Risk Implications of Vessel Flag Registry

Presentation to Marine Board
by
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Tanker *Mandoil II*—Collision off Oregon Coast, Feb. 29, 1968. with Japanese freighter Suwaharu Maru enroute Tacoma

11 Casualties, 33 rescued.
Crude Oil spill > 20,000 tons.

Built—Amsterdam Shipyards
Ownership—Greek
Flag—Liberia
Officers—Greek
Crew—mixed
Star Clipper
Swedish owners``
Built in Belgium

Bermuda Shipping Company
Singapore Operating Company
Maltese Flag
Classed by DNV

Officers—Eastern Europe
Deck Crew—Goa
Engineers--mixed
Hotel Crew—south/east Asia
Sources of Opinion

• Experience as CG Captain of the Port
• Risk assessments of Lower Mississippi, Prince William Sound, Puget Sound
• Development of Ports and Waterways Safety Assessment Tool
• Design and facilitation of USCG International Marine Safety Workshop
• Research for publications in fields of marine safety and port safety
General Answers to Specific Questions

- Committee would like to see evidence of specific risk/safety outcomes due to US regulations, specifically USCG safety regulations. Ideally this evidence would support a rough cost benefit.
- I can provide information that indicates that these outcomes exist, but they are difficult to measure at any level of detail.
- This is true for two reasons: Safety is a systems issue, and detailed sub system data is not available.
Focus has been on detecting and penalizing sub standard vessels and operators, not in tracking cost of compliance

• Marine safety workshop problem statement:
  – A small but unacceptable number of vessel are not maintained in a safe condition and are not operated safely
  – The existing [international maritime safety] system does not adequately detect unsafe conditions.
• Recognition of need for increased Port State authority was evidence that some Flag States and Classification Societies were ineffective.
• Port state authority hindered by lack of transparency in ownership and operation.
Pressure
To Decrease
Cost

Actions
increase
Costs

A SYSTEMS VIEW OF MARITIME SAFETY
EXHIBIT 3
Indicators of At Risk Vessels: Flag is an implied predictor

- PAWSA—Fleet composition is one of 6 risk factors for a port, % high risk deep draft vessels is sub attribute (“those more likely to have a casualty due to poor maintenance or poor crew performance.”)
- GW/RPI Risk model—11 attributes influenced risk determination: vessel age, vessel type, critical system redundancy, owner type, pilotage, management changes, flag, vessel violation history, vessel casualty history, key personnel violation history
- GW/VCU collision model—interacting vessel type
<table>
<thead>
<tr>
<th>Fleet Composition</th>
<th>Traffic Conditions</th>
<th>Navigational Conditions</th>
<th>Waterway Configuration</th>
<th>Immediate Consequences</th>
<th>Subsequent Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of High Risk Deep Draft</td>
<td>Volume of Deep Draft Vessels</td>
<td>Wind Conditions</td>
<td>Visibility Obstructions</td>
<td>Number of People on Waterway</td>
<td>Economic Impacts</td>
</tr>
<tr>
<td>Percentage of High Risk Shallow Draft</td>
<td>Volume of Shallow Draft Vessels</td>
<td>Visibility Conditions</td>
<td>Channel Width</td>
<td>Volume of Petroleum Cargoes</td>
<td>Environmental Impacts</td>
</tr>
<tr>
<td></td>
<td>Volume of Fishing &amp; Pleasure Craft</td>
<td>Tide &amp; River Currents</td>
<td>Bottom Type</td>
<td>Volume of Hazardous Chemical Cargoes</td>
<td>Health &amp; Safety Impacts</td>
</tr>
<tr>
<td></td>
<td>Traffic Density</td>
<td>Ice Conditions</td>
<td>Waterway Complexity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attributes of USCG Ports and Waterways Safety Assessment Tool**
Deep Draft Shipping includes multiple business models based on cargo type with different risk management policies and practices

- Containerized cargo
- Petrochemical cargo
- Bulk cargo
- LNG/LPG
- Vehicle carriers
- Cruise ships
- Passenger ferries
FIGURE 1

Port Security Event Chain: (Containerized Cargo Subsystem)

Organizational Subsystem Factors—liner trade operates as common carrier in closed conference system serving fixed routes, known owners & operators

Situational Factors—threat/attack could be at port city, destination city, or any other point on inter modal container land route

Stage 1 Exposure Factors
- E.g.
  - Terrorist Groups
  - Terrorist Goals
  - Terrorist Plans
  - Terrorist Capabilities
  - Containerized cargo system provides access to US cities
- Requires sophisticated container port facilities

Stage 2 Vulnerability Factors
- E.g.
  - Inability to securely load containers in all ports in world
  - Inability to track containers prior to port of loading
  - Inability to inspect all containers at port of loading
  - Inability to inspect all containers at port of entry
  - Vulnerable cargo handling technology

Stage 3 Attack attempt
- E.g.
  - Weapon in container
  - Bomb
  - Biological agent
  - Toxic Chemical
  - Dirty bomb
  - Nuclear device

Stage 4 Attack
- E.g.
  - Explosion/fire
  - Chemical release
  - Biological release
  - Nuclear explosion
  - Dirty bomb

Stage 5 Consequence
- E.g.
  - Injuries
  - Deaths
  - Persons in Peril
  - Vessel/port Damage
  - Environmental threat

Stage 6 Delayed Consequence
- E.g.
  - Loss of Life
  - Terror
  - Supply chain disruption
  - Economic impact
  - Environmental damage
FIGURE 2

Port Security Event Chain (Bulk Cargo Subsystem)

Organizational Subsystem Factors: - bulk carrier ownership difficult to ascertain; operators, ships and crews may be substandard, ships operate on spot market, no fixed routes, cargo uninspected

Situational Factors: -- threat/attack based on using ship as weapon, impact based on ship location, response location

Stage 1
Exposure Factors
- E.g.
  - Terrorist Groups
  - Terrorist Goals
  - Terrorist Plans
  - Terrorist Capabilities
  - Easy access to own/operate bulk ships
  - bulk cargo ships carry large volumes of concealed cargo

Stage 2
Vulnerability Factors
- E.g.
  - Inability to determine owners
  - Inability to determine cargoes w/o inspecting ship
  - Inability to Inspect cargoes at port of loading
  - Inability to determine ships/cargoes bound for US prior to ANOA

Stage 3
Attack attempt
- E.g. Attempt to
  - Use ship to transport weapon
    - Bomb
    - Biological agent
    - Toxic Chemical
    - Dirty bomb
    - Nuclear device
    - Hijack ship to use for intentional act (e.g. collision, fire)

Stage 4
Attack
- E.g.
  - Launch attack from ship:
    - Explosion/fire
    - Chemical release
    - Biological release
    - Nuclear explosion
    - Dirty bomb explosion
    - Intentional collision with passenger vessel, tanker, fixed facility

Stage 5
Consequence
- E.g.
  - Injuries
  - Deaths
  - Persons in Peril
  - Vessel/port loss/damage
  - Environmental threat

Stage 6
Delayed Consequence
- E.g.
  - Loss of Life
  - Terror
  - Economic impact
  - Environmental damage
Regulations and Cost

- Compliance with regulations generates cost.
- Savings due to intentional non compliance to international regulations by foreign flag carriers can be significant.
- Non compliance is correlated with type of trade (more intense price competition in trade, more advantage to cutting corners), Flag State, and Classification Society (often the same people).
- Many Non US companies are low risk operations—ISM safety management not compliance culture in ownership and management, vigorous flag state oversight, IACS classification society.
- Easier to evaluate risk contribution of cargo preference than it is to evaluate cost benefit of safety regulations.