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# Tanker Operator Conference Hamburg 2017

## Putting People at the Centre of Ship Operations

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# Outline

- People on ships
- Todays Operating Problems and their Causes
  - Complexity (management and technical)
  - Workload and Management Systems
  - The Wrong Paradigm?
- What can we do?
- Resilience
- Conclusion

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# People on ships

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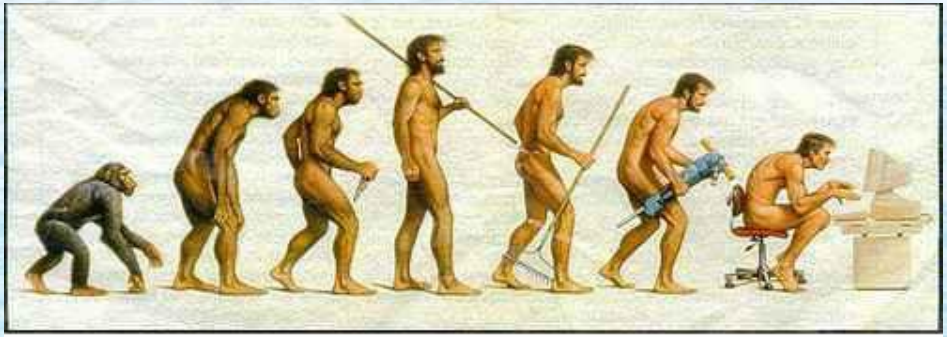
# IMO view of Human Element

**The human element is a complex multi-dimensional issue** that affects maritime safety and marine environmental protection. It involves the entire spectrum of human activities performed by ships' crews, shore based management, regulatory bodies, recognized organizations, shipyards, legislators, and other relevant parties, all of whom **need to cooperate to address human element issues effectively**

What does it say…*its about everything and its all connected…….*

What does it not mention….*people…….*

# People - Evolution ?




- People
- Personnel
- Human Resources *resources are 'exploited'*
- Human Error - *The defective component in an otherwise perfect system*
- Human Factors/Element – *there may be other reasons why humans err*
- Human Contribution …. *getting better the human as hero*
- Human Centred … *the way to go but…*
- Lets try again though with … **people**

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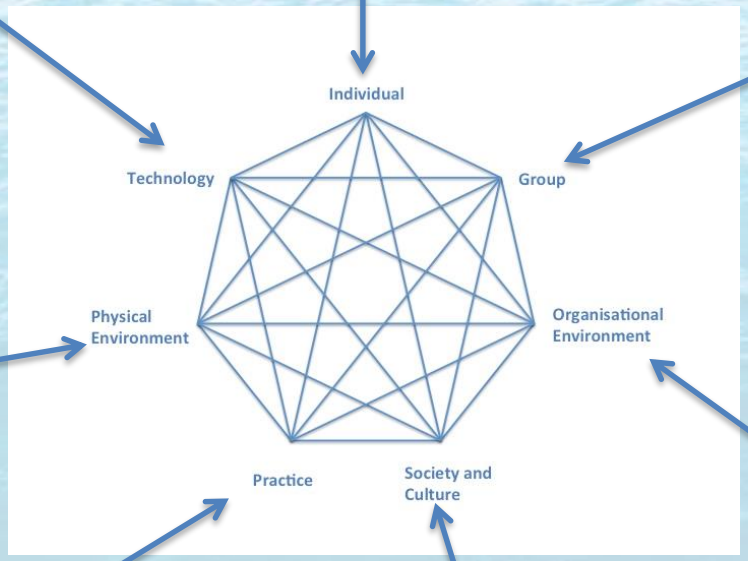
# Its all 'joined up'-the Septigon

**Individual**
Personal
Physical characteristics
Technical Skills
Non Technical

**Technology**
Equipment and System Design
Information

**Group**
Onboard Leadership and Management
Onboard living




**Physical Environment**
Vessel Layout
Engine Room Layout
Environment

**Practice**
Engineering Practice
Operations
Maintenance

**Society and Culture**
Formal Culture
Informal Culture

**Organisational Environment**
Policy and Strategy
Motivation
Culture
Leadership
Procedures
Compliance
Systems

*After Thomas Koester and Michelle Grech … Human Factors in the Maritime Domain*

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# Todays Operating Problems and their Causes

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# The Problem

‘Things that have never happened before happen every day’

*Scott Sagan  The Limits of Safety*

‘In the marine industry things that **have** happened before happen every day in different ways’

*Shaw’s corollary*

The industry has become more complex and less predictable. The answer, often, has been to create more process, creating more complexity and more work, trapping the people onboard in an unyielding structure that punishes initiative.

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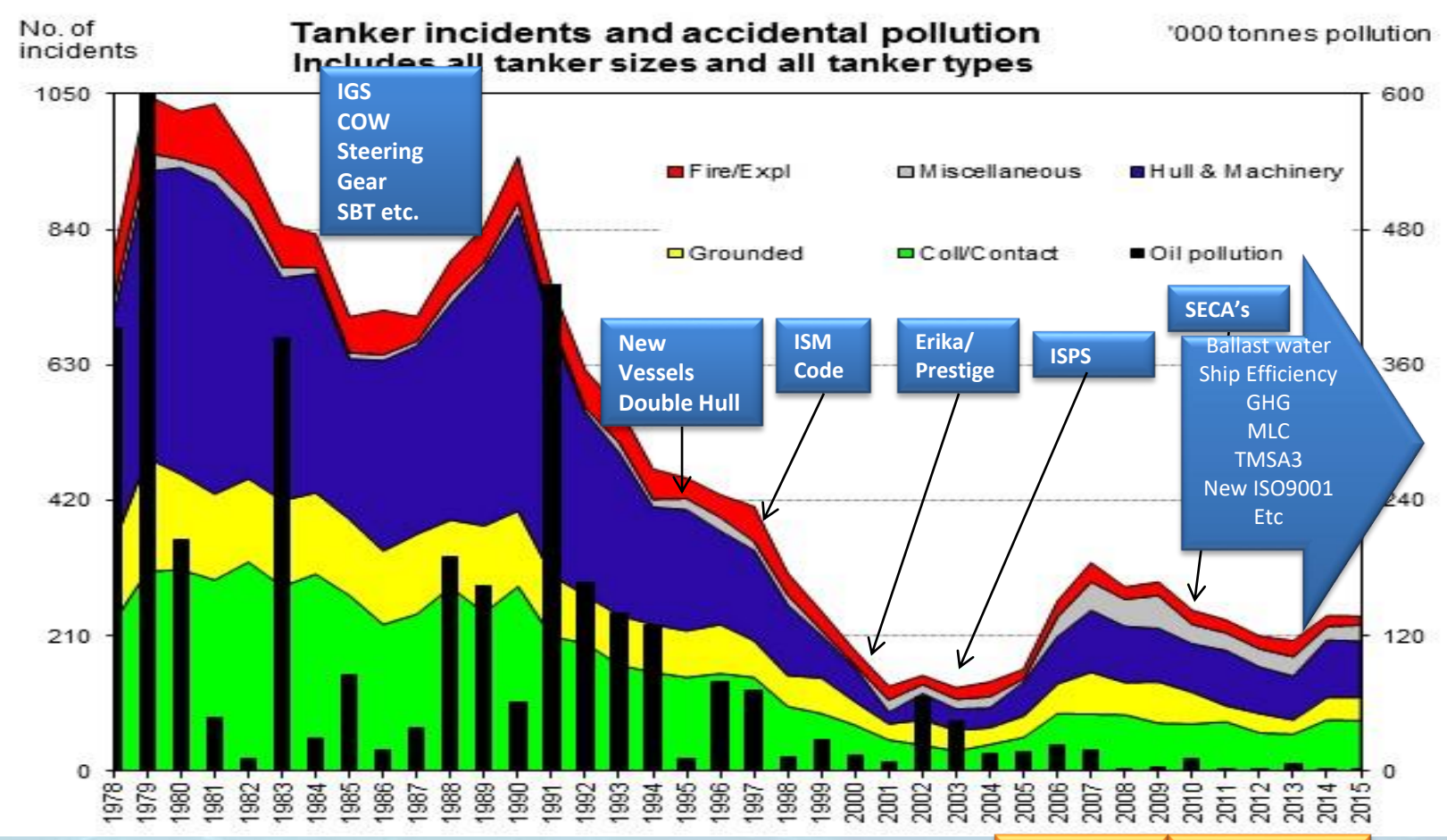
# Good News and Bad News?




Tightening of SOLAS MARPOL STCW

TMSA1

TMSA2

Piracy

Development of Port State and Vetting

Building Boom

Low Freight Rates

Intertanko Statistics

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# Complexity

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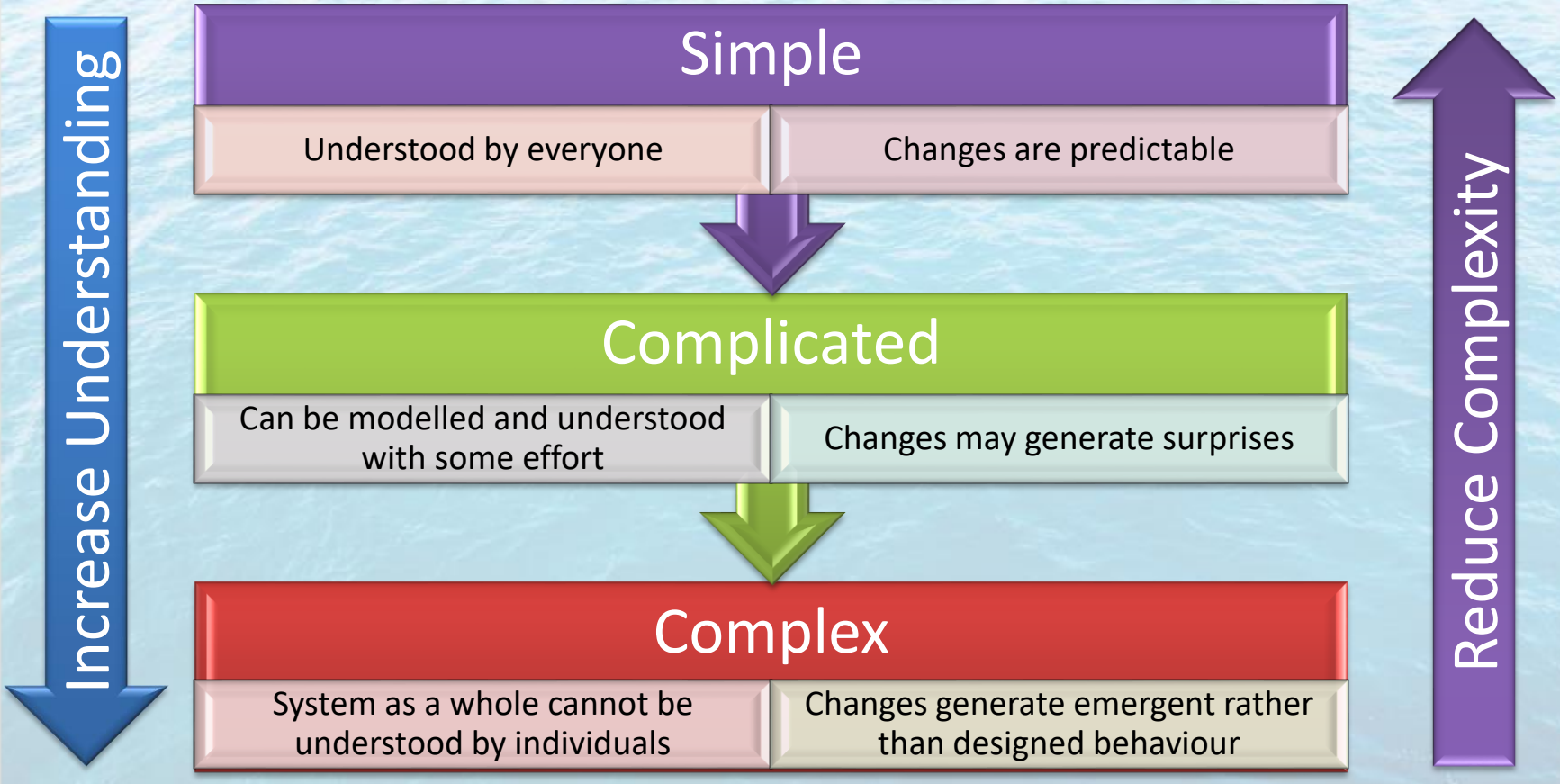
# What is complexity?-definition



# moams Complex Adaptive Systems


## Behaviour

- Alive
- Emergent (Surprising)
- Organised then suddenly disorganised
- Explainable after the event


## Features

- Competing for scarce resources
- Open system-affected by others and affects others
- Large number of interactions
- Agents:-
  - influenced by history and feedback
  - can adapt to improve performance
- Perverse incentives can lead to surprising results

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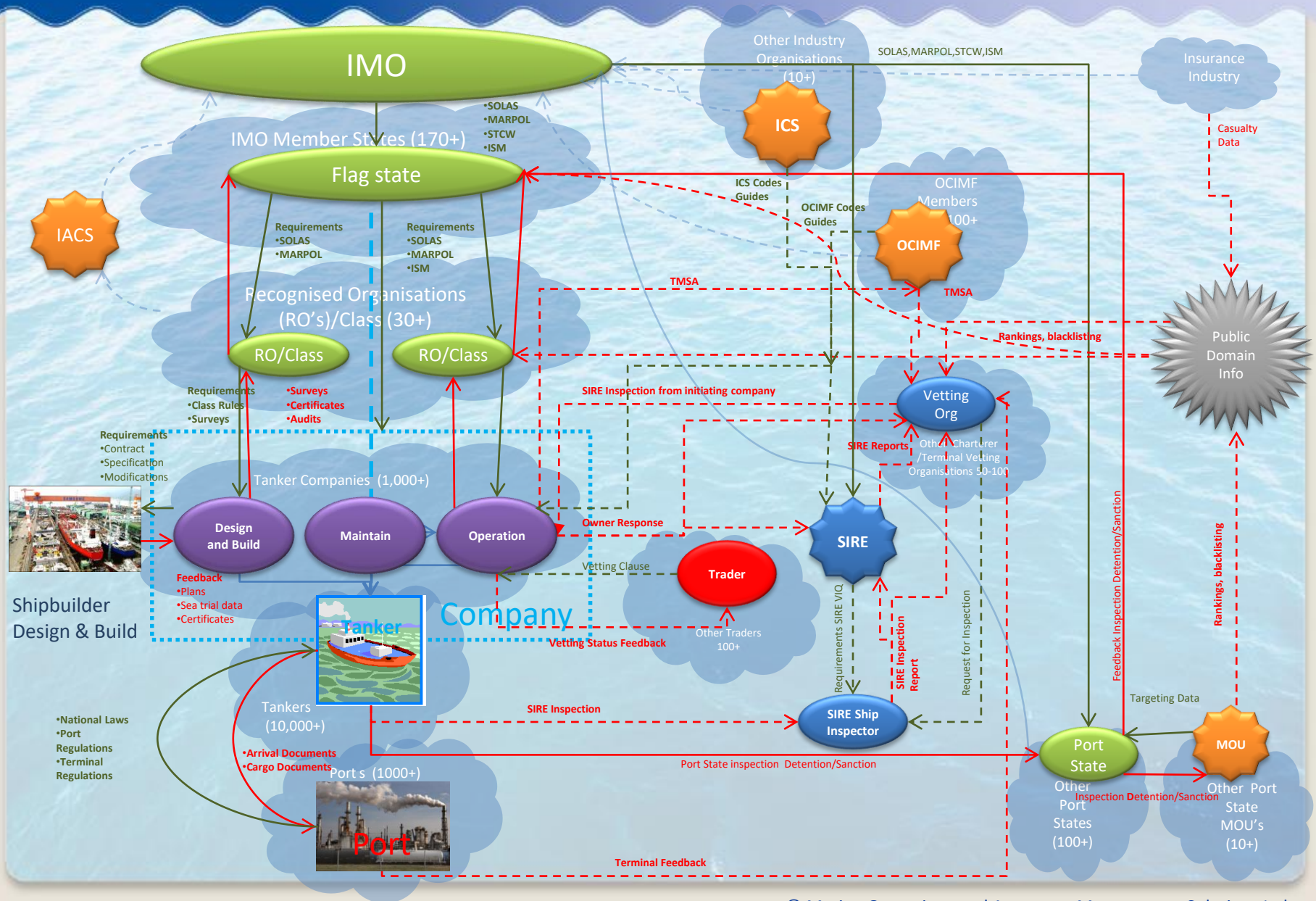
# Complex Tanker Industry



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# Complex Technology

- Automation & watch keeping
  - Arleigh Burke collisions?
  - Air France Airbus
- Irony of Automation
  - Automation masks the development of a serious system failure resulting in limited time to gain 'situational awareness' and react
  - Lack of practice running systems on manual
- System design
  - Reliability of control systems.
  - Poor integration.
  - Lack of Standardisation.
- Limited information and training

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# Workload and Management Systems

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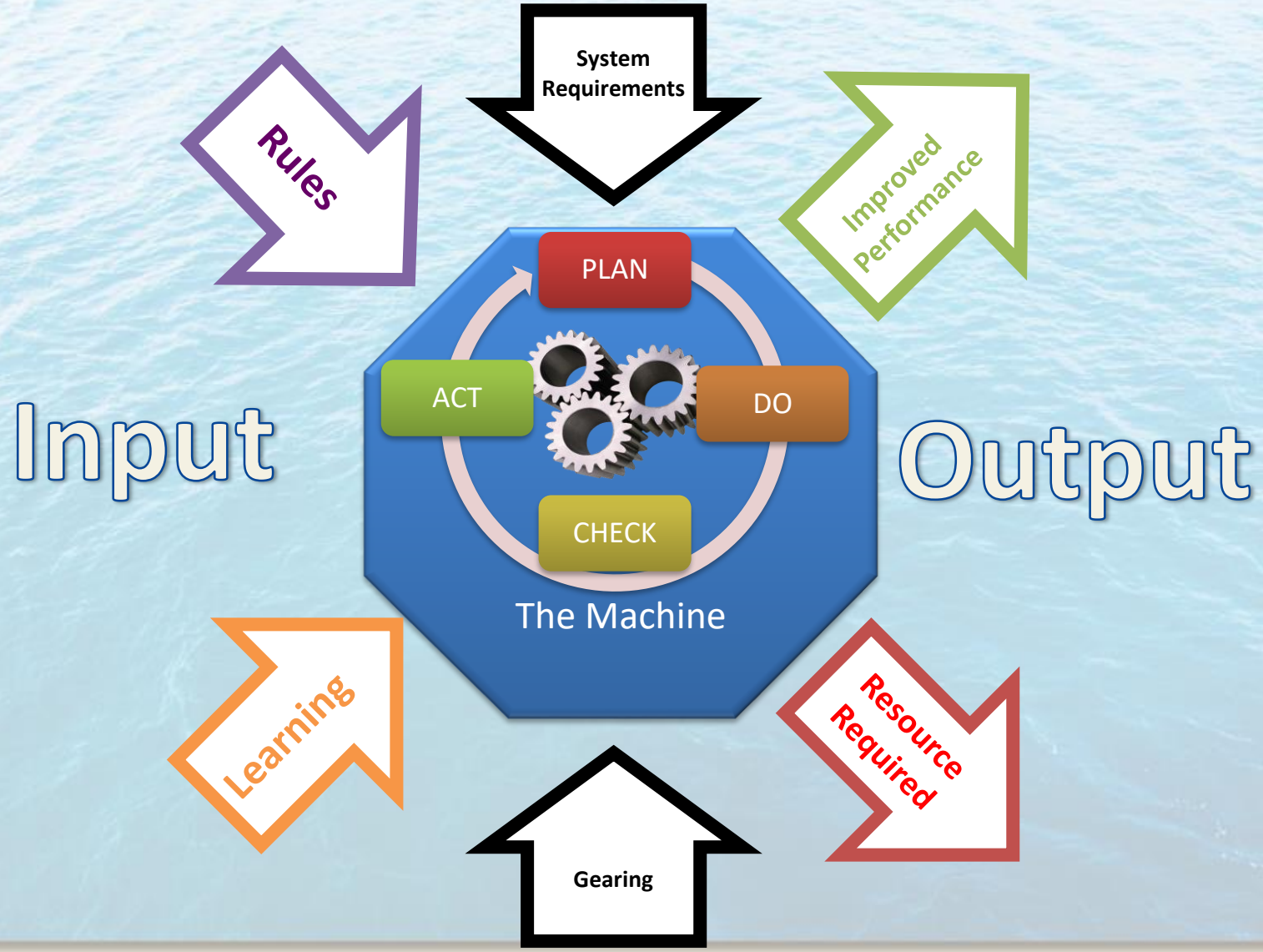
# Management Systems - the Machine



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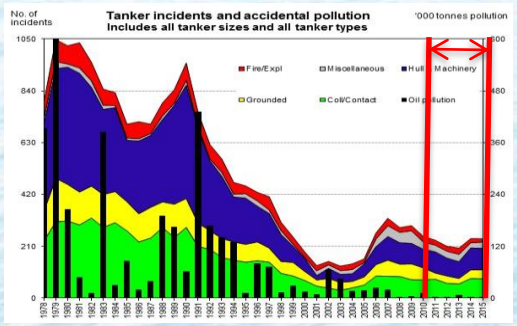
# Cranking up the machine-2010's




ISM
ISO9000
ISO14001
Owner Audits
TMSA

Environmental
Ballast treatment
SIRE
SECA's
Piracy
ISPS
Ship Efficiency
MLC

No further Reduction in Incidents/pollution

PLAN
DO
CHECK
ACT

The Machine

Input

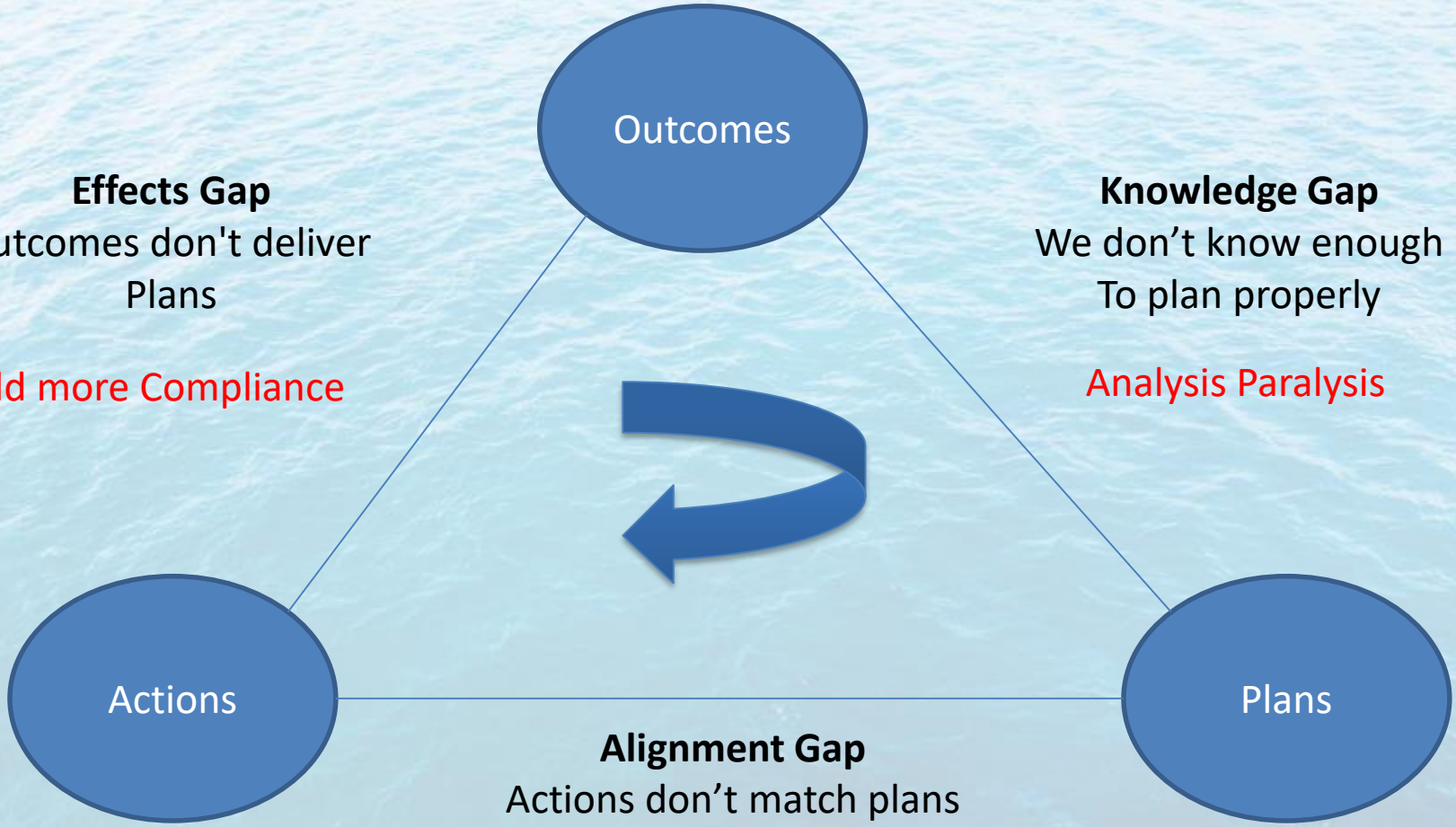
Output

More External
Less Internal
Incident and
Near Miss
Info
Audits and self assessment
Crank Learning
Marketing

Growth in audits
Increased on board risk assessments and checklists
Increased record keeping
Increased port visits
Overload and Brittleness

Computer QA systems
Bonus/incentive
KPI's
Wrong Conclusions
Wrong QA Manager

# moams Drawing the Wrong Conclusions




*From ‘The Art of Action’*
*by Stephen Bungay*

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# The Wrong QA Manager

| | Stupid | Clever |
|---|---|---|
| **Lazy** | "Leave them alone, they do no harm " | "They are suited for the highest office" |
| **Industrious** | "These people are a menace and must be fired at once. They create irrelevant work for everybody" | "They make excellent staff officers, ensuring every detail is properly considered" |

***Von Manstein's Matrix of German Army Officers***

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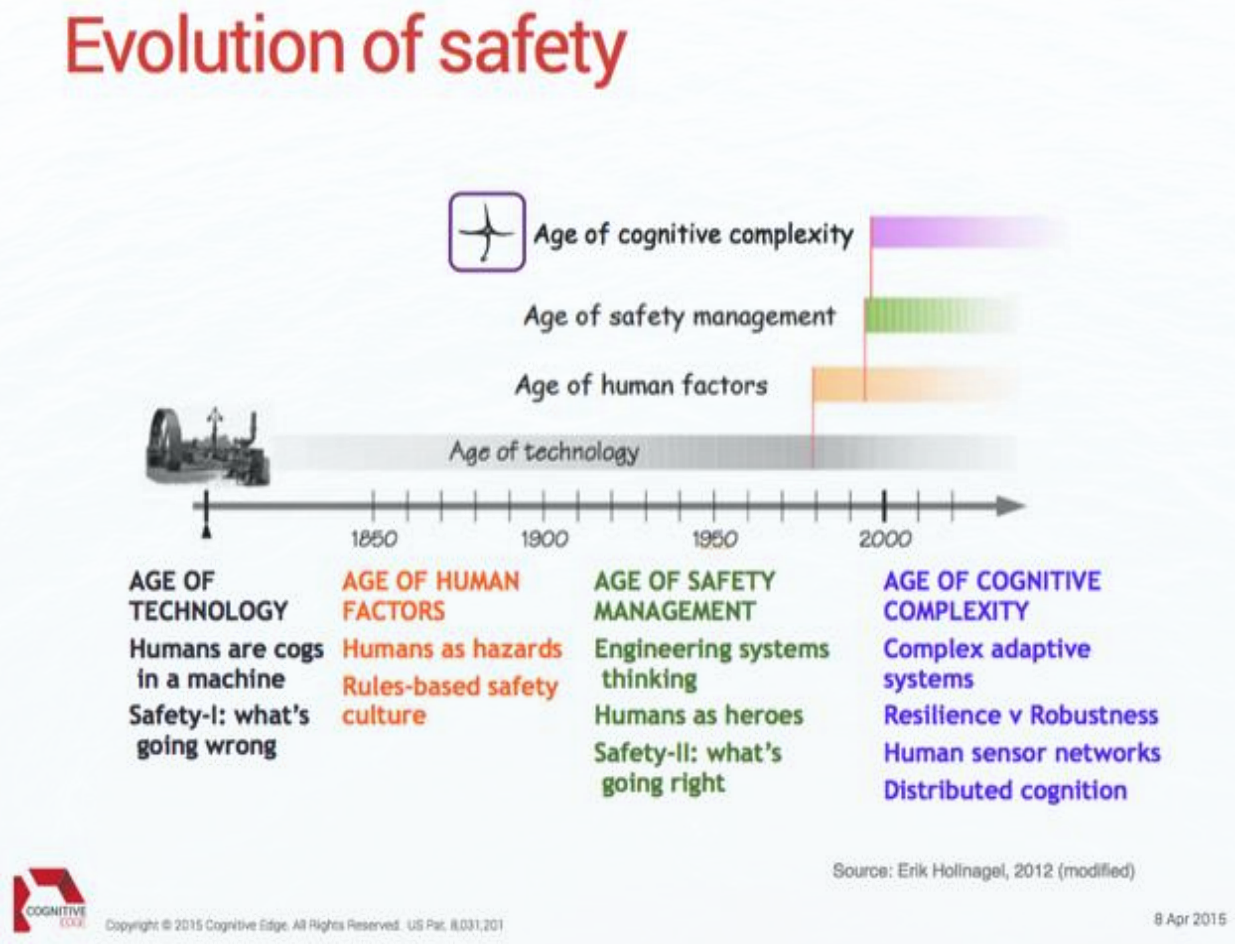
# The Wrong Paradigm



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# How does it feel on board?

## Conflicting Goals

Your priority is safety, emissions, greenhouse gas piracy, security, making money, doing things quicker, ballast water, doing the paperwork

?

## Duplicate /Conflicting Requirements

You need to follow the owners, charterers, flag states, port states, terminals rules and the qa system, chartering , accounts, purchasing department, procedures

## Communications

Budgets
Planned Maintenance
Spare Gear and Stores
Risk Assessments
Incident Reports
Near Misses
Port and Cargo Info

## Systems

ISO9001
ISO14001
ISM
ISPS
SIRE/CDI
TMSA

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# What can we do?

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# Process-IMarEST HEWG

- Major HE focus (correctly!) is on navigation
- But a fresh look at Human Element from operation, maintenance and management point of view may have value.
- Creates access to different learning.
- Use Septigon model to ensure joined up.
- Provides long term direction to HEWG on areas of interest. Proactive not reactive.
- Makes good use of diversity of HEWG
- Identified 10 focus areas and three themes.

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# Themes/Focus Areas

- People Centred Management (PCM)
  - Resilient Management
  - Workload
  - Changing the Paradigm
- People Centred Design
  - Ship and Engine Room Design
  - Human Centred Management
  - Automated Interfaces
  - Standardisation
- 21st Century Skills (Upward Resilience)
  - Changing skill set and skill fade
  - Changing life aboard
  - Engine room teamwork

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# PCM Strategy/Issues

- Improves **all** operational dimensions including safety, sustainability, operational integrity, efficiency and reliability.
- 'Joined up' across management systems, people, technology.
- Create debate/deliver **som**e ideas now, not a long term, 'deep and quiet' research project.
- Need to consider barriers to delivery:-
  - Entrenched positions.
  - Conflict with current rules.
  - Legal issues and liability.
  - Resources.
  - Losing the good bits of the current paradigm.
- Need to identify collaborators and test ideas. (current phase)
- Need to understand Resilience Engineering. (current phase)

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# PCM Strategy

## Changing the Paradigm

| *Old Paradigm* | *New Paradigm* |
|---|---|
| Multi Layered Compliance | Single Layer Compliance |
| Continuous Change | Sustainable Improvement |
| Incentive/Fear | Professional |
| KPI for Everything | Performance Monitoring |
| Safety 1 | Safety 2 |
| Human Error | Human Contribution |
| Procedure Based | People Centred |
| Goal Conflict | Goal Clarity |
| Legal/Liability | Learning |

**Creating the environment for resilience**

## Resilient Company

Resilient management systems that deals with Normal/Abnormal/Emergency Operations

Four Pillars
- Responding
- Monitoring
- Anticipating
- Learning

Upward/Downward Resilience

Creating the Space for Resilience

**Turn off the tap**

## Workload

Reducing Incoming Process

Better processing of requirements

Simplify

**Outcome**
**Better**
*Safety*
*Reliability*
*Efficiency*
*Sustainability*

*The Blunt End* — *The Sharp End*

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# Resilience Engineering Primer

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# Resilience Engineering

**Short Definition**

*The ability to succeed under varying conditions*

***Long Definition***

*The ability of a system to adjust its functioning prior to, during or following changes and disturbances so that it can sustain required operations under both expected and unexpected conditions*

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# The Resilient Shipping Company

The resilient shipping company will be able to succeed in changing circumstances:-

- At a corporate and operating strategy level.
- At an operating and commercial management level.
- At a resource and systems level.
- At the sharp end/front line operating level.

A resilient system is an adaptive system that works for you not against you!

*A critical difference is in timescale. The time to react at the corporate level to changes will generally be much longer than at the front line.*

*Strategic changes may result in gradual change in operating conditions at the front line and this needs to be anticipated.*

*Our focus is the sharp end but the blunt end can enable resilience or destroy it.*

***Resilience Engineering needs to be understood and adapted to the marine environment***

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# Resilience on one slide

Downward Resilience
Resilience inherent in industry and manager systems. Creation of culture

Resilience
The ability to succeed in changing circumstances

**Responding** (Knowing what to do)

**Learning** (Knowing what has happened)

**Monitoring** (Knowing what to look for)

**Anticipating** (Knowing what to expect)

Ability to reconfigure in changing circumstances


Upward Resilience
Skills

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# Conclusions

- People add value they are not just an ‘error prone’ component.
- Is it complex or did we make it complex?
- Don’t just serve the machine or workload will go out of control. High workload and prescriptive systems mean low resilience.
- Systems, people and technology needs to be ‘joined up’ to deal with complexity.
- Late 20th century paradigm is based on prescriptive process and ‘unruly technology’ with limited adaptation for the person.
- If you want resilience put people at the centre and design hardware and process around them.
- Its about **People** not ‘human……’