

Chapter 10 Your TIRE'S BEHAVIOR



FIG. 10.1 Some "Used Tires" Setting in a Pit Area ready for Measurements

"I felt I was on Ice from Lap One until the last one". This is a comment from NASCAR's Jeff Gordon about a Goodyear tire-compound change (Las Vegas Motor Speedway, March 11, 2007). All motorsports racers have experienced adverse tire-behavior at some time. This chapter deals with basic information for "getting the most" out of a tire. This requires seven short tech laps: 1. *Lateral (Sideways) Tire-Behavior*, 2. *Longitudinal Tire-Behavior*, 3. *Steering and Body Slip-Angles*, 4. *Tire Friction-Circle*, 5. *Tire Friction-Ellipse*, 6. *Tire-Load Sensitivity*, and 7. *Motorcycle Tire-Stuff*. Most racers will get help from the first four tech-laps, and only a few tools (equations) are involved. Others will find the Graphs for Tire Friction in tech-laps five and six to be useful. Some non bikers will find helpful information in the last tech-lap.

Section Details

1. Lateral (Sideways) Tire-Behavior:

Tire Slip Angle, Lateral Force-Coefficient, Cornering Stiffness, Operational Cornering-Stiffness & Operational Slip-Angle, Contact Patch Size, and Tools for Lateral Behavior.

2. Longitudinal Tire-Behavior:

Circumferential Velocity, Slip-ratio, Fractional Longitudinal Force & Optimum Slip Ratio, Steering-Angles & Ackermann Effect, and Yawing Velocity & Tangent Speed.

3. Steering and Body Slip-Angles.

4. Tire Friction-Circle.

5. Tire Friction-Ellipse:

Steps for Generating Friction Ellipse, Error Bands, Usage of Friction Ellipse, ABfactor (Cornering Fraction).

6. Tire-Load Sensitivity:

Lateral friction-coefficient, & Max-Angle.

7. Motorcycle Tire-Stuff:

Bike Tires, Mechanical & Pneumatic Trails, Restoring (aligning) Torque, Overturning Trail & Moment, and High Camber Behavior.

Total number of safety ideas = 35

Total number of safety principles = 16

Total number of illustrations = 46

Total number of examples = 9