MAKING THE GRADE

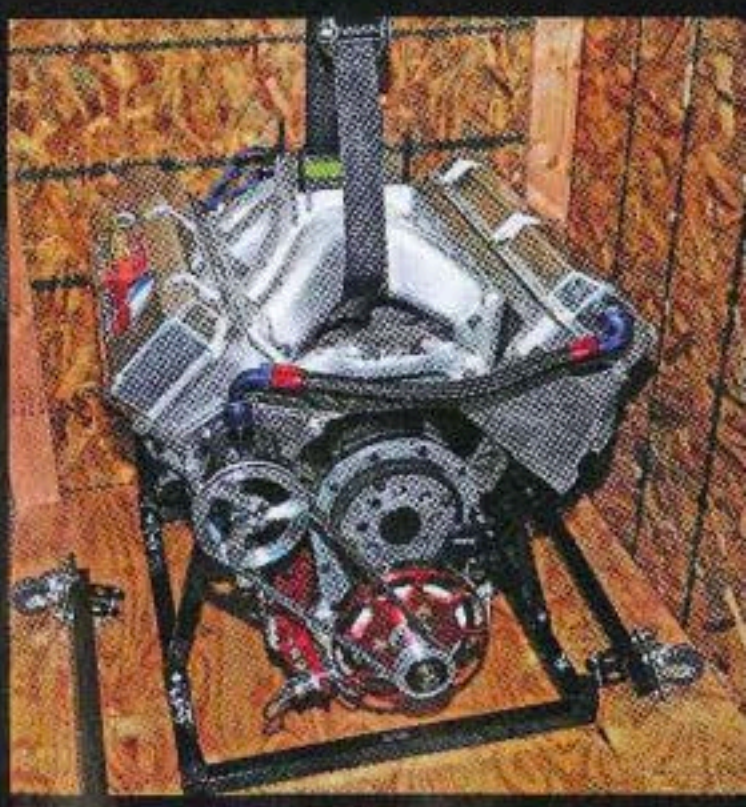
A Mid-Term Report On Our Project Engine

BY JOHN DiBARTOLOMEO

Last year we built a 598-cubic-inch engine (*Project Horsepower, DRA November 2010, January 2011 and May 2011*) as a project in conjunction with Tracy Dennis and his Sunset Racecraft engine-building emporium.

The basis for the project involved starting with a Dart Big M cast iron block and a set of their 11-degree cylinder heads. From that point, Dennis and his crew machined the rest of the components to fit them together all in the search of horsepower.

Once the engine was completed, it was off to Sunset's dyno to test the company's theories. At the end of the day and with very little tuning other than some ignition timing changes, the engine produced 1,224 horsepower at 7,600 rpm with 910 ft. lbs. of torque at 6,200 rpm. However, as has been said numerous times before, "We don't race dynos." So after the day on the dyno and a quick check of the engine's vitals, it was crated up and shipped northeast for installation in one our project dragsters.



From the dyno to the track and eventually to us, our 598 Project Horsepower engine arrived in one piece thankfully due to the great crating job by the guys at Sunset Racecraft.

With over 1,200 horsepower and 900 ft. lbs. of torque, ATI Performance took one look at the dyno sheet and matched a converter combination perfectly on the first shot. In addition, we switched over to their new Super F synthetic trans fluid.

The use of Sunset's throttle stop (*Playing The Game, DRA September 2011*), which is designed to "slam" the stop back open rather than opening it slowly, might have caused tire spin in the middle of the track, but in the end, it became just another one of those unfounded theories.

As has been reported in the national news, the late winter weather in the northeast has been...shall we say...crappy. There are a couple of other adjectives we could think of, but this is a family magazine.

With that said, testing would have to wait a while until things thawed out a bit. Unfortunately, the whole idea of waiting to test would have to be delayed until the first time run session in the Super Comp class at the NHRA Gatornationals in Florida. Not exactly your ideal situation, but the crew at Sunset Racecraft knew their combination well enough to offer certain tuning settings to get us in the ballpark. A call to ATI Performance for a torque converter was also in order.

JC Beattie of ATI said, "While we could give you a converter that will be close to what you need, it's nice to get a look at the dyno sheet in order to match the converter as closely as possible to the horsepower and torque numbers."

In any event, after installation in the car, the engine fired up on the first spin inside a warm shop, while the snow flied outside. All sounded well, but then again, the time slip would be the true test and carry for the most weight toward the final GPA (Grade Point Average). Up to this point, though, the project would be receiving a B+. We're pretty stingy when it comes to grading and the fact that this was, after all, just a run in the shop, which should be nothing special.

There were some questions in our mind as far as the combination is concerned. We opted to continue using the present 15x33 Mickey Thompson tires we had on the car, rather than switching to the more popular larger size. In prior year testing, we had actually gone slower with the larger tires and the 565-inch engine that was in the car. We "blamed" all that on the design of the suspension system built into the fully suspended dragster built by Ed Quay. His choice of four-link suspension is remarkably different than most which provides for more "bite." Through the years of racing all over the country in both Super Comp and bracket modes, we never had any problems hooking the car to the track with the smaller tires.

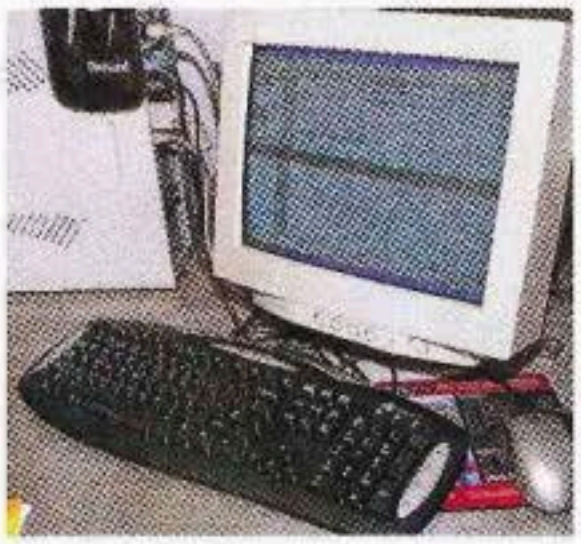
In addition, we also were using one of Sunset Racecraft's new design air-operated throttle stop. In past years, we slowed down the re-opening of the stop's throttle blades so that it would not have a tendency to spin the tires down track. Dennis said, "We don't do that with our blade-style stop and even in cars with much more horsepower, we found out spinning the tires was not an issue. We did find out, though, that anytime you use a needle valve to slow down the air going into the throttle stop cylinder, the consistency of the cylinder's piston was suspect because you created a restriction in the air line. The opening or closing rate of the piston then affected a car's elapsed time consistency. Because of that, it's much better to just slam it open or closed with no restriction."

With little time to test prior to the first race, one of our concerns was the seemingly "small" tire we have on the car. It's generally understood that most people tend to over-tire a car. While our Ed Quay dragster has always run the 15x33 Mickey Thompson tires with good success despite slick tracks, this caused a concern that was unfounded in our testing.

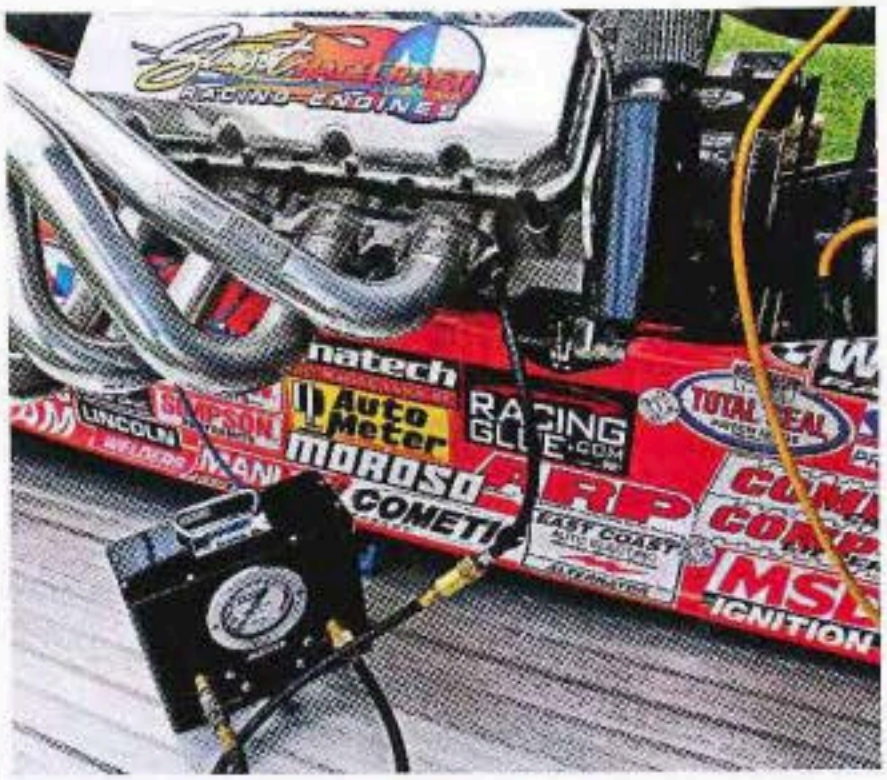
Regardless of all of that, when it came to our first pass down the storied Gainesville Raceway quarter-mile, the car went straight down Broadway without any hiccups whatsoever. The grade earned on its first real test (the time slip)? An 8.924 at 184 mph which correlates to an A-.

One thing that concerned us was the way the engine operated while on the throttle stop. We had set the stop rpm at 4,000 in the pits but on track, as soon as the stop engaged at .05 seconds into the run, the rpm immediately dropped to 3,700 and then jumped right up to 4,000.

Setting the throttle stop rpm is a vital part of tuning your combination. With little time to test, we chose to fall back on Sunset's advice as to the setting as well as stop duration time. First run: An 8.92 at 185 mph in Super Comp trim proved they know what they're talking about.



With the use of our Computech Data Logger, one concern came when the car initially went onto the stop. Engine rpm would drop 300 below our set stop rpm and then immediately come up to the setting.



Part of our maintenance program involves continual valve adjustments and valve spring testing along with occasional leak-down test. Halfway through the season and the valves haven't moved a bit, the springs have not lost any pressure and the piston rings have stayed sealed with leak-down numbers under five-percent. All due in part to the combination of quality components and careful assembly.

Using an Oxygen Sensor in our data logging system, we were able to notice the fuel system go extremely lean during the throttle stop period.

With only three time runs allotted, we felt it best to leave it alone and see if it repeats. Second run, we lost .015 in 60' which translates directly to stop rpm.

When you think about it, with the stop engaging that early into the run, as soon as you let go of the trans brake button, the stop closes and takes away any power to the rear tires. This discounts any thought of tire spin throughout the 60' area.

After a second-round loss, our JEGS Log Book showed a swing of almost .05 in 60' throughout the weekend. It appeared that as the car goes on the stop, the oxygen sensors (O2) showed the engine going lean to 17:1 before slowly climbing back up. Certainly not good, but as we headed back north to colder climates, the final grade after the weekend was a B-. A quick leak-down of the engine along with checking the valves and springs show reliability to be an A+, but that nasty dip in the throttle stop brought the grade down slightly.

To fix the problem, we spoke with Marvin Benoit at Quick Fuel who suggested, "It's a lean condition which is indicative of the way we have that 1,250-cfm carburetor set-up. That carb is not usually run on a throttle stop engine and we purposely keep the intermediate fuel circuit lean to allow for a clean revving engine.

"Even though you have the throttle blades wide open," Benoit added, "the use of the under-the-carb stop when the stop's blades close, it's causing the carb to go onto the intermediate circuit."

We closed up the air bleeds in the carburetor horn by .032" and increased the intermediate fuel jetting in the fuel blocks by .012". Testing the following week at nearby Beaver Springs Dragway showed a great improvement in the data logger rpm line and 60' times varied only .008. Grade? An A+ for the improvement, but we still hadn't run the car flat out to see just how fast it really was.

With the weather still a little on the chilly side, we ventured to Numidia Dragway for more testing and hopefully a little

Quick Fuel's Marvin Benoit said, "Your lean condition during the stop period is due to the intermediate circuit of the carb." By carefully opening up the feed restrictions in the metering block, the lean condition went away and increased throttle stop and 60' consistency.

bracket racing if the weather gods would be so kind. Numidia is located in the hills of northeast Pennsylvania and as such is pretty far up and notoriously slower than other northeast tracks. During Saturday testing, the first two runs netted a 7.202 and a 7.197 with both over 188 mph and a 1.05 60' time. Remember the mention of the smaller tires? Not even a worry as both runs showed no tire spin at all.

Because we shift on time rather than rpm even in bracket mode, the shift in the ATI transmission was occurring at 7,800 rpm. Thinking it might be a little on the high side, we lowered the shift time by two-tenths of a second which lowered the shift rpm to 7,600. A 7.228 was the result with the same 1.05 60'.

Keeping that same shift rpm, our next change involved bolting on a larger set of rubber, going to a set of Mickey Thompson's 16.5x33, which are roughly two inches wider than our smaller tires with the same rollout. The result? Lost .01 in 60' and carrying the wider rubber caused the car to slow to a 7.253. The weather gods weren't so kind as rain moved in cancelling the weekend for us. Grade? A+ on the improvements and things learned and still an A+ in engine reliability.

Over the next couple of months, we made variety of changes to the carb and tuning, while the basic engine continued to impress. As anal as we are, between race maintenance consists of valve adjustment and valve spring checking, with an occasional leak down check of the cylinders. In each case, valve adjustments stayed tight and spring pressures remained solid. Leak down figures ranged from a tight 2% to a "loose" 8, if you want to consider that loose.

We've yet to run the car flat out at a "good air" track, but Dennis did say it should run in the 7.0 range at 190 mph. We're still learning just what it does and wants when certain occurrences happen such as the weather turns one way or another. It also takes a while to gain a certain amount of confidence regardless of what combination you have in your car. Knowing what the car will run is more than half the secret of winning rounds. When you have no idea what the car will run, chances are you're not going to see many win lights.

Mid-terms are now out and our project engine receives an A with the only thing bringing the grade down was the B+ from its time running in the shop. We'll keep running this project and report our findings as it'll give us a chance to test a lot of new products. DRA

SOURCES

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