AAPA Cruise Workshop

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Safety Considerations for the Design

of

Mobile Elevating Gangways

and

Passenger Boarding Bridges

for

Cruise Ships

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It Used to Be So Easy…

Half a Century Ago

Port of New Orleans, LA 2000

Gangway Safety and Design

- **FMT of Trelleborg, Sweden is one of the world's leading designers and manufacturers of safe Mobile Elevating Gangways and Passenger Boarding Bridges**

Safety

I will discuss the parameters for the design of safe Mobile Elevating Gangways and Passenger Boarding Bridges including the all important aspect of avoiding passenger and crew injuries

Design

A number of factors have to be considered for the proper design:

- **Environmental impact**
- **Wind – loads**
- **Local Geometric and fender line**
- **Tidal Fluctuations and passing ship traffic**
- **Present and future Cruise Ships to be served**

Parameters for Safe Design

- **Structural design and codes**
- **Gangway control systems**
- **Correct Calculations of the interaction of the movement between Cruise Ship-Gangway /Bridge**

Codes, Regulations & Legislation

- **ADA (Americans with Disabilities Act)**
- **NFPA 415/417 (National Fire Protection Agency)**
- **UL (Underwriters' Laboratory)**
- **SAE & ASME**
- **ASCE**
- **AISC**
- **EN 25817**
- **EN 287**

Structural Calculations

- **Once the safety parameters of the design have been met, the structural calculations are made in compliance with relevant standards**
- **To make sure that the structural design is correct, all calculations are checked by an independent party**

Operation

The Mobile Gangways/Boarding Bridges controls are designed for safe operation either by an operator’s panel, conveniently located at the Transition Ramp (ship side) – or alternatively by wireless control from the Ships Bridge

Automatic Systems

- **A UPS system will automatically engage in the event of loss of mains power**
- **A Back-up drive system will ensure safe operation of the Gangway in the event of loss of the main system**

Automatic Functions

- **A modern Gangway/Bridge is computer controlled and does not require any human action for adjustments due to Ship movements caused by tidal variations**
- **When the movements of the ship exceed preset ranges an alarm will sound and the Gangway/Bridge will be disengaged or disabled for further passenger movements**

Sensors

- **Modern Gangways/Bridges are fitted with an array of sensors of various kinds, such as: absolute encoders, lasers, infrared and ultrasonic sensors, angle decoders, analogue length sensors and digital limit sensors, all to ensure safety**

On-line Monitoring

- **Mobile Elevating Gangways and Passenger Boarding Bridges are connected via modem for trouble shooting, diagnostics, and software changes all to ensure safety**
- **Automatic, system generated e-mail notification of operational deviations**

Interface Terminal – Mobile Elevating Gangway

If the service envelope of the Gangway requires multiple service positions, a continuous and seamless opening in the Terminal can be provided by the installation of a three-rail sliding door system.

Interface Gangway/Bridge – Cruise Ship

- **Detailed design work is necessary to arrive at an optimal solution of the Transition Ramp**
- **Key considerations include design of fenders/camels – location and size of ship doors – size and position of lifeboats/life rafts or emergency escape slides as well as all other obstructing elements**

Structural Integrity of Quay (Apron)

- **It is of great importance for the safe operation that the quay (apron) can take the calculated live load of the Gangway/ Bridge**
- **In some instances special concrete tracks can be used to secure the foundation for the Gangway/Bridge**

Slope of Gangway/Bridge Tunnels and Walkways

The maximum allowable slopes and lengths of Gangway/ Bridge Tunnels and Walkways are regulated by ADA (Americans with Disability Act)

All FMT designs are in strict compliance with ADA

Main Drive Systems

- **The main drive system shall be electro-hydraulic to be able to instantly react to movements**
- **The hydraulic cylinders shall be fed by several hydraulic pumps to guarantee 100% operation Hydraulic lift cylinders shall be designed in compliance with Det Norske Veritas (DNV) standards**

Gangway/Bridge Exterior Cladding

Modern Gangways/Bridges are to a great extent designed with Glass Walls to create a more passenger friendly environment. Glass Walls, typically 6 mm (1/4”) hardened float glass (BS 6206 Class A) shall be used.

Glass Walls must be able to withstand wind loads of hurricane level winds (146 mph)

Maintenance

All machinery requires periodic maintenance to ensure safe operation. By using only the best materials and components, together with intelligent design and maintenance training, the level of maintenance is reduced

Implications

Safe and intelligent design, operational reliability together with low cost for maintenance are vital guidelines for the procurement of Gangways/ Passenger Boarding Bridges

Port of New Orleans, LA

Julia I – The Largest FMT Installation in the USA

FMT Mobile Passenger Gangways

"Falcon I" at Black Falcon Cruise Terminal,
South Boston, MA – March 2002

Gangway to serve Mezzanine and Balcony levels – ADA compliant handrails throughout

FMT Mobile Passenger Gangways

"Falcon I" at Black Falcon Cruise Terminal,
South Boston, MA – March 2002

Gangway to serve Mezzanine and Balcony levels – ADA compliant handrails throughout

FMT Mobile Passenger Gangways

"Cabrillo" at Port of San Diego, CA
B Pier Cruise Ship Terminal – October 2002

ADA compliant handrails throughout and in Transition Ramp

FMT Mobile Passenger Gangways

"Cabrillo" at Port of San Diego, CA
B Pier Cruise Ship Terminal – October 2002

ADA compliant handrails throughout

FMT Mobile Passenger Gangways

"Eagle I" at Channelside Terminal 3, Tampa Port Authority, Tampa, FL – March 2002

Gangway to serve Mezzanine and Balcony levels – ADA compliant handrails throughout

FMT Mobile Passenger Gangways

"Eagle I" at Channelside Terminal 3, Tampa Port Authority, Tampa, FL – March 2002

ADA compliant handrails throughout

FMT Passenger Loading Bridge

"Notus" at Port Everglades, FL – December 2003

FMT Mobile Telescopic Passenger Bridge
ADA compliant handrails throughout

Thank you for your attention

- **FMT has a proven history of consistently meeting and exceeding the discussed minimum requirements for safe Gangways/ Passenger Boarding Bridges**
- **FMT has all the expertise and an unblemished safety record**