Interreg
EUROPEAN UNION
Danube Transnational Programme
Danube SKILLS

Increased institutional capacity in Danube navigation by boosting joint transnational competences and skills in education and public development services

SAFETY PRACTICES IN EMERGENCY SITUATIONS DURING SHIP OPERATION

MODULE I – SAFETY OF WORK

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15.01.2018

Project co-funded by European Union funds (ERDF, IPA)

1. INTRODUCTION

These course notes are a teaching support both for trainers who will be involved in training of such course module, and the trainees as learning aids in order to facilitate the learning process.

The main objective of this course compendium is to provide practical guidance on safety and health on board the vessels with a view to preventing accidents, diseases and other harmful effects on the health of inland navigation personnel arising from employment on board inland navigation vessels.

2. LEARNING OUTCOMES

By the end of this course, trainees will be able to:

- complies with established emergency response plans and procedures;
- identifies emergency alarm signals;
- takes correct action in given emergencies drills;
- identifies safety hazards in a given situation;
- select the correct personal protective equipment for shipboard tasks;
- adheres to procedures for entry into enclosed spaces.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.1 Safe working practices

General duties and responsibilities of vessel owners

The vessel owner is primarily responsible for the safety and health of all crew members on board vessel.

General duties and responsibilities of the Boatmaster

The Boatmaster should implement the vessel owner's safety and health policy and programme on board the vessel. The policy and programme, including safety rules and instructions, should be clearly communicated to all members of the crew.

General duties and responsibilities of crew members

Crew members should participate in ensuring safe working conditions encouraged to express views on working procedures adopted as they may health, without fear of dismissal or other prejudicial measures.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.2 Health and safety working instructions during on board activities

Nature of on board hazards

-slips, trips and falls due to slippery surfaces (oil, grease, garbage, water, ice, etc.) or obstructions (pipelines, welding cables, lashing eyes, wires, ropes, etc.);

-head injuries due to low doorway entrances, overhead loads, falling equipment or material; falls through open manholes, unfenced 'tween decks, loose or missing gratings;

-clothing, fingers getting caught in moving machinery such as grinding wheels, winch drums, gears, flywheels, etc.

-burns from steam pipes, hot machinery, welding sparks;

-eye injuries through chipping, welding, chemicals;

-hazards of extreme weather e.g. cold temperatures can cause frost bite.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Dangers related to on board hazards

-movement of the vessel;
-provision for safe embarkation and disembarkation of the vessel(e.g. gangplank, ship's boat);
-stowing movable objects;
-working with machinery;
-working with electricity and electrical equipment/devices;
-fire precaution and fire-fighting;
-use of hand tools;
-use of portable power tools;
- slips, falls and tripping.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Safe movements about the vessel

General provisions

Crew members should move about the vessel bearing in mind the possibility of an unusual lurch or heavy roll by the vessel while in inland waterways.

Permanent fittings which cause obstruction and which may be dangerous to vehicles, lifting appliances or persons should be made conspicuous by means of colouring, marking or lighting.

Any deck obstructions and head-height obstructions that are a hazard should be painted in a bright, conspicuous colour.

Where necessary, warning notices should be posted. Graphic symbols should be utilized where possible.

Head-height obstructions should be padded.

The stowage of deck cargoes should take account of the requirements for safe access t
crew working on board the vessel and access to safety equipment.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Safe access to vessel

Means of access to vessel

There should be a safe means of access between any ship and any quay, pontoon or similar structure or another ship alongside which the vessel is secured to.

Crew members should be provided with adequate information on how to make their way safely to and from the ship through the terminal or shore side cargo handling area.

In some modern ports access equipment and information on safe means of access are provided by the port authorities. However, the Boatmaster should ensure, as far as possible, that the eq[illegible] required safety standards.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

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3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Stowage of cargo

All cargoes should be stowed and secured in a manner that will avoid exposing the vessel and persons on board to unnecessary risk. The safe stowage and securing of cargo depends upon proper planning, execution and supervision by properly qualified and experienced personnel.

Loading, stowage and securing of cargo other than bulk cargo is to be carried out in accordance with the ship's approved cargo-securing manual.

All cargo should be stowed having due regard to the order of discharge at a port or number of ports. When planning the position of cargo and the order of loading and unloading, the effects that these operations will have upon access and the safety of personnel should be considered.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Working with machinery (fixed installations)

General provisions

All operations in machinery spaces should be performed by a competent person under the supervision of a responsible officer.

No person should operate a machine unless authorized and trained to do so. Machine operators should be competent in the use of the machine and familiar with its controls.

No work other than routine duties should be undertaken except on the orders of a responsible officer. Maintenance work should be carried out in compliance with manufacturer's instruction manuals. When necessary, specific work should be carried out within the "permit-to-work" system.

Moving parts of machinery should be provided with permanent guards or other saf
railings or fencing.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Working with electricity and electrical equipment/devices

General provisions

Crew members should receive adequate training before being permitted to work on electrical installations.

The installation should be maintained and protected to minimize the possibility of fire, external explosion, electrical shocks and danger to crew members.

All live parts should be effectively insulated and enclosed in conduits or otherwise protected and should be maintained in that condition.

All electrical equipment should be regularly inspected to ensure that it is suitable for its intended use. Any electrical faults or other defects should be immediately reported to the appropriate p
by a competent person.

Attention should be paid to the maintenance of the emergency source of electrical pow

All electrical appliances should be clearly marked to indicate their safe operating volta

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.3 Safety instructions and rules for safety of work and prevention of accidents

Remove slips, trips and falls

Slips, trips and falls are among the most common accidents leading to injuries on board vessel. All crew members know that a vessel moving in waterways is drastically different from a shore-based work environment, with an unstable working platform inevitably making accidents more likely.

There are many causes but they generally fall into the following areas: poor onboard housekeeping, not complying with safety procedures, not applying hard-won training and experience.

A vessel's decks and internal spaces are prime locations for trip, fall and slip hazards. Raising crew awareness of trip and head-height hazards can be assisted by conspicuously marking obstructions, changes of deck height, steps and inclines with high visibility paint or "tiger-stripes".

Use may also be made of "watch your steps" type labels and strategically placed warning and instructions notices.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Safety instructions and rules for safety of work and prevention of accidents

Loading and unloading cargoes

Transporting loads is a very dangerous operation. It might seem like a simple task of getting stuff from one place and bringing it to another. But loading, unloading and transporting cargo can cause serious injury and even fatality. Workers loading and unloading cargo are exposed to serious danger in that heavy objects may hit or fall on them if they don't follow the right loading and unloading safety procedures.

Loading, stowage and securing of cargo other than bulk cargo is to be carried out in accordance with the ship's approved cargo-securing manual.

Safety arrangements made prior to working with cargo should ensure that adequate and suitable lifting plant is available, in accordance with the register of lifting appliances and cargo gear. and that all plant and equipment and any special gear necessary is available and used. Cargo gear regularly throughout the cargo operation for damage or malfunction.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Mooring and unmooring

All crew members involved in mooring and unmooring operations of any kind should be informed of the hazards of engaging in such operations.

A competent person should be in charge of mooring operations and ascertain that there are no persons in a dangerous position before any heaving or letting go operation is commenced.

On each occasion that a vessel berths, all relevant circumstances such as weather, passing vessels, etc., should be considered in determining a safe securing pattern of ropes and wires.

Mixed moorings of wires and ropes in the same direction should not be used because wires and ropes stretch differently.

There should be sufficient crew members available to ensure the safe conduct of operation

Only competent persons should operate windlasses and winches.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Working aloft and over the side

Consideration should be given to a permit-to-work system for work aloft or over the side depending on the nature of the work. A form for working aloft should take account of the particular nature of the operation.

Particular attention should be paid to water and weather conditions and the possibility of squalls before working aloft or over the side is commenced. In general, working aloft or over the side should not be permitted if the movement of a ship in an inland waterway makes such work hazardous.

Special consideration should be given to the problems of working near the ship's whistle, funnel, radio aerials and radar scanners

Warning notices should be posted as appropriate.

The Boatmaster should be informed when the work is completed.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Working with dangerous and irritating substances and radiations

Dangerous and irritating substances should be handled only under the supervision of a responsible officer.

Crew members should wear appropriate personal protective equipment.

Crew members should be aware that materials such as residual fuel oil and used or spent engine oil contain substances known to be carcinogenic. In addition to any carcinogenic effects, contact between oil and human skin may lead to a range of skin complaints ranging from mild irritation to severe oil acne. Contact must be avoided by taking suitable precautions, e.g. the owner should provide barrier creams and personal protective equipment.

Boatmasters should ensure that the data sheet information provided by the manufacturers with their products is made available to all crew members who may come into contact with these products.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Working with batteries

Battery rooms should be adequately ventilated to avoid accumulation of explosive gases.

Light fittings and any electrical equipment in the battery room should be of a type certified as being suitable for a hydrogen atmosphere.

Particular hazards when charging batteries are hydrogen explosion and short circuits.

During charging, a battery gives off hydrogen and oxygen and the subsequent mixture can be easily ignited. Short circuits may cause arcing which could lead to an explosion or burn crew members.

Only authorized persons should enter battery rooms and, when doing so, they should ensure that they do not introduce any source of ignition. Smoking is prohibited in battery rooms.

Care should be taken when using metal tools or implements to avoid making contact with the metal battery case or terminals.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Presence in engine-room

Crew members should never enter or remain in an unmanned machinery space alone, unless they have received permission from or been instructed by the engineer officer in charge at the time.

Notice of safety precautions to be observed by crew members working in unmanned machinery spaces should be clearly displayed at all entrances to the space. Warning should be given that in unmanned machinery spaces there is a likelihood of machinery suddenly starting up.

Unmanned machinery spaces should be adequately illuminated at all times.

When machinery is under bridge control, the bridge should always be advised when a change in machinery setting is contemplated by the engine room staff, and before a reversion to engine room control of the machinery.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Lifting loads

Manual handling

It is important to identify some areas that may require attention in respect of manual handling. In all cases, a risk assessment should be used as the basis for appropriate control measures, which should be put in place to protect those who may be affected.

The assessment should take full account not only the characteristics of the load and the physical effort required but also of the working environment (e.g. ship movement, confined space, high or low temperature, physical obstacles such as steps or gangways) and any other relevant factors (e.g. the age and health of the person, the frequency and duration of the work).

The term “manual handling” is used to describe any operation that includes any transporting or supporting of a load, lifting, putting down, pushing, pulling, carrying or moving by hand or bodily force. This guidance is generally concerned with preventing musculoskeletal injury.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Lifting loads

Mechanical handling

Cargo handling equipment should be operated only by trained and experienced persons. Manufacturer's instructions regarding operation and maintenance as contained in the ship's cargo handling manual should be followed at all times.

Equipment should be inspected by a responsible person prior to and after use. No equipment should be used or operated unless the prescribed certificates of tests and examinations are on the ship and are current and valid.

The crew member with primary responsibility for cargo operations should check that all safety features are in place and that any possible hazards are clearly marked and otherwise dealt with to prevent injury to any persons who may be working on board the vessel.

The Boatmaster should ensure that the crew is aware of any hazardous cargoes or operations. Appropriate protective equipment should be provided to crew members before commencement of cargo operations.

3. INSTRUCTIONS AND RULES FOR THE SAFETY AT WORK AND PREVENTION OF ACCIDENTS

3.4 Health and safety working instructions during activities that take place on board in order to prevent accidents

Entering and working in enclosed or confined spaces

Precautions on entering in enclosed spaces

Before a space is entered, the following precautions should be taken, as appropriate, to make it safe for entry without the need for breathing apparatus, and to ensure that it remains safe whilst crew members are inside:

- a competent person should make an assessment of the space and a responsible officer should be appointed to take charge of the operation;
- the potential hazards should be identified;
- the space should be prepared and secured for entry;
- the atmosphere should be tested;
- a "permit-to-work" system should be used;
- entry procedures should be established and followed;
- continuous ventilation should be maintained throughout.

4. UNDERSTAND ORDERS AND BE UNDERSTOOD IN RELATION TO ON-BOARD DUTIES

4.1 Communication with management and others in performing duties

Communication inside the bridge team

Before the vessel leaves for a voyage the Boatmaster must inform the bridge team about the specific elements of the journey like:

- route plan;
- requirements that must be fulfilled by the bridge team during the voyage;
- discussions about the particularities of the route and identifying the sensible points;
- defining the way of work on the bridge in order to assure the necessary level of safety.

Participate in group discussions to achieve appropriate work outcomes

The ability of the personnel on board to coordinate their activities and to effectively communicate between them is vital in emergency situations.

4. UNDERSTAND ORDERS AND BE UNDERSTOOD IN RELATION TO ON-BOARD DUTIES

4.2 Communication with management and others in performing duties

Importance of respect for team work

Working in a team and free circulation of information professionally encourages development of relations between the bridge team.
Communication on the bridge must be open, with no restrictions caused by the differences of position occupied in the chain of command by the people involved in particular activities. The open communication that must be mainly ensured by the Boatmaster on the bridge but also in other compartments of the vessel also includes new member's training and familiarization with the elements and particularities of the vessel.

4. UNDERSTAND ORDERS AND BE UNDERSTOOD IN RELATION TO ON-BOARD DUTIES

4.3 Dangers to safe vessel operation related to alcohol and drugs

Drug and alcohol abuse and its adverse effects on safety is one of the most significant social problems of our time. It is, appropriately, receiving attention both in the public eye and in government legislation.
The use of alcohol and/or other drugs in general is increasing globally, and the impact of substance abuse can has influence on the workplace.
The management of risk factors including use of alcohol and drugs - illicit, prescriptive and over-the-counter - is a serious issue that extends beyond physical safety to include decision making.

Project co-funded by European Union funds (ERDF, IPA)

5. PERSONAL PROTECTIVE EQUIPMENT

4.3 Types of equipment

Personal protective equipment can be classified as follows:

Type	Examples
Head protection	Safety helmets, bump caps, hair protection
Hearing protection	Earmuffs, earplugs
Face and eye protection	Goggles and spectacles, facial shields
Respiratory protective equipment	Dust masks, respirators, breathing apparatus
Hand and foot protection	Gloves, safety boots and shoes
Body protection	Safety suits, safety belts, harnesses, aprons, high visibility clothing
Protection against drowning	Lifejackets, buoyancy aids and lifebuoys
Protection against hypothermia	Immersion suits and anti-exposure suits

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