For your excavation work, here's the...

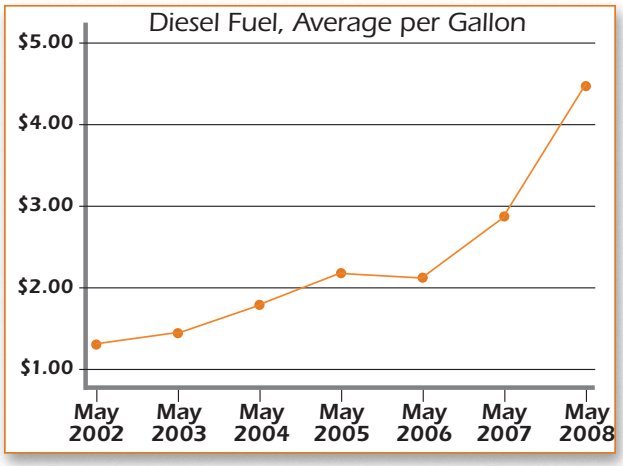
Cure for the **Diesel Fuel Blues**

by David V. Dow, Vice President
TrenchSafety and Supply, Inc.
Memphis ▪ North Little Rock ▪ Nashville

For years, the cost of diesel fuel has been a large expense for utility and site-prep contractors. And, now, thanks to the recent dramatic increases in diesel prices, it's an even bigger expense. According to the U.S. Department of Energy, diesel fuel prices have risen 348 percent since 2002.

Diesel fuel cost is problematic for at least six reasons:

1. You cannot operate your heavy machinery without it.
2. You have no control over the price.
3. It is a significant expense.
4. The cost directly affects your profitability. A $5,000 per month increase in fuel costs represents a $5,000 reduction in your net income.
5. Few construction contracts have provisions to help alleviate the impact of your fuel cost increases.
6. Higher costs directly affect your cash flow. Many fuel suppliers, for example, require weekly payments, and being late is unacceptable.



Source: U.S. Energy Information Administration, ***www.eia.doe.gov***

One cure for the "Diesel Fuel Blues" is to use some form of trench shielding for most of your underground work. Trench shields will significantly reduce the amount of material that you have to handle, and the time required to complete a project.

Let's analyze just the fuel costs needed to dig a trench on a hypothetical sewer project.

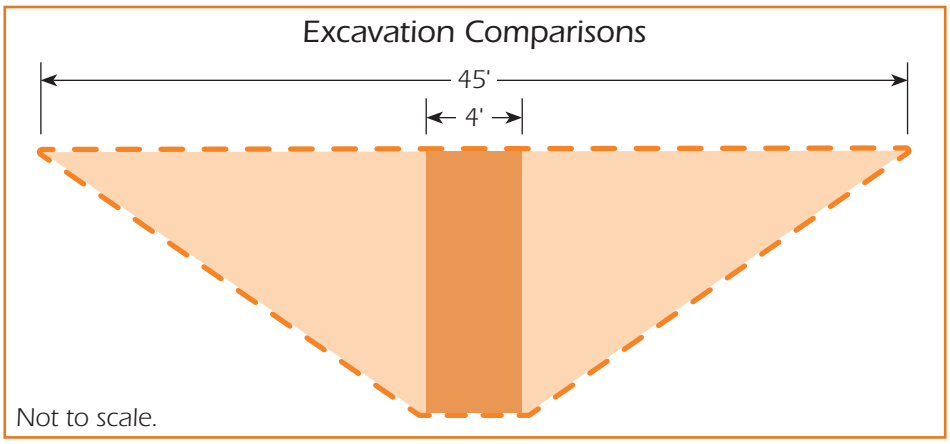
Should You Slope or Use Shields?

This hypothetical job calls for you to lay 1,000 feet of pipe, 14 feet deep in soil that is classified as "Type C" using the OSHA Standard‡. You are trying to decide whether to slope the walls of the trench or use trench shields. So, you make the following assumptions:

- You plan to use a mid-sized excavator that burns 120 gallons of diesel fuel during a ten-hour day.
- Diesel fuel costs $4.50 per gallon, so you'll spend $540 per day for fuel.
- The excavator can dig 1,800 cubic yards of dirt per day. That is based on the machine and operator being able to complete three cycles per

‡ ***OSHA Construction Industry Regulations 29 CFR 1926, Subpart P - Excavations***

minute, for 50 minutes each hour of work, with a 1.2 cubic-yard bucket, and a 10-hour workday. (The math: 3 cycles per minute x 50 minutes x 1.2 cubic yards x 10 hours = 1,800 cubic yards per day.)



In this view looking down the excavation, if sloping was your choice to meet the OSHA Excavation Standard, then the entire volume inside the dotted line (both the dark and light areas) would have to be excavated, temporarily stored, replaced, and the surface restored. If your choice was to use a trench shield, only the dark area in the center would get the same treatment. For a trench of any length, that's only 17% of the volume that would be required to be moved compared to the sloping option.

- You will also use a small dozer to handle the excavated material. The dozer will operate about 50 percent of the time that the excavator is working. The dozer burns 25 gallons of fuel in a ten-hour day.

Proper use of trench shoring or shielding, such as this steel trench box, can mean significant savings in time and excavator fuel costs...and it saves lives!

At $4.50 per gallon, you'll spend $113 each day for dozer fuel.

Let's assume that with sloping, you will need a width of three feet at the bottom of the trench to lay your pipe. Since you are working in a "Type C" soil, the OSHA Standard requires that the walls are sloped at a 34-degree angle, or 1½ (H) to 1 (V). As a result, the trench will be 45 feet wide at the top, and you will have to dig 12.444 cubic yards of material for every linear foot of the excavation. The total for the 1,000-foot sloped trench will be 12,444 cubic yards of material.

At a production rate of 1,800 yards of dirt per day for the excavator, it will take 6.9 days to dig this trench. (12,444 cubic yards of dirt at 1,800 cubic yards per day = 6.9 days to excavate.) Using those figures, let's calculate ***just*** your fuel costs.

Total Fuel Costs for Sloping

Excavator Fuel ($540 per day x 6.9 days) $3,726
Dozer Fuel ($113 per day X 6.9 days) . . . . . $ 780
Total Fuel Costs $4,506

The Trench Shield Option

With trench shields, you would dig a slightly wider trench to allow for the thickness of the shield walls and still provide a three-foot-wide work space inside the shield. However, unlike sloping, the walls of the trench can be vertical.

Just imagine the time — and fuel — needed to excavate this large sloped trench. And, of course, all that soil is stored somewhere, and will have to be returned, the trench filled, and the surface restored.

A four-foot-wide trench, 14 feet deep and 1,000 feet long, will require digging just 2,074 cubic yards of material, or only 17 percent of the amount of material that you would excavate in the sloping example.

Using the same production rate of 1,800 cubic yards of dirt per day, it will take just 1.2 days to dig this trench. (2,074 cubic yards of dirt at 1,800 yards per day = 1.2 days to excavate.) Your fuel costs will be:

Total Fuel Costs Using Trench Shields

Excavator Fuel ($540 per day x 1.2 days) $648
Dozer Fuel ($113 per day X 1.2 days) . . . . . .$ 136
Total Fuel Costs $784

Obviously, you would save $3,722 in fuel costs alone, on this relatively small job. And, of course, we have not even considered other costs that will be drastically reduced because of the smaller size of the excavation and because the work will be completed in 1.2 days instead of nearly 7:

- Personnel
- Right-of-way requirements
- Barricading the job site
- Removal of surface encumbrances (streets,

continued on page 4

A Word About Safety...

A cubic yard of dirt weights about 3,000 pounds. A couple of yards of dirt equals the weight of a pickup truck or SUV. Quite frankly, if a cave-in occurs and workers aren't properly protected, they rarely stand a chance. And all too often, well-meaning co-workers are also injured or killed trying rescue the trapped worker. The point is, someone or several someones, will be seriously injured or killed.

There will be difficult emotional issues associated with a serious injury or death, of course, but there will also be significant direct and indirect costs that can put your company, quite literally, out of business.

Protective systems include sloping the walls of the trench, timber and aluminum hydraulic shoring, and aluminum and steel trench shields. Further, OSHA requires that a "Competent Person" be on the job site. OSHA defines such a person as someone who has been specifically trained in:

- *Soils analysis*
- *The use of protective systems*
- *The requirements of the OSHA Excavation Standard*

The "Competent Person" must regularly inspect the job site, and have the authority to take immediate action if potential hazards exist.

sidewalks, curbs and gutters, utility/electrical poles, fire hydrants, trees, etc.)

- Trucking, if the spoil has to be stored off site
- Relocation and/or support of underground utilities
- Backfilling and compaction
- Restoration of the surface
- Wear and tear on equipment

By using the trench shield option, your crews will also be significantly more productive. It will take less time to complete the job and they can move on to the next job a lot sooner. Said another way, compared to sloping the walls of the trench, the same crew using the same equipment will be able to do more work with trench shields…and generate more revenue.

In summary, using trench shields can significantly reduce your expenditures for diesel fuel, and "cure your diesel fuel blues."

Aluminum hydraulic shoring is an excellent choice for reducing costs and providing a safe workplace in many applications. The shores are light-weight and easily installed and removed by just one person.

David V. Dow is Vice President of TrenchSafety and Supply, Inc. — **www.TrenchSafety.com** *— which supplies laser technology and excavation safety products and services to construction, excavation, and utility companies throughout the Mid-South. From their locations in Memphis, Tenn., and North Little Rock, Ark., TrenchSafety provides sales, rental equipment, repair service, and safety training.*

TrenchSafety, too, is feeling the pinch of the "Diesel Fuel Blues" in its equipment delivery fleet.