Application Note

Aligning Continuous Casters and Steel Mill Rolls

System Recommendation

Continuous Casters
L-740 Ultra-Precision Leveling Laser

Steel
L-743 Ultra-Precision Triple Scan Alignment System

One of the more time-consuming tasks in maintaining continuous-caster steel mills is setting the correct caster-roll pass line. Unlike using optics that requires at least 2 operators, the L-740 only requires one operator, and since the laser automatically sweeps a reference plane, it is a very simple process to measure and set the heights of caster segment rolls. The heights can be set using precision inserts with our targets, as the tolerance of the centerline of the target to its base has been accurately controlled.

In addition, all the rolls of a segment can be checked from one setup. Furthermore, the laser can be set up between two segments and both can be checked at the same time from the same setup.

Recommended System Configuration

L-740 Ultra-Precision Leveling Laser
A-1519-2.4ZB Single-Axis 2.4 GHz Wireless Scan Target
R-1356-2.4ZB Ruggedized Nomad PDA with Read15 Software
A-809XL4 Shipping Case

Optional Accessories

A-1520-2.4ZB Single-Axis 2.4 GHz Wireless Scan Targets
S-1388 Plane5 Software
A-910-2.4ZB 2.4 GHz Computer Radio Interface
R-342 Notebook Computer
R-1342 Ruggedized Laptop Computer

The L-740 Ultra-Precision Leveling Laser for Continuous Caster Alignment

Highest Accuracy in the Industry

The flatness of the laser plane is the most important factor in determining the overall accuracy of the system for measuring flatness. No one surpasses the flatness of our laser planes. The L-740's laser plane is flat to within .00003 in/ft. (0.0025mm/m).

Ultra-High Resolution vs. Human Eye

PSDs (Position Sensing Detectors) are one of the critical components of our laser alignment systems. It is this PSD that senses the laser beam and turns it into a digital signal at a resolution of .00002 in. (0.0005 mm). This greatly reduces the man-to-man variability found in optical measurements because sophisticated electronics determine the measurement rather than the human eye. By relying on the PSD to produce highly repeatable measurements, our L-740 makes it much easier to hand off an alignment project from one crew to the next.

Wireless Targets and Readouts

Hamar Laser's A-1519-2.4ZB Wireless Scan Targets have a ±.55 in. (± 14 mm) measuring range and a wireless range up to 150 feet (45 meters) from the readout. These targets also have height gage measuring capabilities, making them perfect for most steel mill alignment applications. Multiple targets can be used at the same time, allowing the use of multiple work crews to speed alignments.

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Continuously Sweeping Lasers and Live Data Reduces Downtime

Both continuously sweeping lasers and live data output create a powerful combination to align segments up to 70% faster than traditional methods. By providing live alignment data, misalignment errors can be quickly and easily fixed without having to change the setup. This is a tremendous benefit, especially if you are used to using an interferometer, where the entire length of and axis must be measured before the straightness or flatness can be determined and the data provided is not even live.

Laser Planes Have up to 200 ft. (60 m) Range

One of the most powerful features of the L-740 is the automatically rotating laser plane with a range of 100 feet (30.5 meters) in radius. That means even the largest segments (or several segments) can be checked with one setup.

Alignment System Features

- Continuously sweeping laser plane with operational range of 100 ft. (30.5 m) in radius.
- Laser plane is flat to .00003 in/ft (0.0025mm/m)
- Typical setup time 20 minutes or less.
- Uses A-1519-2.4ZB Single-Axis Wireless Scan Target with 1 in. Range and .0001 in. (0.0025 mm) resolution for higher accuracy applications.
- R-1356-2.4ZB PDA Readout displays up to 5 targets at the same time
- Includes Pitch/Roll/Yaw base with coarse and fine adjustments.
- Backlit levels accurate to 1 arc second (.00006 in./ft or 0.005mm/m).
- Battery or AC powered.

The L-743 Ultra-Precision Triple Scan Roll Alignment System for Steel Mill Rolls

Our lasers offer the precision and time savings to meet the ever-tightening tolerances of the steel industry. Our L-743 Ultra-Precision Triple Scan Roll Alignment System is one of only two lasers in the world (L-733 is the other) to offer three automatically rotating laser planes, which creates a powerful tool to not only *measure* but also *fix* almost any misalignment problem in continuous caster mills.

Less Manpower Needed for Alignments

The L-743 Roll Alignment System reduces alignment manpower. Wireless targets and automatically rotating laser planes make setting up the laser at each machine section a one-man job, freeing up technicians for other critical work during shut downs. The wireless readout displays both reference/benchmark targets simultaneously, allowing the operator to quickly buck-in to the benchmarks. Traditional optics usually require at least two men to work the instrument

Multiple Targets and Laser Planes Reduces Downtime

With multiple laser planes and multiple targets, the L-743 can take the place of at least two sets of optics. Once the laser is setup, multiple technicians can each use a target to realign the mill during planned or unplanned outages. This can save tremendous amounts of time and can bring the mill up that much sooner.

Set Roll Pass Line Faster with Fewer Technicians

One of the more time-consuming tasks in maintaining continuous-caster steel mills is setting the correct caster roll pass line. Unlike using optics that requires at least two operators, the L-743 only requires 1 operator, and since the laser automatically sweeps a reference plane, it is a very simple process to measure and set the heights of a caster segment rolls. The heights can be set using precision inserts with our targets, as the tolerance of the centerline of the target to its base has been accurately controlled.

Another timesaving feature of the L-743 is that all the rolls of a segment can be checked from one setup and the operator who set the laser up can start doing the measurements himself! Furthermore, the laser can be setup between 2 segments and both can be checked at the same time from the same setup.

Easy Squareness and Plumb Measurements for Segment Pins

The L-743 has three automatically sweeping laser planes, one horizontal and two vertical, which are all square to each other to within .00006 in/ft (0.005 mm/m). This means that complex tasks like checking the squareness of the pins to the face of the caster is an easy job for the L-743. This greatly reduces the setups needed to measure squareness when using optics. The L-743 can also be used to easily check the plumbness of the segment pins in the mill itself, as the vertical laser planes have 100 feet (30.5 m) radius and are plumb when the laser is leveled.

No Need for Optics' Recalibration After Plumb Measurements

Unlike some optics that usually require time-consuming recalibration of the levels each time plumb is checked, the L-743 can simultaneously check level and plumb from a single setup. This is because the squareness measuring capability is built into the instrument. Furthermore, the levels usually only require calibration once a month.

Recommended System Configuration

L-743 Ultra-Precision Triple Scan Laser
A-1519-2.4ZB Single- 2.4 GHz Wireless Scan Target
R-1356-2.4ZB Ruggedized Nomad PDA with Read15 Software
L-106 Instrument Stand including A-809XL2 case with wheels
A-809XL3 Shipping Case

Optional Accessories

A-910-2.4ZB 2.4 GHz Computer Radio Interface
S-1388 Plane5 Software

Alignment System Features

- Three continuously rotating laser planes with operational range of 100 ft. (30.5 m) in radius.
- Instant on with virtually no warm-up
- Planes are mutually square to .00006 in./ft (0.005mm/m).
- Uses A-1520-2.4ZB Single-Axis Wireless Scan Target with .00001 in. (0.00025 mm) resolution for higher accuracy applications.
- Levels accurate to .00006 in./ft (0.005mm/m).
- Battery or AC powered
- Laser planes flat to .00003 in./ft (0.0025mm/m) in 180º sweep and .00001 in./ft (0.0008mm/m) in 90º sweep.
- Includes Pitch/Roll/Yaw base with coarse + fine adjustments and lighted levels.
- Standard target: A-1519-2.4ZB Single-Axis Wireless Scan Target with 1 in. Measuring Range and .00002 in. (0.0005 mm) Resolution.
- System uses Windows software for quickly recording and analyzing machine geometry data
- Typical setup time 20 minutes or less