		2.1.2.2	Options to intervene depending on situation	4
2.1.3	Explain log keeping functions	2.1.3.1	Routine Operational procedures	3
		2.1.3.2	Emergency Procedures	3
2.1.4	Describe the importance of troubleshooting equipment and systems	2.1.4.1	Steps in troubleshooting	2
		2.1.4.2	System availability and reliability	2
		2.1.4.3	Understanding expected performance	2
		2.1.4.3	Follow-up on outage reports	2
2.1.5	Support VTSO during difficult situations	2.1.5.1	Common technical difficulties	4
		2.1.5.2	General difficult operational situations	4



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
		2.1.5.3	Alternative solutions	4
2.2	Shift management			
2.2.1	Describe the principles of setting and managing a shift scheduling	2.2.1.1	Standard shift schedules	2
		2.2.1.2	Variance in workload	2
		2.2.1.3	Attention during shifts	2
2.2.2	Compare shift requirements and changes in shift schedules	2.2.2.1	Minimum staffing requirements	2
		2.2.2.2	Changes in shift schedules due to <ul style="list-style-type: none">• Staff availability• Operational workload	3
2.2.3	Predict levels of VTS team workload	2.2.3.1	Factors that affect workload <ul style="list-style-type: none">• Ship traffic• Technical issues• Environmental conditions• Allied or other services• Emotional stress	4
		2.2.3.2	Steps to address VTS team workload <ul style="list-style-type: none">• What• When• How	4
2.3	Performance development			
2.3.1	Describe approaches to assess performance	2.3.1.1	Approaches to measure performance <ul style="list-style-type: none">• Rating scales	2



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
			<ul style="list-style-type: none">• 360 degree feedback• Performance Development Agreements	
		2.3.1.2	Factors affecting human performance	2
2.3.2	Coach team members during VTS operations.	2.3.2.1	Coaching and mentoring (differences)	4
		2.3.2.2	Coaching techniques	4
		2.3.2.3	Common challenges in coaching	4
		2.3.2.4	Monitoring / assessing trainee VTS Operators	4
2.3.3	Demonstrate procedures to provide and receive instructions and feedback.	2.3.3.1	Providing clear instructions	4
		2.3.3.2	Approaches to providing feedback	4
		2.3.3.3	Techniques for difficult conversations	4
2.3.4	Respond to conflict in the workplace	2.3.4.1	Identifying conflict	4
		2.3.4.2	Conflict management techniques	4
		2.3.4.3	Escalation of issues	4



MODULE 3 Provision of VTS

3.1 SUBJECT FRAMEWORK

3.1.1 Scope

["This module covers additional responsibilities, in comparison to a VTSO, which involve management activities to ensure the efficient provision of VTS services."]

3.1.2 Objective of Module 3

On completion of the module the student will implement the principles of the provision of VTS and support the VTS team to provide timely and relevant information, monitor and manage ship traffic and respond to developing unsafe situations. This includes:

- Interpreting the regulatory framework for VTS, and how to apply compliance and enforcement activities
- Ensuring VTS interacts effectively with allied services
- Prioritizing and delegating tasks
- Coordinating VTS operations to maintain a safe waterway

3.1.3 Additional references relevant to this module

The following references are relevant and may assist in the planning and delivery of this module:

- International Ship and Port Facility Security (ISPS) Code
- IALA Recommendation R0125 The Use and Presentation of Symbology at a VTS Centre (including AIS)
- IALA Guideline G1089 Provision of a VTS
- IALA Guideline G1070 VTS role in managing Restricted or Limited Access Areas
- IALA Guideline G1166 VTS in Inland Waters
- IMO COMSAR/Circ.15 - Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI)
- ITU-R Recommendation M.493, DSC for use in the maritime mobile services
- PIANC Report number 121-2014 – Harbour approach channels design guidelines
- Regional / national / local legislations and regulations relevant to VTS, ports, harbours, pilotage and allied services

3.2 SUBJECT OUTLINE OF MODULE 3 – PROVISION OF VTS

Table 7 *Subject outline – Provision of VTS*

Element	Recommended Competence Level	Recommended Hours	
		Presentations and Lectures	Exercises and Simulations
Regulatory framework		2 to 4	2 to 4
Regulatory structure for VTS	Level 4		
Legal liabilities and implications for VTS	Level 4		
Compliance and Enforcement	Level 4		
Interaction with allied services		1 to 3	3 to 5
Engagement with allied services	Level 3		
Effective interaction with allied services	Level 5		
Expectations of interaction VTS / allied services	Level 4		
Prioritisation and delegation		1 to 2	1 to 2
Process to plan and delegate of tasks	Level 4		
Maintain a safe waterway		2 to 3	4 to 5
Principles of water space management	Level 4		
VTS operations to maintain a safe waterway	Level 4		
	<i>Total time range</i>	<i>6 to 12</i>	<i>10 to 16</i>



3.2.1 DETAILED COMPETENCE TABLE FOR MODULE 3 – PROVISION OF VTS

Table 8 *Competence Table – Provision of VTS*

Element	Session Objective	Sub-element	Subject Elements	Level of Competence
3.1	Regulatory framework			
3.1.1	Interpret the regulatory structure for VTS	3.1.1.1	The international framework for VTS	4
		3.1.1.2	Responsibility of Competent Authority, VTS Provider	4
		3.1.1.3	Implications for VTS within regulatory structure	4
3.1.2	Assess the implication of legal aspects for VTS	3.1.2.1	Civil, administrative and criminal aspects.	4
		3.1.2.2	Legal liability in VTS	4
3.1.3	Demonstrate compliance and enforcement to support VTS operations	3.1.3.1	Monitoring and managing ship traffic	4
		3.1.3.2	Responding to developing unsafe situations	4
		3.1.3.3	Support to VTS watch team during compliance and enforcement activities	4
3.2	Interaction with allied services			
3.2.1	Prioritize engagement with allied services	3.2.1.1	List allied services <ul style="list-style-type: none">during routine operationsduring emergency operations	1
		3.2.1.2	Interest and power matrix (for example: Mendelow matrix) <ul style="list-style-type: none">routine operationsemergency operations	3
		3.2.1.1	Implications of changing interest and power on operations	3



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
3.2.2	Evaluate effectiveness of interaction with allied services	3.2.2.1	Procedures for communications during routine operations	4
		3.2.2.2	Procedures for communications during emergency operations	4
		3.2.2.3	Guidance for VTSOs when communicating <ul style="list-style-type: none">• routine operations• emergency operations• changing or inconsistent expectations	4
		3.2.2.4	Trends in response to communications and interaction	5
3.3.2	Demonstrate interaction with allied services	3.3.2.1	Expectations during routine operations	4
		3.3.2.2	Expectations during emergency operations	4
		3.3.2.3	Changing or inconsistent expectations	4
3.3	Prioritisation and delegation			
3.3.1	Demonstrate the process to plan and delegate tasks	3.3.1.1	Identify tasks	3
		3.3.1.2	Prioritize tasks <ul style="list-style-type: none">• Importance• Urgency• Tools to support prioritization (for example, Eisenhower Matrix)	3
		3.3.1.3	Delegate tasks	4
		3.3.1.4	Monitor status of completion of tasks	4
3.4	Maintain a safe waterway			
3.4.1	Adapt the principles of water space management in changing situations	3.4.1.1	Zones and restricted areas <ul style="list-style-type: none">• Ship domain	3



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
			<ul style="list-style-type: none">• Ship safety zone• Exclusion zones	
		3.4.1.2	Factors affecting water space management	4
		3.4.1.3	Implications of changes to factors	4
		3.4.1.4	Supporting decisions to change or adapt procedures based on changing situations	4
3.4.2	Coordinate VTS operations to maintain a safe waterway in the VTS area and sectors	3.4.2.1	Enhanced monitoring to provide guidance	4
		3.4.2.2	Provision of timely and relevant information on factors that may influence ship movements and assist onboard decision-making	4
		3.4.2.3	Monitor and manage ship traffic	4
		3.4.2.4	Respond to developing unsafe situations	4
		3.4.2.5	Situation awareness - models and process (for example, Endsley's Model)	4



MODULE 4 Emergency Situations

4.1 SUBJECT FRAMEWORK

4.1.1 Scope

This module builds on existing training and experience, with a focus on contingency plans and emergency management.

4.1.2 Objective of Module 4

On completion of the module the student will:

- Apply contingency plan response actions.
- Respond to internal and external emergency situations and assist in the coordination of team activities.
- Describe the importance of debriefs after emergencies.

4.1.3 Additional references relevant to this module

The following references are relevant and may assist in the planning and delivery of this module:

- IMO Resolution MSC.255(84) Casualty Investigation Code
- IMO MSC-MEPC.7/Circ.7 Guidance on near-miss reporting
- International Ship and Port Facility Security (ISPS) Code
- International Safety Management (ISM) Code
- IALA G1110 Use of Decision Support Tool for VTS Personnel
- IALA G1118 Marine Casualty/Incident Reporting and Recording, Including Near-Miss Situations as it Relates to VTS

4.2 SUBJECT OUTLINE OF MODULE 4 – EMERGENCY SITUATIONS

Table 9 *Subject outline –Emergency Situations*

Element	Recommended Competence Level	Recommended Hours	
		Presentations and Lectures	Exercises and Simulations
Contingency plans		2 to 4	3 to 5
Purpose of contingency plans	Level 3		
Application of contingency plans	Level 4		
Emergency management		2 to 4	3 to 5
Respond to emergencies	Level 4		
Debriefing after emergency	Level 2		
	<i>Total time range</i>	<i>4 to 8</i>	<i>6 to 10</i>



4.2.1 DETAILED COMPETENCE TABLE FOR MODULE 4 – RESPONDING TO EMERGENCIES

Table 10 *Competence Table – Responding to Emergencies*

Element	Session Objective	Sub-element	Subject Elements	Level of Competence
4.1	<i>Contingency plans</i>			
4.1.1	Describe the purpose of contingency plans	4.1.1.1	Description and purpose of contingency plans <ul style="list-style-type: none">• International• National• Regional• Local• Internal	3
		4.1.1.2	Command and control structure in contingency response	3
		4.1.1.3	Importance of Training exercises	3
4.1.2	Apply contingency plans	4.1.2.1	Immediate response according to contingency plans	4
		4.1.2.2	Use of check lists	4
		4.1.2.3	Co-ordination, evaluation and dissemination of information	4
		4.1.2.4	Liaison with allied services as required	4
		4.1.2.5	Importance of maintaining communications	4
4.1.3	Respond to emergencies in VTS area	4.1.3.1	Delegation of responsibilities <ul style="list-style-type: none">• Prioritization• Lines of authority	4
		4.1.3.2	Standard Operating Procedures (SOPs)	4
		4.1.3.3	Resource management	4



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
		4.1.3.4	Organisation of duties of team members	4
4.1.4	Respond to emergencies in VTS centre	4.1.4.1	Delegation of responsibilities <ul style="list-style-type: none">• Prioritization• Lines of authority	4
		4.1.4.2	Standard Operating Procedures (SOPs)	4
		4.1.4.3	Resource management	4
		4.1.4.4	Organisation of duties of team members	4
4.1	<i>Emergency management</i>			
4.1.1	Respond to emergencies	4.1.1.1	Procedures for internal emergencies <ul style="list-style-type: none">• System failure• Fire/flood• Evacuation of VTS centre	4
		4.1.1.2	Procedures for external emergencies (external to the VTS centre), such as: <ul style="list-style-type: none">• Collisions• Allisions• Groundings• Marine Pollution• Fire• Hazardous cargoes• SAR incidents• Severe weather events	4



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
			<ul style="list-style-type: none">Other special circumstances	
		4.1.1.3	Effective teamwork during emergencies	4
		4.1.1.4	Special circumstances - Incidents not fully covered by contingency plans	3
		4.1.1.4	Delegation of responsibilities during emergency response	4
4.1.2	Describe the role of Debriefs after emergencies	4.1.2.1	Preparing for debriefs	2
		4.1.2.2	Timing for debriefs	2
		4.1.2.3	Format for debriefs	2
		4.1.2.4	Lessons learned / continual improvement	2



MODULE 5 Human Factors

5.1 SUBJECT FRAMEWORK

5.1.1 Scope

This module addresses the leadership role of the VTS Supervisor in recognising and implementing factors between humans, technology, systems and procedures that affect operational performance.

5.1.2 Objective of Module 5

On completion of the module the student will demonstrate personal competence and qualities to conduct their duties in a manner that supports an effective and psychologically safe working environment in VTS, including:

- Interpersonal skills, problem solving and decision-making
- The principles of teamwork and how to provide clear instructions
- The role of human factors and ergonomics in VTS
- How to promote a safety culture in VTS

5.1.3 Additional references relevant to this module

The following references are relevant and may assist in the planning and delivery of this module:

- IALA Guideline G1171 Human Factor and Ergonomics in VTS
- IALA Guideline G1176 How to Promote a Safety Culture in VTS
- IALA Guideline G1178 An Introduction to Artificial Intelligence (AI) from an IALA perspective

5.2 SUBJECT OUTLINE OF MODULE 5 – HUMAN FACTORS

Table 11 *Subject outline – Human Factors*

Element	Recommended Competence Level	Recommended Hours	
		Presentations and Lectures	Exercises and Simulations
Problem solving and decision making		1 to 2	3 to 6
Decision making models	Level 3		
Problem solving tools	Level 4		
Data analysis to define problems with clarity	Level 3		
Safe working environment		2 to 4	2 to 4
Effective interpersonal interactions	Level 4		
Psychologically safe working environment	Level 3		
Human factors and ergonomics in VTS	Level 3		
Stress and fatigue in watchkeeping environment	Level 3		
Build resilience and manage stress as a leader	Level 3		
Continuous Professional Development (CPD) self/team	Level 2		
Teamwork		1 to 3	1 to 3
Different teams (VTS Team, Port Team, broader maritime environment)	Level 3		
Principles of team effectiveness / high performing teams	Level 2		
Leading a team	Level 4		
Stress and fatigue in team environment	Level 3		
Managing change		1 to 2	1 to 2
Developments in VTS and port operations	Level 2		
Promoting a just culture / safety culture in VTS	Level 3		
	<i>Total time range</i>	<i>5 to 11</i>	<i>7 to 15</i>



5.2.1 DETAILED Competence table FOR MODULE 5 – Human Factors

Table 12 *Competence Table – Human Factors*

Element	Session Objective	Sub-element	Subject Elements	Level of Competence
5.1	Problem solving and decision making			
5.1.1	Explain decision making models to support the decision making process	5.1.1.1	Overview of decision making models	3
		5.1.1.2	When and where to use different models	3
		5.1.1.3	Bias in decision making	3
5.1.2	Use decision making and problem solving strategies	5.1.2.1	Steps in problem solving related to decision making (based on PDCA – plan do check act) <ul style="list-style-type: none"> • Identify problem • Generate potential solutions • Prioritize / choose solution • Implement • Monitor / adapt 	4
		5.1.2.2	Different tools to help solve problems: <ul style="list-style-type: none"> • Brainstorming • Five why's • Mind maps • SWOT analysis 	4
		5.1.2.3	Teamwork in problem solving	4
5.1.3	Explain the role of information and data analysis in problem solving and decision making	5.1.3.1	Accurate and timely data	3
		5.1.3.2	Data format to support decision making	3



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
		5.1.3.3	Role of informatics / maritime informatics	3
5.2	Safe working environment			
5.2.1	Demonstrate effective interpersonal interactions	5.2.1.1	Self-confidence	4
		5.2.1.2	Positive attitude	4
		5.2.1.3	Empathy	4
		5.2.1.4	Managing conflict	4
		5.2.1.5	Assertiveness	4
5.2.2	Explain psychologically safe working environment	5.2.2.1	Maslow's hierarchy of needs	3
		5.2.2.2	Defining: <ul style="list-style-type: none">• Physical safety• Psychological safety	3
		5.2.2.3	Key factors of a psychologically safe work environment <ul style="list-style-type: none">• Addressing bias• Organizational culture• Growth and development• Motivation• Workload management	3
5.2.3	Explain the role of Human Factors and Ergonomics in VTS	5.2.3.1	HTO framework (human-technology-organization)	3
		5.2.3.2	Human aspects: <ul style="list-style-type: none">• Sensory inputs• Muscle response	3



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
			<ul style="list-style-type: none">• Memory• Cognition factors	
		5.2.3.3	Ergonomics and the VTS work environment	3
		5.2.3.4	Risky situations and human factors <ul style="list-style-type: none">• False assumptions• Vague communication style• Overload and fatigue• Workflow interruptions / watch handover• Interpersonal relationships and responsibly• Tunnel perception (stressful conditions)• Degraded technical equipment	3
5.3	Teamwork			
5.3.1	Compare different teams	5.3.1.1	Working relationships of teams in the VTS area: <ul style="list-style-type: none">• VTS – operational• VTS - management• Port team (ships, pilots, tugs)• Shipboard teams	3
		5.3.1.2	Power Distance index in maritime teams: <ul style="list-style-type: none">• Speak up culture• Challenge and response	3
5.3.2	Describe the principles of team effectiveness	5.3.2.1	Stages of team development	2
		5.3.2.2	Team characteristics and functions	2
		5.3.2.3	Different personalities within the team	2



Element	Session Objective	Sub-element	Subject Elements	Level of Competence
		5.3.2.4	High performing teams	2
		5.3.2.5	Leading a team	2
5.3.3	Provide clear instructions to team members	5.3.3.1	Standard operating procedures	4
		5.3.3.2	Activities and requirements	4
		5.3.3.3	Feedback and improvement for instructions	4
5.3.4	Describe techniques to manage stress and fatigue in watchkeeping environment	5.3.4.1	Resilience and stress management	2
		5.3.4.2	Continuous Professional Development (CPD) self/team	2
5.4	Managing change			
5.4.1	Describe future technical and other developments related to VTS and port operations	5.4.1.1	Changing expectations of VTS <ul style="list-style-type: none">• Technology developments• Maritime Autonomous Surface Ships (MASS)• Artificial Intelligence (AI) / Machine Learning (ML)• Decision Support Tools (DST)	2
		5.4.1.2	Implications for VTS operations	2
5.4.2	Promoting a just culture / safety culture in VTS	5.4.2.1	Elements of a safety culture <ul style="list-style-type: none">• Learning culture• Informed culture• Just culture• Flexible culture• Reporting culture	4
		5.4.2.2	Assessing a safety culture	4