

Safety Initiatives

Vertical Maintenance and Service of a High-Rise AS/RS Aisle

Problem: Corporate safety policies may require ladders and platforms for safe SRM maintenance practices and problem correction within the AS/RS rack aisle.

- Corporate safety requirements may dictate that a safe means is needed to get an operator up to the SRM carriage/shuttle to assist an injured worker or repair an immobilized carriage due to mechanical failure. Carriage elevations could be over 80 feet high and many older SRM's did not include ladders.
- Similarly, safety requirements may require that a safe climb and fall protection system is needed to get down from an immobilized SRM carriage/shuttle.
- Finally, a safe work platform may be required at the top of the maintenance bay to inspect and service the components at the top of the SRM mast assembly (conductor bar and shoes, sheaves, and guide rollers).

Solution: Implement AS/RS Maintenance Platforms and SRM Mast Ladders.

SRM Mast Ladder

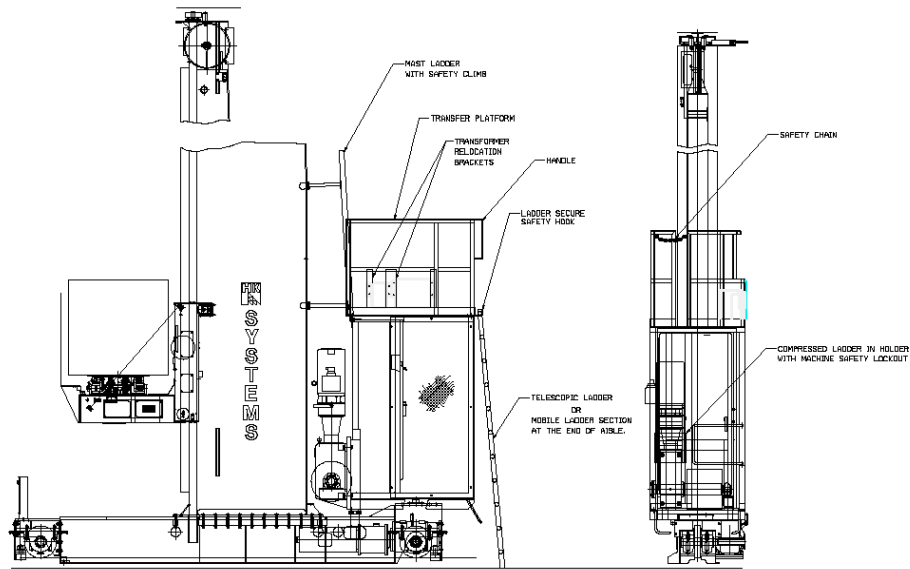
Install an aluminum SRM mast ladder system that extends up the back of each of the SRM mast structures. The ladder system provides access to upper components of the SRM and rack. The ladder is fitted with a Saf-T-climb rail system. As climbers use the ladder, they attach their safety harness to a trolley on the safety rail. If a climber was to slip or fall from the ladder, the trolley engages a cam into the safety climb rail and locks the trolley in place retaining the climber.

The fixed mast ladder system may require a new transfer platform mounted over the SRM control enclosure. A separate compressed removable ladder may be provided in a holder that is mounted to the back of the maintenance platform frame. When a maintenance operator removes the ladder it will telescope from the floor to the transfer platform.

The mast ladder enhances system access and maintenance. By moving with the SRM down the aisleway, a maintenance operator can use the SRM ladders to climb to gain access to every bin location within the AS/RS aisle.



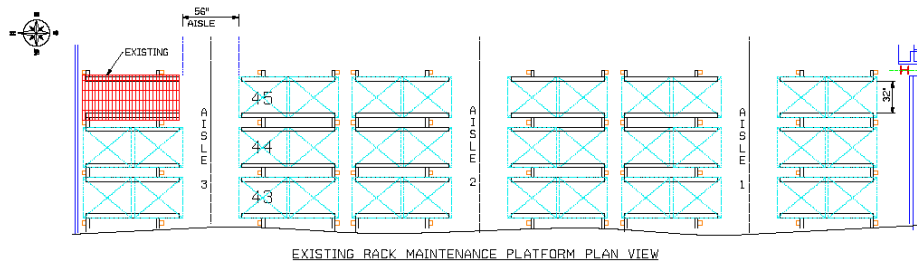
HK SRM Mast Ladder Concept



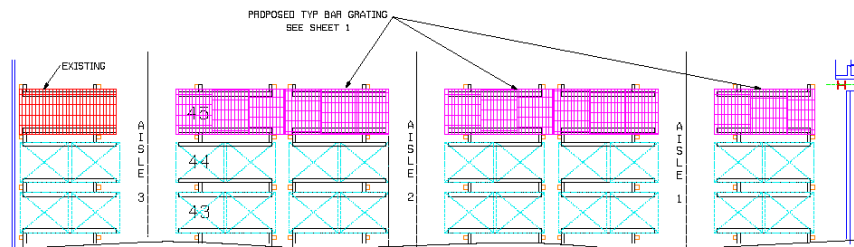
SRM Ladder and Platform Climb System Concept

Operator Maintenance Platform

Additionally, fixed AS/RS maintenance platforms may be installed at the rear and top of each storage aisle to allow for safe inspection and service of the upper SRM components. The maintenance platform may be constructed of a standard bar grating deck and located in the last bin location at the top level of the rack structures. The platform should include fencing on two or three sides of the platform to prevent someone from reaching into the adjacent bays or outside of the rack area. Chain gates are provided on the AS/RS aisleway side



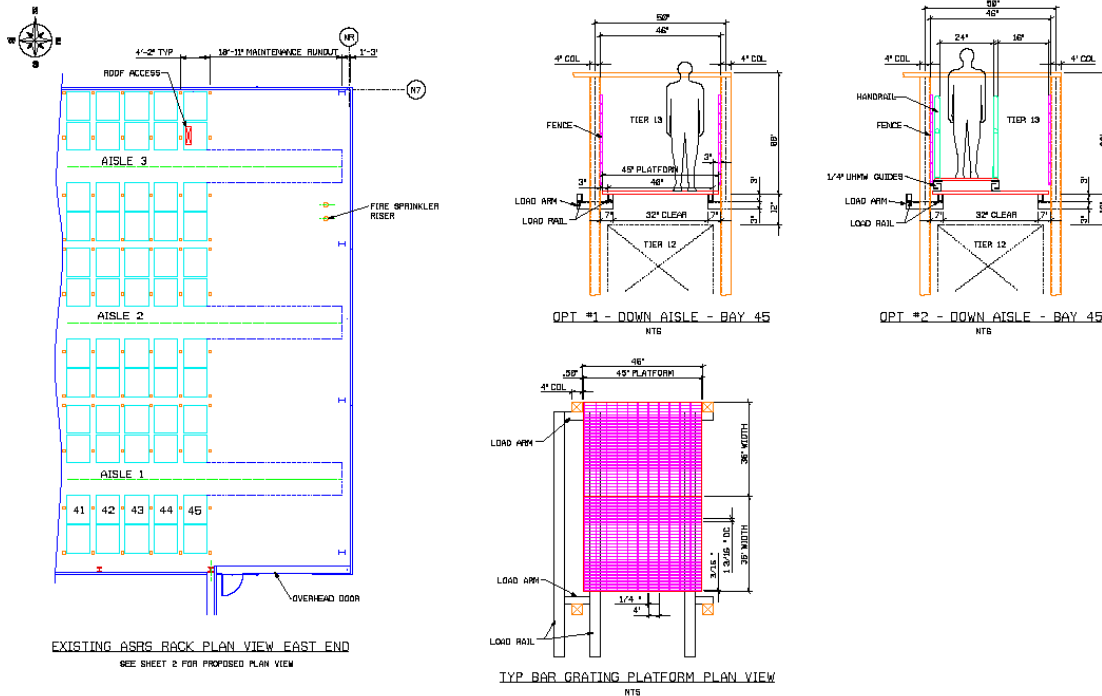
EXISTING RACK MAINTENANCE PLATFORM PLAN VIEW



PROPOSED MAINTENANCE PLATFORM PLAN VIEW

AS/RS Maintenance Platform Concept

A two (2) foot wide manually extendable bridge platform may be provided on the two interior landings that slide across the open aisles in either direction (2 units). Two men would go up to the top to slide the bridge across the aisle and then lock it into place prior to walking across. Signage is provided with proper use procedures.



AS/RS Maintenance Platform and Extendable Bridge Assembly Concept

It is assumed that the operator(s) would ride the SRM carriage or climb the SRM ladders to get to the rack maintenance platform.

Optional OSHA approved ladders and stairs may also be considered to allow a separate climb system for operators.

Electrical Control Interlocks and Safeties

Safety devices, interlocks and indicators are required to assist maintenance operators in securing the SRM and work area when an operator is using the maintenance platform.

Two interlocked sensor switches will be provided for each aisle to detect the position of the proposed extendable bridge. The first interlock switch will indicate that the extendable bridge is in the fully retracted or “home” position and that the SRM is safe to operate in full automatic mode. The second interlock switch will indicate that the bridge is fully extended across the aisle and should be safe for a maintenance person to walk on. The SRM would only be allowed maintenance mode (jog) operation from the main control enclosure.

Automatic SRM motion is permitted only if the extendable bridge platform is fully retracted into the rack structure. When the SRM is in man-in-aisle/manual mode of operation horizontal motion is prohibited if the bridge is not fully retracted. A floor level indicator will be lit if the bridge platform is not fully retracted.

A second indicator is provided on the top-level service platform next to the extendable bridge. A “Green” indicator light will show that the extended bridge is placed into the secure position on the other side of the aisle. A “Red” indicator will be displayed if it is not in a safe position. Signs are provided at the floor and service platform levels to instruct the operators.

Links: **More Supporting Information**

- [Saf-T-Climb Fall Prevention System](#)
- [HK Systems, Inc. SRM Product Lines](#)