

A few columns ago I discussed various tasks required of drivers to properly drive Top Alcohol Funny Cars or Top Alcohol Dragsters. In that column I outlined some of the driving responsibilities that separated blown alcohol cars from most other types of drag race cars and specifically dealt with the importance of starting line rpm and how alcohol cars were the only cars where the driver's right foot controlled the rpm. This time I'd like to continue with the discussion of driving alcohol cars once a driver leaves the starting line and heads down the race track. I'm going to talk about shift points.

Shifting a transmission is something that is shared by many other drivers in many other classes. With the exception of Nitro cars, which have no transmission and most Super Category cars which have either rpm or time controlled

automatic shifters, almost every other car has a transmission that requires the drivers to change gears.

The number of shift points range from (1) one (a 2-speed transmission) to (4) four (a 5-speed transmission) with alcohol cars utilizing a 3-speed transmission resulting in two shift points. The rpm at which a driver shifts is very important and the indicator that is used to tell the driver when to shift is a shift light which is located in the drivers view as he or she looks down the race track. The shift light is turned on at a predetermined rpm which is lower than the desired shift rpm. As example if a driver wishes to shift from 1st to 2nd gear at 9600 rpm the shift light will need to be turned on at 9200 or 9300 to compensate for the time it takes for the driver to react to the light and make the shift on time. The rpm at which you

turn the light on will depend on how quickly the driver reacts to the light and how quickly the rpm is rising at that point on the run. Since the rpm generally rises slower with each successive shift because acceleration of the car is decreasing, it is usually necessary to have the shift light turned on at a slightly higher rpm for each gear assuming the driver's reaction time is the same each time the light is turned on.

In a top alcohol car, the time difference between reacting on time (about .25 second accounts for human reaction and mechanical reaction of the transmission) and being late and hitting an rpm limiter and slowing the car down, is about a .20 second window. This may sound easy since most drivers rarely experience a .20 window on the starting line, however on the starting line the driver is sitting still and has but one job, to

leave when the tree comes on. On the run the driver can be very busy with the management of the car. It could be moving left or right, spinning or shaking and this environment and activity can be quite a distraction when the light comes on.

This is a good time to mention that all of this looks much easier to do when you're sitting in the grandstands or standing on the starting line.

Now that we've covered what the driver needs to do let's take a look at what can happen with improper shift points. Inaccurate shift points can occur for a number of reasons including anticipating the light, reacting to something the driver thought the car was doing but it wasn't, not reacting to something the car was doing that the driver didn't notice, being distracted by other events, being too excited, and sometimes no detectable

reason at all. None of these, as you might expect are good for the car, the E.T. slip or the drivers ego.

If an alcohol driver shifts way too early, while the clutch is still slipping in low gear this is what takes place. First is excessive clutch slippage. Second the engine gets richer. Third the car really slows down. Fourth, they probably lose.

If the alcohol driver shifts a bit later after the clutch has locked up but still too early, it may force the clutch back into slip as in the first example, but if it doesn't slip it may pull the engine rpm down too low at the bottom of 2nd gear and in this case the car may shake. Foregoing an in-depth discussion of tire shake, suffice to say controlled tire spin is necessary to transition the car (specifically the rear tires) from the starting

line to mid-track. Should the tires lose this slight spin early in the run and “stick” to the ground, they shake. This can happen to a top alcohol car with an early shift.

Lastly, an extremely late shift creates an over-rev of the engine which can cause engine damage or if an rpm limiter is used (it's not good to drive at 10,000 rpm on a limiter either) it virtually stops acceleration. If you look at a late shift like this on a Racepak computer, the drive shaft graph goes flat.

So what's the alternative to all of this? Well, the driver must simply shift at exactly the right time on every shift on every run at every race. If you think about it, this is quite difficult to perform, but not impossible. For these reasons and others, driving blown alcohol cars may be one of the more challenging

things to do on a drag strip. Learning how to do these things correctly and consistently is one of the many things we do at our racing school. If you're up for the challenge of becoming an NHRA licensed alcohol driver, give us a call... we'd love to help you with your dreams.