

# An Analysis of Major Maritime Casualty from Bridge Resource Manage

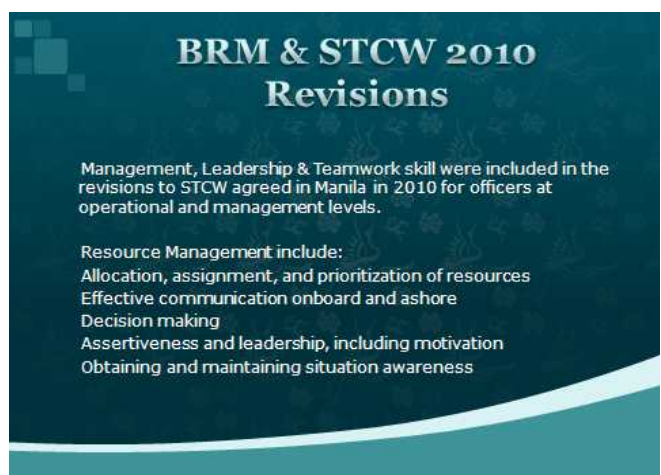
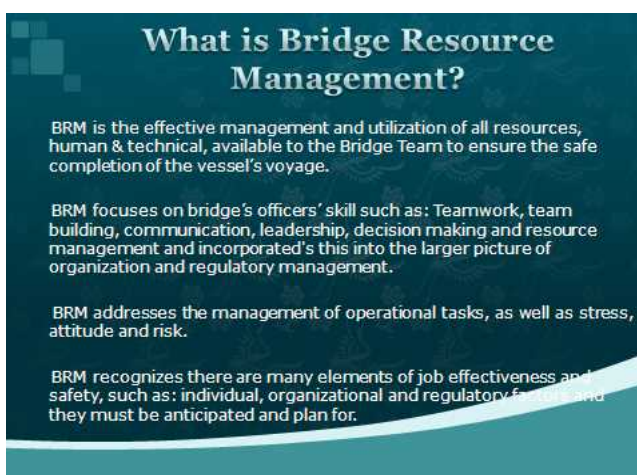
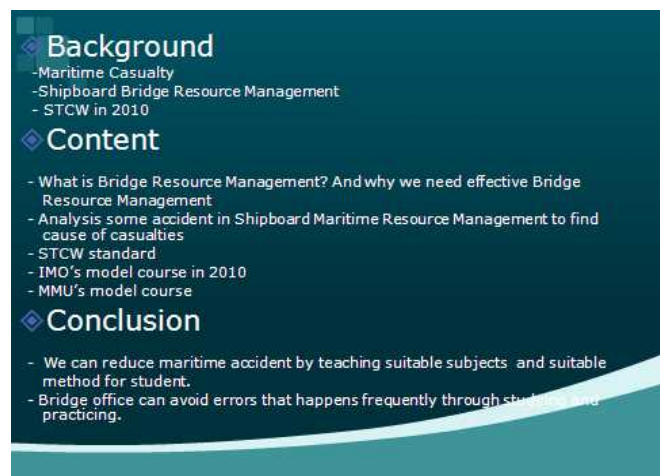
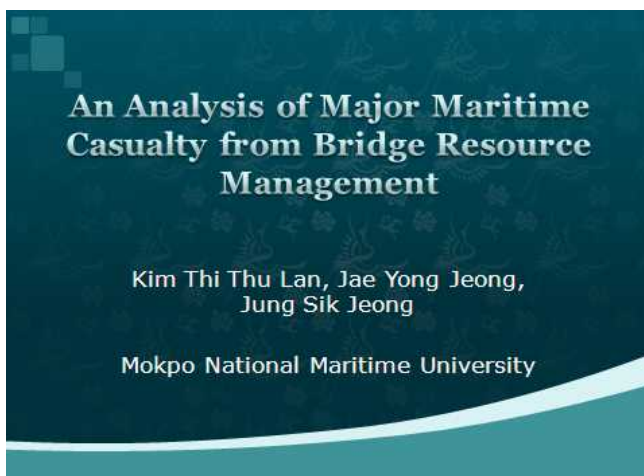
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Abstract : This report represents analysis of the maritime casualty in terms of Bridge Resource Management. We evaluate the attitudes and knowledge of bridge officer regarding human factors issues that have been identified as causal to mishaps in high-risk situations. So to reduce human errors our goal is to establish effective officer resource management (ORM) program which is based on all subjects for cadets in IMO model course. In harmonization with STCW(The International Convention on Standards of training, Certification and Watch-keeping for Seafarers), as the result, the curriculumss in the maritime education institutions is surveyed to improve our education system and then reduce the human errors by mariners at sea.

Key words : Maritime Casualty, Human error, Maritime education, IMO Model Course



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# Voyage Planning

Con Cho (1981) & Exxon Valdez (1989)



## Accident

**Con Cho**  
Captain, Master and officer did not check to write ship's dist and the side of the side.

**Exxon Valdez**  
Captain, Master and officer did not check to write ship's dist and the side of the side. Raw body was wrong side of the ship.

## IMO's standard

Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks taking into account:

- 1. Restrictions
- 2. Meteorological conditions
- 3. Ice
- 4. Seasonal shifts
- 5. Multiple destination systems
- 6. Areas of navigational alerts

## MMU Model Course

- 1. Navigator Equipment
- 2. Communication
- 5. Law, Convention, Regulation

# Stress, Complacency and Distraction

Stockholm-Andrea Dona (in 1956), Lash Atlantico (in 1981), Noordam (in 1993)

Captain failed to make a visual observation of the vessel because of the number of people on the bridge.

There were seven other people on the bridge in 20:27hrs

Captain did not check the VTTCP using ARPA, because radar was used for navigation purposes. Collision avoidance preoccupied with Navigation track from 20:30 to 20:36hrs

The Noordam Passenger Ship in 1993

## IMO's standard

Transmit and receive information by visual signaling, ability to transmit and receive signals in Morse light.

Ability to use the International Code of Signals Communications within the operators area of responsibility as one primary, successful.

Use of Radar and ARPA to maintain safety of navigation information obtained from radar and ARPA is correctly interpreted and analyzed taking into account the equipment and prevailing circumstances and conditions

## MMU Model Course

- 1. Navigator Equipment
- 2. Communication
- 3. Leadership, Team building, teamwork

- 5. Law, Convention, Regulation

# Standardized Procedures

Ehimaru & USS Greenville (2001)



## Accident

\*Greenville's chief of the board was assigned to create a watch bill a supplement.  
\*The watch officer failed to make the required report taking into account the result of the sonar search.  
\*The captain's permission is so slow, not clearly.

## IMO's standard

\*Establish watch-keeping arrangements and procedures.  
\*Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea Basic Principles to be Observed regarding a National Vessel. Effective bridge team work procedures.

## MMU Model Course

- 1. Navigator Equipment
- 2. Communication
- 3. Leadership, Teambuilding
- 4. Commanding and Ship Operation
- 5. Law, Convention, Regulation

# Communication

**External communication (Mount Ymitos and Noordam in 1993)**  
The Captain of Mount Ymitos received no answer on the radio from the Noordam, which was ahead of him but which did not move after within about 2 miles of this position.

**Non-communication (Lash Atlantico & Hellenic Carrier Collision in 1983)**  
Lash Atlantico's crew spoke English but the Hellenic carrier's crew was Greek. And they could not speak as second language. Neither who made any effort to establish radio communication before to make passing arrangement.

**Incomplete communication (Bright Field Collision in 1996)**  
The pilot aboard the Bright Field spoke English, but the crew spoke Chinese. The pilot did not know of their transfer because each crew spoke only their own language. Thus, the pilot did not know that the transfer were occurring and he did not even understand enough of what was being said to press his internal authority to inquire.

**Internal language barriers (Mount Ymitos & Noordam Collision in 1993)**  
Noordam had Dutch officers routinely spoke Dutch on the bridge and conducted watch relief, position fixing and other work in their own language. The Lash's bridge crew spoke English. A number of radio messages were exchanged but neither understood the change of coming officers did not announce to the helmsman.

**Some languages (USS Dwight D. Eisenhower Collision in 1989)**  
The captain did not know ship's speed had been reduced before he was advised of this by the OOD because he heard neither the navigator's recommendation nor the OOD's order.



# Situational Awareness and voyage Monitor

Royal Majesty (1995)



## Accident

\*The ship and coast had made the same voyage as many times that the master was sure they knew their position but they wrong.  
\*The crew did not know their position, even though they took a fix on the coast and were monitor showed normally situation of ship.  
\*So they could not sign 02 to navigate and in dangerous position. The captain did not realize his ship speed had been changed until it was too late to take corrective action. Thus, both of the ship and the crew's comprehension do not need properly in their ship's circumstance.

## IMO's standard

\*Determine position and the accuracy of resultant position fix by any means - Position determination in all conditions.  
\*1. Visual observations.  
\*2. Surveys and observations including the ability to use appropriate charts, notices to mariners.  
\*3. Long modern electronic navigational aids, with specific knowledge of their operating principles, functions, accuracy and mode of operation or interpretation of information and method of correction to obtain accurate position fixing.

## MMU Model Course

- 1. Navigator Equipment
- 2. Communication
- 3. Leadership, Teambuilding, Teamwork
- 4. Law, Convention, Regulation

USS Dwight and Spanish D. Eisenhower (CVN 69) and Spanish bulk carrier Urduliz (1988)



## IMO's standard

Use the standard Marine Navigational Vocabulary as replaced by the IMO Standard Marine Communication Phrases and use English, in written and oral form. English language. Adequate knowledge of the English language to enable the officer to use charts and other nautical publications to understand meteorological information and messages concerning ship's safety and operation, to communicate with other ships and coast stations and to perform the officer's duties also with a multi-lingual crew. Standard Marine Navigational Vocabulary as replaced by IMO Standard Marine Communication Phrases.

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- 1. Navigator Equipment
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# Fatigue



The National Transport Safety Board (NTSB) determined the accident was caused by the master's impaired judgment from acute fatigue - the master had been awake for 33 hours



The grounding of the Exxon Valdez in 1989, the most significant, was the failure of the third mate to properly maneuver the vessel because of fatigue and excessive workload. Other contributing factors were the failure of Exxon Shipping Company to provide a fit master and a rest and sufficient crew



Star Princess Grounding in 1995 the pilot exacerbated by chronic fatigue cause by sleep apnea

IMO's standard  
A knowledge of personnel management, organization and training on board ship

MMU's Model course  
1. Navigator Equipment  
2. Leadership, Team-building, Teamwork  
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# Error Chain

## Accident: Blackthorn-Capricorn Error Chain

<b>Voyage Planning</b> The officer did not have up-to-date side traffic classes made up under what pilot/visual information she may not have had. He was on the ship at 0400 to find out what traffic would be encountered in Tampa Bay.	<b>Standardized Procedures</b> The Blackthorn's executive officer did not know the name of the other ship who was operating in, and the system made an infrared radar contact for an unknown ship. However, there was no contact. Blackthorn's standardized procedure of "close approach" seem to have failed.	<b>Situational Awareness and Voyage Monitoring</b> The executive officer did not know the geographic name of the location so he could not know the situation. Blackthorn's captain looked at his radar and tracked the unknown Capricorn for the southern coast. The result was that no one had an accurate understanding of the traffic situation.
<b>Pilot Integration</b> Stress, Complacency, Distraction Capricorn's pilot did not watch on call for Blackthorn after accident happened because they thought nothing to do with the navigation of the Capricorn and Capricorn. These ship was in a narrow channel in the evening without engaging in communication either at a critical juncture. Blackthorn thought they would get back to homeport after 4 months, so no one in the shiphouse had been underway during that 4 months at the all night and none of ship's officers had ever made a night transit of Tampa Bay.	<b>Teamwork</b> The Captain, the watch officer and the executive officer did not contact to report to each other ship's situation.	<b>Fatigue</b> The captain of Blackthorn was suffering from fatigue.
<b>Communication</b> Three ship could not contact together in VHF-FM bridge-to-bridge radio - this is a litany of failed inter-ship communications. Blackthorn did not make a report about Blackthorn's lookout and the phone talker because they believed the pilothouse personnel already knew of Capricorn. - This is a litany of failed inter-ship communication.	<b>Chain of Human Events</b> Blackthorn's failure to take a pilot: 1. Complacency of our navigation team was sufficient. 2. Reduced communication breakdown - unable to talk with other pilots because lack of a pilot. 3. Lack of education awareness - not knowing what other ships were in the bay because no pilot with the required knowledge was aboard. 4. Poor decision brought on by stress and fatigue - the nearby groundings along the yard period followed by a day of sea trials, repairs and departures.	

# Pilot Integration

Accident

Figaro Accident in 1988 - The helmsman did not tell the pilot that the rudder was hard

Queen Elizabeth Grounding in 1992 - The pilot did not share full information to the captain

Star Princess Grounding in 1995 - The pilot had no conversation about handling of the ship with the vessel's crew for at least 30 mins prior to the accident

The Mount Ymitos-Noordam Collision in 1993 - The pilots prepared for ship departure

IMO's Standard

MMU's Model course  
1. Navigator Equipment  
2. Communication  
3. Leadership, Team-building, Teamwork  
5. Law, Convention, Regulation

# Error chains

<b>Accident</b> <ul style="list-style-type: none"> <li>1. Exxon Valdez Error Chain</li> <li>2. USS Dwight D. Eisenhower Error Chain</li> <li>3. Royal Majesty Error Chain</li> <li>4. Blackthorn-Capricorn Error Chain</li> </ul>	<b>IMO's standard</b> <ul style="list-style-type: none"> <li>The minimum knowledge, understanding and proficiency required for certification is listed in column 2 of A-II/2 in STCW in 2010</li> </ul>	<b>MMU's Model Course</b> <ul style="list-style-type: none"> <li>1. Navigator Equipment</li> <li>2. Communication</li> <li>3. Leadership, Team-building, Teamwork</li> <li>5. Law, Convention, Regulation</li> </ul>
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# Teamwork

The Queen Elizabeth 2 Grounding in 1992-

The Captain & navigator had one valid plan & the pilot had another one bit neither plan was used and the outcome was catastrophe

Bright Field, Noordam, Mount Ymitos, Figaro

Because of having problems of language and potential cultural conflict that can disrupt good communication and thus effect teamwork

IMO's Standard:  
Maintain a safe navigational watch -> Thorough knowledge of effective bridge team work procedures

MMU's Model course  
1. Navigator Equipment  
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5. Law, Convention, Regulation

# Conclusion

- 80% of all marine accidents are related to human errors. It is considered that human error is related to management skill operator status, working environment and decision -> Maritime Education and Training will play an important role to reduce Maritime Casualty.
- IMO has recommend specification of minimum standard of competence for officers which include the knowledge and attitude in relation to the principles of Bridge Resource Management.
- To make BRM successfully, it is important for officer to know the knowledge and skill, experience of officer, etc. To do so, we need establish effective officer resource management education program. Thus, we referred and harmonize MMU's model course to give effective Maritime Education and Training for cadets.