How to Get the Intersection Height of Two Cones

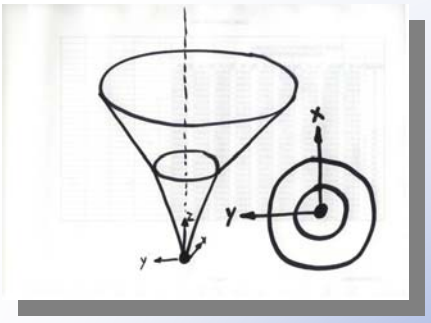

Figure 1

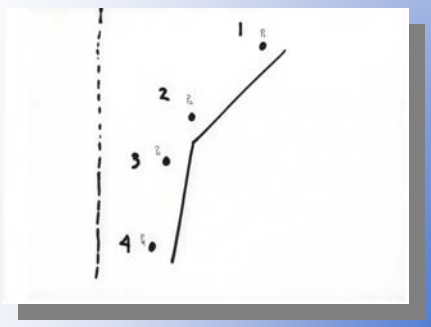

Figure 2

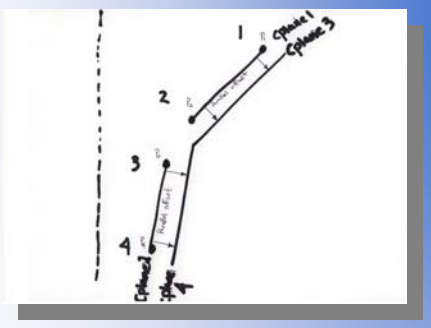

Figure 3

Application Description
The purpose of this document is to show the user how to obtain the intersection height between 2 cones.

Alignment

- Start by measuring a plane perpendicular to the center axis of the cones. Go to **Measure < Plane. Gives Mplane1**.
- Go to **Measure < Line < 2D**, and measure the line that will make your X-axis. This gives Mline1.
- Go to **Measure < Cone**, and measure both the cones. Measure the smaller cone first. This gives Mcone1, Mcone2.
- Go to **Construct < Coordinate System < 321**. Use Mplane1 for the XY-Plane, Mline1 for the X-line, and Mcone1 for the origin. This setup gives Ccoordsys1.
- Go to **Alignment < Cad = Part**. Use "Ccoordsys1" for the measured system and "World" for the nominal system. This results in Calignment1.
- The user should have something similar to Figure 1.

Measurements

- The only measurement needed is a scan.
- Go to **Measure < Scan < Parallel Lock Planes**. Choose 1" (25.4mm) for the increments; let the default stay at 10 for the number of planes, set the minimum distance at .25" (6.35mm). Scan in points.
- For the plane, select XZ Ccoordsys1.
- Put the probe in contact with the cone, and scan in a S-shaped pattern. You only need **TWO** points per cone (4 points total) so don't scan back and forth a lot.
- Your points should look like Figure 2, if looked at from the side.

Constructions

- Now go to **Construct < Point < Best Fit**, and use the "From Screen" button. Pick the points in the order like figure 2. As each point is accepted to the database, you will have to click the OK button. Do so for each point. When done, do not accept the results for all 4 points together. Hit the ESC key on the keyboard a few times to cancel this command. The result gives Npoint1, Npoint2, Npoint3, Npoint4.

- Go to **Construct < Line < Best Fit**. Pick Cpoint1, Cpoint2. Make sure you uncheck the select plane button. Repeat above for Npoint3, and Npoint4. This gives Cline1, Cline2.
- Go to **Construct < Point < Offset**. Use Npoint1 for the point, and key in .5" (12.7mm) in the Y box. Repeat for Npoint3 using the same Y value. This gives Cpoint1, Cpoint2.
- Go to **Construct < Plane < Best Fit**. Use Npoint1, Npoint2, and Cpoint1, click OK. Repeat using Npoint3, Npoint4, and Cpoint2. This will give Cplane1, Cplane2.
- Go to **Construct < Plane < Parallel**. Use Cplane1, and click on the distance button. Key in the **radius** of your ball probe as a negative number. Be careful to check the direction of the offset plane using the graphics. You might have to use a positive number for the offset. This results in Cplane3, Cplane4. The display screen should look like Figure 3.
- Go to **Construct < Line < Plane Project.** Use Cplane3, Cline1. Repeat using Cplane4, Cline2. This gives Cline3, Cline4.
- Go to **Construct < Point < 2 Lines**. Use Cline3, Cline4. This gives the intersect point of the two cones. Look at the Z value, this is the height.
- Figure 4 shows what happens if you do not do the constructions above and just try to intersect the two uncompensated lines.

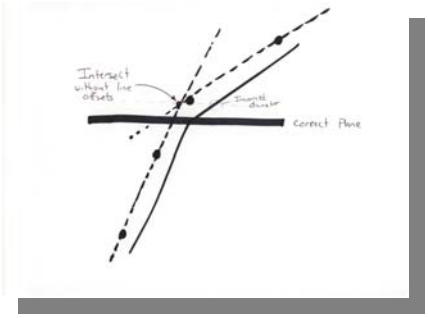

Figure 4

USA: Orlando, Detroit, Los Angeles, Chicago, Charlotte, Columbus, Seattle
Europe: Paris, France; Stuttgart, Gernany; Coventry, UK;Barcelona, Spain; Rivoli, Italy
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