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Bachelor of Maritime Management

Safety Management and Information and Communication Technology (ICT)

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06. November 2019

Link to Kahoot

https://create.kahoot.it/details/safety-management-and-ict/70d612cb-e370-4046-867f-953c5107a7a3

Kahoot Questions:

› What IMO Code Provides an International Standard for the Safe Management and Operation of Ships
  › ISM Code

› Which Convention is the ISM Code a Part of?
  › SOLAS

General

› SOLAS Chapter IX – Management for the safe operation of ships

   › "The company and the ship shall comply with the requirements of the International Safety Management Code"

› International Safety Management Code = ISM Code

   › International standard for the safe management and operation of ships and for pollution prevention

   › Requires the development, implementation and maintenance of a Safety Management System (SMS)

Kahoot Questions:

› The SMS is documented on board in form of a Safety Management Manual (SMM)
  › True

ISM Code Overview

- › ISM Code Objectives

    - › Provide for safe practices in ship operation and a safe working environment
    - › Assess all identified risks to ships, personnel and the environment
        - › Establish appropriate safeguards
    - › Emergency preparedness
    - › Continual improvement
    - › Compliance with mandatory rules

- › ISM Code is all about the Company

    - › "The company should"

        - › Define and document the responsibilities and authorities of the persons involved in work
        - › Provide support and resources to the persons to ensure functions are carried out effectively

Kahoot Questions:

› The Master's Review Serves to Ensure Continual Improvement

    › True

ISM Code Contents

› Designated Person
  › Ensures safe operation of each ship
  › Provides a link between ship and company
  › Has direct access to highest level of management
› Audits
  › Internal & External
  › Observation
    › Statement of fact made during an audit
    › "Two A/E critical spare parts were not on board as these were recently consumed. The requisition for same was in place."

› Audits
  › Non-Conformity
    › A specific requirement was not fulfilled
    › "Two A/E critical spare parts were not on board as these were recently consumed. The requisition for same was not in place."
  › Major Non-Conformity
    › Deviation that poses a serious threat which requires immediate corrective action
    › Lack of systematic implementation of the ISM code

Kahoot Questions:

› What is this: "Ship's departure operations at the last port were not carried out as per the Procedures"

  › Non-Conformity

ISM Code Documentation

› Document of Compliance (DoC)

  › Document issued to a **Company** which complies with the requirements of the ISM Code

› Safety Management Certificate (SMC)

  › Document issued to a **ship** which signifies that the company and the shipboard management operate in accordance with the approved safety management system

› Validity of these certificates should not exceed **five** years

  › Intermediate verifications

    › DoC = Every year

    › SMC = One between second and third year

Kahoot Questions:

› It is Strictly Defined How the ISM Code Objectives Are to Be Implemented in the SMS

    › False

Implementing the ISM Code Objectives

› **Classical Risk Management**
  › Reduce Uncertainty
  › Implement similar, repetitive and restricted behaviour

› Examples
  › Instructions
  › Procedures
  › Checklists

› Leads to limited opportunities to experiment and find innovative and possibly safer solutions

› **High Reliability Organizations (HRO) & Ultra-Resilient Systems**
  › Maintain or even increase uncertainty
  › Decentralization of decision making
    › Empowered local agents
  › Ensure flexibility

› May result in new ways of conducting operations

› Examples
  › Nuclear Power Plants
  › Combat Operations

Kahoot Questions:

› The Document of Compliance (DoC) is issued to
  › The Company

ISM Code and Cyber Risks

› ISM Code Objectives: "Assess all identified risks to ships"

  › Traditional focus on physical domain

  › Greater reliance on digitization creates an increasing need for cyber risk management

  › Cyber security will be formalized in Chapter IX of SOLAS as of **January 1st 2021**

› Cyber risks are created by interconnecting and networking shipboard systems such as

  › Bridge systems

  › Cargo handling and management systems

  › Propulsion and machinery management and power control systems

  › Access control systems

  › Passenger servicing and management systems

  › Passenger facing public networks

  › Administrative and crew welfare systems, and

  › Communication systems

Kahoot Questions:

› Cyber Threats are Presented by

　› Both Malicious and Benign Actions

Cyber Risk Management

Identification of Cyber Related Risk

Analysis and Assessment

Communication

Dealing with Risk
- Accept
- Avoid
- Transfer
- Mitigate to Acceptable Level

Kahoot Questions:

› Is the Below Statement True or False?

> • Cyber safety is concerned with the protection of IT, OT, information and data from unauthorised access, manipulation and disruption.
> • Cyber security covers the risks from the loss of availability or integrity of safety critical data and OT.

   › False

› Correct Statement:

> • Cyber security is concerned with the protection of IT, OT, information and data from unauthorised access, manipulation and disruption.
> • Cyber safety covers the risks from the loss of availability or integrity of safety critical data and OT.

Cyber Risk Assessment

› Risk Assessment
1. Preparation
    1. HAZID: Hazard Identification
        › List all potential hazards and potentially endangered systems
    2. RESID: Resource Identification
        › Competence list of potential internal or external resources
    3. TOP: Potential Safeguards
        › Technical, Organisational, Personal
2. Assessment

› Four general cyber security areas
1. IT: Information technology and networks
    › Office PC's
    › WLAN / LAN
2. OT: Operational technology – System installation
    › GNSS
    › Engine Control
3. IF: Interface IT & OT
4. ACP: Access Points
    › USB
    › DVD/CD ROM

Kahoot Questions:

› Risk Assessment

    › Risk = Likelihood x Severity

Safeguards

› Result of the risk assessment = Identification of necessary safeguards

› Safeguards are sorted in a hierarchy
  › **(T)** Technical
  › **(O)** Organizational
  › **(P)** Personal

› Communication of safeguards by inclusion in SMS
  › In case of confidentiality
    › Ship Security Plan (SSP)

› **IPDRR Check:** Are the measures covering the following aspects
  › **I**dentify
    › Identification of hazards and critical systems
  › **P**rotect
    › Protection against attacks
  › **D**etect
    › Identification of an attack
  › **R**espond
    › Measures to respond to an attack
  › **R**estore
    › Measures to be done after an attack

Kahoot Questions:

› Password Policy, Assignment of Access Rights & Designation of IT Expert are
  › Organisational Safeguards

› Firewall, USB lock & Network Segmentation are
  › Technical Safeguards

› Familiarisation, Transfer of Information & Disciplinary Measures are
  › Personal Safeguards

General Cyber Security Statements

1. The ultimate responsibility in cyber security remains with the top management
2. The captain will receive qualified land-based support to fulfil his SMS tasks
3. Crew members and office staff receive a familiarisation in the company's SMS cyber security activities
   - Familiarisation, instruction and training measures are regularly recurring
   - SMS contains a training and qualification plan
     - Not everyone has to know everything

4. Contingency plans are regularly practiced through exercises
5. Incidents, accidents, near-misses and other relevant occurrences are reported
   - Continual improvement
6. Planned Maintenance System (PMS) monitors and documents measures such as software updates
7. Cyber security is undergoing continuous and major changes
   - One-time setup and implementation is insufficient

Kahoot Questions:

› ## What Kind of Safeguard Has Been Applied Here
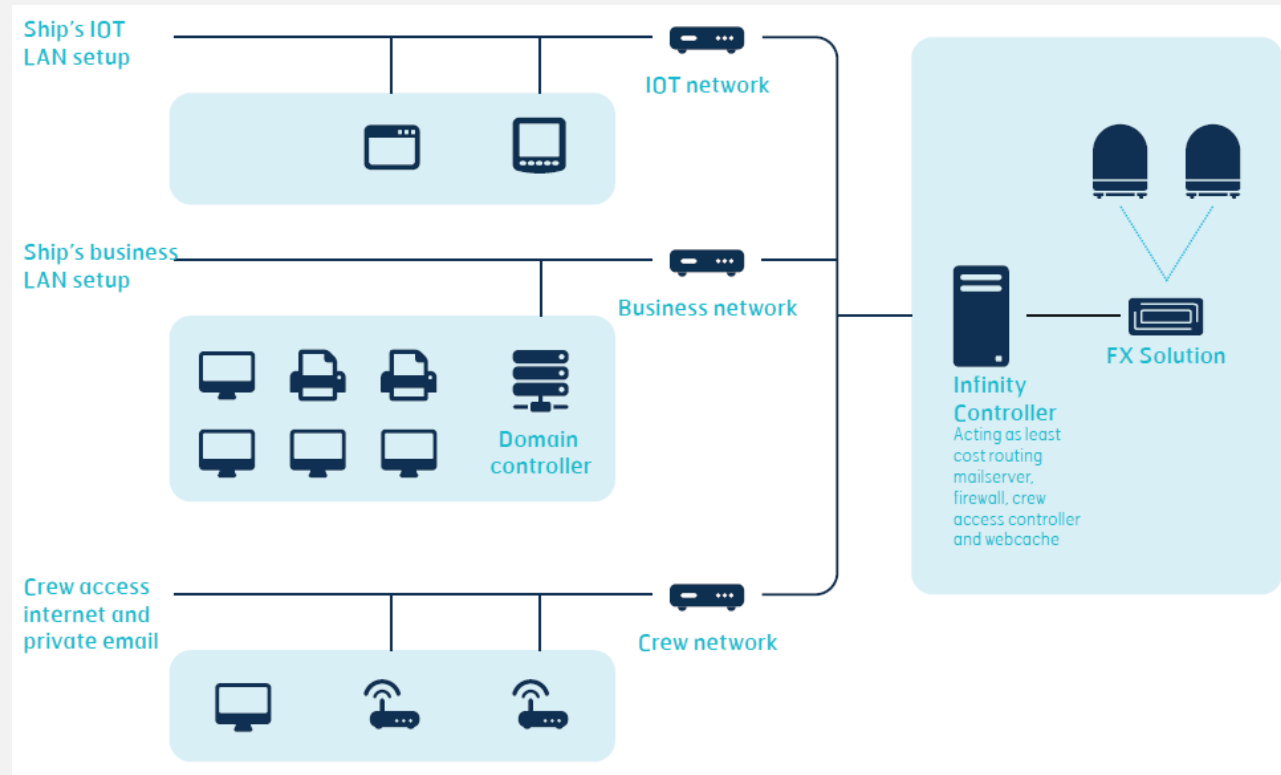
› ## Network Segmentation

Kahoot Questions:

› The Ultimate Responsibility of Cyber Security lies with

  › The Top Management

Sources

› Lim, R. B. H. (2019). *Best Practice Information and Communications Technology (ICT) Recommendations*. Singapore: Inmarsat Maritime.

› International Maritime Organization. ISM Code: International Safety Management Code with Guidelines for its Implementation (2018). Croydon.

› SOLAS. (2014). London: International Maritime Organization.

› Lützhöft, M. & Oltedal, H. A. (2018). *Managing Maritime Safety*. Routledge.

› Myseatime. (n.d.). 7 important elements of ISM Code every seafarer must know about. Retrieved November 4, 2019, from https://www.myseatime.com/blog/detail/7-important-elements-of-ism-code-every-seafarer-must-know-about.

› Deutsche Flagge (2018). *ISM Cyber Security*. Retrieved from https://www.deutsche-flagge.de/de/redaktion/dokumente/ism-rundschreiben/circ2018_4_2.pdf

› BIMCO, CLIA, ICS, INTERCARGO, INTERMANAGER, INTERTANKO, IUMI, OCIMF and WORLD SHIPPING COUNCIL. (2018). *The Guidelines on Cyber Security Onboard Ships*. *The Guidelines on Cyber Security Onboard Ships*. Retrieved from https://www.ics-shipping.org/docs/default-source/resources/safety-security-and-operations/guidelines-on-cyber-security-onboard-ships.pdf?sfvrsn=20

Sources

› Safety Management (ISM). (n.d.). Retrieved November 4, 2019, from https://www.deutsche-flagge.de/en/safety-and-security/ism.

› Morphy. (n.d.). Risk Assessment. Retrieved November 4, 2019, from https://www.stakeholdermap.com/risk/risk-assessment.html.

› ClassNK. (2019). *Handbook for ISM Audits* . *Handbook for ISM Audits* . Retrieved from https://www.classnk.or.jp/hp/pdf/activities/statutory/ism/Hnd-BK/handbook1_e.pdf

› Rancyte, J. (2019, October 22). Cyber Security – are you prepared? Retrieved November 4, 2019, from https://www.seagull.no/newsroom/stories/ArtMID/1039/ArticleID/2379/Cyber-Security-–-are-you-prepared.

› International Maritime Organization. (2017). *Guidelines on Maritime Cyber Risk Management*. *Guidelines on Maritime Cyber Risk Management*. Retrieved from http://www.imo.org/en/OurWork/Security/Guide_to_Maritime_Security/Documents/MSC-FAL.1-Circ.3 - Guidelines On Maritime Cyber Risk Management (Secretariat).pdf

› International Maritime Organization. (2017). *Maritime Cyber Risk Management in Safety Management Systems*. *Maritime Cyber Risk Management in Safety Management Systems*. Retrieved from http://www.imo.org/en/OurWork/Security/Guide_to_Maritime_Security/Documents/Resolution MSC.428(98).pdf