Summer school
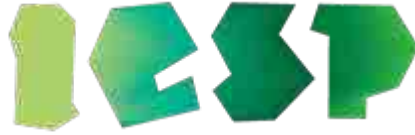
SUSTAINABLE DEVELOPMENT OF YACHTING AND CRUISE INDUSTRY

TOPIC: SAFETY AND SECURITY

Lecturer: Prof. Dr. Špiro Ivošević

Kotor, 21/7/2022

Summary:

- Introduction
- learning outcomes
- Content
- Inernational regulation
- Ship and Port Safety
- Ship and Port Security
- Risk Assesment

Learning Outcomes:

Recognized International Convention and Codes

Understud SOLAS requirements considering Safety and Security

Recognized difference between Safety and Security

Recognized Security treats

distinguish events considering Safety and Security

Review requirements for safety management systems

Analyze the ISPS requirements for personel and Companies

Understud Risk Assement procedure

Content:

International Convention and Codes

Understud SOLAS requirements considering Safety and Security

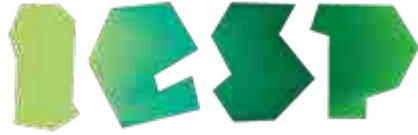Recognized difference between Safety and Security

Recognized Security treats

distinguish events considering Safety and Security

Review requirements for safety management systems

Analyze the ISPS requirements for personel and Companies

Understud Risk Assement procedure

The lectures - What is expected of you as a student?

- Don't be afraid to ask if something is unclear - No question is too stupid

- Respect the lecturer and your fellow students – Don't make unnecessary noise

- Let us know if you feel that something is uncomfortable

- Don't use MOBILE phone during the class.

- FEEL FREE TO ENJOY IN SUMMER SCHOOL IN KOTOR/MONTENEGRO.

Academic content

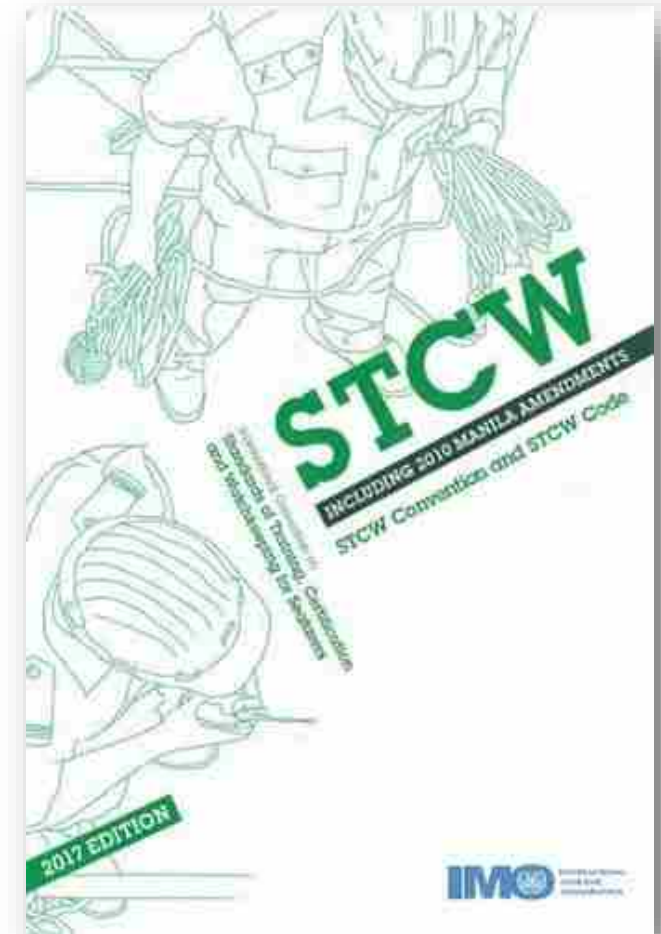- Introduction to International Conventions

- Introduction to SOLAS and relevant CODEs

- Explain difference between SAFETY AND SECURITY

- Safety in Port and Marinas

- Safety onboard
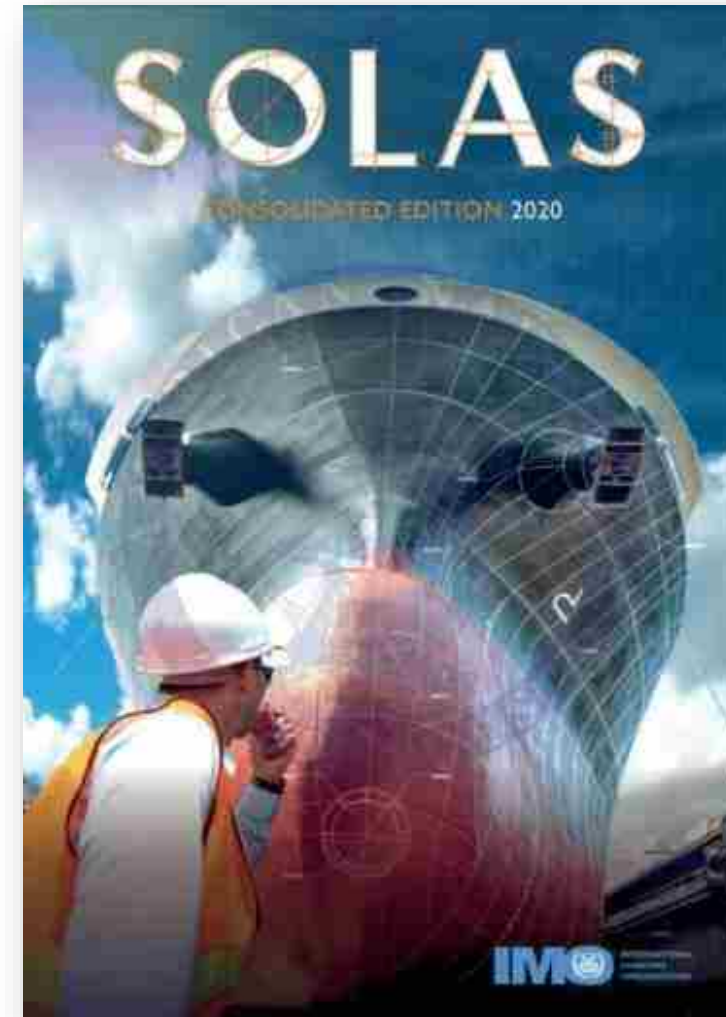
- ISPS Code (Ships and Ports)
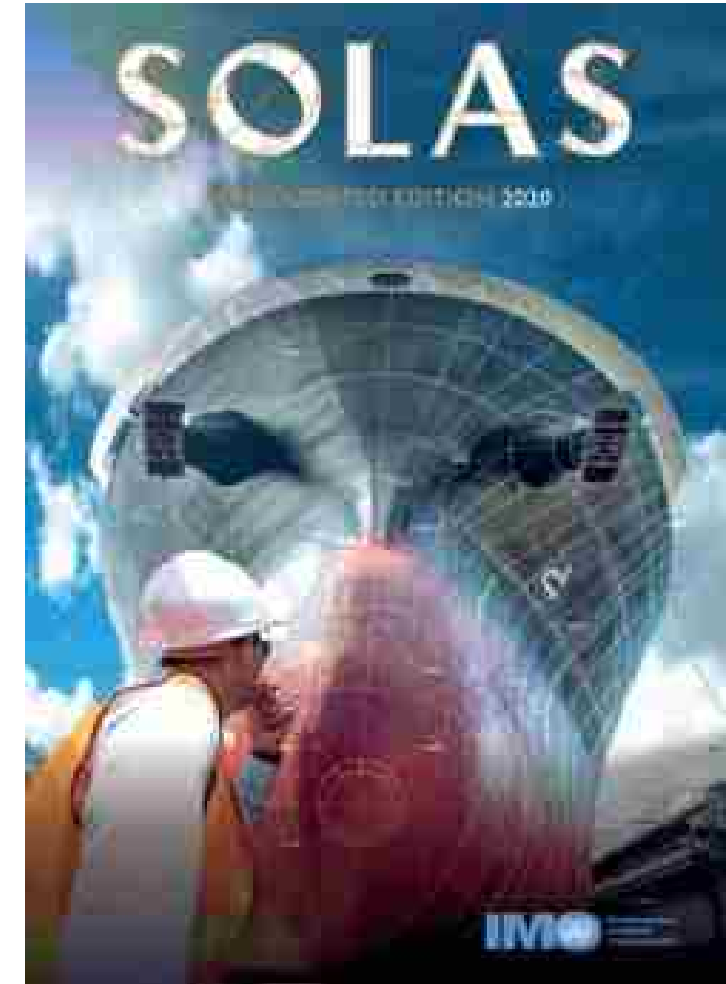
International Conventions
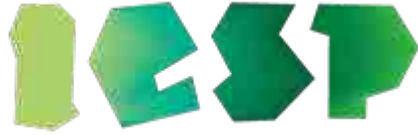
- SOLAS
- MARPOL
- STCW
- MLC
- COLREG
- TONAGE
- ....

International Convention on the Safety of Life at Sea, 1974

The convention's relevant codes

- SOLAS Convention is considered the most important of all international agreements with respect to the safety of merchant ship.

- The 1st version was adopted in 1914, the 2nd in 1929, the 3rd in 1948 and the 4th in 1960.

- The 1974 Convention has been updated and amended on several occasions.

- The main objective of SOLAS is to establish minimum requirements for: ship's construction, ship's equipment and operation of the ship. These are minimum requirements that ensure the safety of the crew and general maritime safety.

- The specific requirements are set out in the appendix consisting of 16 chapters and one appendix showing the design of the vessel certificates (templates.

- Part 2 consists of the requirements for certificates and documents to be on board and the list of IMO resolutions included in SOLAS.

SOLAS generally applies to:

- Motorized cargo vessels that go into international waters and have a BT ≥ 500

- Motorized passenger vessels that enter international waters and are certified to carry 12 passengers or more

Unless national regulations state otherwise, SOLAS does not apply to:

- Motorized cargo vessels that go into international waters and have a BT that is less than 500

- Cargo vessels that only run in national waters

- Warships

- Vessels that do not have motorized propulsion

- Fishing vessel

Chapter IX, Management System for Safe Ship Operations

- Definitions, scope of application, safety management requirements, certification, maintenance/condition and verification/control

- ISM code

- 16 overriding point that sets safety management requirements
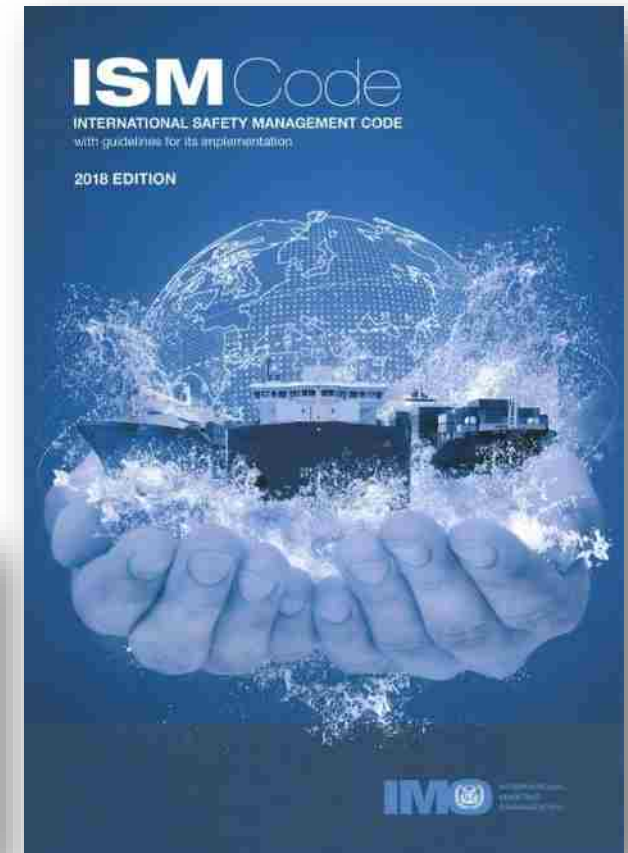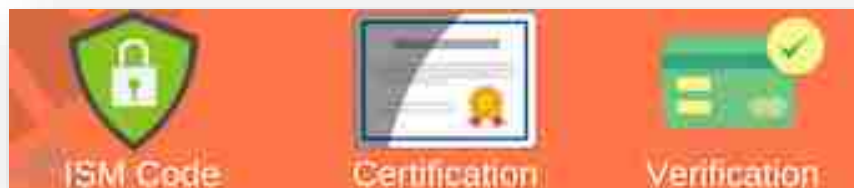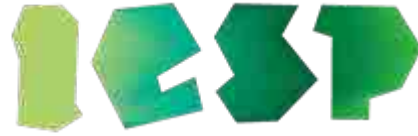
Chapter XI-1 – Special Measures to Improve Maritime Security

- Authorized organizations, more thorough inspections,

- Identification number for ships, shipping identification, requirements for port State control, logging of the ship's history ("CSR"*),

- Additional requirements for investigation of accidents at sea.

Sjøfartsdirektoratet
Norwegian Maritime Authority

NIS // NOR

APPLICATION for Continuous Synopsis Record – CSR

Dates should be in the format yyyy/mm/dd.   FOR THE SHIP WITH **IMO NUMBER:**

| #		
1	This document applies from (date):	
2	Flag State:	Norway
3	Date of registration with the Flag State:	
4	Name of the ship:	
5	Port of registration:	
6	Name of current registered owner(s) and their registered address(es):	
7	Registered owner's Identification Number	
8	If applicable, name and address(es) of current registered bareboat charterer(s):	N/A
9	Name and address of the registered Company for International Safety Management (ISM): Address(es) of its safety management activities:	
10	Company Identification Number	
11	Name of all classification societies with which the ship is classed:	
12	Name Administration/Government-/Recognized Organization which issued Document of Compliance (DOC):	
13	Name Administration/Government-Recognized Organization which issued Safety Management Certificate (SMC):	
14	Name Administration/Government-/Recognized Organization which issued International Ship Security Certificate (ISSC):	
15	Date on which the ship ceased to be registered with the State indicated in 2:	
16	Remarks	

THIS IS TO CERTIFY THAT this record is correct in all respects:

Issued by the Company or master:

Date of issue:

Signature of authorized person:

Name of authorized person:

SEND DIRECTLY TO
The Norwegian Maritime Authority, Ship Registers (Nis/Nor)
P.O. Box 73, Nygårdstangen
N-5838 BERGEN
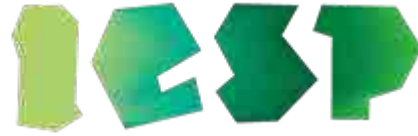
Chapter XI-2 – Special Measures to Raise Maritime "Security"

- Definition, scope of application, requirements for shipping companies and ships, "security" plan, "security" alarm system, communication, etc.

- ISPS code

- NB: ISPS will be thoroughly reviewed in separate presentations.
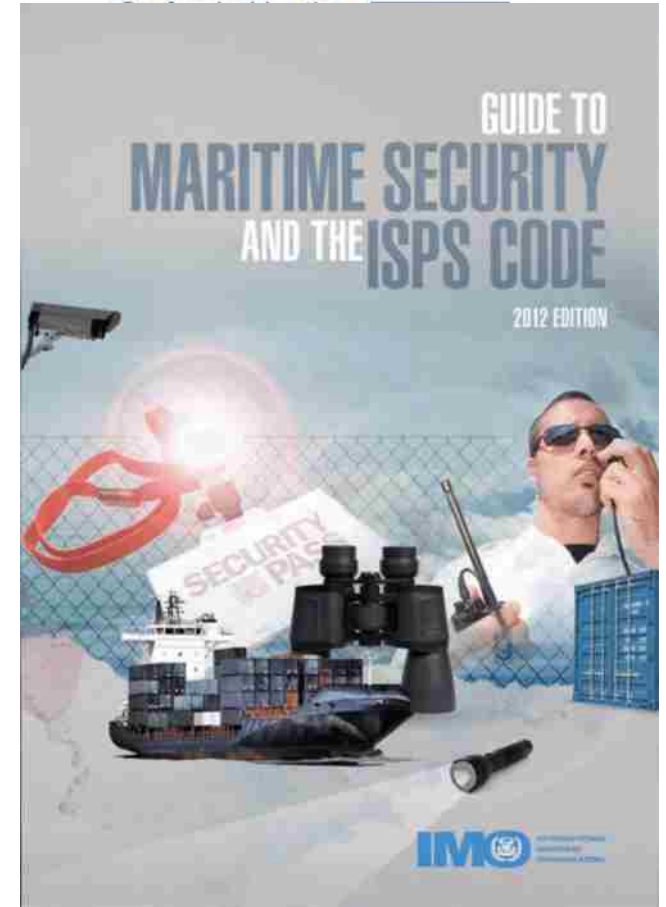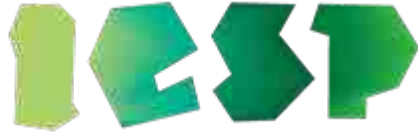
TN100119 - Sea and port operations

- ISM Code – Safety Management System

- General presentation

- The purpose of the code

- The functional requirements of the code

- Code 16 point

- Regulations on safety management system

What is safety?

- Safety can be defined as:

- The condition where the risk of injury to persons, the environment or property is so low that it can generally be accepted

- But the definition can also be defined as:

- Is a state where dangers are not to the place

- In a maritime context where there is no danger to ships, crew or the environment

Functional requirements for safety management systems (SMS)

- Safety and environmental policy
- Instructions and procedures for ensuring safe operation of ships and protection of the environment in accordance with relevant international regulations and flag state legislation
- Defined levels of government and lines of communication between and among personnel on land and on board
- Procedures for reporting accidents and deviations
- Procedures for preparation and response to emergencies
- Procedures for internal audit and management review

Policy

SPS Manuals

SPS Procedures

Work Instructions & Emergency Plans

Documentation and Forms

The requirements that will apply to vessels and shipping companies are set out in 16 main points:

1. General provisions
2. Safety and environmental policy
3. The company's responsibility and authority
4. Designated person (DPA)
5. Master's responsibility and authority
6. Resources and personnel
7. Preparation of plans for operations on board
8. Contingency
9. Reports and analyzes of deviations, accidents and dangerous incidents
10. Maintenance of ships and equipment
11. Documentation
12. Verification, review and assessment in the company
13. Points 13 - 16 of the code primarily apply to the authorities and deal with certification and control

Item 2. "Policy for safety and environmental protection"

- The company will introduce a policy for safety and environmental protection which describes how the goals set out in the ISM Code are to be achieved.

- The company must ensure that the policy is implemented and maintained at all levels in the organization, both on board and ashore

Tools for meeting the functional requirements of the ISM Code

Example electronic system that can meet the functional requirements in the ISM code:

- UniSea IMS - Procedure and document management

- UniSea Risk - Risk management

- UniSea HSE - Variance Reporting

- UniSea Audit - Audit management

- UniSea Bulletins - Information and instruction exchange

- TM Master, TMv2 - Maintenance Management

- OCS HR - Competence control and resource management

Unclear who was responsible

Emergency Response Plan

- The company shall identify possible emergencies on board, and introduce procedures for responding to them.
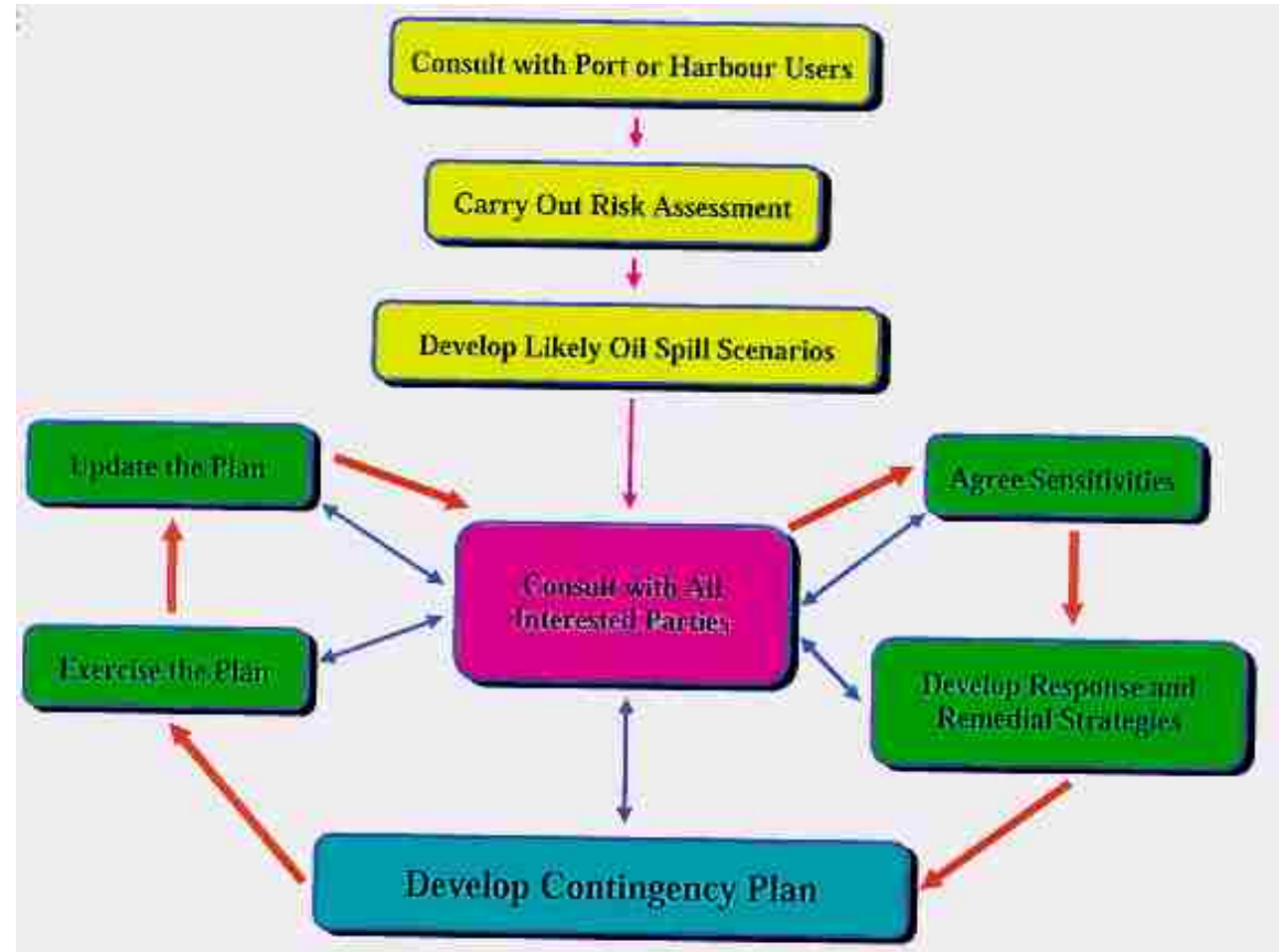
Marcus Tullius Cicero

«Cuiusvis hominis est errare,
nullius nisi insipientis in errore perseverare»

"It's human to make a mistake, but only idiots make the same mistake over and over again, time and time again."

106 - 43 BC

Almost an accident

- Almost Accident ("Near Miss"):

This type of report should be used when reporting conditions that could have led to damage to personnel, damage to property or pollution to the environment if the conditions had been a little different than if something had not been averted in tide.

the rusty lifting gear

Unsafe condition. ∘ Unsafe act ∘ Near miss ∘ Accident

Deviation

- **Non-Conformity:** Used when someone violates or does not follow laws, regulations or the company's established Safety Management Procedures.

- A deviation report can also be used if there are errors or deficiencies in the procedures, the checklists or format do not fit with reality, or they may be in conflict with the authorities' laws or regulations.

- Defects that are discovered during an audit or inspection that are related to safety, environmental prevention, quality or breaches of regulations are also reported as deviations.

- This can be:
  - CC - Condition of Class (Class Deviation)
  - CA - Condition of Authority
  - NC - ISM deviation
  - MNC - Large ISM deviations

Why do injuries occur?

- Inattention
- Distraction
- Haste and load
- Incompetence
- Doing things the wrong way
- Inadequate use of protective equipment
- Poor planning

- Equipment and tool faults
- Lack of Risk Assessment
- Weak management
- Inadequate procedures or use of checklists
- Lack of training
- Bad behavior
- Other causes
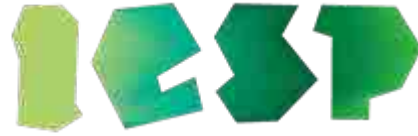
Cruise ship

- Terminals connected to large hotel facilities, good infrastructure and modern logistics on the land side

- Port stays vary depending on the size of the ships (number of passengers) and the length of the upcoming cruise

- The ships "unload" and "load" at the same quay (regulated quays) at which the ships often end and begin their cruises

- Undergoing extensive safety practices

The harbor stay in addition to the time at the quay itself

- Anchoring
- Entering
- Waiting buoys
- Channel running
- Departure

- Lock review
- Hashing between different quays/terminals
- Workshop stays
- Transit

Anchoring

- Often a ship has to anchor outside the harbour to wait for free berth, lock passage, canal passage, etc.

- This can last from a few hours to several days

- The anchorages are dedicated areas outside or within a port area that are often monitored by a VTS

Entring – "Brake water"/harbour

- Change of pilot – Havnelos

- Reports to the VTS/port guard who also in many cases also sees the ship visually when it enters

- Cooperation between pilot and VTS/traffic diversion center

Waiting buoys – Waiting area

Canal and river driving

Hashing between different quays/terminals

- When a ship visits a port, it can load and unload at several quays and/or terminals

- In some cases up to 10–20 pieces

Loading and unloading delays

Infrastructure failure

- Conditions that prevent all cargo from arriving at the port:

- Closed canals/river runs

- Road and rail failures

- Failure of barges and other means of transport in and to the port

- Bend and lift bridges that don't work

- Major damage to the dock, dolfins, etc.

Weather conditions

- Fog

- Strong winds

- Ice
- Water flow in rivers up to a river port

Accidents

- Ship collisions
- Fire and explosions
- Groundings
- Harm to people

Logistical failure

- Missorder and misunderstandings
- Booked pilot, tugboat or mooring people too late or at the wrong time
- Poor communication between ship owners, agents and ships
- Delayed loading/unloading
- Load paper errors and required loading documents
- Crew change delays
- Bad agent services
- Misunderstandings between agent and port authorities
- Misunderstandings between agent and cargo owner/terminal, etc.
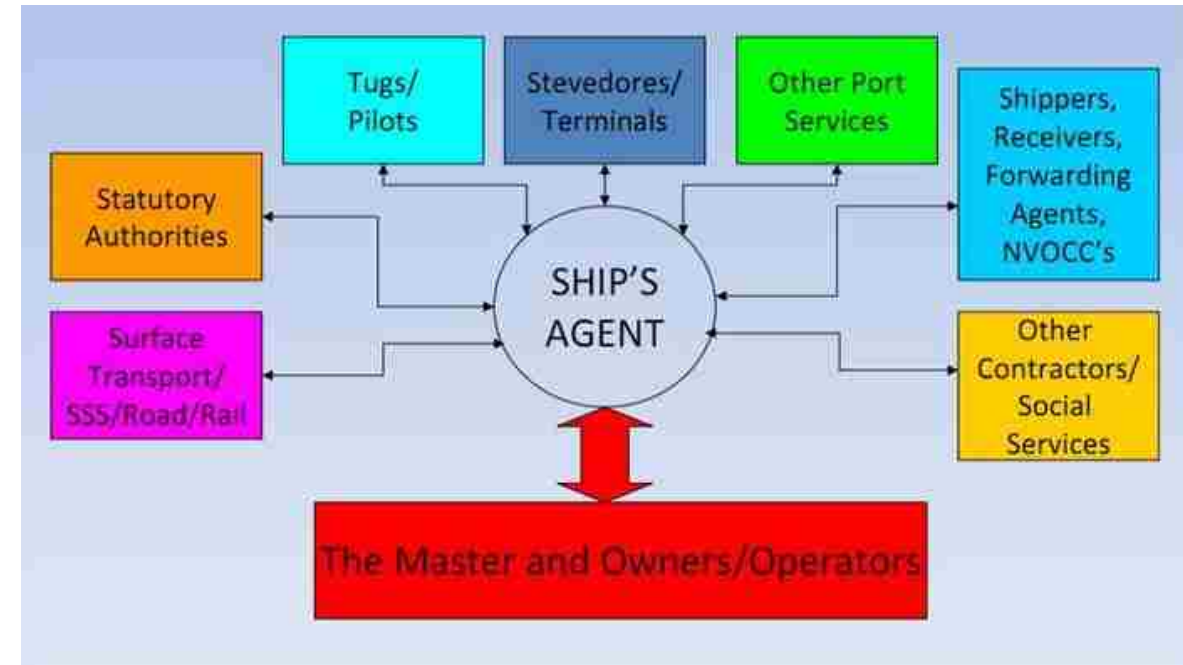
Port development

- Factors affecting port development:
- The development of the size and technology of ships
- Size of retail trade (increase/decrease)
- Efficiency and cost reduction requirements
- Modernization and requirements for technology development
- Development requirements from the areas for which the port is for – "Hinterland„
- Lack of pilot
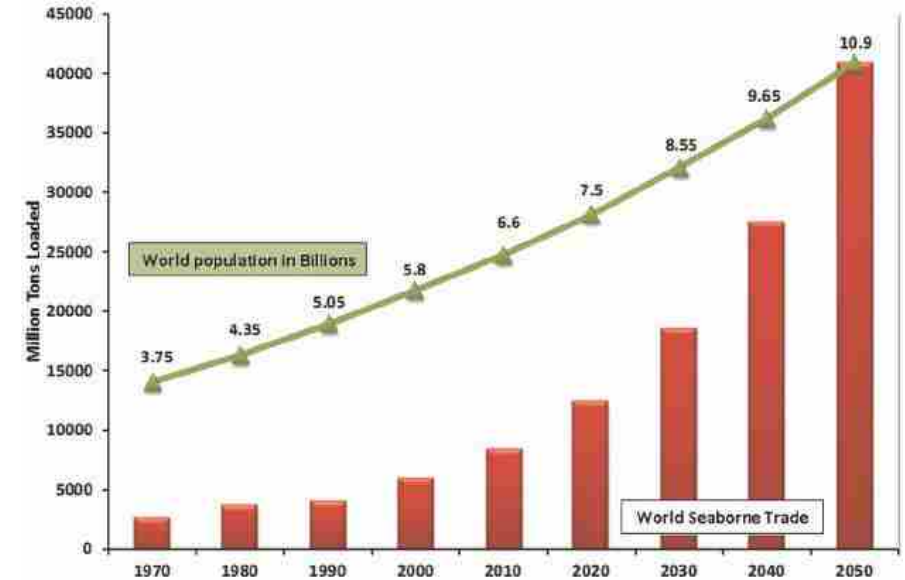
Oasis of the Seas
L: 360 B: 47 m
6295 passasjerer Levert i 2009

«Song of Norway»
L: 168 B: 24 m
724 passasjerer Levert i 1970

- Before, only "rich people" went on cruises

- Today it is common for the ordinary man in the street

- The cruise ships have become bigger and bigger and the cruises have become relatively much cheaper

2009 Oasis of the Seas 220 000 2712 Cabins GT 360 × 47 × 9,1

2006 Freedom of the Seas 158 000 1816 Cabins GT 339 × 38,60 × 8,50 m

1999 Voyager of the Seas 137 300 GT 1557 Cabins 311,12 × 38,60 × 8,60 m

1996 Grandeur of the Seas 74 000 GT 975 Cabins 279,8 × 32,20 × 7,60 m

1990 Fantasy 70 400 GT 1028 Cabins 260,8 × 31,50 × 7,80 m

1982 Song of America 37 600 GT 707 Cabins 214,51 × 28,41 × 6,80 m

1970 Song of Norway 18 400 GT 377 Cabins 168,32 × 23,96 × 6,70 m

Maintenance

- A port must renew itself to be attractive, but it must also be maintained
- This applies to:
- Quays
- Piers
- Lighthouses and brands
- Infrastructure
- Buildings
- Enclosures and fences
- Communication equipment
- Fleet of cars, equipment and tools
- Skills

SECURITY Threats

PIRATES (ROBBERIES)

TERRORISM (POLITHICAL MOTIVATION)

CRIME

SMUGGLIING (GREY ECONOMY)

STOWAWAYS (ILLEGAL MIGRATION)
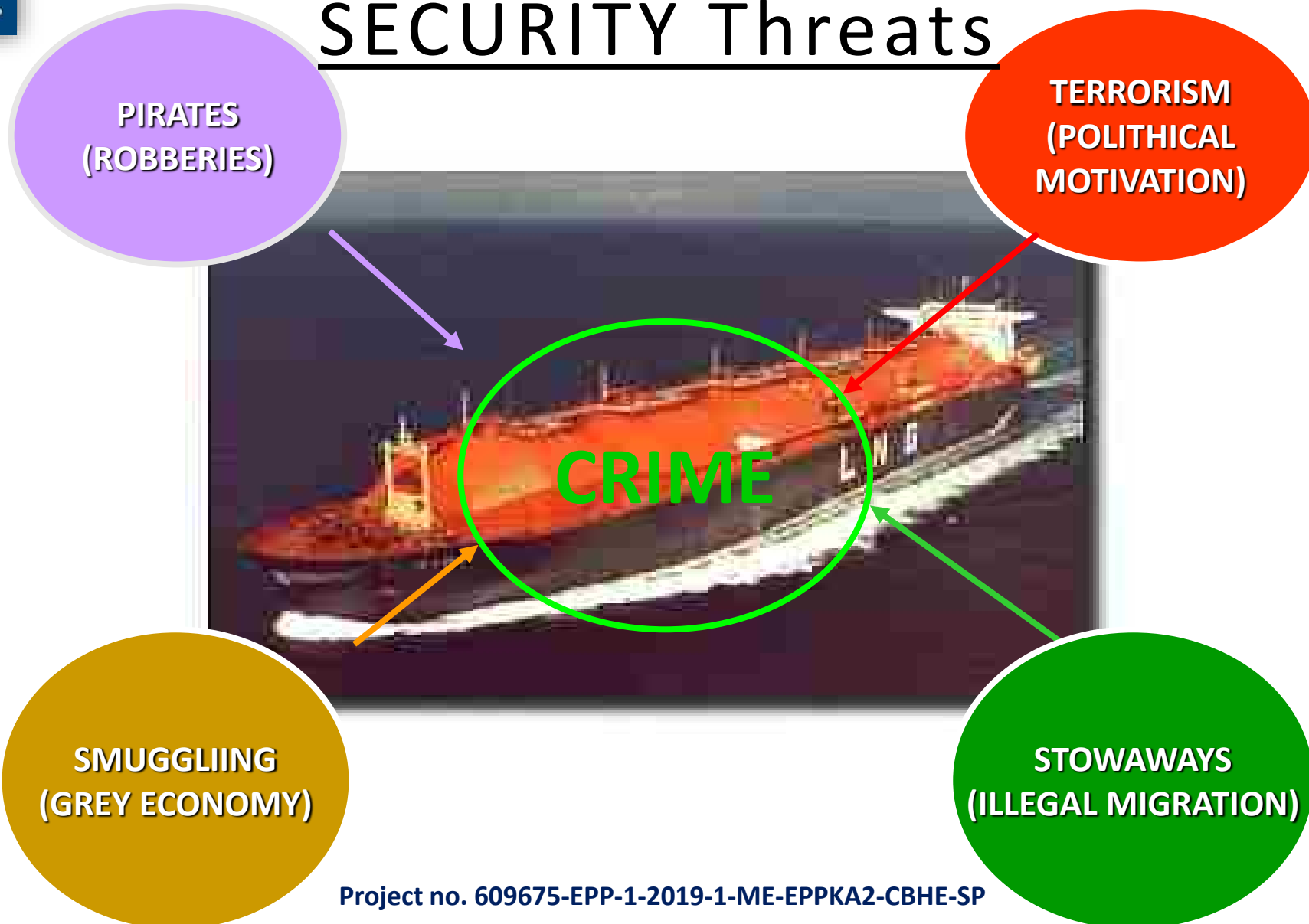
Limburg , 2002.

- The French tanker Limburg, carrying 158,000 tons of crude oil, was attacked off the coast of Yemen by a small boat carrying an explosive detonated by a suicide bomber.
- The explosive was detonated while the boat was passing by the ship, causing a large hole and a huge fire.
- One crew member of this tanker was killed.

COLOR CODED ADVISORY SYSTEM

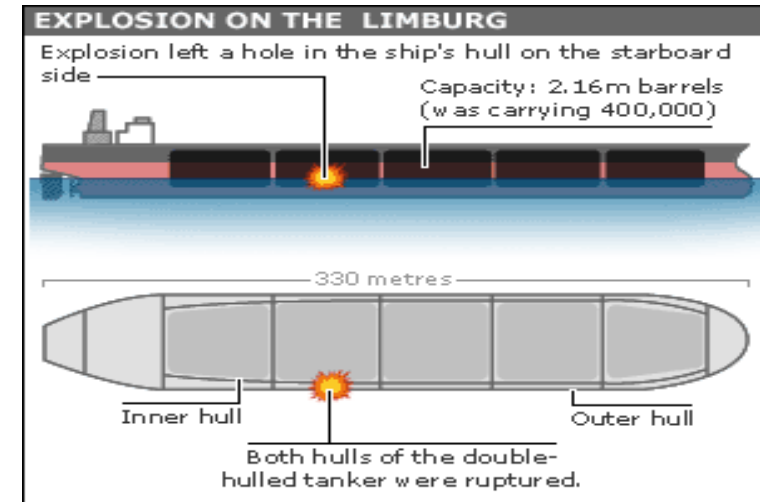- In March 2002, US National Security Advisor Tom Ridge unveiled a new color-coded advisory system for the United States.

- The purpose of this system was to create ways to avoid the risk of terrorist attacks on federal, state or local governments, as well as the entire American people.

- This coded warning system has 5 levels that are linked to the appropriate protective measure and, if activated, will trigger specific actions by federal agencies and local forces.

SEVERE

HIGH

ELEVATED

GUARDED

LOW

RISK LEVELS

THE GOALS OF PIRATERY

Criminal goals:

- Robberies of money and valuable goods (even the ship)
- Taking over of the cargo, supplies and equipment.

Political goals:

- Hostages
- Attracting attention from domestic and foreign media

Stowaways:

- Very common danger on merchant ships.
- Special International Convention Relates to Stowaways/Illegal Immigrants.

SMUGGLING

- The sea route offers many opportunities for smuggling.
- One of the activities that brings great profit
- Interest groups (organizations) were created that evade legal regulations in various ways and smuggle various types of goods.

The most commonly smuggled are:
- drugs (in different forms),
- weapons,
- explosive substances,
- counterfeit money,
- products of the chemical industry (medicines, chemicals, etc.),
- people (sex trafficking).

PROFILING OF SUSPICIOUS PERSONS
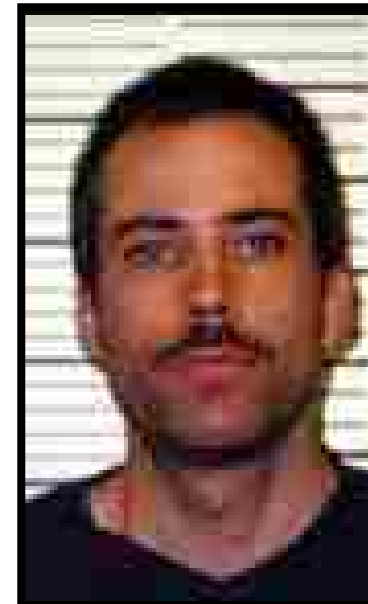
Who from those persons is trustworthy?
Who from those persons is danegerous?

Who is trustworthy?

Bomber from Oklahoma City. 168 victims.

Ola Skauge Loss Prevention Manager in Norwegian Hull Club.

Kaczynski–16 bomb attacks from May 1978 to April 1995.
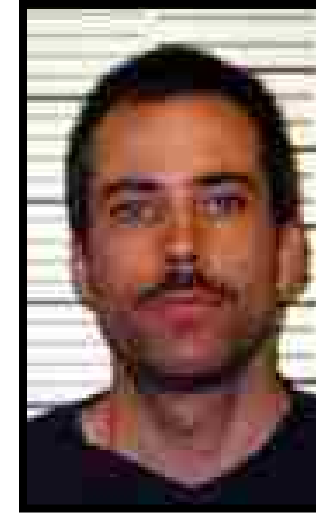
Eric Robert Rudolf- July 27th 1996, explosion in Atlanta's Centennial Olympic Park. 1 dead and 111 injured persons.

Co-funded by the
Erasmus+ Programme
of the European Union

GOALS OF ISPS CODE

- Establishment of certain international frameworks, i.e. standards in the detection and prevention of potential security threats to ships and ports in international traffic.

- Establishment of respective rules and responsibilities of all participants in maritime traffic, in order to achieve the necessary safety both at the national and international level.

Who has to comply with the ISPS Code?

- Contracting Goverments
- Government Agencies
- Local Administration

- Shipping industry
- Port industry
- WCO/ILO

SECURITY LEVELS

ISPS Code determins 3 security levels of the ship/Port Facility.

SECURITY LEVEL I
A DEGREE THAT IS PERMANENTLY IN FORCE AND INCLUDES THE APPLICATION OF MINIMUMS SECURITY MEASURES

SECURITY LEVEL II
THE DEGREE TO WHICH APPROPRIATE ADDITIONAL SECURITY MEASURES ARE TAKEN SPECIFIC TIME, AS A RESULT OF INCREASED SECURITY RISK.

SECURITY LEVEL III
THE DEGREE TO WHICH FURTHER SPECIAL SECURITY MEASURES ARE APPLIED TO A SPECIFIC TIME, WHEN A SECURITY INCIDENT IS LIKELY OR ALMOST INEVITABLE, ALTHOUGH IT IS DIFFICULT TO DETERMINE THE EXACT TARGET OF THE ATTACK.

Functional structure of ISPS Code

Company Security Officer

Local Administrator

Ship Security Officer

Port Facility Security Plan

Ship Security Plan

Adjustment of Security level

Managing different degrees of security

Requirement for Safety Declaration

Safety assesment of the Port Facility

Safety assessment of the ship

Flag State

Port Facility Security Officer

Co-funded by the Erasmus+ Programme of the European Union

ISPS Code - the obligation of the company and the ship is to have:

1. Company Security Officer (CSO)

2. Ship Security Officer (SSO)

3. Ship Security Plan (SSP)

4. Additional equipment and means for monitoring

Port Facility Security Plan (PFSP)

- A plan that should ensure the implementation of established security measures in order to protect port facilities, ships, personnel, cargo, transport cargo devices of the port and ships inside the port from possible incidents that could endanger their safety.

- It should be approved by the Government signatory to the code.
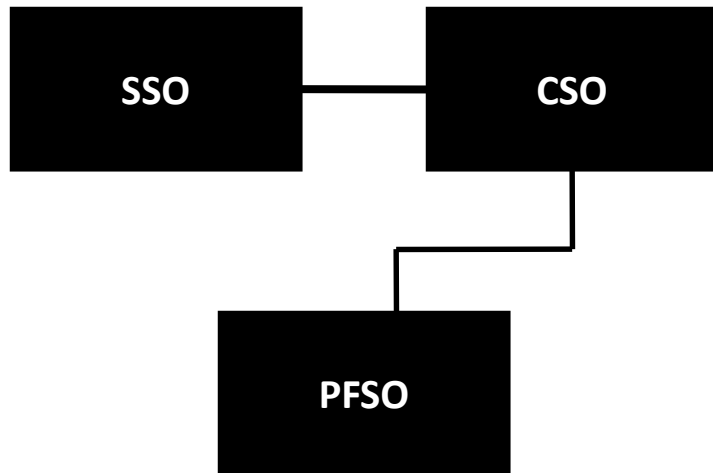
Port Facility Security Officer (PFSO)

SSO	CSO

PFSO

PFSO is a person authorized for:
- Preparation, implementation, necessary revisions and regular maintenance of PFSP,
- Maintaining the necessary contacts with SSO and CSO during the ship's stay in port.

IMPLEMENTATION OF THE SHIP SECURITY PLAN

The implementation of the security plan can be carried out in several stages.

Implementation of the security plan - Part I

The CSO should obtain a ship's general plan to record the information required to conduct a ship's safety assessment, which includes:

- Access to the ship
- Restricted access areas on board
- Directions for leaving the ship and evacuation
- Existing security measures.

Instructions for restricted access areas

The CSO should provide and record information regarding the location of areas that should have restricted access, such as the navigation bridge, machinery spaces and other control stations as defined in SOLAS Chapter II-2 et seq.

Colour		Description
Yellow		Restricted Areas
Red		Access to Restricted Areas
Blue		Access to accommodation
Green		Authorised access to ship
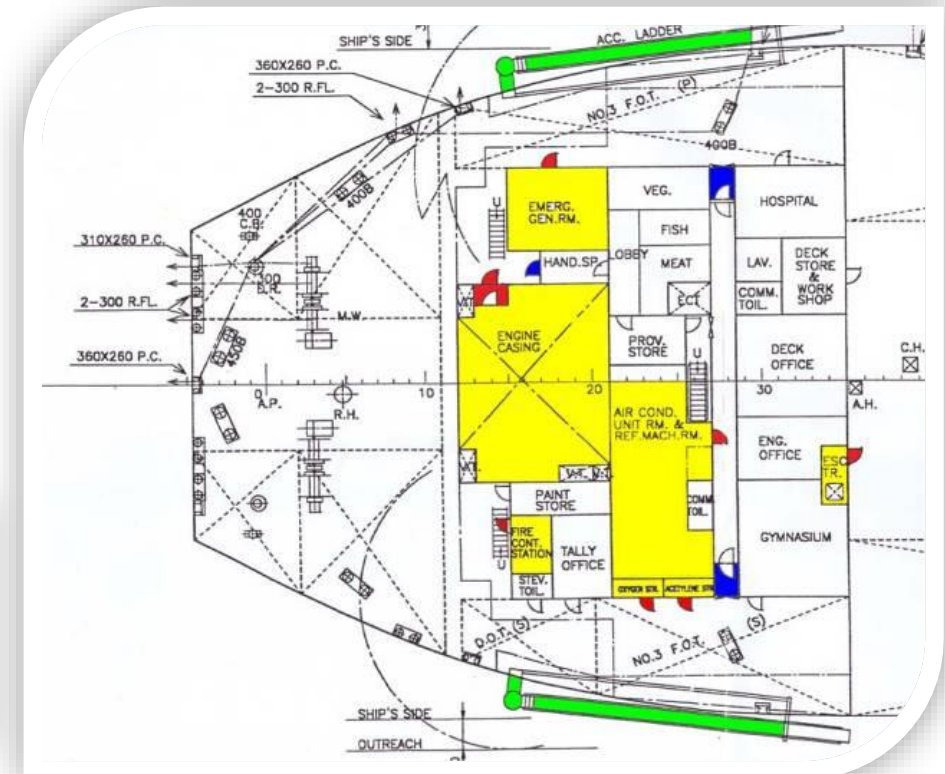
Implementation of the security plan - Threat assessment Part II

- A risk assessment is a process that identifies weaknesses in the ship's physical structure, personnel protection systems, processes or other areas that may lead to security breaches and may result in options to eliminate or mitigate the ship's weaknesses.

- SSA should consider all possible threats, which may include the following types of security incidents:
    - damage or destruction of a ship or port,
    - hijacking or seizure of a ship or persons on board,
    - smuggling of weapons or equipment, including weapons of mass destruction,
    - attacks from the sea while the ship is at berth and
    - attacks on a ship while underway.

Impact assessment elements

Death and injuries	The potential number of lives that can be lost or injured as a result of an attack
Economic impact	Economic consequences due to the attack scenario
Environmental impact	Impact on the environment due to the attack scenario

Ratings intended for relative evaluations depending on performance

3	Catastrophic	Numerous losses of life or injuries, large national economic impact, complete destruction of the surrounding ecosystem
2	Significant	Multiple losses of life or injuries, large regional economic impact, long-term damage to part of the ecosystem
1	Moderate	No loss of life, minimal economic impact, little environmental damage
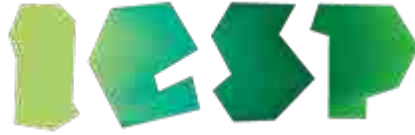
Implementation of the security plan - Vulnerability assessment Part III

Each scenario should be evaluated in relation to the ship's vulnerability to attack.

The four elements that affect a ship's vulnerability are:
- Availability
- Access
- Atructural safety and
- Strength of the ship.

Implementation of the security plan - Mitigation Part IV

- The terms used in the mitigation strategy are:

"Mitigation" means a strategy where security safeguards and procedures are developed to reduce the risk of a hazard.

"Consideration" means that the scenario should be considered and that mitigation strategies will be implemented on a case-by-case basis.

"Document" means that the scenario may not need to be mitigated, so it should only be documented.

Vulnerability & Consequence Matrix

		Total vulnerability Score		
		2	3-4	5-6
	3	Consider	Mitigate	Mitigate
Consequence Score	2	Document	Consider	Mitigate
	1	Document	Document	Consider

- The true value of these assessments is realized when the ship owner and/or operator determines which scenario requires mitigation and when mitigation strategies (protection measures) should be implemented to reduce vulnerability.
- The overall desire to reduce risk is linked to the identified scenarios.
- In general, it is easier to reduce vulnerability through the use of mitigation strategies than to reduce the consequences of ship security threats.

Implementation of the security plan - On-site inspections Part V

- On-site safety inspections form an integral part of the ship's safety assessment.
- Prior to conducting this inspection, information is collected on board regarding access points, restricted areas, evacuation routes and existing security measures.
- During these inspections, all the listed information on the ship is presented and precise information is obtained related to all security measures that have been implemented for all three security levels of ISPS Code protection.
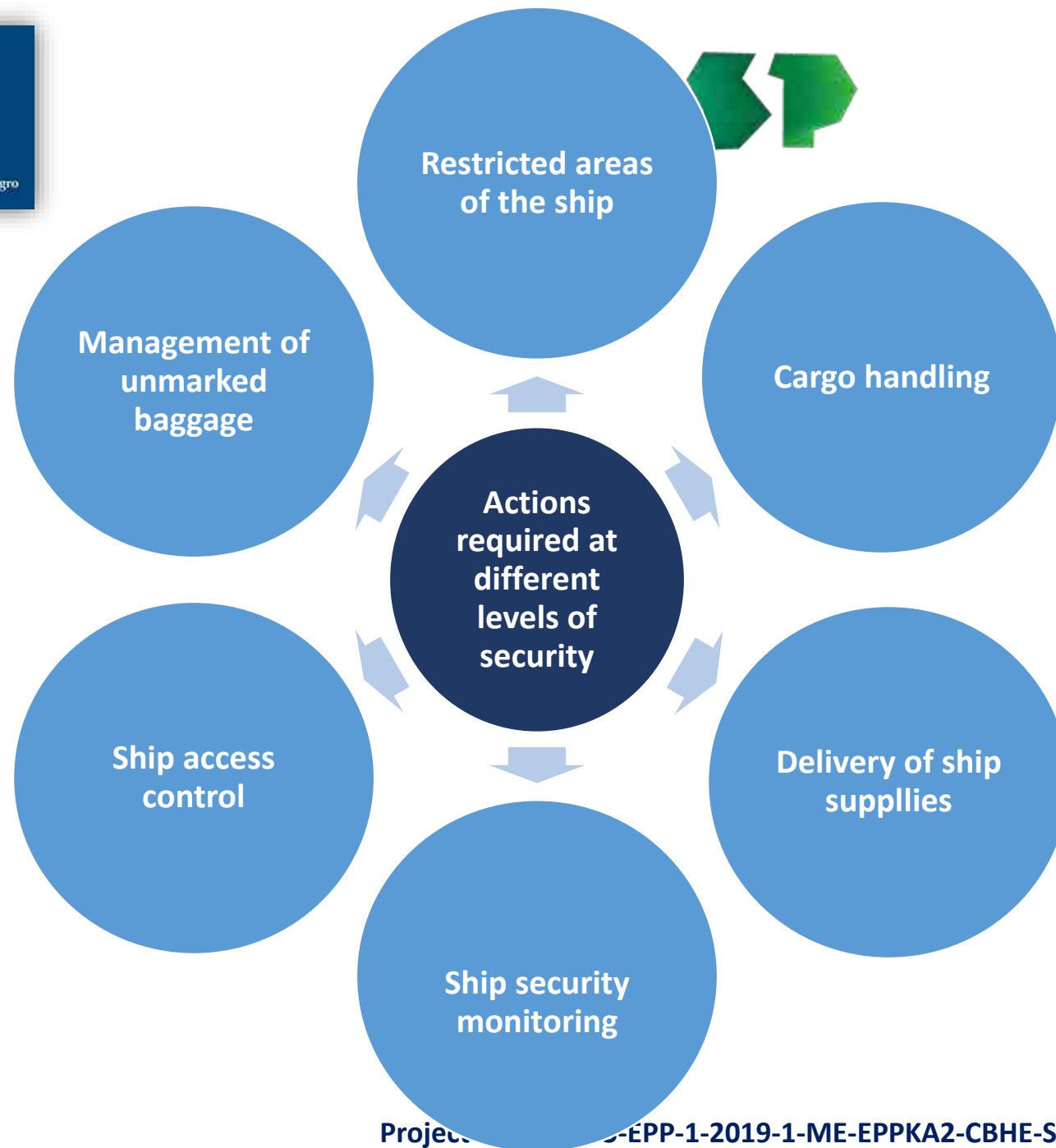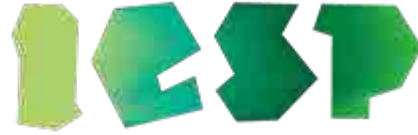
An example of the Declaration of Security

Declaration of Security is valid	From	To	Reason

1 Name of Ship	Name of Port	Other Ship (s)
IMO No	Owners Address	IMO No
Port of Registry		Port of Registry
	Tel No	
Responsible Company	Mobile No	Responsible Company
24 hr Contact No	Fax No E-Mail	24 hr Contact No
Security Level	Security Level	Security Level

Activity	PFSO Port	SSO Ship
Ensuring the performance of all security duties		
Monitoring restricted areas to ensure that only authorized personnel have access		
Controlling access to the port facility		
Controlling access to the ship		
Monitoring of the port facility, including berthing areas and areas surrounding the ship		
Handling of cargo		
Delivery of ship's stores		
Handling unaccompanied baggage		
Controlling the embarkation of persons and their effects		
Ensuring that security communication is readily available between the ship and the port facility		

1.1.1   SIGNATURES AND CONTACT DETAILS

	The Ship	Port Facility	Other Ships
Name			
Title			
Signature			
Date			
Tel No			
Radio Channel			

CONCEPT OF THE RISK

- Concept of the risk is a central topic in any safety related discussion.

- R = P * C

- Goals before accident /loss occurs

- Goals after accident/loss occurs

Risk management phases

1. Establishing the context of risk management

2. Risk identification

3. Risk analysis

4. Risk assessment

5. Risk assessment

6. Consideration of alternatives and selection of the most appropriate instrument for risk management

7. Implementation of the decision

8. Assessment and re-examination

Risk identification

Before any work related to risk, the company must be aware of all those risks that surround it and that may affect the realization of its goals.

Risk analysis

- Risk identification is followed by risk analysis, as a procedure for calculating risks for previously identified hazards.

- Preliminary hazard analysis,
- Hazard and operability study,
- Failure mode, performance and criticality analysis,
- Fault tree analysis,
- Event tree analysis.

Risk assesment

- Risk measurement is the step that follows after the risks have been identified and analyzed, in this step it is actually necessary to assess the frequency and intensity of the risk.

- Basically, risk is characterized by two key aspects:
1. uncertainty
2. side effect (loss).

Probability

	P1	P2	P3
I3	1	2	3
I2	2	4	6
I1	3	6	9

Impact

Risk level

1-2	3-4	6-9
Low	Medium	High

- The intensity of the risk is determined based on:
1. risk impact (I1 – low impact; I2 – medium impact; I3 – severe impact)
2. probability of occurrence (P1 – low probability; P2 – medium; P3 – high)

$$R = I * P$$

Consideration of alternatives and selection of instruments for risk management

- Risk avoidance means that a certain exposure to losses is never undertaken or an already established exposure to losses is abandoned.
- Loss prevention refers to procedures (measures) that reduce the frequency of a certain loss.
- Continuous practice in the application of modern methods of prevention and preventive engineering is the most effective way to reduce risk.
- Risk retention implies that the company retains part or all of the risk.
- Examples of unsecured transfers include contracts, leasing and contracts without damages.
- Self-insurance has systemic value because it is appropriate for loss exposures that have a low probability of loss, yet a high loss severity.
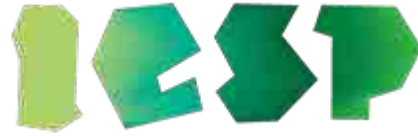
RISK ASSESSMENT MODEL FROM WASTEWATER POLLUTION FROM SHIPPING FACILITIES FOR THE PORT OF KOTOR

Operational risk of the Port of Kotor

Value	Risk	Description
3	High	The probability of a risky event occurring is high.
2	Medium	There is a certain probability of the occurrence of a risky event.
1	Low	The probability of the risk event occurring is unlikely.

Value	Impact	Description
3	Severe	Potential impact on the company's economy (≥3,000.00 €). The consequences of the realization of a risky event can lead to the cessation of the company's work or to a significant extent affect the continuity of the company's work.
2	Medium	Potential impact on the company's economy (>1,000.00 ≤€3,000.00). The consequences of the occurrence of a risky event have a destructive effect on the company's goals.
1	Small	Potential impact on the company's economy (≤1,000.00 €). The consequences of the occurrence of a risky event affect frequent work activities that are carried out within the company at a minor level.

Matrix of the third level The risk of sea pollution with waste water from vessels		Matrix of the first level in terms of the degree of regulation and rules, and equipment of the ship (risk index of pollution sources)					
		1	2	3	4	6	9
Matrix of the second level in terms of the degree of sensitivity of the location and the degree of impact on the location (location vulnerability index)	1	1	2	3	4	6	9
	2	2	4	6	8	12	18
	3	3	6	9	12	18	27
	4	4	8	12	16	24	36
	6	6	12	18	24	36	54
	9	9	18	27	36	54	81
Low risk level		Medium risk level			High risk level		
1 – 12		13 – 27			28 – 81		

Thank you for your attention!