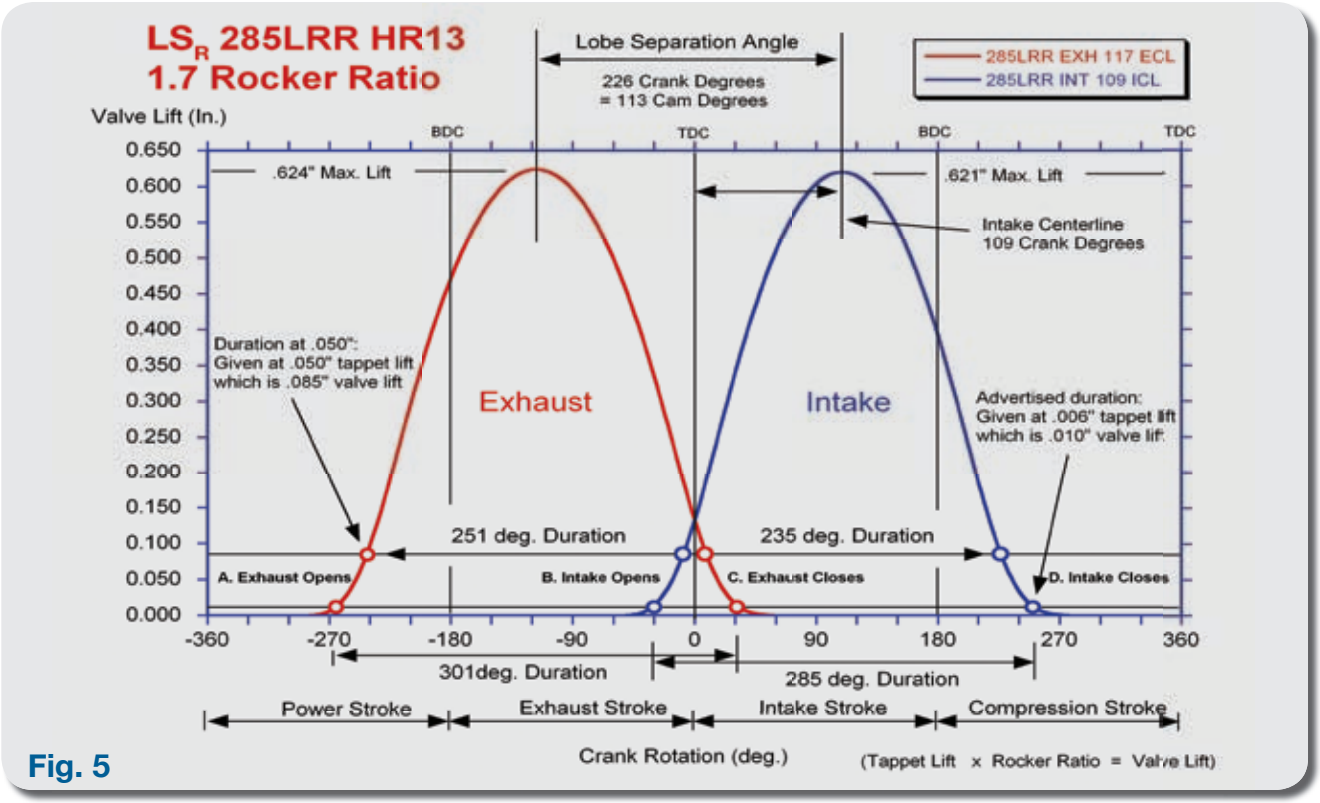


Fig. 5

solid/.006" hydraulic) provides better "seat-to-seat" numbers. The duration at .200" lift gives the best measurement of area under the curve and maximum power potential. Comparing advertised .050" and .200" durations gives engine builders an idea of the profile's "aggressiveness." Tappet durations do not take into account rocker ratio and valve lash effects.

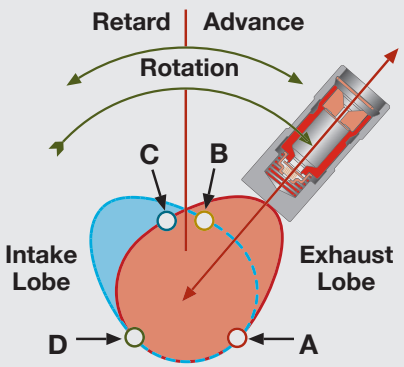
Valve durations will typically be larger than tappet durations and will increase with the rocker arm ratio. In the example, the rated duration is .006" tappet lift: .006" x 1.7 = .010". We now use .010" valve lift. Some cam manufacturers rate their cams at .050" lift. Multiply this by the 1.7 rocker ratio and you get. .085". For the given diagram, the duration at .085" lift shows around 235° and 251° standard for a 285 cam.

Lobe Separation & Centerlines

Lobe separation and intake centerline are often confused, although they are very different measurements that control different events in the engine. The lobe separation angle is equal to ½ the angle in crankshaft degrees of rotation between the maximum exhaust valve lift and maximum intake lift. It cannot be changed after the initial cam grind.

The intake centerline is the angle in crank degrees between a cylinder's piston coming to TDC and the event of maximum intake lift. Exhaust centerline is the angle in crank degrees between the event of maximum exhaust lift and that cylinder's piston coming to TDC. Advance measures the angle of rotation in crankshaft degrees between the point where both centerlines would be the same and the actual intake centerline. These can be changed when degreeing the camshaft. Fig.5 shows an LSR™ 285 Cam with a lobe separation of 113°. We show it installed in the engine 4° advanced, at 109° intake centerline.

Fig. 6



A. Exhaust Valve Opens - Power Stroke
B. Intake Valve Opens - Exhaust Stroke
C. Exhaust Valve Closes - Intake Stroke
D. Intake Valve Closes - Compression Stroke

Fig. 6 shows the end of the same cam with all opening and closing points marked. All points are in the same order as in Fig. 5. This figure shows how a cam must be laid out to give the timing points we aim to achieve. It's important to note that as we design a camshaft, what we are actually designing is the valve motion and valve events required for optimal engine performance. Therefore, Fig. 6 shows the result of the design - NOT the design itself.

Finishing Touches

As far as the mechanics of degreeing, the COMP Cams® DVD "The Proper Procedure to Install and Degree a Camshaft" (#190DVD) takes you step-by-step through the process. The previous pages discuss theory; the video shows you how to get the job done.

At COMP Cams®, we put a lot of pride and effort into designing and engineering our camshafts. Camshaft design is not just some "black art" but rather a series of decisions and compromises based on the engine application. Only years of experience can say whether a certain combination of lobes will work. Take a look at the decals of the top race teams – it's obvious they trust the experts at COMP Cams®.