Current and Outlook of Maritime Safety in the ESCAP Region


Capt. Youngmo Kim, Consultant
Mandate

**Seminars on Improving Maritime Transport Safety**

Why does ESCAP do it?

- **General Assembly**
  - Resolution 70/197 (December 2015)
    
    "recognizes that regional connectivity plays an important role in promoting inclusive and sustainable development in Asia and the Pacific and that maritime transport is an essential factor in supporting the post-2015 development agenda"

- **ESCAP Commission**
  - Resolution 71/6 (May 2015)
    
    "recognizes that regional connectivity plays an important role in promoting inclusive and sustainable development in Asia and the Pacific and that maritime transport is an essential factor in supporting the post-2015 development agenda"
Project overview

Seminars on Improving Maritime Transport Safety

What is the aim and scope of the study?

- Expected outcome:
  - Improving capacity of member states to formulate and implement policies linked to maritime transport safety

- Period: from April 2016 to March 2017

- Partner: Korea Maritime Institute (KMI)

- Study scope:
  - Passenger Vessels (domestic & international transport)
  - Focusing on Vessel safety, prevention of ship accidents and rescue and investigation system
  - Target Countries: Bangladesh, Brunei Darussalam, Cambodia, China, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Viet Nam
Main activities

Seminars on Improving Maritime Transport Safety

What is the components of the study?

- Review experience and practices from selected countries
- Analyze safety trends in maritime transport of the region and identify the main organizational, technical, social and human factors behind accidents
- Suggest policies and measures to improve maritime safety
- Organize one expert group meeting and a seminar on measures to enhance maritime safety in the ESCAP region

- Refer to international studies and status paper of the selected countries
- Refer to survey questionnaires

Structure of Status paper:

- General introduction of maritime
- Policies and institutional framework
- Challenges in managing maritime safety
- Good practices to enhance maritime safety including regulation, training, monitoring and compliance

1. Information on the country’s maritime transport
2. Safety management administration
3. Passenger ship safety management system
4. Maritime casualties
5. Maritime accident investigation
6. Search and rescue
7. Others

UNESCAP Maritime Transport Safety Questionnaire

In close cooperation with the Ocean Maritime Institute, the Transport Division of ESCAP is implementing a project aiming at improving maritime transport safety in the ESCAP region. Under this project, a survey is being conducted to assess the current status and quality of maritime transport safety in selected member countries. The information collected through the survey will serve as the basis for the development of policy recommendations for the region.

Respondent's Details

Country:
Name:
Title:
Organization:
Address:
Phone number:
Email:

Date of completion: the questionnaire: __________________________ 

Please return the questionnaires by 31st July 2017
Mr. Jeong Park, Transport Division, UN ESCAP
Tel: +82-31-575-6356, email: parkj@un.org
We thank you for your cooperation and contribution.
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   2.3 Reason of Accident

3. Current Status of Maritime Safety
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   3.2 Safety Management and Monitoring System
   3.3 Maritime Accident Investigation
   3.4 Search and Rescue
1.1 Outline of Asia-Pacific Economy

1) Growth of Asia-Pacific Economy

- Asia’s economic growth exceeds global average but faces headwinds as China slows; emerging market underperformance.
- But Asia-Pacific markets including China most linked to US economy exhibit slower rates of growth.
- The markets with the higher components of domestic demand and less exposed to exports/trade cycle are exhibiting relatively stronger growth.

Source: Finding value in Asia-Pacific real estate in 2016, HEITMEN
2) Change of Asia-Pacific Population

- Consensus expects growth around 2.5% ~ 2.6%.
- Asia is getting older, richer, and more urban.
- These shifts will impact on tourism, especially in cruise and ferry markets.

Source: Finding value in Asia-Pacific real estate in 2016, HEITMEN
1.2 Growth of Asia-Pacific Passenger Market

1) Growth of Asia-Pacific Ferry Market

- China estimated the second largest global cruise market by 2017.
- Cruise lines see Asia-Pacific as a huge opportunity with 62 ships will visit Asia between 2014 and 2015.
- In the next ten to thirty years, Asia is probably the only continent in which the size of the middle class will expand dramatically.

Source: Asia cruise boom in focus, [http://www.cruiseandferry.net/articles/](http://www.cruiseandferry.net/articles/)

Source: [http://www.cruising.org/docs/](http://www.cruising.org/docs/)
2) Growth of Asia-Pacific Passenger

- Recent cruise passengers carried Asia-Pacific region is dramatically increased 13.5% over 2015.
- Nearly 1.4 million Asian vacationers in 2014, a 34% compound annual growth rate since 2012.
2.1 Major Ferry Disaster

1) Korea – Sewol

- The sinking of MV *Sewol* occurred on the morning of 16 April 2014, en route from Incheon to Jeju in South Korea.
- In all, 304 passengers and crew members died in the disaster.
- The captain was sentenced to life imprisonment.
(1) GM change before and after structural change

Before
- Ballast water: 1,023 ton
- Passenger/cargo: 2,525 ton
- GM: 0.95 m

After
- Ballast water: 2,030 ton
- Passenger/cargo: 1,070 ton
- GM: 1.05 m

Actual (estimate)
- Ballast water: 761 ton
- Passenger/cargo: 2,142 ton
- GM: 0.50 m
(2) Heeling phenomenon when course change

During ahead (Rudder midship) :
Without list

Changing course to starboard :
List to starboard

Continue to starboard :
List to port by centrifugal force
(3) Loss of Stability

Before: Stable  After: Stable  Actual (estimate): Unstable
2) Japan – Shiun Maru

- The *Shiun Maru* disaster was a ship collision in Japan on 11 May 1955, during a school field trip, killing 168 people.

- The Shiun Maru ferry sank in the Seto Inland Sea after colliding with another Japanese National Railways (JNR) ferry, the *Uko Maru*, in thick fog.

- The captain of *Uko Maru* was 1.5 years imprisoned and 2 years probation.
3) China – *Dongfang zhi Xing*

- On June 1, 2015, MV *Dongfang zhi Xing* was sank near Jingzhou approximately 15m deep waters in Yangtze river.
- 442 deaths were confirmed, with 12 rescued.
- The official report found that a massive downburst in the thunderstorm, with gusts over 118 km/h was the likely cause of the capsizing.
4) Myanmar – *Boat Tragedy*

- The ferry capsized on the Chindwin River on its way to the central city of Monywa on October 15, 2016.
- A total of 73 people, including scores of teachers and university students, died.
- The ferry had been laden with at least 300 passengers when it sank, exceeding its official capacity of 120.
5) Bangladesh – *Miraj-4*

- On 15 May 2014, the 30-metre double-decker ferry MV *Miraj-4* was hit by a large wave as it traveled in the Meghna River.

- Between 150 and 200 people were on board at the time, of whom about 75 survived. The official death toll stood at 54 with an unknown number of people missing.
6) Indonesia – Senopati Nusantara

- The M/s Senopati Nusantara was sank in a storm on December 30, 2006.
- The stormy weather was suggested to be the main cause of the disaster.
- At least 400–500 people are thought to have drowned.
7) Philippine – Doña Paz

- The MV Doña Paz was sank after colliding with the oil tanker MT Vector on December 20, 1987.
- With an estimated death toll of 4,386 people and only 24 survivors.
- The vessel was seriously overcrowded with carried no radio and that the life-jackets were locked away. But official blame was directed at the MT Vector, which was found to be unseaworthy, and operating without a license, lookout or qualified master.
## 8) Summery

<table>
<thead>
<tr>
<th>Name</th>
<th>Nationality</th>
<th>Year</th>
<th>No. of Death</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewol</td>
<td>Korea</td>
<td>2014</td>
<td>304</td>
<td>-Unstability -Overloading</td>
</tr>
<tr>
<td>Shiun Maru</td>
<td>Japan</td>
<td>1955</td>
<td>168</td>
<td>-Thick fog -Poor lookout</td>
</tr>
<tr>
<td>Dongfang zhi Xing</td>
<td>China</td>
<td>2015</td>
<td>442</td>
<td>-Bad weather</td>
</tr>
<tr>
<td>Boat Tragedy</td>
<td>Myanmar</td>
<td>2016</td>
<td>73</td>
<td>-Overcrowding</td>
</tr>
<tr>
<td>Miraj-4</td>
<td>Bangladesh</td>
<td>2014</td>
<td>54+</td>
<td>-Bad weather</td>
</tr>
<tr>
<td>Senopati Nusantara</td>
<td>Indonesia</td>
<td>2006</td>
<td>400~500</td>
<td>-Stormy weather</td>
</tr>
<tr>
<td>Doña Paz</td>
<td>Philippine</td>
<td>1985</td>
<td>4,386</td>
<td>-Overcrowding</td>
</tr>
</tbody>
</table>
2.2 Accident and Disaster

1) Total Losses Trends

*Total Losses:* Five year moving loss average by top regions 2006-2015 (All vessels)
2) Marine Casualties and Incidents (06~15)

Source: IMO GISIS
3) World Ferry Accidents

- 163 accidents in 14 years (2000~2014)
- Over 17,000 deaths (conservative estimate) in 40 countries
- 95% of accidents occurred in developing countries
- Four countries, 10% of all countries, responsible for >50% of all accidents

Source: Abigail Golden, Worldwide Ferry Safety Association
4) Proportion of Ferry Accidents

FIGURE 1. Proportion of ferry accidents occurring in top 3 countries

FIGURE 2. Proportion of ferry fatalities occurring in top 5 countries
5) Dead & Missing Record by Country

Dead & Missing 2000-2012

Total 15,763

- Dead and missing
- # Accidents
6) Dead & Missing Record by Sea/Region

Dead & Missing 2000-2012

- Domestic: 7,760 (93%)
- International: 1,080 (7%)
- Total: 15,763

Sea Dead Missing Dead&Missing
- Domestic 6,923 7,760 14,683
- International 185 895 1,080
- All 7,108 8,655 15,763

Dead & Missing 2000-2012

- OECD: 4 (1%)
- Non-OECD: 15,651 (99%)
- Total: 15,763

Region Dead Missing Dead&Missing
- OECD 112 4 116
- Non-OECD 6,996 8,651 15,647
- All 7,108 8,655 15,763
2.3 Reason of Accidents

1) Human error

Human error (operator error) is recognized as a major cause of accidents and mishaps.

Summary of Results of Human Error

<table>
<thead>
<tr>
<th></th>
<th>Conservative</th>
<th>Liberal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Accidents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Human error by total known cases</td>
<td>61</td>
<td>85</td>
</tr>
<tr>
<td>% HE by total cases; known &amp; unknown</td>
<td>53</td>
<td>73</td>
</tr>
<tr>
<td>% unknown</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Fatalities (dead and missing)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. fatalities caused by human error</td>
<td>15,156</td>
<td>18,595</td>
</tr>
<tr>
<td>% fatalities caused by HE by total known cases</td>
<td>75</td>
<td>92</td>
</tr>
<tr>
<td>% fatalities caused by HE by total case, known &amp; unknown</td>
<td>70</td>
<td>86</td>
</tr>
</tbody>
</table>

2) Weather

- Encountering storms and unsafe weather conditions will always pose an unavoidable risk when traveling by water.
- Implicated in more than 50% of accidents
- Seasonal weather conditions such as monsoon season or tropical storm season may contribute to seasonally higher rates of accidents in regions like Southeast Asia.
  - Typhoons, fog and low visibility etc.
3) Overloading and overcrowding

- Severe and rampant
  - throw off a boat’s balance or make it top heavy and more prone to capsizing
- Contributed to up to 43% of total accidents
- Vessels have capacity limits, but more passengers mean more profits
- Not usually fatal on its own— but makes vessels more vulnerable to other threats
4) Poor quality of crew

- If crewmembers are inadequately trained, they are uncertain of how to respond in the event of a disaster, exacerbating these problems.
- Unexperienced and low waged crews do not implement the provisions of maritime law strictly.
5) Old vessel

- Ferries in developing countries are often old vessels, sometimes repurposed to operate in waterways for which they weren’t designed.
3. Current Status of Maritime Safety

3.1 Safety Management Administration

1) Number of vessel

![Bar chart showing the number of vessels for different countries, with categories for Ocean and Domestic. The chart includes data for Bangladesh, Cambodia, India, Korea, Myanmar, Pakistan, Sri Lanka, and Vietnam.]
2) National maritime safety policy

<table>
<thead>
<tr>
<th></th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM SP</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Interval</td>
<td>N/A</td>
<td>N/A</td>
<td>Time to time</td>
<td>5 years</td>
<td>N/A</td>
<td>5 years</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

- Establishment of maritime policy expresses the will of government’s maritime safety.
- India, Korea, Pakistan and Sri Lanka established national maritime safety policy periodically.
### 3) Organization of maritime safety administration

<table>
<thead>
<tr>
<th>Policy</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOS</td>
<td>NPWT</td>
<td>MOSRH</td>
<td>MOMF</td>
<td>MOTC</td>
<td>PMSA</td>
<td>MPS</td>
<td>MOT</td>
<td></td>
</tr>
<tr>
<td>Enforcement</td>
<td>DOS</td>
<td>NCMS</td>
<td>DOS</td>
<td>MPSS (KCG)</td>
<td>MOTC</td>
<td>P.Navy</td>
<td>SCG</td>
<td>MOT (Vinamarin)</td>
</tr>
</tbody>
</table>

- **Type A**: Function of developing policy and enforcement belongings in the same ministry.
  - Example: Japan, China, Vietnam etc.

- **Type B**: Function of developing policy and enforcement belongings in the different ministry.
  - Example: Korea
(1) Type A
- Example: Japan (Ministry of Land, Infrastructure, Transport and Tourism – Japan Coast guard)
(2) Type B
- Example: Korea (Ministry of Oceans and Fisheries – Ministry of Public Safety and Security)
3.2 Safety Management and Monitoring System

1) Safety management system

- The purpose of ISM code is to ensure safety at sea, to prevent human injury or loss of life and to avoid damage to the environment and to the ship.

- ISM Code applies to international trading commercial ships over 500 GT.
2) **Safety management system for domestic vessel**

- Some countries (India, Korea and Sri Lanka) implied DSM Code to domestic vessel.

<table>
<thead>
<tr>
<th></th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domst. cargo ship</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Domst. passenger</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>No</td>
</tr>
</tbody>
</table>

* Operating management Regulation for domestic passenger ship
3) Vessel inspection organization

- Classification society will validate that construction is according to relevant standards and carry out regular surveys in service to ensure compliance with the standards.
- Some countries have their own classification society and other countries delegate their authority to RO.
- Korea has special inspection organization for domestic passenger ship

<table>
<thead>
<tr>
<th>C. S.</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign RO</td>
<td>GL, DNV, LR, NKK, RINA, BV</td>
<td>18 ROs incl. ICAS</td>
<td>BV, DNV, LRS, ABS</td>
<td>BV</td>
<td>LR, BV, NK, ABS, KR</td>
<td>LR, BV, NK, SGS</td>
<td>ICAS(9)</td>
<td>IACS</td>
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<tr>
<td>Pass. ship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>KST</td>
</tr>
</tbody>
</table>
4) Vessel traffic service (VTS)

- A vessel traffic service (VTS) is a marine traffic monitoring system to keep track of vessel movements and provide navigational safety in a limited geographical area.

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of VTS</th>
<th>No. of VTSO</th>
<th>VTSO training</th>
<th>Other organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>1</td>
<td>7</td>
<td>No</td>
<td>No (VTMS)</td>
</tr>
<tr>
<td>Cambodia</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>Yes (GICOMS*)</td>
</tr>
<tr>
<td>India</td>
<td>Major port</td>
<td>15-20</td>
<td>Yes</td>
<td>Yes (DOMA**)</td>
</tr>
<tr>
<td>Korea</td>
<td>18</td>
<td>336</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Myanmar</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td>Yes (CG)</td>
</tr>
<tr>
<td>Pakistan</td>
<td>3</td>
<td>10</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>None</td>
<td>None</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2</td>
<td>57</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

* GICOMS: General Information Center on Maritime Safety and Security
** Department of Marine Administration
3.3 Maritime Accident Investigation

1) No. of accidents in maritime shipping (2015)

- Number of accidents in domestic vessel are much more than international shipping.
2) No. of passenger ship accidents (2015)

- Accidents of international passenger ship are rare than domestic ferry.
3) Cause of accident (2015)

- Human error is main reason of maritime accidents

<table>
<thead>
<tr>
<th>Cause of Accident</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcrowding</td>
<td>2</td>
<td>None</td>
<td>N/A</td>
<td>3</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Ship quality</td>
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<td>None</td>
<td>N/A</td>
<td>31</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Weather</td>
<td>4</td>
<td>1</td>
<td>N/A</td>
<td>6</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>Human factor</td>
<td>8</td>
<td>None</td>
<td>Yes</td>
<td>229</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
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<tr>
<td>Others</td>
<td>1</td>
<td>1</td>
<td>Yes</td>
<td>10</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>None</td>
</tr>
</tbody>
</table>
### 4) Investigation Organization

<table>
<thead>
<tr>
<th>Organization</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOS</td>
<td>None</td>
<td>DGS</td>
<td>KMST</td>
<td>DOMA</td>
<td>MMD</td>
<td>MSS</td>
<td>Vinamarine</td>
<td></td>
</tr>
<tr>
<td>Invest. Mode</td>
<td>Mono</td>
<td>N/A</td>
<td>Mono</td>
<td>Mono</td>
<td>Multi</td>
<td>Mono</td>
<td>Multi*</td>
<td></td>
</tr>
<tr>
<td>Seriousness</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>IMO code</td>
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<td>No</td>
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<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Investigator</td>
<td>7</td>
<td>None</td>
<td>1/each</td>
<td>23</td>
<td>12</td>
<td>7</td>
<td>7</td>
<td>160</td>
</tr>
<tr>
<td>Disciplinary</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Multi-mode means national investigating organization is integrated to one mode with maritime/aviation/railway investigation function.
3.4 Search and Rescue

1) Rescue capacity
   - The goal of SAR is to locate, stabilize and save individuals in distress.
   - Rescue resources reveals country’s SAR capability.

<table>
<thead>
<tr>
<th>Organization</th>
<th>Bangladesh</th>
<th>Cambodia</th>
<th>India</th>
<th>Korea</th>
<th>Myanmar</th>
<th>Pakistan</th>
<th>Sri Lanka</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution function</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>No. of team</td>
<td>-</td>
<td>N/A</td>
<td>5/team</td>
<td>3,029</td>
<td>-</td>
<td>5</td>
<td>140</td>
<td>180</td>
</tr>
<tr>
<td>No. of ship</td>
<td>Variou s</td>
<td>N/A</td>
<td>160</td>
<td>72</td>
<td>5</td>
<td>5</td>
<td>60</td>
<td>7</td>
</tr>
<tr>
<td>No. of aircraft</td>
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### 3) Maritime risk management organization

**Disaster management cycle**


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<th>Cambodia</th>
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</table>

| CG | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |


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Thank you

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