Workshop on Future Shipbuilding

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Changing demands on shipbuilders
Current regulatory trends and possible future developments related to safety

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1. Further development of standards

2. Moving from regulatory compliance to safety culture

3. The human element and the role of classification societies
Ships are designed, constructed and operated according to standards defined within an international regulatory framework

- IMO Regulations
- IACS Classification Rules
- ISO and other Industry Standards
OECD countries use Regulatory Impact Assessment (RIA) as basis for regulatory decision making (e.g. EU carried out 109 Regulatory Impact Assessments in 2011)

Scientific approaches to regulation: Cost Benefit Analyses, Efficiency Analyses, Risk Assessment, Formal Safety Assessment, Safety Level Approaches, Goal Based Standards

The aim is to continually reduce risk that is the main goal in safety and environmental protection regulations

These scientific approaches heavily rely on data, models, expert judgment, assumptions, decision making criteria

The regulatory decision process is made more transparent by analyzing the needs for new regulations and evaluate their impact on safety, the environment and the large scale economy
Goal-Based Standards

- Tier I: Goals
- Tier II: Functional requirements
- Tier III: Verification and Acceptance criteria
- Tier IV: Classification Rules and Industry Standards
- Tier V: Procedures and Quality Systems implemented by individual Parties
Standard Solutions

Goal
Main ship functions
Systems, sub-systems and components

Tier III

Standard Solutions
Alternative Solutions

Statutory Requirements
Class Rules
Industry Standards

Verified by competent Bodies
- Flag Administrations / ROs
- Classification Societies
- Charterers

Compliance culture

Safer and Cleaner Shipping
Goal-Based Ship Construction Standard Solutions

Oil Tankers
- Common Structural Classification Rules for Double Hull Oil Tankers
- Length greater than or equal to 150m

Bulk Carriers
- Common Structural Classification Rules for Bulk Carriers
- Length greater than or equal to 90m

Harmonized Common Structural Rules

Safer and Cleaner Shipping
Alternative Solutions

Tier III

- Systems, sub-systems and components
- Main ship functions
- Safety levels

Standard Solutions
Alternative Solutions

New safety culture

Verification that alternative solutions meet the required safety levels by means of risk-based approaches

Industry Innovations
Risk Assessment

Safer and Cleaner Shipping
Innovative Ship Designs

Safety Level

No Rules

Formal Safety Assessment

Risk Based Design & Appraisal

Safer and Cleaner Shipping
Sustainability

Safety

Costs & Benefits

Environment
Air Environment

GHG Emissions
Energy Savings
Minimum Power
Sea Environment

Contamination

Ballast Water Management

Energy Savings

Safer and Cleaner Shipping
Safety Culture

Human Element

Design issues
- Hardware / Software interface / Working environment

Operational issues
- Crew Training / Ship Management
Classification Society Role

Design phases
- Verification of rules / alternative design solutions
- Surveys during construction / equipment testing

Operational phases
- Periodic surveys / ship management audits
Requirements and practices

- Classification societies use a lot of feedback information from:
  - Design experience
  - Service experience
  - Research and experimental data
Useful data

- Accident statistics (IHS-Fairplay, LMIU, GISIS, EMSIP)
- Reliability or failure data for equipment
- Human reliability data
- Structural Reliability data (material, strength, wave, response, etc.)
- Fleet data (exposure data)
- Cost data on risk control options
- Cost of inspection, maintenance, replacements, off-hire, etc.
- Cost of clean-up, pollution, etc.

The level of detail necessary will depend upon the particular risk control option.
Data challenges

• Equipment reliability data and failure rates
• Exposure data
• Failure definitions, accident classification
• Failure data are conditional, not absolute (conditional on accident, inspection, maintenance, etc.)
• Data are depending on reporting
• Varying units: per hour operation, per hour elapsed, per year, per lifetime, per trip, per time used etc.
• Cost data
• Commercial data
• Intellectual property rights