Impact Crushing Injury (Port of Miami) Expert Investigation Article

This investigative article examines the causes of an impact injury to a worker at the port by a Loaded Container Handler, a type of powered industrial truck a.k.a. “PIT.” This class of specialized cargo handling truck includes top and side handlers, and reacher stackers. Top handlers (PITs) are significantly larger and heavier than the multi-sized forklifts in operation at the port. In this article, efforts were made to survey the reasons why impact injuries occur at container ports, via observation of case testimony, incident photo evidence, and video footage. We endeavor to understand how this fully avoidable crushing injury occurred, impacting a working superintendent at the Port of Miami. The results of data obtained has identified errors by both parties, and in the PIT operator’s focus and attention to duty. The importance of an operator’s situtational awareness are paramount to incident prevention, especially considering the weight and size of a loaded container handler (PIT), compared to a pickup or passenger vehicle. Impact collision incidents between PITs and other vehicles can occur during movement and travel with a container, and especially when a load effectively blocks an operator’s forward field of vision.

In order to prevent serious injury and fatality (SIF), equipment operators must be continually aware of their surroundings, and the continually changing environment in a container yard. They must be alert to unexpected movement and positioning of other (smaller) vehicles, including intrusion by ground workers into the strike zone or path of movement.

According to the International Longshoreman and Warehouse Union (ILWU), *"West Coast longshore workers had higher fatality rates than police officers and fire fighters."* [1]

Setting:

The scene of the incident was at Container Terminal #3, Port of Miami (*See Figure 1.*) where loaded shipping containers were being staged at the wharf edge by loaded container handlers (PITs). The containers a.k.a. "*Cans*" were being loading onto ships moored at the port. The victim was a superintendent of a stevedore company, checking containers and loads, while sitting in his company pickup truck. He had decided to park his vehicle directly adjacent to staged containers, later determined to be within the travel path of a Top Handler.

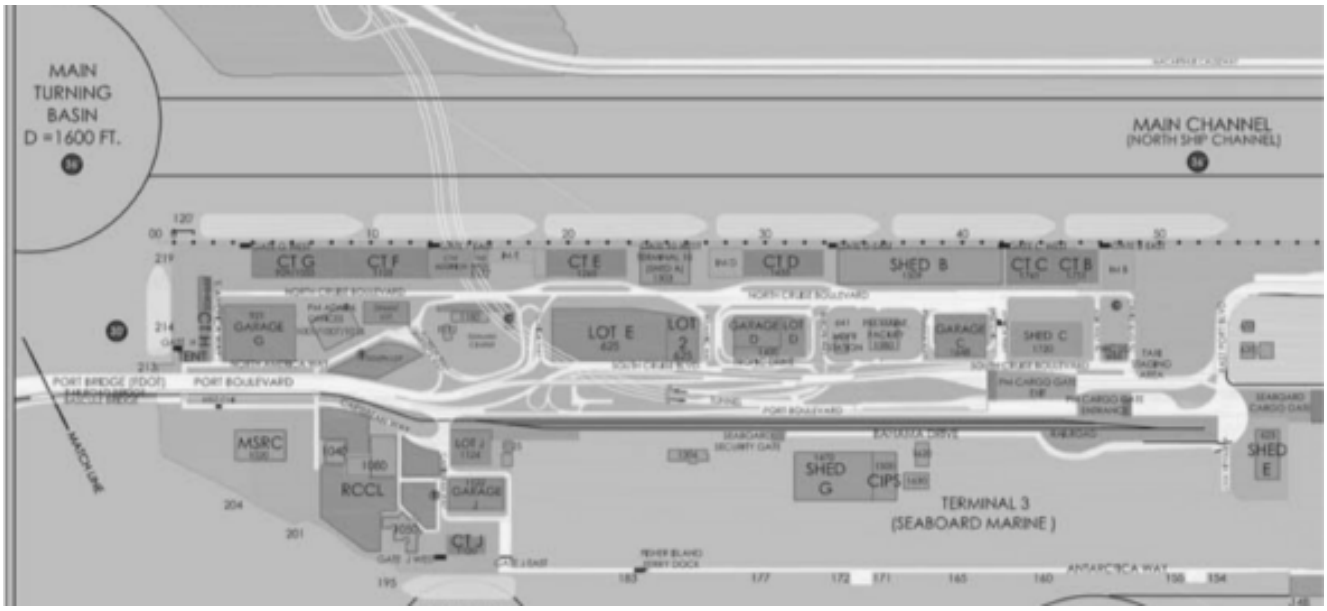

Figure 1. Dodge Island (Port of Miami) Courtesy of Let's see America.com

Note: As this is an active injury case, names of companies and persons have been excluded

[1] ILWU 2014 Dispatcher Newspaper

Figure 2. Stacks of 20'intermodal shipping containers (White units are refrigerated or Refers)

Equipment:

Shipping containers or "*Cans*" are large metal boxes (*See Figure 2.*) used for loading and conveying palletized goods across different modes of transport, including ships, trains, and trucks, without the cargo needing to be unloaded or reloaded. International container shipping sizes include 20′, 40′, and 45' cans holding 10 to 22 loaded pallets, with a maximum loaded weight of 44,000 lbs. There are also 53' containers used in commerce. In this crushing injury case at the Port of Miami, the subject container was a 20' loaded unit, with an undetermined weight. A Loaded Container Handler a.k.a. Top Handler *(Figures 3-4.)* was the type of PIT involved in this injury case. To compare a Top Handler with a small sized pickup (*See Figures 3-6.)*

Figure 3.

Figure 4. Loaded Container Handlers (Top Handlers or PITs)

Specifications of Loaded Container Handlers (Top Handlers):

- Gross Unit Weight 52,000 lbs. / 26 Tons approx.
- 97” Load Center
- 42-ft Telescopic Mast for stacking cans 5-High
- Maximum Cargo Weight: 90,000 lbs.
- Spreader (On Mast) 20’-40’ ISO Container Handling Attachment
- Rated Capacity At 97-in. (2,464 mm) Center of Load
- 90,000-lbs. (40,824 kg) / 2-high Stacking
- 80,000-lbs. (36,288 kg) / 5-high Stacking
- Rated Capacity At 106-in. (2,692 mm) Center of Load
- 82,000-lbs. (37,195 kg) / 2-high Stacking
- 75,000-lbs. (34,020 kg) / 5-high Stacking
- 236-in. (5,994 mm) Wheelbase

Incident:

Before operations on the morning of the incident, a working superintendent for the stevedore company arrived three hours late for his shift, after working an all night shift at the port with another crew. Upon arrival to the port, his regular duty required him to perform a pre-shift safety inspection of the container yard. An important secondary task for the superintendent involved his verification and confirmation of the onsite company installed HIT-NOT® proximity alert units.[2] When these units are working properly, they prevent impacts by emitting a loud beeping sound, to alert workers of moving cargo handling equipment (Forklifts-PITs-Top Handlers). The superintendent failed to conduct this critical inspection of company collision avoidance system. In addition to failing to conduct a container yard physical safety inspection, he should have also gone to each PIT (Top Handler) and verified that their HIT-NOT® unit was working properly. He should have also confirmed that his own receiver was responding correctly, and to verify that incoming signals from the PIT operators' transmitters were being actively heard. This important check was not performed, as it was determined post incident, that the superintendent's unit had a discharged battery and had fallen behind his pickup seat, rendering it nonoperational.

Failure by the stevedore superintendent to station his pickup truck in a safe manner:

On the DOI, the superintendent negligently parked his pickup truck in one of the top handler travel aisles, which created an travel obstruction hazard for the top handler (PIT), preventing safe passage. This constituted a violation of OSHA regulations:

CFR §1910.176 Use of mechanical equipment.

Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked.

There is also a strong indication that due to working multiple back to back shifts, and his physical level of exhaustion, that the stevedore superintendent was likely asleep in his pickup truck, whereby failed to hear the approaching top loader with a heavy load. The noise from an approaching Top Handler and ground vibration from a heavily loaded rig would be significant, sound measuring at the 80-90dB range, [3] well above the OSHA Threshold Limit Value (TLV). [4]

[2] Collision avoidance technology, used as a forklift alert system, HIT-NOT® interacts with personal proximity sensors to provide deterrence to struck-by accidents. The HIT-NOT® system field when fully charged, passes through walls, racks, and containers, and provides visual and audible alerts to users. https://hitnot.com/

[3] Equivalent to a power mower 25 ft, (96 dB); or motorcycle at 25 ft (90 dB). Purdue University

[4] A Study on Assessment of Noise Exposure in the Port Industry: Implications for Occupational Health and Safety

Unsafe Operating Practice by the Top Handler Operator:

Due to the Top Handler Operator's lack of situtational awareness and focus on the day of injury, the operator chose to carry the loaded container low, which effectively blocked his view of the roadway during travel. This unsafe act caused him to be unable to see a parked vehicle directly in his forward direction. This oversight resulted in an impact crushing injury to the superintendent. Upon impact, the supervisor's vehicle was shoved steadily forward by the advancing Top Handler (container), as it crushed the cab and compressed the pickup into the stack of heavily loaded containers. *(See Figure 7.)* The action of blocking the view of the travel path was a violation of the OSHA powered industrial truck (PIT) operating rules. *(See CFR §1910.178(n)(4) below)*

Figure 5. The moment of impact (as seen from a video screen grab), as the carried load (obstructs the forward view) strikes the stationary white pickup, crushing the cab and seriously injuring the occupant

CFR §1910.178(n)(4), OSHA Rules for Powered Industrial Trucks:
If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

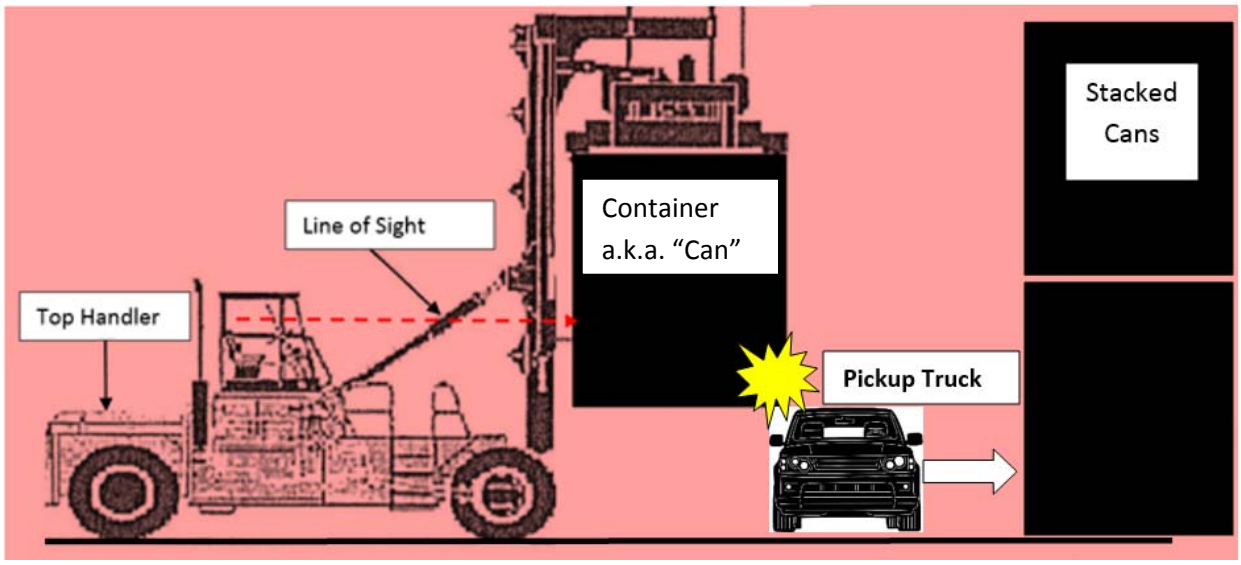

Figure 6. Size Comparative between a Loaded Top Handler and a Pickup Truck
A Loaded Top Handler's average weight w/o load: 52,000 lbs.(26 Tons) add the 38,000 lb. load for a total of 90,000 lbs. (45 Tons). As the Light Duty Pickup Truck (Ford S-10, Chevy Blazer, Toyota) weigh 3000 to 4500 lbs. (1.5 to 2.15 Tons)

In this weight comparative, the parked pickup truck average weight is 3500 lbs. Imagine the consequential impact by a Top Handler with a combined weight of rig and load at 90,000 lbs.

In the actual incident, the pickup was abruptly pushed forward and into a waiting stack of heavily loaded shipping containers. The cans were awaiting loading onto a ship (vessel) at the port.

Post impact, the superintended for the stevedore company sustained significant crushing injury to his left leg, requiring major surgery and months long ambulatory. (*See Figure 7).*

Figure 7.

Figure 8.

Post incident after the top loader moved some of the containers free, the Miami-Dade Fire & Rescue were able to extricate the victim and transport to emergency care. *(See Figure 8).*

In Conclusion

The stevedore superintendent was directly responsible for the initial cause of the collision by the Top Handler. Had he properly verified the operation of the HIT-NOT® unit, the incident could have been prevented.

Also the operator's behavior on the DOI demonstrated willful and wanton conduct. Operating with the load blocking his forward view was a conscious disregard for the duty of care, OSHA regulations, and the safety and welfare of others. His excuse (in testimony) was that due to the extreme weight of the loaded containers, by raising the can higher, they could easily cause the overturn (upset) of the Top Handler during travel. His rationalization was that he could still look over or under the load when traveling. Clearly this unsafe practice was counter to the engineering design principals of a top loader regarding stability, and a violation of the OSHA regulation.

Final Note: Post incident the longshoreman PIT operator tested positive for Marijuana (THC), and had his operator's license suspended by the accident review board. He was on suspension for a period of two years, and was required to retake the 80 hour Top Handler training course and test.

Findings from our Expert Witness Investigation

In review of incident video content from onsite security cameras, the Top Loader operator carrying the container low, failed to see the parked pickup, and ran directly into its cab. He continued on path, shoving and crushing the truck forward until it rammed into stacks of previously staged containers. It was determined in testimony, that due to the light weight of the subject pickup truck, the loader operator was unable to feel the impact, as he collided with the small vehicle.
An equivalent may be similar to a commercial truck driving over an egg placed on the roadway.

Following a thorough forensic investigation, our experts concluded that the PIT operator failed to meet industry standards by performing an unsafe act and failing to follow established safety rules by ensuring carried loads do not block the operator's vision. His post drug test was positive for THC which may have impacted his ability to operator safely, and was a violation of company and union safety regulations.

The stevedore superintendent (pickup driver) also neglected to conduct an inspection of the collision prevention system, which directly contributed to and was the primary cause of injury.

The employer of the superintendent (a port stevedore company) failed to ensure that service vehicles were outfitted with flexible, high-elevation illuminated poles, that make clear the presence/location of each such vehicle. *(See Figure 9.)*

Figure 9. Elevated & Illuminated Poles for small vehicles, photo courtesy of ILA~USMX Joint Safety Committee

Forensic Casework Involving Maritime Container Handling

Port Safety Services by SAFETRAN are qualified to testify in state and federal court. Our team has the experience and in-house expertise to investigate a broad range of safety issues involving material handling, hoisting injury and wrongful death. Our experts have investigated cases involving forklifts, top handers, trucking injury, mechanical equipment explosions, toxic and hazardous materials exposure, that injure and impact the safety of workers at maritime shipping ports.

Call us at 510.894.0229 to determine which of our experts is best suited to investigate the technical issues specific to your case.

Featured Expert

Daniel J. O'Connell, CSP, CHMM is a Board Certified Safety Professional with decades of service in the maritime sector as a Union Longshoreman (PIT and crane operator), and member of the International Brotherhood of Teamsters, as a truck driver. He has extensive firsthand experience as a safety consultant and instructor of material handling equipment and operators for over three decades.

Date
May 6, 2025

Author
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References:

Select powered industrial truck (PIT) and relevant standards for maritime safety and health:

CFR §1910.178(n)(4), OSHA Rules for Powered Industrial Trucks
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.178

CFR §1910.176 Use of mechanical equipment.
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.176

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https://www.osha.gov/sites/default/files/publications/OSHA3973.pdf

Safe Forklift Operation. OSHA QuickCard™ (Publication 3949), (2019).
https://www.osha.gov/sites/default/files/publications/OSHA3949.pdf

Sample Daily Checklists for Powered Industrial Trucks. Prepared by OSHA and the Industrial Trucking Association (ITA) Alliance. OSHA notes that this checklist and related graphics were developed in cooperation with the ITA as part of the OSHA-ITA Alliance.
https://www.osha.gov/training/library/powered-industrial-trucks/checklist