



From manual to 2D:

How upgrading excavator machine control boosts your productivity.

You've had your eye on excavator machine control systems for some time now. Other contractors tell you how much it's increased their accuracy, efficiency and freed their crew from constant grade checks.

But, oh the cost.

And so, you continue to manually grade check, relying on an extra person to handle the rod or getting out of the cab and doing it yourself. You tie up labor, lose time, and productivity and profitability suffer.

Time for a reset. Installing a 2D system is not only a great intro into machine control, you'll also soon wonder why you waited so long, especially considering what you get in return.



The Basics of 2D

2D has been around a long time – decades if you count the first iterations – so it's a proven technology.

Using an external elevation reference point (provided by a laser, stakes or a physical benchmark) combined with a laser receiver, 2D machine control constantly monitors depth and slope as you dig. Think of it as your in-cab coach, guiding you to make the correct cut. As one contractor puts it: "it's like holding both ends of the tape measure."

The in-cab monitor allows you to check your grade in real time, giving you greater accuracy and taking much of the human error out of the equation. No more getting out of the cab several times a day to do your own grade check or waiting for another crew member to give you a reading.

There are even safety benefits. Eliminating the grade checker means that person is no longer in harm's way because he or she is in an excavation or alongside a machine.

2D machine control offers a great assist on projects such as placing building pads, creating slopes, digging foundations and footers, placing utilities, digging ditches and basements, etc.

How 2D surpasses manual grade checking

"2D versus 3D" comparisons often push readers toward pricier 3D systems, implying that 2D is only for smaller operations. But 2D systems can offer a great leg up to any operation, no matter the size.

Because what you're really comparing is 2D versus doing everything the hard way.

Consider the frustrations inherent in manual grade checking. Now, imagine a solution that eliminates many of these pain points. 2D machine control isn't a compromise – it's a game-changer. It outperforms manual methods, streamlining the process and boosting efficiency.



And good news:

2D builds on the grade control basics you already know: setting up a benchmark, checking where you are in reference to that benchmark, and working with lasers. With 2D, you have that information available while you sit in the cab; you know when you're at grade and when you're not.

There's more:

2D works in areas where the satellite feed required by 3D systems is not available, including inside buildings, under a tree canopy, up against a high wall, in a pit, etc.

Manual vs. 2D

Let's delve into some typical jobs to show how much difference using a 2D system can make.

Digging a basement

Job requirement: Dig to a specific depth, creating a level floor in a lower elevation.

Doing it manually:

Set up a laser in the best position to provide a reference elevation for most of the work planned for that day. Use an additional crew member to check grade while you carefully excavate. Or, if you're a one-person operation that day, climb in and out of the cab every 15 to 30 minutes to check grade. The job may also require the services of a surveyor, an extra expense.

Doing it with 2D:

Using the 2D system installed on your machine in combination with a laser, view depth and slope directly on the screen in your cab and dig according to the guidance provided. No need to dedicate a crew member to grade checking. You stay in the cab and the chances of over or under digging have decreased significantly.

Digging a ditch

Job requirement: Create a ditch with a level floor for utility placement.

Doing it manually:

Requires two people, one in the machine and one holding the grade rod in the trench.

Doing it with 2D:

Benchmark against ground level, survey stake, or laser, set the depth of cut on the in-cab monitor, and proceed digging until the system notifies you that you've reached depth. Then back up, benchmark against the new surface and repeat the process for the entire length of the trench. The second person is freed from grade check responsibilities to focus on setting pipe.

Blind cuts

Job requirement: Working from a high point, dig and grade from a position where the bucket cannot be seen from the cab.

Doing it manually:

Requires two people, either communicating by radio or using hand signals. Safety issues can arise since the operator cannot see the bucket.

Doing it with 2D:

Working from a laser reference or a benchmark, the operator can constantly grade check without using a second person to offer guidance.

2D can do all of this, but it can't...

While 2D tells you where your machine is relative to a reference point, it can't adjust its readings when you reposition the machine because it doesn't know that the machine has moved.

When you move the tracks, you must set a new benchmark. It also requires the machine to sit on a relatively level surface, making it a less attractive for jobs with a great deal of uneven terrain.

In other words, a 2D system can tell you what's in front of the machine. On the other hand, a 3D system can tell you what's around the machine and adjust the machine guidance accordingly in real time. More on 3D systems in our next article.

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Why excavator 3D machine control is right for you



What you'll need to get started with 2D

Installing a 2D system can seem like a big step. That's why talking to an expert is mission critical. They'll be able to look at your operation, your needs and your people and give you great advice on how to get started.

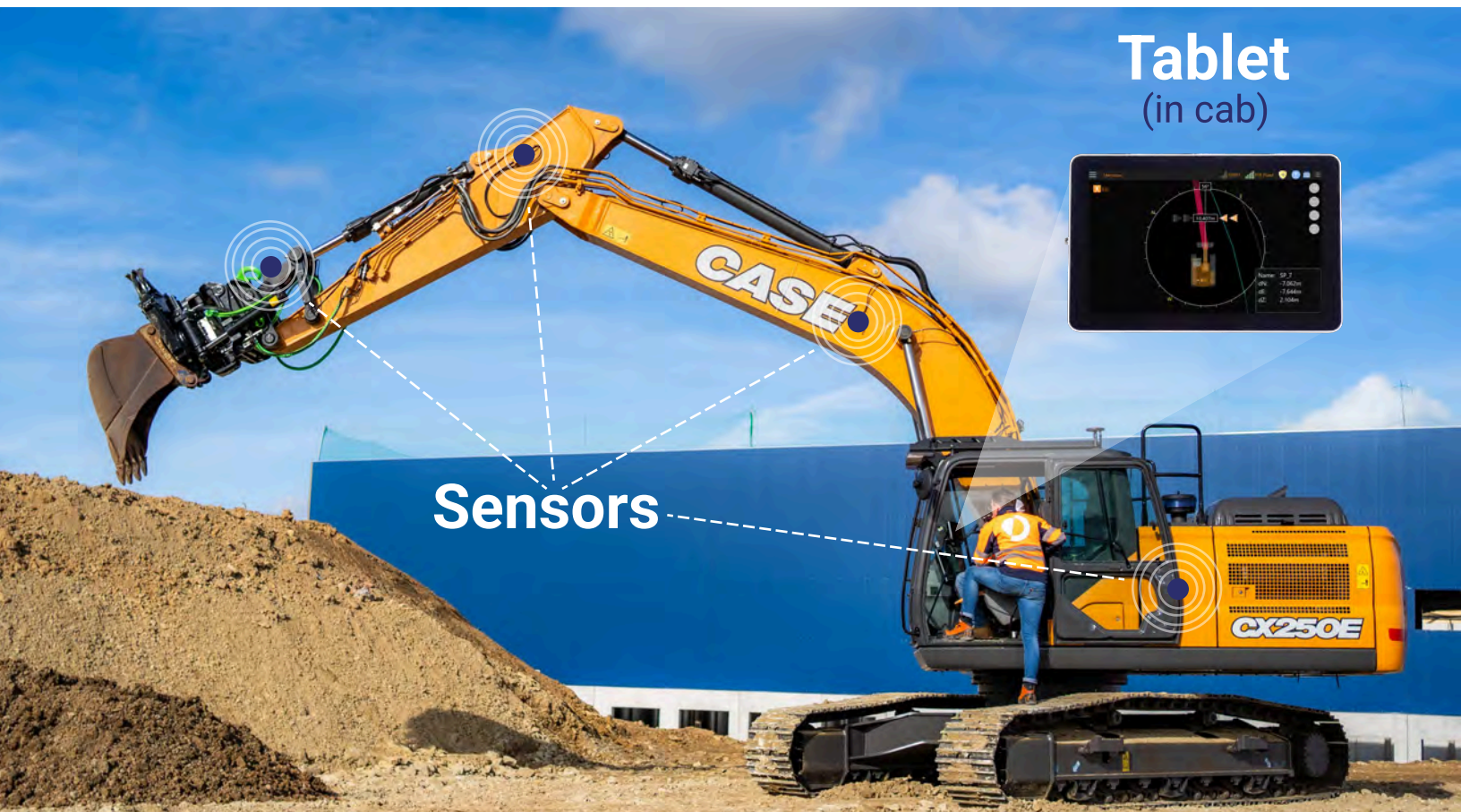
Here are some common questions you'll want answered as you begin your 2D journey:

How much is this going to cost?

Usually, a guide such as this one would ask this question last. Most want to sell you on the benefits of using a 2D system before they say it will “only cost \$X.”

Instead, we’re putting the good news first. The answer is: not nearly as much as you anticipate. Depending on options chosen, a 2D system will cost you somewhere around \$13,000 to \$15,000. The great news is that you can pre-wire additional machines for significantly less, making your system transferable among the critical machines in your fleet.

What are the key components of a 2D system?



Let's first look at what you'll need outside the machine. This may involve something you're likely well-acquainted with: a rotary laser. Mounted on a tripod, a laser projects a 360-degree light beam, establishing a precise elevation reference point.

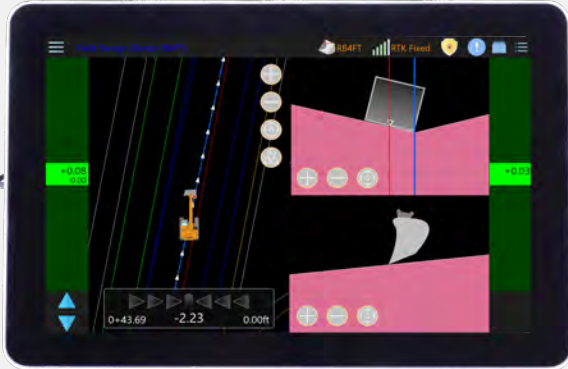
A 2D benchmark can also be set with your bucket teeth touching the desired elevation.

Now let's look at the 2D components on the machine:

Sensors (IMUs, or inertial measurement units), which measure and report findings via cable to the machine's in-cab tablet. These include:

- Chassis (pitch and roll) sensor placed in the upper body of the excavator.
- Boom sensor, which measures angle movement of the boom.
- Stick sensor, which measures angle movement of the stick. A laser receiver, which provides elevation reference when benching to a laser beam, may also be mounted to the stick parallel to the stick sensor.
- Bucket sensor, usually placed either on the excavator's dogbone or the quick coupler, which measures the bucket's open/close movement.
- Optional tilt sensors measure the sideways movement of a tilt bucket.





In-cab touchscreen tablet:

This tablet allows operators to monitor and control the 2D system. Users can quickly toggle between features, including project set up, type of bucket used, etc. You'll also be able to create in-field designs for common jobs such as pads, ramps, and slopes.

Laser receiver/catcher (used with laser-assisted 2D):

Positioned on the excavator stick parallel to the stick sensor, this provides elevation reference when benching to a laser beam.



How long will it take to install on a machine and train our people?

Count on about a day of downtime to install a full 2D system. If you also want to pre-wire an extra machine that installation will take around 6 hours.

Learning a 2D system won't take long. Anticipate 1 to 2 hours of direct instruction along with question-and-answer feedback. Ask your system provider to give you a complete overview of what it will take to get your crew – and you – comfortable with using the system.

Can my 2D system be transferred between machines?

This is a key question because it directly affects the economics of your 2D decision. If a system is tied to just one machine, it's not helping you when that machine is down.

Which is why it makes sense to buy a system that easily can be transferred between pre-wired machines. Make sure the 2D system you use has this capability.

How easy is it to grow my 2D system into a 3D system?

You might land a job perfectly suited for a 3D system. What are your options then?

The last thing you want in this circumstance is to have to ditch your 2D hardware. You'll need a system that uses your current hardware and adds on to it instead of making you pay for shiny-new components at a shiny-new price.

A few last words...

We'll be blunt: continuing to primarily rely on manual grade checks doesn't make much sense considering the availability of 2D machine control.

Adding a 2D excavator system gives you a tremendous boost in productivity and efficiency. It allows operators to focus on the task at hand without needing to leave the cab repeatedly to check grade. And that crew member holding the grade rod? He or she can now be put to work on more schedule-critical tasks. In short, a 2D system eliminates the guesswork by providing precise grade information, allowing you to complete the job accurately and cost-effectively.

Want to know more?

We stand ready to help get you started on your 2D journey. Our experts will be there to answer your questions and match what you need with our great solutions. The journey starts here.



Next up ➔

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