2026 Risk Prevention

Sustainability and HSEQ Risk for Management

For Marine Tank Storage Terminals and Refineries (1 day)

"Terminal Information Deficit Center" (TIDC)

Early Warning System (EWS)

'Mother'

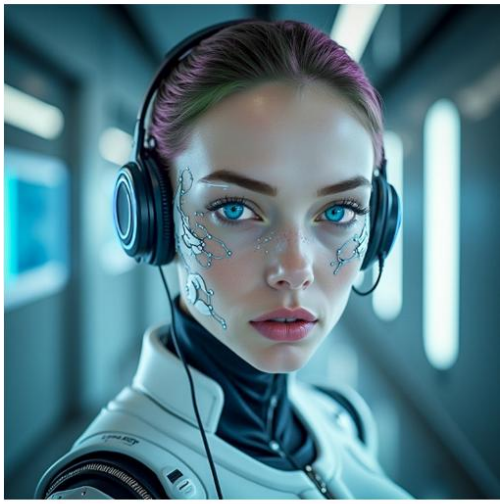
Information Deficit		Action Plan	To be done	Running			Done in Real Time	
Issue	Observed			Running	Date	Deadline	Done	Date
Phone Jetty 3	17-nov	Ordered	X	√	29-nov	30-nov	√	
Learning Gaps	12-okt	Planned for	X		19-okt	30-nov		
Sump on Jetty 1 leak	11-sep	Under repair	X		11-sep	12-sep		
Training shift A.D.E on HSE	18-nov	No budget	X					
Instructions Contractors	10-aug	No budget	X					
Sewer System blocked #5	14-jul	Scheduled next maint.						

This module can also be made for information gaps detected by the MTMSA- Marine Terminal Self Assessment Program

Competency Levels	Contractors	Verification	Turn Around	Cost Effect
Monitoring	Communication	Implementation	Flexibility	Economy
Safety Checks	Hazards	Maintenance	Outsourcing	Environment

What is new?

Cassandra



'Only those systems that use optimal information can function. Let me test yours'

TTT funded the development of an Artificial Intelligence named ‘Cassandra’. Based on The General Law of Functionality, Cassandra detects knowledge gaps and can test and predict HSEQ Performance and Operational Excellence and detect risk exposure. She acts as an Early Warning System preventing risk. This is a unique service only offered by us.

TTT researched Risk Control and Tank Terminal Management and now offers this science based training module.

We designed an Early Warning System to prevent, mitigate, disorder and risk based on 4 universal laws of physics;

a. Information is preserved and can't be divorced nor erased from our physical reality

b. Information Deficit (shortage) ≙ Entropy (disorder) (≙ per definition).

c. The law of Requisite Variety (Ashby's Law)

d. Functionality of dynamic, living systems (terminals) depend on the quality and quantity of information

Marine Storage Terminals and Refineries that fail to effectively implement information process and internal control systems are likely to face an information deficit at some stage resulting in degraded performance. Understanding how information deficits result in entropy or disorder is critical if you want to operate an effective and safe business.

We train people how to detect potential information deficit (shortage) and predict vulnerability. Accessing the quantity and quality of information is needed to verify the potential level of exposure to risk by scientific method.

We have tested this warning methodology worldwide with great success. Terminal Managers, Supervisors and staff can be instructed and trained how to work with this systemic approach to understand possible information gaps by applying the Law of Requisite Variety a.k.a. Ashby's Law: As follows:

- A situation can only be controlled if the variety of the controller matches the variety of the situation to be controlled.

- Requisite Variety is the capacity of a living system, including an organisation and society to respond to risk.

- A storage terminal generates tremendous variety and tries to control it in its own way through checklists, regulations and laws.

- If variety is not matched, systems will spin out of control (entropy).

- It is impossible to control for every variable so most variety is absorbed through relationships with other systems.

- It means that in Risk Management, only enough variety in a system can absorb, or control risks originating from outside variety.

- By using feedback, this information is fed into the system to allow the system to adjust and learn constantly.

- It is impossible to control all Risks as systems fluctuate by information from constant changing variety in a non linear environment. Information reduces uncertainty.

- Human variety, environmental variety, social variety, regulatory variety change all the time thus can only be governed by the use of real time feedback (information).

- Each living system needs to maintain and develop an internal requisite variety to be able to absorb 'outside' variety. This means to have the people with the combined knowledge, experience, expertise, influence, equipment, tools, etc. to do so, using all relevant information as attenuators, to damp variety and variety generators to build variety. An example is a police car. If the car is just a normal car, people won't recognize its importance, so more variety in the form of different paint, a flashing light, traffic control safety tools, weapons, VHF communicator, etc. is added.

- Health and Safety improvement is created by adding variety in the form of PPE, Personal Protective Equipment, Gas detectors and so on.

- Ethics and CSR are requisites that work as information feedback loops and are risk attenuators.

Risks of Information Deficit :

- Automation: The Safety Checklist procedure may have been automated to minimize port-stay at your terminal. Nevertheless up to date information (knowledge) is a requisite variety factor.
- Deepwater Horizon; when you watch the movie you notice that various equipment was not functioning. That information was ignored.

Our world-wide training experience by information theory resulted in the detection of knowledge gaps, which made the terminals dependent on the knowledge of visiting tankers or contractors.

Terminal management and operations are dynamic and need information feedback in real time to be steered and maximally controlled. This can't be regulated because of the physics of uncertainty and the reality of living and working in complexity and a non linear universe.

I realise this may be mind-boggling, but the research can be found on our partner' website www.sustenance4all.com. This would be the next step of terminal performance optimisation, interconnected with sustainability to which the same laws apply: sustainability depends on the quality and quantity of information. Risk prevention depends on information firstly, backed up by regulations, not the other way around.

Why You Should Attend

This 1-day highly interactive and practical course will assist petroleum, gas, crude oil and chemical terminals, contractors and every organisation related to the production, storage and transport industries in achieving a competitive advantage by having an effective and well-managed operation. This course will improve your operational processes and workforce perform up to the highest standards.

Learning Objectives

Master operational best practices and apply a structured approach to oil and gas marine terminal management

1. **Understand how and which physics and natural laws govern** all living systems, this includes Marine Storage Terminals and all related industries
2. **Understanding the value of Cybernetics** and building a VSM, Viable Management System
3. **Build and maintain a Safety Culture** by autopoiesis (self maintenance)
4. **Maximize** your operational efficiency and profit.

Who Should Attend?

This course is designed for anyone with immediate responsibility for custody transfer operations, HSEQ, refinery or terminal management and supervision.

Tank Terminal Training

energy institute Learning Affiliate

COURSE OUTLINE – One Day Training

Session 1

PRE-TRAINING TEST

We ask you general questions related to the management of custody transfer, HSEQ, Risk Management, Maintenance and Ship/Shore Interface.**. These questions are designed to measure, detect and verify potential information deficit.**

Session 2

THE MARINE STORAGE TERMINAL – REFINERY OFF SITES

In order to understand and being able to professionally communicate, supervise and control the ship/shore interface, relevant technical and maritime terminology must be learned and understood.

- Understanding the **Science of Complexity** of your Marine Storage Terminal or Refinery by mapping relationships using information theory (feedback)
- Testing your knowledge of **technical and maritime terminology**
- Identifying of **risk exposure** in your network
- Working with the Marine Terminal Management and Self-Assessment **(MTMSA)** method by OCIMF – verification of operational risks

Session 3

INTERNATIONAL SAFETY GUIDE FOR OIL TANKERS AND TERMINALS (ISGOTT) 6th EDITION – Is there enough information in your system?

- **Human Factors**: human behaviour in Hazardous Environment
- Building and maintaining a self-learning and adaptive **HSEQ system /culture**

Session 4

MANAGEMENT OF THE TANKER AND TERMINAL INTERFACE (ISGOTT Chapter 21 & 25) by communication & cognition

- **Communications:** procedures & precautions
- Pre-Arrival and Pre-Berthing exchange of information
- Information from tanker to terminal
- Information from terminal to tanker
- Cargo load or discharge plan and **Cargo Agreement** (Role Play)
- Pre-transfer exchange of information

Session 5

SETTING UP A SELF-LEARNING HORIZONTAL MANAGEMENT SYSTEM BY INFORMATION by Using Cassandra-AI

- Learn how to govern the terminal operations by information
- Making your terminal or refinery a Viable System ensuring long term continuity
- Contingency planning
- Implementation of the Terminal Information Deficit – Early Warning System

Session 6

REVIEW OF WORKSHOP MATERIAL

- Discussion on workshop subjects
- **Test: Writing a Complexity and Risk Management Plan (500 words)**

Session 7

REVIEWING TEST RESULTS AND CLASS DISCUSSION OF EXAMINATION ANSWERS

- Awarding of **INFORMATION MANAGEMENT** Certificates of Competence

Course Instructor

Arend van Campen – Tank Terminal Training

is a long-standing member of the Energy Institute with over 40 years of experience as CEO, Terminal Manager, Marine Cargo Expediter, and Loss Prevention Advisor across global operations. TTT is officially recognized as an Energy Institute Learning Affiliate.
Arend holds a PhD in Information Physics and promotes the principle that safe, sustainable, and profitable operations are only possible through ethical behaviour, continuous learning, and informed decision-making.
He is also the founder of www.sustenance4all.com which developed an Artificial Intelligence named Cassandra to test HSEQ functionality and operational performance.

We make people better!