Not All Loading Docks Are Alike

With approximately 75 years combined experience designing, studying, and trouble-shooting loading dock applications, the Buechel brothers have seen it all.

WHAT IS THE NUMBER ONE CAUSE OF DISASTROUS LOADING DOCK DESIGN?

On almost a daily basis, we are seeing docks with sloped approaches toward the building and pit levelers. No part of the truck should ever be closer than four inches to the wall of the building. Standard pit levelers come with 4.5" bumpers for level driveway approach. There is zero tolerance for any decline or sloped approach toward the building. Backing the truck down toward the building causes the top of the truck to come closer to the building wall than the bottom.

If this is not addressed in the design, the solution can be extremely difficult, expensive, or even impossible depending on the severity of the slope. Replacing the standard 4.5" bumpers with thicker ones would be the most likely solution except that this reduces the amount of leveler lip extending into the truck, creating a safety and liability issue.

The proper solution can be accomplished by designing the dock area of the building with a wall setback or constructing the building with a concrete ledge even with the floor of the building that projects out several inches. Either design provides the needed space between the wall and the approaching vehicle in a decline situation. (see figure 1)

For mild declines of 1% to 3%, it is possible to add bumper projection and, if levelers are involved, use the 20" lip option adding 4" of lip projection to the standard leveler.
WHAT ARE THE MAIN FACTORS THAT NEED TO BE CONSIDERED WHEN DEALING WITH A SLOPED APPROACH TOWARD A LOADING DOCK?

It would be nice if there was an iron clad mathematical formula for determining the percentage or degree of grade and minimum safe bumper projection and taper of dock seals or shelters, but there are too many variables. If we are told that the approach rises "X" inches over "Y" feet, it almost never a constant slope. Rather, there is normally some flat area adjacent to the building (which helps a lot), then the drive can go up, flatten out, and maybe go up some more. This means that different trucks can come in at different angles. It is better to have the bumpers protruding out too far than not far enough.

Some equipment manufacturers refer to degrees of slope and others refer to percent of grade. We prefer to work with percent of grade. It has been our experience that most customers calling in with the slope measured in degrees are feeding us numbers that are too high to be realistic or accurate.
This is a chart comparing percent of grade to degree of grade.

The percentage of grade is determined by dividing the height difference by the ramp length. As previously stated, the top of the truck needs to be at least four inches away from the wall, so the safe bumper projection is the percent of grade converted to inches plus four.

For example: if the ramp rises 2' over 40', then there is a 5% grade so the recommended safe bumper projection is 9''.

Extra thick laminated dock bumpers are available in various projections up to twelve inches, but the best thing to do is to plan ahead and provide the extra concrete ledge as previously described.

WHAT IS THE IDEAL DOOR OPENING SIZE FOR A LOADING DOCK?

Again, there is no simple answer to what seems like a simple question. Many factors need to be taken into consideration: (1) whether the customer has a fleet of trucks that are identical or if they are serviced by a range of common carriers, (2) the dock height and range of truck heights, and (3) the type of freight. For example, if the best possible seal was desired, and the trucks were 8' wide and 12'6" high, the dock height was 4', and full access to the truck opening was not required, the ideal opening size would be 7'6" x 8'6" using a seal. If trucks were 8' or 8'6" wide and full access to the truck opening was required, then the ideal opening size would be 9 x 10 and a rigid shelter would be a better solution. In general, the larger the opening the less efficient the dock will be in terms of energy consumption.
TO BE 100% SURE THAT THE DOCK WILL BE DONE CORRECTLY, WHAT DO I NEED TO KNOW?

The dock height is a critical dimension. Generally, a standard dock height is considered to be around 48", but several inches more or less is very common. A shorter dock height will raise the top of the truck in relation to the door opening and a deeper dock height will lower it. Forgetting to check the dock height can create problems such as a deep dock height causing the truck to not seal at the top or a shallow dock height causing the truck to hit a standard shelter too high and damage it.

The range of truck widths is another factor that needs to be considered. Most semi trailers are 8', but many of the newer ones are 8'6". On the other extreme, some smaller trucks are also used at docks in places such as bakeries, so they could be even less than 8' wide. Also, when smaller trucks are involved, it is common for them to have some sort of step or lift gate that causes the box of the truck that needs sealed to be even further away from the wall. When dealing with step type trucks, the only way to use a foam dock seal is if those are the only trucks being used at the dock. Whenever both step trucks and non step trucks are used at the same dock, a rigid shelter is the way to go.

Another special type of semi trailer is the high cube trailer. These are full height trailers that have the bottoms low to the ground. They are often used by companies that have low density, light weight products such as mattress or potato chip companies. Often, companies using this type of truck have special short dock heights of 18" to 24". Other times, they use ramps to raise the floor of the trailer up even with the floor of the building. The use of riser ramps at docks can cause many problems with dock seals and shelters, and the solution to this situation needs to be looked at carefully.

A common problem encountered with loading docks is that sometimes people try to put too many openings in not enough space. Side room and head room is critical for the proper installation and performance of dock seals and shelters. There is nothing worse than convincing the customer that shelters are needed instead of seals and then finding out that there is not enough room for them.
LOADING DOCK DESIGN CONSIDERATIONS

Designing the loading dock area of any given building would, at first glance, appear to be a simple task. However, just as other areas and components of a building are critical to its efficient function and use by the occupant, the loading dock must be properly designed for efficient movement of product over the dock.

To achieve a proper dock design, the following items must receive thorough consideration:

- Truck movement to and from the dock - Can the building be positioned on the available site to meet local codes and also provide safe, efficient access for approaching trucks?
- Quantity of door openings
- Grade of truck approach - incline, decline, or level
- Style of truck - tractor trailer, common carrier, captive fleet, straight truck, step vans, trucks with hydraulic lifts, or package delivery vans
- Truck restraint devices
- Number of trucks per door per day
- Method of loading - pallet jack, fork lift, unitized loads, conveyor, or hand loading
- Weight, frequency, and speed of forklift
- Whether to use dock seals or shelters
- Dock height
- Dock leveler style
Another very prevalent problem is over-compression. Many consider 12-inch projection seals and 4-inch projection bumpers to be standard. The problem with this is that seals should be compressed 4 inches to 6 inches. This means that the maximum recommended seal is 10 inches for a 4-inch bumper and the minimum recommended bumper is 6-inch for a 12-inch seal. Anything over 6 inches of compression does not create a better seal; rather, it just makes the seal wear out faster.

Many times, the dock seal and shelter cover fabric specifications are predicated on some of the more expensive rubber based products that have been very heavily promoted by dock seal industry leaders. Although these fabrics have a good reputation, from a durability standpoint, the important factor is not whether the coating is rubber or vinyl, but rather whether the base fabric made to last. The base fabric of a material is the interwoven nylon or polyester strands sandwiched between the two layers of rubber or vinyl. The thickness and quality of the strands determine the tear strength of the material. In some cases, these are very commonly specified light duty base fabrics and used in conjunction with expensive rubber coatings. The end result is a product with low durability and high cost. Nearly every manufacturer of loading dock seals and dock shelters has available what is generically known as high tear vinyl. Because durability and longevity is the goal, these fabrics provide the most cost-effective product.

We hope some of the information contained here has been helpful, and we invite anyone who has a question regarding loading dock design to give us a call at 1-800-457-5251.