

EXXON EXXON ENGINEERING	MARINE TERMINAL GANGWAYS FOR SHIP / SHORE ACCESS PROPRIETARY INFORMATION - For Authorized Company Use Only	DESIGN PRACTICES	
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SCOPE

This design practice covers shore based gangway systems for use at conventional marine piers and sea islands to allow personnel to safely and efficiently pass between moored vessels and shore side facilities. Procedures are provided for calculating the required operating envelope for gangways serving various sized vessels and discusses the necessary requirements that should be included in a gangway Design Basis Memorandum or Design Specification. This design practice does not cover detailed gangway design, fabrication, or installation.

REFERENCES

EE.10TT.78, *Shore Based Gangway Systems*, June, 1978

International Safety Guide for Oil Tankers & Terminals (ISGOTT), 4th Ed., 1996

INTRODUCTION

Marine terminal operations require that shore personnel periodically board vessels at their terminal. For example, after the vessel first moors, the berth operator or another appropriate shore representative boards the vessel to complete a ship/shore safety checklist and to conduct a pre-cargo transfer conference. While the vessel is at the berth, shore personnel will periodically board the vessel to recheck certain items on the ship/shore safety checklist. Shore personnel also are typically involved in measuring and sampling the vessel's cargo tanks at certain times in the cargo transfer procedure.

Either a ship mounted or shore based gangway can be used to provide a means for personnel to pass between a moored ship and the deck of a conventional pier or sea island. Every ship will have some form of gangway. Larger vessels, normally those above 10,000 dwt, will have a permanently mounted, power operated gangway. Smaller vessels and barges may only carry a manual gangway.

However, ship gangway systems can be operationally limited due to design, damage, equipment malfunction, or space limitations on the berth deck to land the gangway. In addition, local tidal conditions or the overall pier layout may restrict the use of the ship's gangway. For these reasons, new Exxon terminals should include a shore-based gangway as part of the design basis.

TYPES OF SHORE BASED GANGWAYS

Shore gangway systems can generally fall into one of two categories depending on how the onshore end of the gangway is fixed to the berth: "mobile systems" and "stationary gangway systems". Brief descriptions of each type of system are given below.

MOBILE GANGWAY SYSTEMS

Conventional

The simplest type of gangway system, consisting of a fixed length walkway with handrails and wheels or a roller on the shore end with wheels or gunwale clips at the ship end. Moved about manually or with the assistance of a shore crane.

Platform Mounted

A gangway attached to a tower that is mounted on a platform supported by wheels. The wheels of the platform may be powered, or the structure may be pulled about the pier deck by a small, motorized vehicle. The gangway is normally controlled by a hydraulic piston between the tower and the underside of the gangway.

Carriage Mounted

Consists of a conventional type gangway with the shore end attached to a carriage, which moves on tracks either parallel or perpendicular to the pier face. Normally positioned with the assistance of a shore crane.

STATIONARY GANGWAY SYSTEMS

Column Mounted

The most versatile type of gangway system, consisting of a telescopic gangway with it onshore end connected to the top of a column fixed to the pier deck. Column mounted gangways are usually provided with self-leveling steps which allow safe access for gangway inclinations up to 50 - 55 degrees.

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TYPES OF SHORE BASED GANGWAYS (Cont)

Tower Mounted

The most sophisticated and expensive type of gangway system, consisting of a fixed length or telescopic gangway connected to a carriage mounted on vertical tracks secured to the face of a tower. The gangway can be raised or lowered to any stage (floor) of the tower to minimize the gangway angle with the vessel deck.

Shore Accommodation Ladder

Basically a ship's accommodation ladder permanently mounted on the pier deck. Provides a good solution for providing access to small vessel decks that are always below the pier deck elevation. The gangway is raised and lowered by its own motorized derrick. This system is unique in that the ship end does not actually sit on the vessel deck. Rather it is held alongside the vessel at the proper elevation by the gangway derrick. The operator must be periodically reposition the gangway as the vessel changes draft or the tide changes the vessel deck elevation relative to the pier deck.

Table 1 lists the various types of gangway systems, the range of vessel sizes they can typical accommodate, and their advantages and disadvantages. A more detailed description of each type of gangway system can be found in ER&E Report, EE.10TT.78, *Shore Based Gangway Systems*, June 1978.

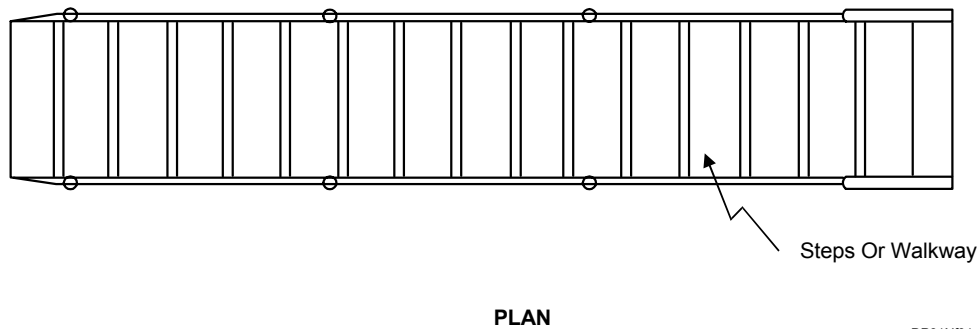
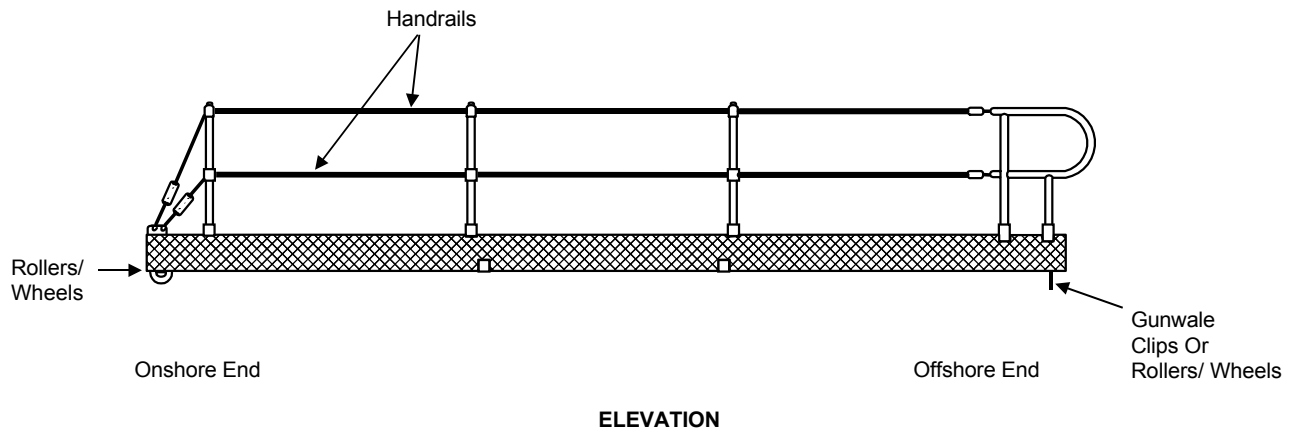
TABLE 1
TYPES OF GANGWAY SYSTEMS

TYPE	ILLUSTRATION	TYPICAL RANGE OF SHIP SIZE ⁽¹⁾	ADVANTAGE	DISADVANTAGE
Conventional (Mobile System)	Figure 1	0.5 kdwt - 1 kdwt 1 kdwt - 5 kdwt 5 kdwt - 20 kdwt 20 kdwt -50 kdwt	Low cost, easy maneuverability, and Minimal Maintenance	Long lengths required for vessels with high freeboard relative to pier deck. Not practical when vessel deck below pier deck
Platform Mounted (Mobile System)	Figure 2	10 kdwt - 50 kdwt 50 kdwt - 100 kdwt	Easily positioned to avoid vessel deck obstructions if sufficient pier space available to maneuver gangway	Requires very large pier deck area for operation and stowage
Carriage Mounted with Track Parallel to Pier Face (Mobile System)	Figure 3	10 kdwt - 50 kdwt 50 kdwt - 100 kdwt	Easily positioned to avoid vessel deck obstructions	May interfere with cargo transfer equipment
Carriage Mounted with Track Perpendicular to Pier Face, Attached to Side of Pier (Mobile system)	Figure 4	10 kdwt - 50 kdwt 50 kdwt - 100 kdwt	No pier deck space required for operation and stowage	Allowable slew motions may be limited when vessel deck below pier deck
Shore Accommodation Ladder (Stationary System)	Figure 5	0.5 kdwt - 1 kdwt 1 kdwt - 5 kdwt	Simple to operate, quickly positioned, and avoids obstructions on vessel deck	Limited to small vessels with decks below the pier deck. Must be periodically repositioned
Column Mounted (Stationary System)	Figure 6	10 kdwt - 50 kdwt 50 kdwt - 100 kdwt 100 kdwt - 500 kdwt	Simple to operate, quickly positioned, and easy to avoid obstructions on vessel deck	Relatively high foundation loads, personnel must always climb to top of column, even when vessel deck elevation is below pier deck
Tower Mounted (Stationary System)	Figure 7	100 kdwt - 500 kdwt	Simple to operate, quickly positioned, and easy to avoid obstructions on vessel deck. Gangway inclinations can be kept to a minimum by raising or lowering carriage on tower	High cost. Most maintenance intensive option

Note: (1) Different size or length of gangway required for each ship range

TYPES OF SHORE BASED GANGWAYS (Cont)

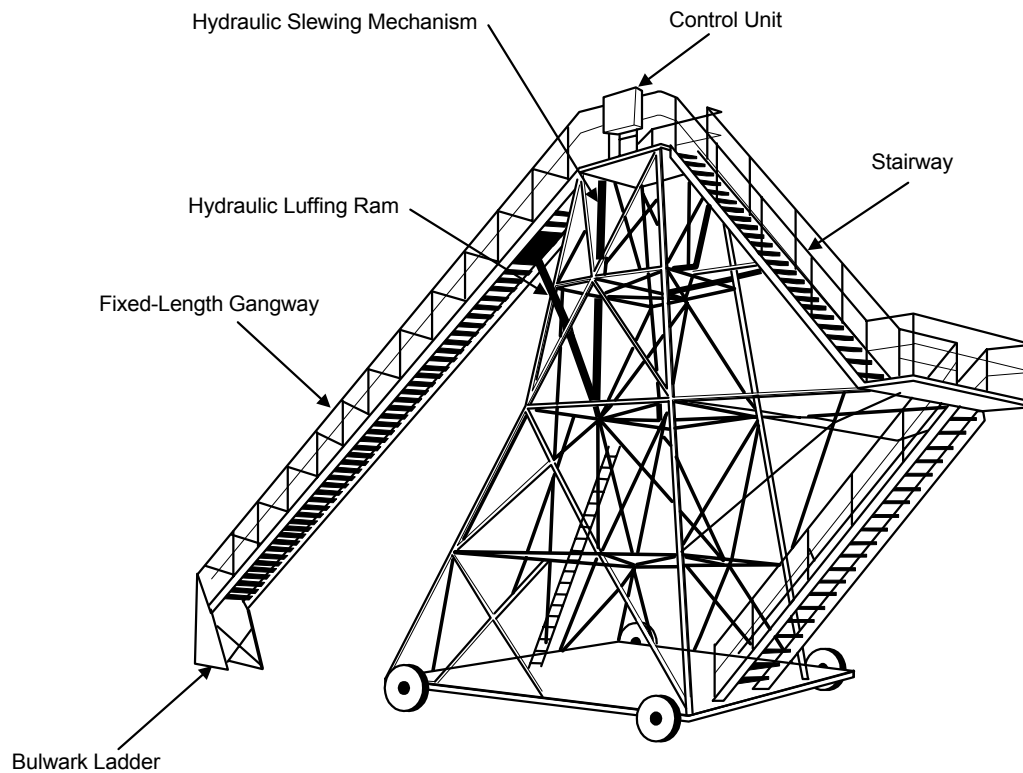
FIGURE 1
CONVENTIONAL GANGWAY



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TYPES OF SHORE BASED GANGWAYS (Cont)

FIGURE 2
PLATFORM MOUNTED MOBILE GANGWAY



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