

PSE & G Rack Safety Audit prepared by Specialized Storage Systems, Inc., Fairfield, NJ

Website: www.specializedstorage.com

The following report details the condition of the present rack installations in the Clifton and Irvington facilities.

General Observations: The rack in Clifton is in fair condition and not severely damaged as a result of fork lift impact. None of the rack is anchored and many of the 12" square steel plates placed below the upright columns intended to keep the rack level have moved due to impact from the lift equipment. If the plates were welded to the rack footplates it would reduce the movement somewhat, but the end result is that the rack is out of level in the down-aisle direction, which causes undue stress on the beam connectors. Coupled with the advanced stages of rusting, one direct hit from a lift truck with a pallet can cause an entire row of rack to collapse, damaging valuable inventory and causing safety hazards for employees.

Beam Capacities: An 8' long teardrop beam with the 4124 designation means that it has a capacity of 5,028 lb. per pair of beams and an allowable deflection of L/180 (.53") according to RMI specifications. There is very little deflection in the beams, meaning that they are the right ones for the application, and all rack manufacturers must meet RMI specifications of a 1.65 safety factor, meaning that. The beams should be loaded to 8,296 lbs. before collapsing.

Safety Locking Devices: Each pair of beams should have a safety pin on one side of the beam to prevent the beam from dislodging when hit by a pallet from a lift truck in the upward direction. The safety pins in Clifton have clearly rusted on most of the rack and there is one photograph showing the pin being pulled completely off the beam, rendering the beam unsafe. The newer beams in Clifton have the safety pin installed as an integral part of the beam, which is much more secure than the galvanized metal clips that have rusted out.

Upright Capacities: All of the 3" wide uprights in the Clifton facility are stamped with a designation of F20 or F30. The F20's have a capacity of 24,000 lbs. based on a 48" beam spacing, which gets downgraded significantly with greater beam spacing or unsupported lengths. The F30's have a capacity of 28,000 lbs. based on a 48" beam spacing, which also gets downgraded significantly with greater beam spacing or unsupported lengths. The 4" wide uprights in the system have a capacity that exceeds 32,000 lbs. based on a 48" beam spacing. All rack manufacturers must make their rack with a 1.92 safety factor.

The maximum beam spacing in this location is 72" from top of beam to top of beam. The F20 upright capacity with beam spacing or unsupported lengths of 72" is downgraded to 14,000 lbs., and with two beam levels of 5,028 lbs. capacity per pair, PSE & G is well within the deflection limits and safety factors of the rack.

All of the above stated capacities and specifications are based on data WITHOUT impact from forklift trucks and are based on indoor usage. If you introduce the weather conditions into the equation, the possibility of advanced deterioration from rust and the elements exists, however, many roll-formed rack systems with standard paint finishes installed outside have lasted for years without incident.

Decking Inspection: The wire mesh decks on the rack are all adequate in terms of capacity. Each deck has a capacity of 2,500 lbs, making it the right one for beams that have a capacity of 5,028 lbs. per pair. However, many of the decks are severely rusted and in need of replacement because they will eventually fail, resulting in damage to valuable inventory.

Height-To-Depth Ratio of Rack: The standard height to depth ratio of rack should not exceed 5:1 before additional bracing is required. At present, the 42" deep rack would need to have the top beam at almost 18'H before exceeding RMI specifications, and both locations do not exceed 12'H to the top of the beams. In addition, two of the double-sided rows in Clifton are secured back-to-back, making them a bit stronger.

Aisle Requirements: The present aisles within the system are adequate for the type of material handling lifts being used. Because of the width of these aisles, damage to the rack from forklift impact is minimal.

Adherence To Building Fire Codes: Not applicable because the installations are outdoors.

RMI (Rack Manufacturer's Institute) Signage: Capacities of each pair of beams should be clearly marked and there is no indication of any capacities on each pair of beams.

Recommendations: Specialized Storage Systems recommends the installation of EITHER new galvanized roll-formed pallet racking with structural channel bases WELDED to the footplates OR structural steel pallet racking with the same channel bases welded to the footplates. These channel bases should be properly leveled and anchored in at least two spots into the existing blacktop with 10" wedge-type anchors to prevent movement of the rack over time from fork lift impact. The primary problem of the rows being out-of-level both down-aisle and cross-aisle has resulted from the rack not being properly anchored into place and it not being welded to the existing steel plates. With proper installation on blacktop, there should be no need for concrete pads or footings.

Structural steel pallet rack will last quite a bit longer than standard roll-formed or galvanized pallet rack because it is designed to be resistant to abuse from fork lifts and other influences like the weather. All connections are bolt-together, resulting in a stronger system both down-aisle and cross-aisle, versus the roll-formed rack's clip-type connections, which tend to be weaker in the down-aisle direction.

We feel that PSE & G should replace all of the severely rusted 4" wide uprights, beams, and wire decks in Clifton first, because these are the ones with a greater possibility of collapse from lift equipment impact or weather. The second phase would encompass the remaining uprights, decks, and beams, and everything would be properly braced and anchored from the start.

We also recommend painting (with a simple stencil) the capacity of each pair of beams on the front of each pair in a commonly designated spot.