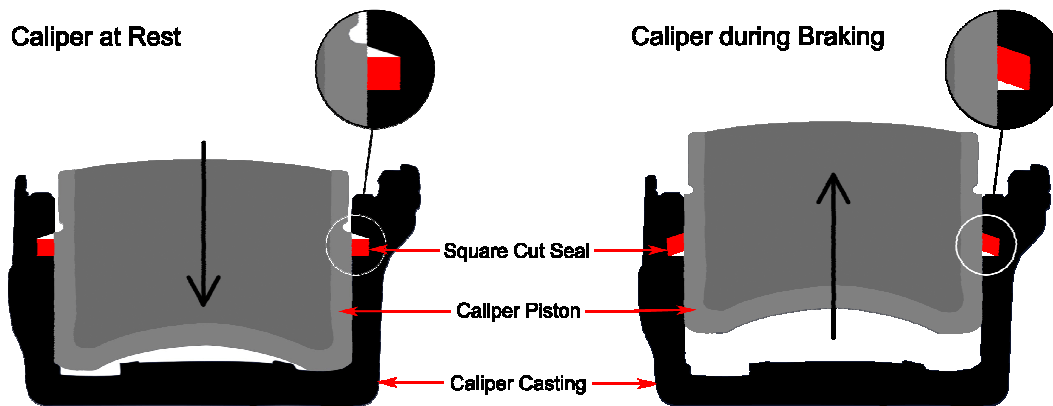




## Disc Brake Calipers and the Square Cut Seal

A study published in the July 1997 issue of Brake & Front End magazine found that pad life was, on average, 62% shorter on a pad replacement-only brake job (i.e. a Hang-and-Turn) versus a brake job that included a caliper replacement (i.e. a Complete Brake Job). This is a dramatic decrease in pad life and begs the question “Why?” The answer is found by understanding the function of the disc brake caliper and, more importantly, the *square cut seal*.

The square cut seal is the most important component in a disc brake caliper. Most Techs know that the seal is responsible for keeping the brake fluid behind the piston so that when you step on the brake pedal, pressure is applied to the piston which, in turn, applies the pad to the rotor (this is the “Sealing” function). What most Techs do not understand is that the seal is also responsible for returning the pad to its rest position (this is the “Spring” function). In a correctly functioning caliper, the square cut seal will stretch during brake application and then return to its original shape upon release. It is this “Spring” function that returns the pad to a position where a very small gap exists between it and the rotor. The graphic below shows the apply-and-release cycle of the caliper.



Below is a photo of a new square seal around its associated piston. You will notice that a new square cut seal fits snugly around the piston. This insures that the caliper works as designed during the apply-and-release cycle.



Below is a photo of a square cut seal that has been in a caliper (and on a car) for approximately four years. It is estimated that this seal has been stretched a minimum of 300,000 times as a result of the apply-and-release cycle. You will notice that the seal no longer fits snugly on the piston. In this condition, the caliper casting will force it to perform the “Sealing” function but it can no longer properly perform the “Spring” function. The result is that during release the pad will not be removed from the rotor and thus set up a condition called “parasitic pad wear”. In other words, the vehicle will wear new pads much more quickly if the caliper was ignored at the time of service.



In summary, a Tech should think twice the next time an irate customer returns his or her vehicle in 15,000 miles after a pad replacement-only brake job. It is easy to blame “the crummy pad”. However, in the future, the Tech should offer, as an option to the pad replacement-only job, a Complete Brake Job that includes caliper replacement. He will be pleasantly surprised at how often the Car Owner chooses the Complete Brake Job if time is taken to properly explain the function of the disc brake caliper and its square cut seal.