

One Thousand Ways to Dig A Trench

One of the simplest tasks in the construction industry: digging a trench. But what machine is best suited for this activity?

By Katie Pullen, Warren Anderson and Philippe Bisson – brand marketing managers at CASE Construction Equipment

How hard can it be to dig a trench? Get the proper utility clearances, map the route, ensure jobsite safety and start digging. But there are other elements to consider.

Sure, you've got a full-size conventional excavator, but would it make more sense to bring in a rubber-tired backhoe loader versus a steel-tracked excavator? Will a compact track loader help eliminate the cleanup required on a finished yard versus a skid steer or a backhoe? Is the bulk of the trenching work in backyards versus wide-open spaces?

In this article, we'll take a look at five different equipment options and the advantages of each in trenching applications.

An important preface: safety when trenching is paramount. While not directly related to equipment choice or selection, these factors are critical:

1. Always know the surroundings and the location of people and objects. Do a full site walkaround prior to excavation.
2. Make sure that all underground utilities have been marked and identified.
3. Take advantage of mirrors and cameras (where available) on equipment to improve visibility and site awareness.
4. Always be mindful of tire/track orientation, and avoid rapid movements during operation.
5. Always exercise caution and follow regulations related to trench boxes/retaining systems when digging trenches.

Option 1: Skid Steer with Trencher Attachment

Option 2: Compact Track Loader with Trencher Attachment

The main difference between these two options is tracks vs. tires. Both are excellent in providing access to confined areas, residential neighborhoods and locations close to obstacles. Compact track loaders provide the added benefit of lower ground pressure and less impact on finished surfaces such as lawns, as well as a stable platform for smooth travel when pulling a trenching attachment.

The relatively compact design of both machines makes them easy to transport and ideal for handling a trencher attachment. Factors to consider:

- Hydraulic flow: it's important to match a standard-flow hydraulic system with a standard-flow trencher, and a high-flow hydraulic system with a hydraulic flow trencher. A common misconception is that a standard-flow system can adequately run high-flow attachments. Powering high-flow

attachments with a standard-flow skid steer or CTL will lead to inefficient operation. In addition to realizing lower-than-expected results, it can also damage the attachment or skid steer/CTL.

- The largest skid steer/CTL trencher attachments will limit operators to a trench of about 5-feet deep and 12-inches wide (all dependent on the attachment specs).
- CASE offers proportional auxiliary switches on skid steers and CTLs that can be locked so that the operator does not need to continually hold the switch in order to run the trencher, which is great for long trenches.
- Using a trencher attached to a skid steer or CTL is very effective, but doesn't allow for any digging improvisation – the operator ultimately is confined to trenching a narrow line in a straight path.
- Easy to transport with a suitable pickup truck and trailer.

Option 3: Compact Excavator

A mini/compact excavator allows the operator to get as up close and personal to a trench as any piece of equipment. These also come with either steel or rubber tracks to allow a contractor to pick a machine best suited for their work environment.

Rubber tracks will be the most common, as much compact excavator trenching will be done in backyards, finished lawns and confined spaces. Advantages of the compact excavator include:

- Knuckle boom and near-zero or zero-tailswing designs allow for trenches to be dug immediately next to structures.
- With the narrowest footprint of any of the equipment options presented in this article (depending on model) – and some models that include retractable tracks – it is easy for compact excavators to travel through backyard fences and even doorways for possible digging/trenching inside of structures.
- Using the largest CASE model as an example (the CX55B), compact excavators can offer digging depths up to 12 feet, 10 inches and bucket widths up to 36 inches. The same model provides an arm digging force of 5,300 pounds and bucket breakout forces up to 11,128 pounds.
- Easy to transport with a suitable pickup truck and trailer.
- A separate piece of equipment will typically be required to remove materials that are trenched.

Option 4: Backhoe Loader

With the backhoe loader, we begin to transition from compact equipment to machines with some heavy-duty capabilities. While backhoes are not as compact as some of the previous options, they do provide excellent versatility and maneuverability on jobsites. And, as a rubber-tired machine, backhoes allow contractors to work without creating as much ground disturbance as a conventional excavator with steel tracks. Trenching considerations for backhoes include:

- Features such as PowerLift provide additional breakout forces – up to almost 15,000 pounds in some models – for digging in tough soils.
- While most backhoes are lumped into the 14- and 15-foot size classes, digging depths can reach to 20 feet depending on bucket and arm configuration, but contractors should remember that “extendahoe” configurations do not provide as much digging power as standard configurations or with the boom retracted.
- Wide track models provide greater flotation and stability.
- A backhoe, with its longer reach and its 180-degree swing arc, allow operators to more easily stockpile materials farther away from the trench – even directly into adjacent trucks – than more compact options.
- Similar to some compact excavators, buckets can be up to 36 inches wide.
- A backhoe positions the operator higher up than more compact options, giving him/her better visibility into the trench.
- Easy to transport, either by roading or truck.

Option 5: Full-Sized Excavators

This category has two subcategories – conventional tailswing design and zero- or minimum-swing radius designs. Which a contractor chooses will be dictated mostly by access/space, as production capacities are relatively comparable when counterweights are added to minimum-swing radius machines. The minimum-swing radius models are better suited for working along roadsides and near other obstacles, while the conventional tailswing design is best suited for power digging in wide-open spaces. Some things to consider:

- Using CASE models as an example, the minimum-swing radius CX235C-SR provides digging depths up to 21 feet, 10 inches and a bucket breakout force up to 34,170 pounds. Its conventional tailswing counterpart, the CX250C, provides digging depths up to 24 feet, 4 inches and bucket breakout forces up to 39,116 pounds. For most common utility and underground construction work, both of these machines are more than sufficient in size and capacity – the difference becomes access to the workspace.
- Pick an excavator with a maximum digging depth that exceeds actual trench needs. This will require the operator to move the machine less.
- Many models offer rubber tracks as an option for reduced ground disturbance.
- Excavators provide the greatest abundance of track options to suit a machine to the specific application. Selecting a machine with wider tracks will provide additional flotation – ideal for conditions where operators are working on rough, soft and uneven ground, or working on a slope. Narrower track pads are more ideal for working in rocky and hard soils, and help lower stress on the undercarriage.

- Transportation with full-sized excavators requires greater attention than other options as owners must pay much closer attention to local laws pertaining to permits and weight limits.

Bonus: The Future

The future is now. Many think of machine control as best suited for work in grading applications – but it can easily be outfitted on excavators (compact and conventional) and backhoes to help dial in trench digging applications. This provides benefits in productivity and machine efficiency – helping operators to hit their mark, avoid over-excavating and keep moving down the line knowing that the trench is dug to its proper depth.

Smart Equipment Buying

We know contractors are good at getting the most out of the equipment they have – but taking the time to really examine digging/trenching needs and environments prior to purchase can provide a company significant efficiencies in terms of owning and operating costs, maintenance, fuel use, transportation, etc. As with most equipment, always choose something that will provide more capacity than needed – but don't overdo it.