



Trailer Collapse Prevention

**Making the Loading Process
Safer and More Efficient**

White paper prepared by Ideal Warehouse Innovations, Inc.®
February 2024

Trailer Collapse Prevention – Trailer Stands

The push to increase productivity, reduce turnaround time, and provide just-in-time inventory has heaped ever-growing pressure on the shipping industry and its workforce. The loading dock area is constantly asked to meet new, more demanding targets. Larger trailers, shorter loading windows, and tighter deadlines have increased the workplace risks workers deal with in this crucial area of the warehouse. Just take a look:

- 25% of all industrial accidents occur at the loading dock¹
- More than 1 in 10 forklifts are involved in an accident each year²
- More than 96,000 injuries from forklift accidents annually in North America³

The evidence is clear, the loading dock is one of the riskiest places in the warehouse. One little-known but high-risk circumstance is created by the everyday (every *minute*) occurrence of forklifts loading/offloading cargo from trailers in the dock. Many loading dock operations use “Spotted” or “Dropped” trailers, whereby the cab detaches from the trailer, leaving it at the dock supported only by the trailer landing gear. Often, a yard jockey (or shunt truck) is used to move trailers in and out of the dock. In these situations, **trailer collapse** caused by landing gear failure, unbalanced loads, or stresses created by forklifts moving within, is a risk that can have devastating consequences:

INSIDE THE TRAILER:

When a trailer tips, upends, or rolls, the forklift driver within can be tossed, crushed, injured, or worse. The result can be anything from a bad scare to a tragedy.

OUTSIDE THE TRAILER:

Workers in the yard or dock approach can, with no warning, find themselves in harm’s way when a trailer collapses in their direction. And a disastrous domino effect, with one trailer colliding into the next (and the next), can put many dock workers at serious risk.

BEYOND INJURY:

While avoiding harm to personnel is paramount and keeping the workplace safe is a critical first priority, there can also be serious business consequences that accompany trailer failure. Consider:

- Dock disruption leading to supply chain challenges
- Forklift, trailer, and loading dock damage
- Lost cargo
- Legal costs
- Employee morale

Add in the potential cost of business disruption due to ‘down’ dock positions and potentially lengthy investigations, and it’s easy to see how this can turn any business’s day-to-day operations upside-down.

Let’s examine trailer collapse situations more closely, to better address them and mediate risk.

Trailer Tip-Over

A trailer tipping during the loading process may seem an unlikely event, but these accidents occur more often than most realize. Typically caused either by landing gear failure or sinking pavement, individual businesses have reported multiple, and as many as six, trailer tip-overs in a single year.

LANDING GEAR FAILURE

A trailer's landing gear, while sturdy when new, is subject to undermining wear-and-tear. The side-to-side forces generated by heavy forklifts loading and unloading within, along with the routine hauling of trailers along the pavement, puts incredible stress on the landing gear. And, as trailers age and rust, the integrity of the landing gear assembly can deteriorate. This is obviously a problem, but one that isn't easily detectable in a typical visual inspection.

Over time, one or both landing gear legs can fail, bringing the trailer crashing down, often with an unsuspecting forklift operator inside.

In the event a single leg of the landing gear collapses, the result is the trailer rolling to one side (putting nearby trailers at risk too); and if both legs collapse, the trailer topples forward.

ASPHALT SINKING

Landing gear dropping into a hidden sinkhole or sinking into hot asphalt can cause similar issues and equally catastrophic consequences.

Trailer Up-Ending

While an up-ending doesn't involve collapsing/aging landing gear, it can happen with any age trailer. Almost always consequential, upending occurs when heavily loaded forklifts at the nose of the trailer, cause it to tip forward, bringing the rear end up and away from the dock. With freight, workers, and a forklift in the trailer, there is significant risk of serious injury, not to mention damage to goods and machinery. Even workers up on the dock and dock equipment are in peril as the open end of the trailer tips up.

In Search of Support – Available Solutions

EFFECTIVE BUT OFTEN IMPRACTICAL.

While “Live Loading” – meaning, leaving the truck’s cab attached to the trailer – provides the more than adequate stability during the loading process, this solution is often impractical from an efficiency perspective and in busy dock operations, trailers are typically detached from their rigs and shunted to and from dock positions by the yard jockey (or shunt truck). This is called trailer spotting. But, as noted above, it is the spotted trailer that is at risk of collapse.

EFFECTIVE EXCEPT WHEN IT’S NOT.

A trailer restraint device that captures the ICC bar at the back of a trailer just below the dock opening, is another effective measure that can *help* prevent trailer up-ending, though this practice offers less protection against trailer tip-over or landing gear collapse. Systems that rotate over the ICC bar, instead of just butting up against it, are more effective. However, since positive engagement with the bar is not always possible, trailer restraint devices are best not to use in isolation. Extra support at the trailer’s nose is always recommended.

EFFECTIVE. AND SIMPLE.

Two risks, one solution. For spotted trailers, where load imbalance and landing gear weakness can be exposed, the best remedy is to employ a supporting device, beneath the nose of the spotted trailer.

Typically referred to as Trailer Stands or Trailer Supports, these supporting devices are positioned under a trailer’s nose and offer simple, strong, and effective safeguards against the risks of both trailer tip-over and up-ending.

One Solution – Many Ways

Available in several configurations and with a variety of features to meet the needs of different dock environments, the Trailer Stand is an easy, cost-effective solution to potentially devastating and costly accidents. Modern trailer stands have evolved through research and trial, from the use of trailer jacks (designed for maintenance and changing tires) to the engineered and tested solutions we use today.

1) TRAILER JACKS ARE NOT SUBSTITUTES FOR TRAILER STANDS

While it was once a common practice to use a trailer jack to provide support at the trailer's nose, these devices are designed for trailer maintenance and are not suitable for use with a moving forklift inside. Using a trailer jack for this type of support introduces many risks and is not recommended.

- With a trailer jack's small contact plates offering no weight distribution, placing one (or two) post-type trailer jacks under a trailer's nose can cause the trailer floor to fail with the jacks pushing through and resulting in tip-over.
- Wide-plate jacks (typically with a 30" contact plate) can distribute weight better, but can also hide landing gear failure until the jack is lowered, at which point tip-over remains a risk but with the jack operator now in mortal danger.
- In fact, all jacks have the ability to lift a trailer off its landing gear, creating a false sense that the landing gear is OK.
- Small wheels, found on most jacks, make them difficult to deploy in rough conditions.

ALERT: It is strongly recommended that trailer jacks only be used for the maintenance operations for which they are designed, and not for trailer support during loading and unloading.

2) PIN-STYLE POST TRAILER STANDS

The first developments in trailer stand design were heavily influenced by the trailer jacks that preceded them. While avoiding the risks created by a jack's lifting function, the pin-style stand still employs a small contact plate and would normally be recommended only to be used in pairs – making them time-consuming, ergonomically unfriendly, and complicated to deploy.

3) TRAILER STANDS – CRANK STYLE

A dramatic increase in dock safety and efficiency came with the next advance in Trailer Stand design. These next-gen stands used a wider top & base to distribute weight better – similar to the wide-plate jacks mentioned above but featuring a design that, importantly, is unable to generate lifting force. The stand's sole purpose is to support the trailer in case of tip-over or up-ending. This eliminates risks that are created by lifting the trailer off its landing gear. Additionally, many of the new trailer stand designs feature larger tires, making them easier to maneuver in weather and difficult conditions.

With the crank variety of stand, the height is adjusted as the dockworker turns a crank handle (which can be anywhere from awkward to uncomfortable with the stand positioned under the trailer's nose) to 'snug-up' the top plate to the underside of the trailer. Clearly, crank style stands result in ergonomic drawbacks.

4) TRAILER STANDS – AUTO-RAISING

The next major improvement in the industry brought increased efficiency along with a more worker-friendly, ergonomic design. Crank-less trailer stands were developed with internal gas shocks that allowed the top plate to automatically rise to the underside of the trailer and lock safely with a pin/lever combination. This enables faster positioning of the trailer stand and eliminates the human wear-and-tear caused by the bending and cranking required with the older variety.

In this phase of stand evolution, debate centered around whether a trailer stand needed to be 'snugged up' to the underside of the trailer or whether a gap was permissible. 'Free fall' testing with over-loaded trailers, has proved that a trailer stand with the right capacity, can stand up to such a dynamic load with as much as a 6" gap between the trailer and the top-plate of the stand.

Unlike a trailer jack, when a trailer stand is supporting a trailer with failed landing gear or load imbalance, it cannot be accidentally removed and will continue to support the full weight of the trailer and cargo until the trailer can be safely emptied and/or repaired.

5) TRAILER STANDS – EXTRA-WIDE

As trailers grew from 48' to 53' in width, loads became heavier, forklifts moved faster, and trailers continued to tip and tumble – even with a wider-support trailer stand in use.

To combine better side-to-side support with quicker deployment in extra heavy-duty applications such as those found in the automotive, pulp & paper, food, and beverage industries, extra-wide stands were developed. These units, at more than double the width of their predecessors, eliminated the need to position two smaller jacks or stands, with one beneath each corner of the trailer.

Initially developed in a manual design employing a crank handle, a more ergonomic option followed as electric-powered models were introduced. These powered models came with a significantly increased cost – both in initial price and ongoing maintenance.

These original extra-wide models were followed by the development of a manually positioned (non-electric) option, with a stepped design for easy positioning that could be secured simply by the use of a foot pedal. This type of extra-wide stand combines a more ergonomic design with better efficiency, offered at a fraction of the cost of the electric models.

No Boots on the Ground®

6) YARD JOCKEY-POSITIONED TRAILER STANDS AND PERMANENTLY POSITIONED GROUND-MOUNTED TRAILER SUPPORTS

With the increased use of trailer stands, the number of dock attendants required to deploy them grew, correspondingly. And, with more workers outside in the dock approach, traffic and **collision related injuries** began to increase, as did **slip-and-fall accidents** from workers getting in and out of shunt trucks to deploy/retrieve the stands. These growing safety issues led some organizations to adopt a “No Boots on the Ground®” safety policy, meaning no workers were permitted on the tarmac in the loading dock. But, such a policy created a conundrum, in that conventional trailer stands could only be deployed manually. So the choicer was either no stand or workers allowed on the dock approach. Neither one a good option.

An early solution involved the use of a truck-positioned trailer jack, set in place by a yard jockey to capture the “king pin” of the trailer, in the same way a truck cab would. While these models ensure the driver does not touch the ground, they are expensive, require frequent service, and take 5 to 6 minutes to put in place. For this solution, the initial investment for a large company with hundreds of loading docks would be massive, not to mention the ongoing labor cost to place and remove.

The development of a more cost-effective solution followed, where a simpler trailer stand was backed into position using the shunt vehicle. Due to this shutable stand’s stepped design, the driver can easily position the stand, delivering hands-free trailer collapse protection. This model also reduces the average positioning time to less than 2 minutes, more than halving the ongoing cost of its use. And the lack of moving parts in these shutable stands, significantly reduces both their initial price and ongoing maintenance costs.

Further innovation in the development of shutable options eliminated the wheel assembly required to deploy earlier models, and has evolved to a solution that is deployed by a lifting device fixed to the front of the yard jockey. This greatly reduces the average cost per stand and even increases the time for deployment advantage resulting in further savings and increased efficiency.

Another advance in No Boots on the Ground® safety has seen the development of a permanently positioned remote-controlled trailer support solution. These ground-mounted trailer supports collapse to the size of a permanently positioned, low-profile speed bump. The trailer is rolled over top by the cab or shunt truck. Then, without setting foot in the dock approach, using a robotic mechanism, the support is activated from inside the dock and rises to snug up against the bottom of the trailer. For the ultimate in support and safety, these ground-mounted supports are a peek into the autonomous dock of the future.

The Best Solution?

The wide variety of Trailer Stand designs described are available in the market at prices ranging from under \$100 to over \$55,000. The choice of stands, while seemingly endless, can be narrowed by considering the various workplace and dock traffic criteria.

How to Choose the Stand for You

Selection Criteria

1) WHAT TYPE OF LOADING IS PRACTICED ON YOUR DOCKS?

“Live Loading”: The truck cab does not decouple from the trailer. This is a safe and effective option requiring no additional trailer support.

“Spotted Loading”, or “Dropped Trailers”: The risk of trailer collapse or up-ending looms. *A trailer supporting device is required.*

“Yard Jockey is used to position trailers”: If a yard jockey is in use in your loading dock exceptional No Boots on the Ground® trailer stand options are available.

2) WHAT IS THE LEVEL OF YOUR LOADING DOCK TRAFFIC?

Low frequency: If spotted loading occurs infrequently, or the loading dock receives a low volume of trailers, a trailer stand device that takes more time to position but costs less may work well for you.

To prevent injuries and save time, the ergonomics and ease-of-use of a stand must be considered, particularly as loading frequency increases.

High frequency: In busy loading dock areas, the initial lower cost of a less-efficient solution, leads to greatly increased costs over time, and likely an increase in user injuries as well. The easiest to deploy and most ergonomically friendly system is always the best choice, but particularly in high-traffic dock environments.

3) WEIGHT OF LOADING

Note: The weight of the product being loaded PLUS the weight of the loading device itself, should always be taken into consideration.

Light loading: A person walking into the trailer with handheld packages, like in a courier operation, is an example of light loading. This type of loading does not entail significant risk of weight shifts or trailer movement. A lighter-duty trailer stand can be considered.

That said, a quality trailer stand, rated at 100,000 lbs or greater, will ensure protection in any uncertain loading environment and is a great investment in safety.

Heavy loading: Forklift loading of full pallets is an example of extremely heavy loading. In these situations, there is a critical risk of trailer collapse or up-ending accidents. A heavy duty, extra-wide trailer stand is an essential component of loading dock safety in these environments.

Who's Buying?

Trailer stands earn attention from various industries, all sizes of businesses, and multiple roles within an organization. Consider:

INDUSTRY

Any industry whose operations include loading dock (with spotted trailers) will be found to use trailer stands. Prime examples include:

Logistics, Pulp & Paper, Automotive Manufacturing, Food & Beverage, and more.

COMPANY SIZE

Even companies with a single dock should employ the use of a trailer stand. But the type and frequency of loading dock traffic can inform some decisions.

Light-Traffic/Low-Volume docks – Manual trailer stands are likely acceptable options for the low-volume docks. But a wide support stand is still an important consideration.

High-Traffic/Heavy-Duty – At the other extreme, busy loading dock operations should consider ergonomics, deployment efficiency, and No Boots on the Ground® options when planning their trailer stand strategy.

50+ Loading Dock Operations – As the number of docks rise, efficiency AND enhanced safety are important considerations. For these businesses, when also using a Yard Jockey, a shuntable trailer stand offers quick turnaround and No Boots on the Ground® safety.

Protecting your People

(and trailers, and forklifts, and cargo, and dock area...)

Loading dock safety begins simply with a desire to protect workers on the job. Employing trailer stands that are easy to deploy and offer strong, wide support, delivers a safer loading dock environment, while also minimizing risk of business interruption. Add on the umbrella-layer of safety (and operational efficiency) delivered by adopting a No Boots on the Ground® approach to trailer stand delivery and you have a powerful, multifaceted approach to protecting your people.

- 1 *Safety & Health Magazine, Dec. 2017*
- 2 *Optimum Safety Management, 2017*
- 3 *Safety in Numbers, Accident Statistics*