



## **Engineer Terminology for How the Radialign works**

### Scope:

To describe in technical terminology the engineering principles used by the Radialign equipment package to project the circumferential circle on the kiln that is square (90 degrees) from the kiln axis.

### Data:

Equipment provided with the system.

- a. Laser and supporting tripod.
- b. Plumb bob with bead on stabilizing tripod
- c. Penta prism and supporting tripod.
- d. Marking card and chalk.
- e. Instruction manual and battery charger.
- f. Safety glasses and lens.

### Engineering review:

- I. This system basically consists of two functions:
  - a. First it establishes a laser beam that is exactly parallel to, but not on the center line of the kiln.
  - b. Secondly it uses a precision rotating 90 degree prism to project the laser beam onto the inside of the kiln shell to establish a true square to the kiln axis work point for the brick placement.
- II. How the parallel laser beam is set:
  - a. The laser unit legs are designed to set up at the bottom of the kiln just left of the kiln centerline when looking up or down kiln. This allows a walkway up and down the kiln. It is important not to bump the laser after it is aligned.
  - b. This unit has two legs of its tripod designed to set on the wall and one adjustable leg to set on the laser floor of the kiln closer to the kiln center line.
  - c. The laser is set up to project its beam up the kiln as close to parallel to the kiln axis as can be determined by the naked eye. The laser unit should be reasonably level to the naked eye. This makes minor adjustments with the adjusting knobs simpler.
  - d. The key to establishing the laser parallel to the kiln shell is the plumb bob tripod assembly.
    - i. First the plumb bob tripod assembly is setup so that the laser will intercept the freely hanging plumb bob string by setting it in front of the laser about 6 inches from the hole emitting the laser light.

Take care that the plumb bob tripod cross arm is installed in the correct orientation and approximately level. This will allow the plumb bob string to

hang freely in the slot of the sliding block on the cross arm and slide the block so it lines up with the white mark on the block.

Once the laser beam is set on the string hanging vertically in front of the laser, adjust the sliding white bead on the string up or down to exactly intercept the laser beam.

- ii. The key is now to move the plumb bob tripod assembly (without making any adjustments) up the kiln a substantial distance and reposition the plumb bob tripod without changing the sliding block or the white bead settings (this is critical).

To position the unit correctly move it up or down the same side of the kiln until the string is vertical and hanging freely.

You will find that once the plumb bob tripod string is hanging freely it will not intercept the laser beam exactly. This is because a "micro" misalignment of the beam at 6" will magnify greatly when you are trying to find the beam up kiln. You will need to have a helper fine tune this misalignment with two adjustment knobs on the laser unit; one for vertical adjustment and one for horizontal adjustment.

Carefully without moving the laser beam tripod adjust utilizing the adjustment knobs only to be exactly on the white bead on the plumb bob tripod string you will have duplicated the original 6 inch position only further away from the laser light source. The laser beam will be essentially connecting two points located identically along the axis of the kiln, thus the laser line will be parallel to the axis of the kiln.

### III. Penta Prism set up.

- a. The penta prism has a double pin hole aperture opening which requires that this unit be placed parallel to the laser beam in order for the beam to hit the prism.
- b. Once adjusted to the laser beam, a strong reflected beam will now project onto the kiln shell at 90 degrees to the kiln axis.

### IV. Marking the kiln.

- a. Refer to the Radialign instruction manual for marking procedures.