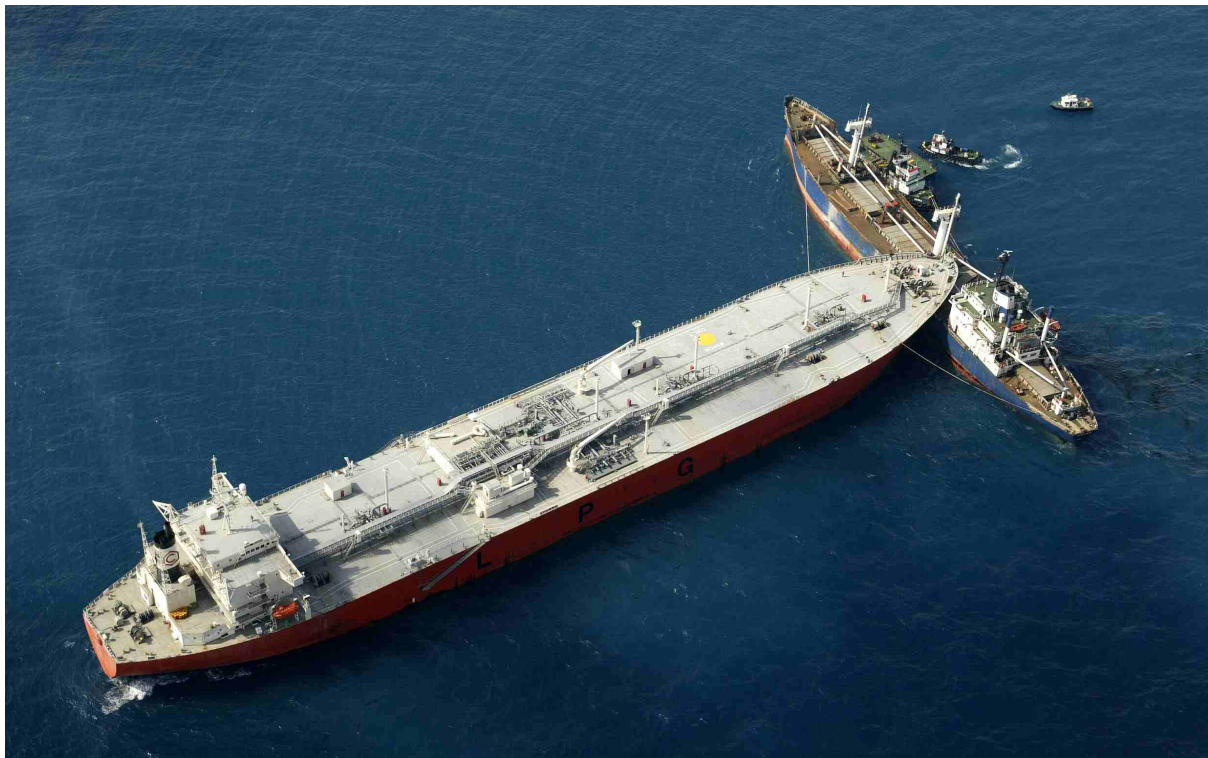


Accident Investigation at Sea

with focus on Human Factors



Objectives

The course provides the participant with in-depth knowledge of accident investigation by focusing on the following:

1. Human Factors
2. Onsite investigations
3. Ensuring human evidence, i.e. interview technique
4. Ensuring physical evidence
5. Analysis of the collected evidence and statements
6. Conclusions, recommendations, and corrective actions

Experts with a broad experience within accident investigation provide the knowledge and methods of accident investigation and analysis.

Purpose

The purpose of the course is to provide knowledge of Human Factors and practical knowledge of accident investigation methods with special focus on Human Factors and its impact on both accident causation and the process of accident investigation.

The participant obtains:

- Theoretical knowledge of Human Factors
- Practical knowledge of how to approach accident investigation
- Tools for collection of human evidence.

The participant is trained in:

- Identification of relevant Human Factors issues in the causation of accidents and incidents
- Interview technique by use of role-play
- Analysis of the collected knowledge from accidents by use of case studies
- Understanding and determining underlying causes and explanatory factors
- Abstracting conclusions and recommendations.

Introduction

On March 27, 1977 two planes collided in Los Rodeos airport on Tenerife. 583 people were killed in the accident. When investigating the accident it was made clear that there were no technical failures involved in the accident. The cause of the accident had to be found elsewhere. It appeared that time pressure on the Dutch captain, his autocratic management style, and the co-pilot's lack of experience were important factors in the accident. The cause of the accident were to be found in the human and organisational factors.



Airline: KLM/Pan AM Aircraft: B747/B747

More than 190 people died on March 6, 1987, when the ferry Herald of Free Enterprise turned over off Zeebrugge harbour. The investigators immediately started looking for damage or technical failure on the ferry, which could have caused the accident. To the investigators' surprise no exterior damages to the ship were found. However, investigations showed that the bow doors of the ship had been left wide open.

Water streaming in through the bow doors caused the accident. The ship had left port with an open bow doors, because the boatswain had slept over.

Later investigation showed a series of breakdowns in the safety barrier, both onboard the ship and in the organisation.

Had the investigation stopped when it was discovered that human errors were the direct cause of the accident, a lot of things would remain incomprehensible and unclarified.



Herald of Free Enterprise

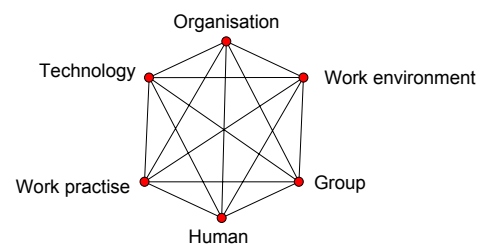
Often, when reading an accident description, it only describes two factors causing accidents, a technical and a human:

1. Factors related to the person: "He slept over and did not close the bow doors. It was a human mistake, therefore it went wrong".
2. Factors related to a technical explanation: "Alarms failed to provide proper warning about doors being left opened. Water streamed in, and therefore the ship sank".

This is what is called a descriptive level. It is only describing what can be observed.

The course takes the descriptive level one step further, to locate the issues and factors causing the errors, which are instrumental in causing accidents to happen. When the investigation is completed, it is not only known how the accident happened but also *why* it happened.

The socio-technical network



Koester og Rabjerg 2005

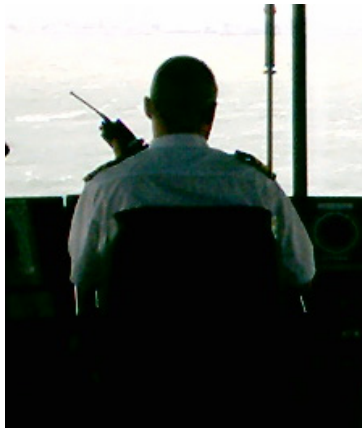
To be able to explain and understand an accident it is necessary to investigate and analyse a series of topics. The model of the socio-technical network is a useful and modern tool for this purpose.

Benefits

After completing the course the participant will be able to:

- Employ and understand theoretical knowledge of Human Factors
- Complete an accident investigation and detection with focus on Human Factors
- Identify underlying causes and explanatory factors
- Make recommendations for corrective actions, which can prevent accidents from recurring.

Topics



Leadership or lack of leadership, may play an important role in the course of an accident. The management style of the captain often mirrors the organisation which he works in, for better or worse.

Human Factors

Human Factors are multidisciplinary, building on different subject areas. It is, however, primarily psychology which has contributed to knowledge in this field. Knowledge of the Human Factor is necessary to clarify the underlying causes for an accident. The first part of the course deals with the following topics:

Individual:

- Performance shaping factors
- Psychological limitations and capabilities.

Group:

- Communication
- Management style, assertion and synergy.

Organisation:

- Human errors and the underlying causes
- Organisation and safety culture
- Pressures and incompatible goals.

Working environment:

- Physical conditions.

Practice:

- Traditions of practice
- Risk behaviour.

Technology:

- Design
- Automation.

Practical accident investigation

Accident investigation is a complicated process, which demands knowledge and insight in a range of topics and methods. The course introduces the participant to a series of tools, which will help him carry out an accident investigation.

Case work and role-plays offer the participant the opportunity to train and test the different techniques in the following topics:

- Finding Human Factors in accident investigation
- Preliminary steps
- Delay of investigation and its consequences
- Practical steps to ensure physical evidence
- Collection of "soft" evidence
- Interview techniques
- Analysis of barriers
- Analysis of change of situations
- STEP-analysis
- Causal relationship
- Recommendations and corrective actions.



Insufficient or wrong perception of the situation is often the course of an accident. Wrong perception of the situation can be caused by a lot of things — lack of experience, disturbances, stress, or bad planning are some of them.

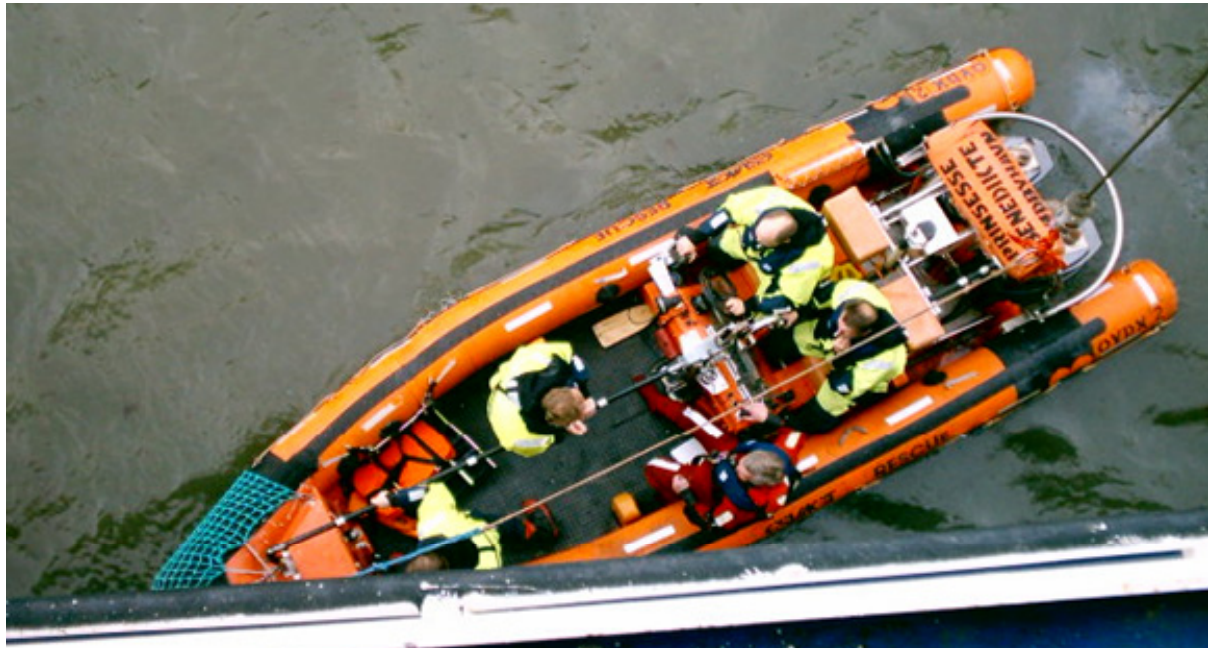
Target group

The course is addressed to:

- People working with accident investigation and accident clarification, including
 - Senior officers
 - Technical managers
 - Safety managers
 - ISM coordinators
 - Casualty investigators.

Representatives from the following groups have attended the training provided at FORCE Technology:

- Danish Maritime Authority control and detection unit
- DSB, Danish State Rail, Risk Management Group
- Admiral Danish Fleet
- Danish Navy, Naval Safety Investigation Board
- Superintendents from tanker operators
- Captains and chief engineers from Oil shipping companies
- Safety managers from cruise shipping companies
- Insurance companies



Practical safety training has been a natural part of life at sea for many years. The course describes the theoretical psychological background for this need and the consequences of inadequate training is clarified.

Design of the course

The training is built on an open dialogue with the participants, and focus is put on the participants' own examples from their workplace.

The subjects are divided into modules, each presented on overhead, whiteboard, blackboard or videos. The points of the course are illustrated by examples from accidents from the shipping industry and the air traffic.

Practical training in analysis of known accidents is part of the training. The exercises focus on training the methods of accident investigation, taught during the course.

Interview technique is practised by use of role-plays. This will teach the participant to collect correct and truthful human evidence.

Duration: 4 days.

Instructors' background

The team of instructors consists of employees with various background and experience. The team, which consists of psychologists and captains, has working experience within:

- Accident investigation and accident detection carried out for foreign shipping companies
- Consulting law firms in collision analysis
- Risk and safety analysis of shipping companies
- Training ship officers, power plant personnel, and health staff in Human Factors
- Human Factors research and projects.



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