

A tractor loader equipped with a laser-guided grader box can easily achieve a finished grade tolerance of $\pm\frac{1}{4}$ inch, minimizing concrete overages in slabs on grade.



Precision Laser Services

Fine-grading with tractor loaders

Using a laser-guided grader box with a tractor loader provides a fast, efficient way to fine-grade subgrades for concrete slabs

BY KIM BASHAM

A tractor loader equipped with a laser-guided grader box can improve production, material yields and the overall quality of concrete slabs on grade. That's because with a laser-control system, the grader box can precisely cut and fill the subgrade to a predetermined level.

The control system consists of a laser transmitter that emits a self-leveled 360-degree reference plane of laser light, one or two receivers mounted on the grader box, and a control panel located inside the cab. When the operator uses the system

in the manual mode, changes in elevation are detected by the receiver as the grader box moves, and they are displayed on the control panel as *Too High*, *On Grade* or *Too Low*, allowing the operator to make adjustments.

However, many operators prefer to use the automatic mode and send this information as an electronic signal to the hydraulic system to automatically correct the elevation of the grader box so it follows the reference plane of laser light. Automatic control allows the operator to concentrate on driving the tractor while making elevation corrections rapidly

and continuously, resulting in faster, more efficient fine-grading.

The standard system configuration consists of a single hydraulic center cylinder and a single laser receiver. For even tighter grade tolerances, a dual configuration with hydraulic cylinders and receivers on each end of the box is available. Using a three-point hitch, workers can attach grader boxes to Class I or II tractors in less than five minutes. The boxes are equipped with non-binding wheels for additional support and to ensure consistent, smooth grading.

Benefits of laser-guided grading

Improved production. A grader box can typically laser level from 40,000 to 50,000 square feet of subgrade to a tolerance of $\pm\frac{1}{4}$ inch in less than eight hours with one worker. Though tolerances as tight as $\pm\frac{1}{16}$ inch are possible, achieving them significantly reduces the rate of production. Because of the tight turning radius and easy maneuverability of tractor loaders, the system can quickly and efficiently grade material in corners and around embeds and columns.

Improved material yields. On a typical 45,000-square-foot floor project, up to 100 cubic yards of concrete can be saved by reducing the subgrade tolerance from the traditional ± 1 inch to $\pm\frac{1}{4}$ inch. If the concrete costs \$65 a cubic yard, the savings would be \$6,500. Also, the use of less stone or other subgrade material is possible with a $\pm\frac{1}{4}$ inch grade tolerance.

Improved quality. A level, on-grade subbase can improve a floor's surface flatness and overall quality. Because of the speed and maneuverability of a tractor loader, this grading system can quickly repair ruts in the subgrade caused by the tires of ready-mix trucks or other equip-

A laser-controlled grader box also can be mounted to the front of a skid-steer loader. Nonbinding wheels ensure consistent, smooth grading.



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ment during the concrete placing operation. If not corrected, subgrade ruts may restrain slab shrinkage, thus increasing the potential for cracking.

System features


At least two manufacturers offer laser-guided grader boxes for both tractor and skid-steer loaders. The Level Best Grading System from Precision Laser Services, Phoenixville, Pa., is available with grader boxes in standard foot widths of 4 to 10 feet. Dual hydraulic cylinders and receivers are available for boxes 6 to 10 feet wide.

Dale Sensenig of Precision Laser Services says, "Our grading system is

very user friendly; it only takes about 30 minutes to install the laser system, attach the grader box and begin laser-level grading." Options include hydraulic wings that increase the width of the grader box by a foot and a hydraulic scarifying bar for breaking up clumps of material.

The Grademaster from Southern Laser Inc., Lutz, Fla., comes in standard foot widths of 4 to 16 feet. Ray Joling of Southern Laser reports that concrete contractors prefer the 5- to 8-foot box with a single hydraulic (two-stage) center cylinder and laser receiver. However, dual hydraulic cylinders and receivers are available for the wider grade boxes.

"Our two-stage hydraulic system provides smooth, fast acting performance of the grader box and enables faster tractor or steer-skid loader speeds than a single-stage hydraulic system," claims Joling. A hydraulic scarifying bar also can be attached to the Grademaster as an option.

Both manufacturers say the cost of a typical system, including the grader box and laser control system (excluding the laser transmitter), ranges from about \$9,000 to \$14,000. The price depends on the width of the grader box, whether it has a single or dual control system, and the options selected. 



Southern Laser Inc.

A single hydraulic center cylinder and laser receiver rapidly and continuously adjust the elevation of the grade box. The box is attached to the tractor using a three-point hitch.

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