Let me start by repeating a statement from my last column on driving alcohol cars.

I said that drivers in TAD and TAFC can more effect the performance of their cars than almost any other category in drag racing. This is not to say that car performance is not affected by driver performance in other categories or that there is not a tremendous amount of driving skill required to win in every category from S/C to Pro Stock to Top Fuel. But the fact remains that driving alcohol cars to optimum performance is a touchy proposition.

A really good alcohol driver can help the crew chief improve performance. A driver that drives the car exactly as instructed by the crew chief, enables the crew chief to better evaluate tune-up decisions, thereby becoming more knowledgeable, make better decisions and ultimately increase performance. If the crew chief has to 'throw away' runs because of poor driver performance or has to extrapolate what might have happened on a particular run had the driver done 'this or that' then he is obviously at a

disadvantage. In the last column I talked about the importance of starting line rpm in TAD and TAFC. The driver's of these cars are faced with the task of getting the engine up to a predetermined rpm and holding it at the exact rpm as instructed by the crew chief and then simultaneously swapping feet (releasing the clutch and applying the throttle) so that these two events happen at exactly the same moment preventing either an unintentional rise or drop in engine rpm. As I said, this action is much harder to do than it sounds and some drivers simply are better at it than others.

Another driver challenge is shifting at exactly the correct rpm. This is of course a skill that must be mastered in a variety of vehicles from Stock Eliminator to Pro Stock, but there are a few elements to shifting alcohol cars that again separate these cars from others.

First consider what the car, engine and clutch are doing the first few hundred feet on an alcohol run. As the car leaves the line the clutch slips (a lot) and then 'locks up'

down course. Following ‘lock up’ the engine continues to rev up to a desired shift point, the transmission is shifted into second gear and away you go.

If the driver shifts the car way too early, (while the clutch is still slipping) a couple things happen. One, the clutch slips excessively and two the acceleration decreases.

Suppose the driver shifts the car later than our first example, still too early, before the engine has reached the right rpm, but after the clutch has already locked up. In this case the car may shake.

Here is an over simplification of tire shake. As the car leaves the starting line the rear tires are distorted, wrinkled and squatted. A few hundred feet down track the tires are tall, narrow and have a smooth sidewall. In order to get the tire to transition from one shape to the other, it appears that the tires need to be spinning slightly. Even when fast cars are ‘hooked up’, the rear wheels are going slightly (2% or 3% or more) faster than ground speed. If the tire stops

spinning and ‘hooks’ tire shake can occur. In general this is why ‘down on power’ creates tire shake.

Back to the driver. As in our second example shifting a bit too early, but after the clutch has locked up, pulls the engine down to a low rpm in the bottom of 2$^{nd}$ gear, which decreases power, sticks the tire and causes shake.

A third example is a missed or late shift. If the driver blows by the shift point, the engine can hit the rpm limiter which causes it to misfire on the rpm limiter. Now this may be okay in a carbureted gas engine (e.g. these cars leave the line on an rpm chip) it is devastating to blown alcohol engines, especially at 10,000 rpm and can cause severe damage.

The fourth option of course is to shift at exactly the right time. Easier said then done.

Like all other shifted cars, alcohol cars have a shift light that indicates to the driver when to shift. It is usually set around 400 rpm earlier than the desired shift point to compensate for driver reaction time and shift reaction time

in the car. Because the alcohol engines rev so quickly it is very important that the driver react to the shift light with deadly accuracy the same as he or she needs to react to the starting lights in order to get consistent shift points. Add to this the fact that the engine rpm gain is more rapid in low gear than second gear and therefore different shift light timing/activation is required for second gear than first and you've got yourself a handful.

If you've never driven an alcohol car it may be difficult to imagine how busy it can get in the drivers seat. These cars are and will remain one of the more challenging vehicles to drive. Which is just one reason that after 20 years of doing so, I still love to teach people to drive them at our school. So…you want to give it a try…give me a call.