Tire and Driver Safety

The Tire Manufacturers Association put together a test to see just how much tire tread plays into the performance of a vehicles ability to stop during a panic brake situation. The test was performed in a controlled environment but with a real life situation using a panic brake situation.

This test was comprised of a half-ton truck, with ABS brakes, traveling at a rate of 70 MPH on a track with five hundredths of an inch of water standing, with the driver panic breaking (slamming on the brakes). The test was conducted a total of three times using a different tread depth on each test. See results below:

(New) 12/32 tire tread panic stop -----------255.1 feet to stop

4/32 tire tread panic stop------------377.8 feet to stop

2/32 tire tread panic stop------------499.5 feet to stop

\*\*Note: The half- ton pickup truck was still traveling 49 MPH when it passed 377.8 feet (the stopping point of the 4/32 tire tread) \*\*

\*\*Please include these stats before the conclusion of your training.

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| **Term** | **Definition** |
| **Accelerator** | A chemical which speeds the vulcanization of rubber; used in tire compounds to reduce curing time. |
| **Activator** | A rubber compound chemical used to help initiate the vulcanization process. |
| **Adjustment** | A prescribed allowance given to a customer toward the replacement of product pursuant to the warranty. |
| **Aging** | A reduction of physical and chemical properties of rubber by oxidation over a period of time. |
| **Air Pressure** | Force exerted by air within a tire, expressed in pounds per square inch or kilopascals. |
| **Alignment** | Angles of the tire and suspension axes relative to each other and the ground: caster, camber, toe. Also, the adjustment of components to bring them into a predetermined position for the most efficient operation of wheel and vehicle for proper even tire wear. |
| **Alpha-Numeric** | A load-based tire sizing system containing the load capacity, type of tire construction, aspect ratio, and the rim diameter in inches. |
| **Anti-Roll bar** | A steel torsion bar, linking the left and right side of a suspension. It comes into play during cornering. As the car leans in a turn, the anti-roll bar resists this leaning by transferring more weight to the outside tire. It provides a means to achieve good handling from stiff roll resistance while maintaining a comfortable ride through soft springs. |
| **Antioxidant** | A chemical, which when added to a rubber compound, prevents surface oxidation; used in tire tread and sidewall compounds to prevent weather checking and cracking. |
| **Aspect Ratio** | The dimensional relationship between tire section height and section width; section height divided by section width. |
| **Axial Play** | The up-and-down movement of a ball joint. |
| **Axle** | A cross support of a vehicle on which its road wheels turn. |
| **Backspacing** | The measurement from the back of the bolt pad to the back edge of the rim; used to calculate offset and determine where the back of the bolt pad is located in relation to the rim width, sometimes referred to as rearspacing. |
| **Balance** | A uniform mass distribution of a tire and wheel assembly about its axis of rotation. |
| **Bale Rubber** | The form in which solid rubber is shipped to tire manufacturers. |
| **Ball Joint** | A ball-and-socket connection that lets a steering knuckle move in several directions at the same time. |
| **Banbury Mixer** | An enclosed mixture machine for the production of rubber materials. |
| **Bead** | The area of the mounted tire which seats against the wheel. |
| **Bead Filler** | A rubber extrusion in the bead area of a tire; used to permit a smooth contour of casing plies around the bead and to the lower sidewall. Also used in enlarged form to stiffen the lower sidewall of a tire. |
| **Bead Seat** | The position where the tire rests and seals on the inside of the rim. |
| **Belt** | An assembly of fabrics and/or wire used to reinforce a tire's tread area. In radial tires, it also constrains the outside diameter against inflation pressure and centrifugal force. |
| **Belt Edge Wedge or Insert** | An extrusion of rubber placed under the edges of a belt; used in radial tires to improve durability. |
| **Belted Bias Tire** | A bias tire with additional reinforcing belt(s) between the casing plies and the tread. |
| **Bias Tire** | A tire built with two or more casing plies which cross each other in the crown at an angle of 30 or 45 degrees to the tread centerline. |
| **Bladder** | A rubber bag used inside a tire during the molding and curing process; contains hot water steam which presses the inside of the tire into the mold. |
| **Blemish Tire** | A tire with a cosmetic or minor uniformity imperfection but whose safety and performance are unaffected. |
| **Block** | Part of a tire tread pattern created by lateral (side-to-side) grooves. |
| **Body** | Tire structure except for tread and sidewall rubber. |
| **Bolt Circle** | Often referred to as the bolt pattern; the diameter of an imaginary circle drawn through the center of each lug hole. |
| **Braking Torque** | Torque applied by a brake to a tire/wheel assembly which slows or stops the vehicle. |
| **Breakaway** | The point at which tire cornering traction is lost. |
| **Bump Steer** | A steering effect resulting from toe or camber changes as the suspension moves up and down. |
| **Calendar** | A machine consisting of two or more rolls that continuously sheets a thin ply of rubber compound or coats a fabric with a rubber compound. |
| **Camber** | The angle that the tire is leaning measured from true vertical. The inward or outward tilt of the wheel/tire at the top. |
| **Camber Thrust** | The cornering force developed by a tire due to its camber. a force in the same direction as the leaning of the tire. |
| **Carbon Black** | Very fine, specially structured particles of carbon; used in rubber compounds as a reinforcing filler. |
| **Carrying Capacity** | Amount of load that a tire can carry at a given inflation pressure as established by the Tire and Rim Association. |
| **Casing (Carcass)** | The structure of tire cords locked around wire beads, (most often used in relation to worn tires). |
| **Caster** | The angle between the tire vertical and the steering pivot axis; the backward or forward tilt of the steering knuckle pivot points. |
| **Center of Gravity** | The center balance point of a vehicle; the single point where a car would be supported without tipping up or down. |
| **Centerline** | A plane dividing a tire, wheel, or vehicle into two symmetrical halves. |
| **Centrifugal Force** | The force that tends to throw a tire away from the center of rotation same as LATERAL FORCE. |
| **Chafer** | Abrasion resistant rubber coated material to help prevent the tire's beads from rim damage and chafing. |
| **Change-Over** | Removal of tires placed on car or truck by the manufacturer prior to significant use, and substitution of better or more suitable tires. |
| **Chapman Strut** | A rear suspension system which operates on the same principle as the MacPherson Strut; it uses lower links or a control arm and a long spring-shock strut. |
| **Chassis** | The frame, suspension system, engine, and drive train of a vehicle; the assembled parts of an automobile without the body. |
| **Coefficient of Friction** | The force required to slide an object, divided by the weight of the object; this indicated the difficulty in sliding one surface against another. |
| **Coil Springs** | Suspension components of coiled spring steel that compress and respond to road pressure, permitting the up-and-down movement of a vehicle as it goes over road bumps and dips. |
| **Cold Inflation** | The pressure in a tire that has been driven less than 1 mile or has been standing for three hours or more. |
| **Compliance Steer** | A steering effect caused by the deflection or compliance of bushings, joints, and other suspension components under loads and forces. |
| **Compounding** | Refers to the mixture of ingredients that go into the rubber used in a tire. Different chemicals or types of compounds affect wear, traction, cut resistance or other properties of a tire. |
| **Concave Molding** | A process by which the center tread area of a tire is depressed in the molding stage. When inflated, the tread flattens out against the road surface more perfectly than a convex molded tire. |
| **Control Arm** | A device used to connect the unsprung position of a suspension to the sprung chassis, which allows suspension travel. |
| **Cord** | Fabric or steel wire strands forming plies and belts in tires. |
| **Cord Angle** | The degree at which the plies or belts cross the center line of any given tire. |
| **Cornering Force** | The force that turns a car around a corner. The opposite of lateral or centrifugal force. |
| **Cross Pattern** | The sequential torquing of the lug nuts in a pattern across from one another. |
| **Cross Section Width** | External sidewall to sidewall measurement of inflated tire, exclusive of ornamental ribs and lettering. Sometimes called section width. |
| **Crown** | The region between the shoulders of the tire. |
| **Crowned Road** | A road design with a slope or pitch from its center to the curb or shoulder in order to facilitate water drainage. |
| **Curb Guard** | A rubber protrusion running circumferentially around some tires just above the whitewall to prevent curb scuffing on the whitewall area of a tire. |
| **Curb Weight** | The total weight of a vehicle with no passengers and a full tank of gas. |
| **Cure** | To vulcanize; also time and temperature conditions used to vulcanize a tire. |
| **Custom Wheel** | An aftermarket wheel designed to improve performance and enhance appearance and comprised of one, two, or three pieces. |
| **Design Rim** | A rim with a specified width; used to measure tire dimensions. |
| **Directional Stability** | The ability of a car to travel in a straight line with a minimum of driver control. |
| **Dog Tracking** | A condition where the rear wheels do not follow the path of the front wheels. |
| **DOT** | A tire branding symbol which denotes the tire meets requirements of the Department of Transportation. |
| **Double A-Arm** | A suspension system which uses two "A"-shaped links or arms of unequal length to attach the upright supporting the wheels to the frame. |
| **Drive Wheel Application** | Describes tires which are designed specifically for optimum performance on drive wheels. |
| **Dual Compound Tread** | A tire tread with two rubber compounds. |
| **Duals** | Two tire and wheel assemblies, mounted on one side of an axle. |
| **Durometer** | A measure of the hardness of a rubber compound; its resistance to penetration of a spring-loaded blunt needle. |
| **Dynamic Balance** | Balance in motion. The balance of a wheel while it is rotating. a condition in which a tire and wheel assemble has weight distributed equally on both sides of the wheel's axis of rotation. |
| **E.C.E. Symbol** | A tire performance certification based on regulations developed by the Economic Commission for Europe concerning physical dimensions, tire branding requirements, and high speed endurance. |
| **Eccentric Mounting** | A condition in which a tire is unevenly mounted or cocked on the hub of a wheel. |
| **Extra Load** | A P-metric tire with a maximum inflation of 41 psi. This higher pressure than a standard loaded tire permits a greater load capacity. |
| **Extrusion** | The process of forcing a material through an orifice to obtain a length of material; used to fabricate tire components. |
| **Fabric** | An array of parrel cords used in tire manufacturing. |
| **Fiberglass** | A material used in belt construction, consisting of fine spun glass coated with adhesive |
| **Flotation Tire** | A tire designed to minimize soil penetration and compaction. |
| **Flush Fit** | A condition where the mounting pad of the wheel goes into place freely and without obstruction against the hub mounting surface. |
| **Follower Joint** | A non-load-carrying ball joint that maintains the position of the steering knuckle and provides the correct steering axis inclination angle; sometimes called pilot joint or friction joint. |
| **Footprint** | The mark let by a loaded tire's tread as it comes in contact with the road surface. |
| **Footprint Area** | The amount or area of contact in square inches the tire has with the road. This is dependent upon both load and inflation pressure as well as tire dimensions. |
| **Fore-and-Aft Weight Transfer** | A load factor where weight is transferred from the front tires to the rear tires during acceleration and from the rear to the front tires during braking. |
| **Front Wheel Independent-Dead Rear** | A suspension system found only on front wheel drive cars. It has a solid rear axle which does not transmit driving torque since the car has front wheel drive. It just holds up the rear wheels. |
| **Front Wheel Independent-Live Rear** | A suspension system found only on rear wheel drive cars. the rear wheels are connected together through an axle which is in turn connected to the frame. A live rear axle includes the differential and transmits driving torque through itself to the rear wheels. |
| **g** | A unit of acceleration. "g" is a symbol that represents the acceleration of gravity. Acceleration at 1g equals 32 feet per second. |
| **Green Tire** | A tire which has not been vulcanized or cured. |
| **Grooves** | Circumferential channels between the tread ribs of a tire. |
| **Grooving** | A tread cutting process in which grooves of varying depths and angles are cut into a tire's tread to improve forward traction, braking, or lateral stability. |
| **Gross Axle Weight Rating (GAWR)** | The maximum weight that the front or rear axle can carry. The front and rear gross axle weight must not exceed the front and rear GAWR's. |
| **Gross Combination Weight Rating (GCWR)** | The total weight of the loaded tow vehicle and the loaded trailer. |
| **Gross Vehicle Weight (GVW)** | The total weight of the vehicle, including passengers, fuel, cargo and attachments. |
| **Gross Vehicle Weight Rating (GVWR)** | The maximum permissible loaded weight of the vehicle and takes into account the capabilities of the engine, transmission, frame, spring, brakes, axles and tires. The GVW must not exceed the GVWR. |
| **H-Rated** | A speed rating category for tires which is used on vehicles with a top speed up to 130 mph. |
| **High Flotation Sizing System for Light Trucks** | A system using overall diameter in inches, section width in inches, type of tire construction, and rim diameter in inches (e.g.: 33x12.50R15LT). |
| **High Pressure Die Cast** | A wheel manufacturing process using aluminum, alloys in special high pressure die casting machines. |
| **Hub Centric** | A situation where the center bore hole of a wheel is made to match up with the hub diameter of the vehicle; the wheel is then centered by the center hole, rather than the lug nuts. |
| **Hydroplaning** | Loss of traction at high speeds caused by a wedge of water which lifts a tire off the road surface. |
| **Idler Arm** | A device attached to the frame of the car which duplicated the movement of the Pitman arm and keeps the center link aligned. |
| **Imbalance** | A non-uniform distribution of mass in a tire and wheel assembly about its axis of rotation. |
| **Independent Suspension** | A suspension system in which the front or rear pair of wheels of a car are independently connected to the frame or underbody. In this system, deflection of the wheel on one side will not affect the wheel on the other side. |
| **Inertia** | The tendency of any mass at rest to stay motionless, or any mass which is moving to remain moving in a straight-line. |
| **Innerliner** | The layers of low permeability rubber which are laminated to the inside of a tubeless tire to insure the air retention quality of the tire body. |
| **Kelnet** | Firestone's tire design that minimizes stress in tire performance. |
| **Kilopascals (kPa)** | Unit of air pressure; in metric terms it takes 6.89 kPa to equal 1 p.s.i. |
| **Lateral Runout** | Wobble or the side-to-side motion of a rotating wheel or tire/wheel assembly. |
| **Lateral Weight Transfer** | A load factor in cornering where weight is transferred from the inside tires to the outside tires. |
| **Lead** | A slight pull to one side. |
| **Leaf Springs** | A series of steel leaves used on suspension systems that are bolted together in the middle. Under compression, they flatten and expand in length, then rebound to their original arched shape. |
| **Lift Points** | Those contact point on the chassis of a vehicle used to hoist the vehicle for servicing; to prevent serious problems and permanent damage, owners' manuals should always be checked for proper lift point locations. |
| **Linearity** | The ability of a vehicle to respond linearly to the driver's steering input at low cornering levels. |
| **Load Index** | A numerical code which specifies the maximum load a tire can carry at the speed indicated by its speed symbol, at maximum inflation pressure. |
| **Load Range** | Replaces the former ply rating term and identifies load and inflation limits. |
| **Load Rating** | The weight that a wheel is designed to support in normal service. |
| **Load-Carrying Capacity** | The load a particular size tire can carry at a given inflation pressure under certain driving conditions, as established by the Tire and Rim Association. |
| **Loading** | The amount of weight put on tires. Increased load can increase cornering force. |
| **Lower Sidewall** | The part of the sidewall nearest the bead. |
| **LT-Metric** | A sizing system using the section width in millimeters, aspect ratio, type of construction, and rim diameters in inches (e.g.: LT235/85R16). |
| **LTP-Metric** | A new (1992) light truck personal use sizing systems using the section width in millimeters, aspect ratio, type of construction, and rim diameters in inches (e.g.: LTP235/75R15). |
| **Lug Centric** | The centering of a wheel by matching it up with the lug nuts, rather than by the center bore hole of the wheel; hub centric is the more accurate centering method. |
| **M+S, M/S or M & S** | A tire sidewall designation indicating that the tire meets the RMA definition of a mud and snow tire. |
| **MacPherson Strut** | A front suspension assembly that combines the functions of the shock absorber, the upper steering pivot, and the wheel spindle in a single unit. |
| **Mag** | A misleading description of specialty wheels; with exception of pure racing wheels, specialty wheels contain little or no magnesium. |
| **Match Mounting** | A mounting procedure that matches the high point of a tire with the low point of its wheel. A dot or mark on the tire is matched with a dot, a sticker, or the valve hole on the wheel. |
| **Metric Tire Size System** | A tire sizing system using the cross section in millimeters, aspect ratio, speed category, tire construction and the rim diameter in inches (e.g.: 185/70SR13). |
| **Mounting Pad** | The surface area of the back of the wheel's center that contacts the brake drum or hub flange of the vehicle. |
| **Negative Camber** | A condition where the top of the tire is leaning inward from the tire's vertical centerline, as viewed from the top. |
| **Negative Caster** | A setting where the steering axis is inclined forward at the top as viewed from the side; a condition which tends to cause instability. |
| **Negative Offset** | When the back of the bolt pad is closer to the inside of the wheel; when the mounting face in inboard of the rim centerline; extends assembly away from vehicle resulting in wider tracking. |
| **NHTSA** | National Highway Traffic Safety Administration. |
| **Nomenclature** | Systematic naming of tire sizing systems. |
| **Nominal** | Tire dimensions figured from the actual numbers in the size. |
| **Numeric System** | A tire sizing system using tire cross section width and rim diameter in inches (e.g.: 7.35-14). |
| **Off-The Car Balancing** | A procedure in which a tire and wheel assembly is balanced by a bubble or computerized electronic balancer while the assembly is off the vehicle; computerized electronic balancers are the best way to accurately measure dynamic balance. |
| **Offset** | The distance from the centerline of the wheel to the mounting face of the wheel. |
| **One-Piece-Wheel** | Used to describe an aluminum specialty wheel that is cast in one piece; also the standard wheel found as OEM on production cars. (OEM wheels are typically two piece.) |
| **Original Equipment (O.E.)** | Refers to tires sold to automobile manufacturers for equipping their new cars. |
| **Out-of-Round** | A wheel or tire defect in which the wheel or tire is not round. |
| **Overall Diameter** | The maximum height of a tire when mounted on a wheel and inflated to rated pressure. |
| **Overinflation** | The inflation of a tire above recommended pressure to achieve improved performance; negative byproducts are rough ride, bruise damage, and suspension system strain. |
| **Oversteer** | A cornering condition where rear tires operate at a greater slip angle than the front tires; the tendency of a car to turn more sharply than the driver intends while negotiating a turn. |
| **Oxidation** | Reaction of a material with oxygen, usually resulting in degradation of the material. |
| **P-Metric System** | A tire sizing system using the section width in millimeters, aspect ratio, type of tire construction, and rim diameter in inches (e.g.: P225/70R15). |
| **Pitch** | The length from a point on one tread block to the same point on the next tread block. Pitch is varied around a tire to minimize noise. |
| **Pitman Arm** | A rubber compound chemical; used to make or keep rubber soft and flexible. |
| **Plies** | The layers of fabric that make up the cord body of a tire. |
| **Plowing** | The loss of cornering capability of the font of the vehicle. The car tends to go straight. |
| **Plus 1/Plus 2 Concept** | A concept to improve handling and performance through the mounting of tires with wider section widths and lower section heights to rims of 1,2 and sometimes even 3 inches greater diameter. |
| **Polyester** | A strong and lightweight synthetic cord material used in casing construction. |
| **Polymer** | A chemical compound made up of a large number of identical components linked together like a chain. |
| **Positive Camber** | A condition where the top of a tire is leaning outward from the tire's vertical centerline, as viewed from the top. |
| **Positive Caster** | A setting where the steering axis is inclined rearward at the top, as viewed from the side; makes possible the self-centering force that tends to return the wheel to the direction the vehicle is traveling. |
| **Positive Offset** | When the back of the bolt pad is closer to the street side of the wheel; when the mounting face is outboard of the rim centerline, draws assembly towards the vehicle resulting in narrower tracking. |
| **PSI** | Pounds per square inch. |
| **Pull** | The tendency of a vehicle to veer to one side. |
| **Pyramid Belt** | A belt design in which the upper layer is narrower than the lower layer. |
| **Pyrometer** | A thermocouple device used for measuring tread temperatures in tires. |
| **Rack-and-Pinion System** | The steering now most used for front wheel drive cars in which a gear at the end of the steering column meshes with a rack of steel teeth; the rack is then connected to the steering arms. |
| **Radial Play** | The side-to-side movement of a ball joint. |
| **Radial Tire** | A tire built with casing plies that cross the crown at an angle of 90 degrees. |
| **Rayon** | A synthetic cord material used in casing and belt construction; provides high dynamic strength and good rubber adhesion. |
| **Rear Spacing** | See Backspacing. |
| **Recirculating Ball System** | The conventional type of steering system in which steering motion is transferred through a gearbox. |
| **Repacking** | The repacking of wheel bearings with quality, heavy-duty grease according to manufacturer's specifications. |
| **Retread** | A used casing which has new tread rubber applied to it. |
| **Returnability** | The ability of a vehicle to return to a straight ahead attitude after removal of steering input. |
| **Revolutions Per Mile** | The number of revolutions a tire makes in a mile at a given load, inflation, and speed. |
| **Ribs** | The rubber elements at the tire tread which contact the ground, oriented in a generally circumferential direction. |
| **Ride Height** | The distance between the frame of the vehicle and the road. |
| **Rim Diameter** | The diameter of the bead seat, not the diameter of the rim edge. |
| **Rim Drop** | The area of the wheel's rim having the smallest diameter. |
| **Rim Flange** | The outermost edge of a wheel's rim to which clip-on weights are attached. |
| **Rim Width** | The measurement inside of the rim flanges; i.g. from inside the flange on one side to inside the flange on the other side. |
| **RMA** | Rubber Manufacturers Association. |
| **Road Wheel** | A large diameter (typically 67") steer wheel capable of rotating at selected speeds; used to simulate road surface for tire testing. |
| **Rolling Resistance** | The force required to roll a loaded tire. |
| **Rotation** | The pattern of movement of tires to different positions on a vehicle to compensate for irregular or unequal tire wear. |
| **Rubber-To-Void-Ratio** | The ratio between the rubber area and the groove area in a tire footprint. |
| **Rubbing** | A condition where a tire rubs against the wheel well or the exhaust system. |
| **Runout Gauge** | A device used to check and correct radial and lateral runout. |
| **S-Rated** | A speed rating category for vehicles with a top speed up to 112 mph. |
| **Safety Bead** | The raised area circling the rim of the wheel and located slightly inward from the bead sear; required on all specialty wheels driven in street use to keep the tire from slipping into the rim bell, if accidentally deflated. |
| **Section Height** | The distance from the bottom of the bead to the top of the tread. |
| **Section Width** | The distance from sidewall to sidewall, exclusive of any raised lettering. |
| **Self-Aligning Torque** | The force which causes a tire/wheel assembly to return to its straight ahead position after a turn. |
| **Semi-trailing Arm** | A rear suspension system that sues a large A-arm for each wheel; its pivot axis is set between the 0 angle of a swing axle and the 90 of a trailing arm to a line running straight across the car. |
| **Series** | This is the part of the size designation in tires which gives the ratio of the height of a tire (from the rim to the top of the tread) to the width of the tire (from sidewall to sidewall). It is also referred to as the aspect ratio of a tire. |
| **Service Description (Load Index/Speed Symbol)** | A speed rating system which describes the load capacity and high speed of a tire; includes numerical load indexes and alphabetical speed symbols. |
| **Shimmy** | A rapid oscillation or wobble of a wheel and tire assembly about the steering axis. |
| **Shock Absorber** | A "damper" between the body or frame of the car and the suspension; used to cushion road bumps and bounces and keep the tire in contact with the road. |
| **Shoulder** | Outer edges of tire tread. |
| **Shoulder Gauge** | The total thickness of a tire in the shoulder area. This is invariably the thickest part of the tire and this gauge directly affects the running temperature of a tire. |
| **Sidewall** | The side of a tire between the tread shoulder and the rim bead. |
| **Singles** | A tire and wheel assembly, mounted, alone, on one side of an axle. |
| **Sipes** | Small, narrow slots molded into the ribs of the tread design which increase the traction edges of the tire and increase the traction ability of the tire on wet pavement. |
| **Skid Resistance** | Maintenance of grip on the road and resistance to slide or slip, either longitudinally or laterally. |
| **Slip** | The change in distance traveled per tire revolution due to driving or braking conditions; expressed as a percentage of the distance traveled under a free rolling condition. |
| **Slip Angle** | The difference between the direction a tire is traveling and the direction it is pointing. |
| **Slots** | Grooves generally positioned in the ribs and shoulder areas of some tires which aid in wet pavement traction. |
| **Speed Rating System (Speed Category Markings)** | An alphabetical system describing a tire's capability to travel at established and predetermined speeds. |
| **Spindle (or Knuckle)** | A device connected to a vehicle's control arm by a ball joint; it is moved by the steering arm to change the direction of the wheels and to transmit braking torque. |
| **Sprung Weight** | The total weight of a vehicle that is supported by the suspension system. |
| **Squirm** | The footprint distortion of a rolling tire; usually hourglass in shape on a straight road and crescent-shaped on curves. |
| **Stability** | The ability of tires to maintain direction of a vehicle on curves without causing excessive body sway. |
| **Stacked Belt** | A belt design in which both layers are of equal width. |
| **Standard Load** | A P-Metric tire with a maximum inflation pressure of 35 psi. |
| **Star Pattern** | The proper method for sequential torquing of lug nuts in a 5-lug bolt circle. |
| **Static** | Having no motion. |
| **Static Balance** | Balance at rest. A condition in which a tire and wheel assembly has equal weight around the wheel's axis of rotation. |
| **Static Loaded Radius** | The measurement from the middle of the axle to the road surface; measured with the tire inflated to required pressure and carrying the rated load. |
| **Steel Belt** | A belt material used in tires. Its high stiffness provides good handling and low tread wear. |
| **Steering Axis** | An imaginary line drawn through the center of the steering pivots. The axis about which the wheel pivots when turned. |
| **Steering Response** | Reaction time between driver input at the steering wheel and the directional change of the vehicle. |
| **Steering System** | A major control mechanism that multiplies driver input on the steering wheel into the motion of turning a vehicle's front wheels. |
| **Sulfur** | A chemical element used in the vulcanization process. |
| **Suspension** | A system of devices supporting the upper part (body and chassis) of a vehicle on its axles. |
| **Suspension Package** | A specialized kit of suspension components designed specifically for individual makes and models of vehicles; usually sold to improve performance. |
| **Swing Axle** | A rear suspension system comprised on half shafts with universal joints only at their inward ends on either side of the differential. |
| **Swing Out** | The tendency of the rear tires of a vehicle to break away during sudden steering maneuvers. |
| **Synthetic Rubber** | Rubber made from chemicals as a substitute for natural rubber; properties can be tailored for specific needs. |
| **T & RA** | Tire and Rim Association |
| **T-Rated** | A speed rating category for vehicles with a top speed up to 118 m.p.h. |
| **Tensile Strength** | The maximum tensile force per cross-section area that a material can withstand before it breaks. |
| **Three-Piece Wheel** | A specialty wheel composed of two outer rim halves, usually made of aluminum alloy, and a center section of pressure-cast aluminum or magnesium alloy. The center is either bolted or riveted to the rim. |
| **Tie Rods** | Devices that join the center link of a steering system to the steering arms that connect to the wheels. |
| **Tire Mixing** | The installation of tires of different sizes and/or construction on a vehicle; a condition generally to be avoided. However, certain manufacturers do recommend different tire sizes on the front and rear positions. Manufacturer's specifications should always be checked. |
| **Toe** | The difference in distance between the front and the rear of a pair of tires mounted on a common axle. |
| **Toe-In** | A condition where the fronts of two tires on the same axle are closer together than at the rear. |
| **Toe-Out** | A condition where the fronts of two tires on the same axle are farther apart than at the rear. |
| **Toe-Out-Turns (Ackerman Angle)** | The difference between the turning angle of the inside wheel and the outside wheel during a turn to the left or right; toe-out turns is not adjustable and is designed into the steering linkage system by the manufacturer. |
| **Torque** | The product of a force applied through a lever arm to produce a rotating or turning motion. |
| **Torque-Rating** | The proper torque, expressed in foot-pounds, for tightening lug nuts of various diameters. |
| **Torquing** | The securing of the tire/wheel assembly to the vehicle by the tightening of the wheel's lug nuts to the studs of the vehicle's hub; in the case of specialty wheels, torquing should always be done with a manual torque wrench, containing an insert socket of plastic or teflon. |
| **Torsion Bar** | A "straight" spring that twists under loads; the natural resistance to this twisting provides the spring action. |
| **TPC** | A Tire Performance Criteria marking, appearing on radial tires, which denotes that a tire meets performance specifications set by General Motors, for original equipment use. |
| **Track** | The distance between the front tires on the front axle and the rear tires on the rear axle. |
| **Tracking** | The difference in distance between each of the rear wheels and the centerline of the vehicle. |
| **Trailing Arm** | A rear suspension system consisting of an arm whose pivot axis is exactly across the vehicle or perpendicular to the direction of travel. |
| **Tread** | The portion of a tire which contacts the road surface. |
| **Tread Buffing** | A process in which a portion of the tire tread is removed by buffing or grinding it down; similar to tread shaving. |
| **Tread Depth** | The distance from the tread surface to the bottom of the grooves. |
| **Tread Life** | Length of service in miles before the tread wears out. |
| **Tread Radius** | The radius of curvature of the tread arc across the tread. |
| **Tread Shaving** | The shaving of tread from a tire with a blade (usually to half of original tread depth) to reduce tread squirm and tearing in racing applications. |
| **Tread Wear Indicators** | A raised area in the tread grooves which becomes even with the tread surface when the tire is worn to 2/32" tread depth; used to define the legal wear-out point in a tire's life. |
| **Tread Width** | The tread width is the distance from outer edge to outer edge of the tread. |
| **Two-Piece Wheel** | A specialty wheel comprising a center section of aluminum or steel that is fastened to an aluminum or steel rim. |
| **U-Rated** | A speed category for a vehicle of a top speed up to 124 mph. |
| **Underinflation** | A condition where a tire is inflated below recommended pressure. |
| **Understeer** | A cornering situation where the front tires generate more sip angle than the rear tires; the tendency of a car to turn less sharply than the driver intends and compensated for by the addition of more steering input. |
| **Undertread** | The portion of the tread compound between the bottom of the tread grooves and the top of the uppermost ply belt. |
| **Undulation** | A slight indentation or wavy appearance on the sidewall surface of an inflated radial tire. Radial body ply cords run straight across the tire from bead to bead and the joining of the ply material in the sidewall area may sometimes cause this condition. Undulating is a common characteristic of radial tires and will not effect the performance of the tire. Refer to the RMA "Tire Information Service Bulletin," VOL 21/#1 12-84, for more information. |
| **Uniformity** | A term describing the amount of radial and lateral force variation in a tire. |
| **Unsprung Weight** | The total weight of a vehicle not supported by the suspension system; tires and wheels, for example. |
| **Upper Sidewall** | The part of a tire's sidewall nearest the tread shoulder. |
| **UTQG** | Uniform Tire Quality Grade; a performance measurement of a tire, based upon its test results in three categories: treadwear, traction, and temperature resistance. |
| **V-Rated** | A speed category for vehicles with a top speed of more than 130 mph. Load index V-speed rated capped at 149 mph. |
| **Variable Integrated Pitch** | Variations in angles and sizes of a tire's tread elements that reduce ride noise levels. |
| **Vulcanization** | The linking together, under heat and pressure, of rubber compound polymers which changes material from a sticky, putty-like substance to an elastic, bouncy substance. |
| **Waddle** | Side-to-side movement of a vehicle at low speeds; caused by a bent wheel or axle or by a tire with high lateral force variation. |
| **Wander** | The tendency of a vehicle to veer or drift to either side from a straight path. |
| **Wheel Bearing** | Most commonly, a tapered roller bearing consisting of tapered rollers, matching races and a cage. Mounted on a hub, they permit the spindle to rotate freely with minimum friction. |
| **Wheel Weights** | Weights that are either clipped, taped, or self-adhered to the inside or outside of the wheel in order to balance the tire/wheel assembly. |
| **Wheelbase** | The distance between the center of the front wheels and the center of the rear wheels. |
| **Wide Oval Tire** | One which has an aspect ratio lower than 75. The Wide Oval design has several advantages other than striking appearance, such as greater handling stability. |
| **Wires** | High tensile, brass plated steel wires, coated with a special adhesion-promoting compound, that are used as tire reinforcement. Belts of radial tires and beads are two common uses. |
| **Z-Rated** | A speed category for a vehicle of a top speed of more than 149 mph. |
| **Zero Offset** | A condition where the centerline of the wheel coincides exactly with the mounting face. |
| **Zero Toe** | A condition in which two tires on the same axle are exactly parallel. |

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