

SlideCam Switchable Cam Lobe System

Lifting You Up with IAV

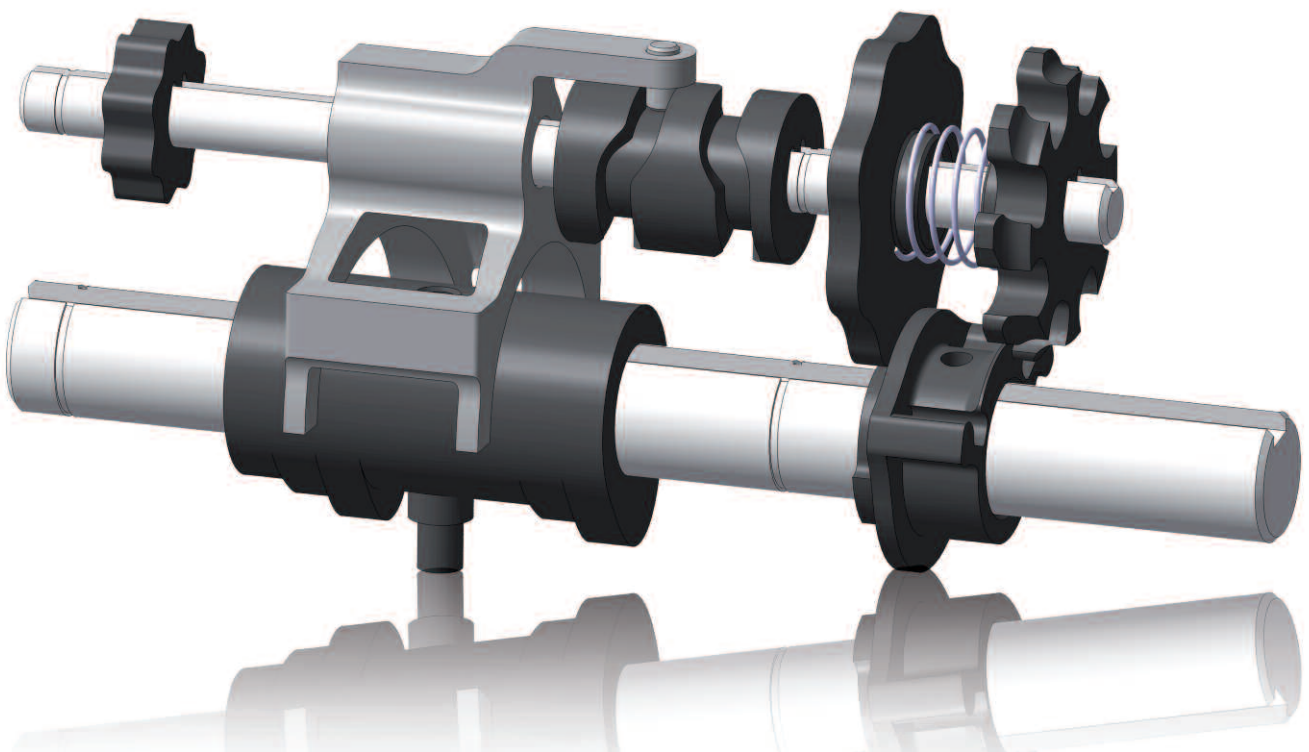
Rising oil prices and stricter legislation on fuel economy have led vehicle and engine manufacturers to explore every avenue to improve internal combustion engine efficiency. Drivers demand quicker acceleration and larger towing capacities, supported by larger engines, but under constant speed highway driving only a small fraction of the available peak engine power is used.

One method for improving fuel economy in such vehicles is to deactivate cylinders and shift the load to the remaining cylinders to increase their operating efficiency. A related approach addresses valve controls, as a single valve lift profile cannot be optimized for all engine operating conditions, despite the aid of current cam phasing technology.

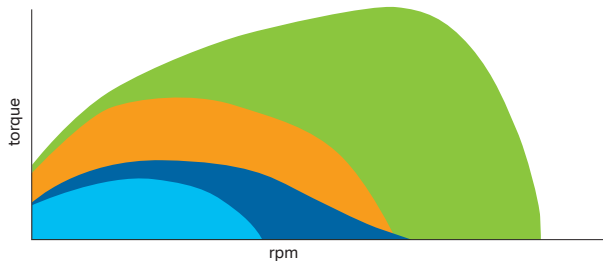
IAV's switchable cam lobe system, SlideCam, enables three separate valve lift profiles which may be switched during a single engine revolution. The possibilities include full lift for max torque, partial lift for lower loads, no lift for a deactivated mode, delayed intake valve closing for Atkinson cycle, or even different intake valve lifts in the same cylinder intake to induce swirl. SlideCam provides the freedom to explore modes not possible with conventional camshafts.

John B. Heywood:

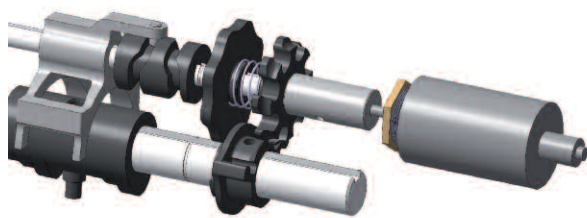
"Earlier-than-normal inlet valve closing reduces backflow losses at low speed and increases volumetric efficiency. The penalty is reduced air flow at high speed. Later-than-normal inlet valve closing is only advantageous at very high speeds. Low valve lifts significantly restrict engine breathing over the mid-speed and high-speed operating ranges."



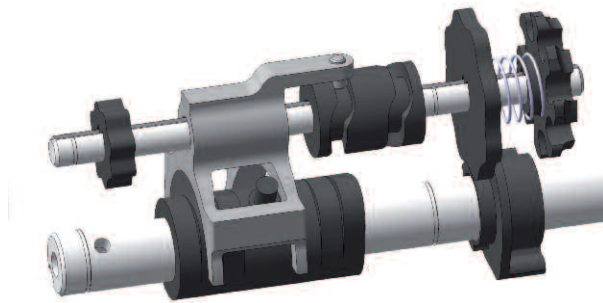
Full lift Partial lift Deactivated Deac.& partial lift



Overview of possible operation modes

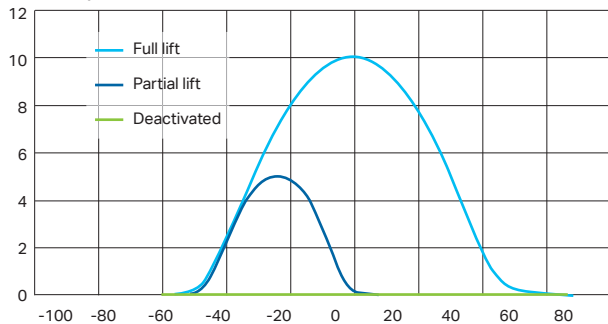


One actuator serves all intake valves on one bank



Profile shift through camshaft rotation

Multiple Valve Lift Curves



Valve profile flexibility

IAV's research and studies make it a leader in the field of alternative valve train technology. With ten patents granted and four additional applications pending, IAV is committed to furthering the development of the ICE valve train.

The SlideCam system works by coupling a sliding outer camshaft and its two or three lobes with a controllable shifting gate. When the driver demands more or less power, the engine controller can determine the optimal valve profile and execute the valve lift change.

The shifting process begins with a solenoid locking the actuating wheel in place. As the inner camshaft rotates, the actuating wheel is rotated 90° to move the shifting gate into position. When the outer camshaft continues to rotate around the inner shaft, a pin engages the displaced shifting gate along a ramp to force the cam element to slide axially into the next lobe.

IAV's SlideCam system can shift from fuel-sipping deactivated mode on the highway to wide open throttle acceleration for passing, or from low-speed partial lift with increased atomization and reduced emissions to pedal-to-the-floor acceleration within a fraction of a second, all of which is imperceptible to the driver.