



SURFACE VEHICLE INFORMATION REPORT

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Motorcycle Terminology

RATIONALE

This Terminology is a primarily compendium of motorcycle engineering terms and phrases, and their definitions. The document was prepared to provide definitions for terms that are unique to motorcycling or, when the terms are used in reference to motorcycles, might have a definition that typically varies from general automobile industry usage. Many terms have been extracted verbatim from SAE Standards, Recommended Practices, and Information Reports, and other sources as shown.

Due to the uniqueness of motorcycles and the more active role the motorcycle rider has while riding, and the various potential operating environments, this Terminology was expanded to define terms and phrases of usage, rider safety and behaviors, and other areas that provide clarity for researchers and other not familiar with motorcycling. The definition provided within this document are directed and intended to be applied to certain two- and three-wheel motorized cycles only. Four wheel vehicles may use similar terms but typically other definitions apply.

The Terminology will serve a valuable function by providing a basis for improving motorcycle engineering terminology in many areas. SAE committees, and others, are encouraged to use its contents in the review of words and phrases used in their respective area, and to determine if additions or revisions might be made which could enhance comprehension and communication. This report is pertinent to such areas as vehicle design and development, the description of motorcycle, rider training and education, and the preparation of standards and regulations. Comments on specific terms and definitions can be directed to the SAE Motorcycle Technical Steering Committee.

This Terminology attempts to resolve many communication issues that exist for those who must research, investigate, regulate, educate, engineer, or communicate in the world of motorcycles and their components, or motorcycling or related activities. Some issues include:

As many new technologies have been applied or adapted to motorcycle in the last fifteen years, they have brought their own vocabularies. The new technologies require formal definitions. And while many older technical terms have evolve with the technology, current engineers, researchers, and others that investigate or document motorcycle statistics and data do not have a reference source for the older terminology.

Some current SAE standards have terms defined in ways which are inconsistent with the same terms defined in a different standard.

Within the motorcycle industry there has not been a single source for defining common terminology. As a result, regional manufacturing and development has led to multiple terms for near identical definitions.

This Terminology compiles terminology from a myriad of sources into a single reference document. As language, technology and usage evolves, this Terminology will be reviewed and upgraded as necessary.

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FOREWORD

This report was prepared by the SAE Motorcycle Technical Steering Committee, which solicits suggestions for improvements and additions to be considered in future revisions. Comments should be directed to SAE Headquarters.

The term motorcycle generally refers to a vehicle in which the front caster assembly and the swing arm assembly are attached to the frame body with respective rigid joints that allow movement in their respective pivot axes. The front caster assembly rotates about an axis fixed in the frame body and the swing arm assembly rotates about a lateral axis, also fixed in the frame body. For simple dynamic evaluations, the frame body and swing arm assembly can be considered to be a single rigid body, and the associated lateral and longitudinal coupling is ignored.

This Terminology includes dynamic and handling terminology for two wheeled, single track vehicles from SAE J1451. It references a vehicle axis system that is connected to and moves with the vehicle's frame body, with a mutually perpendicular set of three axes fixed in the longitudinal plane of symmetry of the upright vehicle. The initial orientation of the longitudinal axis is horizontal and in the direction of straight line forward motion, the lateral axis directed toward the right side of the vehicle, and the initially unperturbed vertical axis down and parallel to the gravity vector.

NOTE: The vehicle axis system can be placed anywhere in the vehicle but is usually at the frame body's center of gravity or at ground level below that point.

A corresponding earth-fixed axis system aligned with the horizontal plane that has axes parallel to the initial orientation of the vehicle axis system, provides an inertial reference frame. This ground based axis system is used to describe a vehicle trajectory or motion referenced to a fixed ground point.

Motions are described by translations along the vehicle fixed axes, and the following angular rotations: roll about the longitudinal axis, yaw about the vertical axis, and pitch about the lateral axis.

NOTE: If the longitudinal axis is not defined as passing through the front and rear tire contact points, the apparent rolling motion or lean of the rider, relative to the ground, represents a combination of roll and translation.

In simple dynamic terms a motorcycle consists of three nominally rigid bodies: the front caster assembly, the frame body, and the swing arm assembly. More detailed analyses can include additional rigid body elements such as the rotating wheels and drive line components, as well as flexibility within the component bodies.

The terms "bike" and "vehicle" generally means motorcycle accordingly in these definitions and the term "vehicle" generally means motorcycle unless noted otherwise.

1. SCOPE

The motorcycle terminology presented herein addresses two-wheel single track vehicles, as well as motorized three wheel cycles. Although two-wheeled, single track scooters and mopeds are similar to traditional motorcycles, they have many characteristics which differentiate them from motorcycles, and while some terms will apply, this Terminology addresses motorcycles specifically, unless otherwise noted. Likewise, some three wheel cycles may have some similar design features and share components with motorcycle, the dynamics and handling of three wheel vehicles differs from two wheel, single track motorcycles.

The terminology presents definitions covering the following subjects: dynamics and handling of single track vehicles, motorcycle categories and types, motorcycle crash dynamics and technology, and in-depth crash investigations, motorcycle design and components, systems, and equipment, motorcycle operation, operational environments and hazards, rider protective equipment including helmets and clothing, rider behaviors, motorcycle safety, competitive motorcycle events and the specialized motorcycles used those events, key national motorcycle-related organization, selected phrases commonly used uniquely by motorcyclists, and related performance measures and selected test criteria.

NOTE: Motorcycle emission terminology does not vary from automobile emission terminology and is not unique and therefore not included in this report.

1.1 Purpose

To provide definitions for terms that are unique to motorcycling or, when the terms are used in reference to motorcycles might have a definition that varies from general automobile industry usage.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

NOTE: Terms and/or definitions from the following sources were used. If a definition was used directly, attribution of the source follows the definition. If a definition was derived or adapted, no attribution is listed. All source reference documents are listed below.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

Goodsell, D., "Dictionary of Automotive Engineering, Second Edition," (Warrendale, Society of Automotive Engineers, Inc., 1995), doi:10.4271/R-159. (Dict. of AE)

SAE J47	Maximum Sound Level Potential for Motorcycles
SAE J131	Motorcycle Turn Signal Lamps
SAE J213	Motorcycle Classifications
SAE J584	Motorcycle Headlamps
SAE J645	Automotive Transmission Terminology
SAE J670	Vehicle Dynamics Terminology
SAE J1101	Test Procedure for Parking Stability of Motorcycles
SAE J1167	Motorcycle Stop Lamp Switch
SAE J1192	Performance of Audible Warning Devices for Motorcycles
SAE J1241	Fuel and Lubricant Tanks for Motorcycles
SAE J1248	Performance Requirements for Parking Stability of Motorcycles
SAE J1287	Measurement of Exhaust Sound Pressure Levels of Stationary Motorcycles
SAE J1306	Motorcycle Auxiliary Front Lamps
SAE J1349	Engine Power Test Code - Spark Ignition and Compression Ignition - As Installed Net Power Rating
SAE J1451	A Dictionary of Terms for the Dynamics and Handling of Single Track Vehicles (Motorcycles, Mopeds, and Bicycles)
SAE J1577	Replaceable Motorcycle Headlamp Bulbs
SAE J1578	Motorcycle Side Stand Retraction Test Procedure
SAE J1846	Characterizing a Test Surface for Motorcycle Side Stand Retraction Performance Testing
SAE J2009	Discharge Forward Lighting System and Subsystems

SAE 2825 Measurement of Exhaust Sound Pressure Levels of Stationary On-Highway Motorcycles

SAE J2982 Riding Range Test Procedure for On-Highway Electric Motorcycles

SAE J3007 Top Speed Test Procedure for Electric Motorcycles

2.1.2 ISO Publications

Available from International Organization for Standardization, 1 rue de Varembe, Case Postale 56, CH-1211 Geneva 20, Switzerland, Tel: +41-22-749-01-11, www.iso.org.

ISO 6725-1981(E) Road vehicles - Dimensions of two-wheeled mopeds and motorcycles - Terms and definitions

ISO 6726 Mopeds and Motorcycles with Two Wheels - Masses - Vocabulary

ISO 7117:2010 Motorcycles - Measurement Method for Determining Maximum Speed

ISO 11838 Motorcycle and Motorcycle-Rider Kinematics - Vocabulary

ISO 13232-1 Motorcycle - Test and Analysis Procedures for Research Evaluation of Motorcyclist Crash Protective Devices Fitted to Motorcycles, Part 1: Definitions, 2005-12-15

2.2 Other Standards

European Standard 1621-1:1998 Motorcyclists' protective clothing against mechanical impact - Part 1: Requirements and test methods for impact protectors (EN 1621-1)

European Standard 1621-2:2003 Motorcyclists' back protectors - Part 2: Requirements and test methods (EN 1621-2)

2.3 Government Standards

National Highway Traffic Safety Administration (U.S.) - Federal Motor Vehicle Safety Standards (FMVSS)

Ministry of Transportation (Canada) - Canadian Motor Vehicle Safety Standards (CMVSS)

2.4 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

Motorcycle Accident In-Depth Study (MAIDS) Final Report (2.0) - In-Depth Investigations of Accidents Involving Powered Two Wheelers, 2009 (MAIDS)

Motorcycle Safety Foundation® - Rider Education and Training System - Vocabulary: Definitions and Connections (MSF)

Paul Thede and Lee Parks - Race Tech's Motorcycle Suspension Bible (2010) (Thede et al)

Vittore Cossalter - Motorcycle Dynamics (2nd Edition) (Cossalter)

Hurt, H.H., Ouellet, J.V., and Thom, D.R., Motorcycle Accident Cause Factors and Identification of Countermeasures Volume I: Technical Report; Traffic Safety Center, University of Southern California, U.S. Dot-HS-5-01160, January 1981 (Final Report) (Hurt)

Phil Irving - Motorcycle Engineering Clymer Publications, 5th printing, 1973. (Irving)

3. DEFINITIONS

3.1 A.B.A.T.E.

A Brotherhood Against Totalitarian Enactments. Formed in the early 70s by motorcycle riders that strongly resisted mandatory helmet laws. Currently ABATE is a motorcyclists' rights organization dedicated to preserving individual freedom and promoting safety by supporting rider training, safety and educational programs.

3.2 ABBREVIATED INJURY SCALE (AIS)

Categorization of injury severity which ranks injury severity from 0 to 6, 0 being no injury and 6 being currently unsurvivable/untreatable, representing a subjective consensus measure of the probability of dying. (ISO 13232-1)

3.3 ABREAST (RIDING)

Riding side-by-side in the same traffic lane.

3.4 ABS

See *antilock brake system*.

3.5 ACCELERATION

Time rate of change of velocity. (SAE J1451)

3.6 ACCELERATION CONTROL INPUT

Positioning, or application of force to, a control means of the propulsion system (e.g., throttle grip, cruise control) for the purpose of maintaining or changing vehicle longitudinal velocity (speed). See *throttle (control)*. (SAE J1451)

3.7 ACCELERATION INDEX

Ratio of steer torque to lateral acceleration in a steady state turn. (SAE J1451)

3.8 ACCIDENT

A term typically used to describe a traffic mishap/collision/crash. Realistically, such mishaps are not accidental but almost always the result of a combination of factors and errors and/or negligent acts that combine to cause the mishap.

3.9 ACCESSORY

Equipment items added to a motorcycle for convenience, improving appearance, increasing storage capacity, or entertainment. It also could refer to a position of the ignition switch that allows operation of accessories.

3.10 ACCESSORY CONTROLS

Those controls not related to vehicle movement, operable by the rider or passenger, that regulate the environment (windscreen height adjusters, vents or heater controls), or communications or entertainment devices.

3.11 ADVENTURE (MOTORCYCLE)

A dual purpose model that is equipped to meet Federal equipment, safety, and emission requirements and state regulations for legal operation on public roads and highways and also has off-road capabilities. Typically, dual purpose models are based on an off-road motorcycle chassis with higher ground clearance, longer suspension travel, tires with aggressive patterns and deep treads for grip on dirt surfaces, and a taller seat height. These models have an upright riding position with foot pegs positioned below or slightly forward of the rider's body.

3.12 ADVENTURE TOURING (MOTORCYCLE)

A dual purpose motorcycle that is equipped to meet Federal equipment, safety, and emission requirements and state regulations for legal operation on public roads and highways and also has off-road capabilities. Similar to an Adventure model, the touring models are typically larger, heavier, and equipped with a more powerful engine for sustained high speed riding on paved surfaces and have increased cargo capacity.

3.13 AERODYNAMIC DRAG FORCE

Longitudinal component of the aerodynamic forces acting on the motorcycle. Force opposite to the direction of travel due to aerodynamic resistance, measured in the longitudinal plane of symmetry of the vehicle. For some engineering purposes, it can be defined, alternatively, as parallel to the relative wind vector. (SAE J1451)

3.14 AERODYNAMIC LIFT

Force in the direction of the vertical axis caused by aerodynamic forces acting upon the motorcycle. (SAE J1451)

3.15 AERODYNAMIC PITCH MOMENT

Moment about the lateral axis caused by the aerodynamic forces and moments acting on the motorcycle. (SAE J1451)

3.16 AERODYNAMIC ROLL MOMENT

Moment about the longitudinal axis caused by the aerodynamic forces and moments acting on the motorcycle. (SAE J1451)

3.17 AERODYNAMIC SIDESLIP ANGLE

Angle formed between the longitudinal axis and the relative wind velocity in the horizontal plane. (SAE J1451)

3.18 AERODYNAMIC YAW MOMENT

Moment about the vertical axis caused by the aerodynamic forces and moments acting on the motorcycle. (SAE J1451)

3.19 AFTERMARKET PART

Any part or component installed on a motorcycle that was not manufactured by or for or installed or sold by the Original Equipment Manufacturer.

3.20 AIRBAG

See *inflatable restraint system*.

3.21 AIR COOLED

An engine which relies on direct air flow over the engine for cooling. The transfer of heat can be facilitated with metal fins covering the outside of the cylinder heads and cylinders which increase the surface area upon which the cooling air acts.

3.22 AIS

See *abbreviated injury scale*.

3.23 ALIGNING MOMENT (ON TIRE)

Moment, at the tire contact point, due to tire/roadway interaction which tends to keep the wheel plane parallel to the motorcycle velocity vector. See also SAE J670. (SAE J1451)

3.24 ALIGNMENT VARIATION

Displacements and deformations of a rotating wheel and the suspension caused by forces and moments applied to the wheel. (SAE J1451)

3.25 ALTERNATOR

An alternating current electrical generator; a mechanical device that converts rotational energy (usually derived from the crankshaft of a motorcycle engine) into alternating current (AC). The alternating current can be rectified to direct current (DC), to power the ignition, charge the battery, and power other electrical circuits in a motorcycle.

3.26 AMA

See *American Motorcyclist Association*.

3.27 AMBIENT WIND VELOCITY

Horizontal component of the wind velocity relative to the roadway (horizontal plane). (SAE J1451)

3.28 AMERICAN MOTORCYCLIST ASSOCIATION (AMA)

A 235000+ member organization (2016) that pursues, protects and promotes the interests of motorcyclists, and is the premier sanctioning organization for motorcycle racing and other competitive events in the U.S.

3.29 American National Standards Institute (ANSI)

An organization that coordinates the U.S. voluntary consensus standards system which promulgates and maintains a wide variety of standards related to engineering and motor vehicles.

3.30 ANGULAR ORIENTATION OF THE MOTORCYCLE

Orientation of the vehicle-fixed axis system (relative to the earth-fixed system) which is given by the following three angular rotations: roll is rotation about the longitudinal axis, yaw is rotation about the vertical axis, and pitch is rotation about the lateral axis. (SAE J1451)

3.31 ANGULAR VELOCITY

Rotational velocity about an axis, which does not include any translational component. (SAE J1451)

3.32 ANSI

See *American National Standards Institute*.

3.33 ANTI-DIVE

A design or suspension parameter that reduces the amount of nose-down pitching or front suspension compression that occurs during moderate to heavy braking.

3.34 ANTILOCK BRAKE SYSTEM (ABS)

A system that is designed to automatically control wheel slip or prevent sustained wheel lock-up when braking.

3.35 ANTISKID BRAKES

See *antilock brake system*.

3.36 ANTI-SQUAT

The tendency of rear suspension to extend under longitudinal acceleration. (SAE J1451)

3.37 APPROACH ANGLE

The smallest angle, in a planar side view of a motorcycle, formed by the surface on which the motorcycle is standing and a line tangent to the front tire circumference and touching any part of the motorcycle forward of the front fender). (SAE J1451)

3.38 ARMOR (BODY PROTECTION)

Padding or other impact-absorbing or hard-shelled or other load distributing material fitted to a motorcyclist's apparel. Often used to help protect spine, elbows, shoulders, etc.

3.39 ASPHALT SEALER

Material used to fill and repair cracks in pavement which may create a slick surface causing loss of traction. (MSF)

3.40 ASYMPTOTIC STABILITY

The state of stability at a prescribed trim condition where, for a small disturbance or control input, the motorcycle motion variables tend to return to the trim values. (SAE J1451)

3.41 AUTOCYCLE

A three-wheel vehicle that has a steering wheel and seating that does not require an operator to straddle or sit astride it, and is typically equipped with doors and occupant restraints.

3.42 AUTOMATIC FUEL SHUTOFF VALVE

A device that prevents fuel flow from the fuel tank to the fuel delivery system, except when the motorcycle engine is running. (SAE J1241)

3.43 AUTOMATIC TRANSMISSION

A transmission in which ratio changes are affected automatically as the motorcycle moves without manual assist. (SAE J645)

3.44 AUTO STABILIZING

The dynamic behavior of the front fork assembly whereby it tends to return to a centered position if proceeding in a straight line, or to a trim condition if the motorcycle is in a turn. (SAE J1451)

3.45 AUXILIARY LAMP

A lighting unit, including sealed beam, intended to supplement either the upper or the lower beam from motorcycle headlamps, and is normally mounted at or near the headlamp height on the motorcycle. (SAE J1306)

3.46 AXIS SYSTEM

A coordinate system fixed in the vehicle, a component body, or the roadway (earth), for purposes of defining positions and motions. (SAE J1451)

3.47 AXLE

Rigid shaft fixed to the motorcycle (front and rear) that positions and supports the rotating wheels. For dynamic analysis purposes, an axle is the shaft which comprises the spin axis of a wheel. (SAE J1451)

3.48 AXLE OFF-SET

Perpendicular distance between the front axle and the centerline of the front fork tubes. (SAE J1451)

3.49 BACK PROTECTOR

Motorcyclist protective equipment typically consisting of a formed, hard plastic shell with padding, fitted with straps to keep it positioned over the back region. The hard shell is intended reduce the severity of injuries caused by impacts by deflecting or distributing force over a larger area, and the padding is used to help absorb the force and cushion the impact to the rider's backbone, back and ribs.

3.50 BACKING IT IN (TO A CORNER)

Common motorcyclist phrase for a high speed turn entry technique in which the rider initiates rear wheel slide to change the direction of the motorcycle while counter steering, to control the motorcycle attitude through the corner. During this maneuver, the rear wheel of the motorcycle is not following the track of the front wheel.

3.51 BAFFLES

Perforated plates in the exhaust system that reduce the amount of noise generated by the engine as measured at the output of the exhaust system. Baffles also increase the amount of backpressure in the exhaust system as most engines are designed to operate with a specified amount of backpressure.

3.52 BANK ANGLE

See *roll angle*. (SAE J1451)

3.53 BANK MOMENT

See *roll moment*. (SAE J1451)

3.54 BANK-TO-TURN

The process of rolling a motorcycle to accomplish a turn. (SAE J1451)

3.55 BANK VELOCITY

See *roll velocity*. (SAE J1451)

3.56 BANKING

Common motorcyclist term used to describe rolling actions or angles. See *roll angle*. (SAE J1451)

3.57 BANKING PLANE

See *roll plane*.

3.58 BATTERY CAPACITY (ELECTRIC MOTORCYCLE)

The kilowatt-hours (kWh) of energy provided by the vehicle battery between the time it is fully charged and the time the vehicle completes a range test conducted in accordance with SAE J2982, Section 7. (SAE J2982)

3.59 BELT DRIVE

Motorcycle drive train that utilizes a toothed belt and pulleys to transmit power from the engine/transmission to the rear wheel.

3.60 BERM

A raised embankment at the side of a roadway or path.

3.61 BIAS PLY

Type of tire construction where the plies, or belts, are laid under the tread of the tire at an angle to the direction of rotation of the tire. (MSF)

3.62 BICYCLE

A human-powered, pedal-driven two-wheel vehicle, having a single track, bank-to-turn with an auto-stabilizing front steering assembly, and having handlebars for steering with a straddle seat for the rider.

3.63 BIKE

Commonly used informal term for motorcycle.

3.64 BLACK ICE

Layer of clear ice or heavy frost over the pavement that allows the black color of the pavement to show through the ice. Therefore, black ice is very difficult to detect. (MSF)

3.65 BLIND CORNER

Turn in the road where, due to environment factors, the roadway is hidden from view, so the rider cannot see the path of travel or what may be in the path of travel.

3.66 BLIP (THE THROTTLE)

Common motorcyclist phrase used to describe a short, quick throttle input. (MSF)

3.67 BODY

Refers to the rigid part of a vehicle or vehicle component, for dynamic analysis or descriptive purposes. (SAE J1451)

3.68 BOTTOMING

See *bottoming out*. (SAE J1451)

3.69 BOTTOMING OUT

Typically used to indicate the vehicle suspension system is at maximum compression. Can also refer to the frame or chassis contacting the ground plane or roadway. (SAE J1451)

3.70 BOTTOMS OUT

See *bottoming out*.

3.71 BOUNCE MOTION

Translational motion of the vehicle in the direction of an earth-fixed vertical axis. Vertical translation if the vehicle is upright. See also SAE J670. (SAE J1451)

3.72 BRAKING

The process of decelerating a vehicle by applying the brake control(s). (SAE J1451)

3.73 BRAKE CONTROL

The device actuated directly by the rider in order to slow or stop the motorcycle or hold it stationary.

3.74 BRAKE FADE

Reduction in the braking torque (stopping force) on a wheel for a given level of rider brake control force; caused by thermal or water factors, for example.

3.75 BRAKE HORSEPOWER

An engine's power output measured at the crankshaft before the loss in power caused by frictional losses in the transmission's and drive train's bearings, gears, oil drag, etc. (SAE J213)

3.76 BRAKE LEVER

A hand-operated control which, when actuated, causes one or more brakes to be applied. See *brake control*.

3.77 BRAKE LEVER FORCE

The force applied to the brake lever or pedal.

3.78 BRAKE PEDAL

A foot-operated control which, when actuated, causes one or more brakes to be applied. See *brake control*.

3.79 BRAKE PEDAL FORCE

The force applied to the brake pedal, usually by the rider.

3.80 BRAKE(S)

The device which applies a force to slow or stop the movement of the motorcycle, or to hold it stationary. See *brake system*.

3.81 BRAKE HORSEPOWER

An engine's power output measured at the crankshaft before the loss in power caused by frictional losses in the transmission's and drive train's bearings, gears, oil drag, windage, etc.

3.82 BRAKE SYSTEM

The combination of parts consisting of the control (lever or pedal), the brake, and the components that provide the functional link between the control and the brake, whose function is to progressively reduce the speed of a moving motorcycle, bring it to a halt, and keep it stationary when halted. The engine and the effect of engine braking are excluded from the brake system.

3.83 BRAKIE

See *stoppie*.

3.84 BRAKING

The process of decelerating a vehicle by applying the brake control(s). (SAE J1451)

3.85 BRAKING CONTROL INPUT

A application of force to a brake lever or brake pedal for the purpose of changing or maintaining vehicle longitudinal velocity (speed). (SAE J1451)

3.86 BRAKING DISTANCE

Distance traveled between initial brake application and a complete stop. (MSF)

3.87 BRAKING TIME

The elapsed time from when the brakes are first applied until the motorcycle is completely stopped. (MSF)

3.88 BRUSH GUARDS

Formed plastic shields fitted to the ends of the handlebars and intended to protect the hands from light brush, small rocks and debris thrown up from a leading motorcycle's rear tire (roost), mud, or from cold. See also *hand guards*.

3.89 BUDDY PEGS

Aftermarket passenger foot pegs.

3.90 BUMP START

See *push start*.

3.91 BUMP STROKE

The distance or length the shock absorber can compress.

3.92 BURNISH(ING)

A procedure used to break-in or seat new brake pads or brake shoes. A series of repeated stops from specific speeds heats up the brake friction materials allowing it to conform to the surface of the rotors and drums for improved stopping performance. In addition, the thermal conditioning of the friction materials during this process will increase the stability of braking effectiveness over a greater range of temperatures compared to when they were first installed.

3.93 CAFÉ RACER (MOTORCYCLE)

A motorcycle designed or modified to resemble road racing motorcycles from the 1950s and 1960s. Typical characteristics include very low or clip-on handlebars, rear set footrests, a single seat and tail section, and engine or brake performance modifications.

3.94 CAMBER

Inclination of the plane of a wheel relative to the inertial vertical. (SAE J1451)

3.95 CAMBER ANGLE

Roll or tilt angle of the plane of a wheel, measured relative to vertical, assuming the roadway is horizontal. Referred to as inclination angle in SAE J670. (SAE J1451)

3.96 CAMBER FORCE

Tire lateral force due to wheel camber angle. (SAE J1451)

3.97 CAMBER STIFFNESS

Change in tire lateral force due to a change in camber angle, usually evaluated around zero camber angle and at zero tire slip angle.

NOTE: Stiffness is a word of art referring to a gradient or sensitivity. (SAE J1451)

3.98 CAMBER THRUST

See *camber force*. (SAE J1451)

3.99 CAMBER TORQUE

Component about the vertical axis of moments applied from the road plane to the wheel due to camber angle when the tire slip angle is zero. (SAE J1451)

3.100 CAPSIZE

Describes a motorcycle falling over to the side. (SAE J1451)

3.101 CAPSIZE MODE

A usually low frequency dynamic characteristic of the vehicle. If stable, a disturbed vehicle will gradually return to an upright or trim roll angle; and if unstable, the vehicle will gradually roll and turn from its original direction of travel. If the capsize instability is slow, on the order of seconds, it is easy for the rider to control. (SAE J1451)

3.102 CARBURETOR

A device for vaporising liquid fuel and mixing it, in appropriate proportions, with air to create an air/fuel mixture that internal combustion engines burn to generate power.

3.103 CARGO NET

Net or webbing with multiple hooks useful for securing cargo loads to a motorcycle.

3.104 CARPET SLED

An apparatus used for motorcycle side stand retraction performance testing and consisting of a piece of 15 x 15 cm (approximately 6.0 x 6.0 inches) plywood approximately 1.9 cm (3/4 inch) thick. Covering one 15 x 15 cm face shall be a 15 x 15 cm piece of carpet meeting the requirements of SAE J1846. The backing of the carpet shall be affixed to the plywood with strong adhesive. Screwed into the middle of each edge of plywood shall be a small eyebolt in which a piece of chain approximately 30 cm (12 inches) long can be hooked onto. The opposite end of the chain shall be attached to a force measurement device such as a spring scale. (SAE J1846)

3.105 CASTER

Refers to the longitudinal distance, at the ground, between the vertical plane through the wheel spin axis and the projected point of intersection of the steering axis at the ground. For a motorcycle, see *mechanical trail*. (SAE J1451)

3.106 CASTER ANGLE

See *rake angle*. (SAE J1451)

3.107 CASTER MECHANISM

A physical device in which a rolling wheel trails behind a pivot axis and is free to swivel to provide a self-centering effect on the wheel. For example, a typical front fork assembly. For in-line, two-wheel vehicles, caster combined with an angled steering axis (rake), contributes to directional stability at speed. (SAE J1451)

3.108 CATEGORY

For motorcycle classification purposes, the general purpose and intended usage for which the motorcycle is designed and equipped. There are five primary categories: on-road, restricted use, dual purpose, off-road, and competition. (SAE J213)

3.109 CC

See *cubic centimeters*.

3.110 CENTER HUB STEER(ING)

See *hub-center steer(ing)*. (SAE J1451)

3.111 CENTER LINE OF THE MOTORCYCLE

Any line which is parallel to the ground and in the vertical plane which bisects the front wheel and rear wheels with the steering centered. See also *longitudinal plane of symmetry*.

3.112 CENTER OF GRAVITY (C.G.)

Point in a free rigid body where, if a force is applied, only translational acceleration results. Conversely, if a force is applied to a free body at any point other than the center of gravity, a rotational acceleration will occur, due to the resulting moment about the center of gravity. (SAE J1451)

3.113 CENTER STAND

A mechanical device with two contact surfaces which supports an upright stationary motorcycle by raising the back wheel off the ground. The stand operates against spring tension which retracts the stand to a stowed position when not in use. (SAE J1248)

3.114 C.G.

See *center of gravity*. (SAE J1451)

3.115 CENTRIFUGAL CASTER

Self-centering effect created by the rotation of a wheel and gyroscopic moments. (SAE J1451)

3.116 CENTRIFUGAL CLUTCH

A clutch mechanism that uses centrifugal force to bring friction elements into contact with the clutch plates. Engagement and disengagement is a function of engine rotational speeds (RPMs).

3.117 CENTRIFUGAL FORCE

An apparent force that is evidenced by increasing lateral (side) loads on motorcycle tires when cornering. For example, the higher the velocity while cornering, at a given turn radius, the higher the lateral loads on the tires; experienced as the force that tends to move a vehicle toward the outside of a turn. For dynamic analysis purposes, an apparent force or acceleration at a point on a rotating body perpendicular to the axis of rotation. (SAE J1451)

3.118 CENTRIPETAL ACCELERATION

When turning or cornering at a given forward velocity, a lateral acceleration vector pointed toward the outside of the turn. A lateral acceleration due to turning or cornering at a given forward velocity. (SAE J1451)

3.119 CHAIN

A series of interlinked metal rings forming a length or continuous loop, or a series of pairs of links interconnected by pairs of rods, which in the case of a roller chain may be hardened steel rollers. (*Dict. of AE*)

3.120 CHAIN DRIVE

A motorcycle drive train that utilizes a chain and sprockets to transmit power from the engine/transmission to the rear wheel.

3.121 CHARGE-DISCHARGE CYCLE (ELECTRIC MOTORCYCLE)

A charge-discharge cycle shall mean the process involving the vehicle battery being fully recharged following discharge to the point that the "End of Test Criteria" in SAE J2982, Section 7 are met and then subsequently discharged to the point that the End of Test Criteria are met again. (SAE J2982)

3.122 CHATTERING

A series of quick rattling or clicking sounds or vibrations. This may be experienced in the drivetrain during clutch engagement or in the suspension while braking.

3.123 CHEST PROTECTOR

Motorcyclist protective equipment typically consisting of a formed, hard plastic shell to deflect and/or distribute force and padding to help absorb the impact forces applied to the rider's body, and fitted with straps to keep it properly positioned.

3.124 CHOKE

A mechanical device for enriching (more fuel, less air) the fuel/air mixture for a "cold" engine start. (*MSF*)

3.125 CHOP THE THROTTLE

Common motorcyclist term for rapidly closing the throttle from an open position.

3.126 CHOPPER (MOTORCYCLE)

A generic term for a customized motorcycle with a specific style and design, usually the result of aftermarket modification. A popular chopper style typically features lengthened forks and increased rake angles, while other styles use normal fork lengths and rake angles. Choppers generally have modified suspension, a small front tire and a wide rear tire, a lowered seating position and a modified exhaust system. The usual rider's position is rearward-inclined with foot pegs positioned forward.

3.127 CLICKERS

External damping adjusters on suspension components. (*Thede, et al*)

3.128 CLIP-ON HANDLEBARS

Short handlebars mounted individually to each fork tube.

3.129 CLIP-ONS

See *clip-on handlebars*.

3.130 CLOSED LOOP CONTROL

See *feedback control*. (*SAE J1451*)

3.131 CLUTCH

A mechanism for engaging or disengaging the transmission of engine power to the drivetrain for the purpose of starting the engine, idling, or shifting gears in the transmission.

3.132 CLUTCH LEVER

A hand control located on the left-side of the handlebar that, when compressed (pulled toward the handlebar), disengages the clutch and thereby disengaging the transmission of engine power to the drivetrain.

3.133 COAXIAL STEERING FRONT SUSPENSION

A front suspension similar to telescopic forks except that the spring and damper are located within the steering head pipe not within the telescopic forks. The upper end of the spring/damper unit is attached at the top of the steering stem and the lower end is located on the fork brace.

3.134 COEFFICIENT OF FRICTION

The ratio of the translational force applied between two adjacent surfaces to the force pressing them together. Can be "static" or "sliding". Coefficient of static friction is the value just before relative motion occurs between the two surfaces. Coefficient of sliding friction is after relative motion occurs. See *friction*. For example, a measure of the amount of friction or grip between a vehicle's tires and the roadway surface. (*SAE J1451*)

3.135 COMBINED BRAKING SYSTEM (CBS)

Where at least two brakes on different axles are actuated by the operation of a single control. (FMVSS 122)

3.136 COMPETITION (EVENTS)

Organized or sanctioned racing, timed or judged events that are conducted under established rules and procedures, usually requiring specialized motorcycles, riding gear, and equipment.

3.137 COMPETITION MOTORCYCLE

A motorcycle designed and equipped or modified to operate in a competitive event. Some motorcycles are marketed and sold as "Competition Only," meaning that those models are intended for operation on a closed or designated course in competitive event and generally cannot be used on public roads or for recreational off-road riding as these models do not comply with Federal equipment, safety, exhaust emission, and noise regulations. (SAE J213-2014)

3.138 COMPLIANCE (MECHANICAL)

Structural deflection, axial or torsional bending. (SAE J1451)

3.139 COMPRESSION (ENGINE)

In an internal combustion engine, the piston compresses the air/fuel mixture to increase thermal efficiency which results in more power output.

3.140 COMPRESSION (SUSPENSION)

In spring or strut suspension systems, the reaction caused by upward movement of the wheel. Also refers to the relative displacement of sprung and unsprung masses in which the distance between the masses decreases from that at static condition, for any type of suspension system. (SAE J1451)

3.141 COMPRESSION DAMPING

Resistance to suspension compression velocity. (SAE J1451)

3.142 COMPRESSION RATIO

The ratio between the volume of the cylinder and combustion chamber when the piston is at the bottom of its stroke, and the volume of the combustion chamber when the piston is at the top of its stroke.

3.143 CONFIGURATION

For motorcycle classification purposes, configuration includes: number of wheels in contact with the ground, whether the wheels are arrayed in symmetric or asymmetric design, whether the vehicle banks-to-turn or steers-to-turn, number of wheel tracks, whether the vehicle steering occurs with the front or rear wheels, and rider and passenger capacity. (SAE J213)

3.144 CONICITY

The deviation from true symmetry about the wheel plane of a tire, such that, instead of the tread profile forming an ideal cylinder, it forms a cone. In consequence, the tire's path would be curving and not straight. (SAE J1451)

3.145 CONICITY FORCE

Tire lateral force due to conicity when the tire slip angle and the camber angle are zero. It can be positive or negative. (SAE J1451)

3.146 CONTACT INJURY

An injury which is due to direct contact with the environment, a vehicle or a vehicle component, another person or animal, or other object involved in the mishap.

3.147 CONTACT PATCH

Portion of a tire surface that is in contact with the roadway. (SAE J1451)

3.148 CONTROL INPUT

Positioning, or application of force, to a control means of the vehicle (typically, steering, braking, rider lean or throttle control) for the purpose of maintaining or inducing a change in the motion of the vehicle. (SAE J1451)

3.149 CONSPICUITY

The extent to which a person or object can be visually observed relative to the surrounding environment. In traffic, the motorcycle represents a smaller overall visual target as compared to automobiles, trucks, or buses and as a result is sometimes not seen or is overlooked by other vehicle drivers. The inability of other motorists to “see” or accurately judge the approaching speed of a motorcycle has sometimes been attributed to the lack of conspicuity or noticeability.

3.150 CONTACT INJURY

An injury which is due to contact with the environment, a vehicle or a vehicle component, another person or animal, or other object involved in the mishap. (MAIDS)

3.151 CONTRIBUTING FACTORS

Any human, vehicle or environmental factor which the investigator considers having contributed to the overall outcome of the mishap. The precipitating event may or may not be considered to be a contributing factor. (MAIDS)

3.152 CONVENTIONALLY LOCATED FUEL TANK

Conventionally located fuel tanks satisfy all of the following conditions:

- a. The tank is mounted between the seat and the steering head.
- b. The major portion of the tank is not enclosed by the structure of the motorcycle.
- c. The tank is positioned such that the operator's knee is located within the region formed by projecting the tank outline in a horizontal direction perpendicular to the motorcycle's vertical plane of symmetry. See also *normally installed position (fuel tank)*. (SAE J1241)

3.153 CONVENTIONAL MOTORCYCLE

A motorized two-wheel, single track, of nominal symmetry, front steering, roll-to-turn vehicle, with rear wheel drive, a straddle seat for the riders, equipped with handlebars for steering, with a hand operated throttle control. (SAE J213)

3.154 CONVERGENT STABILITY

State of stability, at a prescribed trim condition, where, a small disturbance or control input causes an oscillatory vehicle response of decreasing amplitude and the vehicle motion variables tend to return to the trim values. See also *asymptotic stability*. (SAE J1451)

3.155 CORNERING FORCE

Tire lateral force due mainly to slip and camber angle on cornering. (SAE J1451)

3.156 CORNERING LIMIT

Maximum vehicle lateral acceleration at a given speed; usually determined by road clearance of the vehicle's rigid structures (frame, engine cylinder heads, muffler, etc.) or by tire/roadway adhesion. (SAE J1451)

3.157 CORNERING STIFFNESS

Change in the lateral force due to a change in slip angle.

NOTE: Stiffness is a word of art referring to a gradient or sensitivity. See also SAE J670. (SAE J1451)

3.158 CORNERING WEAVE

A combined pitching and yawing motion which may occur in a steady-state turn, under certain adverse conditions. See *pitch-yaw coupling*. (SAE J1451)

3.159 COULOMB DAMPING

Damping in which a constant force due to sliding (Coulomb) friction opposes the vibratory motion. (SAE J1451)

3.160 COULOMB FRICTION

Friction force between two surfaces sliding against one another. Kinetic friction. (SAE J1451)

3.161 COUNTERBALANCE (RIDER ACTION)

Adjusting body position and weight to balance a motorcycle at very low speeds. Requires rider weight shift that is counter to, or opposes, the lean of the motorcycle. (SAE J1451)

3.162 COUNTER STEER (INITIATING A TURN)

Rider steer torque in the direction opposite to that which the vehicle is turning or is intended to turn. The counter steering torque necessary to initiate the roll angle required for a given turn should be distinguished from the sustained steer torque and steering angle necessary to maintain a constant radius and roll angle in a steady state turn. At all but the lowest speeds, the initial counter steer torque and angle are both opposite the desired turn direction. The sustained trim steer angle is typically in the same direction as the turn. (SAE J1451)

3.163 COUNTER STEER (CORRECTING A SLIDE)

If the rear wheel slides in a curve (i.e., the rear sideslip is much greater than the front) in this condition the handlebar must be steered away from the curve and reduced, or opposite steering input must be adopted to compensate. (SAE J1451)

3.164 COUPLED MOTIONS

Coupling may occur when different vehicle motions and/or vehicle component motions (e.g., about different axes) are lightly damped and have similar frequencies. For example, it can result in the combined roll and yaw motions associated with the weave mode. (SAE J1451)

3.165 COURSE ANGLE

See *path angle*. (SAE J1451)

3.166 COVER THE BRAKE

A riding technique in which the rider maintains a position near, or light contact with, the brake controls to decreased reaction time in applying the brakes for an emergency stop. This may apply to either the front or rear brake controls on a motorcycle.

3.167 CRASH

Any collision or upset of a motorcycle which results in property damage and/or personal injury to the motorcyclist.

3.168 CRASH BAR(S)

Crash bar(s) more appropriately called engine guard(s) are intended to protect the engine and body panels from contact with the roadway. A common arrangement of loop of steel tube mounted to each side of a motorcycle's lower frame. See *engine guards*.

3.169 CRASH PROTECTION DEVICES

Designs or devices intended to reduce of the frequency or severity of motorcyclist injuries during collisions or upsets.

3.170 CROSS COUNTRY (RACING)

A generic term for long distance races conducted on natural terrain. Race can be point-to-point or multiple loops. Most race are at least 100 miles in length. Usually, enduro bikes are used for this type of racing as reliability is as important as speed. See *enduro (bike or motorcycle)*.

3.171 CRUISER (MOTORCYCLE)

A laid-back styled on-road motorcycle intend primarily for boulevard cruising with the motorcycle's appearance considered as important as performance. These decedents of customized choppers offer factory-built reliability and warranty, with a classic modified look characterized by low seat and swept back handlebars, an engine tuned to emphasize torque, with a strong exhaust note and an abundance of chrome. The models generally have an upright or rearward-inclined riding position with foot pegs positioned forward. (SAE J213)

3.172 CUBIC CENTIMETERS (CC)

A metric measure of volume commonly used for cylinder displacement in internal combustion engines. Cylinder displacement times the number of cylinders equals the nominal engine size.

3.173 CUBIC INCH DISPLACEMENT (CID)

An American measure of volume used for cylinder displacement in internal combustion engines. Cylinder displacement times the number of cylinders equals the nominal engine size.

3.174 CULPABILITY APPORTIONMENT

The degree or extent, expressed as a percentage, that the motorcycle rider, motorcycle passenger, other vehicle driver, environment or vehicle is to blame in a crash. (MAIDS)

3.175 CURB MASS

Curb weight divided by gravitational constant. (SAE J1451)

3.176 CURB WEIGHT

The total weight of the motorcycle including all operating fluids, at recommended levels and fuel level of more than 90% of rated capacity, but without operator, passengers, or cargo. (SAE J1451)

3.177 CUSTOM (MOTORCYCLE)

An on-road motorcycle with stylistic and/or structural changes to the "standard" mass-produced models offered by major manufacturers. There are two basic types of custom motorcycles: those individual motorcyclists have altered the appearance of their machines or have modified by custom motorcycle builders or shops, and "Custom" models produced by major motorcycle manufacturers. (SAE J213)

3.178 DAMPER

A device which produces a reactive force or torque as a function of translational or rotational velocity, respectively. For example, a shock absorber. (SAE J1451)

3.179 DAMPER RATE

The amount of translational force or rotational torque produced by a damper as a function of velocity. (SAE J1451)

3.180 DAMPER STROKE

Displacement between the damper actuator positions when fully extended and when fully compressed. (SAE J1451)

3.181 DAMPING

For an oscillatory system, progressive reduction in the amplitude of oscillation. Dampers provide a reactive force or torque which opposes translational or rotational velocity. Damping can result from damping devices or from other damping properties of the vehicle. (SAE J1451)

3.182 DAMPING RATIO

A measure of the amount of damping for oscillatory systems. See also SAE J670. (SAE J1451)

3.183 DAMPING TORQUE OF THE FRONT CASTER ASSEMBLY

Damping torque about the steer axis at a given steer angle velocity which does not include damping due to tire and road surface interaction. (SAE J1451)

3.184 DEGREE-OF-FREEDOM

Characteristic motion of the vehicle, or a relative motion between component bodies. Measured about or along an axis. One or more degrees-of-freedom are associated with each mode of motion. See also SAE J670. (SAE J1451)

3.185 DEPARTMENT OF TRANSPORTATION (DOT)

A U.S. Federal agency whose mission includes ensuring viable transportation systems that meets national interests. The National Highway Traffic Safety Administration (NHTSA) is the regulatory agency for motor vehicles and is organized under the DOT.

3.186 DEPARTURE ANGLE

The smallest angle, in a planar side view of a motorcycle, formed by the surface on which the motorcycle is standing and a line tangent to the rear tire circumference and touching any part of the motorcycle aft of the rear tire. (SAE J1451)

3.187 DEPLOYED POSITION (SIDE/CENTER STAND)

See *extended position (side/center stand)*.

3.188 DESERT RACING

A generic term for various types of long distance off-road, cross country races, conducted in a desert terrain, using courses that are either point to point, or multiple loops (or laps).

3.189 DESERT SLED (MOTORCYCLE)

A highly modified or purpose-built competition motorcycle intended for racing in desert terrain. Generally heavier and less agile than a motocross model, these bikes compete at higher speed and for extended distances.

3.190 DESIGN LOAD (ELECTRICAL)

The electrical load specified by the number and type of bulbs (or other electrical load devices) to be operated by each circuit of a switch. (SAE J1167)

3.191 DESTABILIZE

To reduce the stability or damping, e.g., of a characteristic motion or dynamic mode. (SAE J1451)

3.192 DIRECTIONAL CONTROL

Control made by the rider in order to maintain or to change, the path and path angle of the motorcycle to an intended value. Also called lateral-directional control. (SAE J1451)

3.193 DIRECTIONAL STABILITY

Tendency of a vehicle to maintain a desired path under normal steering control, when subjected to directional disturbances such as cross-winds, roadway camber changes, or braking on irregular surfaces. (SAE J1451)

3.194 DIRT BIKE (MOTORCYCLE)

A generalized term for any off-road only motorcycle. See *off-road motorcycle*.

3.195 DIRT TRACK RACING

A form of closed course racing where motorcycles compete on a dirt or clay track. See also *flat track racing*.

3.196 DISC BRAKES

A braking system consisting of a disc rotor fixed to the rotating wheel and one or more sets of brake pads, located within a non-rotating caliper, which press against the disc when the brake lever or pedal is applied.

3.197 DISTURBANCE RESPONSE

Motion of the motorcycle resulting from external force or moment inputs applied to the motorcycle. (SAE J1451)

3.198 DIVE

Nose-down pitching due to front suspension compression and rear suspension extension during moderate to heavy braking. (SAE J1451)

3.199 DIVERGENCE

A motion with progressively increasing amplitude; an instability. (SAE J1451)

3.200 DIVERGENT INSTABILITY

State of instability at a prescribed trim where small disturbance or control input causes an ever-increasing value of the motion variables. (SAE J1451)

3.201 DIVIDER

A physical barrier which separates different traffic lanes. (MAIDS)

3.202 DOT

See *Department of Transportation*.

3.203 DOT HELMET

See *DOT-compliant helmet*.

3.204 DOT-COMPLIANT HELMET

A motorcycle safety helmet that the manufacturer certifies meets the requirements of the U.S. Department of Transportation's Federal Motor Vehicle Safety Standard 218 Motorcycle Helmets.

3.205 DOWN PIPE(S)

Motorcycle exhaust system routed down from the engine to near or below the bottom of the frame.

3.206 DOWN TUBES

Frame members; typically extending from the steering head, down and under the engine and back to the swing arm pivot.

3.207 DRAG (AERODYNAMIC)

See *aerodynamic drag force*.

3.208 DRAG RACING (EVENT)

A timed competitive event in which specially prepared motorcycles compete two at a time to be first to cross a finish line. The 1000 foot (304.8 m) race track consist of two side-by-side, straight lanes on a concrete or asphalt surface. The race begins from a standing start and the racers accelerate through the finish line. Electronic timing and speed sensing systems are used to record the elapsed time and terminal speed for each lane.

3.209 DRESSER (MOTORCYCLE)

A large motorcycle complete with a full touring package such as fairing, windshield, saddle bags, comfortable seat and other decorative and functional accessories.

3.210 DRIFT

Controlled lateral slide in a turn. (SAE J1451)

3.211 DRIFT OUT

Increase in the turning radius. (SAE J1451)

3.212 D-RING

A metal ring in the shape of the capital letter "D" commonly used to fasten the chinstrap on a motorcycle safety helmet. The retention system may have double D-rings where the chinstrap is threaded between the two rings to prevent loosening or a single D-ring with a sliding friction bar to hold the chinstrap from moving. (MSF)

3.213 DRIVE BELT

A continuous loop of toothed belt used to transmit motive power from the engine/transmission to the rear wheel, for the purpose of propelling the motorcycle. The belt itself has teeth or ribs on the inner side to engage a toothed pulley attached to the output shaft of the transmission (drive pulley) and to engage with the toothed pulley attached to the rear wheel (driven pulley).

3.214 DRIVE CHAIN

A continuous loop of chain used to transmit motive power from the engine/transmission to the rear wheel, for the purpose of propelling the motorcycle. The roller-type chain meshes with the teeth of a sprocket attached to the output shaft of the transmission (drive sprocket) and meshes with the teeth of a sprocket attached to the rear wheel (driven sprocket).

3.215 DRIVER'S/RIDER'S BLIND SPOT

An area behind or on either side of a vehicle that cannot be seen with rear view mirrors or is blocked from view.

3.216 DRIVE SHAFT

A metal or composite shaft used to connect and transmit motive power from the engine/transmission to the rear wheel, for the purpose of propelling the motorcycle.

3.217 DRIVE TRAIN

The mechanism that transmits motive power from the motor/transmission to a driven wheel. (SAE J1451)

3.218 DROP(PING) THE CLUTCH

See *dump(ing the clutch)*.

3.219 DRUM BRAKES

A braking system consisting of a drum fixed to the rotating wheel and one or more sets of brake shoes, fixed to the vehicle, which press against the drum when the brake lever or pedal is applied.

3.220 DRY CLUTCH

A clutch that operates with dry friction and pressure plates.

3.221 DRY WEIGHT

The total weight of the motorcycle without an operator, passenger, cargo and excluding all operational fluids. (SAE J1451)

3.222 DUAL PURPOSE (MOTORCYCLE)

Designed for most types of terrain, the name describes an on-road motorcycle that is equipped to meet federal equipment, safety, and emission requirements and state regulations for legal operation on public roads and highways and also has off-road capabilities. Compared to on-road only models, these models feature high ground clearance, longer suspension travel, and tires with aggressive patterns and deep treads for grip on dirt surfaces. These models have an upright riding position with foot pegs positioned below rider's body. Also called dual sport (bike or motorcycle).

3.223 DUAL SPORT (MOTORCYCLE)

See *dual purpose (bike or motorcycle)*.

3.224 DUMP(ING) THE CLUTCH

Common motorcyclist term to describe an abrupt release of the clutch lever that results in immediate engagement of the engine to the drivetrain. At lower engine speeds, this action may cause the motorcycle to lurch forward and/or stalls the engine. At higher engine speeds, this action causes the rear wheel to spin or the motorcycle to wheelie.

3.225 DYNAMICS

Branch of classical mechanics concerned with the motions of a body or an assembly of bodies due to applied forces and moments. (SAE J1451)

3.226 EARLES FORK

A variation of a leading link fork where the pivot point is behind the front wheel, the design is constructed of tubing, with conventional "shock absorbers" mounted near the front axle. The Earles fork has a very small wheelbase change under braking or under compression, unlike telescopic forks.

3.227 ECM

See *electronic control module*.

3.228 ECU

See *electronic control unit*.

3.229 EFFECTIVE CENTER OF TIRE CONTACT

Center of pressure in the contact area of the tire and the roadway. (SAE J1451)

3.230 EIGENVALUE

A value, derived from mathematical modeling and equations of motion, which describes the frequency, amplitude, and damping properties of a mode of motion. (SAE J1451)

3.231 ELBOW GUARD(S)

Motorcyclist protective equipment typically consisting of a formed plastic shield with padding, fitted with straps or elasticized material to keep it properly positioned, and intended to protect the elbow from injury due to impact and/or abrasion.

3.232 ELECTRONIC CONTROL MODULE (ECM)

A system that controls multiple functions, such as the emission system functions with ignition timing and fuel injection, antilock and other advanced braking systems, airbags, and other complex electronic systems. A module may contain more than one electronic control unit (ECU).

3.233 ELECTRONIC CONTROL UNIT (ECU)

A generic term for any embedded system that controls an electrical system or subsystems in a motor vehicle.

3.234 EMISSION COMPLIANT OFF-ROAD MOTORCYCLES

Vehicles in this category comply with Federal exhaust emission requirements for Nonroad Recreational Engines and Vehicles.

3.235 ENCLOSED MOTORCYCLE

A motorcycle with a structure partially or fully enclosing the rider and passenger and that is an integral part of the motorcycle chassis. (SAE J213)

3.236 ENDO

See *end-over*.

3.237 END-OVER

Extreme forward pitching motion; typically resulting in the rider and the vehicle pivoting over the front wheel in the direction of travel and crashing. Also called an endo or a forward flip over. (SAE J1451)

3.238 ENDURANCE RACING

A form of motorcycle racing in which the objective is to test the durability of equipment and endurance of riders. Endurance races can be run either to cover a set distance as quickly as possible, or the distance traveled in a specified time period, typically 6 hours, 12 hours or 24 hours. Endurance races are conducted on paved race tracks or off-road venues depending on the style or type of motorcycle raced.

3.239 ENDURO (MOTORCYCLE)

An off-road racing motorcycle used in enduros. These models typically combine the long-travel suspension of an off-road motocross bike with an engine that is reliable and durable over long distances, and some may be fitted with oversize gas tanks for adequate range. On-road versions of this model are dual purpose motorcycles.



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3.240 ENDURO (EVENT)

A competitive motorcycle sporting event or race run predominantly off-road and cross country from one point to another, usually lasting hours or days, and emphasizing timing, speed, and reliability in which riders must complete a series of stages while keeping to a specific schedule. Also, a motorcycle intended to compete in such an event; See *enduro (bike or motorcycle)*. (SAE J1451)

3.241 ENDUROCROSS (EVENT)

A hybrid motorcycle competition, a mix of supercross, trials, and enduro racing held indoors over an obstacle course. Enduro cross tracks incorporate various elements of off-road riding, including natural terrains such as rocks, boulders, logs, jumps, sand, mud, a water-hole and special man-made obstacles.

3.242 ENGINE BRAKING

Use of retarding forces within an engine to slow a vehicle down, in addition to or instead of using the service brakes. When the throttle is closed, the air flow to the intake manifold is greatly restricted and a braking effect results.

3.243 ENGINE DISCONNECTED

When the engine is no longer internally connected to the driving wheel(s), i.e., the clutch is disengaged, and/or the transmission is in neutral. (FMVSS 122)

3.244 ENGINE DISPLACEMENT

The volume swept by all the pistons inside the cylinders of a reciprocating engine in a single movement from top dead center (TDC) to bottom dead center (BDC). It is commonly measured in cubic centimeters (cc), or in cubic inches (cu in) or (ci).

3.245 ENGINE GUARD(S)

A structure or structures intended to protect the engine casing during a motorcycle crash or fall. A common arrangement is a loop or loops of steel tube mounted on a motorcycle's lower frame, near the front of the engine. Sometimes called crash bars.

3.246 ENGINE SEIZURE

The locking in place of an engine's internal moving parts for some reason, such as overheating, lack of lubrication, improper clearances or fueling issues (lean condition, detonation, etc.) Engine seizure can lock up or stop rear wheel rotation until, or unless, the rider disengages the clutch.

3.247 ENGINE STOP SWITCH

A handlebar-mounted switch that cuts electrical power to the engine ignition system. Sometimes referred to as the engine cutoff switch, emergency stop switch or kill switch (because it "kills" the engine).

3.248 ENVIRONMENTAL FACTOR

Any factor, other than the vehicle factors or human factors, which has any effect on the mishap or injury causation during the pre-crash, crash, or post-crash time periods. (MAIDS)

3.249 EQUATIONS OF MOTION

A set of mathematical relationships which describes and quantifies the dynamics of the vehicle. (SAE J1451)

3.250 EQUILIBRIUM

A state of balance among the forces and moments acting on the vehicle, wherein the resulting motions have achieved steady-state values. (SAE J1451)

3.251 EVASIVE MANEUVER

The act of avoiding a hazard by using the controls of a motorcycle; emergency braking or swerving.

3.252 EXEMPT SCOOTER

A lightweight, low speed scooter that generally has a maximum design speed not exceeding 30 mph (50 km/h) and/or an engine displacement of 50cc or less and their use is restricted to certain speed limited roads, and operation on high speed highways is not allowed. Scooters in this category may be exempt from certain federal and state, province or territorial licensing, insurance, equipment, helmet, or emission requirements. See also *restricted use scooters*.

3.253 EXTENDED POSITION (SIDE/CENTER STAND)

The position of a side or center stand which provides support for a motorcycle while parked. See also *retracted position*.

3.254 (MAKING) EYE CONTACT

A riding technique that involves looking at other driver's eyes in an attempt to determine if they notice and react to the motorcyclist's presence. (MSF)

3.255 EYE PROTECTION

Any device that is designed to protect the motorcyclist eyes from airborne debris or wind; e.g., safety glasses, goggles, helmet face shield.

3.256 FACE SHIELD

A clear or tinted transparent plastic shield, attached to a helmet, intended to provide eye and face protection from the wind or air-borne debris. On full-face helmets, the shield pivots up and down to allow access to the face. On open-face helmets, the shield may be fixed or pivoting. The face shield is also called a visor.

3.257 FADE

See *brake fade*.

3.258 FAIRING, FRONT

A device mounted on the front a motorcycle, whose purpose may include providing the rider some measure of protection from rain, wind and airborne hazards, reducing drag, modifying appearance, and/or managing airflow to cooling components. Fairings may be attached to either the front caster assembly or frame body assembly, and may incorporate head lamp(s), turn signals, a transparent windshield, accessories, and storage for small items. (SAE J1451)

3.259 FALSE NEUTRAL

A shifter position between gears resulting in neither gear being engaged.

3.260 FATAL INJURIES

One or more injuries which result in death within 30 days. (MAIDS)

3.261 FEASIBILITY (OF A PROTECTIVE DEVICE)

Capacity of a proposed protective device to reduce injuries to a given body region, and to reduce injury cost, in a significant percentage of the accident population, without increasing injury cost in more than a very small percentage of the accident population. (ISO 13232-1)

3.262 FEATHERING THE CLUTCH

See *slipping the clutch*.

3.263 FEDERATION INTERNATIONALE DE MOTOCYCLISME

Global governing/sanctioning body of motorcycle racing founded in 1904, representing 111 national motorcycle federations.

3.264 FEEDBACK CONTROL

Process of comparing vehicle output motions with desired (input) motions in order to regulate against disturbances and follow a prescribed path. The rider accomplishes this by making control actions in response to perceived cues, thereby establishing feedback loops. Also called closed-loop control. See also *rider control*. (SAE J1451)

3.265 FIELD CALIBRATION (SOUND LEVEL METER)

Calibration of the sound level meter using an external sound level calibrator, an internal calibration means, or any other method which will ensure the required accuracy of sound level meter readings. (SAE J1287)

3.266 FIM

See *Federation Internationale de Motocyclisme*.

3.267 FITTED TO THE MOTORCYCLE

Attached in a permanent manner to a structural element of the motorcycle. (ISO 13232-1)

3.268 FIXED CONTROL

A mode of vehicle control wherein the position of some point of a control system is held fixed. Rider fixing the steering system typically results in an unstable condition. (SAE J1451)

3.269 FLAT FOUR

A four (4) cylinder motorcycle engine with a centralized crankcase and two pairs of horizontally opposed cylinders.

3.270 FLAT TRACKER (MOTORCYCLE)

A highly modified or purpose-built competition motorcycle for racing on dirt tracks.

3.271 FLAT TRACK RACING (EVENT)

A generic term for various types of races conducted on circle-, oval-, or oblong-shaped mostly dirt tracks ranging from 1/4 mile to 1 mile in length. Generally, the course is smooth and flat, without banking in the corners.

3.272 FLIP-FACE HELMET

See *modular helmet*.

3.273 FLOODED ENGINE

A condition where the engine's combustion chamber(s) contains an excessive amount of fuel.

3.274 FLOOR BOARDS

A flat structure(s) mounted to the bottom portion of the motorcycle to provide a secure place for the rider and or passenger to support their feet while riding. Unlike foot pegs that locate the rider's feet in fixed positions, floorboards allow riders to move their feet into different positions for comfort. Foot pegs and floor boards are also known collectively as foot rests.

3.275 FMVSS - FEDERAL MOTOR VEHICLE SAFETY STANDARDS

U.S. federal vehicle and equipment standards. All motor vehicles and motor vehicle tires and equipment sold in the U.S. must comply with these federal safety regulations. NHTSA has the responsibility for creating and maintaining the safety standards.

3.276 FMVSS NO. 106, BRAKE HOSES

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for motorcycle brake hoses and fittings.

3.277 FMVSS NO. 108, LAMPS, REFLECTIVE DEVICES, AND ASSOCIATED EQUIPMENT

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements pertaining to required lighting, turn signals and markers for motorcycles, and motor driven cycles.

3.278 FMVSS NO. 111, REARVIEW MIRRORS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for equipping motorcycles and motor-driven cycles with rearview mirrors.

3.279 FMVSS NO. 116, MOTOR VEHICLE BRAKE FLUIDS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for marking brake reservoirs with the DOT symbol specified by the brake fluid manufacturer.

3.280 FMVSS NO. 119, NEW PNEUMATIC TIRES FOR VEHICLES OTHER THAN PASSENGER CARS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for motorcycle and motor-driven cycle manufacturers to ensure tires are properly marked with the tire manufacturer's certification in the form of the DOT symbol, and subsequent identifying characters.

3.281 FMVSS NO. 120, TIRE SELECTION AND RIMS FOR MOTOR VEHICLES OTHER THAN PASSENGER CARS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for motorcycle and motor-driven cycle manufacturers to equip vehicles with new tires and rims that are of adequate size and load rating. The tires and rim must be marked with the DOT symbol, and other required markings.

3.282 FMVSS NO. 122, MOTORCYCLE BRAKE SYSTEM

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for the stopping performance of motorcycles, or motor-driven cycles based on the classification of the vehicle. Vehicles must also comply with requirements such as brake fluid reservoir volume and other requirements as listed in the standard.

3.283 FMVSS NO. 123, MOTORCYCLE CONTROLS AND DISPLAYS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for the location, operation, identification, and illumination of motorcycle and motor-driven cycle controls and displays, and requirements for side stands and footrests.

3.284 FMVSS NO. 205, GLAZING MATERIALS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for windscreens used on motorcycles and motor-driven cycles.

3.285 FMVSS NO. 218, MOTORCYCLE HELMETS

The U.S. Federal Motorcycle Vehicle Safety Standard which contains the requirements for a DOT-compliant helmet.

3.286 FOOT PEG(S)

Post-like fixtures protruding horizontally from each side (left and right) of the motorcycle intended to support the rider's or passenger's foot by engaging the juncture of the sole of the rider's boot and front vertical surface of the boot heel. The operator's foot pegs are normally located in a position where the rider can operate foot pedals or foot levers without lifting his or her feet from the foot pegs. Foot pegs and floor boards are also known collectively as foot rests.