Stud Sensors Come of Age

by Pete Young and Clayton DeKorne

Ten years ago, electronic devices for scanning the location of studs in finished walls were new to most builders. These sensors didn't always work well, but they were a definite improvement over rapping the wall with your knuckles or poking holes with nails. Today, Zircon leads the field of manufacturers in this high-tech market, and has introduced several new scanning features into its tool lineup. Newcomer Stanley offers a smaller line of competing products, while lesser-known products, such as Ver Sales's Wall Wizard, have also found their way into hardware stores and lumberyards.

Scanning tools suited for light construction fall into three main classes. Basic stud sensors are designed to detect wood studs behind conventional finished wall surfaces such as drywall and plaster. More advanced multi-function scanning devices detect wood studs, electrical current, and metal behind conventional wall surfaces and, to some extent, through concrete walls or in shallow slabs. Specialized scanning devices can scan through deep concrete or thick foam insulation.

We gathered several of these wall scanning tools and tested how well they detect wood studs, metal, and electrical wiring in finished walls and concrete.

Figure 1. Basic stud sensors detect wood studs in conventional interior walls. Both Zircon's and Stanley's basic devices perform acceptably. But Zircon's Contractor and Pro series have added features that Stanley does not. The Ver Sales functioned poorly in our tests.

Basic Stud Sensors ($17 to $29)

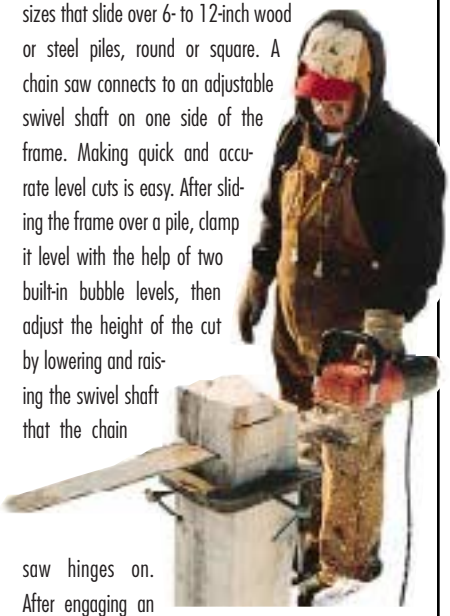
The four devices we looked at in this class (see Figure 1) — Zircon's *Studsensor Pro 4.0* and *Studsensor Contractor*, Stanley's *Intellisensor*, and Ver Sales's *Wall Wizard* — were noticeably different. Both Zircon models share the same interior workings and differ only in their display design and ergonomics. These Zircon units offer features that neither Stanley nor Ver Sales can match. They calibrate instantly and have an error detection feature that alerts the user when calibration occurs over a stud. More importantly, they have a deep scan mode that extends the amount of material through which studs can be sensed. Sometimes, this deep scan mode also makes it possible to detect studs behind strapping.

The Stanley Intellisensor is comparable to the Zircon models in normal performance, but lacks the instant calibration, error detection, and deep scan of the Zircons

Tool Bits

Piling Cutter

The *Ferreras Pile Cutting Tool* ($350) is straight out of Alaska, where perma-frost makes pilings one of the few viable foundation options. The cutter comes in two sizes that slide over 6- to 12-inch wood or steel piles, round or square. A chain saw connects to an adjustable swivel shaft on one side of the frame. Making quick and accurate level cuts is easy. After sliding the frame over a pile, clamp it level with the help of two built-in bubble levels, then adjust the height of the cut by lowering and raising the swivel shaft that the chain saw hinges on. After engaging an elevation-lock handle, make the cut by pivoting the chainsaw through the pile.



Contact: Ferreras Equipment, P.O. Box 895, Barrow, AK 99723; 907/852-7310.

Quiet Chain Saws

Here are two heavy-duty chainsaws that might help keep noise levels down on the job site. The Stihl *E140* is a 1,400-watt electric chain saw that is very quiet, weighs only 7 pounds, and runs on a normal grounded power outlet. The Stihl *023L* is a gas saw which the manufacturer claims is the quietest on the market. Equipped with 14-inch bars, both models retail for $300.

Contact: Stihl Inc., P.O. Box 2015, Virginia Beach, VA 23450-2015; 800/467-8445; www.stihlusa.com.

described above. It is more like the scaled-down Zircon models widely available in the home improvement market. Otherwise, the tools differ only in the exterior shell design. The Zircon models are slightly smaller, and look as though they might hold up slightly better because their display lights are recessed.

Both the Zircon and Stanley basic stud sensing tools worked well in the most conventional wall assemblies. They had no problem detecting wood studs behind 1/2- and 5/8-inch drywall or old plaster and lath.

The Wall Wizard, although it has the added feature of an electrical outlet tester, was a disappointment. The most expensive tool in this class, it failed, at times, to detect studs behind even 1/2-inch drywall.

On site, all basic scanners have limitations. They display false readings near live electrical wires, they cannot read studs through any type of rigid foam (regular or foil-faced), and they cannot scan through materials with higher densities than drywall or plaster (we used Gypsonite in our test).

Multi-Function Devices ($35 to $40)

Zircon offers its *Contractor TriScanner* and *Videoscanner* models in this multi-function class, while Stanley offers the *Intellisensor Pro* (Figure 2). All three sup-

Tool Bits

Clear Dust Collection Hose

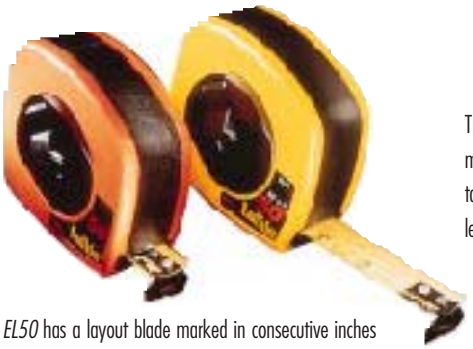
Clear hose is good for dust collection systems because blockages and flow problems can easily be found. In the past, clear hose has been available only in an expensive industrial wire-reinforced design, so many woodworkers chose the cheaper opaque black hose. Now an affordable clear hose is available in 2 1/2-, 3-, 4-, and 5-inch diameters at prices ranging from $1.30 to $2.60 per foot.

Two-Stage Separators. Another good design feature for dust collection is a two-stage system. These separators work by creating a circular air flow in a preliminary collector, which allows heavier chips to fall out of the air stream while carrying smaller particles on the dust collector bag. The *W1049* ($37) separator conveniently fits over most 30-gallon metal trash cans so that high bulk chips can be emptied quickly and easily. The smaller *W2049* ($23) fits over a five-gallon bucket and connects to 2 1/2-inch hose for use with portable wet/dry vacs.

Contact: Woodstock International, Inc., PO Box 2309, Bellingham, WA 98227; 800/840-8420; www.woodstockinternational.com.

Specialty Measuring Tapes

The new line of Lufkin long measuring tapes (50 ft/15 m) has four models, each retailing for $15. The



EL50 has a layout blade marked in consecutive inches to 8ths with highlights at 16- and 19.2-inch centers. The *EL50C* runs in 1/16-inch increments with smaller on-center highlights at 16 and 19.2 inches. The metric *EL15M* is accurate in millimeters and numbered with consecutive centimeters. The *EL15CME* is metric on one side and English on the other. All models have 1-inch-wide blades, a quick-retrieve manual winding drum, and an overall size that fits into most tape pouches.

Contact: Cooper Tools, P.O. Box 30100, Raleigh, NC 27622; 919/783-2013; www.coopertools.com.

Starrett has launched a new digital readout measuring tape, the *DigiTape Plus*, that can function as a standard tape as well. The center of the 1 1/2-inch-wide English measure blade (16 or 25 feet) is marked with black squares that are read by an optical sensor. The versatile display can be oriented to read from the left or right side and in English or metric; the readout format can also be altered to read feet and inches or just inches. Plus, the case length can be included for inside measurements, zero can be reset at any position, and measurements can be saved in memory. An optional serial output port makes it possible, at an added cost, to download measurements to either a computer or palmtop for use in estimating. The manufacturer claims that readout performance is faster than previous models and that battery life is 50% longer.

The DigiTape Plus might be an interesting high tech tape measure, but you'll have to pay at least a hefty $50 to call one your own.

L.S. Starrett Company, 121 Crescent St., Athol, MA 01331-1915; 978/249-3551; www.lsstarrett.com.

Magnetic Torpedo Level

The manufacturer of the Ultra Mag 4-Vial torpedo level claims that it is the strongest holding torpedo level available. Its V-groove parallels up to 10-inch diameters and its four vials are positioned at 0, 30, 45, and 90 degrees. The level measures 8 1/2 x 1 1/4 x 3/4 inches and retails for $30.

Contact: Checkpoint, 4025 Spencer St., Suite 304, Torrance, CA 90503; 310/793-5500; www.checkpoint3d.com.

posedly detect wood studs, metal, and live electrical wires behind finished walls and up to a few inches into concrete. Zircon better supports its claims. Here again, for example, the deep scan feature of the Zircon models allows them to achieve better results when detecting studs behind a strapped drywall surface.

The Stanley Intellisensor Pro's strong point is that it simultaneously detects wood, metal, and electrical charge; Zircon models must be set to stud sensing, deep scan, or metal modes before calibration. Overall, however, the Zircon models are much easier to use. Not only do they instantly calibrate, they also have easy-to-understand readouts. The Stanley takes several seconds to calibrate, and the electrical detection function must be manually switched on with a hard-to-access switch. And Stanley's readouts are a confusing mix of poorly labeled lights. We also preferred the Zircon models' gradually ascending readouts, which identify proximity to metal, to the Stanley model, which indicates metal with all lights going on at once.

When used to detect metal, the Stanley and Zircon models were limited to 2x4 wall construction. Pipes in the very rear of a 2x4 wall cavity were not detected at all, while pipes in the middle of the cavity registered only vague readings. Pipes behind drywall plus 1 inch of unfaced rigid insulation were even harder to detect: When the pipes were directly behind the rigid insulation, we were only able to pick up vague readings.

Results were also limited in concrete. Stanley claims to be able to detect metal through 2 inches of concrete; Zircon claims 3 inches. In practice, readings are sporadic and inconsistent, but still better than nothing. Not surprisingly, the closer the metal is to the surface, the better the readings are.

Zircon *Metalliscanner 6.0* ($120)

At three times the price of the best stud sensor, the Metalliscanner (Figure 3) is a specialized scanning device aimed mostly at commercial and concrete contractors. That said, it greatly outperforms the multi-function models described earlier. The Metalliscanner locates metal in concrete and estimates its distance from the surface. Most suitable for detecting rebar and ductwork in slabs, the Metalliscanner can detect metal through up to 6 inches of concrete. It distinguishes ferrous metals from nonferrous metals, so there is no confusion between rebar, metal studs, aluminum conduit, and copper piping. Using this device, it's even possible to determine whether or not the reinforcing wire in a slab was properly pulled when the concrete was poured.

Figure 2. In the multi-function class, Zircon's Videoscanner and TriScanner performed noticeably better than Stanley's Intellisensor Pro.

Figure 3. Zircon's Metalliscanner is a specialized tool that works very well at a much lower cost than other devices available in the commercial and industrial construction markets.

The Metalliscanner is also suitable for locating pipes in 2x6 wall cavities. And it proved to be the most reliable device we looked at for detecting pipes through unfaced rigid foam insulation.

Scanning Steel Studs

Using scanning devices on walls framed with steel studs adds a twist to the performance review. You might think that the units with metal sensing capabilities would have an advantage, but on the walls we checked, the basic stud sensors performed better than the multi-function models. However, the metal sensing mode of these models tended to overestimate the width of a steel stud. This distortion made it difficult to obtain workable readings. With the Zircon TriScanner and Video scanner, working in the basic stud sensing mode proved the best strategy. This is not an option with the Stanley Intellisensor Pro, however, because the unit automatically defaults to the metal sensing mode during calibration. This greatly limits the usefulness of the Intellisensor Pro when working around metal studs.

We discovered yet another limitation when working on steel framed walls. The electrical current detection feature failed to function on both the Zircon and Stanley multi-function models. They gave no readings around electrical outlets or switches. Obviously, it's important to know what kind of wall you're working on before you assume that one of these devices can assure that no live electrical wires are present.

Wrap Up

How much do you want to spend? Less than $20 gets you an entry-level Zircon StudSensor 3.0 with no frills (the models found most often in home centers). We found this model actually performs slightly better than the similarly priced Stanley Intellisensor. At $25 you can get a Zircon StudSensor Pro 4.0 or Contractor StudSensor. Both have the added deep scan feature as well as instant calibration and error detection. These models are probably the best buy for a residential remodeling contractor. For $35 or $40, multi-function devices will detect wood studs, metal, and electricity. If detecting metal is your only

concern, you can lay down $120 for Zircon's Metalliscanner.

The technologies involved in these scanning devices will no doubt continue to improve with time. At this point, it seems that Zircon will continue to set the industry standard with its Contractor series. However, now that Zircon has more competition, it will be interesting to see what new developments arise. How long till we can use an affordable hand-held device to generate 3-D images of wall assemblies and their interior components, such as pipes, wires, and rebar? How long till we can detect studs and pipes through plywood sheathing or through siding and plywood sheathing? How about rafters through roofing materials? Hang onto your hats — we're not there yet.

Sources of Supply

Stanley Works
1000 Stanley Drive
New Britain, CT 06053
800/782-6539
www.stanleyworks.com

Ver Sales
2509 N. Naomi St.
Burbank, CA 91504
800/229-0518
www.versales.com

Zircon Corporation
1580 Dell Ave.
Campbell, CA 95008-6992
800/245-9265
www.zircon.com