ABS Project on Mariner Personal Safety – Part of ABS’ Mariner Safety Research Initiative
Mariner Personal Safety (MPS) Project Overview

- Objective: Obtain and review incident and near miss reports
- Collected approximately ~ 150,000 records (injuries and near miss)
- Database represents more than 2,100 vessels and 50,000 mariners
- Constructed a database to:
  - Identify trends
  - Create benchmarking statistics
  - Identify potential corrective actions
  - Identify potential lessons learned
- Develop and share results
Near Miss Rates for Industry Partners

Near Miss Rates
Average 180 Close Calls per 1,000,000 man hours

Report back to Industry Partners (IP) their data vs. MPS

Company A 340
Company B 290
Company C 265
Company D 240
Company E 190
Company F 180
Company G 120
Company H 120
Company I 100
Company J 85
Company K 55

ABS Human Factors Activities – An Overview
Industry Partner Uses for Project Results

• Directing safety auditing efforts and new design efforts:
  - Identify potential hazards for specific spaces on board (e.g., work and accommodation areas)
  - Identify potential hazards related to crew activities (e.g., line handling to food preparation)

• Help direct safety intervention, prioritization and resource allocation

• Input to safety measurements (metrics) – benchmarking

• Tool Box Talks and additional safety material for the crew

• Support corporate safety management system
Near Miss Reporting

• Investigation of MPS near misses demonstrated
  - No consistent definition of a near miss
  - No consistent data being captured for incident reports

• A possible consensus definition is:
  - A commonly accepted (but not universally) definition is “a sequence of events and/or conditions that could have resulted in a loss”

• A good starting point for data reporting include:
  - Who and what was involved?
  - What happened, where, when and in what sequence?
  - What were the potential losses and their severity?
  - What was the likelihood of a loss being realized?
  - What is the likelihood of a recurrence?
Work with Industry / SOCP

• The US Ship Operations Cooperative Program (SOCP) asked us (ABS & LU) to draft documents for near miss & injury reporting and recording
• US Maritime Administration (MARAD) key sponsor
• Goals Include:
  - Standardized terminology
  - Standardized reporting practices
  - Development of industry benchmarking
  - Development of industry trending data
• Deliverables – Draft ASTM Best Practices for MARAD to submit to ASTM for publication
The Mariner Safety Research Initiative has officially launched a public website which contains maritime safety related documents and resources.

Some of the products available on the website include:
- Toolbox Talks, safety spotlights, lessons learned, corrective actions, ergonomic and safety discussion papers, related websites, and information on how to get involved.

Visit the website here: http://maritime.lamar.edu/
Incident Data – a Second Look…

• Identify those factors associated with human error
• Identify those factors associated with the incident that can be corrected and/or improved
• Support the planning and guiding of pragmatic guidance
• Possible development of human factors / ergonomics methodologies to:
  - Collect incident data
  - Identify human-error-related causes
Analyses Based on ABS/Industry Data

- The ABS Mariner Safety Research Initiative (MSRI)
- The Australian Transportation Safety Board (ATSB)
- The Marine Accident Investigation Board (MAIB, United Kingdom)
- Transportation Safety Board – Canada (TSB-Canada)
- The Nautical Institute’s Marine Accident Reporting Scheme (MARS)
- The United States Coast Guard (USCG)
Qualitative Grouping of Causes

- **SA² (Situation Assessment and Situational Awareness)**
  - Knowledge, skills, and abilities, and improper task commission / task omission

- **Management Group**
  - Fatigue, communications, BRM, procedures, manning levels

- **Risk Group**
  - Risk tolerance/risk taking, navigation vigilance, complacency, task omission (deliberate), lookout failures

- **Non-Human Error Group**
  - Uncharted hazard to navigation, material failure, unknown cause
Qualitative Grouping of Causes

Comparison of Incident Data Sets

Non Human Error Group
SA2 Group
Risk Group
MGMT Group

ABS MSRI
ATSB
UK MAIB
TSB Canada
Database Review - Observations

- Ineffective watch-keeping
- Inappropriate SA² (situational assessment / situational awareness)
- Preoccupation with administrative tasks
- Failure to communicate intentions (officer/master/pilot)
- Communication / language difficulties
- Lack of assertiveness – failure to challenge decisions (perceived to be incorrect) with officers/pilot
- Failure to comply with procedures / regulations
- Lack of training
Why Procedures are not Followed

- Inadequate knowledge and skill related to the procedure
- Experience and complacency
  - Perceived relevancy, learning that some areas of compliance afford no apparent benefit
  - Low frequency conditions influences risk perception
- Workload, fatigue and time constraints
- Individual characteristics – FFD, risk perception error, high risk tolerance, risk taking tolerance
- Lack of oversight, no accountability/traceability
- Unwieldy procedure design
- Quality system failure, to include MoC
- Law of least effort (energy conservation)
Example Observations

• Failure to follow the Rules-of-the-Road
  - Lack of knowledge, experience, understanding, or training
    • A quote from an incident report says - “It is sadly obvious that half the world's shipping is wandering around expecting the other half to keep out of their way”

• Lookouts
  - Lack of a proper lookout is common, including no apparent look out
  - Undo reliance on electronic navigational aids
    • A quote from an incident report - “The initiating cause of the collision was . . . [Vessel A] chief officer was unaware of the approach of his ship to [vessel B], and [vessel B] bridge team was unaware of the approach of [vessel A].” ........
      • Basically, this quote says that the collision was a surprise on both bridges
Summarizing . . .

- Several incident databases and archives were reviewed / analyzed
- Approximately 85% of incidents appear associated with human error
- SA$^2$ highly indictable in many human errors
- There are implications to better address “human element” issues such as
  - Safety Culture
  - MoC
  - BRM, SA$^2$, communications, procedure design, etc….
  - Human (crew member) machine interface designs
  - Habitability (fatigue recovery, ambient environment, etc…)
In a Nutshell.....

- A good safety culture and strong safety management system (including BRM) are crucial to safer vessel operations
- Make an individual’s compliance expectations consistent with management’s
  - Management consistently communicates compliance expectations
  - Full compliance is expected as a matter of habit and culture
- Compliance is simply a part of the organization’s safety culture
- Maintain readiness of individuals
  - Fatigue, training, workload....
- Emphasize observable management oversight, and that non-compliances will be noted and evaluated
Thank You
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