

## Platforms and Catwalks in the Processing Industries.

Process systems are complex networks of tanks, vessels, pipes and valves in a wide variety of shapes and sizes. Accessibility to the components of these systems, particularly to tanks, vessels and mixers, is critical to the process, to cleaning the equipment and to the maintenance and repair of the system. It is essential to be able to work several feet above ground level, often with fairly large and heavy materials, parts and/or tools. The safe and efficient access to the equipment in a process system requires the integration of platforms, catwalks, stairways, ladders and railings. A&B Process Systems is recognized throughout North America for the design, fabrication and installation of stainless steel process equipment and has therefore gained considerable experience in the integration of personnel access systems into the process systems used by the various industries.

### Why is there a need for Platforms and Catwalks?

Potential fall hazards demand protection and, in the processing industries, it is generally considered that workers will be “at risk” at heights of six feet or more above the ground. Protection is afforded by designing new process systems (or modifying existing systems) to include a means of safe and efficient access to the equipment for both operation and maintenance. Integrated personnel access systems include platforms, catwalks, stairways, ladders and railings. Elevated platforms or catwalks, which necessarily include toe boards and railings, provide permanent and secure access to the high areas of a process system and are recommended if (a) major repairs or frequent maintenance are required or (b) the safety of the employees becomes a question. Under some circumstances the use of scaffolding, ladders or lifts represent lower cost alternatives, but are considered to be less safe.

### Materials of Construction for Platforms and Catwalks.

A platform to provide access to process equipment typically consists of a deck, handrail (with a toe board) and a stairway. The decks are usually constructed from stainless steel bar grating, stainless steel diamond plate or fiberglass reinforced plastic (FRP) grating. Stainless steel grating offers a durable material of construction if an open grating design is acceptable. The stainless steel diamond plate is the preferred material for the deck when containment of moisture and/or particulates is required. The surface of the plate has anti-slip properties to prevent moisture and particulate materials falling through into open vessels or containers, or onto machinery at the lower elevation. However, the seal welding requirements for the diamond plate can lead to excessive warping and hence low spots on the deck. This problem can be largely overcome by incorporating low point drains to remove any build-up of moisture. The framework for the platform is fabricated from either stainless steel square tubing or stainless steel piping.

FRP gratings are lightweight, providing strength and durability, as well as representing a low cost option for construction of a platform or catwalk. The material is particularly attractive for use in very aggressive environments, e.g., in electroplating facilities. FRP gratings are available

in either a bar or square mesh design. Some concerns have been expressed with regard to the tendency of fiberglass to fracture, yielding fragments that may find their way into the products. A further concern is the relatively rough surface of fiberglass, offering sites for entrapment of foodstuffs etc. and leading to the growth of bacteria on the deck.

Carbon steel may be considered for construction of the platform, railings and stairways, being a lower cost material than the stainless steels. However, it is always necessary to paint the surfaces of the carbon steel to inhibit corrosion and this coating requires frequent replacement. The use of this material therefore incurs long term added costs for maintenance.

The stairways provided to access the platforms or catwalks are also fabricated from stainless steel bar grating, stainless steel diamond plate or fiberglass reinforced plastic. Again, carbon steel may be used, but with the limitations stated earlier. The handrails are usually fabricated from either stainless steel or FRP pipe (diameter 1.5 inches) or from stainless steel angled plate (usually 2 x 3/8 inch plate).

### **The Design and Installation of Personnel Access Systems.**

The design of a platform or catwalk must primarily meet the requirements of the customer and OSHA specifications. There is seldom a conflict here, but in the event that there is, it becomes necessary for the design engineer and the customer to reach a compromise in their ideas for the equipment. It is also necessary to consider the environmental and safety factors with respect to the particular process system. Here “environmental factors” largely refer to the location and accessibility of the process equipment. For example, elevated platforms must be spaced well above doorways with adequate clearances from the building structure. The size of the platform or catwalk should accommodate equipment or parts of equipment that either will be raised to the elevated level or set down during maintenance or repair operations. The combined weight of the tools etc. used in maintenance operations will determine the strength of the deck.

Platforms are usually installed so that the top of the deck is approximately 42 inches below the top lip of the manway in the tank or reactor. This allows the operators easy access to the manway, particularly for the addition of materials to the tank. The platforms or catwalks must have handrails attached to the deck. These handrails should be 42 inches high with a 4- inch “toe plate” or “kick plate.” The toe-plate must be fastened securely with no more than 1/4 inch clearance above the level of the deck. It is usually fabricated from stainless steel plate, although some forms of mesh can be used. The handrails typically have both a top railing and an intermediate railing in the horizontal direction and should be separated by at least 3 inches from any walls or other objects (to accommodate the operator’s hand). If the process system includes machinery on the other side of the platform, some state and local building codes require three, or possibly four, horizontal rails. The top of the handrail attached to the stairways to and from the decks is approximately 34 inches above the leading edge of the step and the support posts are spaced not more than 8 feet apart. All handrails must be designed to withstand a load of 200 pounds from any direction.



Stairways should be at least 22 inches wide (inside dimensions) and pitched from 30° to 50° from the horizontal. When floor space is limited it is necessary to include one or more intermediate landings and the stairs above each landing are arranged much like in stairwells, i.e., in opposite directions at each level. If a steeper pitch is required then a “ship’s ladder” is installed, with a self-closing safety gate at the top.

### **What is a Mezzanine Floor?**

A “mezzanine floor” may be regarded to be at an “intermediate level.” It is installed to increase useful floor space in a plant or production facility, particularly if the facility has high ceilings or roofs, yielding accessible headroom. In this way additional storage capability is obtained or the mezzanine floor allows the installation of additional process equipment. The factors that determine the design, fabrication and installation of a platform or catwalk are equally applicable to the installation of a mezzanine floor.

### **Who is A&B Process Systems?**

A&B Process Systems is recognized throughout North America for the design, fabrication and installation of stainless steel equipment for the chemical, pharmaceutical, dairy, food and beverage industries. The company’s reputation has been built upon the capability to produce high quality products to meet the performance requirements in a timely manner. A&B’s success is a direct result of the in-house resources, the design engineers, fabrication engineers, welders and QA/QC professionals. The company has four plants in Stratford, Wisconsin, with approximately 80,000 square feet of manufacturing capability. The expertise in plasma cutting, automated seam welding, GMAW, GTAW and orbital welding is available when needed. An extensive range of process equipment may be fabricated in these facilities to meet customer requirements. In over thirty years of service to the processing industries, A&B Process Systems has gained considerable knowledge in all aspects of the installation of process equipment, including the integration of access systems to ensure the safety of all personnel working on the particular process.