

Back to Basics

Keep these key points in mind and you'll increase safety and productivity in your vacuum truck operations

By Phil Stein

If you attend a drag race, do you walk down from the stands, climb behind the wheel and run a top-fuel dragster down a quarter-mile straightaway in four or five seconds at 320 miles per hour?

Not likely, and certainly not without proper training with the powerful machine you are operating. Yet something similar happens everyday as vacuum truck operators man high-performance trucks, sometimes with limited knowledge.

Why is it that two operators can perform the same job with the same truck, same age, same style, and achieve two very different results? Chances are that only one is making best use of his equipment under the proper conditions and in the safest manner to maximize what the truck can do. That operator is saving his company time and money with greater efficiency.

Most truck operators do not have degrees in physics, nor should they. However, unless they understand some fairly basic principles of physics, they cannot make the trucks perform at peak efficiency, and they may put themselves in very real physical danger.

importance of changing from one hose size to another and the impact of their decisions. Just how much impact can a slight change in diameter make? In seminars, I show operators the difference between a 1/4-inch hose and a 3/8-inch hose. I connect each hose to a mustard jar and see how quickly each jar loads. You might think that since the 3/8-inch hose is half again as large in diameter, it would vacuum the contents 50 percent faster than the 1/4-inch hose. Instead, the jar loads nine times faster with the 3/8-inch hose!

2. Hose diameter is also paramount in getting the most out of your truck.

Changing hose diameters along the length of the suction hose is not only inefficient — it can cause hoses to stop up. If you start off with an 8-inch hose that the operator runs 100 feet, and then change to a 4-inch hose, the speed of the air at the start of the 4-inch hose is deafening. The truck is being asked to suction an amount of air designed to go into an 8-inch hose at full throttle, but only through a 4-inch opening. The material flies through the hose at 4 inches. Then, when

it enters the 8-inch section, the speed of air is reduced, and material clogs up the hose. This is a very common mistake operators make.

3. Performance decreases as friction loss increases.

Hold a 7-inch-long hose with a 1/4-inch diameter to your mouth and try to



It's highly recommended in vacuum operations to have two hose handlers working together to relieve one another during the job.

blow through it. Not difficult. Then try to do the same with a 7-foot length of the same hose. Your eyes will probably bug out trying to push air through to the other side. This gives you some idea of how hard your machine has to work. It doesn't matter if the air is being sucked or blown through a hose, it still suffers from friction loss.

4. Smooth-bore hoses almost always work better.

Drainage system polyethylene hose is a corrugated pipe that is lightweight and easy to handle, but long lengths of this hose/pipe can devastate the performance of your truck. An operator can get by with a drainage system hose on a short job, but on a longer and tougher job, a smooth-bore hose may be necessary. The majority of your hose length should be smooth-bore pipe or rubber hose. Only the last section of hose at the working end could be the lightweight polyethylene corrugated hose.

Staying safe

Safety is just as important on the job as productivity — in fact, even more so. Unfortunately, I see many of the same mistakes and same problems today as six or seven years ago, especially with new

operators. Here are a few vacuum trucks safety points to keep in mind when on the job:

1. The tank is a confined space.

An operator may be handling toxic chemicals. If he enters the tank to make a repair, he might be overcome by fumes. There is only one way in and one way out of the tank, so it is a confined space in the truest sense. Don't enter a tank when there are chemicals inside.

2. An inline "T" and vacuum release can help ensure safety.

There are three release areas available with a truck, including a remote release, a manual release near the truck itself, and an inline "T." I believe all three safety releases should be standard equipment on vacuum trucks. The larger the diameter of the hose, the bigger the force you have. If an 8-inch hose gets stuck to your body at 27 inches Hg, it can be fatal. An inline "T" is the mechanical device placed in the hose that kills the vacuum in the hose.

Injuries also occur because some users do not install the in-line relief and may be working too far away from the truck to quickly access the pendant (remote) or manual relief on the truck. I

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Staying Productive

Productivity with vacuum trucks is critical. Here are a few key points every operator would do well to keep in mind. They are not all you need to know, but I always stress them in my seminars.

1. Hose diameter is very important.

Operators need to understand the



Tip Top Relief Valve from Bandlock.

recommend that the in-line “T” be installed between the very last section of hose and the working section of hose. The cord that releases the in-line relief should be tethered to the hose handler’s belt, or a watch buddy should be nearby holding the cord and

ready to relieve in the event of an emergency. It’s practically an industry-wide practice to have two hose handlers working together to relieve one another while working. Nearly every injury in our industry occurs because these three devices aren’t working or aren’t operative. If all three are working, you won’t have injuries.

3. Always ground the truck.

Grounding is important for any product an operator uses. You might be sucking grain dust, and static electricity could trigger a dust explosion. Air movers should never be used on anything being removed with a temperature flash point of 140 degrees or less. That has been accepted as an industry standard.

4. Wet and dry material should never be mixed.

In most cases, an operator does not know what chemical reaction may occur if wet and dry materials are mixed. In

classroom settings, at one time I used water and Alka Seltzer to demonstrate what could happen when two seemingly safe products were mixed. I would put water in a jar fitted with a pressure gauge and add eight tablets of Alka Seltzer. One day it blew the jar apart — there was no place for the pressure to escape — and I had to discontinue that demonstration.

But the point remains: Who knows what might happen in a tank full of wet and dry materials that happen to act like water and Alka Seltzer? The only exception to this safety rule might be in a situation where acid is to be neutralized with a known chemical like bicarbonate of soda. This is a common activity in the chemical cleaning industry. In that case, the operator knows what he is doing and why, and so should not have trouble working safely.

Being vigilant

Today’s high-powered vacuum trucks can give an operator a false sense of security. They are very forgiving performance-wise, even when not used properly. But in the end, performance relates directly to the operator’s knowledge and care. Knowledge of your truck and common safety measures will aid performance and prevent serious accidents.

Phil Stein of Guzzler Manufacturing gives vacuum truck training seminars to audiences across North America. He presented his “Vacuum Truck Operators’ Training Preview” program at the 2002 Pumper and Cleaner Environmental Expo International.



Truck operators face special safety issues when working in residential or urban environments.