How do you find cam centerline?
Inlet Camshaft: Inlet opening (IO) + inlet closing (IC) + 180 = duration
Duration / 2 = half duration
Half duration – IO = centreline
Exhaust Camshaft: Exhaust opening (EO) + Exhaust closing (EC) + 180 = duration
Duration / 2 = half duration
Half duration – EC = centreline

At first glance it seems strange that Triumph engineers deliberately mismatched intake and exhaust cams in the T140. While the Intake cam is quite "sporty" the exhaust cam is very mild indeed. By doing this Triumph may have avoided some warranty problems by de-tuning the engine, as there wasn't much chance of accidentally overloading the engine. These days we can fit better main bearings. The more adventurous can tuftride a crankshaft, so it's less likely to break if we start playing in the upper rpm limits. We can safely have more torque available where we want it.

There's not much detail on cam-lift and timing in the Workshop Manual. All they give you is valve lift figures at TDC (at the end of the exhaust stroke). With the piston at TDC, the intake valve should be opening and reached 0.190 ins lift and exhaust should be closing and at 0.130 ins lift.

Standard T140 Camshafts

Average standard timing measurements show Intake cam timing opening of 40° BTDC and closing of 74° ABDC (lobe center 107°), and Exhaust cam timing of opening 50° BBDC and closing of 29° ATDC (lobe center 100.5°). These figures are given at 0.020 inch tappet lift. All early T140 engines had "R" radius (1 1/8 inch) exhaust cam followers while all intake cam followers were standard (3/4 inch) radius.

The exhaust cam would be happy at around 4250 rpm, and useful from 2500rpm to 5500rpm. The intake cam, especially the late intake closing, won't be really happy until about 5500rpm, but could be useful between 4000rpm-7000rpm.

The intake could be more useful if it opened and closed 6 or 7 degrees earlier giving a 46° or 47° opening and closer to a 100° lobe center. With stock

pistons and valves there's plenty of piston to valve clearance (about 0.300" between the piston and a closed valve), so there's no problem advancing the intake timing. To get the most power without changing cams, I would advance the intake 1/3 tooth, and use "R" cam-followers on intake and exhaust. "R" followers won't damage the intake cam, but the few extra degrees of intake duration they give won't give enough improvement to suit everyone.

The Old Standby: The "Q" or 3134 Grind

If you want it strong between 4000-5000rpm, the T140 intake cam is not ideal, but advancing it to 47/67 timing would help. In practice, you may have to settle for 45/69 timing (1/3 tooth advanced, using a different keyway on the cam wheel). A 3134 grind (34/55 timing), with "R" radius cam followers would be better suited. Any time you fit a different camshaft, start with new or re-ground cam-followers, use cam-lube and keep the engine speed above 2000 rpm during the first 20 minutes. If a cam-follower won't be used in its original position, on the same lobe where it was last used and facing the same direction, it should be re-ground, cam-lubed etc.

If you want more power, there's no free lunch. If you make maximum torque at 5,500 or 6000 rpm, it won't be so strong at 4500 rpm and worse at 3500rpm.

3134 intake (34/55 timing) would be a little stronger below 5000 rpm and 3134 exhaust cam (55/34 timing) would work better than the standard cam above 4500 rpm. In that case, use the valve clearances for 3134 cams that were used on 650 engines (0.002 inch Intake, 0.004 inch Exhaust). Aftermarket cams with similar timing, and more lift would be strong and give slightly more power at higher rpm. Use the cam-followers and clearances recommended by the grinder/supplier.

The Favorite

The "favorite" combination is 3134 exhaust cam with "R" cam-followers, and standard T140 intake cam. Guaranteed to make more power than a standard engine. Even stronger with the intake advanced 1/3 tooth. No loss, and the engine wakes up with a slightly rougher idle.

If you want more power, there's no free lunch. If you make maximum torque at 5,500 or 6000 rpm, it won't be so strong at 4500 rpm and worse at 3500rpm. There will be more downshifts, and more revs to make it happen. If you're serious, you've probably fitted 32mm carburetors, or bigger, to feed the engine at higher rpm. Unless you're an all-out racer, the practical choice is to use a T140 intake grind (or equivalent) on the exhaust cam, with either standard 3/4" radius cam followers. Exhaust valve clearance will increase to 0.010 inch. Recommended cam timing will be around 100-105 degree for the intake lobe centre, and close to 105 degree for the exhaust lobe centre.

The timings aren't written in stone; you can be flexible. Early intake closing makes the engine feel strong and torquey. You may lose a little maximum power, not much; but you could have more available torque where you need it most. A long overlap gives a rough idle, but you get over it when you open the throttle. Exhaust opening point is the least important event. A google-search of "bikeboy 2v cam timing" shows you roughly what to expect with 2 valve heads. Brad, the bikeboy, works on Ducatis. He's adventurous with cam timing, and has the dyno results.

My Choice: Stock Intake Lobes on Both Intake and Exhaust

My choice is an intake lobe centre around 100 degrees ATDC, exhaust around 105 degrees BTDC or even 110 degrees. 110 degree exhaust lobe centre gives a smoother idle, good mid-range, a little less power at high rpm. With a T140 intake grind on intake and exhaust, you can idle close to 1000 rpm, still have approximately the normal T140 feeling to about 4000 rpm, then enjoy some extra power from 4000-7000.

It Pays to Check

Checking valve timing seems to cause unnecessary confusion. It's worth checking; it's not worth guessing. The hardest part is finding TDC on the degree wheel. The exact point of full lift doesn't matter; the valve is within 0.010" of full lift (and moving very slowly) for about 40 crankshaft degrees. The position of the opening and closing flanks, where the valve is opening and closing at about maximum speed does matter. Below 0.050" lift, the valve is moving slowly and measurements aren't so accurate. Above 0.050" lift, a one degree error shows

up as about 0.004” difference in lift. Use 0.050” for checking, or use 0.100”. If you find 0.100” lift points on the opening and closing flanks, the lobe centre is 1/2 way between them.

Out of curiosity, check maximum lift and the opening and closing 0.020” lift points. Don’t be concerned if they don’t entirely agree with the lobe centre angle you already found. A degree or two either way at only 0.020” lift won’t have much effect.

You Have to Close Those Valves

Valve action wouldn’t be complete without valve springs. Using T140 intake cams, you can’t use much more than 78 lbs seated spring load with new standard springs. If the springs have sagged 1/16”, 66lbs would be a maximum to safely avoid coil-bind. Seated spring loads of 65 lbs intake and 70 lbs exhaust are plenty. Even 60 lbs will get you past 7000rpm easily. If you have the head off the bike and still assembled, the easiest way to check is to push the spring against bathroom scales. Put each valve tip over a small block on the scales, and push down until the valve just begins to move. Note the scale reading and you have the seated spring load, provided the scale is reasonably accurate.

If you find an aftermarket cam that suits your expectations better, you can ignore some of what I’ve written. Take notice of the manufacturer’s advice on cam followers, valve to pistons and top spring collar to guide clearances, spring action for coil bind at full lift and any other necessary changes. Pete Russell.

Pete Russell is a Triumph enthusiast for over 40 years, experienced mechanic and engineering tradesman and popular contributor to the Triumph forum on the web blog www.britbike.com We are pleased to share some of his experience, and insight, with our readers. VB