IHRA drag racing is highlighted by one of the most unique racing vehicles in the world, Top Fuel. Now with nitro Funncar added to National Competition, the spectators and other competitors who watch these amazing cars experience the chest vibrating noise and rumble from 650 pound, 7,000+ horsepower engines, so powerful, they are lucky to last one quarter mile race. I have been curious for many years about the tune-up of these cars when writing drag race books and the IHRA Tech Stop gave me access to some secrets of their spectacular power achievement.

Recall from previous articles that an IHRA Top Fuel engine is based on an all-aluminum Hemi V-8. It is equipped with a Roots supercharger turning as much as 50% faster than the engine. It has a huge fuel injection hat above the supercharger grabbing air at a rate of over 3,700 cubic feet a minute. A very high volume fuel pump at as much as 100 gallons per minute flow rate is used. Ignition is two magnetos providing over one amp of current (and over 50,000 volts) at each spark plug for each cylinder firing. In one 4.9 sec. run, that is a little over 300 cubic feet (or over 530,000 cubic inches) of air during the run and, as reported earlier, over a gallon of nitro per second.

**TUNE-UP:** Top Fuel Dragsters and Funncars idle at 2,500 to 3,500 RPM. Some tune-ups involve a lean idle to build a specified engine temperature. Then the driver engages fuel enrichment that causes a pull-down of the engine idle speed. Pull-down is a term used by some and a tuning adjustment to set the launch idle speed. At the launch, the driver floored the throttle. Then the engine goes instantly to over 8,000 RPM; spark advance is 55 to 60 degrees before top dead center. Keep in mind that the intake valve has closed at about 100 degrees before top dead center. That leaves only about 40 to 45 crankshaft degrees for engine compression before ignition or about one quarter turn of the crankshaft. At the launch, the tire twists up and plants inches. The contact patch narrows and gets shorter. During that time, several fuel enrichment stages occur. In addition, several clutch stages are automatically tightened. The clutch is fully engaged (although slipping into recovery for over 3 seconds out). Jack Wyatt, nitro Funncar owner and driver reports as many as 15 stages can occur for a tune-up. In addition, ignition advance is gradually restored. From that point on, engine speed creeps up. Fuel is again removed in stages to keep the fuel volume more or less constant. Timing is restored in steps. More ERKB. At some point, intake manifold heat becomes excessive, and engine power starts to go away. More ERKB is necessary to balance the tune-up aggressiveness against the engine heat buildup limit. At the finish line, the engine is well over 8,000 RPM, and the vehicle is over 300 MPH. The tune-up must also be adjusted ahead of time for air density, humidity, track condition, engine combination, parts deterioration, and amount of aggressiveness against the competitor, blower overdrive, ignition advance, …tune-up tasks (x) (y) (z) then (1a) (1b) 1c) … and so on!

**RUN INTERRUPTION:** A time-based regulator controls fuel enrichment, clutch stage engagement, and timing. If the driver has to momentarily lift from tire spin, shake, or getting out of shape, the tune-up may be lost. It can be anyone’s race from that point. To my knowledge, there is no recovery tune-up. That is one reason track preparation is critical. Another reason is that a Top Fueler could run record performance at anything but a well-prepared National event racetrack surface. The amount of track washing before treatment and VHT application is enormous and an art form to some raceways.

NOTE: As a courtesy from IHRA to our readers, previous Tech Stop articles can be viewed or downloaded from our web site: www.racecarbook.com

Thanks to the following for information about the Top Fuel Tune-up:

1. Pete Jackson Gear Drives (323) 849 2622, manufacturer of race engine camshaft gear drives and the special Top Fuel fuel-metering valve used on many nitro burners

2. Don Jackson, DJ Engineering (714) 269 9645, supplier of the standard BDK metering valve used on most nitro burners to accurately control the amount of high fuel volume bypass; and also provider for instrumented blower dynamometers for measuring Top Fuel performance values

3. Jack Wyatt, owner-driver of a nitro Funncar, is an IHRA event winner and fierce competitor for the IHRA world championship.

**Bob Szabo** is an owner / driver of a blown alcohol drag racecar and author of the technical book: “5,000 Horsepower on Methanol,” a perfect gift for Holidays. While much of it is about methanol for racing, information is also provided about nitro, racing gas, nitrous oxide, and ethanol as well. His first book “Fuel Injection Racing Secrets,” also a perfect gift for Holidays, is all about mechanical fuel injection for racing. It is already standard reading for a growing number of IHRA drag race competitors. Check the DRM Yellow Pages for Szabo Publishing or look on the Internet at http://www.racecarbook.com or call (707) 446 2917.