

GLOSSARY OF TERMS

The following presents a summary of terms that are used in this document. Sources of information for this glossary include the Asphalt Institute¹, the National Concrete Pavement Technology Center², and the Transportation Research Board³.

AADT. The average annual daily traffic, expressed as the 24-hour traffic volume counts collected over a number of days greater than 1 day but less than 1 year, at a given location. AADT can also be approximated by adjusting the ADT count for daily (weekday versus weekend) and seasonal (summer versus winter) variations

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.

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.

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, or crushed stone used with a hydraulic cementing medium to produce either concrete or mortar; or used with asphalt cement to produce asphalt concrete; or used in the base and/or subbase layers of a pavement structure.

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.

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-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.

¹ Asphalt Institute (AI). *n.d.* *Asphalt Industry Glossary of Terms*. ([Web Link](#))

² Taylor, P. C., S. H. Kosmatka, G. F. Voigt, M. E. Ayers, A. Davis, G. J. Fick, J. Grove, D. Harrington, B. Kerkhoff, H. C. Ozyildirim, J. M. Shilstone, K. Smith, S. Tarr, P. D. Tennis, T. J. Van Dam, and S. Waalkes. 2006. *Integrated Materials and Construction Practices for Concrete Pavements: A State-of-the-Practice Manual*. FHWA-HIF-07-004. Federal Highway Administration, Washington, DC.

³ Transportation Research Board (TRB). 2013. *Glossary of Transportation Construction Quality Assurance Terms: Sixth Edition*. Transportation Research Circular E-C173. Transportation Research Board, Washington, DC. ([Web Link](#))

Air Void. A space in cement paste, mortar, or concrete filled with air; an entrapped air void is characteristically 0.04 in (1 mm) or more in size and irregular in shape; an entrained air void is typically between 0.004 inches and 0.04 inches (10 μ m and 1 mm) in diameter and spherical (or nearly so).

Albedo. Solar reflectance.

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

Allocate. Distribution of available resources among programs or geographic districts/regions.

Alternatives. Available choices or courses of action that can be considered at each stage of resource allocation or utilization.

Asphalt Cement. A bituminous material that, when used as a binder with aggregate, creates hot-mix asphalt.

Asphalt Cutback. Asphalt cement that has been liquefied by blending with petroleum solvents (diluent). Upon exposure to atmospheric conditions the diluents evaporate, leaving the asphalt cement to perform its function.

Asphalt Emulsion. An emulsion of asphalt binder and water that contains a small amount of an emulsifying agent. Emulsified asphalt droplets may be of either the anionic (negative charge), cationic (positive charge) or nonionic (neutral).

Asphalt Rubber (AR). Conventional asphalt cement to which recycled ground tire rubber has been added, that when reacted with the hot asphalt cement causes a swelling and/or dispersion of the tire rubber particles.

Asset. The physical infrastructure (e.g., right-of-way, pavements, structures, roadside features). Assets can also include other agency resources capable of providing added value (e.g., human resources, real estate, equipment and materials).

Asset Management. Business processes for resource allocation and utilization with the objective of better decision-making based upon quality information and well-defined objectives.

Asset Management Plan. Tactical plan for managing an agency's infrastructure (and/or other assets) to deliver an agreed upon level of service. Typically, the asset management plan encompasses more than one asset (e.g., a system approach).

Base. The layer of material immediately beneath the pavement surface or binder course.

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 Plant. Equipment used for batching concrete materials.

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

Benchmark. Process for comparing cost, performance life, productivity, or quality of a specific process or method to a standard or best practice. Benchmarking is used in strategic management

to evaluate various process aspects in relation to best practice. Agencies then use the benchmarking results to develop plans for process improvement or adoption of best practices, usually with the aim of increasing performance.

Benefit/Cost. A comparison analysis of the economic benefit of an investment to its cost. The benefit/cost analysis should include all costs and benefits to both the agency and the users of the facility over an appropriate life cycle period. In asset management, benefit/cost can be applied for prioritizing projects, evaluation of the benefits and costs for all projects in a program, and determination of program tradeoffs.

Binder. An adhesive composition of asphalt cement, modified asphalt cement, or other bituminous materials which is primarily responsible for binding aggregate particles together. Also used to refer to the layer of asphalt directly below the surface course (i.e., binder course).

Bitumen. A class of black or dark-colored (solid, semisolid, or viscous) cementitious substances, natural or manufactured, composed principally of high molecular weight hydrocarbons, of which asphalts, tars, pitches, and asphaltites are typical.

Bituminous. Any asphalt material used in the construction or maintenance of a roadway.

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.

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.

Bonded Concrete Overlay. Thin layer of new concrete 2 to 4 inches (51 to 102 mm) placed onto slightly deteriorated existing concrete pavement with steps taken to prepare the existing surface to promote adherence of new concrete.

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.

Capital. Type of investment that generally involves construction or major repair and can include: new construction, reconstruction, structural and functional improvements, and rehabilitation.

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, 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.

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.

Chip Seal. A surface treatment in which a pavement surface is sprayed with asphalt (generally emulsified) and then immediately covered with aggregate and rolled. Chip seals are used primarily to seal the surface of a pavement with non-load-associated cracks and to improve surface friction (skid resistance). Also referred to as “seal coat.”

Clinker. A fused or partially fused by-product of the combustion of coal. Also includes lava and portland cement and partially vitrified slag and brick.

Coal Tar. A dark brown to black cementitious material produced by the destructive distillation of bituminous coal.

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.

Cold In-Place Recycling (CIR). A process in which a portion of an existing bituminous pavement is pulverized or milled, the reclaimed material is mixed with new binder and new materials, and the resultant blend is placed as a base for a subsequent overlay.

Cold Milling. A process of removing pavement material from the surface of the pavement either to prepare the surface to receive overlays (by removing rutting and surface irregularities), to restore pavement cross slopes and profile, or to re-establish the pavement’s surface friction characteristics.

Compaction. The process whereby the volume of asphalt, aggregate, soil, or 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.

Condition Index. A numeric score determined from pavement condition data and used to represent the performance of the pavement.

Consistency. The degree of fluidity of asphalt cement at any particular temperature. The consistency of asphalt cement varies with its temperature; therefore, it is necessary to use a common or standard temperature when comparing the consistency of one asphalt cement with another.

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.

Continuously Reinforced Concrete Pavement (CRCP). A concrete pavement characterized by no regularly spaced transverse joints and continuous longitudinal reinforcement.

Cost Plus Time Bidding. Also called **A+B Bidding**. A bidding procedure that selects the low bidder based on a monetary combination of the traditional bid price (A) and the time (B) needed to complete the project or a critical portion of the project. A cost-plus-time contract can be devised to actually pay the contractor either only the A portion of the bid or the A portion plus or minus an agreed-upon incentive–disincentive amount for early or late completion; this latter form of the contract is sometimes referred to as a **cost-plus-time with incentives or disincentives (A + B + I/D) contract**. [The intent of either form is to provide an incentive for the contractor to minimize delivery time for high-priority roadways.]

Course. In pavement construction, a horizontal layer of asphalt, concrete, or aggregate, usually one of several making up a lift. See also Lift.

Crack and Seat. A fractured slab technique used in the rehabilitation of PCC pavements that minimizes slab action in a jointed concrete pavement (JCP) by fracturing the PCC layer into smaller segments. This reduction in slab length minimizes reflective cracking in new asphalt overlays.

Deflection Basin. The idealized shape of the deformed pavement surface as a result of a cyclic or impact load as depicted from the peak measurements of five or more deflection sensors.

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

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

Design–Bid–Build (DBB). A project delivery system in which the design is completed either by in-house professional engineering staff or a design consultant before the construction contract is advertised. [The DBB method is sometimes referred to as the traditional method.]

Design–Build (DB). A project delivery system in which both the design and the construction of the project are simultaneously awarded to a single entity. [The main advantage of the DB method is that it can decrease project delivery time.]

Design–Build–Maintain (DBM). A project delivery system in which the design, construction, and maintenance of the project are awarded to a single entity.

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.

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. A device located across transverse joints at mid-depth of a PCC slab to provide load transfer from one slab to the adjoining slab. These are commonly smooth, round, and coated to resist corrosion.

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.

Empirical model. A model developed from performance histories of pavements. [An empirical model is usually accurate only for the exact conditions and ranges of independent variables under which it was developed.]

Emulsifying Agent or Emulsifier. The chemical added to the water and asphalt that keeps the asphalt in stable suspension in the water. The emulsifier determines the charge of the emulsion and controls the breaking rate.

Entrained Air. Round, uniformly distributed, microscopic, non-coalescing air bubbles entrained by the use of air-entraining agents; usually less than 0.04 inches (1 mm) in size.

Entrapped Air. Air in concrete that is not purposely entrained. Entrapped air is generally considered to be large voids (larger than 0.04 inches [1 mm]).

Facility. A general term referring to a street, roadway, or highway.

Fatigue Cracking. Cracking of a roadway surface (either asphalt or concrete) caused by repetitive loading.

Faulting. Differential vertical displacement of abutting concrete pavement slabs at joints or cracks creating a step-like deformation in the pavement.

Flexible Pavement. An asphalt pavement.

Flow. 1) Time dependent irrecoverable deformation. 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 jiggling a specified number of times.

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.

Fog Seal. A light application of diluted asphalt emulsion. It is used to renew old asphalt surfaces, seal small cracks and surface voids, and inhibit raveling.

Full-Depth Asphalt Pavement. The term FULL-DEPTH (registered by the Asphalt Institute with the U.S. Patent Office) certifies that the pavement is one in which asphalt mixtures are employed for all courses above the subgrade or improved subgrade. A Full-Depth asphalt pavement is placed directly on the prepared subgrade.

Full-Depth Reclamation. A technique in which the full thickness of the existing asphalt pavement and a predetermined portion of the underlying materials (base, subbase, and/or subgrade) are uniformly pulverized and blended to provide a homogeneous material.

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

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).

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.

Hot In-Place Recycling (HIPR). A process which consists of softening the existing bituminous surface with heat, mechanically removing the surface material, mixing the material

with a recycling agent, adding new asphalt or aggregate to the material (if required), and then replacing the material back on the roadway.

Hot Mix Asphalt (HMA). A plant-produced, high-quality hot mixture of asphalt cement and well-graded, high-quality aggregate thoroughly compacted into a uniform dense mass.

Incentive–Disincentive Provision (for quality). A pay adjustment schedule that functions to motivate the contractor to provide a high level of quality. [A pay adjustment schedule, even one that provides for pay increases, is not necessarily an incentive or disincentive provision, as individual pay increases or decreases may not be of sufficient magnitude to motivate the contractor toward high quality.]

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.

International Roughness Index (IRI). A measurement of the roughness of a pavement, expressed as the ratio of the accumulated suspension motion to the distance traveled obtained from a mathematical model of a standard quarter car traversing a measured profile at a speed of 50 mi/hr (80 km/h).

Jointed Plain Concrete Pavement (JPCP). A concrete pavement system characterized by short joint spacings and no reinforcement. Smooth dowels may be placed across the transverse joints to facilitate load transfer.

Jointed Reinforced Concrete Pavement (JRCP). A concrete pavement system characterized by longer joint spacings and containing steel mesh reinforcement distributed throughout the slab to hold any cracks tightly together.

Level of Service (LOS). Measures related to the public’s perception of asset condition or of agency services; used to express current and target values for maintenance and operations activities.

Life Cycle. A length of time that spans the stages of asset construction, operation, maintenance, rehabilitation, and reconstruction or disposal/abandonment; when associated with analyses, refers to a length of time sufficient to span these several stages and to capture the costs, benefits, and long-term performance impacts of different investment options.

Life Cycle Assessment (LCA). A technique that can be used for analyzing and quantifying the environmental impacts of a product, system, and/or process.

Life Cycle Cost Analysis (LCCA). A method of reducing all of the significant costs of an asset over its lifetime to either a present worth (today’s cost) or equivalent uniform annual cost (annual cost). As such, LCCA accounts for initial (or in-place) costs, subsequent maintenance and rehabilitation costs, and salvage value. In addition to all of these costs, inputs to an LCCA include the analysis period and the discount rate (reflecting the time value of money).

Life Cycle Inventory (LCI). LCI involves collecting, validating, and aggregating input and output data to quantify material use, energy use, environmental discharges, and waste associated with each life cycle stage.

Lift. The material placed between two consecutive horizontal placements, usually consisting of several layers or courses.

Load Transfer Restoration (LTR). The placement of load transfer devices across joints or cracks in an existing jointed PCC pavement.

Longitudinal Tining. 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.

Maintenance. Activities that enable a transportation system to continue to perform at its intended level; comprises a range of services in preservation, cleaning, replacing worn or failed components, periodic or unscheduled repairs and upkeep, motorist services (incident response, hazardous materials response), snow and ice control, and servicing of traffic devices and aids; does not add to structural or operational capacity of an existing facility.

Maintenance Mix. A mixture of asphalt emulsion and mineral aggregate for use in relatively small areas to patch holes, depressions, and distressed areas in existing pavements. Appropriate hand or mechanical methods are used in placing and compacting the mix.

Mean Profile Depth (MPD). A measurement of pavement surface texture that strongly affects wet pavement friction.

Mechanistic Model. A model developed from the laws of mechanics, in which the prescribed action of forces on bodies of material elements are related to the resulting stress, strain, deformation, and failure of the pavement.

Mechanistic–Empirical Model. A model developed from a combination of mechanistic and empirical considerations. The basic advantage is that it provides more reliable performance predictions.

Microsurfacing. A mixture of polymer modified asphalt emulsion, crushed dense graded aggregate, mineral filler, additives and water. It provides a thin resurfacing of 0.38 to 0.75 inches (10 to 19 mm) to the pavement.

Mineral Filler. A finely divided mineral product, at least 70 percent of which will pass a 0.075 mm (No. 200) sieve. Pulverized limestone is the most commonly manufactured filler, although other stone dust, hydrated lime, portland cement, and certain natural deposits of finely divided mineral matter are also used.

Multi-Parameter Bidding. Also called **A + B + C bidding**. A bidding procedure that selects the low bidder based on a monetary combination of the traditional bid price (A), the completion time (B), and other elements (C) such as construction quality, safety, and life-cycle costs. Quantification of the elements and bidder evaluation methodology are included in the procedure.

Natural (Native) Asphalt. Asphalt occurring in nature, which has been derived from petroleum through natural processes of evaporation of volatile fractions, leaving the asphalt fractions. The native asphalt of most importance is found in the Trinidad and Bermudez Lake deposits. Asphalt from these sources is often called lake asphalt.

Network. System of assets to provide transportation services to customers.

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).”

Open-Graded. Aggregate in which the voids are relatively large when the aggregate is compacted.

Open-Graded Friction Course (OGFC). A bituminous paving layer consisting of a mix of asphalt cement and open-graded (also called uniformly graded) aggregate. An open-graded aggregate consists of particles of predominantly a single-size aggregate.

Optimization. Process for determining the best available value (e.g., cost, performance life) within a given set of constraints.

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

Oxidation. Chemical reaction between the asphalt in an asphalt pavement and air, causing the bituminous surface to become discolored and stiffer.

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.

Pavement Maintenance. Work that is planned and performed on a routine basis to maintain and preserve the condition of the highway system or to respond to specific conditions and events that restore the highway system to an adequate level of service.

Pavement Management. All the activities involved in the planning, programming, design, construction, maintenance, and rehabilitation of the pavement portion of a public works program. A system which involves the identification of optimum strategies at various management levels and maintains pavements at an adequate level of serviceability. These include, but are not limited to, systematic procedures for scheduling maintenance and rehabilitation activities based on optimization of benefits and minimization of costs.

Pavement Management System (PMS). A set of tools or methods that assists decision-makers in finding optimum strategies for providing, evaluating, and maintaining pavements in a serviceable condition over a period of time.

Pavement Preservation. A program employing a network-level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations.

Pavement Rehabilitation. Structural enhancements that extend the service life of an existing pavement and/or improve its load-carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays.

Pay Factor. A multiplication factor, often expressed as a percentage, used to determine the contractor's payment for a unit of work, based on the estimated quality of work. [Typically, the term "pay factor" applies to only one quality characteristic.]

Performance-Based. Characteristic of an asset that reflects its functionality or its serviceability as perceived by transportation users; often related to condition.

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."

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 3 to 4 inches (76 to 102 mm).

Pneumatic-Tire Roller. A compactor with a number of tires spaced so their tracks overlap delivering a kneading type of compaction.

Polymer Modified Asphalt. Conventional asphalt cement to which one or more polymer compounds have been added to improve resistance to deformation at high pavement temperatures and often cracking resistance at low temperatures.

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 Concrete. A composite material consisting of portland cement, coarse aggregate, fine aggregate, water, air, and possibly other additives that, when mixed together, hardens through a chemical reaction 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.

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.

Preventive Maintenance. Proactive approach that applies maintenance treatments while the asset is still in good condition; extends asset life by preventing the onset or growth (propagation) of distress.

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.

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.

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.

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 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.

Raveling. The wearing away of a bituminous pavement surface caused by the dislodging of aggregate particles and loss of asphalt binder.

Reclaimed Asphalt Pavement (RAP). Excavated asphalt pavement that has been pulverized, usually by milling, and is used like an aggregate in the recycling of asphalt pavements.

Recycled Asphalt. A mixture produced after processing existing asphalt pavement materials. The recycled mix may be produced by hot or cold mixing at a plant, or by processing the materials cold and in-place.

Recycled Concrete Aggregate. A granular material manufactured by removing, crushing, and processing hydraulic-cement concrete pavement for reuse with a hydraulic cementing medium to produce fresh paving concrete.

Release Agent. Material used to prevent bonding of concrete to a surface.

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

Residual Asphalt. Amount of asphalt left in an emulsion after water has evaporated.

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

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.

Rigid Pavement. A pavement constructed with hydraulic cement concrete.

Roughness. Distortions of the road surface that contribute to an undesirable, unsafe, uneconomical, or uncomfortable ride.

Rubblization. The pulverization of a portland cement concrete pavement into smaller particles, reducing the existing pavement layer to a sound, structural base that will be compatible to an asphalt overlay.

Rutting. A surface depression in the wheelpath caused by a permanent deformation in any of the pavement layers or subgrade.

Sand Seal. An application of asphalt emulsion covered with fine aggregate. It may be used to improve the skid resistance of slippery pavements and to seal against air and water intrusion.

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

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.

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.

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.

Skid Number (SN). A standard test measure of the friction between a braking tire and the pavement 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.

Slurry Seal. A mixture of quick- or slow-setting emulsified asphalt, well-graded fine aggregate, mineral filler, and water. It is used to fill cracks and seal areas of bituminous pavements, to restore a uniform surface texture, to seal the surface to prevent moisture and air intrusion into the pavement, and to provide skid resistance.

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. The breakdown of the slab edges within 0.6 m (2 ft.) of the side of the joint caused by excessive stresses at the joint or crack or poor joint forming/sawing practices.

Specification Limit(s). The limiting value(s) placed on a quality characteristic, established preferably by statistical analysis, for evaluating material or construction within the specification requirements. The term can refer to either an individual USL or an LSL, called a single specification limit, or to USL and LSL together, called double specification limits.

Stakeholders. A person, group, or organization that affects or can be affected by an agencies actions.

Steel-Wheel Vibratory Rollers. A compaction device used to compress underlying asphalt layers. The amount of compactive force is adjusted by changing the frequency and amplitude of vibration.

Stone Matrix Asphalt (SMA). A hot-mix asphalt consisting of a mix of asphalt cement, stabilizer material, mineral filler, and gap-graded aggregate. A gap-graded aggregate is similar to an open-graded material, but is not quite as open.

Subbase. Layer of material immediately beneath the base course.

Subgrade Soil. The native soil prepared and compacted to support a pavement structure.

Superpave™. Short for "Superior Performing Asphalt Pavement" a performance-based system for selecting and specifying asphalt binders and for designing asphalt mixtures.

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 Friction. The retarding force developed at the tire-pavement interface that resists sliding when braking forces are applied to the vehicle tires.

Surface Texture. The characteristics of the pavement surface that contribute to both surface friction and noise. Surface texture is comprised of microtexture and macrotexture.

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

Thin Asphalt Overlays. Plant-mixed combinations of asphalt cement and aggregate that are commonly placed in thicknesses between about 0.75 and 1.50 inches (19 and 38 mm).

Tradeoff Analysis. Comparisons of alternative solutions, particularly involving consequences of reallocating funds between programs.

Transverse Crack. A crack in the pavement surface that is perpendicular to the direction of travel.

Transverse Tining. 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.

Ultra-Thin Whitetopping (UTW). Thin concrete overlays of existing asphalt pavements that consist of very thin (2 to 4 inches [51 to 102 mm]) layers of concrete bonded to an existing asphalt pavement.

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.

User Costs. Costs incurred by highway users traveling on the facility and the excess costs incurred by those who cannot use the facility because of either agency or self-imposed detour requirements. User costs typically are comprised of vehicle operating costs (VOC), crash costs, and user delay costs.

Utilization. Process of applying labor, funds, information, and other resources to implement projects and services for the transportation system.

Validation. (1) The process of confirming the soundness or effectiveness of a product (such as a model, a program, or specifications) thereby indicating official sanction; (2) The mathematical comparison of two independently obtained sets of data (e.g., agency acceptance data versus contractor data) to determine whether it can be assumed they came from the same population [The *validation* of a product often includes the *verification* of test results.]

Verification. The process of determining the accuracy of test results, by examining the data or providing objective evidence, or both. [Verification sampling and testing may be part of an acceptance program (to verify contractor testing used in the agency's acceptance decision).]

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

Void. Gaps beneath pavements (usually concrete slabs) that lead to poor support conditions and high deflections.

Warm Mix Asphalt (WMA). A general term for technologies that reduce the temperature needed to produce and compact asphalt mixtures for the construction of pavements. Utilization of WMA technology can reduce compaction temperatures by approximately 25 to 80 °F (14 to 25 °C).

Weathering. The hardening and aging of the asphalt binder.

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

Whitetopping. Concrete overlay pavement placed on an existing asphalt pavement.

