AGENDA

Classification: Process/Role
- Classification and Statutory Services
- Oversight of Classification Societies
- Class Role in Marine and Offshore Safety

Classification: Current Issues
- IMO RO Code
- EU 3rd Maritime Safety Package
- Mutual Recognition
- Harsh Environments: IMO Polar Code
- IACS 2015 - 2016 Focus

Classification: Future Challenges
- Cybersafety & Cybersecurity
- Human Element & Classification
- Class in the Future
CLASSIFICATION: PROCESS/ROLE

- Class societies establish and apply technical standards for the design, construction and survey of marine related facilities, including vessels and offshore structures
Classification is a Process

- Technical standards (Rules and Guides) are not design codes
- Technical plan review and design approval according to Rules
- Surveys during new construction and equipment certification according to the Rules
- Subsequent, periodic surveys for maintenance of class
- Survey of damages, repairs and modifications
CLASSIFICATION AND STATUTORY SERVICES

- Class Societies perform delegated certification services on behalf of:
  - Governmental Agencies/Flag States
    - National Requirements
    - International Maritime Organization (IMO) Conventions
      - SOLAS/MARPOL / Loadline
      - ISM/ISPS

- Referred to as Recognized Organizations
OVERSIGHT OF CLASSIFICATION SOCIETIES

- International Association of Class Societies (IACS)
- International (IMO)
  - IMO RO Code
- EU Regulations for ROs (e.g., European Maritime Safety Agency, QACE)
- Flag State Agreements, Inspection, Oversight and Audits
- Port State Control
- Extensive internal auditing of Classification Societies in accordance with IACS Quality Management Requirements and ISO (9001, 17021) Standards
OVERSIGHT OF CLASSIFICATION SOCIETIES (CON‘T)

- **International Association of Classification Societies (IACS)**
  - Twelve **Members**
    - ABS: American Bureau of Shipping
    - BV: Bureau Veritas
    - CCS: China Classification Society
    - CRS: Croatian Register of Shipping
    - DNV/GL: Det Norske Veritas/Germanischer Lloyd
    - IRS: Indian Register of Shipping
    - KR: Korean Register of Shipping
    - LR: Lloyd’s Register
    - NK: Nippon Kaiji Kyokai (ClassNK)
    - PRS: Polish Register of Shipping
    - RINA: Registro Italiano Navale
    - RS: Russian Maritime Register of Shipping

- IACS member Societies class over 90% of all commercial tonnage and offshore structures
- IACS is a technical body, not a trade association
CLASS ROLE IN MARINE AND OFFSHORE SAFETY

- A stakeholder in the safety network
- Recognized Organization
- Involved in joint industry and government research
- Complete lifecycle approach to projects
  - Safety Performance
  - Risk Reduction
A Class Certificate issued in favor of the M/V Donald Trump is an attestation that:

1. The M/V Donald Trump is seaworthy.
2. The M/V Donald Trump is fit for its intended purpose.
3. The M/V Donald Trump complies with the Class Rules at the time of survey.
4. The M/V Donald Trump is FANTASTIC like The Donald himself.
5. 1,2,3 as above
3 The M/V Donald Trump complies with the Class Rules at the time of survey.
CLASSIFICATION: CURRENT ISSUES

- IMO RO Code
- EU Reg. 391/2009
  - Mutual Recognition
- Harsh Environments (IMO Polar Code)
- IACS Focus: 2015 - 2016
IMO RO CODE

- RO Code (effective January 1, 2015) provides a consolidated instrument with criteria against which ROs will be assessed, authorized/recognized.
- Purpose is to achieve consistent global assessment of ROs.
- Provides guidance for monitoring of ROs by Administrations.
- Proposal was made to limit Class liability for simple negligence in the RO Code along the lines of the IMO Model Agreement.
EU 3RD MARITIME SAFETY PACKAGE

- Fines and penalties established
  - May be imposed up to 5% of total average turnover of prior 3 years
  - For performance related issues or providing incorrect information to the Commission

- Mutual Recognition of Class Certificates

- Quality Assessment & Certification Entity (QACE)
  - Independent body to provide periodic assessment and ongoing oversight of quality systems

- Transparency must be maintained
  - No contractual clauses may be used to restrict European Commission’s access to information or access on board any ship necessary for the Commission’s assessment

- Separation between Class and Statutory Services
MUTUAL RECOGNITION

- Reg. No. 391/2009 (Art. 10): EU ROs should harmonize their Rules and Procedures related to materials, equipment and components based on equivalent standards issued by the EU ROs.

- Challenges:
  - Mutual Recognition works well for simple components.
  - More complex equipment and components must take into account design, materials, manufacturing processes, testing, intended applications, etc…
  - Class Societies will be required to Class Vessels with Equipment and Components of which they are unfamiliar.
  - Mutual Recognition has not been accepted by all Non-EU Flag States.

- EU ROs have attended workshops and developed different tiers (1-5) based on the complexity of the Equipment and Components.

- Liability concerns arising out of Mutual Recognition.
HARSH ENVIRONMENTS: IMO POLAR CODE

- Long-term endeavor at IMO, enters into force on 1 January 2017
- New mandatory requirements addressing:
  - Safety (construction, equipment, machinery, life-saving)
  - Operations (navigation, communication, procedures, operational limitations)
  - Environmental protection
- IACS assisted and coordinated Polar Code development
- ABS assisted US and IACS delegations to IMO on Polar Code
IACS FOCUS: 2015 – 2016

- Cybersafety and Cybersecurity
- IMO Goal Based Standards
- IACS Quality System Certification Scheme (QSCS) for classification society performance
- Other safety and environmental initiatives
CLASSIFICATION: FUTURE CHALLENGES

- Cybersafety and Cybersecurity
- Human Element / Crew Performance
- Class of the Future
IACS Examining Potential Unified Requirements for Cybersafety/Cybersecurity

Control Systems are Critical to System Safety and Human Safety

- Cyber-physical systems are now found in every domain
  - Pervasive in process control, machinery, ship control, platform management (positioning, drilling, etc.)
  - Significant implications for human and system safety

All cyber-enabled systems must be auditable to understand modes: use, abuse, misuse

- Human-Machine Interfaces (HMI) are important to proper function and control
Next Step is to address Cyber-Enabled Systems in Engineering Environment
- Without new guidance, growth of ‘smart‘ systems will continue to outpace current ability to assess, inspect and monitor
- There is more to inspect than just machinery and software

Areas to Cover in Evolved Survey and Inspection
- **Engineering analysis methods** must expand functional and failure mode analyses
- **Software assurance** to examine functional capability, fail-safe modes, manual backups
- **Data generation, storage, use, communications assessment**
- Cybersecurity and cyber-safety control assessments that inspect security and proper function, in combination with expected crew / user processes
CYBERSAFETY & CYBERSECURITY (CON‘T)

- Cyber-Enabled Systems are key to Maritime Infrastructure
  - Integrated ship control
  - Navigation and charting
  - Machinery control
  - Propulsion control
  - Cargo handling
  - Environmental control (HVAC)
  - Third-party software and services
  - Environmental compliance monitoring

- Standards as part of Survey must evolve with the Technology and its use in Maritime Applications

All include individual risk factors; interface and inter-connections add additional, often unknown risks.
HUMAN ELEMENT & CLASSIFICATION

- SOLAS, STCW, MARPOL
- ISM Code
  - Addresses “People“ Issues Associated with Maritime Safety and pollution prevention. Focus on both Shipboard and Shoreside Management
- Maritime Labour Convention
- Class Societies have largely been working independently on the Human Element
HUMAN ELEMENT & CLASSIFICATION
(CON‘T)

- Maritime Labour Convention (MLC) sets out seafarers’ rights to decent conditions of work
- Creates conditions of fair competition for countries & ship-owners
- Updates and consolidates 37 existing ILO Conventions
- Considered to be the 4th pillar of maritime regulations

STCW  SOLAS  MARPOL  ILO MLC
Objectives in the Maritime Setting:
- Improve human performance and safety
- Reduce human error
- Increase productivity
HUMAN ELEMENT & CLASSIFICATION (CON‘T)

- Design and layout/ambient environment
  - Guidance Notes on the Application of Ergonomics to Marine Systems
  - Guidance Notes on the Ergonomic Design of Navigation Bridges
  - Guides for Crew Habitability on Ships, Offshore Installations, Workboats, and MODU’s
  - Guides for Passenger Comfort on Ships and Yachts
  - Guide for Means of Access for Inspection
  - Guide for ILO MLC Title 3 - Accommodations (MLC-ACCOM)
  - Guide for Ergonomic Notations
  - Guidance Notes on Noise and Vibration Control
  - Guidance Notes for Implementing HFE into the Design of Offshore Installations
  - Guidance Notes for Ergonomics to Marine Engineering Spaces
HUMAN ELEMENT & CLASSIFICATION (CON’T)

- **People**
  - Research on human performance, health hazards and shock
  - Mariner Personal Safety (MPS) project

- **Management and organization**
  - Guidance Notes on the Investigation of Marine Incidents
  - Guidance Notes on the Safety Culture and Leading Indicators for Safety Assessments
    - Ships
    - Offshore Drilling
    - Offshore Production
  - Guidance Notes for the Development of Procedures and Manuals
HUMAN ELEMENT & CLASSIFICATION (CONT’)

- Controls, displays, alarms and their integration
- Video-display units and workstations
- Valves – operation, location and orientation
- Labeling, signs, graphics, and symbols
- Stairs, vertical ladders, walkways, and ramps
- Maintenance and materials handling
- Crew habitability
- Application of ergonomics to design
- Anthropometrics (Physical Dimensions of Crew)
To enable organizations with cargo-carrying vessels to self-assess their safety culture and leading indicators of safety

Directed at cargo-carrying vessel owners and operators

Contents

- Administering the survey
- Safety culture questionnaire
- Safety factors
- Objective and subjective leading indicators
- Interpreting the results
- Action plan
Outlines the process of effective incident investigation and root cause analysis

Provides a Root Cause Analysis Map and an explanation of every item on the Root Cause Analysis Map

Provides instructions for 5 Whys Tree, Fault Trees, Causal Factors Charts

Cross references root causes to industry standards such as ISM Code
CLASS IN THE FUTURE

- More Condition-Based, Continuous and Risk Driven Surveys
- Predictive, Data Driven Analytics (Big Data)
- More Sophisticated Survey Equipment
QUESTION 2

The most effective way to incorporate the Human Element into the Class/Certification process is by:

1. Underwriters requiring Human Element Certificates in their policies as a condition precedent to coverage.

2. Expansion of the Class Rules by the Classification Societies to cover the Human Element.

3. All stakeholders in the safety regime supporting the development of standardized Human Element certification.
2 All stakeholders in the safety regime supporting the development of standardized Human Element certification.
QUESTIONS?

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