



Bridging the Gap Between Trailers and Warehouses

How selecting the correct dock leveler can establish a safe and efficient loading area to enhance productivity and safety for employees and freight

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Introduction

The trucking industry plays a critical role in the US economy and virtually every aspect of the public and private sector are impacted in some way by freight logistics and transport. In 2019, the trucking industry collectively moved 12 billion tons of freight, generated \$792 billion in revenue and employed 8 million people.¹ While those numbers continue to grow and trucking remains the primary method of freight transportation, over the last decade the industry has seen a shortage in drivers. Although there is a continual increase in freight and deliveries, the driver shortage has reduced the number of vehicles on the road, making efficiency at the dock more essential than ever to help ensure that tight arrival times and departures can be met.

Loading docks must be optimized to ensure that drivers and dock attendants can load and unload trailers safely and efficiently so trucking companies can stay on schedule and avoid unnecessary delays. Docks must have the correct equipment so freight can be transported quickly from trailers and warehouses, and the most essential item at any loading dock is the platform used to transition the gap between the two. These metal ramps provide a smooth transition from the trailer bed and loading dock floor for foot traffic, forklifts, pallet jacks, dollies and other non-motorized equipment.

With a wide variety of portable and permanent options within the material handling industry to choose from, it is important to know the differences, variables and performance features that can best meet your budget and loading needs while improving productivity and safety. In this white paper, we'll discuss why gaps between trailers and loading docks are necessary and how they can compromise employee safety and dock operations if not compensated for properly. We will also take a look at the products designed to bridge those gaps and which applications are suited for lightweight, portable options (dock boards and plates) and which need permanent, heavy-duty solutions (dock levelers).



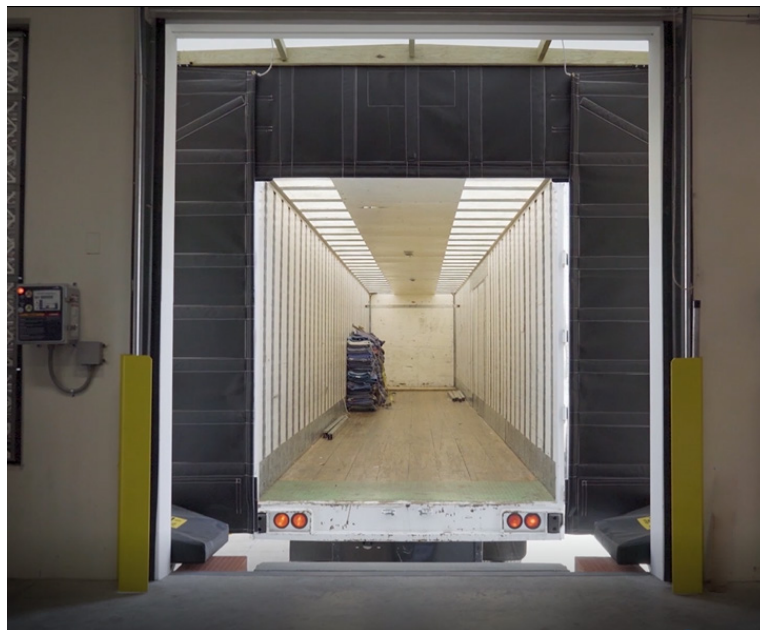
Recessed Pit-Style Dock Leveler



Edge-of-Dock Leveler

The Importance and Dangers of Gaps

The Material Transfer Zone (MTZ) acts as a bridge between trucks and the warehouse, and it extends well beyond the loading dock. It reaches as far out as the drive approach and covers the company's entire shipping, receiving and staging area. Perhaps no greater aspect of the MTZ is the loading dock itself and the platform used to load or unload trailers. No matter how precise the design, gaps between trucks and the building wall will, and must, be present. As a truck backs into the loading area, heavy-duty rubber bumpers protect the dock by stopping the trailer from impacting the building wall. These bumpers establish a gap between the loading dock wall and the rear of the vehicle. Although necessary to prevent building damage, this gap creates an obstacle for material handling operations, as forklifts and other wheeled equipment are unable to travel over the opening.



Height difference and gap between the dock floor and trailer bed

Along with improving the efficiency and maneuverability of equipment at the dock, bridging this gap is also of paramount importance for employee safety, as workers can fall into the gap and become injured. In 2019, an employee in California was unpacking boxes from a trailer when he fell into a gap between the loading dock and truck. He sustained numerous injuries and required knee surgery.² Similarly, in 2018, an employee in New Hampshire was unloading a truck when he stepped into an opening between the dock floor and the trailer. He sustained multiple internal injuries when his leg went into the opening and was hospitalized.³

Beyond the physical and emotional impact injuries have on employees, a single nonfatal workplace accident can cost an employer thousands of dollars. The National Safety Council (NSC) estimates that the cost per medically consulted injury in 2019 was \$42,000, excluding property or equipment damage.⁴ In addition to medical expenses and employee wages, employers may also be subject to fines from the Occupational Health and Safety Administration (OSHA) if they are found guilty of violating safety laws or regulations. In the case above from California, the employer was issued a serious safety violation from OSHA that carried a \$15,300 penalty.

Besides ensuring employee safety and reducing employer costs from workplace accidents, covering the gap also ensures better efficiency and productivity at the dock. There is often a height difference between the trailer and loading dock floor that requires a durable surface to transition between the two at either an incline or decline while supporting the weight of dock personnel, equipment and cargo. The most common method of bridging the gap and compensating for the varying floor heights is to use a loading dock leveler or light-duty dock plates and dock boards. These products provide a metal surface that connects the warehouse to the truck, but their methodology, function and performance vary drastically. In the next section, we will discuss the differences between dock plates, boards and levelers, and which applications are best suited for each type.

Portable Versus Permanent Products

Although they all share the same goal, dock levelers, dock plates and dock boards differ significantly in their application, performance and overall functionality. These products bridge the gap between trailer beds and warehouse floors to facilitate loading and unloading through powered and non-powered applications. However, that is where their commonalities end. In this section, we will discuss the differences between levelers, plates and boards and which applications are better suited for light-duty, portable products or permanent investments.



A pit-style leveler creates a smooth transition from the dock floor to the trailer bed

A dock plate is a portable ramp made from aluminum and is designed for lighter loads that are generally 10,000 pounds or less to accommodate pallet jacks, carts, dollies and other non-powered equipment. Dock plates are the easiest to transport, the least expensive and are best suited for low-traffic docks that load or unload smaller quantities of goods that do not require a forklift. However, their edges are unprotected, with only painted sides acting as a visual guide. Dock boards are also a portable solution like a dock plate, but they differ in design and application. Dock boards are designed to accommodate forklifts and can hold a much greater amount of weight, with capacities reaching as high as 40,000 pounds. Dock boards also include reinforced curbs, making it more difficult for equipment or machinery to roll off the edge and offering some protection for dock attendants.

Dock plates and dock boards must be lifted and transported into position over the gap, typically using either a forklift or manually carried by employees. Their portable designs create several obstacles for facilities, especially those with limited floor space. While not in use, dock plates and boards must be stored somewhere, which can be difficult because they can range in sizes up to 7 feet wide and 6 feet long. While steel dock boards are typically too heavy to lift manually and require a forklift to transport, aluminum dock plates may be lifted by one employee and can weigh as little as 56 pounds. However, the act of carrying these platforms can also cause employee discomfort or harm. A recent study by the US Bureau of Labor Statics found that back injuries account for 39% of all work-related musculoskeletal disorders, and many were the result of unsafe lifting and carrying of heavy or awkward objects.⁵

Along with the act of physically lifting and carrying the dock plates, having to work over the opening between the trailer and warehouse is also dangerous. When an employee in California needed to unload merchandise from a trailer, he manually carried a dock plate to cover a 9-inch gap between the truck and the dock floor. Once unloading was complete, he lifted the dock plate and was preparing to return it to storage when his right foot fell through the gap. The employee suffered a fractured hip and required hospitalization.⁶

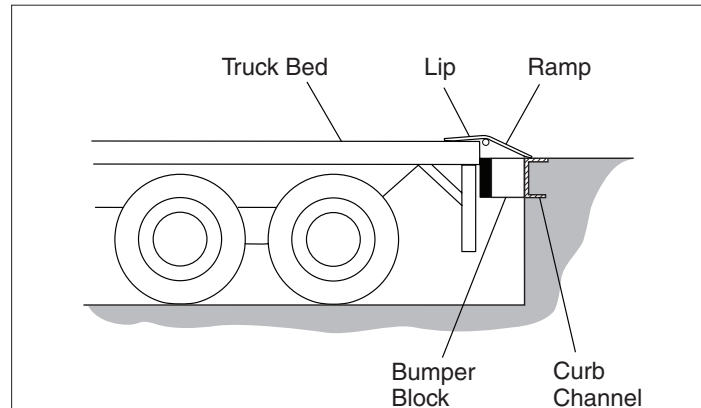
Unlike portable dock boards and plates, loading dock levelers are firmly attached to the loading area and are fixed into either a recessed pit or mounted to the exterior face of the dock wall. They are designed for use with most forklifts, motorized equipment, heavy machinery and are available in capacities ranging from 20,000 – 100,000 pounds in a wide variety of sizes up to 7' x 12'. Levelers are not only stronger, larger and more reliable, but they also have adjustable working ranges to accommodate almost any truck, vehicle or trailer for above or below dock loading. Without the need to lift and maneuver the levelers into place, employees avoid back strain and the dangers of slipping through gaps while also saving time and increasing productivity at docks. In addition to being easier for employees, levelers also have extra safety features and won't slip or dislodge, unlike removable dock plates and boards.

Dock Leveler Selection Guide

Although portable dock boards and ramps may be appropriate for a small percentage of buildings and loading areas, by far the most popular solution is a loading dock leveler. They allow faster loading and unloading, do not take up any valuable storage space on the warehouse floor, handle larger capacities, increase safety and are easier for workers to use. There is a wide selection of loading dock levelers available on the market today and choosing the correct model is essential to ensure smooth, safe shipping and receiving operations. In this section, we will analyze the various leveler operating types and functions while discussing the specific benefits associated with each style. When evaluating which leveler is best for your application, it is important to consider the following:

- Types of vehicles or equipment used to load and unload trailers
- Capacity range of each operating style
- How many times per day/shift the loading dock is used
- Truck bed heights versus dock floor height
- Maintenance costs and repairs
- Energy-efficient designs

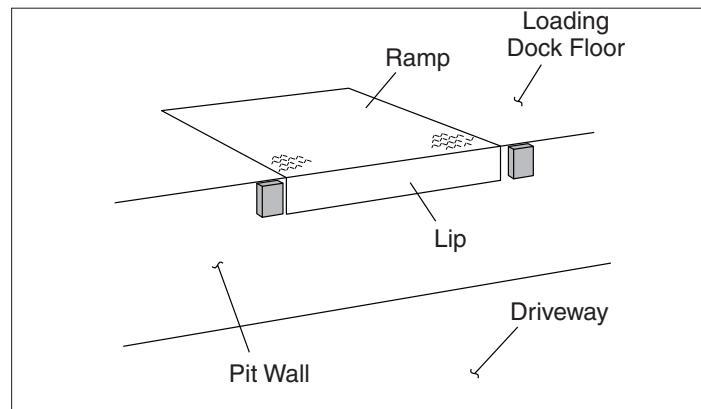
Dock levelers are inherently easier to use than portable ramps and boards, but each is designed and functions differently. There are two primary styles of loading dock levelers: recessed pit-style and edge-of-dock (EOD). Edge-of-Dock Levelers are used when dock space is limited or the working range and capacity of a full-size, pit-style leveler is not needed. An EOD leveler mounts to the dock's exterior face and provides a simple, economical alternative to recessed levelers while still offering more versatility and safety than a plate or board. EODs are ideal for facilities that transport less weight and have lighter equipment or vehicles to load and unload trailers, with capacities ranging from 20,000 to 35,000 pounds and a standard operating range of 5 inches above and below dock. There are two common operation methods for an EOD: hydraulic and mechanical. Hydraulic EODs activate at the push of a button, which raises and extends the leveler and lip into the trailer bed. Mechanical EODs are operated manually by a dock attendant who pulls a heavy-duty steel lever backward to raise the leveler and then pushes the lever forward to extend the lip plate into the trailer bed. Although mechanical EODs require manual operation, activating them should not be labor-intensive. Reputable manufacturers take worker comfort, safety and ergonomics into account and provide a roller-bearing lift mechanism and dual-extension springs or torsion springs for smooth, easy lifting.



Edge-of-Dock Levelers install onto the face curb of the loading platform

Edge-of-Dock Levelers are ideal for facilities that transport lower weight loads or have loading areas that are used infrequently. However, if facilities require a greater capacity or have high-traffic docks that are used multiple times per shift, recessed pit-style levelers are needed. These larger, more robust levelers come in sizes up to 7' x 12' with capacities up to 100,000 pounds. There are three main types of activation for recessed loading dock levelers: mechanical, hydraulic and air-powered. Each method comes with distinct benefits, and those must be weighed carefully while choosing the right design for your loading areas. Hydraulic and air-powered units operate at the push of a button, while mechanical levelers are engaged manually by dock attendants. While mechanical levelers have the lowest initial costs, they have more moving parts and will typically incur greater maintenance and repair expenses over time. Air-powered levelers, in contrast, require the least amount of maintenance and have the fewest moving parts but do not have as great of capacities as hydraulic levelers. Air-powered and mechanical levelers typically have a maximum capacity of 55,000 pounds, compared to the 100,000 pound maximum for hydraulic units. Regardless of the operation, most recessed levelers have a standard operating range of 12 inches above and below dock to accommodate most truck types and trailer heights.

All pit-style dock levelers have built-in safety and security features to help protect employees and safeguard facility access. When selecting brands and models of loading dock levelers, it is important to consider how they are designed and if they can protect your dock attendants if a truck pulls away from the dock early. Premature departure is one of the leading causes of forklift falls and injuries at the dock. The lip of the leveler rests on the trailer bed and provides a smooth transition from the warehouse floor for the forklift operator. At a minimum, the lip must overlap into the trailer bed at least 4 inches to ensure an adequate lip purchase to support the weight of the leveler, motorized vehicles and cargo. However, if a trailer pulls away while the leveler is still in use, there must be additional safety measures in place to keep the leveler from falling.



Recessed dock levelers are installed in a pit formed in the loading platform

It is important to select a leveler that can combat the dangers of premature departure. Manufacturers like NOVA Technology include standard safety equipment to help protect against free-fall situations. The NOVA NMS Mechanical and NAS Air Powered levelers include safety legs, which engage automatically and stop the ramp from falling within 4 inches below dock level. The NOVA NHS Hydraulic leveler includes a velocity fuse, which suspends the hydraulic fluid in the event of a free-fall situation and stops the leveler from dropping within 3 inches. Built-in safety provisions are another advantage that levelers provide over plates and boards. Safety, combined with enhanced efficiency, ease of use and greater capacities, are some of the reasons why material handling professionals, dock attendants and truck drivers prefer permanent dock levelers over portable, light-duty options.

Key Takeaways

Knowing the differences in design, performance and function between dock plates, dock boards and levelers is critical when deciding what equipment to use for your application. Unlike dock plates and boards that require employees to manually lift and place them into position, lock the legs and set span locks, loading dock levelers are permanent installations that activate and store quickly, feature numerous built-in safety features and will not slip or move out of position. Loading dock levelers come in a variety of different sizes, capacities and operating methods to accommodate most building types and are designed for ease of use while increasing productivity, efficiency and safety.

In this white paper, you learned:

- Why a gap must exist between trailers and loading docks
- The dangers and risks present if the gap is not covered properly
- How dock plates and boards differ from loading dock levelers

- The difficulties and dangers associated with portable ramps
- How loading dock levelers are designed for durability, safety and efficiency
- What factors to assess when choosing a dock leveler

There are many different aspects to consider when selecting the right dock leveler for your needs, but all should prioritize safety, reliability and strength while increasing productivity at the dock. Loading dock levelers bridge the gap between trucks and commercial buildings and are essential for establishing a smooth and safe transition between the trailer bed and dock floor.

About NOVA Technology

NOVA Technology is an international manufacturer and distributor of loading dock equipment and accessories. We offer a variety of recessed and edge-of-dock levelers and can provide the correct size and capacity for nearly any application. All of our levelers offer best-in-class performance, safety and security. Our product line includes the NHS Hydraulic Dock Leveler, NAS Air Powered Dock Leveler, NMS Mechanical Dock Leveler, Hydraulic Edge-of-Dock Leveler and the Mechanical Edge-of-Dock Leveler, and below you'll find a brief overview of each product to see which design might best suit your needs.

NHS Hydraulic Dock Leveler – activates at the push of a button and features a hydraulic pump for operating both the leveler platform and lip cylinders. Available in capacities up to 100,000 pounds.



NAS Air Powered Dock Leveler – incorporates the use of a low-pressure, high-volume air system and bladder to raise and lower the platform. Available in capacities up to 55,000 pounds.



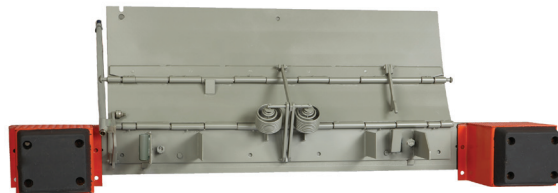
NMS Mechanical Dock Leveler – pull-chain operation with a flip-out lip, cam and roller counterbalance system for smooth, dependable walk-down and a patented holdown assembly with Auto Release technology. Available in capacities up to 55,000 pounds.



Hydraulic Edge-of-Dock Leveler – fully hydraulic unit with independent lip and deck cylinders. Available in capacities up to 35,000 pounds.



Mechanical Edge-of-Dock Leveler – includes a heavy-duty steel lever with an ergonomic handle and available with dual-extension, roller-bearing spring lift mechanisms or torsion springs. Available in capacities up to 35,000 pounds.



For over 30 years, NOVA has provided the innovation, reliability and resources needed for our customers to handle the continuously evolving needs of the material handling industry. We offer a variety of dock levelers, seals and shelters, vehicle restraints, light communication systems, dock lifts, safety barrier products and a selection of aftermarket parts and accessories. All of our products are designed to maximize safety, productivity, security and environmental control at loading docks and throughout commercial facilities. Call us today at 1-800-236-7325 or send an email to sales@novalocks.com for more information or to find a dealer in your area.

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