Application Note

Saw Mills

System Recommendations

L-743 Ultra-Precision Triple Scan® Laser
L-733 Precision Triple Scan® Laser

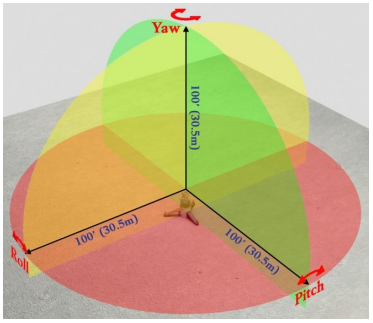
How the Alignment System Works – L-743/L-733 on Saw Mills

The critical alignments for a sawmill is to ensure that the log carriage is traveling straight and flat, is perpendicular to the blade, where the mill is cutting specific board lengths, and parallel to the blade, where the mill is cutting/shaping board lumber.

The L-733/L-743 Triple Scan® Laser systems offer the fastest and most accurate way to align saw mills on the market today. They are easy to learn and quick to set up. Here is a rough procedure outlining how it's used.

L-743 Ultra-Precision Triple Scan® Laser Alignment System

Checking Log Carriage Straightness and Flatness/Level

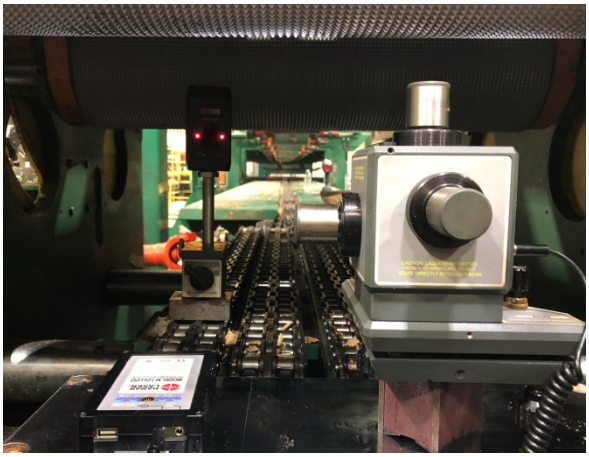


L-743 Laser Showing the 3 Laser Planes

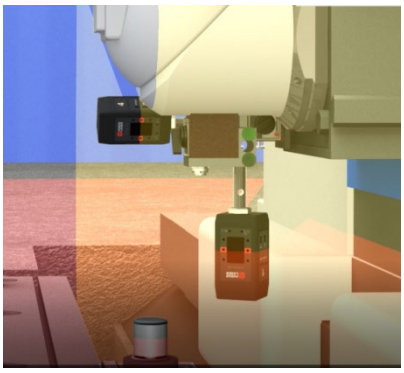
1. The L-743 or L-733 is positioned at the end of the mill and is leveled, using the built-in level vials.
2. Two reference points are needed to align the laser to the machine centerline. Typically a fixture is made to hold 2 A-1519-2.4ZB Targets to pick up the tight wire centerline mounting points. The fixturing positions the center of the targets to within .001 in. (0.025 mm) of the centerline jig location.
3. Each A-1519-2.4ZB is placed at end point of the machine and the L-733/L-743 is placed near one end of the mill or in the middle. Then using the yaw adjustment on the L-743/L-733 laser base, the laser is adjusted so the targets in the far position and the near positions both read the same value. This means the laser is parallel to the reference points.
4. Then the L-106X Laser Translation Stage is used to translate (move the laser with very little angular change) the laser plane so both targets read close to zero, usually the tolerance is .010 in (0.25 mm). This means the laser is now on the centerline of the machine.
5. Steps 4 & 5 might need to be repeated a few times to get the laser aligned (bucked-in) to the reference points.

Setting up the L-743 in the middle of the mill

6. Next an A-1519-2.4ZB Target is mounted on the log carriage (or fixture to simulate the carriage) horizontally and adjusted so that it detects the laser beam. A second A-1519-2.4ZB can be mounted vertically on the carriage to measure flatness/level (this setup is similar to the machine tool setup in image "2 A-1519-2.4ZB Targets mounted….")
7. Now both A-1519-2.4ZB measuring targets on the carriage are zeroed at a location next to the laser.
8. To measure the straightness, the carriage is moved at user-specified intervals and any deviations from zero are noted or recorded. Since the readings update in real time, the target can be used as a digital indicator and the point can be brought into alignment by adjusting it until the reading is zero.
9. To measure the flatness/level, the vertical target is used in the same manner and at the same time as the horizontal target.
10. Both the flatness/level and straightness can be measured and aligned at the same time.

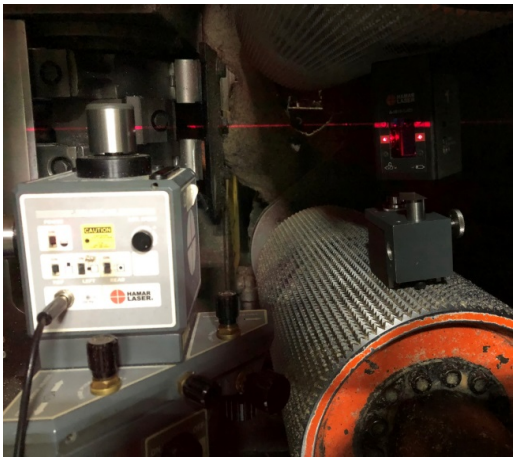


L-743 Measuring flatness of carrier



2 A-1519-2.4ZB Targets mounted vertically & horizontally on a machine tool spindle

R-1356-2.4ZB PDA Readout showing values for Targets #1, 2 & 3

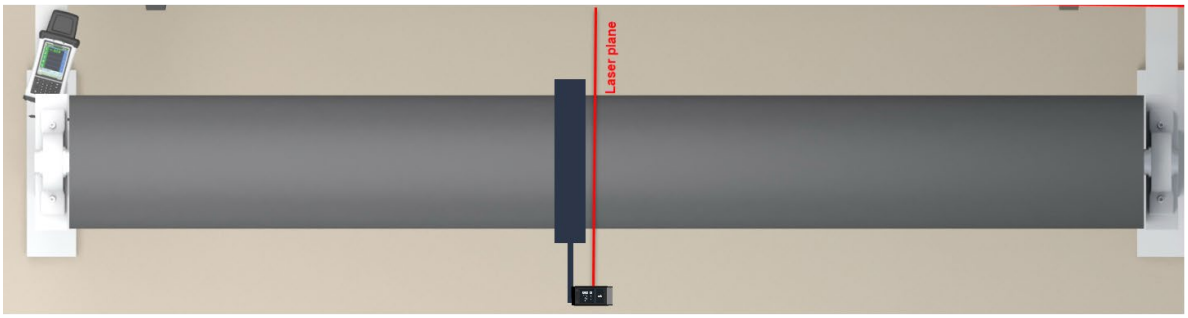


L-743 & A-1519-2.4ZB Checking Roll Levelness

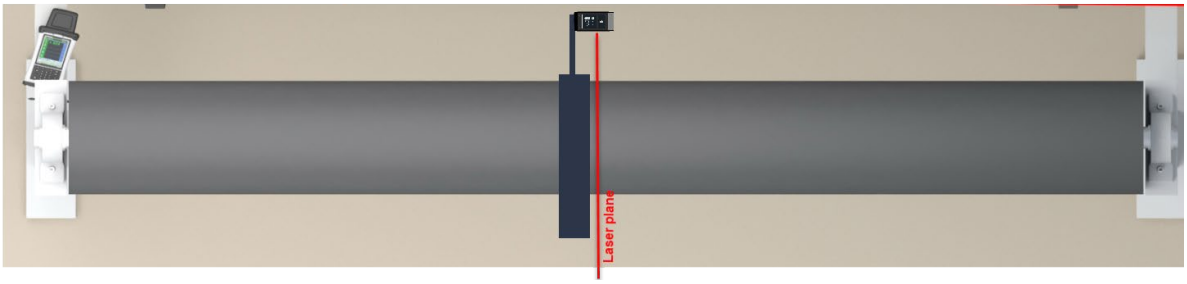
Checking Support Rollers for Squareness

Here the goal is to make sure the rollers supporting the logs are perpendicular to the machine centerline to prevent "wandering" of the logs to one side or the other.

Top View of Roll - Target in Near Position



Top View of Roll - Rotated to Far Position



With the same setup as above, you make up a fixture that is mounted over the roll. It has a post that is maybe 12" long and the target is mounted horizontally, which will be used to "sweep the roll", which means you rotate the fixture/roll to put the target as close to the laser as you can and then sweep it through the arc to the other side.

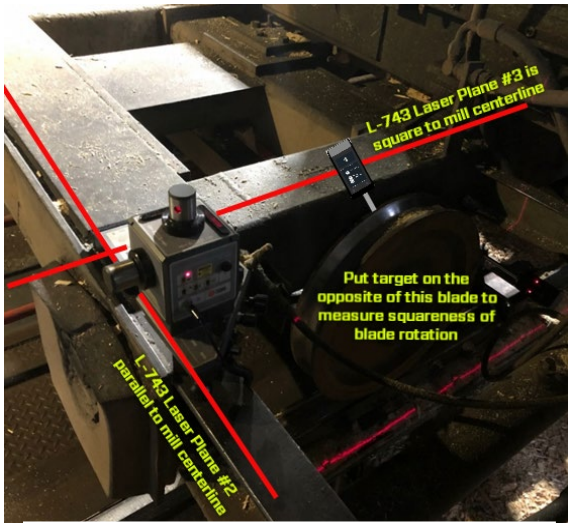
First you zero the target in the near position. Then rotate the roll so the target/fixture are as far away from the laser as possible (far position). Any deviation from zero is a measure of how far out of square the roll is.

For example, if a tape measure is used to measure how far the target moves when it is swept from near to far and the alignment value at the far location is noted, then the angular value can be calculated and is expressed in inches/inch. For example, if the sweep distance is 20 inches and the value at the far location is .030", then this means the angle is = .030/20 = .0015 in/in. Therefore, if the roll is 24 inches long, then to correct the error, you move either end of the roll by 24*.0015" = .036".

Checking Saw-Blade Squareness

When checking the squareness of a saw blade to the travel of the log carriage, the laser must be moved along the centerline (down the machine) from the initial setup location to within 12 to 18 inches (305 mm to 483 mm) of the blade. Here is how:

1. After roughly aligning the laser, to the references, it is then "bucked in" as before (steps 4-7) to put the laser plane on the machine centerline.
2. Recall that the L-743/L-733 has 3 laser planes, 2 vertical and 1 horizontal and they are all square to each other. This means that with the 1st vertical laser (#2 in the graphic) plane aligned to the machine's centerline, the 2nd vertical laser plane (#3 in the graphic) is perpendicular to it, so to measure squareness of a saw blade, you simply mount a target horizontally on the closest point on the blade and zero it.
3. Then rotate the blade 180 degrees and any deviation is how far out of square the blade is to the machine's centerline.



L-743 Measuring Squareness of Blade to the Mills' Centerline

4. If the blade is mounted on a carriage, where the travel is supposed to be perpendicular to the centerline, then you can simply zero the target in a close position and then move the blade carriage to the other end of its travel and any deviation noted in the value is a measure of the squareness error of the travel of the blade carriage.
5. Again since the readings update in real time, the blade (or carriage) can be adjusted so that the reading is zero, which means it is perpendicular to the travel of the carriage.

Checking Saw-Blade Parallelism

To check the parallelism of saw blades that cut parallel to the carriage travel, again the setup procedure is followed for "Checking Support Rollers for Squareness" from above.

The A-1519-2.4ZB target is placed on the blade at the closest point to the laser (3:00) and zeroed. Next, the blade rotated 180 degrees so the target is at farthest point on the blade from the laser (9:00). Any deviation from zero is a measure of the parallelism errors of the blade to the carriage travel.

L-743 & A-1519-2.4ZB Measuring Blade Parallelism

Checking Plumbness of Blades

With the laser being leveled, this means both vertical laser planes are plumb to earth, which means the plumbness of the blade can easily be checked. First you place a target on the blade at a 12:00 position and zero it.

Next rotate the blade so the target is at 6:00. Any deviation in the target reading is a measure of how far out of plumb the blade is.

Of course, with many different machine types, we have not covered all the applications but the L-743/L-733 can be used for many other applications in the mill. Give us a call and let us know if you are not sure!

Note: Many thanks to Cutting Edge Tooling, Inc. Russellville, AR who provided the sawmill setup photos!