Guidance Notes on the Investigation of Marine Incidents
Incidents & Human Element

- Incidents (accidents and near misses) and their causes must be identified and documented
  - Including the role of humans in incidents

- ABS has created tools to assist in investigation of marine incidents
  - ABS Guidance Notes on the Investigation of Marine Incidents
  - ABS Incident Investigation Model

Available for download at:
Objectives of ABS Technique

- Provide a technique that:
  - Guides the conduct of investigation and root cause analysis
  - Helps identify, document and trend the causes of accidents and near misses for a variety of incident types:
    - Groundings, collisions, near misses, pollution events, injuries, etc.
  - Supports Class-related activities such as ABS SQE notation, as well as the International Safety Management Code and the International Ship and Port Facility Security Code
  - Supports industry initiative such as Tanker Management and Self Assessment
  - Is sufficiently flexible to allow customization to a client's own management and Safety Management System
The ABS Incident Investigation Model below, encapsulates a process for conducting investigations following losses whether they are related to people, structures, machinery, equipment, outfitting or other factors.
Investigation of Incidents

- Appropriate resources shall be applied to investigate incidents

- Varying risk/consequences levels drive:
  - Investigation management
  - Classification of severity
  - Types of investigation teams, techniques, and documentation appropriate for each incident

- Classification of Severity
  - Categories of Incidents are defined in the Guidance Notes as follows:
    - Catastrophic
    - Major Accident
    - Minor Accident
    - Near Miss
Identification of Losses

- Acute losses reported by field personnel
- Chronic losses identified by examining incident data
- Investigation of chronic events focuses on medium to high risks
- The investigation may be performed using techniques such as failure modes effects analysis, fault tree analysis, and 5-whys analysis
Investigation Team

- Comprised of:
  - At least one person knowledgeable in the process or activity involved
  - A team leader with appropriate knowledge and skills to investigate and analyze the incident
  - For catastrophic incidents, a lead investigators may be subject to additional training in advanced investigation approaches
Obtaining the Facts of an Incident

- Gather relevant information of the incident for the subsequent investigation
- The level of effort shall reflect the severity of the incident - greater “Depth of Analysis” for incidents with increasing actual or potential loss
- A stepwise process is provided:
  - Assess needed “Depth of Analysis”
  - Establish a team
  - Data Gathering and Preservation
  - Data Analysis using 5-Whys, Fault Trees, Causal Factor Charts, etc.
Determining Root Causes of the Causal Factors

- Identify management system weaknesses that may explain why causal factors existed
- Focus on the management systems that were in place to monitor and control the human activities and equipment integrity/reliability
- Use the Marine Root Cause Analysis Map to provide structure and consistency to the results
- Document paths through the Marine Root Cause Analysis Map

**Root Cause** is defined as the depth in a chain of events to a level where an intervention could reasonably be identified, and where management has the power to implement change and thereby prevent re-occurrence.
Root Cause Analysis Map

- Root Cause map has been “marinized” based on reviews of hundreds of marine accident reports
  - Reported causes, cause categories, etc.
  - Taxonomy of root causes constrained, comprehensive.
Root Cause Analysis Map
Determining Loss Potential

- Consider Potential as well as Actual Consequences
- Make Qualitative versus Quantitative Estimates
- Use a Loss Potential Matrix
- Consider Probability of Recurrence Estimates
- Be Realistic about Potential Consequences

<table>
<thead>
<tr>
<th>Frequency (Likelihood)</th>
<th>Minor</th>
<th>Serious</th>
<th>Major</th>
<th>Catastrophic</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Aid/ Medical Treatment</td>
<td>No effects outside vessel, not reportable</td>
<td>More than 10 K but 100 K or less</td>
<td>More than 100 K but 1M or less</td>
<td>More than 1M</td>
</tr>
<tr>
<td>Lost Work Day</td>
<td>Recordable event requiring outside notification</td>
<td>Significant impact outside vessel and reportable</td>
<td>Release with long term effects or irreparable damage</td>
<td>Environmental</td>
</tr>
<tr>
<td>10K or less</td>
<td>More than 10 hours but 1 day or less</td>
<td>More than 1 day but 7 days or less</td>
<td>More than 7 days</td>
<td>Property Damage Costs</td>
</tr>
<tr>
<td>10 hours or less</td>
<td>More than 10 hours but 1 day or less</td>
<td>More than 1 day but 7 days or less</td>
<td>More than 7 days</td>
<td>Schedule</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consequence (Potential)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor</td>
</tr>
<tr>
<td>First Aid/ Medical Treatment</td>
</tr>
<tr>
<td>Lost Work Day</td>
</tr>
<tr>
<td>10K or less</td>
</tr>
<tr>
<td>10 hours or less</td>
</tr>
</tbody>
</table>
Develop Recommendations for Each Causal Factor

- Recommendations:
  - Level 1: Address causal factors
  - Level 2: Correct the intermediate causes discovered as part of the investigation
  - Level 3: Correct similar problems that exist on the vessel or in other areas of the organization (other vessels and/or shore facilities)
  - Level 4: Reduce likelihood of reoccurrence
Reporting Requirements

- Reports contain:
  - Date and time of the incident
  - Date and time the investigation started
  - A description of the incident
  - Identification of causal (contributing) factors
  - Identification of root causes
  - Recommendations from the investigation
  - List of investigation team members and their roles
Reporting Requirements

- The level of reporting detail required is related to the risks associated with an incident.

- Additional documentation may include:
  - Parts testing/examination reports
  - Witness statements
  - Causal factor chart
  - Fault tree
  - Incident investigation forms
  - Test plans
  - Photographs or videotapes
  - Maps and diagrams, etc.
Follow-up to Investigation Recommendations

- Recommendations tracked to resolution
- Need for tracking form
- Reasons for rejecting recommendations
- Tracking recommendation status
- Documentation of final resolutions
- Trending: Requirements to database findings and periodic review
Training Requirements

- Entity undertaking incident investigation needs to address:
  - Training Policy
  - Role of Safety Manager
  - Requirement for Team Leaders

- ABS has a Guidance Note available to download to familiarize interested parties called the:
  - ABS Guidance Notes on the Investigation of Marine Incidents
Summary & Conclusion

- It’s important (and often required) to identify the factors and root causes of accidents and incidents.
- Processes and tools are available to reliably identify these factors and root causes, including:
  - ABS Guidance Notes on the Investigation of Marine Incidents
- Applying these techniques will promote consistency in the investigations, and allow subsequent analysis of trends.