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GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE

PART XII MISCELLANEOUS

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Indian Standard

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GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE

PART XII MISCELLANEOUS

0. FOREWORD

0.1 This Indian Standard (Part XII) was adopted by the Indian Standards Institution on 16 February 1973, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Cement concrete is one of the most versatile and extensively used building materials in all civil engineering constructions. There are a number of technical terms connected with the basic materials for concrete as well as the production and use of concrete which quite often require clarification to give precise meaning to the stipulations in the standard specifications, codes of practices and other technical documents. It has, therefore, become necessary to standardize the various terms and definitions used in cement and cencrete technology and thus avoid ambiguity in their interpretations. The Sectional Committee has, therefore decided to bring out a series of glossaries of terms relating to concrete and concrete materials.

0.3 For convenience of reference, this glossary of terms relating to cement concrete has been grouped into the following twelve parts:

Part I	Concrete aggregates
Part II	Materials (other than cement and aggregate)
Part III	Concrete reinforcement
Part IV	Types of concrete
Part V	Formwork for concrete
Part VI	Equipment, tools and plant
Part VII	Mixing, laying, compaction, curing and other construction aspects
Part VIII	Properties of concrete
Part IX	Structural aspects
Part X	Tests and testing apparatus
Part XI	Prestressed concrete
Part XII	Miscellaneous

0.3.1 In addition to the above, two separate standards have been brought out concerning terminology relating to hydraulic cement and pozzolanic materials. These standards are IS : 4845-1968* and IS : 4305-1967†.

0.4 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following publications:

BS : 2787-1956 Glossary of terms for concrete and reinforced concrete. British Standards Institution.

BS : 4340-1968 Glossary of formwork of terms. British Standards Instiution.

ASTM Designation : C 125 Definitions of terms relating to concrete aggregate. American Society for Testing and Materials.

ACI No SP-19 Cement and concrete terminology. American Concrete Institute.

ACI 617-1968 Recommended practice for concrete form work. American Concrete Institute.

1. SCOPE

1.1 This standard (Part XII) covers miscellaneous definitions relating to cement concrete.

2. DEFINITIONS

2.0 For the purpose of this standard the following definitions shall apply.

2.1 Absolute Specific Gravity — Ratio of the mass of a given volume of a solid or liquid, referred to a vacuum at a stated temperature to the mass, referred to a vacuum, of an equal volume of gas-free distilled water at a stated temperature (*see* **2.229**).

2.2 Acceleration — Increase in velocity or in rate of change, especially the quickening of the natural progress of a process, such as hardening, setting, or strength development of concrete.

2.3 Accidental Air — Air voids in concrete which are not purposely entrained.

*Definitions and terminology relating to hydraulic cement.

†Glossary of terms relating to pozzolana.

2.4 Addition — A material that is interground or blended in limited amounts into a hydraulic cement during manufacture either as a processing addition to aid in manufacturing and handling the cement or as a functional addition to modify the used properties of the finished product.

2.5 Adiabatic — A condition in which head neither enters nor leaves a system.

2.6 Adiabatic Curing — The maintenance of adiabatic conditions in concrete or mortar during the curing period.

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

2.8 Air Entraining — The capability of a material or process to develop a system of minute bubbles of air in cement paste, mortar, or concrete.

2.9 Air Void — A space in cement paste, mortar, or concrete filled with air; an entrapped air void is characteristically 1 mm or more.

2.10 Anchor Bolt — A bolt with the threaded portion projecting from a structure, generally used to hold the frame of a building secure against wind load or a machine against the forces of vibration; known also as hold-down bolt and foundation bolt.

2.11 Angle of Repose — The angle between the horizontal and the natural slope of loose material below which the material will not slide.

2.12 Apparent Specific Gravity — *See* **2.229**.

2.13 Arc Spectrography — Spectographic identification of elements in a sample of material, heated to volatilization in an electric arc or spark.

2.14 Arenaceous — Composed primarily of sand; sandy.

2.15 Argillaceous — Composed primarily of clay or shale; clayey.

2.16 Bacterial Corrosion — The destruction of a material by chemical processes brought about by the activity of certain bacteria which may produce substances, such as hydrogen sulphide, ammonia, and sulphuric acid.

2.17 Bag (of Cement, also Sack) — A quantity of Portland cement, 50 kg in India and most countries using the metric system. For other kinds of cement, the quantity indicated on the packing or container.

2.18 Ball Mill — Horizontal, cylindrical, rotating mill charged with large grinding media.

2.19 Barrel-vault Roof — A thin concrete roof taking the form of a part of a cylinder.

2.20 Base — A subfloor slab or 'working mat', either previously placed and hardened or freshly placed, on which floor topping is placed in a later operatioan; also the under-lying stratum on which a concrete slab, such as a pavement, is placed.

2.21 Base Bead — *See* **2.24.**

2.22 Base Coat — Any plaster coat or coats applied prior to application of the finish coat.

2.23 Base Plate — A plate of metal or other approved material formerly placed under pavement joints and the adjacent slab ends to prevent the infiltration of soil and moisture from the sides or bottom of the joint opening. Also a device used to distribute vertical loads as for building columns or machinery.

2.24 Base Screed — A preformed metal screed with perforated or expanded flanges to provide a ground for plaster and to separate areas of dissimilar materials.

2.25 Batch — Quantity of concrete or mortar mixed at one time.

2.26 Batch Box — Container of known volume used to measure constituents of a batch of concrete or mortar in proper proportions.

2.27 Batter — Inclination from the vertical or horizontal.

2.28 Batter Boards — Pairs of horizontal boards nailed to wood stakes adjoining an excavation, used as a guide to elevations and to outline the building.

2.29 Beam Bottom — Soffit or bottom form for a beam.

2.30 Beam Pocket — Opening left in a vertical member in which a beam is to rest; also an opening, in the column or girder from where forms for an intersecting beam will be framed.

2.31 Beneficiation — Improvement of the chemical or physical properties of a raw material or intermediate product by the removal of undesirable components or impurities.

2.32 Bent — Two-dimensional frame which is self-supporting within these dimensions, having at least two legs and usually placed at right angles to the length of the structure which it supports.

2.33 Bentonite — A clay composed principally of minerals of the montmorillonite group, characterized by high adsorption and very large volume change with wetting or drying.

2.34 Berliner (Crazy) — A type of terrazzo topping using small and large pieces of marble paving, usually with a standard terrazzo matrix between pieces.

2.35 Blaine Fineness — The fineness of powdered materials, such as cement and pozzolana, expressed as surface area usually is square centimetres/gram.

2.36 Block Beam — A flexural member composed of individual blocks which are joined together by prostressing.

2.37 Board Butt Joint — Shotcrete construction joint formed by sloping gunned surface to a 25 mm board, laid flat.

2.38 Belt Sleave — A tube surrounding a bolt in a concrete wall to prevent concrete from sticking to the bolt and acting as a spreader for the formwork.

2.39 Bredigite — A mineral, alpha prime dicalcium silicate ($2CaO.SiO_2$) occurring naturally or in slags and Portland cement.

2.40 Brownmillerite — A tennary compound originally regarded as $4CaO.Al_2O_3.Fe_2O_3$ (C_2AF) occurring in Portland cement and high alumina cement; now used to refer to a series of solid solutions between $2CaO.Fe_2O_3$ (C_2F) and $2CaO.Al_2O_3$ (C_2A).

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

2.42 Bulking — Increase in the bulk volume of a quantity of sand in a moist condition over the volume of the same quantity, dry or completely inundated.

2.43 Bulking Curve — Graph of charge in volume of a quantity of sand due to change in moisture content.

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

2.45 Bulk Loading — Loading of unbagged cement in containers, specially designed trucks, railroad cars or ships.

2.46 Bulk Specific Gravity — *See* **2.229.**

2.47 Butyl Stearate — A colourless oleaginous, practically odourless material ($C_{17}H_{35}COOC_4H_9$) used as a damp-proofer for concrete.

2.48 Cage — A rigid assembly of reinforcement ready for placing in position.

2.49 Caisson Pile — A cast-in-place pile made by driving a tube, excavating it, and filling the cavity with concrete.

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

2.51 Calcine — To alter composition or physical state by heating below the temperature of fusion.

2.52 Calcite — A mineral having the composition calcium carbonate ($CaCO_3$) and a specific crystal structure, the principal constituent of limestone, chalk, and marble; usually a major raw material used in Portland cement manufacture.

2.53 Capillarity — The movement of a liquid in the interstices of soil or other porous material due to surface tension.

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

2.55 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).

2.56 Carbonation — Reaction between carbon dioxide and calcium compounds, especially in cement paste, mortar, or concrete, to produce calcium carbonate.

2.57 Cast-in-place Pile — A concrete pile concreted either with or without a casing in its permanent location, as distinguished from a precast pile.

2.58 Celite — A name used by Torneboom (1897) to identify the calcium alumino ferrite constituent of Portland cement.

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

2.60 Cementation Process — The process of injecting cement grout under pressure into certain types of ground, for example, gravel, fractured rock to solidify it.

2.61 Cement Bacillus — A mineral, high sulphate calcium sulfoaluminate ($3\ CaO\ Al_2O_3\ 3CaSO_4$-30-$32\ H_2O$); occurring naturally or formed by sulphate attack on mortar and concrete; designated as 'cement bacillus' in older literature.

2.62 Cement Bituminous — A black solid, semisolid, or liquid substance at natural air temperatures and appreciably soluble only in carbon disulphide or some volatile liquid hydrocarbon, being composed of mixed in determinate hydrocarbons mixed from natural deposits. Produced as a residue in the distillation of petroleum, or obtained by the destructive distillation of coat or wood.

2.63 Cement Clinker — Nodules of cementitious compound, emerging from shaft, rotary kiln or any sintering device, which is ground to make cement.

2.64 Cement Gel — The colloidal material that makes up the major portion of the porous mass of which mature hydrated cement paste is composed.

2.65 Cementitious — Having cementing properties.

2.66 Cement Paint — A paint consisting generally of white Portland cement and water, pigments, hydrated lime, water repellents, or hygroscopic salts.

2.67 Cement Paste — A mixture of cement and water; may be either hardened or unhardened.

2.68 Cement Plaster — Plaster containing Portland cement.

2.69 Cement Rock — Natural impure limestone which contains the ingredients for production of Portland cement in approximately the required proportions.

2.70 Ceramic Bond — The development of fired strength as a result of thermo-chemical reactions between materials exposed to temperatures approaching the fusion point of the mixture such as that which may occur, under these conditions, between calcium-aluminate cement and a refractory aggregate.

2.71 Chalk — A soft limestone composed chiefly of the calcareous remains of marine organisms.

2.72 Chalking — Disintegration of coatings, such as a cement paint, manifested by the presence of a loose powder evolved from the paint at, or just beneath, the surface.

2.73 Chamfer — A bevelled corner which is formed in concrete work by placing a chamfer strip in the corner of the form.

2.74 Chemical Bond — Bond between materials that is the result of cohesion and adhesion developed by chemical reaction.

2.75 Chipping — Treatment of a hardened concrete surface by chiseling.

2.76 Clay Content — Percentage of clay by dry weight of a heterogeneous material, such as a soil or a natural concrete aggregate.

2.77 Coat — A film or layer as of paint or plaster applied in a single operation.

2.78 Coating — Material applied to surface by brushing, dipping, mopping, spraying, trowelling, etc, such as to preserve, protect, decorate, seal, or smooth the substrate.

2.79 Coefficient of Linear Thermal Expansion — Length change per unit of length per degree of temperature change.

2.80 Coefficient of Subgrade Reaction — An experimentally determined ratio between the vertical subgrade reaction and the deflection at a point on the surface of contact.

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

2.82 Cold-water Paint — A paint in which the binder or vehicle portion is composed of latex, casein, glue, or some similar material dissolved or dispersed in water.

2.83 Composite Sample — Sample obtained by blending two or more individual samples of a material.

2.84 Concrete — A composite material which consists essentially of a binding medium within which are embedded particles or fragments of aggregate; in Portland cement concrete, the binder is a mixture of Portland cement, any admixture approved by the engineer-in-charge, and water.

2.85 Concrete Pile — A precast reinforced or prestressed concrete pile driven into the ground by a pile driver or otherwise placed.

2.86 Conductivity, Thermal — A property of a homogeneous body measured by the ratio of the steady state heat flux (time rate of heat flow per unit area) to the temperature gradient (temperature difference per unit length of heat flow path) in the direction perpendicular to the area.

2.87 Construction, Composite — Construction consisting of cast-in-place reinforced concrete and members made of some other material so interconnected that the component elements act together as a unit.

2.88 Cover Block — Device which maintains reinforcement in proper position, or wall forms at a given distance apart, before and during concreting.

2.89 Cross Nicols — Two nicol prisms placed so that their vibration planes of transmitted light are mutually at right angles.

2.90 C/S Ratio — The molar or weight ratio, whichever is specified, of calcium oxide to silicon dioxide; usually of binder materials cured in an autoclave.

2.91 Deflection — In general, an angular variation from an established direction or plane, usually measured as a linear deviation from an established plane rather than an angular variation.

2.92 Deformation — A change in dimensions or shape due to stress.

2.93 Dehydration — Removal of chemically bound or adsorbed water from a material.

2.94 Density — Weight per unit volume.

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

2.96 Density (Dry) — The dry weight of a substance per unit volume at a stated temperature.

2.97 Deterioration — Deterioration into small fragments or particles due to any cause.

2.98 Diatomaceous Earth — A friable earthy material composed of nearly pure hydrous amorphous silica (opal) and consisting essentially of the frustules of the microscopic plants called diatoms.

2.99 Dicalcium Silicate — A compound having the composition 2 CaO. SiO_2, abbreviated C_2S, that occurs in Portland-cement clinker.

2.100 Differential Thermal Analysis (DTA) — Indication of thermal reaction by differential thermocouple recording of temperature changes in a sample under investigation compared with those of a chemically passive control sample, that is heated uniformly and simultaneously.

2.101 Diffusivity, Thermal — Thermal conductivity divided by the product of specific heat and unit weight; an index of the facility with which a material undergoes temperature change.

2.102 Diluent — A substance, liquid or solid, mixed with the active constituents of a formulation to increase the bulk or lower the concentration.

2.103 Discolouration — Departure of colour from that which is normal or designed.

2.104 Disintegration — *See* **2.97**.

2.105 Dispersant — A material which deflocculates or disperses finely ground materials by satisfying the surface energy requirements of the particles; used as a slurry thinner or grinding aid.

2.106 Dispersing Agent — An addition or admixture capable of increasing the fluidity of pastes, mortars, or concrete by reduction of inter-particle attraction.

2.107 Dolomite

a) A mineral having a specific crystal structure consisting of calcium carbonate and magnesium carbonate in equivalent chemical amounts which are 54·27 and 45·73 percent by weight, respectively.

b) A rock containing dolomite as the principal constituent.

2.108 Dried Strength — The compressive or flexural strength of refractory concrete determined with 3h after first drying in an oven at 105 to 110°C for a specified time.

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

2.110 Ductility — That property of a material by virtue of which it may undergo large permanent deformation without rupture.

2.111 Dummy Joint — A construction joint created by forming a groove in the surface of a pavement, floor slab, or wall to control random cracking.

2.112 Earth Pigments — The class of pigments which are produced by physical processing of materials mined directly from the earth; also frequently termed natural or mineral pigments or colors.

2.113 Efflorescence — A deposit of salts, usually white, formed on a surface, the substance having emerged from below the surface.

2.114 Emulsifier — A substance which modifies the surface tension of colloidal droplets, keeping them from coalescing, and keeping them suspended.

2.115 Endothermic — Pertaining to a reaction which occurs with the absorption of heat.

2.116 Epoxy Resins — A class of chemical bonding systems used in the preparation of special coatings or adhesives for concrete or as binders in epoxy-resin mortars and concretes.

2.117 Erosion — Deterioration brought about by the abrasive action of fluids or solids in motion.

2.118 Ettringite — *See* **2.61**.

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

2.120 Exothermic — Pertaining to a reaction which occurs with the evolution of heat.

2.121 Extensibility — The maximum tensile strain that hardened cement paste, mortar, or concrete can sustain before cracking occurs.

2.122 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.

2.123 Felite — A name used by Tornebohm (1897) to identify one form of dicalcium silicate ($2CaO\ SiO_2$), one of the crystalline components of Portland cement clinker.

2.124 Fire Strength — The compressive or flexural strength of refractory concrete determined after first firing to a specified temperature for a specified time and subsequent cooling.

2.125 Fired Unit Weight — The unit weight of refractory concrete after having been exposed to a specified firing temperature for a specified time and subsequent cooling.

2.126 Foundation Bolt — *See* **2.10**.

2.127 Frame or Panel — The principal prefabricated, welded structural unit in a scaffolding tower; also beam and column skelton of a building.

2.128 Gel — Matter in a colloidal state that does not dissolve, but remains suspended in a solvent from which it fails to precipitate without the intervention of heat or of an electrolyte.

2.129 Grog — Burned refractory material, usually calcined clay or crushed brick bats.

2.130 Grout — Mixture of cementitious material and aggregate to which sufficient water is added to produce pouring consistency without segregation, segregation of the constituents, or mixtures of other compositions, such as containing PVC or epoxy resin or sodium silicate, but similar consistency.

2.131 Gupman — Workman on shotcreting crew who operates delivery equipment.

2.132 Heat of Hydration — Heat evolved by chemical reactions with water, such as that evolved during the setting and hardening of Portland cement (*see also* **2.133**); the difference between the heat of solution of dry cement and that of partially hydrated cement.

2.133 Heat of Solution — Heat evolved by the solution of material in a solvent.

2.134 Heavy-media Separation — A method in which a liquid or suspension of given specific gravity is used to separate particles into a portion lighter than (those that float) and a portion heavier than (those that sink) the medium.

2.135 Hemihydrate — A hydrate containing one-half molecule of water to one molecule of compound; the most commonly known hemihydrate is partially dehydrated gypsum (plaster of Paris , $CaSO_4 \cdot \frac{1}{2} H_2O$.

2.136 Hot Face — The surface of a refractory section exposed to the source of heat.

2.137 Hot Load Test — A test for determining the resistance to deformation or shear of a refractory material when subjected to a specified compressive load at a specified temperature for a specified time.

2.138 Hydrate — A chemical combination of water with another compound or an element.

2.139 Hydration — Formation of a compound by the combining of water with some other substance; in concrete, the chemical reaction between cement and water.

2.140 Hydraulic Properties — Hydraulic properties are the ability of a material to set and harden in the presence of water, with formation of stable compounds.

2.141 Isotropy — The behaviour of a medium having the same properties in all directions.

2.142 Joint Filler — Material used to fill a joint to prevent the infiltration of debris.

2.143 Joint Sealant — Material used to exclude water and solid foreign materials from joints.

2.144 Liquid — Volume Measurement — Measurement of grout on the basis of the total volume of solid and liquid constituents.

2.145 Macroscopic — Visible to the unaided eye.

2.146 Marl — Calcareous clay, usually containing from 35 to 65 percent calcium carbonate ($CaCO_3$), found in the bottoms of shallow lakes, swamps, or extinct fresh-water basins.

2.147 Masonry Mortar — Mortar used in masonry structures.

2.148 Matrix — In the case of mortar, the cement paste in which the fine aggregate particles are embedded; in the case of concrete, the mortar in which the coarse aggregate particles are embedded.

2.149 Megascopic — *See* **2.145.**

2.150 Melilite — A group of minerals ranging from the calcium magnesium silicate, ackermanite, to the calcium aluminate silicate, gehlenite, that occur as crystals in blast-furnace slag.

2.151 Membrane Curing — A process that involves either liquid sealing compound (for example, bituminous and paraffinic emulsions, coal tar cutbacks, pigmented and nonpigmented resin suspensions, or suspensions

of wax and drying oil) or nonliquid protective coating (for example, sheet plastics or waterproof paper), both of which types function as films to restrict evaporation of mixing water from the fresh concrete surface.

2.152 Micron — A unit of length; one-thousandth of a millimeter or one-millionth of a metre.

2.153 Microscopic — Discernible only with the aid of a microscope.

2.154 Modulus of Subgrade Reaction — An experimentally determined ratio between the vertical subgrade reaction and the deflection at a point on the surface of contact.

2.155 Monolith — A body of plain or reinforced concrete cast or erected as a single integral mass or structure.

2.156 Montmorillonoid — *See* **2.157.**

2.157 Montmorillonite — A group of clay minerals, including montmorillonite, characterized by a sheet like internal molecular structure; consisting of extremely finely-divided hydrous aluminum or magnesium silicates that swells on wetting, shrink on drying, and are subject to ion exchange.

2.158 Nailer — A strip of wood or other fitting attached to or set in concrete, or attached to steel to facilitate making nailed connections.

2.159 Neat Cement — Hydraulic cement in the unhydrated state.

2.160 Neat Line — A line defining the proposed or specified limits of an excavation or structure.

2.161 Nicol Prism — A system of two optically clear crystals of calcide (Iceland spar) used in producing plane-polarized light.

2.162 Nonevaporable Water — The water that is chemically combined during cement hydration; not removable by specified drying.

2.163 Ocrate Process (trade name) — The treatment of concrete with gaseous SiF_4 to transform any free CaO into CaF_2.

2.164 Offset — A horizontal ledge occurring along a change in wall thickness; the narrow flat surface (or shelf) created by reducing the thickness of the wall above.

2.165 Ovals — Marble chips which have been tumbled until a smooth oval shape has resulted.

2.166 Packer-head Process — A method of casting concrete pipe in a vertical position in which concrete of low water content is compacted with a revolving compaction tool.

2.167 Pack Set — Finished cement which develops low or zero flowability during or after storage in silos, or after transporation in bulk containers, hopper-bottom cars, etc; may be caused by:

a) interlocking of particles,

b) mechanical compaction, and

c) electrostatic attraction between particles.

2.168 Palladina — *See* **2.34.**

2.169 Petrography — The branch of petrology dealing with description and systematic classification of rocks aside from their geologic relations, mainly by laboratory methods largely chemical and microscopical; also, loosely, petrology or lithology.

2.170 Petrology — The science of rocks, treating of their origin structure, composition, etc; from all aspects and in all relations.

2.171 Phenolic Resin — A class of synthetic, oil-soluble resins (plastics) produced as condensation products of phenol, substituted phenols and formaldehyde, or some similar aldehyde that may be used in paints for concrete.

2.172 Pigment — A colouring matter, usually in the form of an insoluble fine powder.

2.173 Plaster — A cementitious material or combination of cementitious material and aggregate that, when mixed with a suitable amount of water, forms a plastic mass or paste which when applied to a surface, adheres to it and subsequently hardens, preserving in a rigid state the form or texture imposed during the period of plasticity; also the placed and hardened mixture.

2.174 Plaster of Paris — Gypsum ($CaSO_4 \frac{1}{2} H_2O$) from which three quarters of the chemically bound water has been driven off by heating; when wetted it recombines with water and hardens quickly.

2.175 Plastic — Possessing plasticity, or possessing adequate plasticity.

2.176 Plastic Mortar — A mortar of plastic consistency.

2.177 Plasticizing — Producing plasticity or becoming plastic.

2.178 Plastic or Bond Fire Clay — A fire clay of sufficient natural plasticity to bond nonplastic material; a fire clay used as a plasticizing agent in mortar.

2.179 Plumb — Vertical or to make vertical.

2.180 Polish or Final Grind — The final operation in which fine abrasives are used to hone a surface to its desired smoothness and appearance.

2.181 Polyethylene — A thermoplastic high-molecular-weight organic compound used in formulating protective coatings or, in sheet form, as a protective cover for concrete surfaces during the curing period, or to provide a temporary enclosure for construction operations.

2.182 Polymer — The product of polymerization; more commonly a rubber or resin consisting of large molecules formed by polymerization.

2.183 Polymerization — The reaction in which two or more molecules of the same substance combine to form a compound containing the same elements, and in the same proportions, but of high molecular weight, from which the original substance can be regenerated, in some cases only with extreme difficulty.

2.184 Polystyrene Resin — Synthetic resins varying in colour from water-white to yellow formed by the polymerization of styrene on heating with or without catalysts that may be used in paints for concrete, or for making sculptured moulds, or as insulation.

2.185 Polysulphide Coating — A protective coating system prepared by polymerizing a cholorinated alkyl polyether with an inorganic polysulphide, exhibits outstanding resistance to ozone, sublight, oxidation, and weathering.

2.186 Polyurethane — Reaction product of an isocyanate with any of a wide variety of other compounds containing an active hydrogen group; used to formulate tough, abrasion-resistant coatings.

2.187 Polyvinyl Acetate — Colourless, permanently thermoplastic resin; usually supplied as an emulsion or water-dispersible powder characterized by flexibility, stability towards light, transparency to ultraviolet rays, high dielectric strength, toughness, and hardness; the higher the degree of polymerization, the higher the softening temperature; may be used in paints for concrete.

2.188 Polyvinyl Chloride — A synthetic resin prepared by the polymerization of vinyl chloride, used in the manufacture of nonmetallic waterstops for concrete.

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

2.190 Pot Life — Time interval after mixing during which liquid material is usable with no difficulty.

2.191 Pozzolana — An essentially silicious material which while in itself possessing little or no cementitious properties will, in finely divided form and in the presence of water, react with calcium hydroxide at ambient

temperature to form compounds possessing cementitious properties. The term includes natural volcanic material having pozzolanic properties as also other natural and artificial materials, such as diatomaceous earth, calcined clay and fly ash.

2.192 Pozzolana Mortar — A lime or cement mortar in which pozzolana has been used.

2.193 Pozzolanic Material — These materials which have the pozzolanic activity of combining with lime to form cementitious compounds.

2.194 Pozzolanic Properties — The ability of a material to combine chemically with calcium hydroxide in the presence of water under ambient temperature forming compounds having cementitions properties.

2.195 Prefiring — Raising the temperature of refractory concrete under controlled conditions prior to placing it in service.

2.196 Preformed Foam — Foam produced in a form generator prior to introduction of the foam into a mixer with other ingredients to produce cellular concrete.

2.197 Primary Nuclear Vessel — Interior container in a nuclear reactor designed for sustained loads and for working conditions.

2.198 Promoter — A substance that accelerates or causes a chemical reaction without itself being transformed by the reaction.

2.199 Pyrometric Cone — A small, slender, three-sided oblique pyramid made of ceramic or refractory material for use in determining the time-temperature effect of heating and in obtaining the pyrometric cone equivalent (PEC) of refractory material.

2.200 Quartering — A method of obtaining a representative sample by dividing a circular pile of a larger sample into four equal parts and discarding opposite quarters successively until the desired size of sample is obtained.

2.201 Raw Mix — Blend of raw materials, ground to desired fineness, correctly proportioned, and blended ready for burning; such as that used in the manufacture of cement clinker.

2.202 Reactive Silica Material — Several types of materials which react at high temperatures with Portland cement or lime during autoclaving; includes pulverized silica, natural pozzolana, and fly ash.

2.203 Refractories — Materials, usually nonmetallic, used to withstand high temperatures.

2.204 Refractoriness — In refractories, the property of being resistant to softening or deformation at high temperatures.

2.205 Refractory — Resistant to high temperatures.

2.206 Reglet — A groove in a wall to receive flashing.

2.207 Reinforced Masonry — Unit masonry in which reinforcement is embedded in such a manner that the two materials act together in resisting forces.

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

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

2.210 Sack of Cement — *See* **2.17**.

2.211 Santorin Earth — A volcanic tuff used as a pozzolana.

2.212 Scoria — Volcanic rock characterized by a vesicular texture and dark colour; particles between 4 and 32 mm are essentially equivalent to volcanic cinders.

2.213 Sealing Compound — Material used to exclude water and solid foreign materials from joints.

2.214 Secondary Nuclear Vessel — Exterior container or safety container in a nuclear reactor subjected to design load only once in its lifetime.

2.215 Settling — The lowering in elevation of sections of pavement or structures due to their weight, the loads imposed on them, or shrinkage or displacement of the supporting earth.

2.216 Shelf Life — Maximum interval during which a material may be stored and remain in a usable condition.

2.217 Shell Construction — Construction using thin curved slabs.

2.218 Shrinkage-Compensating — A characteristic of grout, mortar, or concrete made using an expansive cement in which volume increase if restrained, induces compressive stresses which are intended to approximately offset the tendency of drying shrinkage to induce tensile stresses.

2.219 Silica — Silicon dioxide (SiO_2).

2.220 Silica Flour — A siliceous binder component which reacts with lime under autoclave curing conditions; prepared by grinding quartz to the fineness of Portland cement.

2.221 Silicate — Salt of a silicic acid.

2.222 Skew Back — Sloping surface against which the end of an arch rests, such as a concrete thrust block supporting thrust of arch bridge.

2.223 Slop — The waste material produced in the wet grinding process and consisting of finely ground terrazzo and water.

2.224 Sludge — *See* **2.223.**

2.225 Solid Volume — The displacement volume of an ingredient of concrete or mortar; in the case of solids, the volume of the particles themselves, including their permeable and impermeable voids but excluding space between particles; in the case of fluids, the cubic content which they occupy.

2.226 Solution — A liquid of at least two substances, one of which is a solvent in which the other or others are dissolved.

2.227 Solvent — A liquid in which another substance may be dissolved.

2.228 Soundness — The freedom of a solid from cracks, flaws fissures, or variations from an accepted standard; in the case of cement, freedom from excessive volume change after setting; in the case of aggregate, the ability to withstand the aggressive action to which concrete containing it might be exposed particularly that due to weather.

2.229 Specific Gravity — The ratio of the mass of a unit volume of a material at a stated temperature to the mass of the same volume of gass-free distilled water at a stated temperature:

a) *Apparent Specific Gravity* — The ratio of the mass in air of a unit volume of a material at a stated temperature to the mass in air at equal density of an equal volume of gas-free distilled water at a stated temperature. If the material is a solid, the volume is that of the impermeable portion.

b) *Bulk Specific Gravity* — The ratio of the mass in air of a unit volume of a permeable material (including both permeable and impermeable voids normal to the material) at a stated temperature to the mass in air of equal density of an equal volume of gas-free distilled water at a stated temperature.

c) *Bulk (Saturated-Surface-Dry Basis) Specific Gravity* — Same as bulk specific gravity except that the mass includes the water in the permeable voids (*see also* **2.1**).

2.230 Specific Surface — The surface area of particles contained in a unit weight or absolute unit volume of a material.

2.231 Spraying Drying — A method of evaporating the liquid from a solution by spraying it into a heated gas.

2.232 Stabilizer — A substance which makes a solution or suspension more stable, usually by keeping particles from precipitating.

2.233 Sticky Cement — *See* **2.167.**

2.234 Stockhouse Set — *See* **2.167.**

2.235 Stress Corrosion — Corrosion of a metal accelerated by stress.

2.236 Stucco — A plaster used for coating exterior walks and other exterior surfaces of buildings.

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

2.238 Subgrade — The soil prepared and compacted to support a structure or a pavement system.

2.239 Sulphate Attack — Harmful or deleterious chemical or physical reaction or both between sulphates in soil or ground water and concrete or mortar, primarily the cement-paste matrix.

2.240 Sulphate Resistance — Ability of concrete or mortar to withstand sulphate attack.

2.241 Surface Active — Having the ability to modify surface energy and to facilitate wetting, penetrating, emulsifying, dispersing, solubilizing, foaming, frothing, etc; of other substances.

2.242 Surface Area — *See* **2.230.**

2.243 Surface Voids — Cavities visible on the surface of a solid.

2.244 Temperature Rise — The increase of temperature caused by absorption of heat or internal generation of heat, as by hydration of cement in concrete.

2.245 Temperature-Rise Period — The time interval during which the temperature of a concrete product rises at a controlled rate to the desired maximum in autoclave or atmospheric pressure steam curing.

2.246 Tetracalcium Aluminoferrite — A compound in the calcium aluminoferrite series, having the composition $4CaO\ Al_2O_3\ Fe_2O_3$, abbreviated C_4AF, which is usually assumed to be the aluminoferrite present when compound calculations are made from the results of chemical analysis of Portland cement.

2.247 Thermal Conductivity — *See* **2.86.**

2.248 Thermal Diffusivity — *See* **2.101.**

2.249 Thermoplastic — Becoming soft when heated and hard when cooled.

2.250 Thermosetting — Recoming rigid by chemical reaction and not remeltable.

2.251 Thixotropy — The property of a material that enables it to stiffen in a short period on standing, but to acquire a lower viscosity on mechanical agitaion, the process being reversible; a material having this property is termed thixotropic or shear thinning.

2.252 Tieback — A steel rod fastened to a deadman or a rigid foundation to prevent the lateral movement of formwork, sheet pile walls, retaining walls, etc.

2.253 Timber Stresses — Stresses for stress-grade lumber conforming to recognized values.

2.254 Time-Dependent Deformation — Combined effects of autogenous volume change, contraction, creep, expansion, shrinkage, and swelling occurring during an appreciable period of time; not synonymous with 'inelastic behaviour' or 'volume change'.

2.255 Tolerance — The permitted variation from a given dimension or quantity.

2.256 Toughness — The property of matter which resists fracture by impact or shock.

2.257 Triaxial Compression Test — A test in which a specimen is subjected to a confining hydrostatic pressure and then loaded axially to failure.

2.258 Triaxial Test — A test in which a specimen is subjected simultaneously to lateral and axial loads.

2.259 Unsound — Not sound (*see also* **2.228**).

2.260 Vapour Pressure — A component of atmospheric pressure which is caused by the presence of vapour, expressed in centimeters, or millimeters of high of a column of mercury.

2.261 Vehicle — Liquid carrier; binder; anything dissolved in the liquid portion of a paint is a part of the vehicle.

2.262 Veneer — A masonry facing which is attached to the backup but not so bonded as to act with it under load.

2.263 Vermiculite — A group name for certain platy minerals, hydrous silicates of aluminium, magnesium, and iron; characterized by marked exfoliation on heating; also a constituent of clays.

2.264 Viscosity — Friction within a liquid due to mutual adherence of its particles.

2.265 Void-Cement Ratio — Volumetric ratio of air plus water to cement.

2.266 Volatile Material — Material that is subject to release as a gas or vapour, liquids that evaporate readily.

2.267 Warehouse Set — The partial hydration of cement stored for periods of time and exposed to atmospheric moisture.

2.268 Waterproofing Compound — Material used to impart water repellency to a structure or a construction unit.

2.269 Waterstop — A thin sheet of metal, rubber, plastic, or other material inserted in a construction joint to obstruct the seeping of water through the joint.

2.270 Wetting Agent — A substance capable of lowering the surface tension of liquids, facilitating the wetting of solid surfaces and permitting the penetration of liquids into the capillaries.

2.271 Wythe (Leaf) — Each continuous vertical section of a wall one masonry unit in thickness.

2.272 Xonotlite — A crystallized monocalcium silicate hydrate which can be synthesized at steam pressures of about 14 to 16 kg/cm^2 gauge or higher.

2.273 X-ray Diffraction — The diffraction of X-rays by substances having a regular arrangement of atoms; a phenomenon used to identify substances having such structure.

2.274 X-ray Fluorescence — Characteristic secondary radiation emitted by an element as a result of excitation by X-rays, used to yield chemical analysis of a sample.

2.275 Yellowing — Development of yellow colour or cast in white or clear coatings, on aging.

(*Continued from page* 2)

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