



2007 Cruise Seminar

Grand Cayman, Cayman Island
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Design & Safety

Mobile Elevating Gangways and
Passenger Boarding Bridges

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Introduction

- FMT of Trelleborg, Sweden, the accomplished innovator of Passenger handling systems for Seaports and Airports with numerous US and International Patents for Mobile Elevating Gangways and Passenger Boarding Bridges for Seaports



SAFETY

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= RELIABILITY

It used to be so easy...



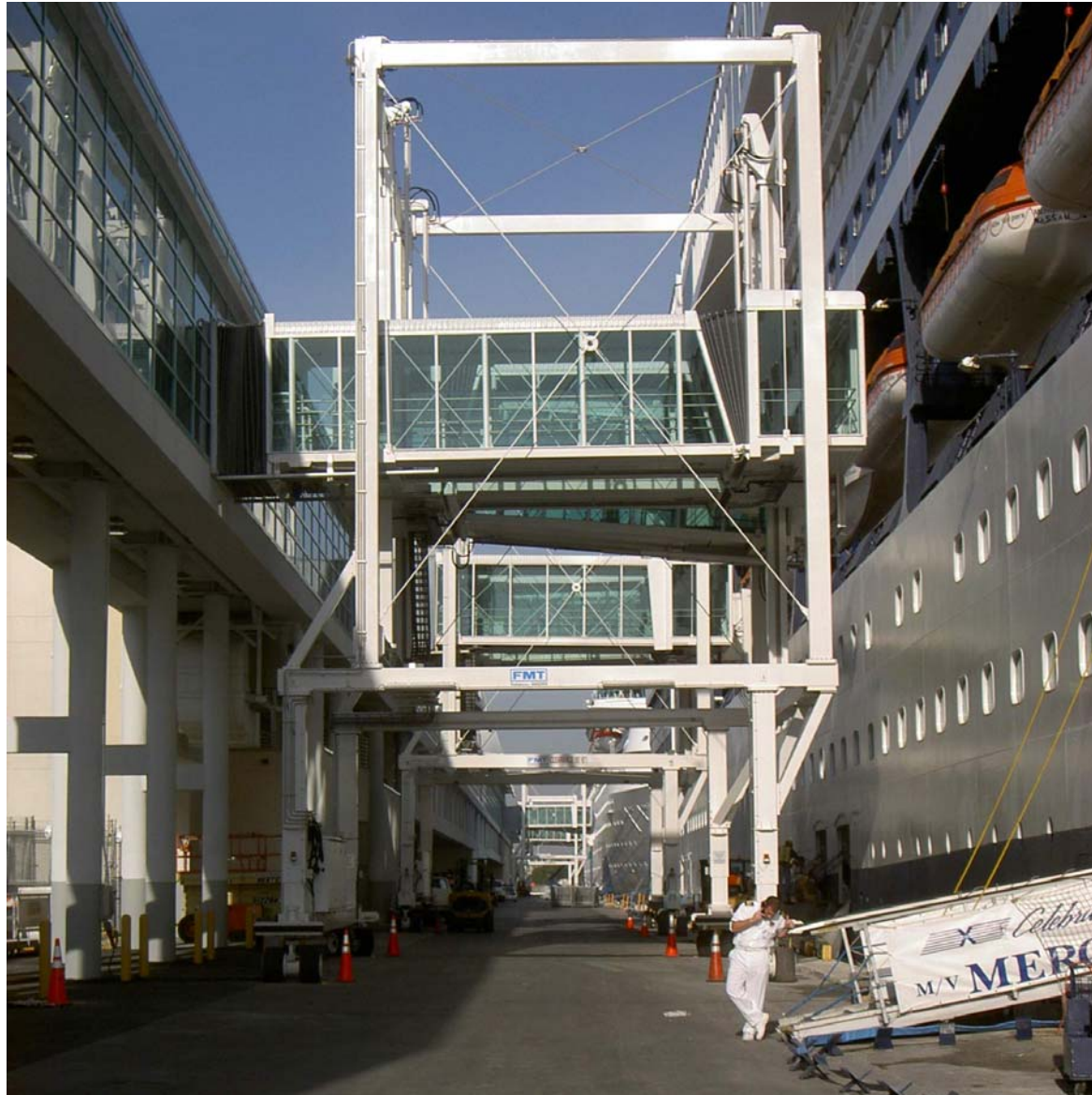
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Half a century ago, or so...



Today, since 1999



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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

Safety of Gangways

- Safety considerations are the basis of good design to assure total reliability
- **How to achieve safety:**
 - **Risk analysis** (assessment) of all components and parts (hazard identification)
 - **Risk classification** (risk rating assessment), risk control

Risk Classification

- Risks shall be analyzed using the Consequence versus Likelihood classification
- Once Consequence and Likelihood classifications are determined for each risk, the information is used to determine a risk rating

Risk Rating Assessment

Code

	A	B	C	D
1	E	E	H	M
2	E	H	M	M
3	H	M	M	L
4	M	M	L	N

E = **Extreme Risk**

H = **High Risk**

M = **Medium Risk**

L = **Low Risk**

N = **No Risk**

Considerations for Design

- Load calculations, live – wind
- Seismic considerations
- Hurricane/Storms (150 mph)
- Advanced Sensor Technology
- “Floating” transition ramps to Ship
- Redundancy of Systems

Maintenance and Operation

- Maintenance shall be performed by trained and certified personnel according to plan assisted by on-line professional support.
- Operation by trained and certified personnel **only**
- Computerized automatic operation allowing Gangway to **instantly** follow Ship movements
- Electronic surveillance with automatic sms functions.
- Back-up drive system to ensure safe operation in the event of loss of the main system

Safety: Basis of Design to Assure Total Reliability

- Craftsmanship: Quality components and parts only
- Remote connection by GSM/GPRS for diagnostics, trouble shooting, software and program updates (service)
- Drive systems: hydraulic
- Ease of operation to avoid “short cuts”

Main Drive Systems

- The main drive system shall be **electro-hydraulic** to produce a linear movement with low complicity and load holding without the need for any rotating mechanisms, gear boxes, etc.
- The hydraulic lift cylinders shall be fed by several hydraulic pumps to guarantee highest redundancy.
- Hydraulic lift cylinders shall be designed in full compliance with Det Norske Veritas (DNV) marine standards.

Gangway Design

- Design of Gangway to allow for totally unencumbered vehicle traffic and loading of stores and luggage
- Full access for vehicles and personnel:
 - Emergency
 - Fire trucks
 - Ambulances
 - Police
 - USCG/DHS/TSA

SAFETY

- S** = *Strict compliance with codes and regulations*
- A** = *Advanced IT solutions and software programs*
- F** = *Functionality, first class components*
- E** = *Education of operators/maintenance*
- T** = *Technology with talent*
- Y** = *Yield of investment*

SAFETY = RELIABILITY AND CONFIDENCE

New Orleans, LA - Julia Street



129' wide apron, full flexibility to accommodate for 17' difference
in water level of Mississippi River

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San Diego, CA – B-Street Pier



24' wide apron with 15' clearance for traffic under Gangway

Galveston, TX – Terminal 2



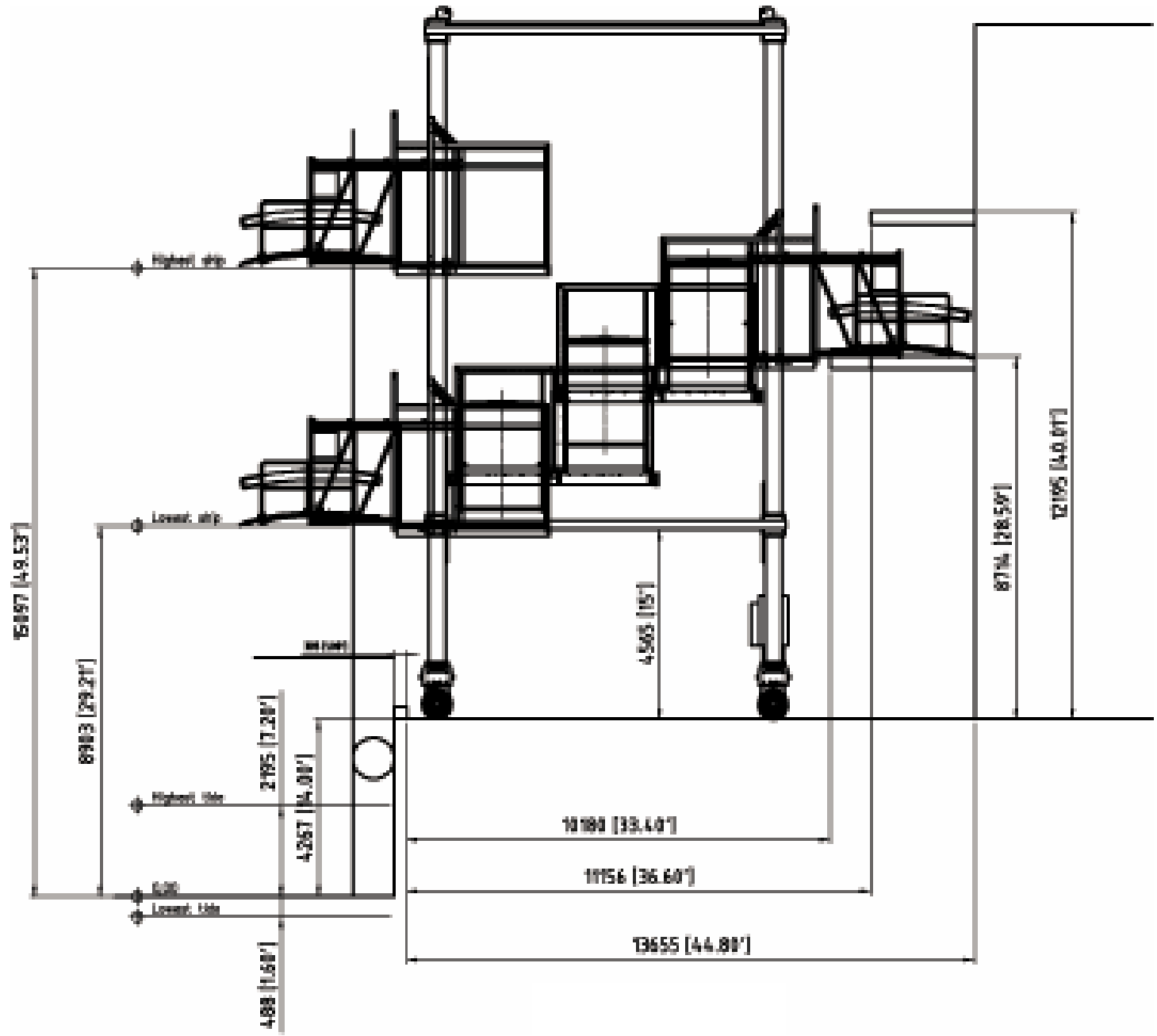
For servicing of RCL Voyager Class vessels
180' fixed walkway with two Mobile Telescoping Bridges



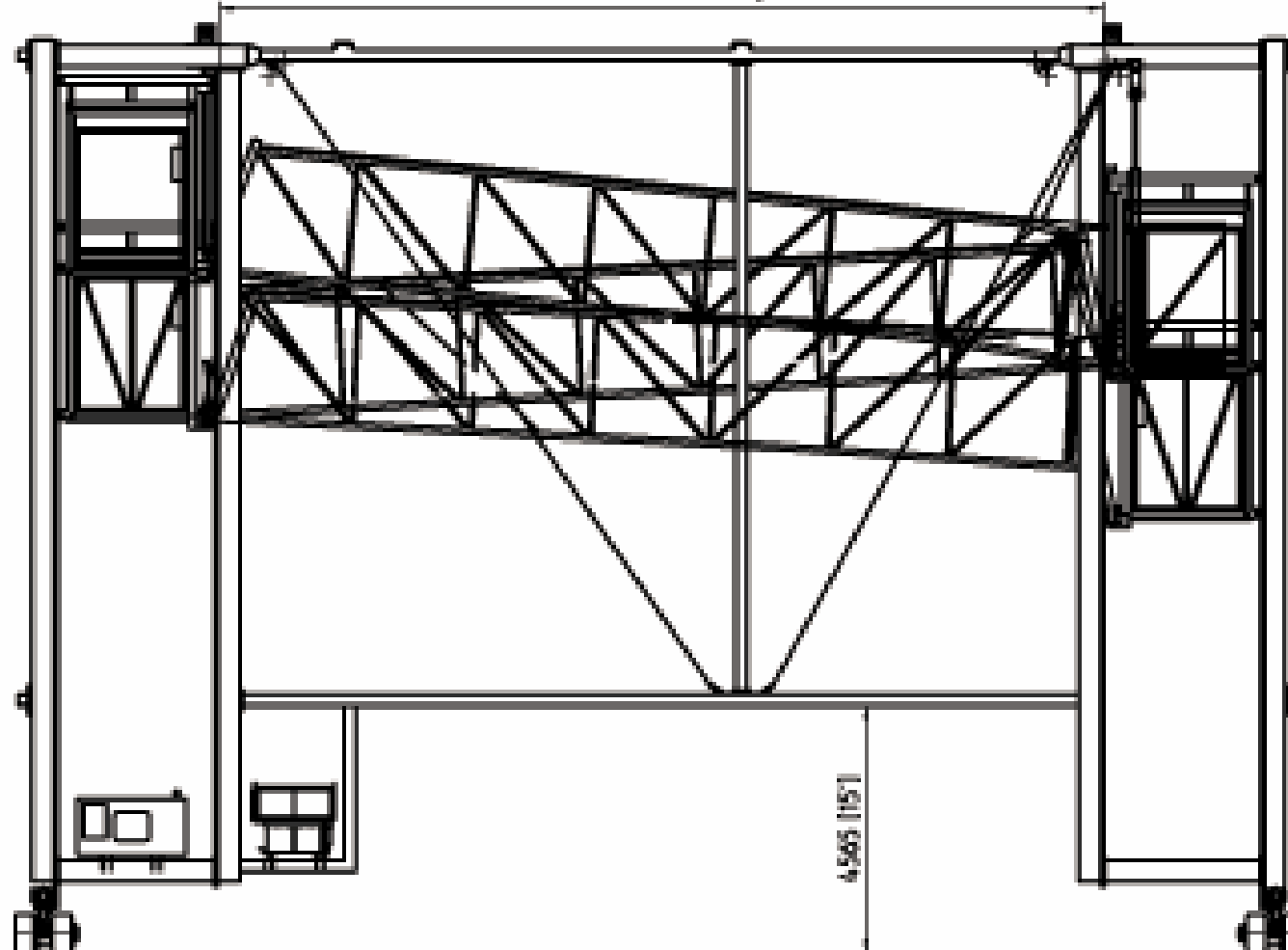
Port Everglades, FL – Terminal 26



Holland-America Line Westerdam
100' wide apron, service elevation max 42' above apron



16300 [53.5'] Tunnel slope 1:12



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Questions?

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Thank you for your attention!

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