Glossary (based on ACPA definitions)

A

AASHTO
American Association of State Highway and Transportation Officials

Absolute Specific Gravity
The ratio of the weight referred to in a vacuum of a given volume of material at a stated temperature to the weight referred to a vacuum of an equal volume of gas-free distilled water at the same temperature.

Absolute Volume (of ingredients of concrete or mortar)
The displacement volume of an ingredient of concrete or mortar; in the case of solids, the volume of the particles themselves, including their permeable or impermeable voids but excluding space between particles; in the case of fluids, the volume which they occupy.

Absorbed Moisture
The moisture held in a material and having physical properties not substantially different from those of ordinary water at the same temperature and pressure.

Absorbed Water
Water held on surfaces of a material by physical and chemical forces, and having physical properties substantially different from those of absorbed water or chemically combined water at the same temperature and pressure.

Absorption
The amount of water absorbed under specific conditions, usually expressed as a percentage of the dry weight of the material; the process by which the water is absorbed.

Acceleration
Increase in rate of hardening or strength development of concrete.

Accelerator
An admixture which, when added to concrete, mortar, or grout, increases the rate of hydration of hydraulic cement, shortens the time of set, or increases the rate of hardening or strength development.

ACI
American Concrete Institute

ACPA
American Concrete Pavement Association

ACR
Alkali-carbonate reaction

Admixture
A material other than water, aggregates, and portland cement (including air-entraining portland cement, and portland blast furnace slag cement) that is used as an ingredient of concrete and is added to the batch before and during the mixing operation.

Aggregate
Granular material, such as sand, gravel, crushed stone, crushed hydraulic-cement concrete, or iron blast furnace slag, used with a hydraulic cementing medium to produce either concrete or mortar.

Aggregate Blending
The process of intermixing two or more aggregates to produce a different set of properties, generally, but not exclusively, to improve grading.

Aggregate Gradation
The distribution of particles of granular material among various sizes, usually expressed in terms of cumulative percentages larger or smaller than each of a series of sizes (sieve openings) or the percentages between certain ranges of sizes (sieve openings). See also Grading.

Aggregate Interlock
The projection of aggregate particles or portion of aggregate particles from one side of a joint or crack in concrete into recesses in the other side of the joint or crack so as to effect load transfer in compression and shear and maintain mutual alignment.

Aggregate, Angular
Aggregate particles that possess well-defined edges formed at the intersection of roughly planar faces.

Aggregate, Coarse
See Coarse Aggregate

Aggregate, Dense-graded
Aggregates graded to produce low void content and maximum weight when compacted.

Aggregate, Fine
See Fine Aggregate

Aggregate, Gap- graded
Aggregate so graded that certain intermediate sizes are substantially absent.

Aggregate, Maximum Size
See Maximum Size of Aggregate

Aggregate, Nominal Maximum Size
In specifications for and descriptions of aggregate, the smallest sieve opening through which the entire amount of the aggregate is permitted to pass; sometimes referred to as "maximum size (of aggregate)."

Aggregate, Open-graded
Concrete aggregate in which the voids are relatively large when the aggregate is compacted.

Agitating Truck
A vehicle in which freshly mixed concrete can be conveyed from the point of mixing to that of placing; while being agitated, the truck body can either be stationary and contain an agitator or it can be a drum rotated continuously so as to agitate the contents.

Agitation
The process of providing gentle motion in mixed concrete just sufficient to prevent segregation or loss of plasticity.

Air Content
The amount of air in mortar or concrete, exclusive of pore space in the aggregate particles, usually expressed as a percentage of total volume of mortar or concrete.

Air Void
A space in cement paste, mortar, or concrete filled with air; an entrapped air void is characteristically 1 mm (0.04 in.) or more in size and irregular in shape; an entrained air void is typically between 10μm and 1 mm (34 ft and .04 in.) in diameter and spherical (or nearly so).

Air-Entraining
The capabilities of a material or process to develop a system of minute bubbles of air in cement paste, mortar, or concrete during mixing.

Air-Entraining Agent
An addition for hydraulic cement or an admixture for concrete or mortar which causes air, usually in small quantity, to be incorporated in the form of minute bubbles in the concrete or mortar during mixing, usually to increase its workability and frost resistance.

Air-Entraining Cement
A cement that has an air-entraining agenda added during the grinding phase of manufacturing.

Air-Entrainment
The inclusion of air in the form of minute bubbles during the mixing of concrete or mortar.

Alkali-Aggregate Reaction
Chemical reaction in mortar or concrete between alkalis (sodium and potassium) released from portland cement or from other sources, and certain compounds present in the aggregates; under certain conditions, harmful expansion of the concrete or mortar may be produced.

Alkali-Carbonate Reaction
The reaction between the alkalies (sodium and potassium) in portland cement binder and certain carbonate rocks, particularly calcite dolomite and dolomitic limestones, present in some aggregates; the products of the reaction may cause abnormal expansion and cracking of concrete in service.

Alkali-Silica Reaction
The reaction between the alkalies (sodium and potassium) in portland cement binder and certain siliceous rocks or minerals, such as opaline chert, strained quartz, and acisic volcanic glass, present in some aggregates; the products of the reaction may cause abnormal expansion and cracking of concrete in service.

Artificial Turf
Surface texture achieved by inverting a section of artificial turf that is attached to a device that allows control of the time and rate of texturing.

Asphalt
A brown to black bituminous substance that is chiefly obtained as a residue of petroleum refining and that consists mostly of hydrocarbons.

ASR
See, Alkali-Silica Reaction

ASTM
American Society for Testing and Materials

B

Backer Rod
Foam cord that inserts into a joint sealant reservoir and is used to shape a liquid joint sealant and prevent sealant from adhering to or flowing out of the bottom of the reservoir.

Bag (of cement)
A quantity of cement; 42.6 kg in the United States, 39.7 kg in Canada; portland or air-entraining portland cement, or as indicated on the bag for other kinds of cement.

Ball Test
A test to determine the consistency of fresh concrete by measuring the depth of penetration of a steel ball. The apparatus is usually called a Kelly ball.

Bar
A member used to reinforce concrete, usually made of steel.

Barrel (of cement)
A unit of weight for cement: (170.6 kg) net, equivalent to 4 US bags for portland or air-entraining portland cements, or as indicated by the manufacturer for other kinds of cement. (In Canada, 158.8 kg. net per barrel.)

Base
The underlying stratum on which a concrete slab, such as a pavement, is placed.

Base Course
A layer of specified select material of planned thickness constructed on the subgrade or subbase below a pavement to serve one or more functions such as distributing loads, providing drainage, minimizing frost action, or facilitating pavement construction.

Batch
Quantity of concrete or mortar mixed at one time.

Batch Plant
Equipment used for batching concrete materials.

Batch Weights
The weights of the various materials (cement, water, the several sizes of aggregate, and admixtures) that compose a batch of concrete.

Batched Water
The mixing water added to a concrete or mortar mixture before or during the initial stages of mixing.

Batching
Weighing or volumetrically measuring and introducing into the mixer the ingredients for a batch of concrete or mortar.

Beam Test
A method of measuring the flexural strength (modulus of rupture) of concrete by testing a standard unreinforced beam.

Binder
See Cement Paste

Blast-Furnace Slag
The non-metallic byproduct, consisting essentially of silicates and aluminosilicates of lime and other bases, which is produced in a molten condition simultaneously with iron in a blast furnace.

Bleeding
The self-generated flow of mixing water within, or its emergence from, freshly placed concrete or mortar.

Bleeding Rate
The rate at which water is released from a paste or mortar by bleeding, usually expressed as cubic centimeters of water released each second from each square centimeter of surface.

Blended Cement
See Cement, Blended

Blended Hydraulic Cement
See Cement, Blended

Blistering
The irregular rising of a thin layer of placed mortar or concrete at the surface during or soon after completion of the finished operation.

Bond
The adhesion of concrete or mortar to reinforcement or other surfaces against which it is placed; the adhesion of cement paste to aggregate.

Bond Area
The interface area between two elements across which adhesion develops or may develop, as between concrete and reinforcing steel.

Bond Breaker
A material used to prevent adhesion of newly placed concrete from other material, such as a substrate.

Bond Hardness
The support (bond strength) that the metal matrix in a diamond saw blade segment provides to each diamond that is embedded within the matrix.

Bond Strength
Resistance to separation of mortar and concrete from reinforcing steel and other materials with which it is in contact; a collective expression for all forces such as adhesion, friction due to shrinkage, and longitudinal shear in the concrete engaged by the bar deformations that resist separation.

Bond Stress
The force of adhesion per unit area of contact between two surfaces such as concrete and reinforcing steel or any other material such as foundation rock.

Bonded Concrete Overlay
Thin layer of new concrete 5 to 10 cm (2 to 4 in.) placed onto slightly deteriorated existing concrete pavement with steps taken to prepare old surface to promote adherence of new concrete.

Bonding Agent
A substance applied to an existing surface to create a bond between it and a succeeding layer, as between a bonded overlay and existing concrete pavement.

Broom
The surface texture obtained by stroking a broom over freshly placed concrete. A sandy texture obtained by brushing the surface of freshly placed or slightly hardened concrete with a stiff broom.

Bulk Cement
Cement that is transported and delivered in bulk (usually in specially constructed vehicles) instead of in bags.

Bulk Density
The mass of a material (including solid particles and any contained water) per unit volume, including voids.

Bulk Specific Gravity
The ratio of the weight in air of a given volume of a permeable material (including both permeable and impermeable voids normal to the material) at a stated temperature to the weight in air of an equal volume of distilled water at the same temperature.

Bulking Factor
Ratio of the volume of moist sand to the volume of the sand when dry.

Bull Float
A tool comprising a large, flat, rectangular piece of wood, aluminum, or magnesium usually 20 cm (8 in.) wide and 100 to 150 cm (39 to 60 in.) long, and a handle 1 to 5 m (1.1 to 5.5 yd) in length used to smooth unformed surfaces of freshly placed concrete.

Burlap
A coarse fabric of jute, hemp, or less commonly flax, for use as a water-retaining cover for curing concrete surfaces; also called Hessian.

Burlap Drag
Surface texture achieved by trailing moistened coarse burlap from a device that allows control of the time and rate of texturing.

C

Calcareous
Containing calcium carbonate, or less generally, containing the element calcium.

Calcium Chloride
A crystalline solid, $CaC1_2$; in various technical grades, used as a drying agent, as an accelerator of concrete, a deicing chemical, and for other purposes.

Calcium Lignosulfonate
An admixture, refined from papermaking wastes, employed in concrete to retard the set of cement, reduce water requirement and increase strength.

Caliche
Gravel, sand, or desert debris cement by porous calcium carbonate or other salts.

California Bearing Ratio
The ratio of the force per unit area required to penetrate a soil mass with a 19.4 cm^2 circular piston at the rate of 1.27 mm (.05 in.) per min to the force required for corresponding penetration of a standard crushed-rock base material; the ratio is usually determined at 2.5 mm (.10 in.) penetration.

California Profilograph
Rolling straight edge tool used for evaluating pavement profile (smoothness) consisting of a 25-ft frame with a sensing wheel located at the center of the frame that senses and records bumps and dips on graph paper or in a computer.

Capillary
In cement paste, any space not occupied by unhydrated cement or cement gel (air bubbles, whether entrained or entrapped, are not considered to be part of the cement paste).

Capillary Absorption
The action of surface tension forces which draws water into capillaries (i.e., in concrete) without appreciable external pressures.

Capillary Flow
Flow of moisture through a capillary pore system, such as concrete.

Capillary Space
In cement paste, any space not occupied by anhydrous cement or cement gel. (Air bubbles, whether entrained or entrapped, are not considered to be part of the cement paste.)

Carbonation
Reaction between carbon dioxide and the products of portland cement hydration to produce calcium carbonate.

Cast-In-Place
Concrete placed and finished in its final location.

Cement
See Portland Cement

Cement Content
Quantity of cement contained in a unit volume of concrete or mortar, ordinarily expressed as pounds, barrels, or bags per cubic yard.

Cement Factor
See Cement Content

Cement Paste
Constituent of concrete consisting of cement and water.

Cement, Blended
A hydraulic cement consisting essentially of an intimate and uniform blend of granulated blast-furnace slag and hydrated lime; or an intimate and uniform blend of portland cement and granulated blast-furnace slag cement and pozzolan, produced by intergrinding Portland cement clinker with the other materials or by blending Portland cement with the other materials, or a combination of intergrinding and blending.

Cement, Expansive
A special cement which, when mixed with water, forms a paste that tends to increase in volume at an early age; used to compensate for volume decrease due to drying shrinkage.

Cement, High Early-Strength
Cement characterized by producing earlier strength in mortar or concrete than regular cement, referred to in the United States as Type III.

Cement, Hydraulic
Cement that is capable of setting and hardening under water, such as normal portland cement.

Cement, Normal
General purpose portland cement, referred to in the United States as Type I.

Cement, Portland Pozzolan
A hydraulic cement consisting essentially of an intimate and uniform blend of portland cement or portland blast-furnace slag cement and fine pozzolan produced by intergrinding portland cement clinker and pozzolan, by blending portland cement or portland blast-furnace slag cement and finely divided pozzolan, or a combination of intergrinding and blending, in which the pozzolan constituent is within specified limits

Cement-Aggregate Ratio
The ratio, by weight or volume, of cement to aggregate.

Cementitious Materials
Substances that alone have hydraulic cementing properties (set and harden in the presence of water); includes ground, granulated blast-furnace slag, natural cement, hydraulic hydrated lime, and combinations of these and other materials.

Central Mixer
A stationary concrete mixer from which the fresh concrete is transported to the work.

Central-Mixed
Concrete that is completely mixed in a stationary mixer from which it is transported to the delivery point.

Chalking
A phenomenon of coatings, such as cement paint, manifested by the formation of a loose powder by deterioration of the paint at or just beneath the surface.

Coarse Aggregate
See Aggregate, Coarse

Coefficient of Thermal Expansion
Change in linear dimension per unit length or change in volume per unit volume per degree of temperature change.

Cohesion Loss
The loss of internal bond within a joint sealant material; noted by a noticeable tear along the surface and through the depth of the sealant.

Cohesiveness
The property of a concrete mix which enables the aggregate particles and cement paste matrix therein to remain in contact with each

other during mixing, handling, and placing operations; the "stick-togetherness" of the concrete at a given slump.

Combined Aggregate Grading
Particle size distribution of a mixture of fine and coarse aggregate.

Compacting Factor
The ratio obtained by dividing the observed weight of concrete which fills a container of standard size and shape when allowed to fall into it under standard conditions of test, by the weight of fully compacted concrete which fills the same container.

Compaction
The process whereby the volume of freshly placed mortar or concrete is reduced to the minimum practical space, usually by vibration, centrifugation, tamping, or some combination of these; to mold it within forms or molds and around embedded parts and reinforcement, and to eliminate voids other than entrained air. See also Consolidation.

Compression Test
Test made on a specimen of mortar or concrete to determine the compressive strength; in the United States, unless otherwise specified, compression tests of mortars are made on 50-mm (2-in.) cubes, and compression tests of concrete are made on cylinders 152 mm (6 in.) in diameter and 305 mm (12 in.) high.

Compressive Strength
The measured resistance of a concrete or mortar specimen to axial loading; expressed as pounds per square inch (psi) of cross-sectional area.

Concrete
A composite material that consists essentially of a binding medium in which is embedded particles or fragments of relatively inert material filler. In portland cement concrete, the binder is a mixture of portland cement and water; the filler may be any of a wide variety of natural or artificial aggregates.

Concrete Spreader
A machine designed to spread concrete from heaps already dumped in front of it, or to receive and spread concrete in a uniform layer.

Concrete, Normal-Weight
Concrete having a unit weight of approximately 2,400 kg/m^3 made with aggregates of normal weight.

Concrete, Reinforced
Concrete construction that contains mesh or steel bars embedded in it.

Consistency
The relative mobility or ability of fresh concrete or mortar to flow. The usual measures of consistency are slump or ball penetration for concrete and flow for mortar.

Consolidate
Compaction usually accomplished by vibration of newly placed concrete to minimum practical volume, to mold it within form shapes or around embedded parts and reinforcement, and to reduce void content to a practical minimum.

Consolidation
The process of inducing a closer arrangement of the solid particles in freshly mixed concrete or mortar during placement by the reduction of voids, usually by vibration, centrifugation, tamping, or some combination of these actions; also applicable to similar manipulation of other cementitious mixtures, soils, aggregates, or the like. See also Compaction.

Construction Joint
The junction of two successive placements of concrete, typically with a keyway or reinforcement across the joint.

Continuously Reinforced Pavement
A pavement with continuous longitudinal steel reinforcement and no intermediate transverse expansion or contraction joints.

Contract
Decrease in length or volume. See also Expansion, Shrinkage, Swelling.

Contraction Joint
A plane, usually vertical, separating concrete in a structure of pavement, at a designated location such as to prevent formation of objectionable shrinkage cracks elsewhere in the concrete. Reinforcing steel is discontinuous.

Control Joint
See Contraction Joint

Core
A cylindrical specimen of standard diameter drilled from a structure or rock foundation to be bested in compression or examined petrographically.

Corner Break
A portion of the slab separated by a crack that intersects the adjacent transverse or longitudinal joints at about a 45° angle with the direction of traffic. The length of the sides is usually from 0.3 meters to one-half of the slab width on each side of the crack.

Course
In concrete construction, a horizontal layer of concrete, usually one of several making up a lift; in masonry construction, a horizontal layer of block or brick. See also Lift.

CPCD
Concrete pavement contraction design; term used in Texas for jointed plain concrete pavement (see JPCP).

Crack Saw
Small three-wheeled specialty saw useful for tracing the wandering nature of a transverse or longitudinal crack; usually contains a pivot wheel and requires a small diameter crack sawing blade.

Cracking
The process of contraction or the reflection of stress in the pavement.

Crazing
Minute surface pattern cracks in mortar or concrete due to unequal shrinkage or contraction on drying or cooling.

CRC Pavement (CRCP)
Continuously reinforced concrete pavement; see Continuously Reinforced Pavement.

Cross Section
The section of a body perpendicular to a given axis of the body; a drawing showing such a section.

Crushed Gravel
The product resulting from the artificial crushing of gravel with a specified minimum percentage of fragments having one or more faces resulting from fracture. See also Coarse Aggregate.

Crushed Stone
The product resulting from the artificial crushing of rocks, boulders, or large cobblestones, substantially all faces of which possess well-defined edges and have resulted from the crushing operation.

Crusher-Run Aggregate
Aggregate that has been broken in a mechanical crusher and has not been subjected to any subsequent screening process.

Cubic Yard
Normal commercial units of measure of concrete volume, equal to 27 ft^3.

Cure
Maintenance of temperature and humidity for freshly placed concrete during some definite period following placing and finishing to ensure proper hydration of the cement and proper hardening of the concrete.

Curing
The maintenance of a satisfactory moisture content and temperature in concrete during its early stages so that desired properties may develop.

Curing Blanket
A built-up covering of sacks, matting, Hessian, straw, waterproof paper, or other suitable material placed over freshly finished concrete. See also Burlap.

Curing Compound
A liquid that can be applied as a coating to the surface of newly placed concrete to retard the loss of water or, in the case of pigmented compounds, also to reflect heat so as to provide an opportunity for the concrete to develop its properties in a favorable temperature and moisture environment. See also Curing.

D

Damp
Either moderate absorption or moderate covering of moisture; implies less wetness than that connoted by "wet," and slightly wetter than that connoted by "moist." See also Moist and Wet.

Deformed Bar
A reinforcing bar with a manufactured pattern of surface ridges that provide a locking anchorage with surrounding concrete.

Deformed Reinforcement
Metal bars, wire, or fabric with a manufactured pattern of surface ridges that provide a locking anchorage with surrounding concrete.

Density
Mass per unit volume; by common usage in relation to concrete, weight per unit volume, also referred to as unit weight.

Density (dry)
The mass per unit volume of a dry substance at a stated temperature. See also Specific Gravity.

Density Control
Control of density of concrete in field construction to ensure that specified values as determined by standard tests are obtained.

Design Strength
Load capacity of a member computed on the basis of allowable stresses assumed in design.

Deterioration
1) Physical manifestation of failure (e.g., cracking delamination, flaking, pitting, scaling, spalling, staining) caused by environmental or internal autogenous influences on rock and hardened concrete as well as other materials.

2) Decomposition of material during either testing or exposure to service. See also Disintegration and Weathering.

Diamond Grinding
The process used to remove the upper surface of a concrete pavement to remove bumps and restore pavement rideability; also, equipment using many diamond-impregnated saw blades on a shaft or arbor to shave the surface of concrete slabs.

Dispersing Agent
Admixtures capable of increasing the fluidity of pastes, mortar or concretes by reduction of inter-particle attraction.

Distress
Physical manifestation of deterioration and distortion in a concrete structure as the result of stress, chemical action, and/or physical action.

Dolomite
A mineral having a specific crystal structure and consisting of calcium carbonate and magnesium carbonate in equivalent chemical amounts (54.27 and 45.73 percent by weight, respectively); a rock containing dolomite as the principal constituent.

Dowel
1) A load transfer device, commonly a plain round steel bar, which extends into two adjoining portions of a concrete construction, as at a joint in a pavement slab, so as to transfer shear loads.

2) A deformed reinforcing bar intended to transmit tension, compression, or shear through a construction joint.

Dowel Bar (Dowelbar)
See Dowel

Dowel Bar Retrofit (DBR)
See Retrofit Dowel Bars

Dowel Basket
See Load-Transfer Assembly

Drainage
The interception and removal of water from, on, or under an area or roadway; the process of removing surplus ground or surface water artificially; a general term for gravity flow of liquids in conduits.

Dry Process
In the manufacture of cement, the process in which the raw materials are ground, conveyed, blended, and stored in a dry condition. See also Wet Process.

Dry Mix
Concrete, mortar, or plaster mixture, commonly sold in bags, containing all components except water; also a concrete of near zero slump.

Dry Mixing
Blending of the solid materials for mortar or concrete prior to adding the mixing water.

Drying Shrinkage
Contraction caused by drying.

Durability
The ability of concrete to remain unchanged while in service; resistance to weathering action, chemical attack, and abrasion.

Dynamic Load
A variable load; i.e., not static, such as a moving live load, earthquake, or wind.

Dynamic Loading
Loading from units (particularly machinery) which, by virtue of their movement or vibration, impose stresses in excess of those imposed by their dead load.

E

Early Strength
Strength of concrete developed soon after placement, usually during the first 72 hours.

Early-Entry Dry Saw
Lightweight saw equipped with a blade that does not require water for cooling and that allows sawing concrete sooner than with conventional wet-diamond sawing equipment.

Econocrete
Portland cement concrete designed for a specific application and environment and, in general, making use of local commercially produced aggregates. These aggregates do not necessarily meet conventional quality standards for aggregates used in pavements.

Edge Form
Formwork used to limit the horizontal spread of fresh concrete on flat surfaces, such as pavements or floors.

Edger
A finishing tool used on the edges of fresh concrete to provide a rounded edge.

Efflorescence
Deposit of calcium carbonate (or other salts), usually white in color, appearing upon the surface or found within the near-surface pores of concrete. The salts deposit on concrete upon evaporation of water that carries the dissolved salts through the concrete toward exposed surfaces.

Entrained Air
Round, uniformly distributed, microscopic, non-coalescing air bubbles entrained by the use of air-entraining agents; usually less than 1 mm (.04 in.) in size.

Entrapped Air
Air in concrete that is not purposely entrained. Entrapped air is generally considered to be large voids (larger than 1 mm [.04 in.]).

Equivalent Single Axle Loads (ESALs)
Summation of equivalent 18,000-pound single axle loads used to combine mixed traffic to design traffic for the design period.

Evaporable Water
Water set in cement paste present in capillaries or held by surface forces; measured as that removable by drying under specified conditions.

Expansion
Increase in length or volume. See also Autogenous Volume Change, Contraction, Moisture Movement, Shrinkage, and Volume Change.

Expansion Joint
See Isolation Joint

Exposed Aggregate
Surface texture where cement paste is washed away from concrete slab surface to expose durable chip-size aggregates for the riding surface.

Exposed Concrete
Concrete surfaces formed so as to yield an acceptable texture and finish for permanent exposure to view. See also Architectural Concrete.

External Vibrator
See Vibration

F

False Set
The rapid development of rigidity in a freshly mixed portland cement paste, mortar, or concrete without the evolution of much heat, which rigidity can be dispelled and plasticity regained by further mixing without addition of water; premature stiffening, hesitation set, early stiffening, and rubber set are terms referring to the same phenomenon, but false set is the preferred designation.

Fast-Track
Series of techniques to accelerate concrete pavement construction.

Faulting
Differential vertical displacement of a slab or other member adjacent to a joint or crack.

FHWA
Federal Highway Administration

Fibrous Concrete
Concrete containing dispersed, randomly oriented fibers.

Field-Cured Cylinders
Test cylinders cured as nearly as practicable in the same manner as the concrete in the structure to indicate when supporting forms may be removed, additional construction loads may be imposed, or the structure may be placed in service.

Final Set
A degree of stiffening of a mixture of cement and water greater than initial set, generally stated as an empirical value indicating the time in hours and minutes required for a cement paste to stiffen sufficiently to resist to an established degree, the penetration of a weighted test needle; also applicable to concrete and mortar mixtures with use of suitable test procedures. See also Initial Set.

Final Setting Time
The time required for a freshly mixed cement paste, mortar, or concrete to achieve final set. See also Initial Setting Time.

Fine Aggregate
Aggregate passing the 9.5-mm (3/8-in.) sieve and almost entirely passing the 4.75-mm (#4) sieve and predominantly retained on the 75-mm (#200) sieve.

Finish
The texture of a surface after compacting and finishing operations has been performed.

Finishing
Leveling, smoothing, compacting, and otherwise treating surfaces of fresh or recently placed concrete or mortar to produce desired appearance and service. See also Float and Trowel.

Finishing Machine
A power-operated machine used to give the desired surface texture to a concrete slab.

Fixed Form Paving
A type of concrete paving process that involves the use of fixed forms to uniformly control the edge and alignment of the pavement.

Flash Set
The rapid development of rigidity in a freshly mixed portland cement paste, mortar, or concrete, usually with the evolution of considerable heat, which rigidity cannot be dispelled nor can the plasticity be regained by further mixing without addition of water; also referred to as quick set or grab set.

Flexible Pavement
A pavement structure that maintains intimate contact with and distributes loads to the subgrade and depends on aggregate interlock, particle friction, and cohesion for stability; cementing agents, where used, are generally bituminous (asphaltic) materials as contrasted to portland cement in the case of rigid pavement. See also Rigid Pavement.

Flexural Strength
A property of a material or structural member that indicates its ability to resist failure in bending. See also Modulus of Rupture.

Float
A tool (not a darby) usually of wood, aluminum, or magnesium, used in finishing operations to impart a relatively even but still open texture to an unformed fresh concrete surface.

Float Finish
A rather rough concrete surface texture obtained by finishing with a float.

Floating
Process of using a tool, usually wood, aluminum, or magnesium, in finishing operations to impart a relatively even but still open texture to an unformed fresh concrete surface.

Flow
1) Time dependent irrecoverable deformation. See Rheology.
2) A measure of the consistency of freshly mixed concrete, mortar, or cement paste in terms of the increase in diameter of a molded truncated cone specimen after jigging a specified number of times.

Flow Cone Test
Test that measures the time necessary for a known quantity of grout to completely flow out of and empty a standard sized cone; usually used in slab stabilization to determine the water quantity necessary for stabilization grout.

Fly Ash
The finely divided residue resulting from the combustion of ground or powdered coal and which is transported from the fire box through the boiler by flu gasses; used as mineral admixture in concrete mixtures.

Form
A temporary structure or mold for the support of concrete while it is setting and gaining sufficient strength to be self-supporting.

Free Moisture
Moisture having essentially the properties of pure water in bulk; moisture not absorbed by aggregate. See also Surface Moisture.

Free Water
See Free Moisture and Surface Moisture

Full-Depth Patching
Removing and replacing at least a portion of a concrete slab to the bottom of the concrete, in order to restore areas of deterioration.

Full-Depth Repair
See Full-Depth Patching

G

Gap-Graded Concrete
Concrete containing a gap-graded aggregate.

Gradation
See Grading

Grading
The distribution of particles of granular material among various sizes, usually expressed in terms of cumulative percentages larger or smaller than each of a series of sizes (sieve openings) or the percentages between certain ranges of sizes (sieve openings).

Gravel
Granular material predominantly retained on the 4.75 mm (#4)

sieve and resulting from natural disintegration and abrasion of rock or processing of weakly bound conglomerate.

Green Concrete
Concrete that has set but not appreciably hardened.

Green Sawing
The process of controlling random cracking by sawing uniform joint spacing in early age concrete, without tearing or dislocating the aggregate in the mix.

Grooving
The process used to cut slots into a concrete pavement surface to provide channels for water to escape beneath tires and to promote skid resistance.

Gross Vehicle Load
The weight of a vehicle plus the weight of any load thereon.

Gross Volume (of concrete mixers)
In the case of a revolving-drum mixer, the total interior volume of the revolving portion of the mixer drum; in the case of an open-top mixer, the total volume of the trough or pan calculated on the basis that no vertical dimension of the container exceeds twice the radius of the circular section below the axis of the central shaft.

H

Hairline Cracking
Barely visible cracks in random pattern in an exposed concrete surface which do not extend to the full depth or thickness of the concrete, and which are due primarily to drying shrinkage.

Hardening
When portland cement is mixed with enough water to form a paste, the compounds of the cement react with water to form cementitious products that adhere to each other and to the intermixed sand and stone particles and become very hard. As long as moisture is present, the reaction may continue for years, adding continually to the strength of the mixture.

Harsh Mixture
A concrete mixture that lacks desired workability and consistency due to a deficiency of mortar.

Harshness
Deficient workability and cohesiveness caused by insufficient sand or cement, or by improperly graded aggregate.

Header
A transverse construction joint installed at the end of a paving operation or other placement interruptions. To a contractor, a header is the location at which paving will resume on the next day.

Heat of Hydration
Heat evolved by chemical reactions of a substance with water, such as that evolved during the setting and hardening of portland cement.

Heavy-Weight Aggregate
An aggregate of very high unit weight, such as barium, boron, or iron ore, steel shot or punchings, which forms a high density mortar of concrete when bound together with hardened cement paste.

Heavy-Weight Concrete
Concrete in which heavy aggregate is used to increase the density of the concrete; unit weights in the range of 165 to 330 lb/ft^3 are attained.

High Range Water-Reducing Admixture
See Water-Reducing Admixture (high range)

High Early-Strength Cement
See Cement, High Early-Strength

High Early-Strength Concrete
Concrete that, through the use of high-early-strength cement or admixtures, is capable of attaining specified strength at an earlier age than normal concrete.

Honeycomb
Concrete that, due to lack of the proper amount of fines or vibration, contains abundant interconnected large voids or cavities; concrete that contains honeycombs was improperly consolidated.

Horizontal-Axis Mixer
Concrete mixers of the revolving drum type in which the drum rotates about a horizontal axis.

Hot-Pour Sealant
Joint sealing materials that require heating for installation, usually consisting of a base of asphalt or coal tar.

Hydrated Lime
A dry powder obtained by treating quicklime with sufficient water to convert it to calcium hydroxide.

Hydration
The chemical reaction between cement and water which causes concrete to harden.

Hydraulic Cement
A cement that is capable of setting and hardening under water due to the chemical interaction of the water and the constituents of the cement.

Hydroplaning
To go out of steering control by skimming the surface of a wet road.

I

Incentive
Barely visible cracks in random pattern in an exposed concrete surface which do not extend to the full depth or thickness of the concrete, and which are due primarily to drying shrinkage.

Inclined-Axis Mixer
A truck with a revolving drum that rotates about an axis inclined to the bed of the truck chassis.

Incompressibles
Small concrete fragments, stones, sand or other hard materials that enter a joint sealant, joint reservoir, or other concrete pavement discontinuity.

Initial Set
A degree of stiffening of a mixture of cement and water less than

final set, generally stated as an empirical value indicating the time in hours and minutes required for cement paste to stiffen sufficiently to resist to an established degree the penetration of a weighted test needle; also applicable to concrete or mortar with use of suitable test procedures. See also Final Set.

Initial Setting Time
The time required for a freshly mixed cement paste to acquire an arbitrary degree of stiffness as determined by specific test.

Inlay
A form of reconstruction where new concrete is placed into an area of removed pavement; The removal may be an individual lane, all lanes between the shoulders or only partly through a slab.

Isolation Joint
A pavement joint that allows relative movement in three directions and avoids formation of cracks elsewhere in the concrete and through which all or part of the bonded reinforcement is interrupted. Large closure movement to prevent development of lateral compression between adjacent concrete slabs; usually used to isolate a bridge.

J

Joint
A plane of weakness to control contraction cracking in concrete pavements. A joint can be initiated in plastic concrete or green concrete and shaped with later process.

Joint Depth
The measurement of a saw cut from the top of the slab to the bottom of the cut.

Joint Deterioration
See Spalling, Compression

Joint Filler
Compressible material used to fill a joint to prevent the infiltration of debris and to provide support for sealant.

Joint Sealant
Compressible material used to minimize water and solid debris infiltration into the sealant reservoir and joint.

Joint Shape Factor
Ratio of the vertical to horizontal dimension of the joint sealant reservoir.

Joint, Construction
See Construction Joint

Joint, Contraction
See Contraction Joint

Joint, Expansion
See Expansion Joint

Jointed Plain Concrete Pavement (JPCP)
Pavement containing enough joints to control all natural cracks expected in the concrete; steel tiebars are generally used at longitudinal joints to prevent joint opening, and dowel bars may be used to enhance load transfer at transverse contraction joints depending upon the expected traffic.

Jointed Reinforced Concrete Pavement (JRCP)
Pavement containing some joints and embedded steel mesh reinforcement (sometimes called distributed steel) to control expected cracks; steel mesh is discontinued at transverse joint locations.

K

Keyway
A recess or groove in one lift or placement of concrete, which is filled with concrete of the next lift, giving shear strength to the joint. See also Tongue and Groove.

L

Laitance
A layer of weak material containing cement and fines from aggregates, brought to the top of overwet concrete, the amount of which is generally increased by overworking and over-manipulating concrete at the surface by improper finishing.

Layer
See Course

Lean Concrete
Concrete of low cement content.

Life-Cycle Cost Analysis
The process used to compare projects based on their initial cost, future cost and salvage value, which accounts for the time value of money.

Lift
The concrete placed between two consecutive horizontal construction joints, usually consisting of several layers or courses.

Liquid Sealant
Sealant materials that install in liquid form and cool or cure to their final properties; rely on long-term adhesion to the joint reservoir faces.

Load Transfer Device
See Dowel

Load Transfer Efficiency
The ability of a joint or crack to transfer a portion of a load applied on the side of the joint or crack to the other side of the joint or crack.

Load Transfer Restoration (LTR)
See Retrofit Dowel Bars

Load-Transfer Assembly
Most commonly, the basket or carriage designed to support or link dowel bars during concreting operations so as to hold them in place, in the desired alignment.

Longitudinal Broom
Surface texture achieved in similar manner as transverse broom, except that broom is pulled in a line parallel to the pavement centerline.

Longitudinal Joint
A joint parallel to the long dimension of a structure or pavement.

Longitudinal Reinforcement
Reinforcement essentially parallel to the long axis of a concrete member or pavement.

Longitudinal Tine
Surface texture achieved by a hand held or mechanical device equipped with a rake-like tining head that moves in a line parallel to the pavement centerline.

Lot
A defined quantity.

M

M-E PDG

Guide for Mechanistic-Empirical Design of New and Rehabilitated Pavements (NCHRP 2004).

Map Cracking
1) Intersecting cracks that extend below the surface of hardened concrete; caused by shrinkage of the drying surface concrete which is restrained by concrete at greater depths where either little or no shrinkage occurs; vary in width from fine and barely visible to open and well-defined.

2) The chief symptom of chemical reaction between alkalis in cement and mineral constituents in aggregate within hardened concrete; due to differential rate of volume change in different portions of the concrete; cracking is usually random and on a fairly large scale, and in severe instances the cracks may reach a width of ½-in. See also Crazing and Pattern Cracking.

Maximum Size Aggregate
The largest size aggregate particles present in sufficient quantity to affect properties of a concrete mixture.

Membrane Curing
A process that involves either liquid sealing compound (e.g., bituminous and paraffinic emulsions, coal tar cut-backs, pigmented and non-pigmented resin suspensions, or suspensions of wax and drying oil) or non-liquid protective coating (e.g., sheet plastics or "waterproof" paper), both of which types function as films to restrict evaporation of mixing water from the fresh concrete surface.

Mesh
The number of openings (including fractions thereof) per unit of length in either a screen or sieve in which the openings are 6 mm (¼-in.) or less.

Mesh Reinforcement
See Welded-Wire Fabric Reinforcement

Method and Material Specification
Specification that directs the contractor to use specified materials in definite proportions and specific types of equipment and methods to place the material.

Mix
The act or process of mixing; also mixture of materials, such as mortar or concrete.

Mix Design
See Proportioning

Mixer
A machine used for blending the constituents of concrete, grout, mortar, cement paste, or other mixture.

Mixer, Batch
See Batch Mixer

Mixer, Transit
See Truck Mixer

Mixing Cycle
The time taken for a complete cycle in a batch mixer; i.e., the time elapsing between successive repetitions of the same operation (e.g., successive discharges of the mixer).

Mixing Plant
See Batch Plant

Mixing Speed
Rotation rate of a mixer drum or of the paddles in an open-top, pan, or trough mixer, when mixing a batch; expressed in revolutions per minute (rpm), or in peripheral feet per minute of a point on the circumference at maximum diameter.

Mixing Time
The period during which the mixer is combining the ingredients for a batch of concrete. For stationary mixers, the time is measured from the completion of batching cement and aggregate until the beginning of discharge. For truck mixers, mixing is given in term of the number of revolutions of the drum at mixing speed.

Mixing Water
The water in freshly mixed sand-cement grout, mortar, or concrete, exclusive of any previously absorbed by the aggregate (e.g., water considered in the computation of the net water-cement ratio). See also Batched Water and Surface Moisture.

Mixture
The assembled, blended, commingled ingredients of mortar, concrete, or the like, or the proportions for their assembly.

Modulus of Rupture
A measure of the ultimate load-carrying capacity of a beam, sometimes referred to as "rupture modulus" or "rupture strength." It is calculated for apparent tensile stress in the extreme fiber of a transverse test specimen under the load that produces rupture. See also Flexural Strength.

Moist
Slightly damp but not quite dry to the touch; the term "wet" implies visible free water, "damp" implies less wetness than "wet," and "moist" implies not quite dry. See also Damp and Wet.

Moisture Barrier
A vapor barrier.

Moisture Content of Aggregate
The ratio, expressed as a percentage, of the weight of water in a given granular mass to the dry weight of the mass.

Moisture-Free
The condition of a material that has been dried in air until there is no further significant change in its mass. See also Ovendry.

Mortar
Concrete with essentially no aggregate larger than about 3/16 inch.

Mud Balls
Balls of clay or silt ("mud").

N

Natural Sand
Sand resulting from natural disintegration and abrasion of rock. See also Sand and Aggregate, Fine.

NCHRP
National Cooperative Highway Research Program

NHI
National Highway Institute

Nominal Maximum Size (of aggregate)
In specifications for and descriptions of aggregate, the smallest sieve opening through which the entire amount of the aggregate is permitted to pass; sometimes referred to as "maximum size (of aggregate)."

Non-Agitating Unit
A truck-mounted container for transporting central-mixed concrete that is not equipped to provide agitation (slow mixing) during delivery; a dump truck.

Non-Air-Entrained Concrete
Concrete in which neither an air-entraining admixture nor an air-entraining cement has been used.

No-Slump Concrete
Concrete with a slump of 6 mm (¼-in.) or less. See also Zero-Slump Concrete.

NRMCA
National Ready Mixed Concrete Association

O

Open-Graded Subbase
Unstabilized layer consisting of crushed aggregates with a reduced amount of fines to promote drainage.

Ovendry
The condition resulting from having been dried to essentially constant weight, in an oven, at a temperature that has been fixed, usually between 105 and 115°C (221 and 239°F).

Overlay
The addition of a new material layer onto an existing pavement surface. See also Resurfacing

Overlay, Bonded
See Bonded Concrete Overlay

Overlay, Unbonded
See Unbonded Concrete Overlay

Overlay, UTW
See Ultra-Thin Whitetopping

Overlay, Whitetopping
See Whitetopping

Over-Sanded
Containing more sand than would be required for adequate workability and satisfactory finishing characteristics.

Over-Vibrated
Concrete vibrated more than is necessary for good consolidation and elimination of entrapped air.

Over-Wet
The consistency of concrete when it contains more mixing water and hence is of greater slump than is necessary for ready consolidation.

P

Particle-Size Distribution
The division of particles of a graded material among various sizes; for concrete materials, usually expressed in terms of cumulative percentages larger or smaller than each of a series of diameters or the percentages within certain ranges of diameter, as determined by sieving.

Paste
Constituent of concrete consisting of cement and water.

Pattern Cracking
Fine openings on concrete surfaces in the form of a pattern; resulting from a decrease in volume of the material near the surface, an increase in volume of the material below the surface, or both.

Pavement (concrete)
A layer of concrete over such areas as roads, sidewalks, canals, airfields, and those used for storage or parking. See also Rigid Pavement.

Pavement Structure
The combination of surface courses and base/subbase courses placed on a prepared subgrade to support the traffic load.

Paving Train
An assemblage of equipment designed to place and finish a concrete pavement.

PCA
Portland Cement Association

PCC
Portland cement concrete

Pea Gravel
Screened gravel the particle sizes of which range between 3/16 and 3/8 inch in diameter.

Percent Fines
Amount, expressed as a percentage, of material in aggregate finer than a given sieve, usually the 75-mm (#200) sieve; also, the amount of fine aggregate in a concrete mixture expressed as a percent by absolute volume of the total amount of aggregate.

Performance-Based Specification
Specification that describes the desired levels of fundamental engineering properties (for example, resilient modulus and/or fatigue properties) that are predictors of performance and appear in primary prediction relationships (i.e., models that can be used to predict pavement stress, distress, or performance from combinations of predictors that represent traffic, environmental, roadbed, and structural conditions).

Performance-Related Specification
Specification that describes the desired levels of key materials and construction quality characteristics that have been found to correlate with fundamental engineering properties that predict performance. These characteristics (for example, strength of concrete cores) are amenable to acceptance testing at the time of construction.

Permeable Subbase
Layer consisting of crushed aggregates with a reduced amount of fines to promote drainage and stabilized with portland cement or bituminous cement.

Phasing
The sequences used by a contractor to build elements of a project.

Pitting
A localized disintegration taking the form of cavities at the surface of concrete.

Placement
The process of placing and consolidating concrete; a quantity of concrete placed and finished during a continuous operation; also inappropriately referred to as "pouring."

Placing
The deposition, distribution, and consolidation of freshly mixed concrete in the place where it is to harden; also inappropriately referred to as "pouring."

Plain Bar
A reinforcing bar without surface deformations, or one having deformations that do not conform to the applicable requirements.

Plain Concrete
Concrete without reinforcement.

Plain Pavement
Concrete pavement with relatively short joint spacing and without dowels or reinforcement.

Plane of Weakness
The plane along which a body under stress will tend to fracture; may exist by design, by accident, or because of the nature of the structure and its loading.

Plastic
Condition of freshly mixed cement paste, mortar, or concrete such that deformation will be sustained continuously in any direction without rupture; in common usage, concrete with slump of 80 to 100 mm (3 to 4 in.).

Plastic Consistency
A condition of freshly mixed concrete such that it is readily remoldable and workable, cohesive, and has an ample content of cement and fines, but is not over-wet.

Plastic Cracking
Cracking that occurs in the surface of fresh concrete soon after it is placed and while it is still plastic.

Plastic Deformation
Deformation that does not disappear when the force causing the deformation is removed.

Plastic Shrinkage Cracking
Cracks, usually parallel and only a few inches deep and several feet long, in the surface of concrete pavement that are the result of rapid moisture loss through evaporation.

Plasticity
That property of fresh concrete or mortar which determines its resistance to deformation or its ease of molding.

Plasticizer
A material that increases the plasticity of a fresh cement paste, mortar, or concrete.

Pneumatic
Moved or worked by air pressure.

Popout
Pit or crater in the surface of concrete resulting from cracking of the mortar due to expansive forces associated with a particle of unsound aggregate or a contaminating material, such as wood or glass.

Porosity
The ratio, usually expressed as a percentage, of the volume of voids in a material to the total volume of the material, including voids.

Portland Cement
A commercial product which when mixed with water alone or in combination with sand, stone, or similar materials, has the property of combining with water, slowly, to form a hard solid mass. Physically, portland cement is a finely pulverized clinker produced by burning mixtures containing lime, iron, alumina, and silica at high temperature and in definite proportions, and then intergrinding gypsum to give the properties desired.

Portland Cement Concrete
A composite material that consists essentially of a binding medium (portland cement and water) within which are embedded particles or fragments of aggregate, usually a combination of fine aggregate course aggregate.

Portland-Pozzolan Cement
See Cement, Portland Pozzolan

Pozzolan
A siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

Pozzolan-Cement Grout
Common slab stabilization grout consisting of water, portland cement and pozzolan; usually fly ash.

Preformed Compression Seal
Joint sealant that is manufactured ready for installation and is held

in a joint by lateral pressure exerted against the reservoir by the seal after being compressed during installation.

Preservation
The process of maintaining a structure in its present condition and arresting further deterioration. See also Rehabilitation, Repair, and Restoration.

Pressure-Relief
Cut made in a concrete pavement to relieve compressive forces of thermal expansion during hot weather.

Process Control
Those quality assurance actions and considerations necessary to assess production and construction processes so as to control the level of quality being produced in the end product. This includes sampling and testing to monitor the process but usually does not include acceptance sampling and testing.

Profile Index
Smoothness qualifying factor determined from profilograph trace. Calculated by dividing the sum of the total counts above the blanking band for each segment by the sum of the segment length.

Profile Line
On a profile trace, line drawn by hand on the field trace to average out spikes and minor deviations caused by rocks, texturing, dirt or transverse grooving.

Project Scoping
An early planning step in the development of a project where all project requirements are defined and a plan is developed to address them.

Proportioning
Selection of proportions of ingredients for mortar or concrete to make the most economical use of available materials to produce mortar or concrete of the required properties.

PSI
1) Pounds per square inch; a measure of the compressive, tensile or flexural strength of concrete as determined by appropriate test.

2) In pavements, the Performance Serviceability Index.

Pumping
The forceful displacement of a mixture of soil and water that occurs under slab joints, cracks and pavement edges which are depressed and released quickly by high-speed heavy vehicle loads; occurs when concrete pavements are placed directly on fine-grained, plastic soils or erodible subbase materials.

Punchout
In continuously reinforced concrete pavement, the area enclosed by two closely spaced transverse cracks, a short longitudinal crack, and the edge of the pavement or longitudinal joint, when exhibiting spalling, shattering, or faulting. Also, area between Y cracks exhibiting this same deterioration.

Q

QA/QC
See, Quality Assurance and Quality Control

Quality Assurance
Planned and systematic actions by an owner or his representative to provide confidence that a product or facility meet applicable standards of good practice. This involves continued evaluation of design, plan and specification development, contract advertisement and award, construction, and maintenance, and the interactions of these activities.

Quality Assurance/Quality Control Specification
Statistically based specification that is a combination of end result and material and method specifications. The contractor is responsible for quality control (process control), and the highway agency is responsible for acceptance of the product.

Quality Control
Actions taken by a producer or contractor to provide control over what is being done and what is being provided so that the applicable standards of good practice for the work are followed.

R

Radius of Relative Stiffness
A character or property of a concrete slab which measures the stiffness of the slab in relation to that of the subgrade; it is expressed by the equation:

$$l = \sqrt[4]{\frac{E_c h^3}{12(1-\mu^2)k}}$$

Random Crack
See Uncontrolled Crack

Raveling
Displacement of aggregate or paste near the slab surface from sawing; normally indicates that concrete strength is too low for sawing.

Reactive Aggregate
Aggregate containing certain silica or carbonate compounds that are capable of reacting with alkalis in portland cement, in some cases producing damaging expansion of concrete.

Ready-Mixed Concrete
Concrete manufactured for delivery to a purchaser in a plastic and unhardened state.

Rebar
Abbreviation for "reinforcing bar." See Reinforcement.

Rebound Hammer
An apparatus that provides a rapid indication of the mechanical properties of concrete based on the distance of rebound of a spring-driven missile.

Reconstruction
The process of removing an existing pavement from its grade and replacing it with a completely new pavement.

Recycled Concrete
Concrete that has been processed for use, usually as aggregate.

Recycling
The act of processing existing pavement material into usable material for a layer within a new pavement structure.

Rehabilitation
The process of repairing or modifying a structure to a desired useful condition. See also Preservation, Repair, and Restoration.

Reinforced Concrete
Concrete containing adequate reinforcement (prestressed or not prestressed) and designed on the assumption that the two materials act together in resisting forces.

Reinforcement
Bars, wires, strands, and other slender members embedded in concrete in such a manner that the reinforcement and the concrete act together in resisting forces.

Reinforcement, Transverse
Reinforcement at right angles to the longitudinal reinforcement; may be main or secondary reinforcement.

Relative Humidity
The ratio of the quantity of water vapor actually present to the amount present in a saturated atmosphere at a given temperature; expressed as a percentage.

Release Agent
Material used to prevent bonding of concrete to a surface. See also Bond Breaker.

Remoldability
The readiness with which freshly mixed concrete responds to a remolding effort, such as jigging or vibration, causing it to reshape its mass around reinforcement and to conform to the shape of the form. See also Flow.

Repair
To replace or correct deteriorated, damaged, or faulty materials, components, or elements of a structure. See also Preservation, Rehabilitation, and Restoration.

Reservoir
The part of a concrete joint that normally holds a sealant material. Usually a widening saw cut above the initial saw cut.

Restoration
The process of reestablishing the materials, form, and appearance of a structure to those of a particular era of the structure. See also Preservation, Rehabilitation, and Repair.

Resurfacing
The addition of a new material layer onto an existing pavement surface for the purposes of correcting a functional factor, such as smoothness or texture.

Retardation
Reduction in the rate of hardening or strength development of fresh concrete, mortar, or grout; i.e., an increase in the time required to reach initial and final set.

Retarder
An admixture that delays the setting of cement and hence of mixtures such as mortar or concrete containing cement.

Retempering
Addition of water and remixing of concrete or mortar that has lost enough workability to become unplaceable or unusable. See also Tempering.

Retrofit Dowel Bars
Dowels that install into slots cut into the surface of an existing concrete pavement.

Revibration
A second vibration applied to fresh concrete, preferably as long after the first vibration as the concrete will still respond properly.

Rheology
The science of dealing with flow of materials, including studies of deformation of hardened concrete, the handling and placing of freshly mixed concrete, and the behavior of slurries, pastes, and the like.

Ribbon Loading
Method of batching concrete in which the solid ingredients, and sometimes the water, enter the mixer simultaneously.

Rich Mixture
A concrete mixture containing a large amount of cement.

Rigid Pavement
Pavement that will provide high bending resistance and distribute loads to the foundation over a comparatively large area.

Rock Pocket
A portion of hardened concrete consisting of a concentration of coarse aggregate that is deficient in mortar; caused by separation during placement or insufficient consolidation, or both; see Honeycomb.

Rod
A specified length of metal, circular in cross section with one end rounded; used to compact concrete or mortar test specimens.

Rod, Tamping
A straight steel rod of circular cross section having one or both ends rounded to a hemispherical tip.

Rodability
The susceptibility of fresh concrete or mortar to compaction by means of a tamping rod.

Rodding
Compaction of concrete by means of a tamping rod. See also Rod, Tamping, and Rodability.

S

Sack
See Bag

Sample
A group of units, or portion of material, taken from a larger collection of units or quantity of material, which serves to provide information that can be used as a basis for action on the larger quantity or on the production process; the term is also used in the sense of a sample of observations.

Sampling, Continuous
Sampling without interruptions throughout an operation or for a predetermined time.

Sampling, Intermittent
Sampling successively for limited periods of time throughout an operation or for a predetermined period of time. The duration of sample periods and of the intervals between are not necessarily regular and are not specified.

Sand
The fine granular material (usually less than 3/16 inch in diameter) resulting from the natural disintegration of rock, or from the crushing of friable sandstone.

Sand Grout
Grout mixture containing water, portland cement, and sand.

Sand Streak
A streak of exposed fine aggregate in the surface of formed concrete caused by bleeding.

Saturated Surface-Dry
Condition of an aggregate particle or other porous solid when the permeable voids are filled with water but there is no water on the exposed surface.

Saturated Surface-Dry (SSD) Particle Density
The mass of the saturated surface-dry aggregate divided by its displaced volume in water or in concrete. (Also called Bulk Specific Gravity).

Saturation
1) In general, the condition of the coexistence in stable equilibrium of either a vapor and a liquid or a vapor and solid phase of the same substance at the same temperature.

2) As applied to aggregate or concrete, the condition such that no more liquid can be held or placed within it.

Saw Blade, Abrasive
Concrete sawing medium that uses non-diamond abrasion elements. These blades do not need water to cool, but water is sometimes used.

Saw Blade, Diamond
Concrete sawing medium that uses industrial diamonds as the primary abrasion element. Blades are cooled with water to protect the host metal from melting and prematurely dislodging the diamonds.

Saw Cut
A cut in hardened concrete utilizing diamond or silicone-carbide blades or discs.

Sawed Joint
A joint cut in hardened concrete, generally not to the full depth of the member, by means of special equipment.

Sawing
Cutting of joints in hardened concrete by means of special equipment utilizing diamond or silicon carbide blades or discs; cut goes only part way through the slab.

Scaling
Flaking or peeling away of the near-surface portion of hydraulic cement concrete or mortar.

Schmidt Hammer (trade name), Swiss Hammer, or Rebound Hammer
A device used to estimate the compressive strength of hardened concrete by measuring surface hardness.

Scoping
See Project Scoping

Screed
1) To strike off concrete lying above the desired plane or shape.

2) A tool for striking off the concrete surface, sometimes referred to as a Strikeoff.

Screed Guide
Firmly established grade strips or side forms for unformed concrete that will guide the strikeoff in producing the desired plane or shape.

Screeding
The operation of forming a surface by the use of screed guides and a strikeoff. See also Strikeoff.

Sealant
See Joint Sealant and Membrane Curing

Sealant Reservoir
The saw kerf or formed slot in which a joint sealant is placed. Many times this refers to a cut made to widen the original saw cut made for a contraction joint.

Sealing
The process of filling the sawed joint with material to minimize intrusion into the joint of water and incompressible materials.

Sealing Compound
See Joint Sealant and Membrane Curing

Secondary Sawing
The sawing that takes place to establish shape in the joint. Many times this shape is the reservoir of the joint.

Segregation
The tendency, as concrete is caused to flow laterally, for coarse aggregate and drier material to remain behind and for mortar and wetter material to flow ahead. This also occurs in a vertical direction when wet concrete is over-vibrated, the mortar and wetter material rising to the top. In the vertical direction, segregation may also be called Stratification.

Semiautomatic Batcher
A batcher equipped with gates or valves that are separately opened manually to allow the material to be weighed but which are closed automatically when the designated weight of each material has been reached.

Separation
The tendency, as concrete is caused to pass from the unconfined ends of chutes or conveyor belts, for coarse aggregate to separate from the concrete and accumulate at one side; the tendency, as processed aggregate leaves the ends of conveyor belts, chutes, or similar devices with confining sides, for the larger aggregate to separate from the mass and accumulate at one side; the tendency for solids to separate from the water by gravitational settlement. See also Bleeding and Segregation.

Set
The condition reached by a cement paste, mortar, or concrete when it has lost plasticity to an arbitrary degree, usually measured in terms of resistance to penetration or deformation. Initial set refers to first stiffening. Final set refers to attainment of significant rigidity.

Set-Accelerating Admixture
See Accelerator

Set-Retarding Admixture
See Retarder

Setting of Cement
Development of rigidity of cement paste, mortar, or concrete as a result of hydration of the cement. The paste formed when cement is mixed with water remains plastic for a short time. During this stage it is still possible to disturb the material and remix without injury, but as the reaction between the cement and water continues, the mass loses its plasticity. This early period in the hardening is called the "setting period," although there is not a well-defined break in the hardening process.

Setting Time
The time required for a specimen of concrete, mortar or cement paste, prepared and tested under standardized conditions, to attain a specified degree of rigidity.

Settlement
Sinking of solid particles in grout, mortar, or fresh concrete, after placement and before initial set. See also Bleeding.

Settlement Shrinkage
A reduction in volume of concrete prior to the final set of cementitious mixtures; caused by settling of the solids and decreases in volume due to the chemical combination of water with cement. See Plastic Shrinkage.

Shrinkage
Decrease in length or volume.

Shrinkage Crack
Crack from restraint of volume reduction due to shrinkage or temperature contraction; usually occurring within the first few days after placement.

Shrinkage Cracking
Cracking of a slab due to failure in tension caused by external or internal restraints as reduction in moisture content develops.

Shrink-Mixed Concrete
Ready-mixed concrete mixed partially in a stationary mixer and then mixed in a truck mixer.

Sieve
A metallic plate or sheet, a woven-wire cloth, or other similar device, with regularly spaced apertures of uniform size, mounted in a suitable frame or holder for use in separating granular material according to size.

Sieve Analysis
The classification of particles, particularly of aggregates, according to sizes as determined with a series of sieves of different openings.

Silicone
A resin, characterized by water-repellent properties, in which the main polymer chain consists of alternating silicon and oxygen atoms, with carbon-containing side groups; silicones may be used in joint sealing compounds, caulking or coating compounds, or admixtures for concrete.

Silicone Sealant
Liquid joint sealant consisting of silicone-based material.

Skid Resistance
A measure of the frictional characteristics of a surface.

Slipform Paving
A type of concrete paving process that involves extruding the concrete through a machine to provide a uniform dimension of concrete paving.

Slipform
A form that is pulled or raised as concrete is placed; may move in a generally horizontal direction to lay concrete evenly for highway paving or on slopes and inverts of canals, tunnels, and siphons; or vertically to form walls, bins, or silos.

Slump
A measure of consistency of freshly mixed concrete, equal to the subsidence measured to the nearest 6 mm (¼-in.) of the molded specimen immediately after removal of the slump cone.

Slump Cone
A mold in the form of the lateral surface of the frustum of a cone with a base diameter of 203 mm (8 in.), top diameter 102 mm (4 in.), and height 305 mm (12 in.), used to fabricate a specimen of freshly mixed concrete for the slump test.

Slump Loss
The amount by which the slump of freshly mixed concrete changes during a period of time after an initial slump test was made on a sample or samples thereof.

Slump Test
The procedure for measuring slump.

Slurry
Mixture of water and concrete particles resulting from concrete sawing or grinding.

Solid Volume
See Absolute Volume

Sounding
Process of tapping concrete slab surface with metal object, listening for tone from the impact, to determine areas of delamination.

Soundness
In the case of a cement, freedom from large expansion after setting. In the case of aggregate, the ability to withstand aggressive conditions to which concrete containing it might be exposed, particularly those due to weather.

Spalling, Compression
Cracking, breaking, chipping, or fraying of slab edges within 0.6 meter of a transverse joint.

Spalling, Sliver
Chipping of concrete edge along a joint sealant; usually within 12 mm of the joint edge.

Spalling, Surface
Cracking, breaking, chipping, or fraying of slab surface; usually within a confined area less than 0.5 square meters.

Specific Gravity
The ratio of the weight in air of a given volume of material at a stated temperature to the weight in air of an equal volume of distilled water at the same temperature.

Specific Gravity Factor
The ratio of the weight of aggregates (including all moisture), as introduced into the mixer, to the effective volume displaced by the aggregates.

Split Batch Charging
Method of charging a mixer in which the solid ingredients do not all enter the mixer together; cement, and sometimes different sizes of aggregate, may be added separately.

Spud Vibrator
A vibrator used for consolidating concrete, having a vibrating casing or head that is used by insertion into freshly placed concrete.

Standard Deviation
The root mean square deviation of individual values from their average.

Static Load
The weight of a single stationary body or the combined weights of all stationary bodies in a structure (such as the load of a stationary vehicle on a roadway); during construction, the combined weight of forms, stringers, joists, reinforcing bars, and the actual concrete to be placed.

Stationary Hopper
A container used to receive and temporarily store freshly mixed concrete.

Storage Hopper
See Stationary Hopper

Straight-Edging
Process of using a rigid, straight piece of either wood or metal to strike off or screed a concrete surface to proper grade or to check the planeness of a finished surface.

Stratification
The separation of over-wet or over-vibrated concrete into horizontal layers with increasingly lighter material toward the top; water, laitance, mortar, and coarse aggregate will tend to occupy successively lower positions (in that order).

Strength
A generic term for the ability of a material to resist strain or rupture induced by external forces. See also Compressive Strength, Flexural Strength, and Tensile Strength.

Stress
Intensity of internal force (i.e., force per unit area) exerted by either of two adjacent parts of a body on the other across an imagined plane of separation; when the forces are parallel to the plane, the stress is called shear stress; when the forces are normal to the plane the stress is called normal stress; when the normal stress is directed toward the part on which it acts it is called compressive stress; when it is directed away from the part on which it acts it is called tensile stress.

Strikeoff
To remove concrete in excess of that required to fill the form evenly or bring the surface to grade; performed with a straightedged piece of wood or metal by means of a forward sawing movement or by a power operated tool appropriate for this purpose; also the name applied to the tool. See also Screed and Screeding.

Structural Capacity
Expression of the ability of a pavement to carry traffic loads; Expressed as number of equivalent single axle loads in AASHTO design methodology.

Subbase
A layer in a pavement system between the subgrade and base course or between the subgrade and a portland cement concrete pavement.

Subgrade
The soil prepared and compacted to support a structure or a pavement system. Also sometimes called grade.

Sulfate Attack
Chemical or physical reaction between certain constituents in cement and sulfates in the soil or groundwater; sufficient attack may disrupt concrete that is susceptible to it.

Sulfate Resistance
The ability of aggregate, cement paste, or mixtures thereof to withstand chemical attack by sulfate ion in solution.

Superplasticizer
See Water-Reducing Admixture (high range)

Supplementary Cementitious Material
Mineral admixtures consisting of powdered or pulverized materials, which are added to concrete before or during mixing to improve or change some of the plastic or hardened properties of Portland cement concrete. Materials are generally natural or by-products of other manufacturing processes.

Surface Moisture
Water retained on surfaces of aggregates capable of mixing with portland cement in concrete; distinguished from absorbed moisture, which is contained inside the aggregate particles.

Surface Retarder
A retarder used by application to a form or to the surface of newly placed concrete to delay setting of the cement to facilitate construction joint cleanup or to facilitate production of exposed, aggregate finish.

Surface Tension
That property, due to molecular forces, that exists in the surface film of all liquids and tends to prevent the liquid from spreading.

Surface Texture
Degree of roughness or irregularity of the exterior surfaces of aggregate particles or hardened concrete.

Surface Vibrator
A vibrator used for consolidating concrete by application to the top surface of a mass of freshly mixed concrete; four principal types exist: vibrating screeds, pan vibrators, plate or grid vibratory tampers, and vibratory roller screeds.

Surface Voids
Cavities visible on the surface of a solid.

Surface Water
See Surface Moisture

Swelling
Increase in length or volume. See also Contraction and Expansion.

T

Tamper
1) An implement used to consolidate concrete or mortar in molds or forms.

2) A hand-operated device for compacting floor topping or other unformed concrete by impact from the dropped device in preparation for strikeoff and finishing; contact surface often consists of a screen or a grid of bars to force coarse aggregates below the surface to prevent interference with floating or troweling.

Tamping
The operation of compacting freshly placed concrete by repeated blows or penetrations with a tamping device.

Temper
The addition of water and mixing of concrete or mortar as necessary to bring it initially to the desired consistency. See also Retempering.

Tensile Strength
Maximum stress that a material is capable of resisting under axial tensile loading based on the cross-sectional area of the specimen before loading.

Terminal Joint
Joint used in continuously reinforced concrete pavement (see CRCP) to transition to another pavement type or to a bridge structure.

Texturing
The process of producing a special texture on either unhardened or hardened concrete.

Thermal Expansion
Expansion caused by increase in temperature.

Thermal Movement
Change of dimension of concrete or masonry resulting from change of temperatures. See also Contraction and Expansion.

Thermal Shock
The subjection of newly hardened concrete to a rapid change in temperature which may be expected to have a potentially deleterious effect.

Tiebar
Bar at right angles to and tied to reinforcement to keep it in place; deformed bar extending across a construction joint to prevent separation of adjoining slabs.

Time of Haul
In production of ready-mixed concrete, the period from first contact between mixing water and cement until completion of discharge of the freshly mixed concrete.

Time of Set
Time required after addition of water to cement for cement paste, mortars, or concretes to attain a certain arbitrary degree of hardness or strength.

Time of Setting
See Initial Setting Time and Final Setting Time.

TMMB
Truck Mixer Manufacturers' Bureau; most truck mixers carry TMMB rating plates.

Tongue and Groove
A joint in which a protruding rib on the edge of one side fits into a groove in the edge of the other side, abbreviated "T & G." See also Keyway.

Topping
1) A layer of high quality concrete placed to form a floor surface on a concrete base.

2) A dry-shake application of a special material to produce particular surface characteristics.

Transit-mixed Concrete
Concrete, the mixing of which is wholly or principally accomplished in a truck mixer. See Truck-Mixed Concrete.

Transverse Broom
Surface texture obtained using either a hand broom or mechanical broom that lightly drags the stiff bristles across the surface.

Transverse Crack
Crack that develops at a right angle to the long direction of the member.

Transverse Joint
A joint normal to the longitudinal dimension of a structure.

Transverse Reinforcement
See Reinforcement, Transverse.

Transverse Tine
Surface texture achieved by a hand held or mechanical device equipped with a rake-like tining head that moves laterally across the width of the paving surface.

TRB
Transportation Research Board

Trial Batch
A batch of concrete used for establishing or checking proportions.

Trowel
A flat, broad-bladed steel hand tool used in the final stages of finishing operations to impart a relatively smooth surface to concrete floors and other unformed concrete surfaces; also, a flat triangular-bladed tool used for applying mortar to masonry.

Truck-Mixed Concrete
Concrete, the mixing of which is accomplished in a truck mixer.

Truck Mixer
A concrete mixer suitable for mounting on a truck chassis and capable of mixing concrete in transit. See also Horizontal-Axis Mixer, Inclined-Axis Mixer, and Agitator.

U

Ultra-Thin Whitetopping
Thin layer of new concrete (2-4 inches), usually high strength and fiber-reinforced, placed over a prepared surface of distressed asphalt

Unbonded Concrete Overlay
Overlay of new concrete placed onto distressed existing concrete pavement with a layer of asphalt or other medium between the new and old concrete surface to separate them.

Uncontrolled Crack
A crack that is located within a slab away from the sawed joints.

Under-Sanded
A concrete mixture that is deficient in sand content; a condition associated with poor workability or finishing characteristics.

Unit Water Content
The quantity of water per unit volume of freshly mixed concrete, often expressed as pounds or gallons per cubic yard. It is the quantity of water on which the water-cement ratio is based and does not include water absorbed by the aggregate.

Unit Weight
See Bulk Density and Specific Gravity

Unreinforced Concrete
See Plain Concrete

Unsound Aggregate
An aggregate or individual particles of an aggregate capable of causing or contributing to deterioration or disintegration of concrete under anticipated conditions of service.

Uplift Beam
Beam-like movement detection device used to monitor slab lift during slab stabilization.

V

Vibrated Concrete
Concrete compacted by vibration during and after placing.

Vibration
Energetic agitation of concrete produced by a mechanical oscillating device at moderately high frequency to assist consolidation and compaction.

Vibration Limit
That time at which fresh concrete has hardened sufficiently to prevent its becoming mobile when subject to vibration.

Vibration, External
External vibration employs vibrating devices attached at strategic positions on the forms and is particularly applicable to manufacture of precast items and for vibration of tunnel-lining forms; in manufacture of concrete products, external vibration or impact may be applied to a casting table.

Vibration, Internal
Internal vibration employs one or more vibrating elements that can be inserted into the concrete at selected locations, and is more generally applicable to in-place construction.

Vibration, Surface
Surface vibration employs a portable horizontal platform on which a vibrating element is mounted.

Vibrator
An oscillating machine used to agitate fresh concrete so as to eliminate gross voids, including entrapped air but no entrained air, and produce intimate contact with form surfaces and embedded materials.

Vibratory Plate Compactor
Motorized, one-man tool consisting of a vibrating square plate that transmits energy to compact granular mate rials.

Volume Batching
The measuring of the constituent materials for mortar or concrete by volume.

W

Wash (or Flush) Water
Water carried on a truck mixer in a special tank for flushing the interior of the mixer after discharge of the concrete.

Water-Cement Ratio
The ratio of the amount of water, exclusive only of that absorbed by the aggregates, to the amount of portland cement in a concrete or mortar mixture; preferably stated as a decimal by weight.

Water-Cementitious Materials Ratio
The ratio of the amount of water, exclusive only of that absorbed by the aggregates, to the amount of portland cement and other cementitious material (fly ash, pozzolan, etc.) in a concrete or mortar mixture; preferably stated as a decimal by weight.

Water-Gain
See Bleeding

Water-Reducing Admixture
A material that either increases slump of freshly mixed mortar or concrete without increasing water content or maintains a workability with a reduced amount of water, the effect being due to factors other than air entrainment; also known as water reducer.

Water-Reducing Admixture (High Range)
A water-reducing admixture capable of producing large water or great flowability without causing undue set retardation or entrainment of air in mortar or concrete.

Weathering
Changes in color, texture, strength, chemical composition or other properties of a natural or artificial material due to the action of the weather.

Weight Batching
Measuring the constituent materials for mortar or concrete by weight.

Welded-Wire Fabric Reinforcement
Welded-wire fabric in either sheets or rolls, used to reinforce concrete.

Well-Graded Aggregate
Aggregate having a particle size distribution that will produce maximum density; i.e., minimum void space.

Wet
Covered with visible free moisture; not dry. See also Damp and Moist.

Wet Process
In the manufacture of cement, the process in which the raw materials are ground, blended, mixed, and pumped while mixed with water; the wet process is chosen where raw materials are extremely wet and sticky, which would make drying before crushing and grinding difficult.

Whitetopping
Concrete overlay pavement placed on an existing asphalt pavement.

Whitetopping, Conventional
Overlay of new concrete, greater than 4 inches thick, placed onto existing asphalt pavement with no particular steps taken to ensure bonding or debonding.

Whitetopping, Ultra-Thin
See Ultra-Thin Whitetopping

Wire Mesh
See Welded Wire Fabric

Workability
That property of freshly mixed concrete or mortar which determines the ease and homogeneity with which it can be mixed, placed, compacted, and finished.

Working Crack
A crack in a concrete pavement slab that undergoes significant deflection and thermal opening and closing movements; Typically oriented transverse to the pavement centerline and near a non-functioning transverse contraction joint.

Y

Yield
The volume of fresh concrete produced from a known quantity of ingredients; the total weight of ingredients divided by the unit weight of the freshly mixed concrete.

Zero-Slump Concrete
Concrete of stiff or extremely dry consistency showing no measurable slump after removal of the slump cone. See also Slump and No-Slump Concrete.