COURSE MANUAL

NAVIGATION

MANAGEMENT LEVEL

PROJECT: COMPETING
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AUTHOR: MAH
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PREFACE

To assist education and training entities to meet the requirements of the Standards of competence for inland navigation personnel, required by Directive (EU) 2 017/2397 on the recognition of professional qualifications in inland navigation, and Delegated Directive (EU) 2020/12 supplementing Directive (EU) 2017/2397 as regards the standards of competences and corresponding knowledge and skills, for the practical examinations, for the approval of simulators and for medical fitness, the transnational Course Manual on Navigation for Management Level personnel was developed.

This Course Manual will be a useful transnational training tool for conducting the Train the Trainer session and is intended to assist education and training providers and their teaching staff in organising and introducing new education & training programmes, or in enhancing, updating and supplementing existing didactical materials with the ultimate end results of raising quality and effectiveness of the education & training programmes.

Since education & training systems as well as the cultural background of inland navigation topics differ considerably from one country to another, the Course Manual on Navigation for Management Level has been designed so as to support the preparation, organisation and planning of effective teaching and training and to be used as a part of the quality assurance of the education and training institutes.

Technical content and levels of knowledge and abilities are in line with the applicable Delegated Directive (EU) 2020/12 supplementing Directive (EU) 2017/2397 as regards the standards of competences and corresponding knowledge and skills, for the practical examinations, for the approval of simulators and for medical fitness, being an essential tool for crew members at Management Level, to plan a journey and conduct navigation on inland waterways including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation, to apply knowledge of the applicable rules on the manning of craft, including knowledge on resting time and on the composition of the deck crew, to sail and manoeuvre ensuring the safe operation of the craft in all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) a nd to respond to navigational emergencies on inland waterways.

TABLE OF CONTENTS

1. GENERAL INFORMATION

1	**Aim**	Provide training to assist in the implementation of Directive (EU) 2017/2397 on the recognition of professional qualifications in inland navigation and ES-QIN - Standards of competence – Navigation for crew members at Management Level.
2	**Objective**	Provide training and practical guidance for trainees in order to be able to plan a journey and conduct navigation on inland waterways including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation, to apply knowledge of the applicable rules on the manning of craft, including knowledge on resting time and on the composition of the deck crew, to sail and manoeuvre ensuring the safe operation of the craft in all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) and to respond to navigational emergencies on inland waterways.
3	**Entry standards**	See Directive (EU) 2017/2397 - Annex 1.
4	**Course certificate**	On successful completion of the course, a document may be issued, stating that the holder graduated this learning module.
5	**Course intake limitation**	Admittance may be limited by the capacity of the educational infrastructure used for this learning module (i.e. in the simulation room max. 4 trainees, on board of the real/training craft 12 trainees, etc.).
6	**Staff requirements**	The trainer should meet the requirements of Directive (EU) 2017/2397, Art. 18.
7	**Training facilities, equipment and teaching aids**	For the theoretical part of the course a classroom is required with video presentation equipment, teaching aids, etc. For the practical part of the course a real/training craft or full mission ship-handling simulators are mandatory.

8	**Learning outcomes**	*The Boatmaster shall be able to plan a journey and conduct navigation on inland waterways including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation, to apply knowledge of the applicable rules on the manning of craft, including knowledge on resting time and on the composition of the deck crew, to sail and manoeuvre ensuring the safe operation of the craft in all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) and to respond to navigational emergencies on inland waterways.* At the end of the course the trainee shall be able to: • Navigate on European inland waterways including locks and lifts according to navigation agreements with agent; • Respect and apply traffic regulations applicable to navigation on inland waterways to avoid damage; • Consider economic and ecological aspects of the craft operation in order to use the craft efficiently and respect the environment; • Take account of technical structures and profiles of the waterways, and use precautions; • Work with up-to-date charts or maps, notices to skippers or mariners and other publications; • Use relevant traffic supervision tools and be able to apply them; • Ensure safe manning of craft in accordance with applicable rules, including knowledge on resting time and on the composition of the deck crew; • Navigate and manoeuvre taking into account geographical, hydrological, meteorological and morphological characteristics of the main inland waterways; • Give order to moor and unmoor craft and to haul towage operations; • Provide safe access to craft; • Use modern electronic navigation aids; • Respect technical requirements for inland navigation; • Consider effects of current, waves, wind and water levels in relation to interactions of crossing, meeting and overtaking craft as well as ship-shore (canal effect); • Use of propulsion and manoeuvring systems as well as appropriate communication and alarm systems; • Sail and manoeuvre also in situations that involve high traffic density or where other craft carry dangerous goods, requiring basic knowledge of the ADN; • Take precautions in an emergency when intentionally beaching a craft in order to prevent greater damage; • Refloat a grounded craft with and without assistance; • Take appropriate actions if collision is imminent; • Take appropriate actions after a collision and assessment of damage.
9	**Assessment & evaluation**	Minimum requirements for assessment & evaluation of the trainees for graduating from the learning module (i.e. minimum score for theoretical evaluation, for practical evaluation, etc.). I.e. online training record book as a pathway for the course.

2. INSTRUCTOR MANUAL

This instructor manual provides guidance on the material that is to be presented during the Navigation course Management Level and has been arranged under the eighteen Learning Outcomes (competences) identified in the course outline. The reference material indicated may be supplemented by additional texts or material at the discretion of the instructor.

The course outline and provisional timetable also provide guidance on the time allocation for the course, because the time actually taken for each subject area may vary, especially in respect of time allocated to practical activities. The detailed teaching syllabus must be carefully studied and appropriate lesson plans or lecture notes compiled. A template of a lesson plan is presented under point 2.1 of this Chapter.

Each lesson should commence with a statement of the learning outcomes it is intended to achieve. At the end of each lesson, the participants should be told which associated portions of the reference material they should read and any activity they should undertake. Questions arising from such readings and activities must be given priority at an appropriate time.

The presentation of the various subject areas should be done in such a way that those taking part in the course are involved in an interactive participation during the lessons and learning process. Questions from the course participants should be encouraged, as should answers to such questions from other course participants.

The lessons should aim at conveying as much practical instruction and practice as possible to the participants, in order to develop their knowledge of and their skills in the tasks they will be expected to carry out. Course materials for additional study must be prepared and distributed online or offline if required.

2.1 Lesson plan

This lesson plan is only a template to give the teachers/ trainers a general idea on how to create their lessons for the various competences. This template can be used for every competence and adjusted as appropriate for the institute to use.

2.2 Background material

Bibliographical materials, reference documents and other didactical materials are presented in Annex 1 of this Course Manual.

Competence 1.1.1 Navigate on European inland waterways including locks and lifts according to navigation agreements with agent;
Learning objective
Learning outcomes
Required equipment

Lesson structure			
Learning activity	Didactical method (ABC method)	Materials	Time

2.3 Practical activities

This practical training links the theoretical content of the lessons to their practical use.

(Simulator) exercises
Practical exercises on board a (training) vessel or in an applicable IWT ship handling simulator can be undertaken in order to give the candidates the opportunity to deepen and enhance their theoretical knowledge into practical skills. This practical training links the theoretical content of the lessons to their practical use.

Case studies
Theoretical subjects are elaborated by the candidates autonomously in case studies. The candidate should deepen his or her knowledge in defined theoretical subjects by elaborating on a variety of facts and figures about this topic and present them in front of his or her classmates afterwards.

Discussions and reflection, interactive learning
Possible solutions to theoretical and practical subjects can be discussed within (parts of) the learning group. Different views and opinions on a defined subject are exchanged and discussed by the participants in order to broaden the view of the individual on this problem and show different possible solutions and their respective advantages and disadvantages. A discussion should be monitored and steered (stimulated or consolidated) if necessary, in order to secure that every participant actively participates.

Team work
Assignments can be individual as well as group assignments, depending on the objective. An individual assignment should stimulate and show the competences of the individual. In a team work assignment the participants will have exposure to a wide range of experiences from quick problem-solving involving synergy to experiences which may relate to such items as interpersonal difficulties in a group setting. Depending on the purpose of the assignment the team should be defined in advance and the assignment and the rules of the working process, if there are any, should be communicated to the group in a very clear and formal manner.

Annex 2 of this Course Manual presents a few exercises, case studies and practical scenarios which are useful for practical training and examination of the trainees.

The ETRB is the tool on which the students can be tested.

2.4 Classroom facilities and educational tools

For the theoretical part of the course a classroom is required with video presentation equipment, teaching aids, etc.

For the practical part of the course a real/training craft or full mission ship-handling simulators are mandatory.

2.5 Examination & assessment

According to Directive (EU) 2017/2397, Article 17, assessment of competences:
The Commission shall adopt delegated acts in accordance with Article 31 to supplement this Directive by laying down the standards for competences and corresponding knowledge and skills in compliance with the essential requirements set out in Annex II.2. Member States shall ensure that persons who apply for the documents referred to in Articles 4, 5 and 6 demonstrate, where applicable, that they meet the standards of competence referred to in paragraph 1 of this Article by passing an examination that was organised:
(a) Under the responsibility of an administrative authority in accordance with Article 18 or;
(b) As part of a training programme approved in accordance with Article 19.

The essential requirements set out in Annex II of Directive (EU) 2017/2397 for Navigation Management Level are:

In particular the Boatmaster shall be able to:
- Plan a journey and conduct navigation on inland waterways including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation;
- Apply knowledge of the applicable rules on the manning of craft, including knowledge on resting time and on deck crew members composition;
- Sail and manoeuvre ensuring the safe operation of the craft in all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN);
- Respond to navigational emergencies on inland waterways.

To assess the progress and level of understanding of the students it is necessary to test the students in a formative way. The main goal of these tests is to give feedback to the student.

A standard for practical examination for Boatmaster is developed in CESNI QP.

The Illias platform provides examples of assessments for the separated competences for Navigation at Management Level.

3. REGULATION AND CERTIFICATION

According to Chapter 2, Union Certificates of Qualification, Article 4, Obligation to carry a Union certificate of qualification as a deck crew member of Directive (EU) 2017/2397:

1. Member States shall ensure that deck crew members who navigate on Union inland waterways carry either a Union certificate of qualification as a deck crew member issued in accordance with Article 11 or a certificate recognised in accordance with Article 10(2) or (3).

2. For deck crew members other than boatmasters, the Union certificate of qualification and the service record book as referred to in Article 22 shall be presented in a single document.

3. By way of derogation from paragraph 1 of this Article, certificates held by persons involved in the operation of a craft, other than boatmasters, issued or recognised in accordance with Directive 2008/106/EC, and therefore in accordance with the STCW Convention, shall be valid on sea-going ships operating on inland waterways.

In Directive (EU) 2017/2397 in Annex I the minimum requirements for certification as a boatmaster are as follows:

Every applicant for a Union certificate of qualification shall:

(a)
- Be at least 18 years of age;
- Have completed an approved training programme as referred to in Article 19, which was of a duration of at least three years and which covered the standards of competence for the management level set out in Annex II;
- Have accumulated navigation time of at least 360 days as part of this approved training programme or after completion thereof;
- Hold a radio operator's certificate;

or

(b)
- Be at least 18 years of age;
- Hold a Union certificate of qualification as a helmsman or a certificate as a helmsman recognised in accordance with Article 10(2) or (3);
- Have accumulated navigation time of at least 180 days;
- Have passed an assessment of competence by an administrative authority as referred to in Article 18 to verify that the standards of competence for the management level set out in Annex II are met;
- Hold a radio operator's certificate;

or

(c)
- Be at least 18 years of age;
- Have accumulated navigation time of at least 540 days, or have accumulated navigation time of at least 180 days, if the applicant can also provide proof of work experience of at least 500 days that the applicant acquired on a sea-going ship as a member of the deck crew;
- Have passed an assessment of competence by an administrative authority as referred to in Article 18 to verify that the standards of competence for the management level set out in Annex II are met;
- Hold a radio operator's certificate;

or

(d)
- Have a minimum of five years' work experience prior to the enrolment in an approved training programme, or have at least 500 days' work experience on a sea-going ship as a member of the deck crew prior to the enrolment in an approved training programme, or have completed any vocational training programme of at least three years' duration prior to the enrolment in an approved training programme;
- Have completed an approved training programme referred to in Article 19, which was of a duration of at least one and a half years, and which covered the standards of competence for the management level set out in Annex II;
- Have accumulated navigation time of at least 180 days as part of that approved training programme and at least 180 days after completion thereof;
- Hold a radio operator's certificate.

4. LESSON MATERIALS

The lesson materials referred to in this Course Manual are for inspiration and are free to use for the teachers of the educational institutes. The lesson materials will be available on the Edinna website (https://www.edinna.eu/).

As already mentioned in Chapter 2, background materials and practical activities can be found in respectively Annex 1 and Annex 2 of this Course Manual. The background materials referenced can be used as additional documentation for the teachers to create their lessons and/or add more details. Annex 2 consists of suggestions and examples of exercises, case studies and/or practical scenarios.

Thematic content of the Course Manual for Navigation of the craft - ML is presented in Annex 4 of this document if necessary, which is linked to the European Standard for Qualifications in Inland Navigation (ES-QIN), Part I, Chapter 2, Point 1 Navigation .

COMPETENCES OF NAVIGATION – ML

The numbering of the chapters is in accordance with the Standards of competence for the Management Level - 1 Navigation.

The competences of Navigation are:

1.1 The Boatmaster shall be able to plan a journey and conduct navigation on inland waterways including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation.

Competence	Knowledge and skills
1. **Navigate on European inland waterways including locks and lifts according to navigation agreements with agent;**	1. Knowledge of national and international waterways used by inland navigation, geographical location of rivers, canals, seaports, inland harbours and the relationship with cargo flows; 2. Knowledge of CEMT classification of inland waterways, dimensions of the waterway in relation to craft dimensions using modern information systems; 3. Ability to calculate with water levels, depth and (air) draught using relevant information sources; 4. Ability to calculate distances and sailing time using information sources concerning distances, locks, restrictions and sailing speed/time; 5. Knowledge of liability and insurance; 6. Ability to instruct crew members and shipboard personnel to perform tasks in a safe way.
2. **Respect and apply traffic regulations applicable to navigation on inland waterways to avoid damage;**	1. Knowledge of the rules of the road [such as CEVNI] [such as the agreed set of rules applicable in inland navigation] for the inland waterway which is being sailed to avoid damage (e.g. collision); 2. Ability to apply relevant traffic regulations applicable to the waterway which is being sailed.
3. **Consider economic and ecological aspects of the craft operation in order to use the craft efficiently and respect the environment;**	1. Knowledge of the environmental aspects when sailing on inland waterways; 2. Ability to perform environmentally sustainable and economical navigation with regard to e.g. fuel efficiency, bunkering, emission levels, shallow water effects, connection to shore electricity and waste management.
4. **Take account of technical structures and profiles of the waterways, and use precautions;**	1. Knowledge of the influence of engineering structures, waterway profiles and protection works on navigation; 2. Ability to navigate passing through various types of locks and the locking procedures, various types of bridges, profiles of canals and rivers and to make use of “safe harbours” and overnight ports.
5. **Work with up-to-date charts/maps, Notices to Skippers/Mariners and other publications;**	1. Knowledge of navigation aids; 2. Ability to use navigation aids as applicable, e.g. satellite positioning system; 3. Ability to use nautical charts considering factors relating to accuracy and chart reading such as chart date, symbols, soundings, bottom description, depths and datums (WGS84) and to use international charts standards such as Inland ECDIS; 4. Ability to use nautical publications such as Notices to Skippers/ Mariners in order to collect necessary information required for safe navigation stations, finding height of tide at any time, information on ice, high/low water levels, berths and port directory.
6. **Use relevant traffic supervision tools and be able to apply them;**	1. Knowledge of signals; 2. Ability to use day and night signs such as lights to guide craft. Knowledge of Inland AIS, Inland ECDIS, electronic reporting and Notices to Skippers/Mariners, RIS, surveilled and non-surveilled VTS systems and its components; 3. Ability to use traffic information tools.

1.2 The Boatmaster shall be able to apply knowledge of the applicable rules on the manning of craft, including knowledge on resting time and on deck crew members composition.

Competence	Knowledge and skills
1. Ensure safe manning of craft in accordance with applicable rules;	1. Knowledge of minimum manning requirements and mandatory professional qualifications of crew members and shipboard personnel. 2. Knowledge of requirements of medical fitness and medical checks of crew members. 3. Knowledge of administrative procedure to record data in service record books. 4. Knowledge of applicable modes of exploitation and minimum resting time. 5. Knowledge of administrative procedure to record data in the logbook. 6. Knowledge of working time rules. 7. Knowledge of specific authorisation requirements. 8. Knowledge of specific manning requirements with respect to vessels covered by the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN), passenger vessels and for LNG craft where applicable. 9. Ability to instruct crew members when to take up and to end duty.

1.3 The Boatmaster shall be able to sail and manoeuvre ensuring the safe operation of the craft in all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN).

Competence	Knowledge and skills
1. Navigate and manoeuvre taking into account geographical, hydrological, meteorological and morphological characteristics of the main inland waterways;	1. Knowledge of the hydrological and morphological characteristics of the main waterways, e.g. catchment area and watershed, types of rivers by water source, the slope and course of a river, flow velocity and current pattern, human intervention in the course of a river. 2. Knowledge of the meteorological effects on the main inland waterways, e.g. weather forecast and warning services, scale of Beaufort, district division for wind and storm warnings with factors such as air pressure, wind, high and low pressure areas, clouds, fog, types and passage of fronts, ice warning and high water warning. 3. Ability to apply geographical, hydrological, meteorological and morphological information.
2. Give order to moor and unmoor craft and to haul towage operations;	1. Knowledge of technical requirements and documents on mooring and hauling operations. 2. Ability to initiate procedures of mooring and unmooring manoeuvre and to ensure that equipment on different types of craft complies with requirements of craft certificate. 3. Ability to communicate with deck personnel, e.g. to use communication systems and hand signals.
3. Provide safe access to craft;	1. Knowledge of technical requirements on facilities to access craft. 2. Ability to organise safe access to craft whether sailing, moored or at anchor and to use, e.g. stairway, gangplank, ship's boat, fall protection and illumination.

Competence	Knowledge and skills
4. Use modern electronic navigation aids;	1. Knowledge of functions and operation of navigation aids. 2. Knowledge of operating principles, limitations and sources of error of navigation aids. 3. Ability to use nautical sensors and indicators providing navigation information, e.g. (D) GPS, position, heading, course, speed, distance, depth, Inland ECDIS, Radar. 4. Ability to use River Information Services (RIS) and technologies, e.g. Inland AIS, Inland ECDIS, Electronic Reporting and Notices to Skipper, FIS (Fairway Information Services), TIS (Traffic Information Services), TMS (Traffic Management Services), CAS (Calamity Abatement Services), ITL (Information for Transport Logistics), ILE (Information for Law Enforcement), ST (Statistics), WCHD (Waterway Charges and Harbour Dues) distance, depth, also in connection with Radar. 5. Ability to detect misrepresentation of information and apply methods of correction.
5. Respect technical requirements for inland navigation;	1. Knowledge of structure and content of the applicable technical requirements and of the content of the craft certificate. 2. Ability to initiate checks and certification procedures.
6. Consider effects of current, waves, wind and water levels in relation to interactions of crossing, meeting and overtaking craft as well as ship-shore (canal effect);	1. Knowledge of the influence of waves, wind and current on sailing, manoeuvring or stationary craft, including the effect of wind, e.g. cross wind, when manoeuvring, also at nautical superstructures or when entering or leaving ports, locks and secondary waterways. 2. Knowledge of the influence of current on sailing, manoeuvring and stationary craft on waterways used by inland navigation such as the effect of current, e.g. when manoeuvring upstream and downstream or with empty or loaded craft and when, e.g. entering and leaving ports, locks or secondary waterways. 3. Knowledge of the influence of water movement during sailing, manoeuvring and when stationary such as the influence of water movement regarding draught subject to water depth and the reaction to shallow water effects e.g. by decreasing sailing speed. 4. Ability to respect interaction effects when sailing, manoeuvring and when stationary in a narrow fairway and to recognise the interaction effects relating to empty or loaded craft. 5. Knowledge of the effect of cargo handling and stowing conditions during sailing, manoeuvring and when stationary relating to stability. 6. Ability to take into account trim, angle of heel, downflooding, lever principle, points of gravity.
7. Use of propulsion and manoeuvring systems as well as appropriate communication and alarm systems;	1. Knowledge of propulsion, steering and manoeuvring systems and their influence on manoeuvrability. 2. Ability to use propulsion, steering and manoeuvring systems. 3. Knowledge of anchoring devices. 4. Ability to use anchor in various circumstances. 5. Knowledge of communication and alarm systems. 6. Ability to give instructions if necessary in the case of an alarm.
8. Sail and manoeuvre also in situations that involve high traffic density or where other craft carry dangerous goods, requiring basic knowledge of the ADN.	1. Basic knowledge of structure of ADN, ADN documents and instructions and visual signals required by ADN. 2. Ability to find instructions in ADN and to identify visual signs for craft subject to ADN.

1.4 The Boatmaster shall be able to respond to navigational emergencies on inland waterways.

Competence	Knowledge and skills
1. Take precautions in an emergency when intentionally beaching a craft in order to prevent greater damage;	1. Knowledge of shallow places and banks of sandy character that can be used to beach the craft; 2. Ability to adequately use machines or anchoring devices if beaching becomes necessary.
2. Refloat a grounded craft with and without assistance;	1. Knowledge of measures to take in the event of running aground including the sealing of leaks and the actions to be taken to redirect the craft into the fairway; 2. Ability to seal leaks, to redirect the craft with the assistance of other craft, e.g. tug or push vessels.
3. Take appropriate actions if collision is imminent;	1. Knowledge of rules applicable if collision or accident is imminent; 2. Ability to navigate the craft when in an unavoidable collision situation in such a way that damage will be minimal to persons, e.g. for instance passengers and crew members, the colliding craft and other craft, the cargo and the environment.
4. Take appropriate actions after a collision and assessment of damage.	1. Knowledge of rules applicable after a collision or accident; 2. Ability to take the appropriate measures in the event of damage, collision and running aground, including assessment of the damage, communication with the competent authority and obtaining permission to sail to a position of recovery.

5. EFFECT OF THE HUMAN ELEMENT ON SUSTAINABLE SHIPPING

The human activities of deck crews on board of ships have a direct relation with sustainability in Inland Shipping. Due to the standardisation of training and conformity with Directive (EU) 2017/2397 there will be an increase in navigational safety.

Different factors affect the development of sustainability in shipping, from regulatory to socio-economic factors, market-related aspects and human factors, which all together contribute in different ways to the development of these three pillars.

Since many different stakeholders are involved in the process, it follows that one of the main factors in supporting Sustainable Shipping is the understanding of all parties' concerns, needs and expectations.

The shipping industry is run by people, for people. People design ships, build them, own them, crew them, maintain them, repair them and salvage them. People regulate them, survey them, underwrite them and investigate them when things go wrong.

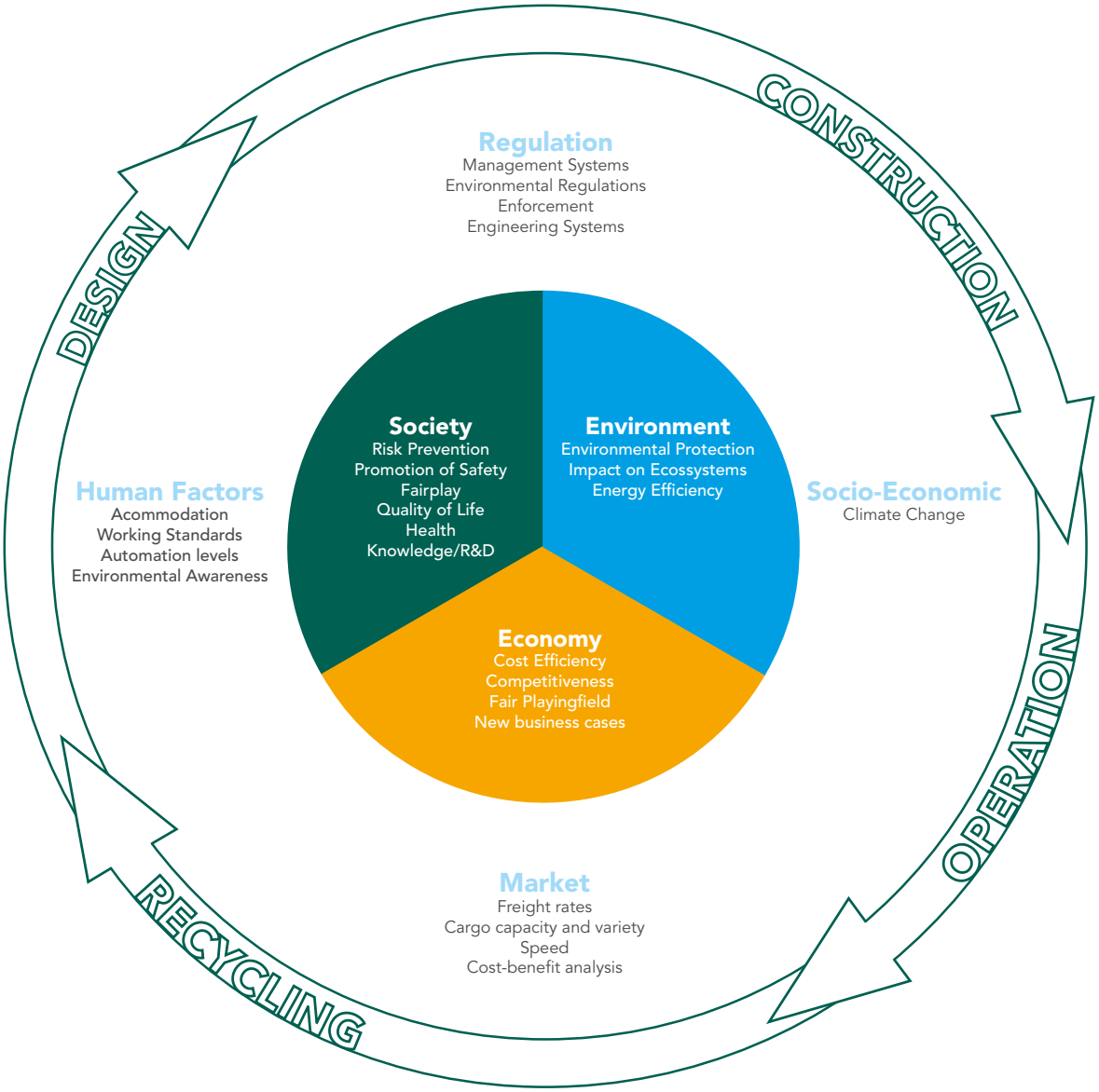


Figure 1 https://www.maintworld.com/R-D/Application-of-European-Qualification-Framework-EQF-in-Maintenance

While these people vary in all sorts of ways, they are all, nevertheless, people – with the same basic set of capabilities and vulnerabilities.

Humans are not simply an element like the weather. They are at the very centre of the shipping enterprise. They are the secret of its successes and the victims of its failures. It is human nature that drives what happens every day at work – from the routine tasks of a ship's rating, right through to policy decisions.

The eight aspects of human nature are:

1. **People actively make sense of things**
   What's obvious to you may be far from apparent to somebody else. We explain how it is that most of what you see and understand is down to you and your expectations, rather than a response to 'what's out there'. The key problem is ensuring that the sense you make of things is enough for you to deal effectively with the reality of a continuously unfolding situation – a situation that you must also share with your colleagues.

2. **People take risks**
   Everybody takes risks all the time. In a world that is essentially uncertain, this is not only normal but inescapable. We explain how the human perception of risk is quite different from the probability with which events actually occur. The key problem is in ensuring that your own perception of risk maps well onto the world with which you are interacting.

3. **People make decisions**
   We explain the difference between how people think they make decisions and how they actually do it – and how experts' decision making is quite different from the way they did it when they were learning. We also explain why experience does not always lead to expertise, but that expertise always requires experience – and lots of it. The key problem is to understand what the components of a good decision are, and how to recognise when you are about to make a bad one.

4. **People make mistakes**
   A fundamental human strength depends directly on the ability to make, and then recover from, mistakes. Without error there can be no learning or development. And without these, organisations cannot achieve their goals. The important aspect is in ensuring that potentially harmful or expensive mistakes are prevented, caught or minimised before they have a chance to get far enough to matter. We explain how this depends as much on organisational culture as on individual competence.

5. **People get tired and stressed**
   We explain the causes and consequences of fatigue and stress and explain what you can do to avoid them or lessen their impact. We also explain why workload turns out to be as much to do with your own experience, as the actual demands placed on you by the job.

6. **People learn and develop**
   People learn all the time. They can't stop themselves. The main problem is in ensuring that they learn the right things at the right time. People also have aspirations which can be managed by an organisation to further its own safety and profitability. However, in the absence of good management, people's aspirations will either be ignored or permitted to dominate – with potentially disastrous consequences either way. We explain the enormous power that effective, well-timed training can give to an organisation.

7. **People work with each other**
   Working with each other sometimes requires us to work as individuals in pursuit of our own goals, and at other times as members of a team with a common purpose. The key problem is in ensuring that we have effective 'people' skills, as well as technical task skills. We explain what these other skills are, why they are important and what can go wrong when they are absent.

8. **People communicate with each other**
   Successful communication involves the clear transmission of a message. We explain what has to happen for communication to be successful. We explain the responsibilities of both listener and messenger.

These are eight things we do that help to make us human. They are inescapable and will not go away. Understanding a little more about their nature, and how you can deal with them more effectively, will change your behaviour – and, maybe, that of those around you.

6. REFERENCE TO NQF, EQF, ECTS

Nowadays, the European Union (EU) consists of 27 member states, and each state has a different education system. Therefore, the European Commission (EC) prepared the European Qualifications Framework (EQF) because it wanted to:

- Make national qualifications more readable across Europe;
- Harmonise national qualification systems of different countries to a common European reference framework;
- Promote workers' and learners' mobility between the countries of the EU and to facilitate their lifelong learning.

The EQF system has eight reference levels (figure 2), each level describes what a learner has to know, understand and be able to do.[1]

Inland waterway transport (IWT) plays a relevant role in the EU in cargo exchange. Especially on the international scale on the network of the European waterways. On the one hand, the transport is still more economical than any other mode of transport for many types of cargo, particularly such as bulk, general, liquid cargo and containers.

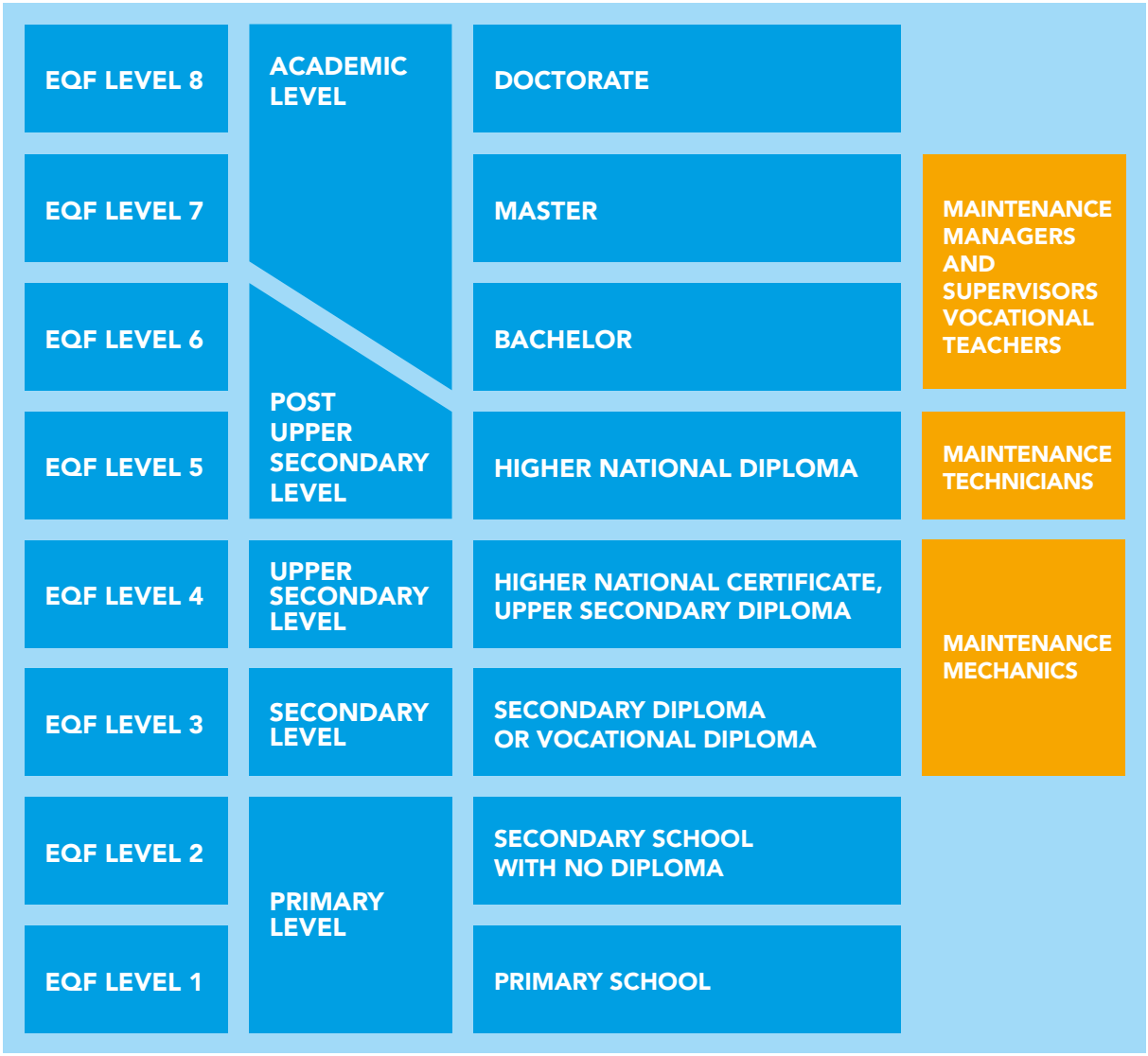


Figure 2 EQF levels compared with achieved education and maintenance personnel positions

1 http://www.maintworld.com/R-D/Application-of-European-Qualification-Framework-EQF-in-Maintenance, 1 December 2016

Germany	DQR Deutscher Qualifikationsrahmen für lebenslanges Lernen	www.dqr.de
The Netherlands	NLQF Nationaal Coördinatiepunt	www.nlqf.nl
Romania	anc Autoritatea Națională pentru Calificări	www.anc.edu.ro
Slovakia	TREXIMA PEOPLE . PROFESSION . PROSPERITY	www.treXima.sk/new

Table 1 Overview of national organisations in the EQF context

On the other hand, it is the friendliest mode to the environment.

The field of IWT includes various job positions that are related to its segments such as vessels, ports and waterways. Project IWTCOMP focused on EQF and the job qualifications in IWT in 4 countries (Germany, the Netherlands, Romania and Slovakia) because each country uses a different education system.

In all the countries involved in the project there are websites and organisations dedicated to the use of EQF in the national context. Below you will find an overview of these organisations.

The IWTCOMP project outlined the fact that regarding international sectoral qualifications there is (still) not an agreement on the approach and international process of comparing the EQF levels via the National QFs (NQFs). Some member states do not want to adjust their procedures and this means all member states still have their own NQF procedure.

Slovakia used to have two vocational schools which prepared students for the job positions in IWT but they were closed because of low interest of young people to work in this field. Nowadays, the Transport Authority examines the candidates for lower job positions in IWT such as skipper, captains, boatmen (EQF 2 and 4). Before the exams it organises the courses for applicants. The exam has oral and written forms and consists of various areas in IWT. The Department of Water Transport at the University of Zilina educates students for higher job positions (EQF 6, 7, 8) in IWT.

The curricula are approved by the Ministry of Education, Science, Research and Sport of the Slovak Republic and its control body (Accreditation Commission). They are prepared according to the requirements of practice and standards of higher education in Slovakia.

In Germany there is a combined system of education at school and in a shipping company ending in centralised exams held by the Chamber of Commerce. Both schools and companies have to follow the curricula, but they are not responsible for the exams. The exams consist of two parts, one focussing on knowledge and one focussing on the skills. Therefore both school and shipping company contribute to the education of the students enabling them to pass the centralised exams.

In Romania there are dedicated programmes for IWT boatman (EQF 2). There are vocational schools for boatmen in Galati and Orsova, offering courses for boatmen qualification.

In the Netherlands there are qualifications set for the different levels of education within the IWT sector. For each educational level there is a set of qualifications given by the national contact point in cooperation with the work, field and educational institutes. The Netherlands government decided to place the Captain/Manager IWT qualification in NQF level 5 (EQF5), but in a later stage it was withdrawn and placed in NQF level 4 (EQF4).

In conclusion, although the EQF system in the field of inland water transport has been accepted in all EU countries, this EQF system is not used by all countries. This is due to the reason that some institutes have to focus on the professional competences based on national and international legislation. The curricula at schools, universities and training centres are prepared according to the international or national standards in cooperation with the international or national authorities (the Rhine Commission, the Danube Commission, the Ministries of Education), shipping companies and other authorities that work in the field of IWT in the Rhine or Danube Regions. It depends on the level of general education (higher or lower) per country.

ANNEX 1

Bibliographical materials, reference documents, didactical materials

- Directive (EU) 2017/2397 of the European Parliament and of the Council of 12 December 2017 on the recognition of professional qualifications in inland navigation and repealing Council Directives 91/672/EEC and 96/50/EC & Final drafts of competences and practical exams, 2017;
- ES-QIN, European Standard for Qualifications in Inland Navigation, CESNI 2019;
- Course Manuals for Inland Navigation ML. Example educational material; competence 1.1, 1.2, 1.3, 1.4, 1.5 (CMINET);
- Course Manuals for Inland Navigation ML. Example educational material; competence 1.6 (CMINET);
- Inland Navigation and Ports, NELI;
- Ship manoeuvring for inland convoy, NELI;
- Logistics course, NELI, 2011;
- RIS course, NELI;
- Train the Trainer course for Inland Navigation training, Leonardo da Vinci Program;
- Train the Trainer course Competency Based Training and Assessment Inland Waterway Transport Didactical Manual, IWTCOMP, 2019;
- Manual on the Sava River Navigation, International Sava River Basin Commission, Zagreb 2018;
- Assessment of the effectiveness of the use of simulations with respect to education, assessment and examination, Prominent, July 2017;
- Digital tools to support the further integration of IWT knowledge to general logistics education and training, Prominent, July 2017;
- Prototype of digital education and training tools, Prominent, October 2017.

Online e-learning

- INeS: www.ines-danube.info / www.ines.info;
- MOK: www.mok.anewspring.nl

ANNEX 2

Practical scenarios

Scenario 1

1.3.1.2 Navigate and manoeuvre taking into account geographical, meteorological and morphological characteristics of the main inland waterways

Meteorology

To be able to sail safely on the wide inland waters, some knowledge of the weather is essential. Safety then has to do with the ship, the people on board, shipping around us and the environment. It is important to have a good insight into the expected weather.

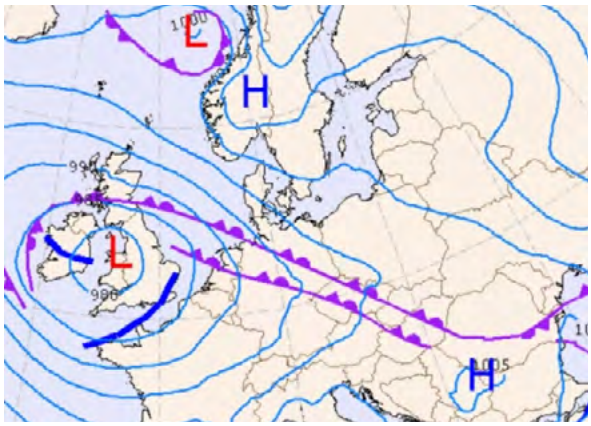
We can get the information in different ways. Below we mention a few:

- Newspaper;
- Television;
- Radio;
- Internet;
- VHF;
- Navtex;
- Your own observation.

Assignment

Create a weather report for three consecutive days. Print the weather forecast with date every day and paste it on the page for the weather report. The following aspects must be covered in the weather forecast:

- Temperature;
- Wind direction;
- Wind force;
- The wind shrinks, counter clockwise. Depression on the way?
- Clearing wind, clockwise. Better emergence?
- Air pressure;
- Humidity;
- Cloudiness;
- Cloud type.



Scenario 2

1.3.8 Sail and manoeuvre in situations that involve high traffic density or where other craft carry dangerous goods, requiring basic knowledge of the ADN

The ADN contains dangerous substances that may only be transported if the ship meets certain requirements. To be allowed to load and unload these hazardous substances there must be someone on board who is in possession of an ADN statement. Rules have been included in the ADN for loading and unloading hazardous substances. ADN consists of a main legal text (the Agreement itself) and annexed Regulations and aims at:

- Ensuring a high level of safety of international carriage of dangerous goods by inland waterways;
- Contributing effectively to the protection of the environment by preventing any pollution resulting from accidents or incidents during such carriage; and
- Facilitating transport operations and promoting international trade in dangerous goods.

Certain properties of dry cargo also have dangers. By this we mean something other than hazardous substances.

Assignment

Make a distinction between the **hazardous substances** and the **hazardous properties of dry cargo**. State this as best you can.

ANNEX 3

Standards for practical examination for obtaining a certificate of qualification as a boatmaster - module 1 - navigation

Standards for practical examination for obtaining a certificate of qualification as a Boatmaster was adopted by Commission Delegated Directive (EU) 2020/12 supplementing Directive (EU) 2017/2397 of the European Parliament and of the Council as regards the standards for competences and corresponding knowledge and skills, for the practical examinations, for the approval of simulators and for medical fitness.

Standards for practical examination for obtaining a certificate of qualification as a Boatmaster are included in **Annex II, Chapter IV** of this aforementioned Delegated Directive and are referred to under:

1. Specific competences and assessment situations.

The examination comprises two parts: one on journey planning and a second one on journey execution.

Journey planning

The part of the examination on journey planning comprises the elements listed in the table below, elements related to the Navigation module, such as:

No.	Competences	Examination elements	Category I - II
1.	1.1.1	Navigate on European inland waterways including locks and lifts according to navigation agreements with the agent;	I
2.	1.1.3	Consider economic and ecological aspects of the craft operation in order to use the craft efficiently and respect the environment;	II
3.	1.1.4	Take account of technical structures and profiles of the waterways, and take precautions;	I
4.	1.2.1	Ensure safe manning of craft in accordance with the applicable rules;	I
5.	1.3.3	Ensure safe access to the craft.	II

Elements are grouped in Categories I and II according to their importance.

Journey execution

Applicants are required to demonstrate that they are capable of executing a journey.
The individual elements to be tested as well as elements related to the Navigation module can be found in the table below:

No.	Competences	Examination elements
1.	1.1.1	Navigate and manoeuvre the craft appropriate to the situation and in accordance with the statutory requirements of navigational law (as a function of current speed and direction, checking depth of the water and loaded draught, underkeel clearance, traffic density, interaction with other craft, etc.);
2.	1.1.4	Dock and cast off the inland waterway craft, in a correct and proper manner and in compliance with statutory and/or safety-related requirements;
3.	1.1.5	Readjust or reset navigation aids if necessary;
4.	1.1.5	Gather all the information relevant for navigation supplied by the navigation aids and use it to adapt the handling of the craft;
5.	1.1.6	Turn on the necessary devices at the steering position (navigation aids such as Inland AIS, Inland ECDIS) and adjust them.

Annex II, Chapter V of the aforementioned Delegated Directive includes Standards for the additional module on supervision in the context of the practical examination for obtaining a certificate of qualification as a Boatmaster. Candidates who have neither completed an approved training programme based on the standards of competence for the operational level nor passed an assessment of competence by an administrative authority aimed at verifying that the standards of competence for the operational level are met, have to pass this module.
The requirements below need to be met in addition to those referred to under the standards for the practical examination for obtaining a certificate of qualification as a Boatmaster.

The individual elements to be tested as well as elements related to the Navigation module, can be found in the table below:

No.	Competences	Examination elements	Category I - II
1.	0.1.1	Use materials available on board such as winches, bollards, ropes and wires considering relevant work safety measures including the use of personal protective and rescue equipment;	I
2.	0.1.2	Connect and disconnect push/barge combinations using the required equipment and materials;	I
3.	0.1.2	Use equipment and materials available on board for coupling operations considering relevant work safety measures including the use of personal protective and rescue equipment;	I
4.	0.1.3	Demonstrate anchor manoeuvres;	I
5.	0.1.3	Use equipment and materials available on board for anchoring operations considering relevant work safety measures including the use of personal protective and rescue equipment;	I
6.	0.1.4	Secure the watertightness of the craft;	I
7.	0.1.4	Work according to the checklist on deck and in the living quarters such as waterproofing and securing of the hatches and holds;	I
8.	0.1.5	Explain and demonstrate the applicable procedures to deck crew members while passing locks, weirs and bridges;	II
9.	0.1.6	Handle and maintain the craft's day and night marking system, signs and sound signals.	I

ANNEX 4

Thematic content of the Course Manual

The aim of this annex is to set out the thematic content of the competences of Navigation at Management Level of Chapter 4 if necessary.

COMPETING

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