# OPTIMISM – ONLINE PROGRAMME FOR TRAINING ON INTERNATIONAL MANAGEMENT OF ISM CODE


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**Summary**

The International Maritime Organization (IMO)'s Guidelines on Management for the Safe Operation of Ships and for Pollution Prevention, known as the International Safety Management (ISM) Code, became mandatory in 1998.

The development of the ISM Code was prompted by several high-profile maritime accidents in the 1980s, most notably the capsizing of the Herald of Free Enterprise, a roll-on/roll-off passenger ferry, at Zeebrugge in March 1987. This tragic incident resulted in the loss of 193 lives out of the 539 passengers and crew on board and highlighted serious shortcomings in safety management and operational oversight.

Twenty-five years later—after five amendments and several key provisions introduced under SOLAS Chapter IX relating to the ISM Code—the OPTIMISM project (Online Programme for Training on International Management of the ISM Code) was launched. This initiative is led by five European organisations with support from the European Commission.

The primary aim of the OPTIMISM project is to evaluate the effectiveness of the ISM Code and its associated measures in improving safety and operational standards across the shipping industry, and to recommend enhancements where needed.

Running from September 2023 to August 2026, the project will deliver two major outcomes: (1) a comprehensive report on the current state of ISM Code implementation in the maritime sector, along with evidence-based recommendations for improvements; and (2) a fully developed, competence-based online training programme. This course will focus on the principles and practical application of the ISM Code and will include a novel assessment system featuring self-evaluation tools, written assignments, and an oral examination component.

**Key words: ISM Code, Maritime Safety, Marine Environment, learning from Accidents, Audits and Inspections**

## 1. INTRODUCTION

International Safety Management Code (ISM) should be familiar to all mariners around the world. The ISM Code consist of 12 core elements and provides guidance on verification and certification processes, The purpose of ISM Code is to ensure the safety at sea, to prevent human injury or loss of life, to ensure marine environment protection and damage to the ship. To comply with the ISM Code, each ship must have a working Safety Management System (SMS) consisting following element: Commitment from top management, a top tier policy manual, a procedures manual, that vessel is following company SMS procedures for conducting both internal and external audits to ensure the ship is doing what is documented in the procedures manual, Designated Person Ashore (DPA) to serve as the link between the ships and shore personnel, a system for identifying where actual practises do not meet those that are documented and for implementing associated corrective actions and regular management reviews . Almost all ISM Code manuals are required to take ISO 9000 Quality System and ISO 14000 Environmental Management System into account. The problem is that any form of procedural quality system such ISM does not necessarily improve safety for this reason a novel online course on ISM Code requirements and all relevant safety, environmental and quality standards is needed. Furthermore, many smaller shipping companies are unable to apply international quality or management systems such as ISO 9000 due to resource limitations [1].

OPTIMISM team started the project with literature review divided into three chapters, ISM Code and associated rules and regulations, latest reports on or in support of the ISM Code and learning from Audits, Inspections and Accidents/Incidents. Review of some 60 accidents from 200 accident report reviews since 2010 was carried out. The accidents included a range of ship types covering collisions, grounding, capsizing, falling from heights, fire/explosion, exposure to hazardous gases in enclosed spaces and so forth. These accidents are broken down into several columns giving information including the accident number (1), vessel's name (2), type of vessel (3), type of accident e.g., collision or fire (4), actual description (5), cause of the accident (6), casualty (7), actions taken/recommendations (8) and stating if the accident will recur (9). In almost all cases the ISM element/sub-element causing or contributing to the accident is identified (10).

## 2. MARINE SAFETY INVESTIGATION REPORTS

Marine safety investigation reports selected for analysis in OPTIMISM-project were chosen totally random but other than seeking answers to several questions when interviewing a sample of key stakeholders. Whilst working on the review of the selected accident reports it was found that many of the reports were less than satisfactory regarding lacking comprehensive evidence to lessen the probability that these accidents would not be repeated. Many of the reports included inadequate explanations for their conclusions or were inappropriate or lacked substance. There were several inconsistencies for instance the nature of the casualties was not apparent or missing; there was no indication or reference to key organizations involved. This suggests that the investigators were not fully aware of the requirements of Safety Management Certificate (SMC) or Document of Compliance (DOC) viz., it was not clear which administration was involved or any reference to the ownership, the crew or their timesheets. The explanation on the human element mainly mentioned inadequacy of the training, in most cases in vague terms. There were discrepancies in the safety issues identified. The quality (fitness) of recommendations and actions were generally poor for the purpose of preventing these accidents occurring again. Indeed, in about half of the cases reviewed there was inadequate information for ensuring the accident would not happen again. In majority of cases, key and other contributing factors were hardly mentioned.

It was found difficult to rely on Global Integrated Shipping Information System (GISIS) and depended instead on the actions and recommendations made in the accident reports which have been corroborated with the findings of others such as a report submitted to the IMO, entitled 'Lessons Learned and Safety Issues Identified from the Analysis of Marine Safety Investigation Reports'. To this end, considerable effort was expended on developing a new system for reviewing accident reports. This focuses as to whether the main root cause was a Quality Assurance related deficiency (Error) or a human (or system) deficiency (Mistake) by finding out, from the information available in the accident reports, whether human element failures/factors (Mistake) were the main contributing factor or the ship quality assurance system/SMS (Error). Having studied the reports several important

factors were identified. It was apparent that communication, human vulnerability and decision making were the most frequent occurrences with several other factors also playing a major role such as inadequate knowledge of the crew members or risk assessment by the company. When reviewing the accidents, a decision was made to also identify if there was a management fault and if this was the case whether manning was also an issue.

## 3. ACCIDENT INVESTIGATION REPORT ANALYSIS

A methodology was developed to extract notable information from these reports such as description of the accident, actions suggested by the investigators, main root causes of the accident and any other contributing factors such as inadequate risk-assessment, inadequate knowledge, inappropriate decision-making, poor supervision and so forth. A column was also devoted to the likelihood of this accident happening again focusing on the main task of investigating accidents by the investigators.

Figures 1 and 2 give details of the annual number of accidents by year and the types of ships involved in these accidents.

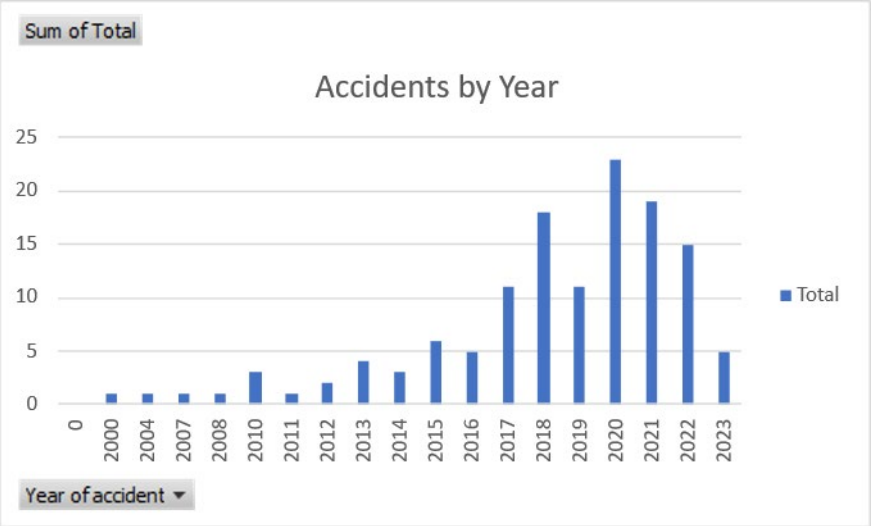


Figure 1 – Accidents each year vs. Year of accidents (Source: Ziarati et al. 2025, Project OPTIMISM: Learning from Accidents, ISM Audits and Port Inspections TransNAV'25, Poland, 2025)

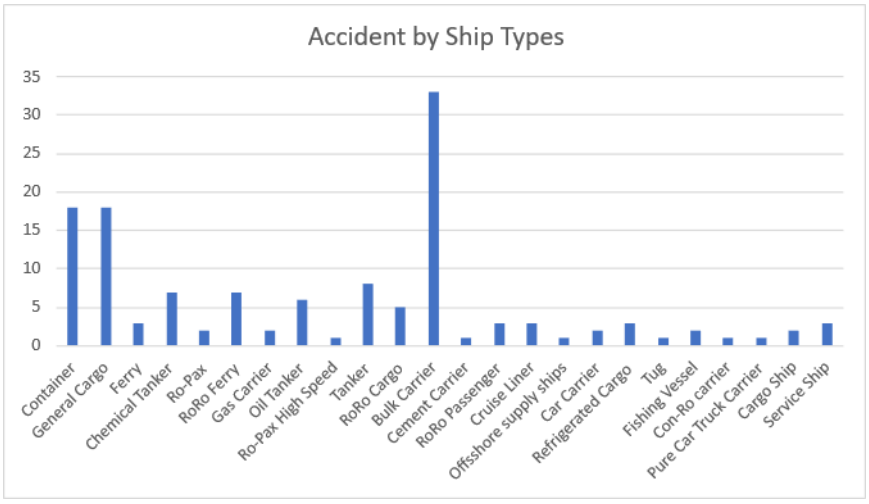


Figure 2 – Number of accidents vs. Ship Type (Source: Ziarati et al. 2025, Project OPTIMISM: Learning from Accidents, ISM Audits and Port Inspections TransNAV'25, Poland, 2025)

In a study by Zachau [2] issues regarding analysis of accident investigation reports highlighted several areas of for improvements. The study was complemented by Ziarati et al. [3] and De Melo Rodriguez et al. [4]. The latter studies provided a new taxonomy of root causes of and contributing factors to accidents at sea and ports. The latter two studies examined the effectiveness of safety management systems and identified critical gaps in training effectiveness, risk perception, and the implementation of safety measures. The study found that many

safety protocols were not adequately applied in real-world operational settings, with crew members struggling to retain and apply training under high-pressure conditions.

In this study information for preparing the table of accidents was obtained from Centre for The Future Factories' (C4FF) list of questions and causes of, and contributing factors to, accident to ascertain the main root causes of accidents while at the same time distinguishing between Mistakes, Errors, Recklessness, Lapse, Slip, Violation or Sabotage [3,4]. A sample of accident investigation review summaries are given below in Table 1:

| | |
|---|---|
| **GISIS Number** | RZ/HK |
| **Description** | Grounding and capsizing due to unsafe passing distance to shore at high speed. The collision caused severe and fast income of water which led to the immediate loss of propulsion and general services. |
| **Key Root Causes** | *Crew-related (Mistake)* - Poor leadership and Team operation - Captain's inattention/distraction due to the presence of persons extraneous to Bridge watch and a phone call not related to the navigation operations. *Company-related (Error)/Management fault* - ISM non-conformity due to inadequate risk assessment - The General Emergency Alarm was not activated immediately after the impact. This fact led to a delay in the management of the subsequent phases of the emergency. The analysis of crew certification, of the Muster List (ML) and of the familiarization and training highlighted some inconsistencies in the assignment of duties to some Crew members. |
| **Casualties** | 32 fatalities: 16 passengers, 4 crew and 4 still missing. |
| **Action-Recommendation** | It is worth summarizing that the human element is the root cause in the accident reported here, both for the first phase of it, viz., the unconventional action which caused the contact with the rocks, and for the general emergency management. A complete review of safety culture particular for after the first sign of collision showed issues with the scope of the *Minimum Safe Manning* (MSM) and with the Muster List (ML) – noting that the SOLAS regulation V/14.1 requires that the ship shall be Marine Casualties Investigative Body – C/S Company document Page 7 - sufficiently and efficiently manned. This regulation refers, but not in a mandatory way, to the *Principles of Safe Manning* adopted by the Organization by Resolution A.890(21) as amended by resolution A.955(23). |
| **Would it happen again?** | No if the Master was not distracted/inattentive and did not sail too close to the coastline and pass at an unsafe distance at nighttime and at high speed (15.5 kts). |

Table 1. Example of the template developed for the micro-analysis of accident reports (OPTIMISM – Project)

The final stage in summarizing the accident was for each sub-focus group deciding what was the main root cause of the accident and as to whether Human Vulnerability, Decision Making or Communication played a role in causing the accident or contributed to making it worse immediately after.

It is interesting to note that majority of safety issues are Quality Assurance (QA) related while non-QA plays a major role either as the main root cause of accidents or as a contributing factor to it. In almost all cases there were deficiencies due to Human Vulnerabilities, Decision Making and Communication. In almost half of the accidents, it was noted that knowledge/skills/competence to be an issue. This clearly indicates that quality assurance of shipping companies is a problem area needing attention.

## 4. ONLINE TRAINING PROGRAMME

Besides a comprehensive report on the current state of ISM Code implementation in the maritime sector, along with evidence-based recommendations for improvements a fully developed, competence-based online training programme will be developed. This course will focus on the principles and practical application of the ISM Code and will include a novel assessment system featuring self-evaluation tools, written assignments, and an oral examination component. Also, appendixes including guidance for senior managers, ship crew and personnel at shore This training programme will be available free of charge fall 2026 at https://optimismproject.eu. (Figure 3)

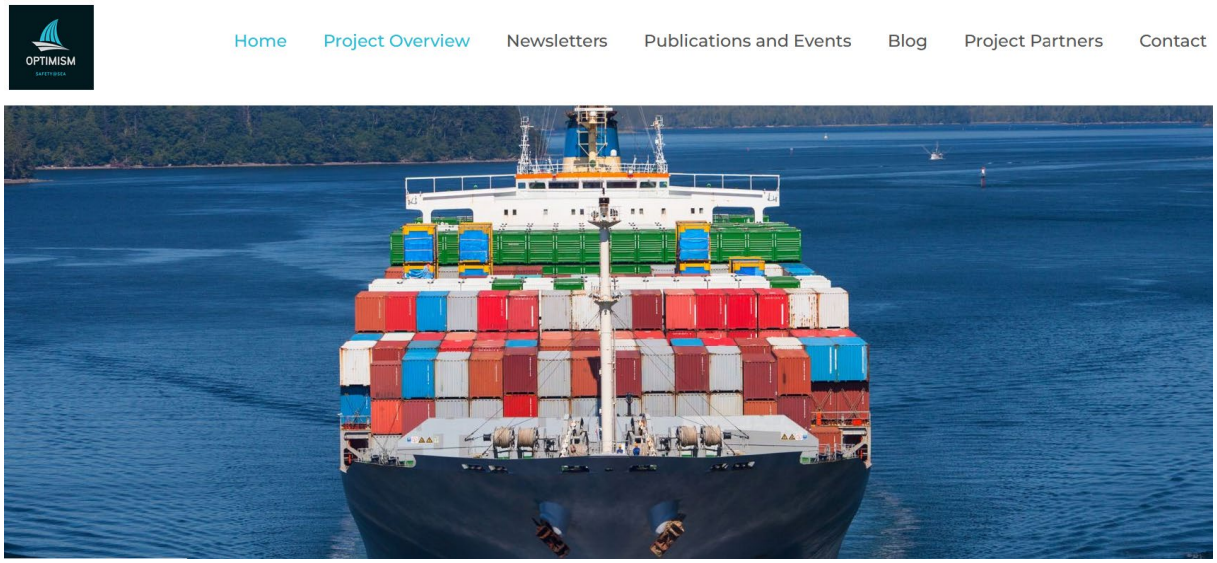


Figure 3. Screen shot of OPTIMISM home page, https://optimismproject.eu.

All material and the link to the online programme can be found at OPTIMISM home page. Moodle platform will be used like in similar training projects earlier (Figure 4).

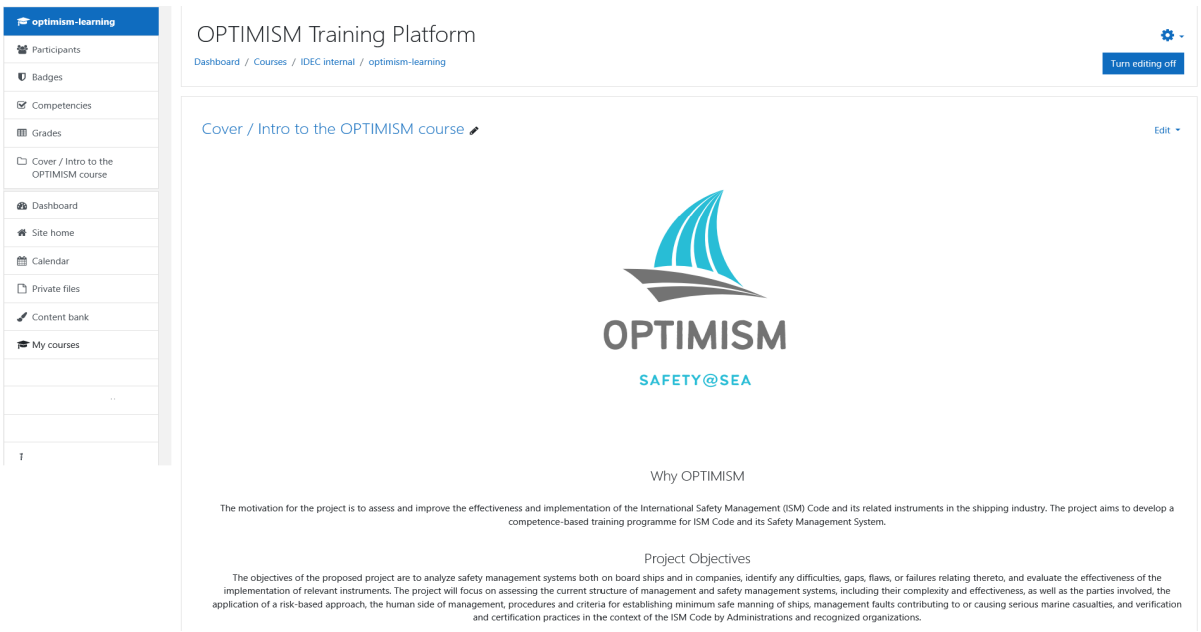


Figure 4. OPTIMISM moodle home page.

## 5. CONCLUSION

In many cases the ISM deficiency should have been detected during an audit or an inspection. The problem is that even when non-conformities or deficiencies by International Association of Classification Societies (IACS) or Port State Control Officers (PSCOs) respectively are identified, a significant number of companies fail to take actions. It is particularly important to note that, in a survey conducted by C4FF [2,3] more than half of administrations and Recognised Organisations (Ros) had found evidence of repetitive deficiencies from previous ISM Code audits. This shows that there are a significant number of companies which do not take identified safety issues seriously.

Review of accident investigation reports was carried out with the aim of finding common safety issues and how they can be analysed effectively. The result was, inter alia, that a common safety issue was the lack of risk assessment, and that minority of the cases indicated ISM Code was not effectively implemented. As demonstrated in the sample case study (Table 1) here are several fuzzy areas where it is difficult to establish if there is a knowledge deficiency on the part of the crew member or that the company had not provided sufficient guidance or training on safety related matters.

Furthermore, three common main contributing factors to accidents were found to be ineffective communications, inappropriate decision-making and ignorance of human vulnerabilities.

The main output of this project is a complete competence-based online training programme on ISM Code and its implementation. There will be a novel assessment system covering self-assessment, assignments and an oral test. The programme will be Credit System for Vocational Education and Training (ECVET) and European Credit Transfer and Accumulation System (ECTS) compliant and will be submitted for accreditation and certification to a professional and internationally known professional body.

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