

Installation and Implementation of an AS/RS



Depending on the size and complexity of your Automated Storage & Retrieval System (AS/RS), a Daifuku AS/RS can be installed in a warehouse, distribution center, or manufacturing facility in as little as six months. Here you will discover the step by step process of AS/RS implementation and installation.

Preliminary Stages

Before implementation, Daifuku and the customer agree on a concept and negotiate pricing, schedule and terms and conditions. Daifuku engineers then prepare a design document identifying system components and how the system will be built, designed, and tested. Within one to two months after the customer places an order, Daifuku begins to manufacture the AS/RS. Manufacturing time depends on the size and complexity of the system.

Once the components are manufactured, they are delivered to the customer's site and the process of implementation and installation begins.

Step 1: Prepping, Pouring, and Managing the Slab

Before the AS/RS equipment can be installed, a concrete slab is poured. (In the case of an existing slab, the floor conditions are verified.) A general contractor obtains loading specifications from Daifuku based on weight of the load and the rack design of the AS/RS. Rebar is laid out according to precise measurements and placed to accommodate the footprint of the AS/RS rack.

The goal is to avoid core drilling of the rebar to maintain the structural integrity of the slab. If this process is performed correctly, less than five percent of holes need to be drilled. The rebar is placed six inches below the surface of the concrete while anchors securing the AS/RS rack are drilled to approx one foot depths. Daifuku inspects the location of the rebar to help minimize core drilling. Load weight and overall AS/RS building height determines slab thickness.

Once poured, the concrete must cure before rack installation can begin. Concrete samples are taken during pouring of the slab and tested periodically over a one month timeframe to verify hardness.



Step 2: Installing the AS/RS Rack

It often takes two weeks for the slab to cure enough to begin installing rack and one month for the slab to be considered one-hundred percent cured. Prior to rack assemble and while awaiting confirmation of the slab hardness, rack is laid out and slab levelness verification is performed. Layout typically takes less than one week.

Rack is assembled in sections. An AS/RS aisle is comprised of two rows of rack; each row typically has three bays. During assembly, a crew often builds and stands three bays at a time before moving onto the next aisle. Upper beams, or cross aisle ties, connect all aisles for stability. Within each aisle, the crane (or storage retrieval machine – often referred to as an SRM) is guided by an upper rail.

A lower traveling rail is installed in each aisle. SRMs are then assembled and manually pushed into place. Finally, “run out” rack is installed. In a rack-supported application, a pre-fabricated wall is attached.

The timeframe of this stage depends upon the size of the rack. Once rack is installed, and in most cases while rack installation is being completed, the interfaces are added, which include, siding, roofing, input/output aisle conveyor, and software and controls. In most systems, a fire safety sprinkler system is required to meet local building codes and is attached onto the rack by a subcontractor. (Often the sprinkler pipes are added onto the rack while it is being assembled on the ground. Once the rack is standing and tightened, the pipes are connected.)



Step 3: Making Electrical Connections

Power is provided to the SRM via an isolated buss bar that runs the full length of each aisle parallel to the main rail that the SRM runs on. Electric wires are run to the buss bars as well as control boxes at the end of each aisle that connect with input/output conveyor. Communication and control of the SRM is via optical laser.

Finally, software enables the AS/RS to communicate via a LAN connection with a warehouse management system (WMS) as well as the customer’s main host system.



Step 4: Completing Construction & Commissioning

At this stage, AS/RS construction is complete. In a rack-supported building AS/RS, where the rack supports the exterior building structure, the siding, roof, lightning protection, and drains are added.

Before power is turned on, wiring is inspected. During commissioning, the AS/RS is powered. A team of Daifuku employees use a checklist to identify any open issues. Finally, several hours are necessary to program each SRM to calibrate it with each location in the system.

The customer also receives system training and documentation (in the form of a user's manual) during the commissioning phase.



Step 5: Customer Acceptance

Once commissioned, items are loaded into the system and acceptance testing commences. The goal is to ensure that controls, software, and equipment are properly interfaced. Acceptance testing performed by Daifuku also verifies that the system's cycle time matches requirements as outlined in the contract with the customer. Once the customer verifies the test, the system is turned over to customer for operation.

Step 6: Customer Support & System Maintenance

Daifuku components and software have a standard one year warranty. During this time customers have access to 24x7 support via the Daifuku Call Center. On complex systems, an on-site maintenance support person is also an available option. Many customers choose to purchase a Daifuku service contract after the initial warranty period is complete.

Daifuku also offers a preventative maintenance software package. This software has the capability to determine when it is time to perform preventative maintenance, replace system parts, as well as enable users to view real-time information about operation cycles, hours in-use, and travel distances.

About Daifuku

Daifuku has provided material handling solutions to companies around the globe for over 70 years. With over 20,000 global crane installations, no one is more experienced than Daifuku at engineering high-performance automated material handling and warehouse management systems, specifically designed to meet and overcome any challenge. Daifuku America Corporation is the North American affiliate of Daifuku Co., Ltd. For information on Daifuku's complete offerings visit www.daifukuamerica.com.