Converting Profile to Cam Grinding Wheel Path (using mm lift, using inches is very similar)

We will describe converting a profile measured with a smaller diameter roller to a larger diameter Cam Grinding wheel path for a cam grinder. First you will start a new test by clicking on File, then EZ Start Wizard. As always, save the existing file (if any) as any recent changes will be lost when starting a new test.

Click on No for the first screen in the EZ Start Wizard. The next screen is critical, you want to choose "No" for Using E Electronics and "Yes" for Import Text or Spread Sheet Data. For the next screens, your inputs are not critical.

🖾 Cam Analyzer v4.0 'Plus' Performa	ance Trends [mikko 001]	E7 Start Wizard	🕞 F7 Start Wizard
File Edit Graphs Reports Test/Cam Setup	Find TDC Settings Help Rec		
EZ Start Wizard (new, EZ method for New Tes New (classic way to start new test)	it)	Run Similar Test?	Type of Test?
Open (from all saved tests) Open from History Log Save Save As	Ctrl+O st Comments ort from excel Ctrl+S Ctrl+A	Do you want to run another test just like test: mikko 001 the test currently on the main screen?	Pick the Lype of Lest you want to run from the list below. Click on 'down arrow' button on the right side of the list to display all types.
Open from Floppy/CD Drive (A:\ Drive) Save to Floppy/CD Drive (A:\ Drive)	29.59 [////22]	Choose Yes' to run another test where where Lift (in mm) and	
Import Export as Cam Dr File (and other formats) Export Manufacturing Style Cam File Email This Cam Test File	Show De	Degrees will be measured with electronic sensors, either on a Cam Test Stand or in the engine using the same Rocker Am Ratio, Lifter Type, etc. Then, you will only be asked a couple of questions about this new test.	Using Electronic Sensors No 💌
Backup Restore from a Backup	•	Choose 'No' and you will be asked for additional details about running this new test.	Import Text or Spread Sheet Data
Print Main Screen Print Blank Worksheet Print Cam Card Windows Printer Setup		Note: You can change most any setting after you start your new test. It is not necessary to have everything exactly correct now, before you start a new test.	For Test Type = Measured by Hand: Cam Lift and Cam Degrees will be measured by hand with a Dial Indicator and a
Unlock Program Unlock 'Plus Version' Features Unlock 'Cam Grinder' Features Show 'Plus Version' Demo		If there is a better test to path in this test after, click on 'Pick' to open that test from your aved Tests.	
Exit Program 14 346. .00000 15 348. .00000 16 350. .00000	Ctrl+X	Pick No Yes Cancel	Back Next > Cancel

When done with EZ Start Wizard, the program will present this explanation, and present you with the "Edit Test Data" screen shown below, and click Yes.

Continue	e with this Type of Cam Data?
?	You have selected to copy data from a Text File. When you are finished entering some specs about this data (rocker ratio, lifter type, file name, etc), you will be presented with a screen to Paste data which you have copied from the file using a Ctrl-C command.
	If you are not able to do this when this Wizard is finished, you can do this later by clicking on Edit at the top, left of the main screen, then clicking on Copy/Delete/Paste after you have copied your text file or spread sheet data to the 'Clip Board'.
	Do you want to continue?

If the "Edit Test Data" screen does not appear, click on the top, gray cell in the "Tappet Lift" column to bring it up.

🚰 Cam Analyzer v4.0 '	Plus' Performance Trends [n	nikko 002]		_	
File Edit Graphs Reports	🖻 Edit Test Data			×	
Test & Valve Train Co Test Time/Date 11 Cam Number Grind Number Rckr Ratio/Lash Te 1 / .5 do Test Data EZ Data Entry	Delete the Previous Rows Delete the Remaining Rows Click 'Delete Row Click 'Delete Previous Rows' to erase this row and all rows above this row. Click 'Delete Remaining Rows' to erase this row and all rows below this row.	Text1 Use This Data Cancel Click into Text Box above to place cursor there. Then do a 'Ctrl-C' to copy the lift data there. Click on the 'Use This Data' button to copy lift data to lift column for this lobe.	Advance Import Features Read as Polar Coordinates (requires 2 columns of data) Read Decrees as Radians First Column is Lift Crank Degrees C Cam Degrees Read as XY Coordinates (requires 2 columns of data)		pe given in the Help frame. Click on "H
Point Degree Tappet Wheel Lift	1.0				

Process for importing just 1 column of Lift Data

(If you want to import both degrees and lift, jump to page 4.)

Now, open you Excel spreadsheet as shown to the right, or whatever type of file you may have. Click on the "B" at the top of the Lift column to highlight that column. Then do a Ctrl-C command to copy that column's contents.

You will notice that the first data point is at 0.5 degrees and not zero.



Open the Edit Test Data screen as shown on page 1, click in the big white area with the mouse and do a Ctrl-V command to paste the contents into that text box. Because the first data point was not at zero degrees, move up in the text box to the top row and insert a 0 to move all rows down one. It is not critical that the data starts at zero, but that it starts at an

even cam degree increment. could have deleted the first zero and the data would then have started at 1 cam deg.

Now click the Use This Data button and the lifts will be placed Tappet Lift column.

			We
🖻 Edit Test Data			row
Copy to Clipboard		Advance Import Features	
Erase Column		Read as Polar Coordinates (requires 2 columns of data)	
Paste from Another Program		Read Degrees as Radians	
Paste from Clipboard	<u> </u>	🔲 First Column is Lift	Sec. 10. 1
Cancel	Use This Data Cancel	○ Crank Degrees ○ Cam Degrees	in the
Copy to Clipboard' lets you copy these lifts to some other lobe (int or exh) to this or any other cam file.	Click into Text Box at you have bee cursor there. Then do a 'Ctrl-C' to copy with data there. Click on the 'Use This Data' button to copy lift data to lift column for this lobe.	☐ Read as XY Coordinates (requires 2 columns of data)	

Note: The program uses data in 1 cam degree increments for all math, so the program shows the following message. Because every 2nd point is dropped, we want those to be the 0.5, 1.5, etc degree points.

Cam Analyzer	$\mathbf{ imes}$
More than 420 rows of data, only every 2nd row of data will be re-	ad.
[OK]	

You now have the lift points imported. Now you can generate the degree points for these lifts.

🖆 Cam Analyzer v4.0 'Plus' Performance Trends [mikko 002]					
<u>File</u> Edit <u>G</u> raphs <u>R</u> eport	ts <u>T</u> est/Cam Setup Find TDC	Settings Help Reg To	: st.heikkilä		
			Intake #1		
Test & Valve Train C	onditions	Test Comments			
Test Time/Date 1	11:00 am 01/10/2016	import from excel	~	Move mouse over a	
Cam Number Grind Number	-			menu line for more d	
Rckr Ratio/Lash	Test Operator Josh				
,	_	L			
Test Data					
EZ Data Entry	y Generate Deg	ree Wheel Beadings	Show Degree Wheel		
Point Degree Tapp Wheel Lift 1 0	et A				
2 0	1.0				
4 U 5 0					
7 0					
9 0					
10 0	0.8				

In the Generate Degree Wheel Readings screen, enter the First Degree Wheel Reading, in this case 0. The program is going to work with Crank Degrees, so if the first degree point in what we imported was at 1 cam

degree, we would have to enter 2 for this reading in Crank Degrees.

Select 2 for Crank Deg Steps (1 cam degree).

And choose the largest setting of "720 deg" for the Estimated Duration. Then click on the OK (generate degrees) button.

Now that you have both degrees and lift points, the program will present the profile as it was measured.

🖻 Generate Degree Wheel Readings	×
Generate Degree Wheel Readings	
First Degree Wheel Reading 0	
Crank Deg Steps 2 deg	45 315
Estimated Duration 720 deg	$\left(\left \right\rangle \right)$
Deg. Wheel Type 0.90.180.270.0 ▼	1
Preview 0, 2., 4 0	
Help Click on the down arrow button to select the number of degrees you estimate you will measure on this cam lobe. You can always add more if you need to. p 33	135 225
OK (generate degrees)	
Help Cancel Print	



Process for importing both Degrees and Lift Data

(If you want to import just Lift Data, go to page 2.)

Hold down the Ctrl kkey and click on both the A and B column headings (or whatever they say in your data in Excel), and it will highlight both columns. Then do Crtrl-C to copy both columns.

You can also do something similar with possibly a .csv or .xls file for Excel, or some other format data file. The Cam Analyzer works best if there is a tab or comma separating the 2 columns of data. Shown below is a .xls

Place your mouse cursor in the text box in the Edit Test Data screen shown below, also shown on page 2. Do a Ctrl-V to paste the contents of the 2 columns of data.

For the Advanced Import Features, bt sure to select "Read as 2 columns of Degrees and Lift" and "Cam Degrees" if the degree increments are in Cam Degrees. Then click Use This Data button to have the data imported.







This will produce a main screen with a cam profile as shown below, which is the same main screen as shown on page 3. However, the process shown here of importing both Degrees and Lift together requires several fewer steps. (Note: These screens are from v4.0 A.033. Earlier versions may not work exactly as shown here.)



Click on Test/Cam Setup to bring up that screen. Now we need to convert this imported data to the file format of 'Measured with Electronics". Change the "Type of Cam Data" at the top from 'Measured by Hand" to 'Measured with Electronics".



The program will warn you that this is a major change, but you need to answer Yes.

Change Type of Cam Data Anyway?			
The program will now convert your data to a format much like it was Measured with Electronic Sensors (800 crank degrees, 2 deg increments, etc). This will be a major change to the data, but will allow you to do additional types of analysis. After this change, you will NOT be able to return to the original data.			
It is recommended you save this data, and then save again to a New Name before you continue. That way you CAN go back to your old data file if need be.			
Are you sure you want to make this change to the Type of Cam Data now?			

The program will then ask if you want to include Base Circle into the measurements. Answer Yes, and then enter the the base circle measurement. This is needed for doing some of the math conversions.

Include Base Circle ?				
Do you want a base o	ircle include:	d with this conversion?		
Yes No Cancel				

Enter Base Circle	
What do you want to use for Base Circle diameter for this cam, a number from 10 to 250 mm ?	ОК
If you do not know, enter 30 .	Cancel
34	

Once the conversion is made, click on the "See Virtual Follower Details" as pointed out on the screen at the top of this page. It brings up the screen shown on the next page.

In the "Lifter/Follower Details" you will tell the program the diameter of the follower with which you measured the profile, then also the diameter of the "Virtual Roller" which will ride on the cam (which is the grinding wheel.

In the case shown to the right, you will see the Base Circle of 34 mm. Change the Follower Type to Virtual Roller. Follower Body Diameter is not critical.

Set Follower Roller Diameter to the **DIAMETER** of the grinding wheel.

Set the Probe Radius to the **RADIUS** of the probe or roller follower you used to measure the original cam.

Then click on Back (OK + save) at upper left and the conversion will be made. Then click on Back/OK at upper left of Test/Cam Setup screen to return to the main screen.

🛱 Lifter/Follower Details			
Back (OK + save) Recalculate Results	Cancel File	Help	
Intake		E	khaust (matches intake)
Intake Advanced Specs		Exhaust Specs Ex	actly Match Intake Specs
Cam Lobe Base Circle Dia, mm	34	new from Front of E	naine
Follower Type Virtual Roller			/
Follower Body Diameter, mm	21.387		
Follower Roller Diameter, mm	120		
Probe Radius, mm 15.5		1	$\langle \rangle$
Intake Help Pick the direction the cam rotates in the L	laugut drawing		
The the direction the cam totales in the t	ayout urawing.		
		· · · ·	\searrow
Intake Virtual Follower Specs			
Cam End Pivot Angle Clc	Valve End	Pivot Angle Clc	Cam Location Angle Clc
Cam End Pivot Distance	Valve End	Pivot Distance	Cam Location Distance
Cam End Pivot Radius	Valve End	Pivot Radius	Valve Stem Distance
Load Defaults Copy from Exh	Stac	k Up Error 1.283	Valve Stem Diameter
Clear		Fix Stack Up Error	Cam Rotation Clockwise

If the Follower Diameter is larger than 2x the Probe Radius, which is typical, you will see the cam profile curve on the main screen being "fatter" than what you originally had.

Now we need to export this profile data for use in your CNC cam grinder. Click on File at upper left, then "Export as Cam Dr (and other formats)" to bring up the screen on the next page.

🚰 Cam Analyzer v4.0 'Plus' Performance Trend	s [mikko 002]	
File Edit Graphs Reports Test/Cam Setup Find TDC S	5ettings Help Record(F5) Reg To: st.heikkilä	
EZ Start Wizard (new, EZ method for New Test) New (classic way to start new test) Ctrl+N	Int #1)
Open (from all saved tests) Ctrl+O Open from History Log Save Ctrl+S Save As Ctrl+A	st Comments	Click on one of the Tabs here to change to a different Cam Lobe.
Open from Floppy/CD Drive (A:\ Drive) Save to Floppy/CD Drive (A:\ Drive)	Iose: -43.40 Area: 1267.259 Pk0per: 14.020 PkNose: -10.612 P	2kClose: 14.265 Runout: .0220 MinDia: 34.72
Import		
Export as Cam Dr File (and other formats) Export Manufacturing Style Cam File Email This Cam Test File	Show Degree Wheel Watch Cam/Follower	
Backup Restore from a Backup	Lift simulated	by Virtual Follower
Print Main Screen Print Blank Worksheet Print Cam Card Windows Printer Setup Unlock Program		
Unlock 'Plus Version' Features Unlock 'Cam Grinder' Features Show 'Plus Version' Demo		
Exit Program Ctrl+X		
14 346. .00000 15 348. .00000 16 350. .00000 17 352. .00000 19 356. .00000 20 358. .00000 21 0 .00000 23 4. .00000 24 6. .00000 25 8. .00000 26 10. .00000 27 12. .00000 28 14. .00000 29 16. .00000 30 18. .00000		

In the Export File Options screen, select "Raw Converted Data.csv" as the file format.. The .csv option creates a comma separated file with a .csv extension. This format can be easily imported into Excel.

Set the file name and path as needed.

Set "Create data for every" to either 1.0 or 0.5 cam degree steps, which ever you need. If you want only 360 degrees of data, set "Limit to One Cam Rev" to Yes. Otherwise you would likely get 400 degrees of output, but you can edit the file once in Excel or whatever program you will use to read it.

Set "Include" to what you will need, typically "Deg and Lift", then click on Make File. The program will likely respond that the file has been created.

Now you can open this file with a simple editor program like Notepad, shown at upper right, or Excel as shown at lower right.

In Excel you can add it Base Circle RADIUS if you cam grinder needs that, and then export that.

