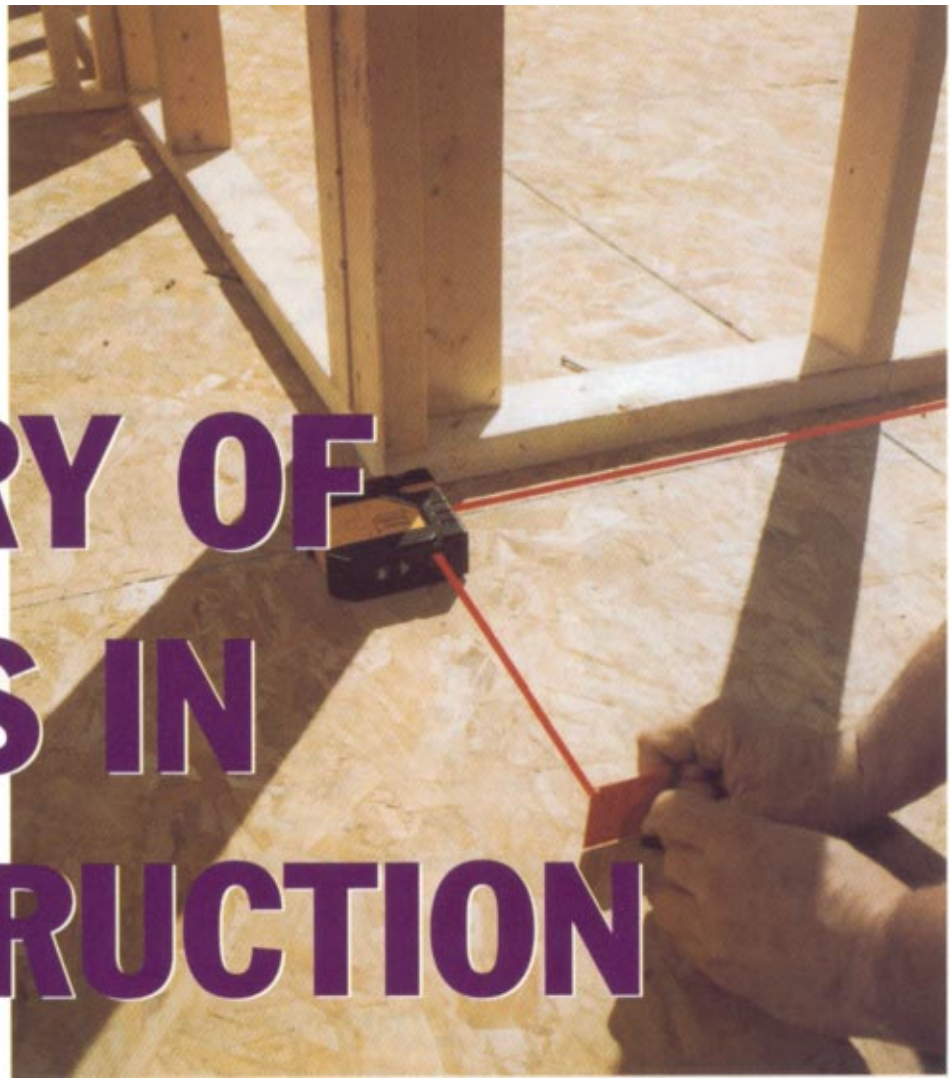
By Peter Downs

THE HISTORY OF LASERS IN CONSTRUCTION



The Popular Tool Is Relatively Young, but the Lasers of Today Wouldn't Recognize Their Older Family Members

Interior construction lasers are 31 years old this year, and to the joy of many, that first big baby was followed by many smaller, and smarter, relatives.

Theodore Maiman grabbed the worlds attention in 1960 when he introduced the first laser, but so ready was the world for this technology that within months many other scientists had duplicated the feat with different materials—Maiman later joked that nearly everything scientists touched seemed to lase.

Physicists building lasers quickly set up companies to commercialize their inventions. Most of those early start-ups failed. The first to succeed, Spectra Physics, Dayton, Ohio, is by most accounts still the largest construction laser company in the world. Today it is known as Spectra Precision.

Spectra introduced a laser for interior construction in 1968. By the standards of today's workhorses, it was, well, lazy. It did not have a spinning rotor, says Mike Yowler, product manager for construction instruments at Spectra Precision. The operator turned it to point in the direction he wanted. Users leveled it manually with the help of a built in carpenter's bubble level. The laser plasma tube-the tube containing the mixture of helium and neon gases that "lased" to produce the laser beam—only lasted about 300 hours. And the whole thing cost between $7,000 and $8,000, he says.

It wasn't long before Spectra stuck a motor on the rotor to cre-

ate the first rotating laser. The great advantage here was that it allowed several workers to use the same laser simultaneously.

The 1970s was a decade of mechanical innovation making lasers more useful to interior contractors . . . but not without their irritations.

Laser companies still had a lot to learn about what interior construction crews needed, however. Greg Petersen, marketing services manager for AGL Laser-source, Jacksonville, Ark, says his company didn't even have wall mounts when it introduced its rotating laser in 1974. "You had to find some way to hang it up to get close to the ceiling," he says.

Even so, one industry source in 1972 estimated that lasers increased the productivity of interior contractors by 25 percent to 50 percent.

Gradually, laser companies made tools that more closely matched the needs of the industry.

Signs of Progress

In 1973, Spectra brought out the first self-leveling laser. Other companies quickly followed suit.

Self-leveling might be better thought of as leveling assurance. One roughly levels the laser, then the "compensator" takes over to keep it level. It has a switch that shuts off the laser if it is knocked off level, perhaps because

someone bumped it or the movement of heavy equipment nearby caused it to vibrate.

The assurance that the beam was level saved contractors time and saved them from errors. You didn't have to repeatedly walk to the laser to check the bubble to see if it was still level. And if you forgot to check, there was less chance of building an unintentional slope as the beam drifted off level.

But self-leveling still wasn't error free. Self-leveling compensators, whether a pendulum type, bearing or liquid type, "still were affected by wind," Petersen says. Eventually, manufacturers addressed that problem with electronic self-leveling, but in the 1970s, that was still years away

The next big advance in the 1970s was the introduction of 90 degree split beam lasers for layout work These enabled workers to speedily install square partition corners and straight walls.

In short, the 1970s was a decade of mechanical innovation making lasers more useful to interior contractors . . . but not without their irritations.

In the 1980s, manufacturers tackled the problem of power supply.

One of the annoying things about lasers in 1980 was that the power box, or converter, was separate from the laser itself. The laser plugged into a power box, which in turn plugged into an AC wall outlet. Some manufacturers said their lasers could operate off batteries, but they were car batteries.

"The power box was big and heavy," Yowler says, and it was always getting beat up. People kept damaging the darn things, and when they were broken, the laser wouldn't work.

The reason manufacturers kept the power box separate from the laser was heat. The box gave off enough heat to de-calibrate the precisely tuned lasers.

In the mid-1980s, Spectra licked the

heat problem and introduced a laser tool with a built in power box, but you still had to find a place to plug it in.

Despite the expense and power draw-. backs to interior lasers, they had become so useful in interior construction that by the end of the decade, interior contractors used lasers more than anyone else in construction, says Armand Motamed, president of LCI Lasers, Hawthorne, Calif. There was a perception that maybe interior lasers were becoming a mature industry with little room for growth.

Then, the electronics revolution hit the construction laser industry. The results have been a cascade of innovations in interior lasers since the mid-199Os, the division of the market into several distinct segments, and the entry of at least a dozen new companies.

Major Innovations in the 1990s

The biggest single event was the successful introduction of the visible laser diode in the first part of the decade. Up until 1990, the HeNe, or helium-neon laser tube, was the basis of all interior lasers. "It was the Cadillac of lasers," Petersen says. It was bright, accurate and sharply focused.

The first visible laser diode was hard to see, and it had a lousy spot, says Dennis House, advertising manager at Topcon Laser Systems, Pleasanton, Calif. The spot was football shaped and fairly large. The work of two people working off different parts of the spot at two different places in a room could be out of alignment by as much as half an inch, he says.

But, diode lasers were cordless and $1,000 cheaper than HeNes, and they sold well. Visible laser diodes "significantly opened up the market," Motamed says. They improved rapidly and soon took over the market. Two years ago, AGL, for example, gave up on the interior HeNe completely.

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Topcon, a subsidiary of a 60-year-old Japanese instrument maker, is one of the companies that entered the market in the 1990s with visible diode lasers. It quickly became number two in the industry

Topcon was the first to introduce scanning technology, by which a computer brain in the laser detects the target and locks onto it, which makes the spot appear brighter. Other companies quickly followed with their own versions of scanning.

Tiny, low cost electronics also made possible electronic self-leveling, which is a truer self-leveling instrument and is more resistant to wind and vibration than self-leveling with compensators and multiple beams.

Diode lasers also last 30,000 hours, compared to the 300 hours of the early HeNes. And they operate with as much power as a flash light. Some use four C-cell batteries, some use AAs.

The industry did not forget the basic designs of the 1970s and 1980s, however. Momentum Laser, Inc., Santa Clara, Calif., founded in 1995, introduced a manual leveled laser based on a visible light diode. It was the first rotary laser designed for mass production, says company vice president and co-founder Jerry Teng, and it debuted at $388, a price that was less than one-half of the previous lowest price rotary laser on the market.

"We revolutionized that market, because we aimed to make lasers tools that belonged in every toolbox," Teng says.

"They opened our eyes," says Spectra's Yowler. "They showed us that the future may not be in the high end." Spectra purchased a German laser company that specialized in low-end lasers and expanded its product line.

LCI also introduced low priced lasers. “They am almost becoming commodities,” Motamed says. The differences between manufacturers “are the ruggedness of the product, the ease of use and customer support,” he says.

Not everyone was impressed by Momentum’s strategy, however. Topcon’s House dismisses those lasers as “toys.”

Many companies claim to have the brightest laser on the market, but they get there in different ways. Momentum rotates the laser diode directly, instead of reflecting the beam through a prism. Spectra uses an autofocus technology that focuses the beam to one-tenth its usual diameter, thereby increasing brightness 100-fold. Topcon has a green laser, because a green light of a certain intensity is easier to see than a red light of the same intensity. Topcon is the only company with a green laser, in part because, with current technology, it is so much more power-hungry than red lasers.

At the end of the 1990s, the choices for interior lasers are many Leica of Norcross, Ga., even has a hand held laser distance meter, useful for planning renovations that require interior demolition and reconstruction. The little inboard computer calculates areas, volumes and hypotenuses.

Despite the expense and power drawbacks, lasers had become so useful in interior construction that interior contractors used lasers more than anyone else in construction.

No matter how big or small a contractor is, or what his needs, there probably is a laser to fit him. And in few industries have the price drops been as dramatic. A rotating laser with the same features as the original ones 30 years ago would cost one-tenth as much today, last 100 times as long and would have the advantages of cordless operation and scanning. If only cats had improved as much.

About the Author

Peter Downs is a free-lance journalist in St. Louis, Mo., who covers the construction industry.