



# Building a Race Car: Part 13

## Happy Hour Practice

**A**s we learned last month, earning a spot in the starting grid on first-day qualifying allows a team to concentrate on race setups. The team that tries to qualify on its race setup is likely to miss the show. On the other hand, the team that races on its qualifying setup is in for disaster.

*Above: Pit stops are a major part of racing and the team utilizes key equipment to complete each job.*

Once they know they're in the race, teams change many things: Shock-spring-sway bar combinations; engine-transmission-rear gear ratio combinations are different for racing. A short qualifying run allows the car to be on the edge, and generally the car closest to the edge sets on the pole.

In the race, fast but consistent runs are what the teams look for. The ability to run

faster and longer on tires is the answer to success. Teams document tire wear's effects on lap speeds.

In race setups, the input from drivers is valuable. Generally, the first hour of practice is in the morning. The cool track, cool air temperatures and the location of sun on the track at 9 a.m. make for conditions that are very different from those at a race finish at 6 p.m. Add a Truck or Busch race between the practice and the race, and the differences broaden.

Many teams use the morning practice to run in motors, scuff tires and check and baseline shock absorbers. During these runs, engine guys work frantically, changing any combinations of carburetors, timing, gearing and sometimes even de-tuning engines for long race runs. They check

spark plugs after each run, insuring that the engine won't "lean out" and burn pistons.

Engine builders decide on final changes after Happy Hour. In Happy Hour, teams lay out two or three sets of tires, shocks, sway bars, etc. The car is quickly baselined. Then four or five one-lap runs are made and changes are made before the crew chief, car boss and driver are satisfied to run a long run.

Long runs are dictated by tire life or fuel capacity. If the life of the tire is 50 laps, but the fuel capacity is 48, the longest run is 48 laps. The handling characteristics of a car have to be tailored for green flag laps. If a car loses lap time 20 laps into a 48-lap run, falling off more than other cars, the team will make changes. If the car is moderate as the driver starts the run, but is 3/10 seconds faster than others at the end, it could be successful.

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Gas mileage is very much an issue. As a driver makes each run, the handling characteristics are matched to mileage. Tight cars use more fuel.



Post-race inspection calls for cars to be filled with fuel and weighed, then pushed on for more inspection.

During Happy Hour, teams plan for changes during the race. With good Happy Hour speeds, the crews can build adjustability into the cars. Spring setups that are perfect for Happy Hour are replaced with springs with rubbers so the car can be adjusted if the car changes on race day.

Many top teams will "dyno" springs at the end of runs and replace these with new springs for the race. Springs can be dynoed with rates not showing change, but 1,000-plus miles can slow speeds by .03 to .04 seconds. Drivers can run 500 to 1,000 miles during test laps for a Winston Cup race, an issue many teams do not address.



The same holds true for engines. Many top teams know that laps take power away from any engine. Qualifying engines are put in the car when a team goes to the track and see only practice laps before qualifying. Race engines are put in for practices, including Happy Hour. Some teams limit laps put on race engines. Inside sources on two championship teams in the 1999 season say that 500 miles can result in up to a 100-horsepower loss on a chassis dyno.

That means teams that have 200 to 500 miles in practice are at a deficit from the

start! Spot Robert Yates a 100 horsepower and that's a license to steal the championship, right? Many teams believe that an engine that lasts 50 to 100 laps is seasoned and will not fail. Most top teams are comfortable with replacing engines for horsepower gains.

Once Happy Hour ends, race procedures start. The team checks all nuts and bolts, then the chassis setup. Shocks, sway bars and track bar are all set to race.

Finally, NASCAR again inspects the car. The templates, heights, weights and tires are all reviewed for specs. Once the car com-

ability to match combinations to driving style was part of a body builder's duties.

The paint and body took an artist's renditions from paper to steel. Suspension and drivetrain were installed, checked and prepped with winning in mind. The driver environment was prepped for long safe racing. Data engineers tested at the track and grouped all the information into a database.

Engine builders spent hours testing combinations, then instructing assemblers on oil, fuel and electrical systems.

Once the race started, strategies were played out. The 30-second laps seemed like



Left: Jeff Burton's car has been baselined for the race. Happy hour is over; changes are documented for the show. Above: John Andretti's team changes a spring in the opening minutes of Happy Hour. Once changed, a long run will be attempted. Right: The crash cart is parking behind pit wall. Notice, less chassis, there is a complete car on the wagon. This is very important for points runs.

pletes inspection, the line on the windshield sticker turns into an "X" and the car is pushed to the starting line.

## One Last Review

We started with a pile of steel. We built and designed suspension and managed weight along with establishing the roll cage super-structure. Our body choices included hours of wind tunnel and track testing. The



days. But a top-five finish erased all memories of the hard work.

As teams go through the last NASCAR inspection of the week, the hoses are rolled up and the tools loaded in the transporter, teams will say: "If we had moved that spoiler up .125 inch, opened up that nose another square inch, rolled back that timing, changed the gear about 10 points, we could have won. We can't wait until next week!"