Application Note

Roll Alignment

System Recommendations

Printing Presses/Paper Machines
   L-742 Ultra-Precision Roll Alignment System
Rubber Mills/Textiles
   L-732 Precision Roll Alignment System

Whether you have a paper mill, printing press or textile mill, your business can benefit from laser alignment. Most roll-type machines that are poorly aligned will produce a product that has wrinkles and other quality problems. The material will also wander or "walk" to one side of the roll or the other. This means a lot of down time and scrapped product.
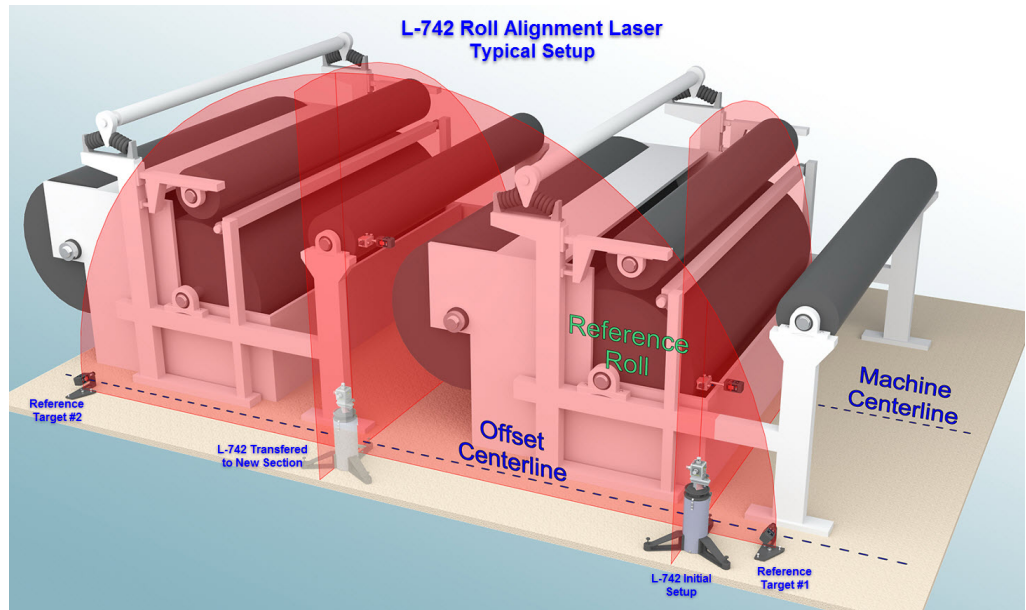
Our patented, state-of-the-art laser alignment systems are up to 6 times more accurate than and twice as fast as a theodolite. The system can align one roll of a mill to another that is 200 feet away to within .004 in. And unlike theodolites, only one technician is needed to run the laser system, freeing up critical maintenance staff during shutdowns.

L-742 and L-732 Dual Scan® Roll Alignment System

The L-742 and L-732 Dual Scan® Roll Alignment systems have been designed specifically for roll alignment applications. They are very affordable yet powerful tools to not only measure but also *fix* roll misalignment on almost any kind of paper mill or process mill, all in a fraction of the time needed with conventional methods. The systems are so accurate and easy to use that you can get the alignment right the first time, saving enormous costs in reduced downtime, scrapped product and quality problems.

Two Laser Accuracy Grades

1. L-742 Ultra-Precision Dual Scan® Laser - has plane flatness of .00003 in/ft (0.0025 mm/m) and a roll-parallelism measuring accuracy of .00006 in/ft (0.005 mm/m).
2. L-732 Precision Dual Scan® Laser - has plane flatness of .00012 in/ft (0.01 mm/m) and a roll-parallelism measuring accuracy of .00024 in/ft (0.02 mm/m).

Laser Planes Have 200-Foot Range Vertically and Horizontally

The L-742/L-732 Lasers offer two automatically rotating laser planes with 100-foot (30.5 meters) range in radius. That means rolls, at almost any elevation, can be measured simultaneously without having to move the laser vertically. This also allows the laser to be moved to more sections without having to change the location of the reference targets.

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5 Ye Olde Road, Danbury, CT 06810 • Phone: (800) 826-6185 • Fax: (203) 730-4611
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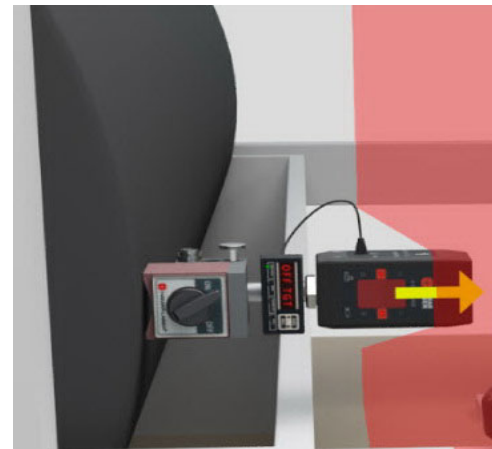## Wireless Targets and Readout Speeds Setup

With the A-1519-2.4ZB Wireless Targets, there is no need to string long extension cords to reference targets. The targets have up to a 1.1 in. (28 mm) measuring range and can be used up to 100 feet (30.5 m) from the laser.

The A-1519-2.4ZB target uses the R-1356-2.4 ZB PDA Readout, providing up to .00001 in. (0.001 mm in metric mode) resolution, color software and a wireless PDA data receiver to display up to 5 targets. The R-1308, a single-axis readout that connects directly to the wireless targets may also be used for roll measuring. Other features like electronic zeroing and target averaging help to speed setup.

Less Manpower Needed for Alignments

The L-742 Roll Alignment System's wireless targets and automatically rotating laser planes make setting up the laser at each machine section easier and reduce alignment team manpower. Our laser systems usually require only one operator. The wireless readout displays both targets simultaneously, allowing the user to quickly reference the benchmarks. Traditional optics usually requires at least one man holding a reference target in both reference locations.

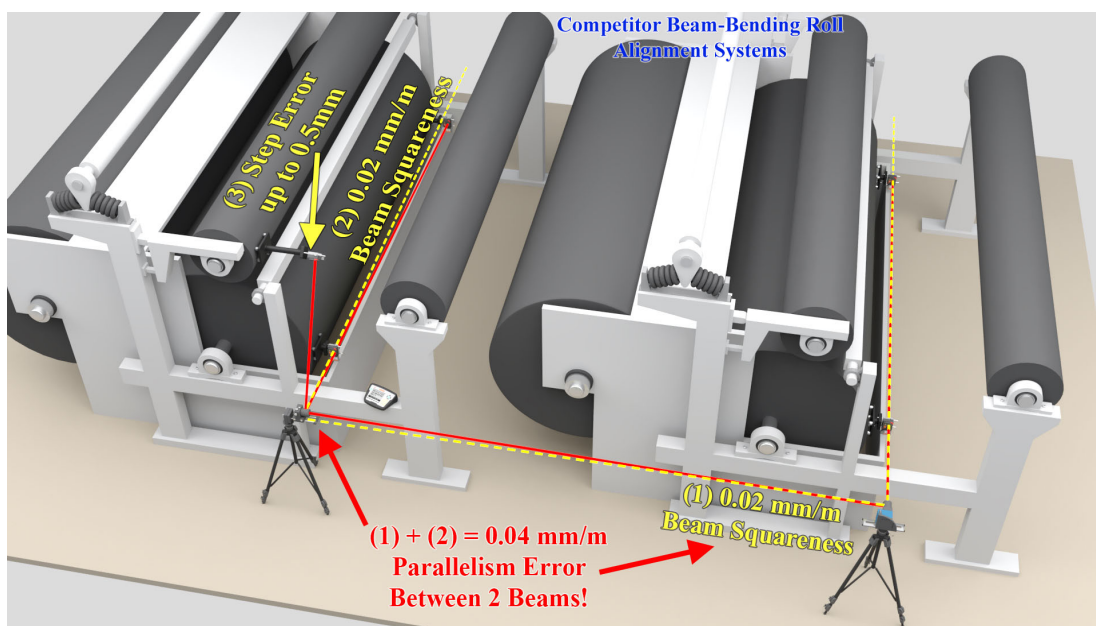## No Need for Optic's Time-Consuming Recalibration after Plumb Measurements

Unlike optics that usually require recalibration of the levels each time plumb is checked, the L-742 can simultaneously check level and plumb from a single setup. The levels usually only require calibration once a month or so and can easily be checked in the field with a simple 10-minute procedure.

High Accuracy Reduces Optics' Guesswork

Hamar Laser's L-742/L-743 Roll Alignment System's parallel accuracy is .00006 in. in/ft (0.005 mm/m) under good atmospheric conditions. The L-732's parallelism accuracy is .00012 in/ft (0.015 mm/m). This high accuracy is far better than optics' accuracy, which is subject to much higher variability due to each operator "seeing" the readings differently. In fact, it is rare that any two optics operators will get the same numbers. With the L-742/L-732, this operator-to-operator variability is significantly reduced because the target electronics determine the alignment reading, which is very repeatable from one operator to the next.

Up to 8x More Accurate than "Point-n-Shoot" Competitive Laser Systems

Competitive "point-n-shoot" lasers (manual laser rotation) use finicky pentaprism optics to bend the beam for shooting a roll. So this means there are 2 angular errors to decrease accuracy. In fact, our lasers are up to 8 TIMES more accurate for roll-to-roll accuracy than our competitors!
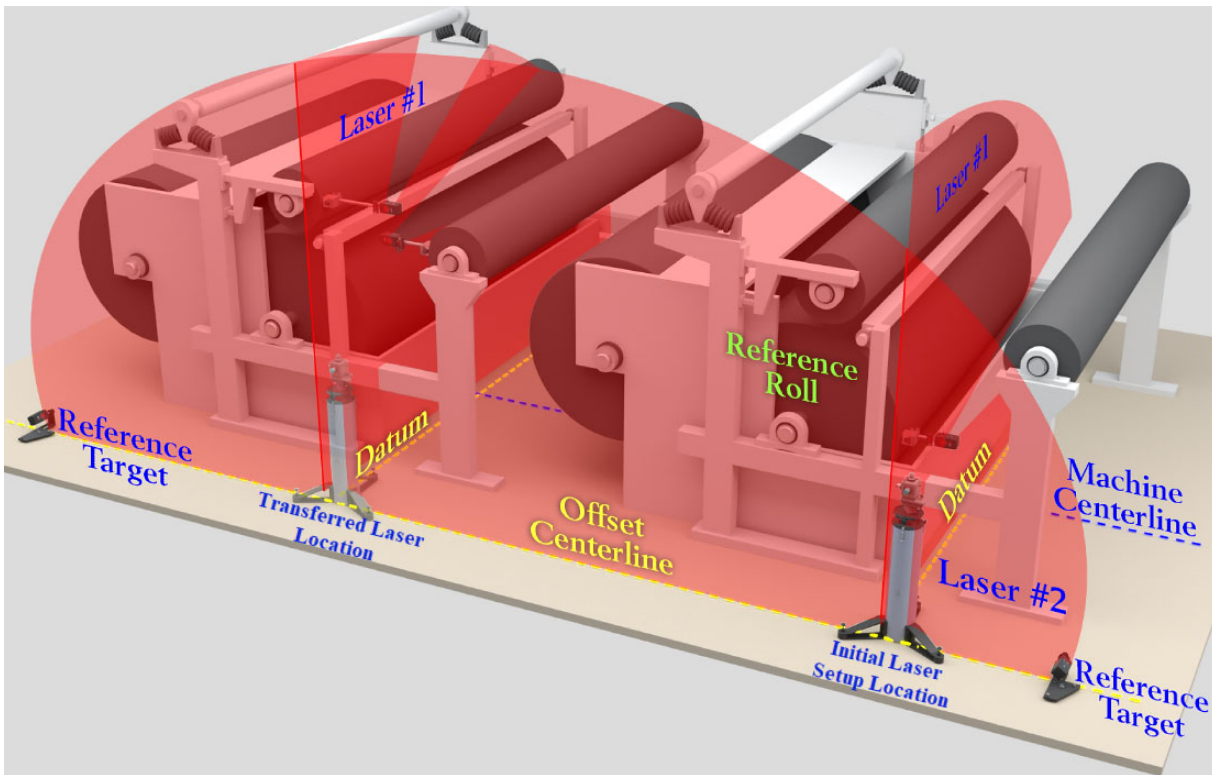

Recommended System Configuration

- L-742WW Ultra-Precision Dual Scan® Laser
- A-1519-2.4ZB Single-Axis Wireless Target w/1 in. range and .0005 mm resolution   (qty 3)
- T-1500 Floor Fixture for reference targets (qty 2)
- R-1356-2.4ZB Readout w/Read 15 software
- R-1308 Single-Axis Readout for A-1519
- L-106 Instrument Stand
- L-106XY Translation Stage for L-106
- A-809XL3 Airline Shipping Case

Optional Accessories

- T-1600 Non-Magnetic Roll Fixture
- T-1601 Tight Space Tram Bar for T-1600
- Alternative Lower Accuracy Laser
  L-732WW Precision Dual Scan® Laser

Competitor Beam-Bending Roll Alignment Systems

(3) Step Error up to 0.5mm

(2) 0.02 mm/m Beam Squareness

(1) 0.02 mm/m Beam Squareness

(1) + (2) = 0.04 mm/m Parallelism Error Between 2 Beams!

Reference Roll and Laser Transfer Method Reduces Laser Error

We recommend using a reference roll as the datum for the L-742 setup because when using our Laser Transfer Method, the squareness error between the laser planes is eliminated. And in fact, our Laser Transfer Method can align rolls for as long as a machine is, so even a machine that is 1000 feet (305 m) can easily be aligned with the L-742 without a loss of accuracy!

For those who must use floor benchmarks, our T-1500 Floor Fixtures can be used to pick up offset-centerline, benchmark, and "prick marks" to use as the reference for the laser. We recommend the benchmarks be double-checked to the machine reference roll since this method is subject to significant errors due to poor maintenance and cracks in the floor that cause the benchmarks to move.

The R-1356-2.4ZB Readout Displays up to 5 Targets

The R-1356-2.4ZB Readout uses Hamar Laser's Read15 alignment software on a wireless, ruggedized PDA data receiver. The R-1356-2.4ZB can display data for up to 5 A-1519-2.4ZB Single-Axis Wireless Targets, making multiple readouts unnecessary and allowing the user to perform many alignment functions with the convenience and portability of a handheld computer.

The Read15 software features a "Buck-In" Wizard that aids in setting up the sometimes difficult initial laser setups. Each target display area can toggle between **Absolute** (indicating exactly where the laser plane hits the target cell) and **Zero** modes. In Zero Mode, the readout shows the measurement relative to the user-determined zero point. Data can be recorded right on the PDA.

L-742/L-743 System Features

- 2 continuously rotating laser planes with operational range of 100' (30.5 meters) in radius.
- Laser planes flat to 0.5 arc second (.00003 in/ft or 0.0025 mm/m). The L-732's laser planes are accurate to 2 arc seconds (.00012 in/ft or 0.01 mm/m).
- Backlit, split-prism levels accurate to 1 arc second (.00006 in/ft or 0.005 mm/m). The L-732 standard levels are accurate to 2 arc seconds.
- A-1519-2.4ZB Single-Axis Wireless Target with 1.1 in. (28 mm) measuring range and .00002 in. (0.0005 mm) resolution.
- Factory-built benchmark fixtures and laser translation-slide fixture are included in system.
- The L-742 WW Laser includes Pitch/Roll/Yaw adjustment base with coarse and fine adjustments. The L-732WW Laser includes a Pitch/Roll/Yaw adjustment base with coarse adjustments.
- Battery or AC powered.
- Typical setup time 15 minutes or less.