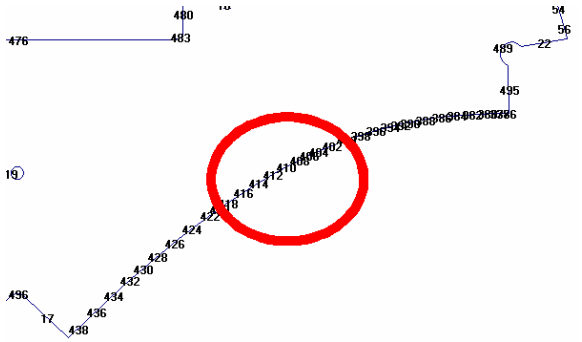
P.E.P. TECHNOLOGY©

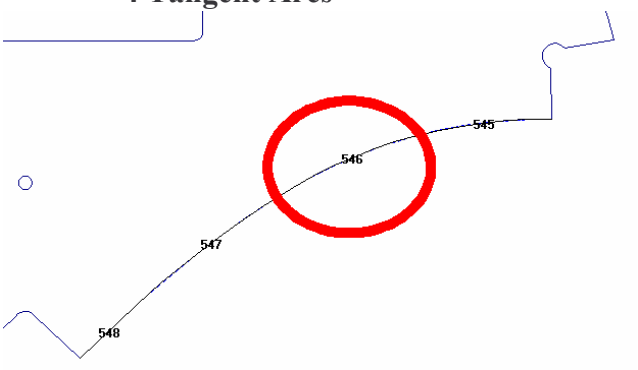
CUTTING CONSECUTIVE INTERSECTING LINES WITH A LASER

The following is an explanation of the benefits of replacing intersecting line segments with tangent arcs.

30 Consecutive Lines



4 Tangent Arcs



What happens when short consecutive intersecting lines <u>are not replaced with arcs</u>?
Part cut quality will vary according to the drive system on your machine.

Linear Drive Machines
As the length of the line segments making up a part become shorter:

a) Cut Time Goes Up – when a machine cuts a line segment before reaching the programmed feed rate, the acc/dec feed rate curve becomes a greater percentage of the cutting time and therefore the average programmed feed rate will be drastically reduced increasing the cutting time.

b) Cut Quality Goes Down - the acc/dec start and stop points will be more pronounced affecting the appearance of the part and the edge quality making it possible to see the individual lines. The shorter the line segment the more obvious the points will be.

c) Machine Noise - The machine will make a pounding noise at each stop point if the machine does not accelerate and de-accelerate through the acc/dec curve. As the lines get shorter the noise gets louder. Lowering the programmed feed rate will only increase the cutting time for the entire job and make each line more distinct.

d) Machine Service – The pounding noise coming from the linear motors does not appear to damage the linear motors, however, some customers report shorter service cycles.

Ball Screw Machines

a) Cut Time Goes Up – ball screw machines take longer to reach the programmed feed rate because of the acc/dec slope, therefore the cut time is reduced even greater on ball screw machines than linear drive machines.

b) Cut Quality Goes Down - the acc/dec start and stop points are not as pronounced as cutting with a linear drive machine resulting in a smoother looking part.

c) Machine Noise - The machine will make a pounding noise at each stop point if the machine does not accelerate and de-accelerate through the acc/dec curve. As the lines get shorter the noise gets louder. Lowering the programmed feed rate only increases the cutting time for the entire job.

d) Machine Service – The acc/dec positioning is hard on ball screw machines causing premature wear.

e) Look Ahead - Ball screw machines with controls having "Look Ahead" like Fanuc controls will cut choppy like on a linear drive. The choppy start stop conditions are hard on the ball screw, even though the acc/dec time will result in the part being cut faster.

Rack /Pinion Machines
On a rack/pinion machine the result will look choppy and add time, but the rack holds up better.

Do short consecutive intersecting lines create heat build up in the part?
Yes, more heat will be put into the plate. Machine controls with dynamic power control and or controls using exact stops will reverse the motor to stop, but not drop power and duty cycle resulting in heat buildup.

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