ARCC UPDATE

June 2012

Toronto Chapter Cruise Night

by Anthony Tersigni, Richmond Hill

Photo by Anthony Tersigni.

The attendance at the cruise night of June 7th began very light due to lingering scattered showers. The clouds cleared out and attendance progressed nicely as the evening went on. It was nice to see a very good showing of Alfas, particularly GT Juniors and GTVs. In all I would estimate about 20 Alfas or so came out. It was a good night to be there to chat up the Alfa owners, handing out posters, making a last attempt to encourage them to attend the Alfa Canadese Convention towards the end of June. Most Alfisti advised me that they had already registered. Over all it seems as though these cruise nights continue to be very well attended! If you missed this one, come out on July 5th!

Cam Timing Techniques

by George Beston, Cobourg

In the May issue of the ARCC Update I wrote about the installation of some custom cams in my Spider. As you might expect with custom cams, the intended timing of them is definitely not what the factory had in mind for the original equipment cams.

Before I go any further I should point out that the cam timings reflected in my diagrams are not what I'd recommend for anyone else, unless you have a good basis for making the decision. The subject of cam timing is a brave new world for me, and even though I've used unconventional setups with some success, the reader really must come up with his or her own guidance on this.

We are really blessed with our Alfa engines because cam timing is simple to set and adjust. This is made possible by the design and construction of Alfa cams. The design incorporates a vernier adjustment by having15 holes located around the sprocket, and 16 aligning holes in the camshaft end piece. This means there are 16x15 = 240 combinations possible for the location of the cam relative to the sprocket. So, the incremental adjustment for the cams is 360° / 240 = 1.5 camshaft degrees. This translates to 3 crankshaft degrees. Therefore, it's possible to set cam timing to any target value ±1.5 degrees.

I already went through cam timing six years ago when I had the engine on a stand in my workshop. The method I used then was to create some timing tape marked with the desired cam events. For each cam, I located the engine at the position for cam lobe centre using the timing tape, and then set up a dial indicator to read valve lift. In those circumstances it seemed relatively simple to move the cam back and forth until I found the centre of the slight dead spot when the lift pauses briefly at its maximum. I then locked down the cams with the vernier bolts and carried on with the rest of the project.

This time around, the engine was most definitely still in the car. I already had the crankshaft pulley off to replace the front engine seal, so again, I applied some timing tape made up with the help of Excel and some bemused staff at my local Staples store. For the 1750 engine, the tape will just fit on paper 17" long. It was no surprise that I had to fiddle with printer settings to get just exactly the right length. It was fairly simple to apply the tape with the pulley out of the car, and then get on with setting cam timing by lobe centres as mentioned above. Except... this time around, by the time I got the cams rotated to lock them in on the vernier adjustment, there was some drift in the settings

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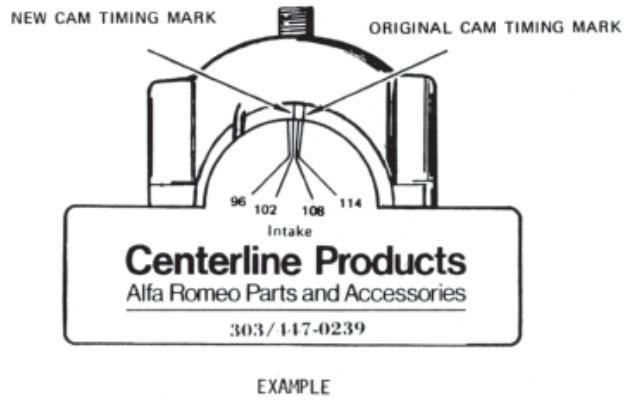
which meant I had to redo the procedure to get the timing I wanted.

Photo by George Beston.

This experience caused me to reconsider the use of the cam timing templates found on the Centreline website. I've looked at them before, but had some reservations about using them. What sounds like big changes in cam timing are in marks very close together, which made me wonder about how I could re-mark the front cam bearing caps accurately enough. Also, I was concerned about how the caps might start to look if I wanted to change cam timing yet again. Finally, I didn't understand why the marks appear where they do on the templates.



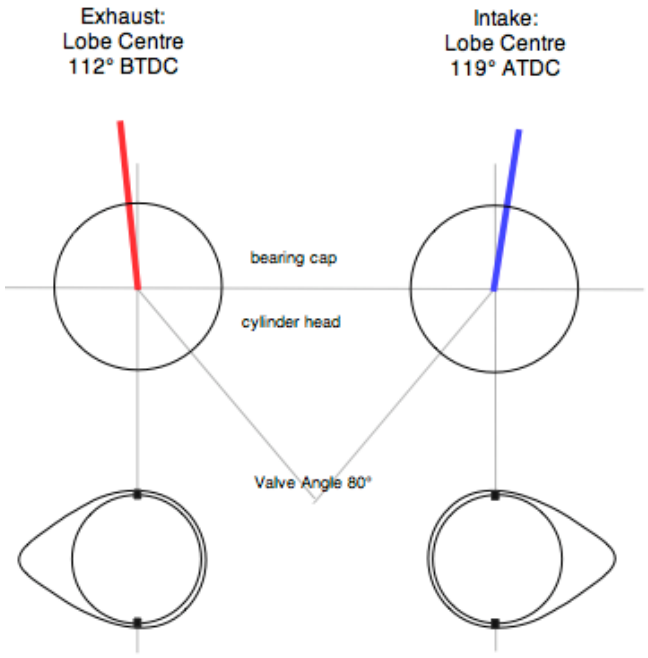
Drawing cropped from a Centreline pdf file.

After pondering this for a while, I first decided to make use of the Centreline templates by estimating where my desired timing would appear on the template and then marking the outside area at that point. I cut away the part of the template used to mark the bearing cap and used the rest of the template to check my cam timing which had already been established by confirming lobe centres, opening events and closing events with the dial indicator and timing tape.

Lo and behold, the marks I had interpolated were right on the money. Now, I have faith! Of course, I also have curiosity. I went through a diagrammatic exercise using some observations and basic geometry in an effort to figure it out.

The standard instructions for cam timing on a traditional Alfa 4C engine is to align timing marks with the engine at TDC at the point where #1 cylinder would be just starting it's combustion stroke. Cams are set so that the lobes for #1 are pointing "out" or away from the centre of the engine. If you take a look at a camshaft, it has two marks on the locating flange at the back of the first cam bearing. These marks are 180° apart and they are both 90° away from the lobe centre. Another useful fact is that the included angle between valves is 80°.

In a hypothetical situation where the camshaft marks are perpendicular to the plane of the top surface of the head, the exhaust cam must rotate past 90° to point down, and then another 40° to point directly along the valve stem at lobe centre.



Cam lobes showing timing mark locations

N.B. Direction of rotation is counter clockwise as seen from the back.

That's a total travel of 130° for the camshaft, which translates to 260° for the crankshaft. This would result in an exhaust cam lobe centre of 100° BTDC.

Following this logic, here are some different lobe centres with a calculation of where the timing mark would be on the cam bearing cap:

Exhaust Cam Lobe Centre °BTDC	Timing Mark Location Advanced from perpendicular
Advanced = rotated counter clockwise (as seen from the back of the bearing cap)	
114°	7°
112°	6°
110°	5°
102°	1°

In the same hypothetical situation where the camshaft marks are perpendicular to the plane of the head's top surface, the intake cam must rotate through 180° plus 50° to reach lobe centre.

That's a total travel of 230° for the camshaft, which translates to 460° for the crankshaft. This would result in an intake cam lobe centre of 100° degrees ATDC.

Again, here are some different lobe centres with a calculated location of the timing mark:

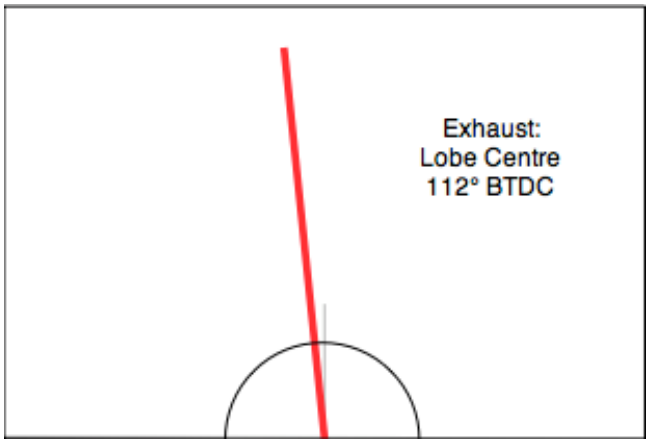
Intake Cam Lobe Centre °ATDC	Timing Mark Location retarded from perpendicular
Retarded = rotated clockwise from perpendicular (as seen from the back of the bearing cap)	
114°	7°
112°	6°
106°	3°
102°	1°

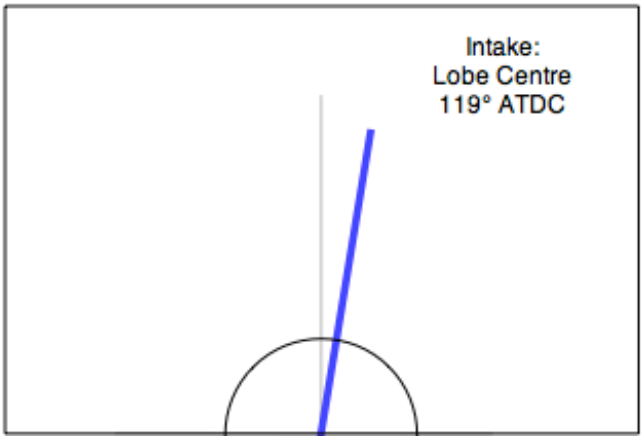
Hmm. There's a certain symmetry here. I'm starting to wonder if this is the reason for the 80° valve angle.

With this information in hand, my plan is to draw my own templates the next time I get into a cam timing exercise. The biggest hurdle is to get the template accurately drawn so that the inner diameter is the same as the cam flange at that point (1.30”), the plane of the head surface is in the right spot on the template, and most importantly, the desired angle of the locating mark is precisely drawn.

The timing marks have been drawn with broad lines for a reason. Their width matches the width of the timing marks on the cam, which is 0.050”. That way, it should be easy to pick the best final cam location if there’s a problem choosing between two adjacent alignment locations. I've used Easy Draw to create the drawings that are the basis of the templates I'm planning to use the next time around. I'm sure whatever brand of personal computer you use, a similar inexpensive drawing program is available.

Proposed Template Examples





If anyone reading this wants templates prepared to their own specifications, let me know and I'll volunteer to give it a try.

Upcoming ARCC Events

Alfa Club of Edmonton

Date	Time	Event
April 28	11:00 am	Ron's Grease Pit Blowout
May 7	7:30 pm	Speedsters Racing
June 16	TBD	Reynolds Museum
June 23	TBD	Easy Solstice Rally
July 10	TBD	St. Albert Casino
June 17-24		**Alfa Canadese**
August 7-11	TBD	Rockin' Horse, St Albert
Sept. TBA	TBD	Concourse
Sept. 30	TBD	Pie Run, Stony Plain
Nov. TBA	TBD	Great Italian Eating
Dec. TBA	TBD	Christmas Tree Hunt
January	TBD	Christmas After Party

Toronto Chapter

Date	Time	Event
March 22	7:00 pm	AGM, Scarlett Road
April 21	10:00 am	1st Choice Garage Tour
May 3	7:00 pm	Cruise Night
May 6	TBD	Sunday Drive
June 7	7:00 pm	Cruise Night
June 15-17	TBD	Vintage Festival/Drive
June 17-24		**Alfa Canadese**
July 5	7:00 pm	Cruise Night
July 8	TBD	Sunday Drive
August 2	7:00 pm	Cruise Night
August 4-5		Toronto/Detroit Party
Sept. 6	7:00 pm	Cruise Night
Sept. 9	TBD	Europa Rally
Sept. 15	TBD	Alfas and Sevens
Oct. 4	7:00 pm	Cruise Night
Oct. 14	TBD	Fall Wine Tour
Nov. 7	7:00 pm	Pub Night/Directors' Mtg
Nov. 24	6:00 pm	Holiday Dinner

Other Events of Interest

- Members' **Tech Sessions,** whenever possible
- **Italian Day Parade**, June 16, Ottawa
- **Italian Car Day**, July 21, Boyd Park
- **Concorso Canadese**, August 25, Mississauga
- **Grand Prix of Mosport**, ALMS series, July 19-22
- Non-official **Cruise Nights** happen every Thursday evening May to October at the La Paloma location.

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ARCC Update

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