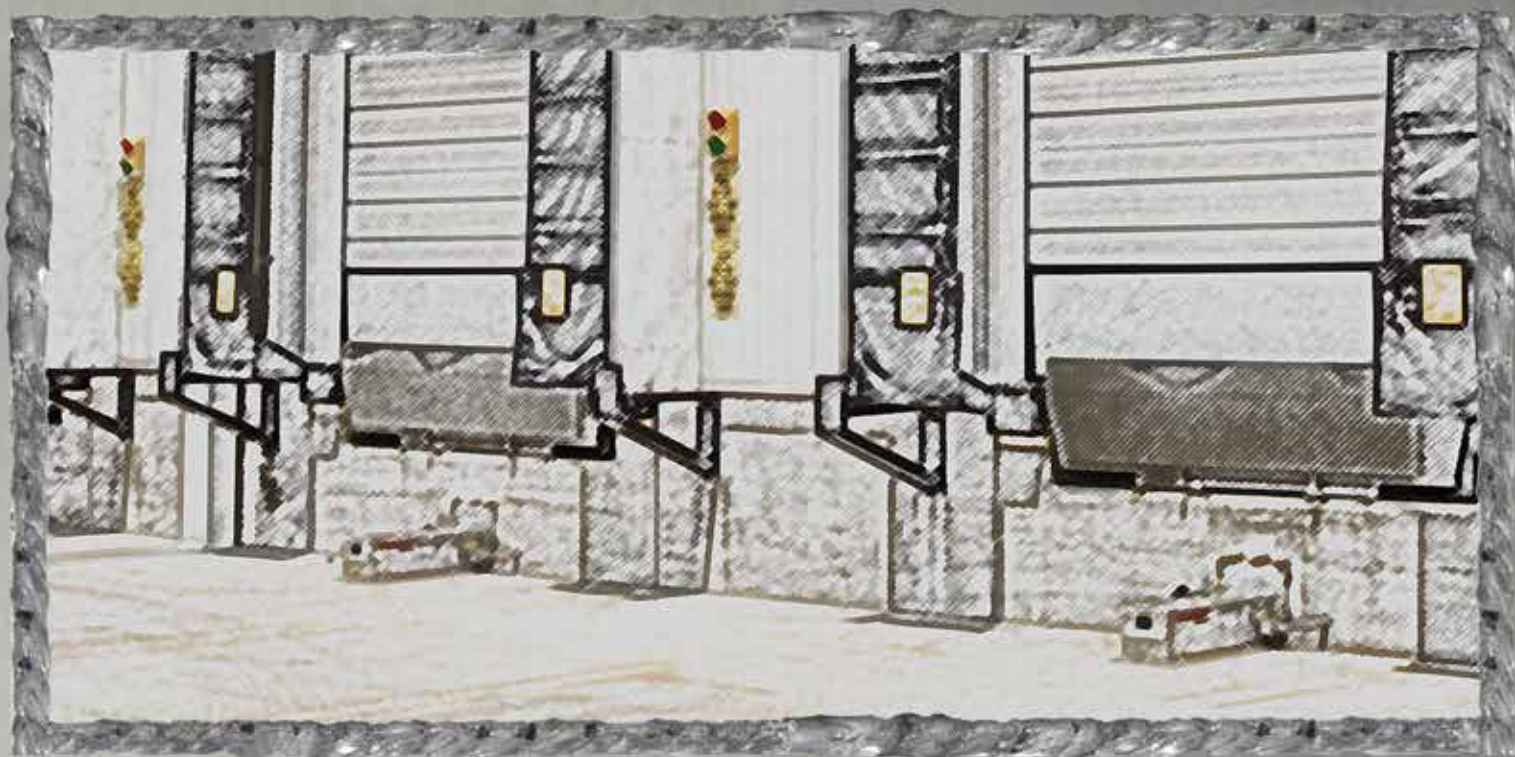


# Vehicle Restraints 101



**LODEM**

LOADING DOCK EQUIPMENT MANUFACTURERS

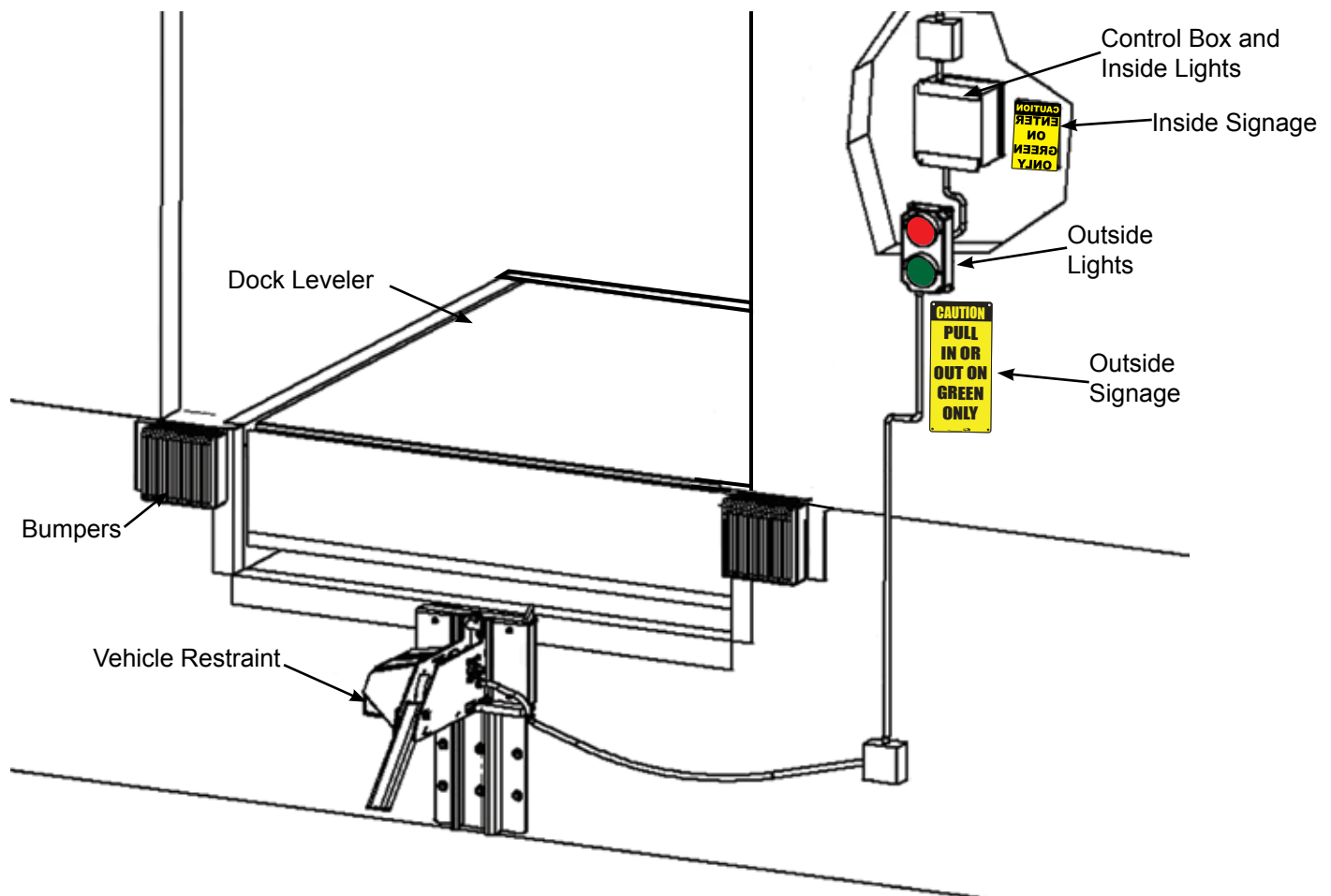
A Product Section of Material Handling Industry, MHI

# What You Always Wanted to Know About Vehicle Restraints But Were Afraid to Ask

## *Just what the heck is a vehicle restraint?*

A vehicle restraint is a piece of equipment installed at the loading dock that is intended to prevent a transport vehicle from leaving the dock during the loading/unloading process. It is also a serious safety hazard for a trailer to pull away from your loading dock while your fork lift operator is still inside. A properly engaged restraint will prevent this. A vehicle restraint can also help keep your very expensive trailer and cargo at the dock where it belongs rather than disappearing as soon as you leave for the day.

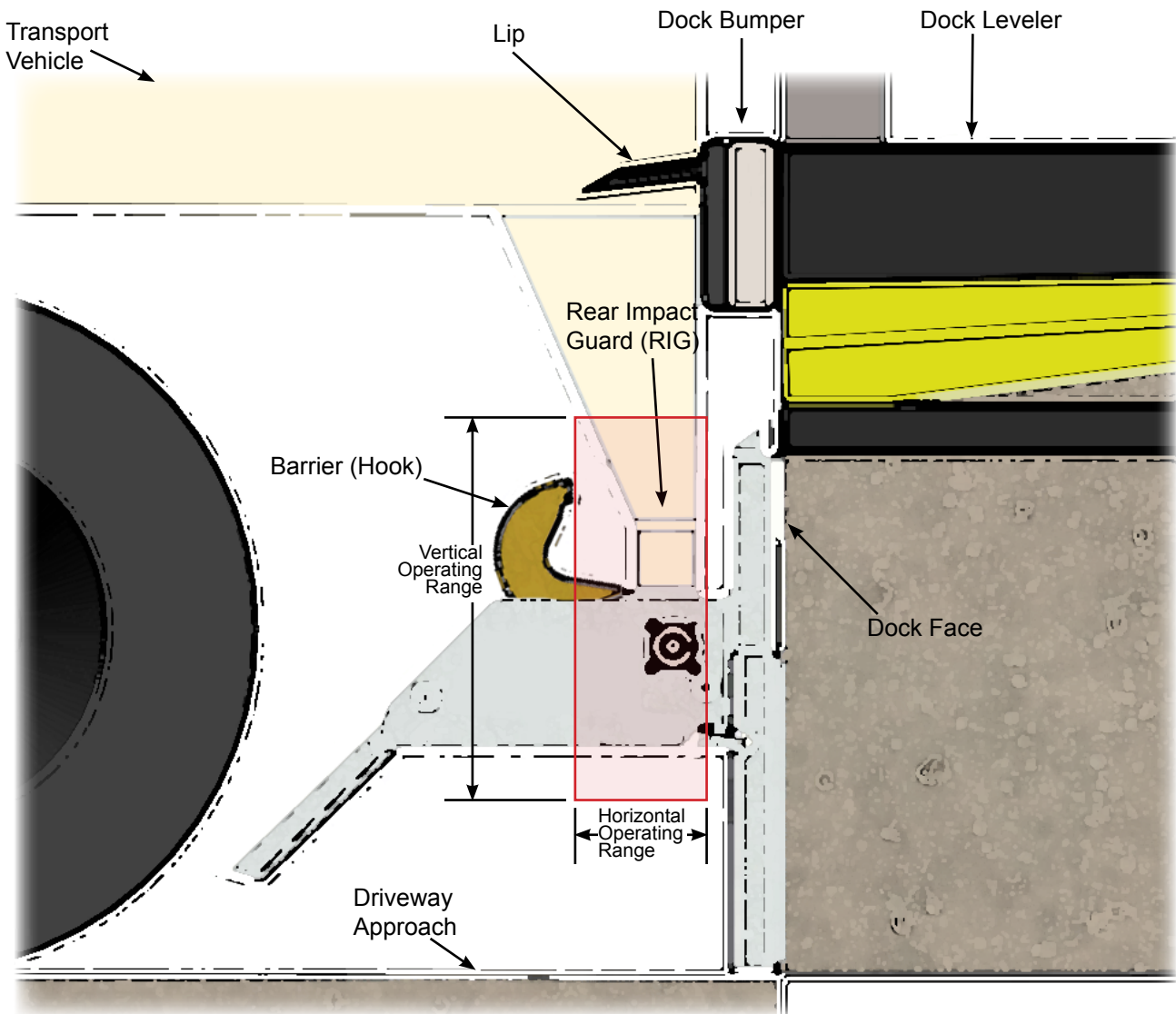
A red and green light communication system can be added to the most basic restraint system improving communication between the loading dock operating personnel and transport vehicle driver.



# Common Terms and Definitions

***What do I need to know before I can start selecting a vehicle restraint for my application?***

You might want to know some common terms and definitions:



# Common Terms and Definitions

**Automatic Operation:** placement of a vehicle restraint device in its operating position by powered means not initiated by the loading dock operating personnel.

**Barrier:** the portion of a vehicle restraint device that engages the transport vehicle to prevent movement.

**Bumpers:** these are used to prevent the transport vehicle from contacting and damaging the building, dock leveler or vehicle restraint. They are usually made of rubber. Bumper sizes and projections vary, based on vehicles serviced and other factors such as driveway slope.

**Chock:** to place a wheel chock in front of a wheel of a transport vehicle to inhibit movement of the vehicle away from a loading dock.

**Communication Lights:** colored lights to communicate the status of the loading operation to the dock operator and to the driver of the transport vehicle. Typically one set of lights is visible to the dock operator to indicate whether the restraint is engaged, and another set of lights is visible to the transport vehicle driver to indicate whether it is safe to pull the vehicle away from the dock. The lights are typically green to indicate "GO" and red to indicate "STOP". Amber lights may be used to indicate caution.

**Dock:** This is the area of a building where loading and/or unloading of transport vehicles takes place.

**Dock Bumper:** See Bumpers

**Dock Face:** vertical surface at the front of a dock projecting from the driveway to the dock floor.

**Dock Level:** This term involves the vertical level that conforms to the building's floor surface.

**Dock Leveler:** a device affixed to a dock structure to form a bridge between the dock structure and a transport vehicle, thus allowing movement of industrial vehicles between the transport vehicle and the dock structure.

**Dock Pit:** The pit is the recessed opening in the building's floor that accommodates the pit dock leveler. Most pits are lined along the edges with structural steel angles that are embedded in the concrete.

**Dock Mounted Restraint:** a vehicle restraint mounted to the dock structure, usually the face of the dock.

# Common Terms and Definitions

**Driveway:** the surface in front of the dock where the transport vehicle is parked. The driveway surface may be generally horizontal or may be sloped toward or away from the dock. The driveway surface is typically made of concrete, asphalt or gravel.

**Driveway Mounted Restraint:** a vehicle restraint mounted to the driveway surface rather than to the dock.

**Hook:** see “barrier”.

**Horizontal Operating Range:** range of height of the RIG measured from the driveway that can be engaged by the restraint. The horizontal distance between the face of the dock bumpers and the restraining surface of a vehicle restraint. See “working range”

**ICC Bar:** see “rear impact guard (RIG)”

**Industrial Vehicle:** fork lift trucks, powered or non-powered pallet jacks, or any other form of vehicles used to load or unload material on a transport vehicle.

**Light Communication Package:** typically a red and green light system which can be activated manually or automatically. Intended to improve communication between loading dock operating personnel and transport vehicle driver.

**Lip:** The lip assembly is usually pivotally attached to the deck assembly and pivots from a vertical stored position to a position that rests on the transport vehicle’s floor. Lips are usually made with a tread plate that is similar to the deck.

**Loading Dock:** building area or structure where goods are moved to and from a transport vehicle. The dock is usually elevated above a driveway where the transport vehicle is parked.

**Loading Dock Operating Personnel:** a person or persons engaging in the process of loading and/or unloading transport vehicles whereby the activities may include the operation of industrial vehicles, dock levelers, vehicle restraints, dock doors, etc.

**Manual Operation:** placement of a vehicle restraint device in its operating position by the manual effort of the loading dock operating personnel.

**RIG Bar Restraint:** a vehicle restraint that engages the rear impact guard (RIG) of a transport



# Common Terms and Definitions

vehicle, thus preventing movement of the vehicle away from the dock structure.

**(RIG) Rear Impact Guard:** a structure attached to the rear of a transport vehicle to prevent an automobile from running under a transport vehicle during a rear end collision (a.k.a. ICC bar or underride guard). As of January 1998, U.S. federal motor vehicle safety standards FMVSS 223 & FMVSS 224 regulate the performance and use of rear impact guards for trailers rated over 10,000 pounds Gross Vehicle Weight (GVW).

**Restraining Surface:** see “barrier”

**Transport Vehicle:** a cargo-carrying vehicle (e.g., a truck, semi-trailer, trailer, or railcar) which may be entered upon by a powered or non-powered industrial vehicle or conveyors to load or unload material.

**Underride Guard:** See “rear impact guard”

**Unscheduled Departure:** the event of a transport vehicle departing the dock before loading or unloading is completed.

**Vehicle Creep:** the movement of a transport vehicle away from the loading dock caused by the transfer of momentum as an industrial vehicle decelerates when entering the vehicle and accelerates when exiting the vehicle. Uncontrolled trailer creep may allow the lip of a dock leveler to become unsupported and create a dangerous gap between the transport vehicle and the dock.

**Vehicle Restraining Device:** a device affixed to a dock structure or a driveway to engage a transport vehicle.

**Vertical Operating Range:** the range of heights of the bottom of an RIG above the driveway that can be engaged by the vehicle restraint. See “working range”

**Wheel Check:** a block, usually wedge shaped, which is placed on the driveway in front of a wheel of a transport vehicle to inhibit movement of the vehicle away from a loading dock.

**Wheel Restraint:** a vehicle restraint that engages one or more wheels of a transport vehicle, restraining uncontrolled movement of the vehicle away from the dock structure.

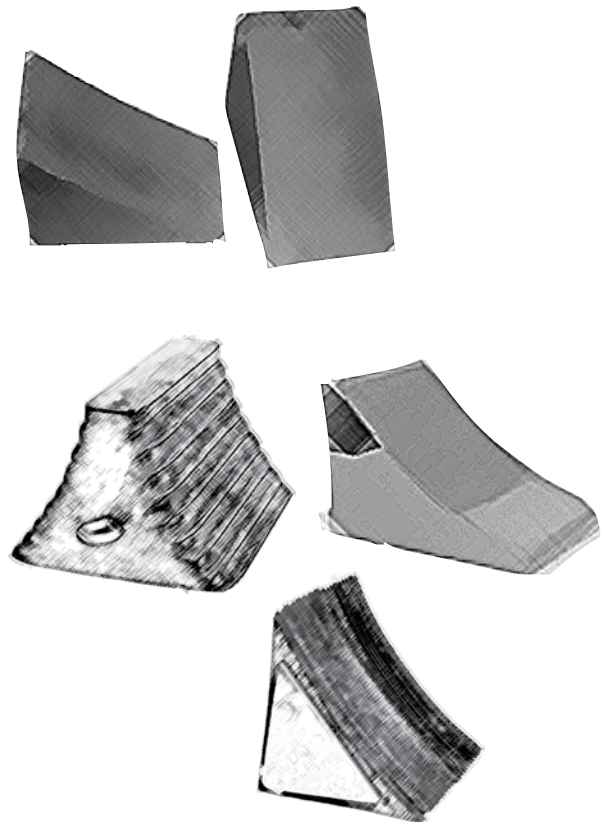
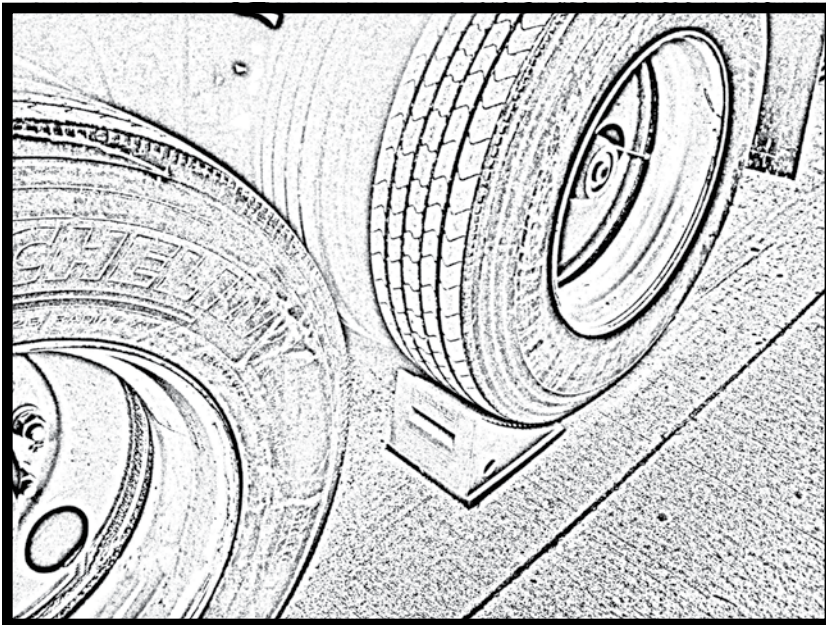
**Working Range:** the horizontal and vertical range of positions of an RIG that can be engaged by the vehicle restraint.

# Types of Vehicle Restraints

## **What kinds of vehicle restraints are there?**

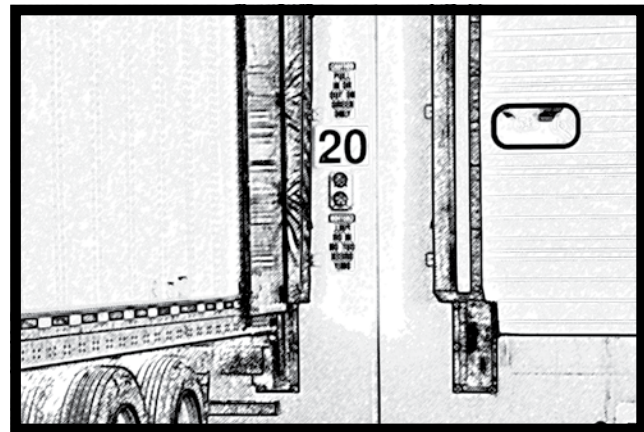
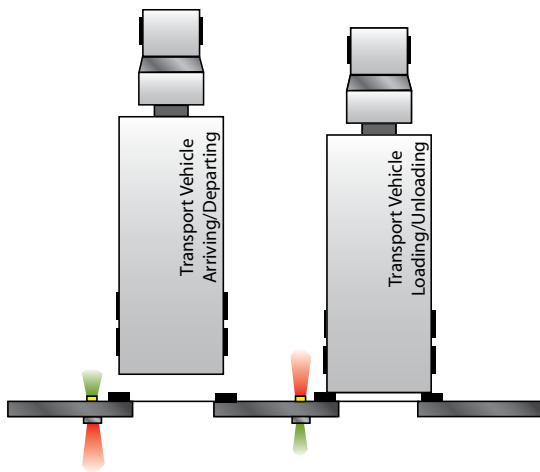
There are many different kinds of restraints. The most basic type is a “wheel chock” which can be utilized with or without a light communication package. Vehicle restraint systems can be manually or automatically activated. Vehicle restraints restrict movement of a transport vehicle by engaging the rear impact guard (RIG) or actual wheels of the transport vehicle. These restraints are typically mounted to/ in the dock wall or drive immediately in front of the dock and typically include special designs that are unique to an individual manufacturer as well as have unique installation characteristics based on an individual manufacturer.

**Basic Wheel Chock:** A wheel chock can be a simple block of wood, form fitted rubber/laminate wedge chock or constructed of plastic or metal alloy. A wheel chock is manually placed in front of one or more of the trailers wheels in an attempt to restrict the trailers movement during the loading/unloading process.

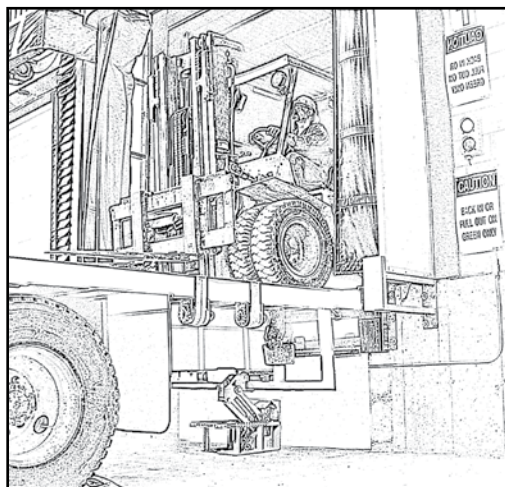


# Types of Vehicle Restraints

**Light Communication Package:** A light communication package can stand alone, be combined with a simple wheel chock or integrated with a vehicle restraint system. A common system would include an interior and exterior “red” and “green” lighting system designed to enhance the communication between dock operating personnel and transport vehicle driver. A set of signs are frequently added to indicate when it is safe to enter the trailer or pull away from the dock area. The lighting sequence can be manually or automatically activated.



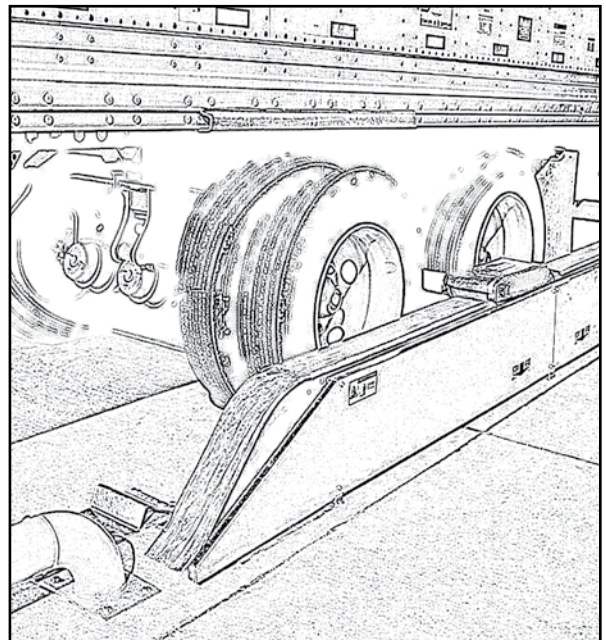
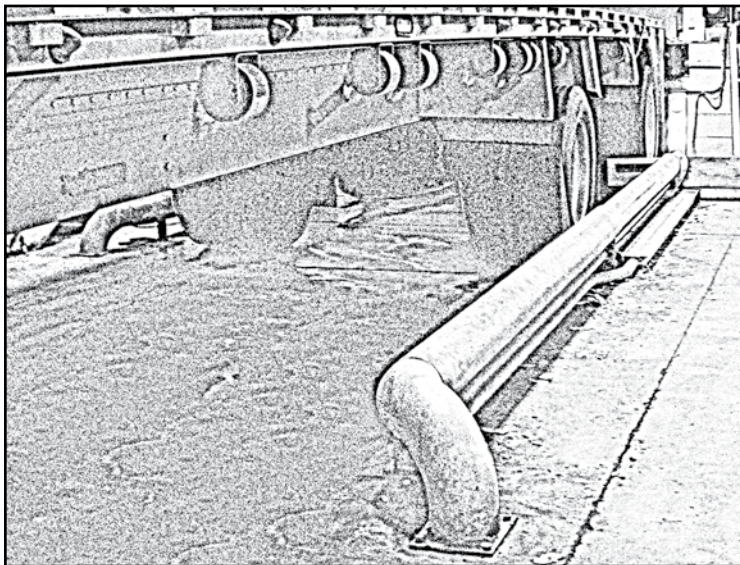
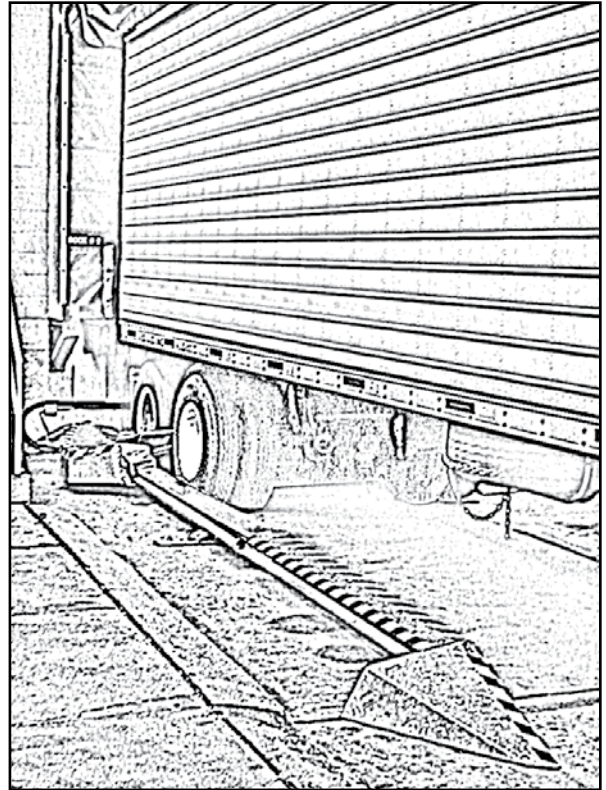
**Rear Impact Guard (RIG) Type:** This is by far the most common type of vehicle restraint. It is designed to engage the RIG bar common to most transport vehicles. It does this by either blocking the bar (rotating hook) or forming a vertical obstruction, preventing the vehicle from moving away from the dock until the restraint is released by the dock operator. These restraints are typically mounted to either the dock wall or to the drive immediately in front of the dock, but can also be recessed in the building structure under the dock pit as well.





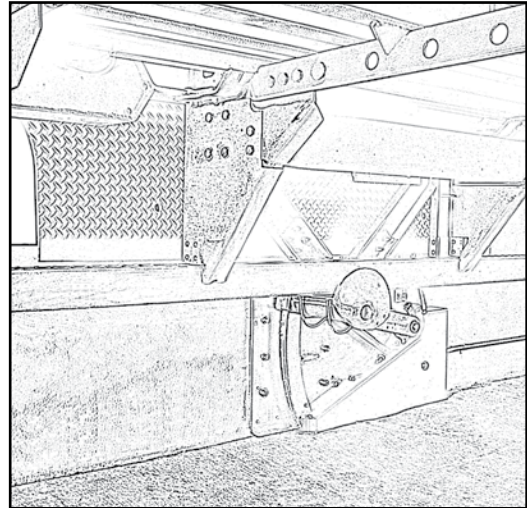
# Types of Vehicle Restraints

**Wheel Engaging Type:** This type of restraint acts by engaging one or more of the tires of the transport vehicle. Wheel engaging restraints are frequently used in applications where the transport vehicles being serviced do not have RIG bars or RIG bar is obstructed, such as lift gate trailers or small city delivery vehicles. These systems are typically surface or recess mounted to the driveway for ease of installation and to aid in vehicle alignment. Automatic and manually positioned systems are available.

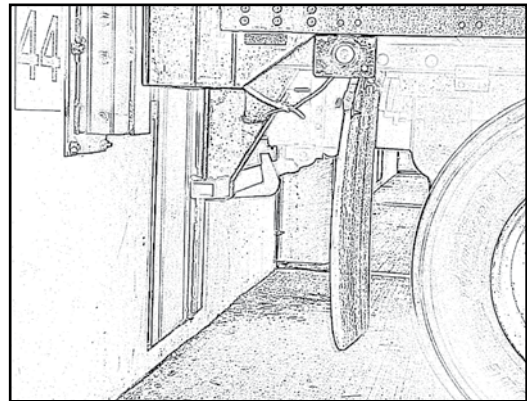


# Mounting Variations

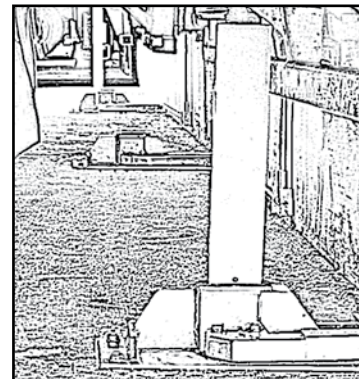
**Dock Mount:** Device is affixed to the foundation wall via concrete anchors and/or embedded steel plates. Installation brackets are frequently required to secure the restraint for specific dock configurations.



**Interior Pit Mount:** Device is recessed behind the foundation wall or part of a “deep pit” stand.



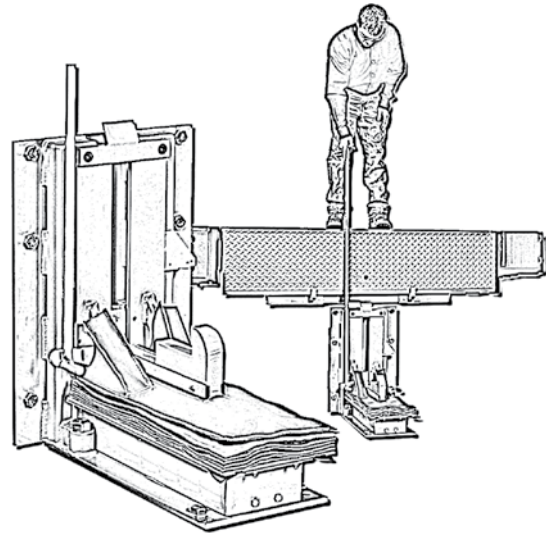
**Driveway Mount:** Device is affixed to drive surface or recessed into the driveway approach.



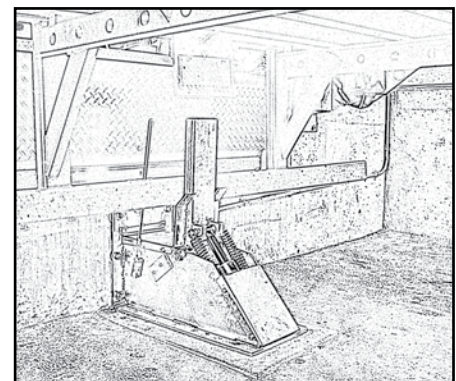
# Operational Types

Vehicle restraining devices are further classified according to manual versus powered operation:

**Manually Operated:** A vehicle restraining device that is both engaged and released manually. While less expensive than powered equipment, manually operated units depend on the dock operator to typically use a rod like device to engage and disengage the unit. A light communication package which may be part of a manual restraining device can be manually or automatically sequenced.



**Power Operated:** A vehicle restraining device that is both engaged and released through a powered means. This is the most popular type of restraint in that the operation is simple and easily accomplished. The restraint is operated by either a simple push button or is automatically engaged as part of an over-all integrated dock system. A light communication package which is part of a powered operated vehicle restraining device is generally sequenced automatically.





# More Information

## ***How do I find out more?***

You can contact the Loading Dock Equipment Manufacturer's website at [www.MHI.org/LODEM](http://www.MHI.org/LODEM)

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