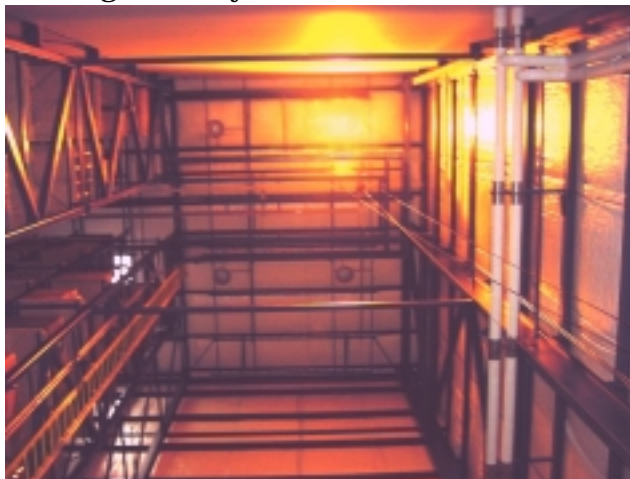


FALL PROTECTION INCORPORATED INTO AUTOMATED MATERIAL HANDLING

An automated material handling and storage facility was built in 1995 at the Naval Undersea Warfare Center, Keyport, Washington. The structure was erected to consolidate storage of heavy torpedo parts and for prompt and accurate retrieval of the parts while minimizing the risk of injury to warehouse workers.



Storage rack system, from below

The storage structure, which is 100 feet high and 300 feet long, houses a 150-foot long by six story high matrix of storage compartments that also function as structural components of the building itself. The building was specially designed for an automated storage and retrieval system that stores pallets of torpedo components in bins. When activated, the system's computer sends an electronic signal to a high-speed *parts picker* robot. The robot races down a 150-foot rail between the storage racks and up to the designated bin where it retrieves the specified torpedo component.

Shortly after the automated storage and retrieval system was installed, it became apparent that warehousemen would occasionally have to climb up the storage racks to release pallets or bins that had jammed or been damaged during storage or retrieval operations. When that happened, warehousemen risked falling while they climbed and when working to get the automated storage and retrieval system back into service again.



Robotic parts picker

Mr. Mark Hurst, a Certified Safety Professional (CSP) with the command's Occupational Safety and Health Office, recognized that a fall hazard existed when warehousemen had to service the automated storage and retrieval system. He notified the command of the fall hazard and requested financial assistance from the Chief of Naval Operation's (CNO's) Hazard Abatement Program to protect the warehousemen.

Working with an architectural and engineering firm, the Naval Undersea Warfare Center came up with a fall-protection system and procedures to prevent injury to warehousemen while getting to and working on the storage and retrieval system. Mr. Basil Tominna, Naval Facilities Engineering Command Fall Protection Engineer and the Navy's Hazard Abatement Program's resident expert on fall protection, reviewed and approved the design and the Naval Undersea Warfare Center's proposed project for proper use of the fall-protection system. Following Mr. Tominna's approval, the CNO's Hazard Abatement Program funded the design and construction of the authorized fall protection system.



Typical parts bins

The most noticeable part of the fall-protection system is the aerial platform with containment railings, similar to scaffolds used by painters and window washers who work on the outside of tall buildings. The railings keep workers from stepping or falling off the platform.

When a warehouseman steps onto the aerial fall-protection platform, he is already wearing a full-body harness that he then attaches to a *fall-arrest lanyard*, a heavy-duty cord or rope, that is securely fastened to a *restraint anchor*. The *restraint anchor* is firmly and permanently secured to the platform. The *lanyards* and body harnesses have been independently tested and approved to ensure they will stop a person's fall in the unlikely event that he loses his balance and goes over the railing. After each person on the platform attaches his full-body harness to a *fall arrest lanyard*, the platform is lifted to the trouble spot. An overhead cable moves along a rail that is attached to the roof. The cable is attached to two electrically powered winches, one on each end of the platform. It lifts the fall-protection platform, and the workers on it, to the location where they are needed.



Fall-protection platform with *fall-arrest lanyards*

Servicing a pallet or storage bin can often be done without leaving the elevated fall-protection platform, but sometimes a warehouseman may need to leave the

platform to get close enough to the problem. In such a situation, the warehouseman immediately connects his fall arrest *lanyard* securely to special nylon anchors that are attached to the framework of the storage system, which is capable of withstanding the force resulting from an accelerating falling body. The anchors keep the worker attached firmly to the framework nearest the location where he must work. He connects his fall arrest *lanyard* onto the anchors before leaving the platform so that he is protected at all times from falling. After completing the task, the worker reenters the elevated fall-protection platform, disconnects his fall arrest *lanyard* from the temporary anchorage, and immediately reattaches it to the restraint anchor on the airborne platform.

The NUWC Keyport automated material handling fall protection system prevents falls from great heights that would undoubtedly result in fatalities. NUWC warehousemen who previously had to climb and service equipment without fall protection can now safely proceed with these tasks. Using the new fall protection system, warehousemen can now work quickly and efficiently to resolve equipment problems, resulting in increased productivity.

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