

Cam Grinder Timing

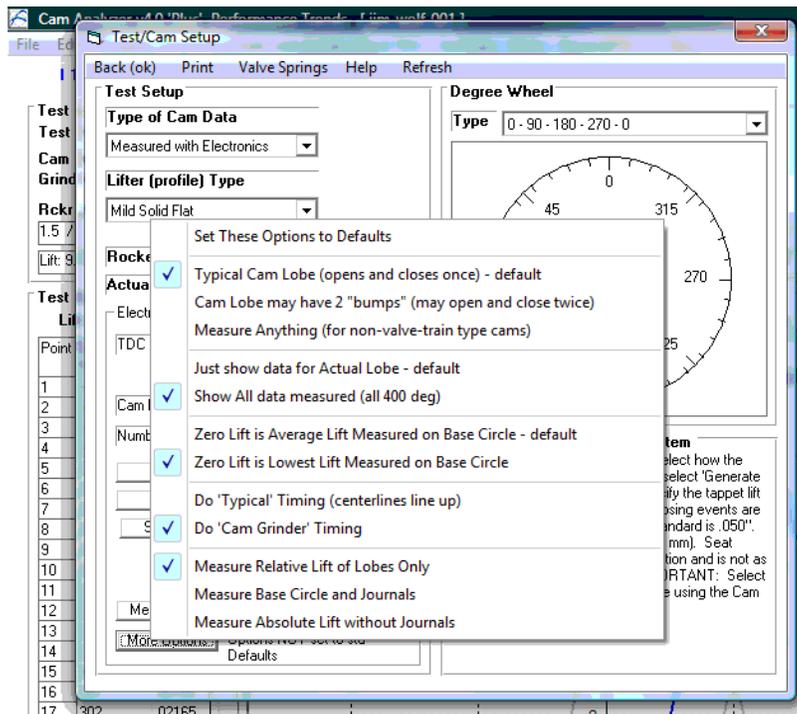
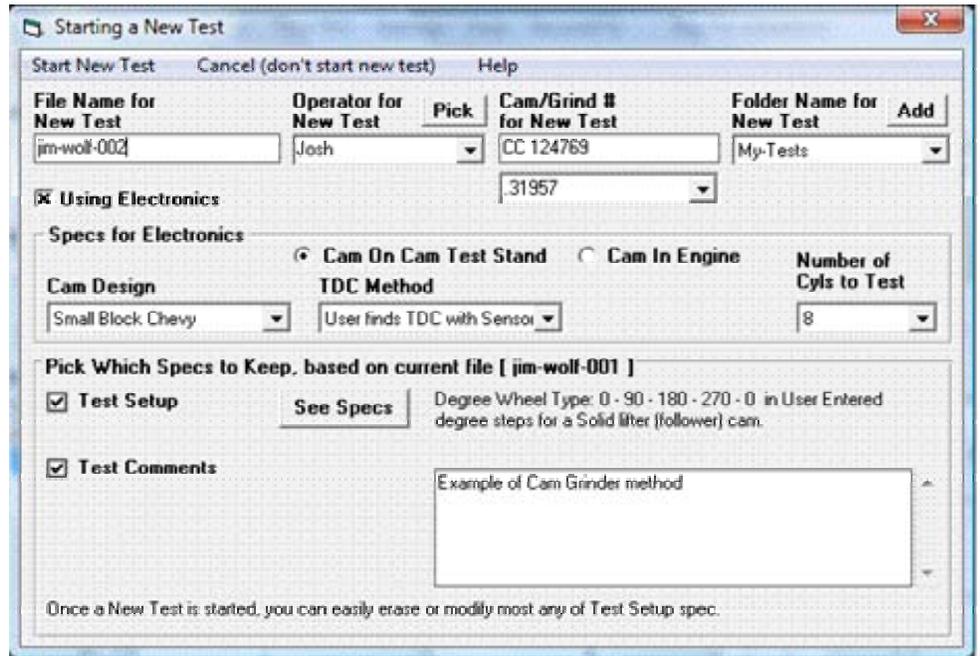
Cam grinders often want the cam lobes laid out without correcting for lifter bore angle, firing order, etc. They want to look at the lobes as if they are looking at the end of the cam. To measure a cam this way, you need the Cam Grinder version of the software and follow the procedure as outlined below.

First, start a new test by clicking on File, then New Test (classic method). Be sure you have selected to "User Finds TDC with Sensor" for the TDC Method.

Click on "Start New Test" at upper left and you are presented with a blank screen. Click on Test/Cam Layout at top of the screen for the new screen below.

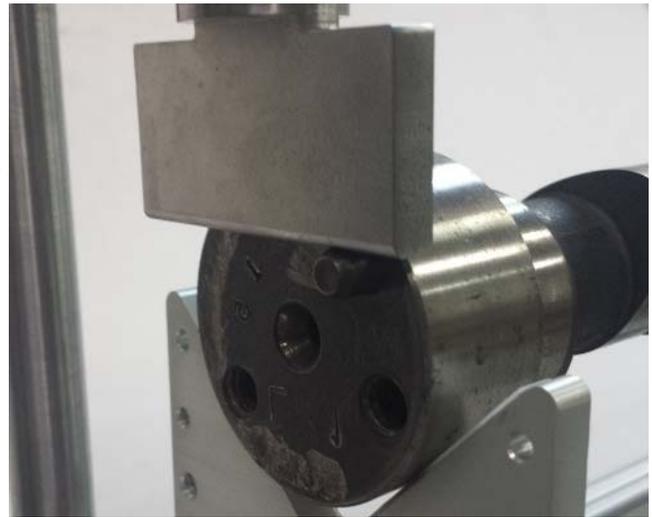
Click on the "More Options" button at the lower left for the options menu shown. Check the options as shown.

Note: If you do not see the "More Options" button, you have to turn this on in the Preferences menu.



Press F5 or click "Record" at top of main screen to bring up the Recording screen. Before you can start measuring lobes, you have to "index" the rotary encoder, so the degree readings have more meaning. Typically cam grinders want to degree off the dowel pin, keyway, or whatever is used to time the cam. In this case, we will index off the dowel pin.

Since we stated we would locate TDC with a sensor, the sensor is the linear encoder. We will use it to measure the dowel pin location. The easiest way to do this is with the Universal Narrow Flat Follower (CTS-UFHN) as shown to the right.



In the Recording screen, you will see "Set TDC F4". Press F4 and follow the instructions as shown in the screen below.

Then you will press F5 when the dowel pin is located as shown to the upper right, so the dowel pin will lift the follower at least 2 mm or .100 inches as it is rotated through its peak location. When enough data has been recorded, the program will give you a tone saying it has finished. See screen below.

It will then ask where the center of the dowel pin should be located. It will default to the location you have loaded in the Camshaft Layout Details screen in the Test/Cam Setup screen. However, you can change it to most anything you want. Most cam grinders would set this at 0 degrees.

Cam Analyzer v4.0 'Plus' Performance Trends [jim-wolf-002]

Perf Trends Readings: Intake 1 F9>

Lift: **4.225**

Rotation: **223.19**
#1 cyl 86.38 atdc

Time: **.000**

Intake 1

0

45

90

135

180

25.000 Lift, mm

Updating Display Only (not recording). Press <F1> with lifter on base circle to start

Help: Click on one of the Tabs here to change to a different Cam Lobe.

Finding TDC with Sensor

After you click on OK to clear this message:

Rotate the crank to a point where the sensor first starts to measure piston or cam key/dowel pin motion, then press the <F5> Key.

(Sensor must move at least 2 mm up and down to be accurate.)

OK Cancel

Cam Analyzer v4.0 'Plus' Performance Trends [jim-wolf-002]

Perf Trends Readings: Intake 1 F9>

Lift: **4.446**

Rotation: **323.38**
#1 cyl 286.75 atdc

Time: **8.875**

Intake 1

0

45

90

135

180

25.000 Lift, mm

Recorded Enough Data. Rotate back to approximate

Help: Click on one of the Tabs here to change to a different Cam Lobe.

Use 53 degrees CW (clockwise) from TDC for Timing ?

TDC measured successfully.

The Cam Layout Details shows that the Dowel Pin or Keyway just measured is 53 degrees CW (clockwise) from TDC.

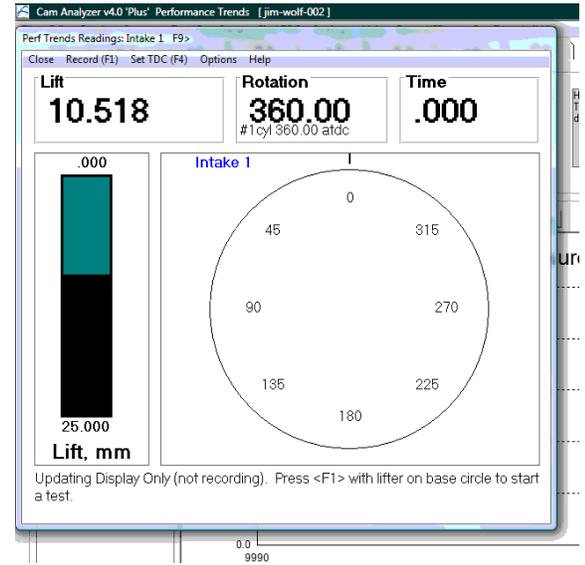
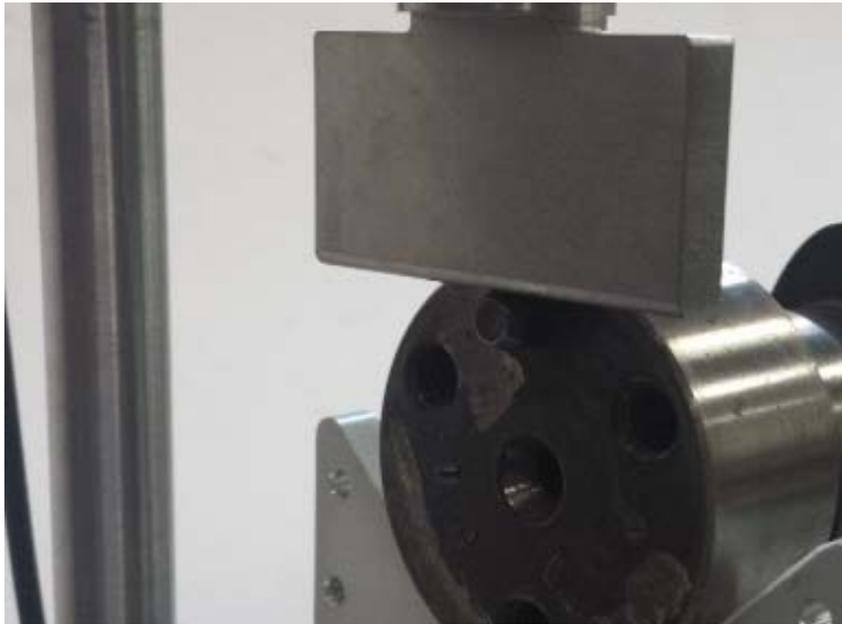
Note: If this data is provided by Performance Trends, it was assumed to be accurate for most production cams. Not all cams are ground with the dowel pin or keyway at this location.

Click on 'No' if you need to enter some different degrees offset, or '0' degrees if the point just measured was piston TDC.

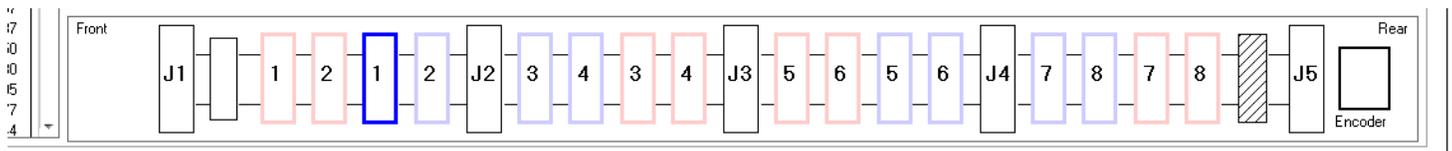
Do you want to use the preloaded settings of 53 degrees CW (clockwise) from TDC for Timing ?

Yes No

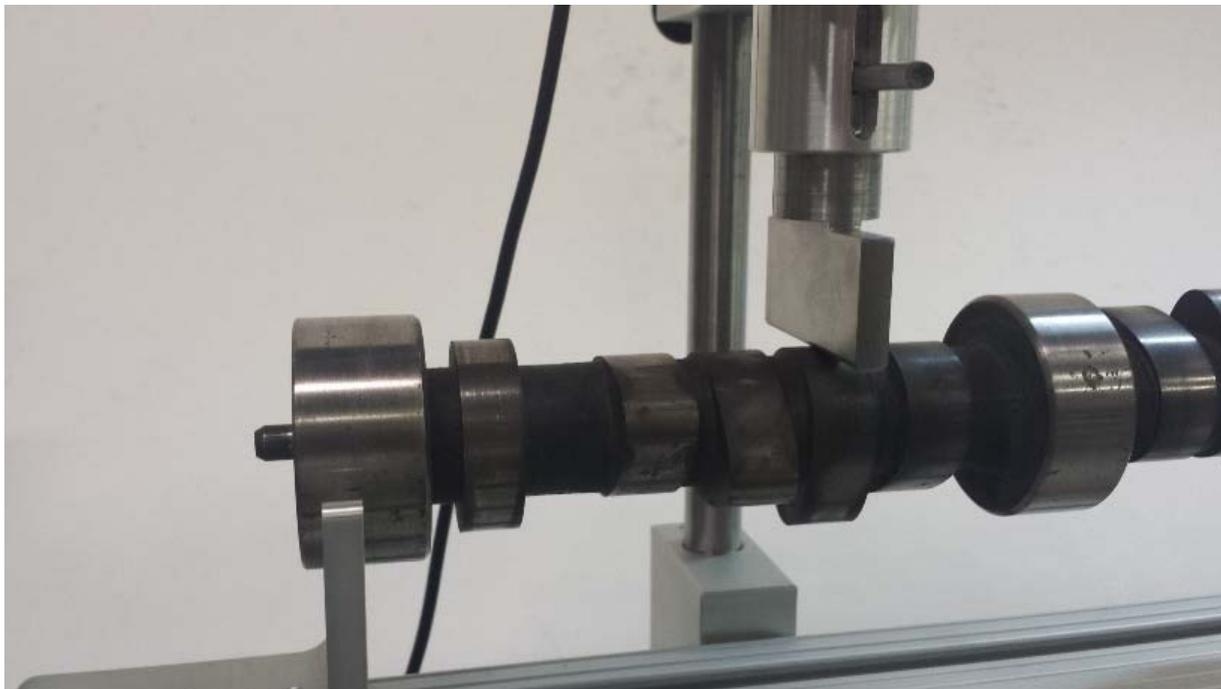
If you want to check the accuracy of this TDC determination, rotate the cam until the reading on the screen is 0 or 360 degrees as shown to the right. You should see the dowel pin at the top of its location as shown below.



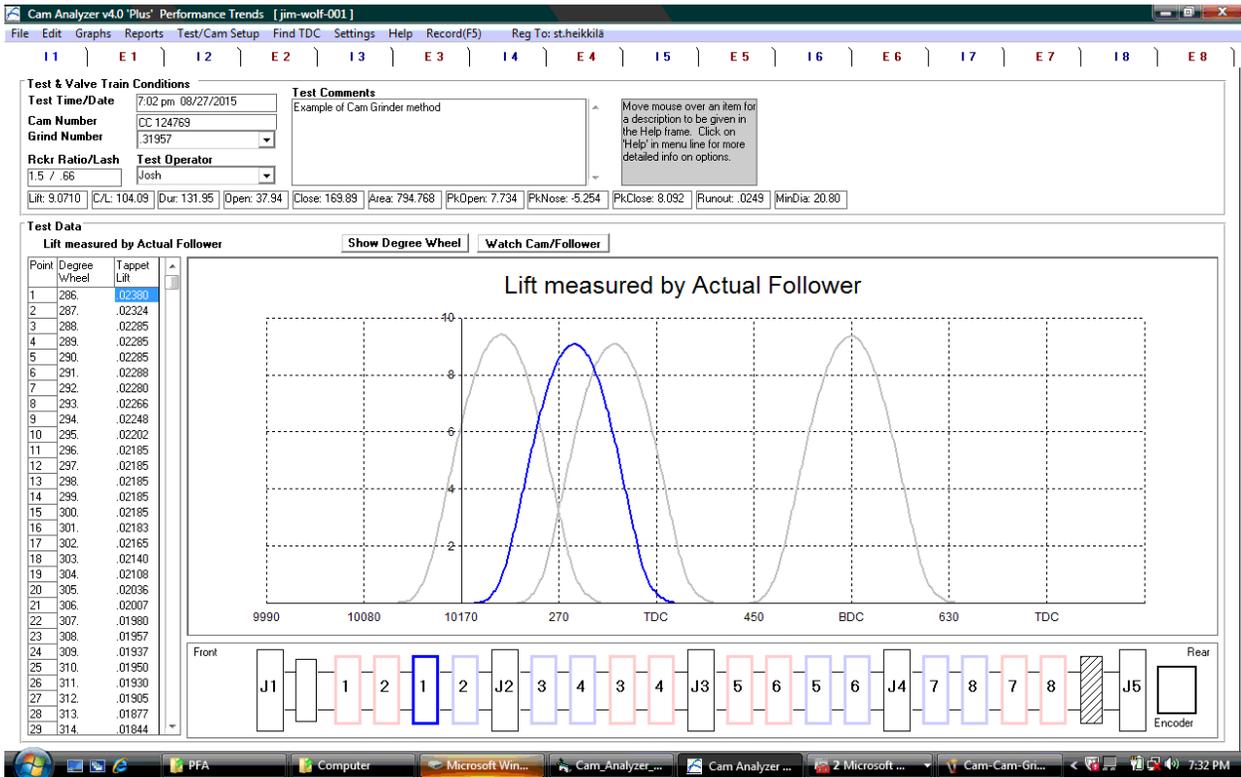
Now you are ready to start measuring lobes, starting with #1 Intake as shown by the drawing at the bottom of the main screen. Place the proper design follower on the #1 intake. Since this particular cam is a flat tappet cam, we can continue



to use the Universal Flat follower for measuring the lobes, as shown below. As shown, the measurement is started with the follower on base circle, opposite of the “nose” of the cam.



Measure the lobes as directed by the camshaft drawing at the bottom of the main screen. Here we show the main screen after measuring the first 4 lobes. You will see that nothing lines up, but that is what a cam grinder wants.



Here's the "Compare Lobes" report for these 4 lobes. Their centerlines are all with respect to the dowel pin being located at 0 degrees. Note that the centerline of 358.97 for Exhaust #1 is the same as -1.03 degrees from the dowel pin.

The screenshot shows the 'Compare Lobes' report in the Cam Analyzer v4.0 software. The report is titled 'Report of: Cyl 1, Cam Data' and includes the following data:

CLine	Dur	Open	Close	Lb Area	Lb Lift	Vlv Lift	RAR	Lash	LbSep/Adv	Overlap	ASym
In: 104.1	132.0	37.9	169.9	794.77	9.071	13.607	1.5	.66	105.1	389.2	-0.17
Exh: 359.0	136.9	290.3	427.2	845.58	9.358	14.037	1.5	.71	.0	Straight Up	0.26

Lobe	Lobe Lift	Center Line	Lobe Sep.	Advance	Duration	Open	Close	Lobe Area	Open Accel	Nose Accel	Close Accel	Asymetry	Runout	Min Flat Dia
I 1	9.0710	104.09	105.12	.00	131.95	37.94	169.89	794.768	7.734	-5.254	8.092	-0.17	.0249	20.80
I 2	9.0747	140.97	104.70	.00	131.69	75.10	206.79	793.870	8.226	-5.208	8.304	-0.02	.0277	20.42
I 3												90.00		
I 4												90.00		
I 5												90.00		
I 6												90.00		
I 7												90.00		
I 8												90.00		
E 1	9.3581	358.97	105.12	.00	136.94	290.25	427.18	845.575	7.473	-5.456	8.982	0.26	.0084	20.28
E 2	9.4007	36.27	104.70	.00	136.76	-32.40	104.36	847.042	7.629	-5.241	8.663	0.29	.0154	20.40