Development of GBS Tier V (Industry Standards and Practices)

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Why GBS?

- **Higher standards** than today for ships design and construction
- **More comprehensive safety work** at sea
- **Super regulation** linking all current IMO instruments (SOLAS, MARPOL and Load Line)
- **Clarifying relationship** between Class and National Administrations
Expectations to GBS

IMO (Public / Regulators)
- Safe
- Environmentally Friendly
- Robust

Shipping Industry
- Fit for purpose
- Reliable
- Easy to Maintain

Higher Standards

Quality Control

Liability

Shipbuilding Industry
Effects of GBS on shipbuilding industry

- Increase of initial cost
  - Design and engineering
  - Materials and equipments
  - Labor

- Change of processes and facilities
  - Design and approval
  - Construction quality assurance

- Change of shipbuilding environment
  - Market: Seller’s Market -> Buyer’s Market
  - Engineering service market
  - Role of Administrations, ...
Effects of GBS

Goal Based Standards

Partly Introduced in SOLAS II-2

Risk Based Approach

Setting the goals on safety, security and environmental protection

Acceptable Level of risk

Public Demands

Flexibility on Design to achieve the goal

Verification and approval design

Ships achieving the goal

[Source: Mr. K. Yoshida, 2005]
Effects of GBS

Linking risk-based ship design and approval with goal-based standards

IMO mission statement

Goal-based Standards
Goals, objectives, functional requirements, principles

Risk breakdown → Verification
Prescriptive regulations and rules

Risk breakdown → Verification
Risk-based regulations and rules

Design → Approval
Traditional ship

Design → Approval
Risk-based ship

Design → Approval
Novel ship

Risk-based Design → Risk-based Approval

Safety through Innovation
Scope of Interests

Tier I
- Goals

Tier II
- Functional Requirements
- "Rule of rules" by IMO

Tier III
- Verification of Compliance

Tier IV
- Prescriptive Regulations & Class Rules
- By Class/Administrations

Tier V
- Industry Standards & Codes of Practice
- By Industry
Importance of Tier V

- Flexibility in design and approval
- Different interpretations for GBS
  - Based on different expectations from different stakeholders
- Feed-backs to rules/ regulations
  - IMO, IACS, …
- Practical means to assure the safety
  - e.g airplane
- To improve the productivity in design and construction
Roles of IMO, ISO and Industry

IMO
Conventions (MSC, MEPC)

ISO
Development/Maintenance of IS (TC8*1, TC188)

Industry
Design/construction (shipyards, suppliers)

Proposal/Technical advices

Technical advices (SC/WG/CG, ...)

Proposals/participations (TC/SC/WG, ...)

Requirements (mandatory)

Requirements/Guidelines (non-mandatory)
IMO (MSC/SCs)

- Goals for
  - Ship safety
  - Cargo safety
  - Passenger safety
  - Environmental safety ...

- Functional Requirements for
  - Design
  - Construction
  - Survey and maintenance
  - Recycling, ...

- Verification scheme for
  - Class. Rules (e.g CSR)
  - Regulations of IMO and Administrations
ISO (TC8/ SCx, TC67, TC188)

<table>
<thead>
<tr>
<th>TC8/ SCx</th>
<th>IS published</th>
<th>IMO links (published)</th>
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</thead>
<tbody>
<tr>
<td>TC8 ships and marine technology</td>
<td>3</td>
<td>1(0)</td>
</tr>
<tr>
<td>SC1 lifesaving and fire protection</td>
<td>18</td>
<td>57(17)</td>
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<tr>
<td>SC2 marine environment protection</td>
<td>2</td>
<td>3(0)</td>
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<tr>
<td>SC3 piping and machinery</td>
<td>41</td>
<td>15(7)</td>
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<td>SC4 outfitting and deck machinery</td>
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<td>5(0)</td>
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<tr>
<td>SC6 navigation</td>
<td>32</td>
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<tr>
<td>SC7 inland navigation vessels</td>
<td>44</td>
<td>0</td>
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<tr>
<td>SC8 structures</td>
<td>21</td>
<td>7(5)</td>
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<tr>
<td>SC9 general requirements</td>
<td>9</td>
<td>7(3)</td>
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<tr>
<td>SC10 computer applications</td>
<td>17</td>
<td>5(1)</td>
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<tr>
<td>SC11 inter modal and sea shipping</td>
<td>2</td>
<td>2(1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>212</strong></td>
<td><strong>133(52)</strong></td>
</tr>
</tbody>
</table>

[Source: ISO/TC8 N1000 Status report, 2005]
Development of GBS Tier V

- **Category of industry standards**
  - Processes/methodologies
  - Performance standards
  - Materials and equipments
  - Others

- **Stakeholders**
  - Regulators
  - Classification societies
  - Ship operators
  - Shipbuilders
  - Suppliers
Identification of Tier V

- Based on Tier I, II and III of GBS
- FSA methodology can be used

FSA Methodology:

1. Step 1: Hazard Identification
2. Step 2: Risk Assessment
3. Step 3: Risk Control Options
4. Step 4: Cost Benefit Assessment
5. Step 5: Decision Making Recommendations

[FSA Guidelines, MSC/Circ.1023]
## Goals and Functional Requirements

<table>
<thead>
<tr>
<th>Goals</th>
<th>Functional Requirements</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety of the ship</strong></td>
<td>- Design transparency&lt;br&gt;- Structural Integrity&lt;br&gt;- Protection against corrosion&lt;br&gt;- Survey and maintenance (design stage)&lt;br&gt;- Structural accessibility&lt;br&gt;- Intact stability&lt;br&gt;- Floatability / (reserve) buoyancy&lt;br&gt;- Maneuverability&lt;br&gt;- Sea-keeping performance&lt;br&gt;- Anchoring&lt;br&gt;- Mooring/towing</td>
<td>- Structural strength&lt;br&gt;- Fatigue limit state&lt;br&gt;- Residual strength/accidental limit state&lt;br&gt;- Structural redundancy&lt;br&gt;- Watertight and weather−tight integrity&lt;br&gt;<strong>SOLAS 74</strong></td>
</tr>
<tr>
<td><strong>Environment protection</strong></td>
<td>- Pollution prevention&lt;br&gt;- Recycling</td>
<td>- air pollution&lt;br&gt;- water pollution&lt;br&gt;<strong>MARPOL 73/78</strong></td>
</tr>
<tr>
<td><strong>Human Elements</strong></td>
<td>- safety of crews&lt;br&gt;- safety of passengers</td>
<td></td>
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<tr>
<td><strong>Others</strong></td>
<td>- safety of cargos&lt;br&gt;- security</td>
<td></td>
</tr>
</tbody>
</table>

[Source: MSC83/5/3, 2007]
Examples of Tier V

- **Guidelines:**
  - Design for safety
  - Design for environment
  - Design for human elements
  - Ship construction files, ...

- **Performance standards:**
  - Protective coating
  - ...

- **Material and equipments:**
  - Safety equipments and devices
  - Information systems

- **Other risk control options:**
  - Training
  - Management
**GBS Tier V Initiatives in Korea**

- **Objectives:**
  
  Development of IMO GBS related industrial standards for Shipbuilding

- **For 5 years (2007.8~2011.7)**

- **Led by KOSHIPA**

- **Co-worked with MOERI, KR, RIMS**

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**Diagram:**

- Project Manager (KOSHIPA)
- Advisory Committee
- Technical Committee
- WG1: common issues
- WG2: structure
- WG3: ship systems
- WG4: construction
- WG5: small size ships
Challenges

- Identification of standards
- Participation of experts from industry
- Supports from R&DS
- Collaborations with
  - Industries (shipping, shipbuilding, suppliers)
  - Other nations
- Feed-back to IMO
Suggestions

- **Industry Standard is “more than regulations”**
  - for safety assurance
  - for their competitiveness

- **International level of collaboration is required among worldwide shipbuilding industry for:**
  - Development of international standards
  - reflects on IMO GBS and related rules/regulations

- **Further discussions are required at ASEF**
Thank you for your attention!

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