

Accurate Alignment Is The Key Factor To A Successful Preventive Maintenance Program

- ✓ Reduce tire, trunnion, and thrust roller wear
- ✓ Eliminate hot bearings
- ✓ Eliminate shell cracks
- ✓ Reduce refractory failures
- ✓ Reduce seal damage

This applies to new or old installations. Our experience has shown that many new installations use old outmode techniques to set the kiln, or dryer, resulting in maintenance headaches forever. We realize that production has priority and that maintenance personnel must make adjustments on the fly or in the middle of the night and, many times, under pressure. Working in these conditions makes it difficult to keep track of all of the adjustments made over time.

Some form of alignment survey needs to be preformed to find out your present kiln settings before further adjustments are made. Our recommendation is to utilize our **DATscan™ Reflectorless Technology** and establish a baseline to work from. Many customers perform this survey annually and usually before establishing their maintenance budgets.

Resulting information from a good survey:

- Determination of centerline of tires relative to each other.
- Determination of location of rollers, (trunnions), relative to tires at each station.
- Determination of slope, elevation, canting, and centerline of bases.
- Determination of roller, (trunnion), and tire face condition, identifying any taper, cupping, or crowning. Also measuring diameters.
- Determination of runouts on each of the tires.
- Determination of shell/tire ovality and tire creep at each station.
- Determination of roller (trunnion) slope and skew relative to the tire centerline.
- Determination of roller (trunnion) slope relative to machined bases to determine bushing wear.
- Measure shell doglegs.
- Check gear mesh with thermal imaging.

These tasks can be performed hot or cold, running or not.

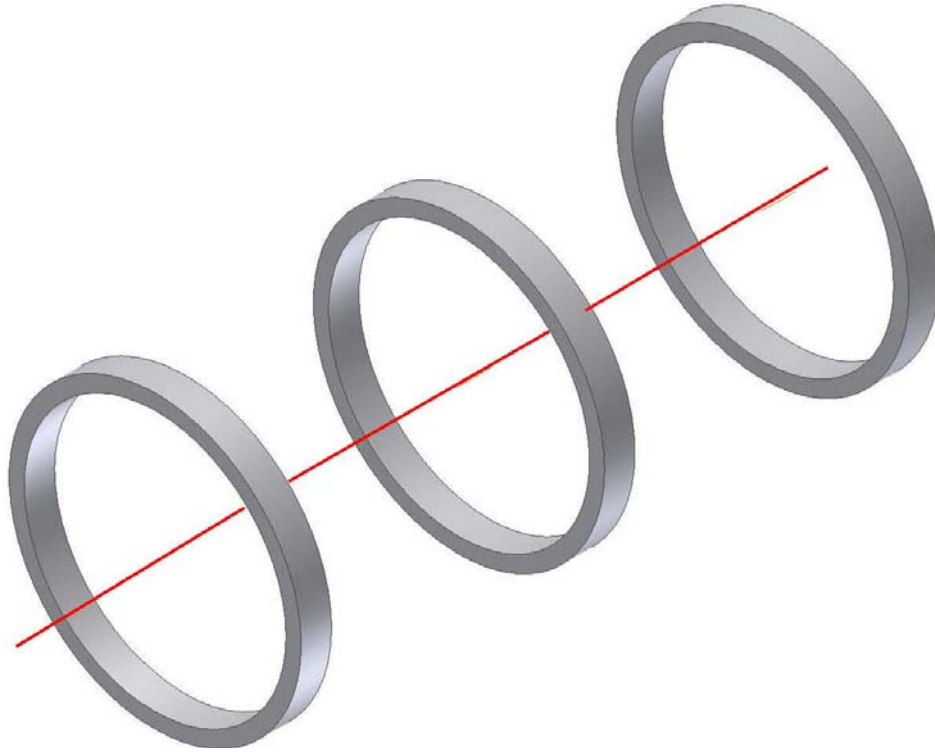


FIGURE 1- TIRE CONCENTRICITY

A PROPERLY ALIGNED KILN (DRYER) WILL HAVE ALL TIRES ROTATING ON THE SAME CENTERLINE AND ON THE PROPER SLOPE

The tire diameters, roller, (trunnion), diameters, and bearing height are not always the same at each tire station. For a given station, the rollers, (trunnions), and centerline shafts to base on the right or left may not be the same diameter or height. Tires and rollers, (trunnions), may be larger or smaller than the original design as a result of wear, grinding, and/or replacement with the incorrect diameters.

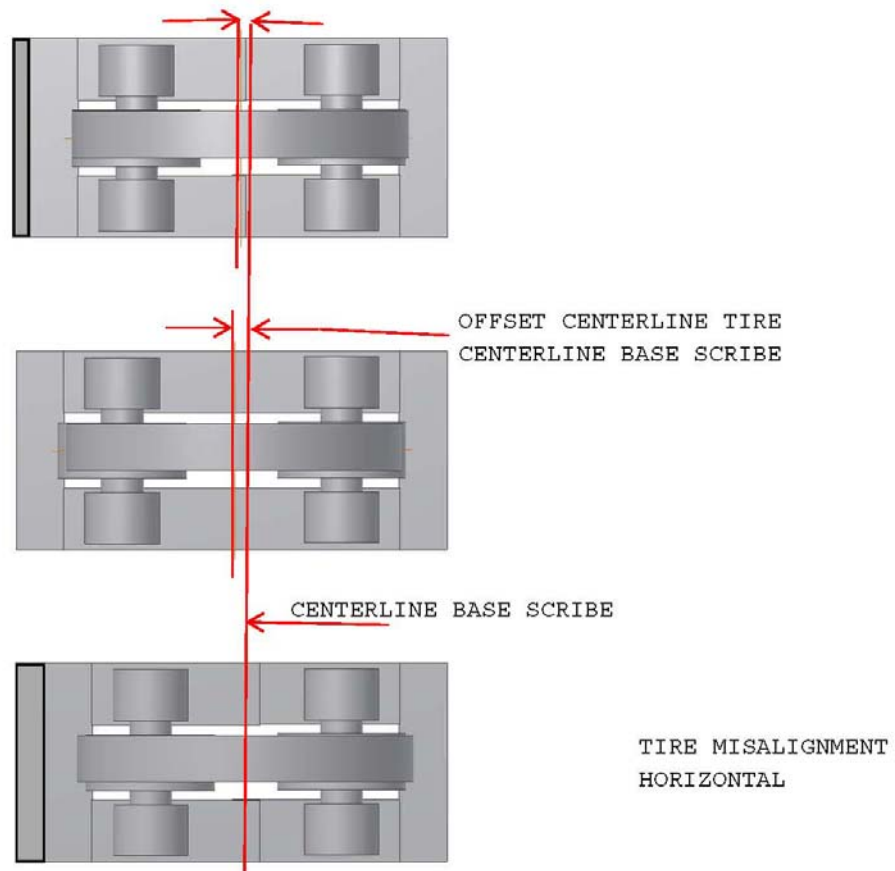


FIGURE 2 – TIRE CENTERLINE OFFSET IN THE HORIZONTAL DIRECTION

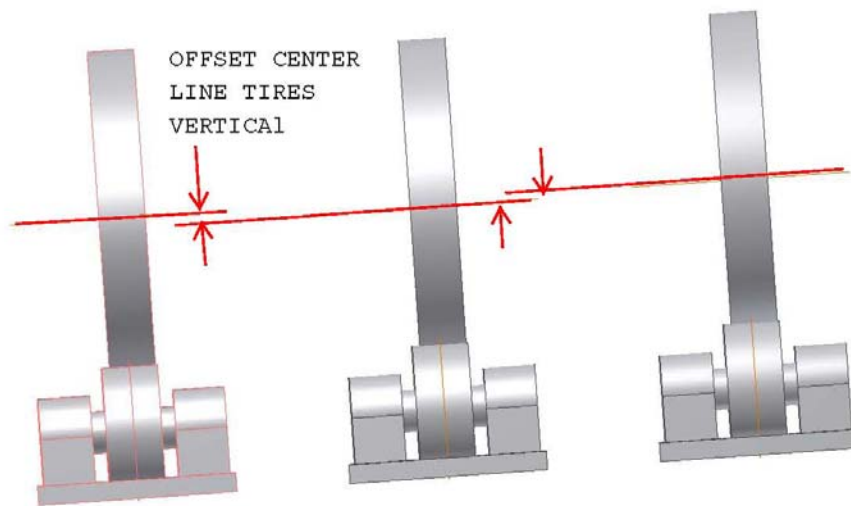


FIGURE 3- VERTICAL MISALIGNMENT

To **Measure** and **Calculate** alignment, we must make a few assumptions:

- The bases are at the correct slope and elevation and are level perpendicular to the kiln (dryer).
- The bases have a scribes centerline or punch marks which accurately establish the centerline of the kiln.
- If the above cannot be confirmed, we highly recommend that these datum points be established by precision optical methods, such as our **DATscan™ Reflecterless Technology.**
- The original tire and roller diameters should be determined along with the appropriate designed roller and angle "A" as shown in the figure below .

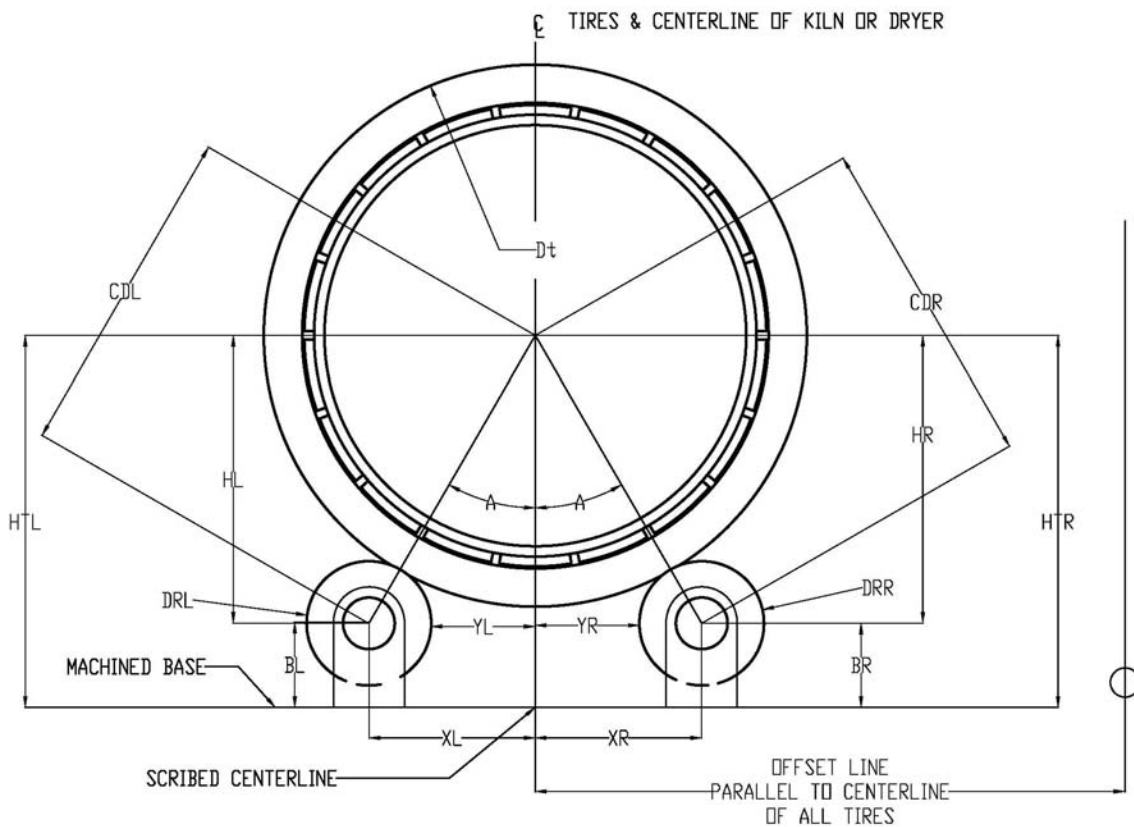


FIGURE 4- TIRE STATION CRITICAL DIMENSIONS

Calculation:

$$CDL = (DRL + Dt)/2$$

$$CDR = (DRR + Dt)/2$$

$$HL = CDL \times \cos(A)$$

$$HR = CDR \times \cos(A)$$

$$XL = CDL \times \sin(A)$$

$$XR = CDR \times \sin(A)$$

$$HTL = HL + BL$$

$$HTR = HL + BL$$

DO NOT MEASURE BL AND BR. INSTEAD, MEASURE THE DISTANCE FROM MACHINED BASE TO BOTTOM OF THE SHAFT (BRX) OR (BLX) AND CALCULATE BL AND BR USING THE SHAFT DIAMETER (SR) OR (SL).

$$BL = BRX + (SR/2)$$

$$BL = BLX + (SL/2)$$

$$YL = XL - (DRL/2)$$

$$YR = XR - (DRR/2)$$

Example:

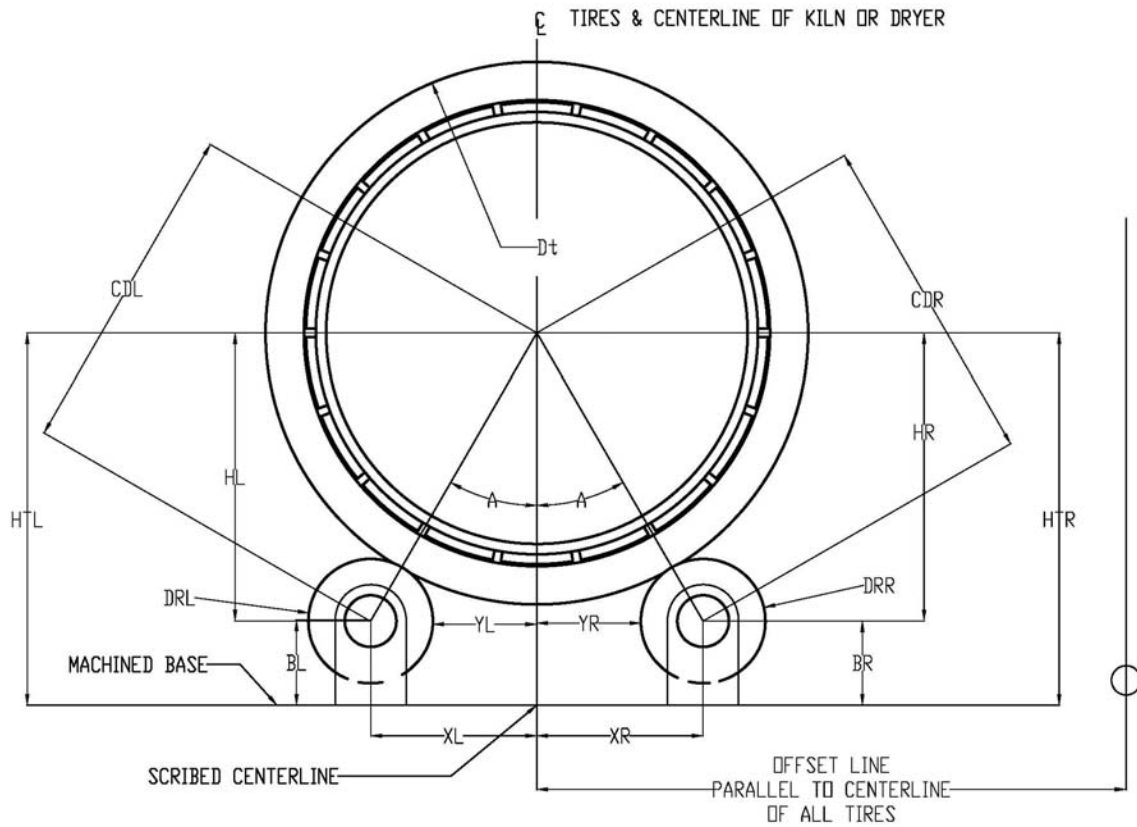


FIGURE 4- TIRE STATION CRITICAL DIMENSIONS

Measured or Known:

DR= 54, DL=54, Dt=222, S=18, DRX=8, DLX=8, A= 30 DEGREES

Calculated:

$$CDL = (54 + 222)/2 = 138$$

$$HL = 138 \times \cos(30) = 119.51$$

$$XL = 138 \times \sin(30) = 69$$

$$BL = 8 + (18/2) = 17$$

$$HTL = 119.51 + 17 = 136.5$$

$$YL = 69 - (54/2) = 42$$

$$CDR = (54 + 222)/2 = 138$$

$$HR = 138 \times \cos(30) = 119.51$$

$$XR = 138 \times \sin(30) = 69$$

$$BR = 8 + (18/2) = 17$$

$$HTR = 119.51 + 17 = 136.5$$

$$YR = 69 - (54/2) = 42$$

These measurements and calculations give you the necessary information required to accurately adjust your kiln, (dryer). **Adjustments to your kiln (dryer) should only be performed by trained, and certified, personnel.**