

AS/RS Life-Cycle Upgrades

SRM Floor Rail Upkeep

Problem: After several years of operation the AS/RS floor rail is becoming flattened (loss of crown) and has several damaged spots. The Storage/Retrieval Machine (SRM) experiences bumps at floor rail joints and slight jogs during travel. Anchors have become loose and will occasionally be sheared off.

The AS/RS floor rail system is the critical foundation for a long and reliable SRM mechanical and structural life. Over time subtle bumps and misalignments will cause unnecessary errors and premature failures associated with not only mechanical assemblies but the electrical control components as well. If uncorrected, the system may also experience costly product and machine damage. The following are symptoms of a normal floor rail life cycle that needs to be addressed by a rail specialist.

- Subtle bumps and chips in the floor rail surface inflict extreme forces day-after-day to the SRM structural joints and mechanical assemblies. Bumps are caused by mechanical rail splices or unmaintained wear patterns at welded joints (thermite welded joints over time wear less than the parent rail). Floor rail chips and damage can be caused by poor SRM alignment, prolonged operation on failed bearings, damaged wheels and sudden Estops.
- Rail misalignments (rails do not lay straight down the center of the aisle) can be caused by rail clips that become loose or pull up over time. Misalignments can cause premature failure of side guide rollers and bearings which, if not corrected result in uneven wear patterns and severe damage to the rail. Even slight misalignments can cause the SRM to have unacceptable variances in storage depths that are further amplified in double- and triple-deep rack systems due to load shuffling. When detected by carriage photo sensors during shuttle motion, the SRM will be stopped and operator intervention is required to correct a load misalignment error. In severe cases when not detected, the SRM will collide with loads that protrude too far into the aisleway.
- Inconsistencies in the floor rail profile (elevation) in severe circumstances can cause palletized product to be dumped or damaged by dragging on load arms during shuttle motions or cause tall loads to hit rack structural components including sprinklers which can be broken and cause extraordinary damage.



Flat and Damaged AS/RS Floor Rail Splice Joint

Solution: Periodic Floor Rail Grinding and Periodic Maintenance

The following describes inexpensive preventative maintenance procedures that are available through knowledgeable AS/RS floor rail specialists. Users should require that service providers include the following in their rail maintenance programs:

- A visual inspection of the floor rail system and rail components is performed to identify unusual wear and damage.
- Anchor bolts are randomly checked for correct torque.
- Profile grinding is performed to remove irregularities.
- SRM wheel and guide roller assemblies are inspected and recommendations for repairs are reported.
- Random rail wear measurements and Brinell hardness tests are performed.
- Shims are adjusted to re-establish the correct elevation profile.
- Loose anchors are tightened. Broken anchors are core drilled and replaced.
- Short sections with severe damage may be cropped, removed, replaced with new, and welded using a specialized thermite welding procedure for an extra fee. In some cases, little used sections at the back of the aisle have been swapped with worn sections at the front of the aisle.
- A final report outlining findings and life-cycle recommendations is submitted to the AS/RS owner.
- In case of a severely damaged floor rail system or flattened, worn out rail the following additional steps are required:
 - The aisle is surveyed for profile and alignment.
 - The old floor rail is removed and the new rail is installed. Thermite welding procedures may be performed outdoors or inside the AS/RS aisle.
 - Epoxy grouting is frequently installed as a continuous support pad under the rail.
 - The rail is re-aligned and shimmed to be correctly centered and profiled in the aisle. Loads may need to be removed and replaced in severely misaligned locations.
 - The floor rail system in each aisle is re-surveyed for final profile and alignment.



Thermite Welding AS/RS Rail Repair Procedure

Links: More Supporting Information

- [HK Crane Rail Upgrades](#)
- [HK Storage/Retrieval Machines](#)
- [HK Aftermarket Services](#)