



HUMAN FACTOR COMPETENCIES FOR THE FUTURE MARINER

by



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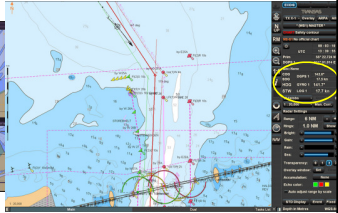
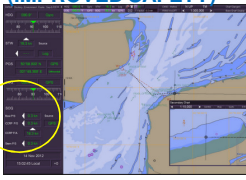
LAST 2 DECADES



CHANGES IN MARITIME INDUSTRY



1. ECDIS (IMPROVED SAFETY)



THE SAME DATA SHOWS DIFFERENTLY ON DIFFERENT SCREENS!!

CHALLENGE → NON-STANDARDISED INTERFACES
PROCESSING OF INFORMATION DIFFICULTIES



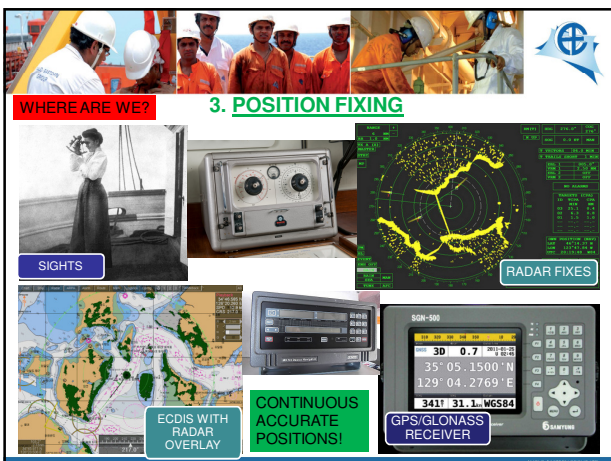
1. ECDIS (CONTD..)

CHALLENGE → NON-STANDARDISED INTERFACES
PROCESSING OF INFORMATION DIFFICULTIES



2. ELECTRONIC ENGINES

OLD DAYS MONITORING vs MONITORING TODAY



3. POSITION FIXING

WHERE ARE WE?

SIGHTS vs RADAR FIXES

ECDIS WITH RADAR OVERLAY vs CONTINUOUS ACCURATE POSITIONS!

GPS/GLONASS RECEIVER



4. ENVIRONMENTAL REGULATIONS

Sox Nox Analyzer vs ONLINE Sox / Nox GAS ANALYSER

BALLAST WATER MANAGEMENT SYSTEM

NEED TO MAKE THE SEAFARERS BELIEVE!

5. E-NAVIGATION

MAN-MACHINE INTERFACE. EQUIPMENT DESIGN

INTEGRATED BRIDGE SYSTEM VESSEL TRAFFIC SERVICE

6. EXCESSIVE COMMUNICATIONS

Back in the days of "Marconi" radios

Then came the days of TOR

V-SAT = 1900 mails/month

**SOFTWARE ISSUES
EQUIPMENT RELIABILITY**

7. MARITIME LABOUR CONVENTION

SINGAPORE STRAITS MISSISSIPPI RIVER

REST HOURS – MASTER ON THE BRIDGE?

MANNING SCALES?

GOOD OLD DAYS!

8. WHISTLE BLOWING

BLOW THE WHISTLE

On-board complaint procedures

Competent authority Ship owner

No victimization of seafarers for lodging complaints

a copy of the on-board complaint procedures

Developing an on-board complaint procedures

complaint Breach of the requirement Complaint

Seafarers Master

Shipowner, operator fined \$1.85M in pollution case

Whistle-blower, a Filipino crewman, to receive a reward amount to be decided

Whistle-Blowing Seafarer Stands to Earn 6-Figure Reward, \$1.2M Fine Assessed to Shipowners

GOOD OLD DAYS-MY SHIP , MY LAW

Judge awards whistle-blower \$462,500 in high-seas pollution case

Low-level officer alerted Coast Guard to illegal dumping via 'magic pipe'

9. CYBER SECURITY

CYBER HACKING

After running spot checks, a maritime cybersecurity firm found 37% of servers running Microsoft did not patch in April and are vulnerable to attack.

10. BIG DATA

IS THE MARINE INDUSTRY READY TO USE BIG DATA?

INCREASED REGULATIONS

SOLAS 1974	158	SOLAS TODAY	294
MARPOL 73/78	265	MARPOL TODAY	447
STCW 95	243	STCW 2010	356
		COSWP	512
		MARPOL ANNEX VI AND NTC 2008	340
		MLC 2006	110
		IMASAR VOLUME III	180
		LSA CODE	280
		FSS CODE	365
		BALLAST WATER CONVENTION	38
		ANTI-FOULING CONVENTION	45
		FLAG STATE CIRCULARS (MI)	2969
		TOTAL	5936

RECORDS TO BE MAINTAINED

GARBAGE RECORD BOOK

BALLAST RECORD BOOK

NPDES* RECORD BOOK

SECURITY RECORD BOOK

GANGWAY LOGBOOK

BIOFOULING RECORD BOOK

GMDSS LOG BOOK

OIL RECORD BOOK

CAN WE AUTOMATE RECORD KEEPING?

* NPDES – National Pollutant Discharge Elimination System




HUMAN FACTOR COMPETENCIES REQUIRED?




Competence
A specific range of skill, knowledge, ability to do something successful being adequately or well qualified in the condition of being capable of to meet demands, requirements




1. ABILITY TO PROCESS LARGE AMOUNTS OF DATA





STANDARDIZED USER INTERFACE NEEDED!




2. ABILITY TO FOCUS ON CRITICAL ISSUES

STERNING GEAR COMMON ALARM	CAF	OFF	ALARM
SPR FDRS BALD LEVEL HIGH	LAI	OFF	ALARM
HIS OIL MIST DENSITY HIGH PRE-WARN	DAH	OFF	ALARM
SRM RT EMU LEVEL HIGH	LAI	OFF	ALARM
MEL OIL MIST DETECTOR CRANKCASE FAU	DAH	OFF	ALARM
MIE HIGH PRESS PIPE OIL LEAKAGE	DAI	OFF	ALARM
STERNING GEAR COMMON ALARM	CAF	OFF	DI ACK
STERNING GEAR COMMON ALARM	CAF	ON	Normal
NO.1 CARGO HOLD B/W IS LEVEL HIGH	LAI	OFF	DI ACK
NO.2 OIL SW GAS TEMP OUT CYL 3	THW	OFF	ALARM
BLUZE OIL W. SEPA OIL CONTENT HIGH	DA	OFF	ALARM
BLUZE OIL W. SEPA OIL CONTENT HIGH	DA	OFF	ALARM
BLUZE OIL W. SEPA OIL CONTENT HIGH	DA	OFF	ALARM
MIB ACC220V INSULATION LOW	DA	OFF	ALARM
MIB ACC220V INSULATION LOW	DA	ON	ALARM
MIB ACC220V INSULATION LOW	DA	OFF	ALARM
PNE FAILURE	DA	OFF	ALARM
PNE FAILURE	DA	OFF	ALARM
MIB ACC220V INSULATION LOW	DA	ON	ALARM

Focus on What's Important

3. ABILITY TO WORK WITH REMOTE TEAMS

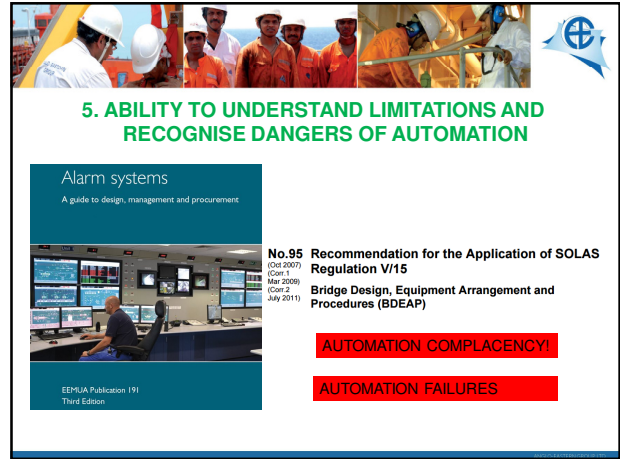


VTS **ENGINE TEAM**

OPERATIONS TEAM

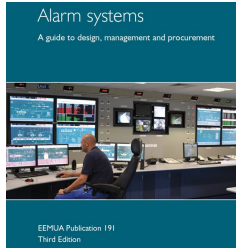


4. ABILITY TO BE ASSERTIVE



5. ABILITY TO UNDERSTAND LIMITATIONS AND RECOGNISE DANGERS OF AUTOMATION

Alarm systems
A guide to design, management and procurement



EEMUA Publication 191
Third Edition

No. 95
(Oct 2007)
(Corr. 1
Mar 2008)
(Corr. 2
July 2011)

Recommendation for the Application of SOLAS Regulation V/15 Bridge Design, Equipment Arrangement and Procedures (BDEAP)

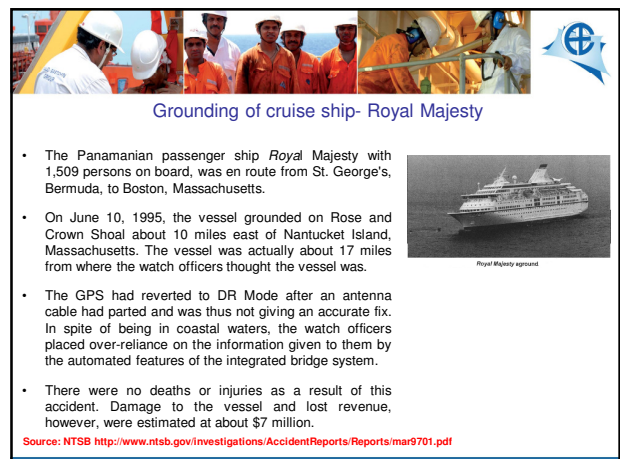
AUTOMATION COMPLACENCY!

AUTOMATION FAILURES




Case Study

Grounding of cruise ship- Royal Majesty



Grounding of cruise ship- Royal Majesty

- The Panamanian passenger ship *Royal Majesty* with 1,509 persons on board, was en route from St. George's, Bermuda, to Boston, Massachusetts.
- On June 10, 1995, the vessel grounded on Rose and Crown Shoal about 10 miles east of Nantucket Island, Massachusetts. The vessel was actually about 17 miles from where the watch officers thought the vessel was.
- The GPS had reverted to DR Mode after an antenna cable had parted and was thus not giving an accurate fix. In spite of being in coastal waters, the watch officers placed over-reliance on the information given to them by the automated features of the integrated bridge system.
- There were no deaths or injuries as a result of this accident. Damage to the vessel and lost revenue, however, were estimated at about \$7 million.



Royal Majesty grounded

Source: NTSB <http://www.ntsb.gov/investigations/AccidentReports/Reports/mar9701.pdf>



Grounding of cruise ship- Royal Majesty

Over reliance on Integrated Bridge System- The watch officers were over reliant on the automated features of IBS. The GPS receiver antenna cable connection had separated about 52 minutes after departure St. George and the system had switched to dead reckoning mode. The auto-pilot was not programmed to detect the mode change and no longer corrected for the effects of wind, current or sea.

Relates to...
Ability to understand the limitations and recognize dangers of automation.

Source: NTSB <http://www.ntsb.gov/investigations/AccidentReports/Reports/mar9701.pdf>



6. ABILITY TO MANAGE CHANGE



Is this relevant?





7. ABILITY TO LEARN CONTINUOUSLY



SHIP HANDLING



ENGINE



HYDRAULICS TRAINING



CARGO HANDLING



ELECTRONIC ENGINES



TANK OF A CHEMICAL TANKER



8. ABILITY TO COPE WITH INCREASED STRESS








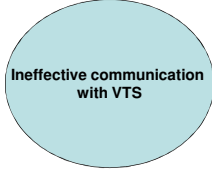

9. ABILITY TO COMMUNICATE EFFECTIVELY






Case Study

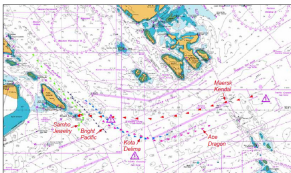
Grounding of Maersk Kendal in Singapore Straits




Ineffective communication
with VTS



- *Maersk Kendal*, a UK registered container ship, ran aground on Mongkok Sebarok reef in the Singapore Strait on 16 September 2009.
- The vessel had altered her course to starboard to give way to three vessels exiting Jong Channel. This caused her to head towards the reef with the intention of altering course to port and resuming her original planned track after passing astern of the third vessel.
- Despite warnings from Singapore Vessel Traffic Information System (VTIS), the vessel did not reduce speed or alter course in sufficient time to prevent her from grounding.
- Substantial damage was sustained to the fore part of the vessel. However, there were no resulting injuries and no pollution.



Source: MAIB <https://www.gov.uk/maib-reports/grounding-of-container-vessel-maersk-kendal-on-mongkok-sebarok-reef-in-the-singapore-strait>



Important points

1. **Inadequate communication** – The master and chief officer misinterpreted the information received from VTIS in respect of which three vessels it had referred to. The master and chief officer were complacent in not recognizing the assistance that VTIS was able to provide.
- Although VTIS provided *Maersk Kendal* with the ranges and bearings of *Kota Delima* and *Bright Pacific*, and facilitated safe passing with these two vessels, the bridge team did not seek further clarification on the name of the third vessel. As a result, the master automatically discounted *Ace Dragon* as one of the three vessels, as she posed no threat to *Maersk Kendal*, and focused his attention on avoiding *Samho Jewelry*.
- VTIS advised *Maersk Kendal* that *Samho Jewelry* was a piloted vessel and was not leaving Singapore port limits.
- VTIS was so concerned by *Maersk Kendal's* actions that it requested all ships to stand-by while it warned *Maersk Kendal* again that she appeared to be heading towards *Samho Jewelry*.
- **The master and chief officer became irritated by the frequent interventions by VTIS. This resulted in the chief officer automatically acknowledging all subsequent radio communications without fully appreciating their significance – the important information from VTIS was missed.**

Relates to...
Ability to communicate effectively.

Source: MAIB <https://www.gov.uk/maib-reports/grounding-of-container-vessel-maersk-kendal-on-mongkok-sebarok-reef-in-the-singapore-strait>



10. ABILITY TO BE A LEADER



ORGANIZING

MEETINGS

PUBLIC RELATIONS

NEGOTIATION

MOTIVATION



FUTURE MARINER

ANALYTICAL

ADAPTABLE

TECH-SAVVY

RATIONAL




DRONE VESSEL



OR MAYBE JOBLESS!



WHAT CAN WE DO?



PSYCHOMETRIC TESTS? MAYBE??

Whole Brain Model™

A CEREBRAL MODE

- Logical
- Analytical
- Fact based
- Quantitative

B LEFT MODE

- Organised
- Sequential
- Planned
- Detailed

LIMBIC MODE

D RIGHT MODE

- Holistic
- Intuitive
- Integrating
- Synthesising

C RIGHT MODE

- Interpersonal
- Feeling based
- Kinesthetic
- Emotional


I HAVE 3 SIDES

1. The quiet and sweet side.
2. The fun and crazy side.
3. The side you never want to see.

PERSONALITY TESTING

MY WIFE TOLD ME WHAT TYPE I WAS LAST WEEK AND IT WASNT ANY OF THESE...

It doesn't matter if you don't like my personality, I have several more!




TRAINING

Human

- Motivation
- Preparation
- Feedback
- Priority & Learning
- Resources
- Information

Technology

- Modality
- Structure
- Timing & Control
- Self Study
- Personal Goals
- Global Reach


BLENDED



OJT

OBE

- Standard of Education
- Curriculum
- Accreditation requirements
- Industry
- Company programs




FOCUS ON HUMAN ELEMENT

HUMAN PERFORMANCE

INDIVIDUAL FACTORS	HUMAN BEHAVIOUR	ORGANISATION/WORKPLACE FACTORS
FAMILY VALUES	WORK ETHICS	COMMUNICATIONS
SOCIO-ECONOMIC BACKGROUND	(VISIBLE)	PAY/BENEFITS
RELIGIOUS BELIEFS	(NOT VISIBLE)	OPPORTUNITIES FOR GROWTH
EDUCATION		RESPONSIBILITIES GIVEN
PEERS		TRUST SHOWN
IMMEDIATE SUPERIORS/HEROES		RESPECT GIVEN
PHYSICAL STATE		RECOGNITION GIVEN
EMOTIONAL STATE	ATTITUDE	SAFE WORK ENVIRONMENT PROVIDED
PAST EXPERIENCES	BELIEFS	JOB PRESSURES CREATED
PRIORITIES AT THAT MOMENT	COMMITMENT	FAIR AND JUST CULTURE
GENETICS* (NEW RESEARCH)	LOYALTY	EMPATHY
		CARE FOR FAMILY OF EMPLOYEE

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FOCUSSING ON HUMAN FACTOR COMPETENCIES IS CRITICAL FOR PROGRESS IN OUR INDUSTRY!

STW HAS BECOME HTW!



**THANK YOU FOR
CONSIDERING ANGLO-
EASTERN WORTHY OF
SHARING OUR VIEWS!**