

## Definitions for Architectural Precast

**Accelerated curing-** See Curing.

**Admixture-** A material other than water, aggregates and cement used as an ingredient in concrete, mortar or grout to impart special characteristics.

**Aggregate-** Granular material, such as sand, gravel, and crushed stone used with a cementing medium to form a hydraulic-cement concrete or mortar.

**Aggregate, structural lightweight-** Aggregate with a dry, loose weight of 70lbs/ft<sup>3</sup> (1121kg/m<sup>3</sup>) or less.

**Air entraining admixture-** A chemical added to the concrete for the purpose of providing minute bubbles of air (generally smaller than 1mm) in the concrete during mixing to improve the durability of concrete exposed to cyclical freezing and thawing in the presence of moisture.

**Ambient temperature-**The temperature of the air surrounding the forms and molds into which concrete is to be cast, or of the air surrounding an element during curing.

**Anchorage-** The means by which the pre-stressing force is permanently transmitted from the pre-stressing steel to the concrete. In post-tensioned applications, a mechanical device comprising all components required to anchor the pre-stressing steel and transmit the pre-stressing force to the concrete.

**Architectural precast concrete-** A product with a specified standard of uniform appearance, surface details, color and texture.

**Architectural precast concrete Trim Units-** Wet cast products with a high standard of finish quality and of relatively small size that can be installed with equipment of limited capacity, such as sills, lintels, coping, cornices, quoins, medallions, bollards, benches, planters and pavers.

**Backup mix-** The concrete mix cast into the mold after the face mix has been placed and consolidated.

**Bleeding-** A form of segregation in which some of the water in a mix rises to the surface of freshly placed concrete; also known as water gain.

**Blocking-** Materials used for keeping concrete elements from touching each other or other materials during storage and transportation.

**Bondbreaker-** A substance placed on a material to prevent it from bonding to the concrete, or between a face material such as natural stone and the concrete backup.

**Bonding Agent-** A substance used to increase the bond between an existing piece of concrete and a subsequent application of concrete such as a patch.

**Bull float-** A tool comprising a large, flat, rectangular piece of wood, aluminum, or magnesium usually 8 in. (200mm) wide and 42 to 60 in. (1.0 to 1.5m) long, and a handle 4 to 16 ft. (1 to 5m) in length used to smooth unformed surfaces of freshly placed concrete.

**Bugholes-** Small holes on formed concrete surfaces formed by air or water bubbles, sometimes called blowholes.

**Camber-** (1) The deflection that occurs in pre-stressed concrete elements due to the net bending resulting from application of a pre-stressing force. (It does not include dimensional inaccuracies); and (2) A built-in curvature to improve appearance.

**Certification-** Assurance by a competent third party organization, operating on objective criteria and which is not subject to undue influences from the manufacturer or purchaser or to financial considerations, that elements are consistently produced in conformity with a specification. It not only proclaims compliance of a product with a specification, but also that the manufacturer's quality control arrangements have been approved and that a continuing audit is carried out.

**Clearance-** Interface space (distance) between two items.

**Coarse aggregate-** Aggregate predominately retained on the U.S. Standard No. 4 (4.75mm) sieve; or that portion of an aggregate retained on the No. 4 (4.75 mm) sieve.

**Compaction-** The process whereby the volume of the concrete is reduced to the minimum practical space by the reduction of voids usually by vibration, tamping or some combination of these.

**Connection-** Device for the attachment of precast concrete units to each other or to the building or structure.

**Covermeter-** See R-meter.

**Crazing-** A network of visible, fine hairline cracks in random directions breaking the exposed face of a panel into areas of from 1/4 in. to 3 in. (6 to 75 mm) across.

**Creep-** The time dependent deformation (shortening) of pre-stressing steel or concrete under sustained loading.

**Curing-** The maintenance of humidity and temperature of freshly placed concrete during some definite period following placing, casting, or finishing to assure satisfactory hydration of the cementitious materials and proper hardening of the concrete; where the curing temperature remains in the normal environmental range [generally between 50 and 90 deg. F (10 and 32 deg. C)] use the term normal curing; where the curing temperature is increased to a higher range [generally between 90 and 150 deg. F (32 and 66 deg. C)] use the term accelerated curing.

**Detensioning of strand or wire-** The transfer of strand or wire tension from the bed anchorage to the concrete.

**Draft-** The slope of concrete surface in relation to the direction in which the precast concrete element is withdrawn from the mold; it is provided to facilitate stripping with a minimum of mold breakdown.

**Dunnage-** See Blocking

**Elastic shortening-** The shortening of a member which occurs immediately after the application of the pre-stressing force.

**Elongation-** Increase in the length of the pre-stressing steel (strand) under the applied pre-stressing force.

**Exposed aggregate concrete-** Concrete manufactured so that the aggregate on the face is left protruding.

**Face mix-** The concrete at the exposed face of a concrete unit used for specific appearance purposes.

**Fine aggregate-** Aggregate passing the 3/8 in. (9.5 mm) sieve and almost entirely passing the No. 4 (4.75 mm) sieve and predominately retained on the No. 200 (75  $\mu$ m) sieve; or that portion of an aggregate passing the No. 4 (4.75 mm) sieve and predominately retained on the No. 200 (75  $\mu$ m) sieve.

**Form-** See mold

**Formed surface-** A concrete surface that has been cast against formwork.

**Form release agent-** A substance applied to the mold for the purpose of preventing bond between the mold and the concrete cast in it.

**Friction loss-** In post-tensioned applications, the stress (force) loss in a pre-stressing tendon resulting from friction created between the strand and sheathing due to curvature in the tendon profile during stressing.

**Gap-graded concrete-** A mix with one or a range of normal aggregate sizes eliminated, and/or with a heavier concentration of certain aggregate sizes over and above standard gradation limits. It is used to obtain a specific exposed aggregate finish.

**Grout-** A mixture of cementitious materials and water, with or without sand or admixtures.

**Hardware-** Items used in connecting precast concrete units or attaching or accommodating adjacent materials or equipment. Hardware is normally divided into three categories.

**Contractor's hardware-** Items to be placed on or in the structure in order to receive the precast concrete units, e.g., anchor bolts, angles, or plates with suitable anchors.

**Plant hardware-** Items to be embedded in the concrete units themselves, either for connections and precast concrete erector's work, or for other trades, such as mechanical, plumbing, glazing, miscellaneous iron, masonry, or roofing trades.

**Erection hardware-** All loose hardware necessary for the installation of the precast concrete units.

**Homogeneous mix-** A uniform concrete mix used throughout a precast concrete element.

**Initial prestress-** The stress (force) in the tendon immediately after transferring the pre-stressing force to the concrete.

**Jacking force-** The maximum temporary force exerted by the jack while introducing the pre-stressing force into the concrete through the pre-stressing strand.

**Jig-** A template or device to align parts of an assembly, usually for pre-assembling reinforcing steel and hardware cages, with a minimum of measurement to attain consistent accuracy from one cage to the next.

**Laitance-** Residue of weak and nondurable material consisting of cement, aggregate fines, or impurities brought to the surface of plastic concrete by bleed water.

**Lifting frame (or beam)-** A rigging device designed to provide two or more lifting points of a precast concrete element with predictable load distribution and pre-arranged direction of pulling force during lifting.

**Mark number-** The individual identifying mark assigned to each precast concrete unit predetermining its position in the building.

**Master mold-** A mold which allows maximum number of casts per project; units cast in such molds need not be identical, provided the changes in the units can be simply accomplished as pre-engineered mold modifications.

**Matrix-** The portion of the concrete mix containing only the cement and fine aggregates (sand).

**Miter-** An edge that has been beveled to an angle other than 90 deg.

**Mold-** The container or surface against which fresh concrete is cast to give it a desired shape; sometimes used interchangeably with form. (The term is used in this Manual for custom made forms for specific jobs while forms are used for standard forms or forms of standard cross section.)

**Pattern or positive-** Replica of all or part of the precast element sometimes used for forming the molds in concrete or plastic.

**Plastic cracking-** Short cracks often varying in width along their length that occur in the surface of fresh concrete soon after it is placed and while it is still plastic.

**Post-tension-** A method of pre-stressing concrete whereby the tendon is kept from bonding to the plastic (wet) concrete, then elongated and anchored directly against the hardened concrete, imparting stresses through end bearing.

**Pre-cast engineer-** The person or firm who designs precast concrete members for specified loads and who may also direct the preparation of the shop drawings.

**Pretensioning-** A method of pre-stressing concrete whereby the tendons are elongated, anchored while the concrete in the member is cast, and released when the concrete is strong enough to receive the forces from the tendon through bond.

**Production drawings-** A set of instruction in the form of diagrams and text which contain all the information necessary for the manufacturer to produce the unit.

**Quality-** The appearance, strength and durability which is appropriate for the specific product, its particular application and its expected performance requirements. The totality of features and characteristics of a product that bear on its ability to satisfy stated or implied needs.

**Quality assurance (QA)-** All those planned or systematic actions necessary to ensure that the final product or service will satisfy given requirements for quality and perform intended function.

**Quality control (QC)-** Those actions related to the physical characteristics of the materials, processes, and services, which provide a means to measure and control the characteristics to predetermined quantitative criteria.

**Quirk miter-** A corner formed by two chamfered members to eliminate shard corners and ease alignment.

**R-meter-** An electronic device used to locate and size reinforcement in hardened concrete.

**Retarder-** An admixture which delays the setting of cement paste and therefore of concrete.

**Retarder, surface-** A material used to produce exposed aggregate concrete by retarding or delaying the hardening of the cement paste on a concrete surface within a time period and to a depth to facilitate removal of this paste after the concrete element is otherwise cured.

**Retempering-** The addition of water or admixture and remixing of concrete which had started to stiffen in order to make it more workable.

**Return-** A projection which is angles away from the main face or plane of view.

**Reveal-** (1) Groove in a panel face generally used to create a desired architectural effect; and (2) The depth of exposure of the coarse aggregate in the matrix after production of an exposed aggregate finish.

**Rustication-** A groove in a panel face for architectural appearance; also reveal.

**Sandwich wall panel-** A prefabricated panel which is a layered composite formed by attaching two wythes or skins of concrete separated by an insulating core.

**Scabbing-** A finish defect in which parts of the form face including release agent adhere to the concrete, some probable causes are an excessively rough form face, inadequate application of release agent, or delayed stripping.

**Scouring-** Irregular eroded areas or channels with exposed stone or sand particles; some probable causes of this finish defect are excessively wet concrete mix, insufficient fines water in form when placing, poor vibration practices, and low temperature when placing.

**Sealer-** A clear chemical compound applied to the surface of precast concrete units for the purpose of improving weathering qualities or reducing water absorption.

**Segregation-** The tendency for the coarse particles to separate from the finer particles in handling; in concrete, the coarse aggregate and drier material remain behind and the mortar and wetter material flowing ahead; this also occurs in a vertical direction when wet concrete is overvibrated or dropped vertically into the forms, the mortar and wetter material rising to the top; in aggregate, the coarse particles roll to the outside edges of the stockpile.

**Self stressing form-** A form provided with suitable end bulkheads and sufficient cross-sectional strength to resist the total pre-stressing force.

**Set-up-** The process of preparing molds or forms for casting, including installation of materials (reinforcement and hardware) prior to the actual placing of concrete.

**Sheathing-** A material covering forming an enclosure around the pre-stressing steel to avoid temporary or permanent bond between the pre-stressing steel and the surrounding concrete.

**Shrinkage-** The volume change in precast concrete units caused by drying normally occurring during the hardening process of concrete.

**Shop drawings-** (1) Collective term used for erection drawings, production drawings and hardware details; and (2) Diagrams of precast concrete members and their connecting hardware, developed from information in the contract documents. They show information needed for both field assembly (erection) and manufacturer (production) of the precast concrete units.

**Specially Finished Structural Precast Concrete-** A product fabricated using forms and techniques common to the production of structural elements as defined in MNL-116 and having specified surface finished that require uniformity and detailing more demanding than the requirements of MNL-116. These surface finish requirements should be clearly specified, and verified with appropriate samples and mockups.

**Spreader beam-** A frame of steel channels or beams attached to the back of a panel, prior to stripping, for the purpose of evenly distributing loads to inserts and for lifting the panel about its center of gravity.

**Strand-** A group of wires laid helically over a central-core wire. A seven-wire strand would thus consist of six outer wires laid over a single wire core.

**Strand anchor-** A device for holding a strand under tension, sometimes called a strand chuck or vice.

**Stripping-** The process of removing precast concrete elements from the form in which it was cast.

**Strongback/Stiffback-** A steel or wooden member which is attached to a panel for the purpose of adding stiffness during handling, shipping and/or erection.

**Structural lightweight concrete-** Structural concrete made with lightweight aggregate with an air-dry unit weight of the concrete in the range of 90 to 115 lb/ft<sup>3</sup> (1440 to 1850 kg/m<sup>3</sup>) and a 287-day compressive strength of more than 2500 psi (17.24 MPa).

**Superplasticizer-** A high range water reducing (HRWR) admixture producing concrete of significantly higher slump without addition of water.

**Surface retarder-** A material used to retard or prevent the hardening of the cement paste at a concrete surface to facilitate removal of this paste after curing.

**Tendon-** A high strength steel element consisting of one or more wires, strand or bars, or a bundle of such elements, used to impart pre-stressing forces to concrete. In post-tensioned applications, a complete assembly consisting of anchorages, pre-stressing steel (strand), corrosion inhibiting coating and sheathing. It imparts the pre-stressing force to the concrete.



**Tolerance-** Specified permissible variation from state requirements such as dimensions, location, alignment, strength, and air entertainment.

**Product tolerances-** Those variations in dimensions relating to individual precast concrete members.

**Erection tolerances-** Those variations in dimensions required for acceptable matching of precast members after they are erected.

**Interfacing tolerances-** Those variations in dimensions associated with other materials in contact with or in close proximity to precast concrete.

**Transfer strength-** The minimum concrete strength specified for the individual concrete elements before the pre-stressing force may be transferred to them, sometimes called detensioning strength or release strength.

**Unbonded tendon-** A tendon in which the pre-stressing steel (strand) is prevented from bonding to the concrete. When unbonded tendons are used, pre-stressing force is permanently transferred to the concrete by the anchorage only.

**Veneered construction-** The attachment of other materials, such as natural stone or clay products, to a concrete panel.

**Wedges-** Pieces of tapered metal with teeth which bite into the pre-stressing steel (strand) during transfer of the pre-stressing force. The teeth are beveled to assure gradual development of the tendon force over the length of the wedge.

**Wedge set-** The relative movement of the wedges into the anchorage cavity during the transfer of the pre-stressing force to the anchorage.

**Workability-** The ease with which a given set of materials can be mixed into concrete and subsequently handled, transported, placed, and finished with a minimum loss of homogeneity.