



GLOSSARY OF COMMON TERMS

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A

Aftershock

Smaller earthquakes that occur after all large earthquakes

Aggregates

Materials (usually rock) that are mixed with cement to make concrete; may be fine or coarse and the type of rock can affect the strength of concrete

Air-Purifying Respirator (APR)

Respirator that uses filters or absorbent material to remove airborne contaminants from the breathing air before the air is inhaled

Anchor System

System used to attach objects or structures to concrete and to attach concrete to a crane or another lifting system

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B

Basket Hitch

A hitch that supports the load by wrapping the sling around the load and attaching to the same hook as the other side of the sling

Beams/Girders

A concrete or steel load-bearing structural member that carries both horizontal and vertical loads; concrete beams/girders often reinforced



Bending

Combination of compression, tension, and shear forces through an object

Bevel Cut

An angled cut that is made during a lift-out operation; critical when cutting over the top of a victim(s)

Bolt Shear

The tendency of a steel, pin-like connector (such as a bolt, nail, or screw) to break across its cross-section

Bolting

The placement of bolts into concrete as anchors to support either the slab portion being removed or to support a tool

Brittle

The tendency of a material to break without warning

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C

Cast-in-Place Concrete

Concrete that has been poured in the location where it is expected to remain

Catenary Action

The failure of a vertical support will cause unplanned tension forces in the remainder of the structure and may cause lean-over of the remaining walls. Catenary action can prevent complete collapse, but it leaves a condition that is difficult to assess.

Center of Gravity (CG)

The balance point at which the whole weight of an object is acting vertically downward

Chain Sling

A sling consisting of a master link on one end and a smaller sized chain connected to a hook at the other

Choker Hitch

A choker hitch is a hitch that is created by wrapping the sling around the load and securing it back onto itself. One eye is passed through the shackle that is attached to other eye. The other eye is placed onto the hook.



Class 1 Lever

Fulcrum is placed between the force applied and the weight (load)

Class 2 Lever

Weight (load) is placed between the force and the fulcrum

Class 3 Lever

Force is placed between the fulcrum and the load

Collapse/Hazard Zone

An area established to control access to the immediate area that could be affected or impacted by further building collapse, falling debris, or other hazardous situations (i.e., aftershocks)

Column

Round, square, or rectangular support members

Complex Mechanical Advantage (MA) System

A system of traveling pulleys that move in the opposite direction of the load

Compound Mechanical Advantage (MA) System

One simple system pulls on another simple system and some of the traveling pulleys move at a different speed than the load

Compression

Two forces being applied directly toward each other (in-line) through an object

Concrete

A very hard building material made by mixing together cement, sand, small stones, and water

Concrete Frame Buildings

Structures constructed with a heavy floor structure made of cast-in-place, non-ductile reinforced concrete; some have infill walls while others do not

Concrete Screw

A screw that is driven into a pre-drilled hole to fasten devices like the electronic level and other monitoring devices



Concrete Shear Wall Buildings

Structures constructed with a heavy wall structure made with reinforced concrete shear walls

Course Aggregates

Aggregates that include crushed stone, gravel, cinders, shale, lava, pumice, and vermiculite with particles between 0.2 in. (5 mm) and 1½ in. (38.1 mm) in diameter

Cribbing

Cribbing is an easily adjustable shore for height and width dimensions. Height must be limited due to a large amount of deflection due to crushing and the possibility of stability failure caused by different crushing rates at different bearings. Cribbing may be used for sloped floors up to 15 degrees.

Critical Angle

The angle formed between a horizontal line and a sling leg

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D

Dead Loads

Vertical forces imposed on a structure from building components

Diagonal Bracing

The component of a shore used as lateral bracing as an X or V between shores

Diagonally Braced Framing Systems

Constructed similarly to moment frame structures; lateral load resistance provided by adding diagonal members between columns to prevent lateral racking

Diagonally Braced Steel Frame Buildings

These buildings are constructed from heavy structural steel. This type of building is normally well engineered where members are very ductile. The overall performance is dependent on the connections and proper proportioning of column strength.

Diagonal Tension Crack

Cracks that occur in the high-shear stress zones of beams and girders in a typical pattern under normal vertical load conditions



Door/Window Shore

A door/window shore is a shore used in Unreinforced Masonry (URM) buildings to support loose masonry over openings. This shore may be used in other building types where door or window headers have been damaged and in badly racked wood buildings to provide additional shear wall strength.

Double Basket Hitch

A hitch that uses two single slings wrapped as basket hitches at separate locations on the load

Double Choker Hitch

A hitch that uses two single slings wrapped as choker hitches at separate locations on the load

Double-T Shore

A stable initial stabilization shore and much preferred to the marginally stable T-shore

Ductile

The ability of a material to stretch and/or bend without suddenly breaking

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E

Earthquake Magnitude

A method of measuring the total energy released by an earthquake, which could also relate to the total damage done

Equilibrium

A state in which opposing forces or influences are balanced and the object is at rest

Explosion

A rapid increase in volume and a release of energy generating high temperatures and the release of gases

Explosive Spalling

The violent projection of concrete that may be caused by heat or a portion of concrete being sheared by a tool



Eye Nut

A drop forged and galvanized device that can be attached to the exposed threads of an installed expansion bolt to produce a lifting device

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F

Fine Aggregates

Aggregates that usually include natural sand or crushed stone with a particle diameter less than 0.2 in. (5 mm)

Fixed Pulley

A stationary pulley that is attached to the anchor system and is used to change the direction of effort

Framed Vertical Load System

Consist of a uniform grid of columns and beams; tend to have longer spans between columns and the collapse of one column may involve an area twice the column spacing in each direction

Friction

The force found in the location of contact between two surfaces; depends on the type and roughness of the contact surfaces as well as the force of gravity that is acting upon it

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G

Gravity

The force that attracts a body toward the center of the earth, or toward any other physical body having mass; imposes vertical loads on a structure

Grout

A mixture of Portland cement and water with sand and sometimes pea gravel

Gusset Plate

The component of a shore used to hold various joints together; not designed to support any direct load

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H

Header

The horizontal component of a shore that collects the load at the roof and the floor

Hollow Core Slab

A precast, pre-stressed concrete slab with continuous voids extending the length of the slab that are often used as electrical or mechanical runs

Hook

A device attached to a crane or other piece of heavy equipment used to receive the load from one or more slings

Horizontal Angle

The angle formed between the top of the load and the sling leg

Horizontal Members

Structural members that support floor and roof planes

Hydrostatic Pressure

Lateral and lifting pressures due to water (or other fluid) that can highly load foundation and basement walls and lift structures when the water level is not equalized between exterior and interior spaces

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I

Impact Loads

Vertical forces imposed on a structure from vibrations, impact, or acceleration

Incident Action Plan (IAP)

Document developed by the Incident Command System (ICS) management team that identifies all incident objectives, strategies, and tactics and assigns responsibilities

Inclined Plane

A simple machine consisting of a gradual slope



Included Angle

The angle formed between sling legs at the hook

Inelastic Action

The permanent deformation of a material through force

Insertion Point

The height at which a raker shore needs to intersect a wall

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L

Laced Post Shore

A high capacity four-post system constructed in a similar way to a pair of two-post vertical shores, but laced together; space inside the laced post may be used as a safe haven

Lateral Forces

Forces applied horizontally to a structure; most common lateral loads are wind and earthquakes

Lateral Loads

Forces pushing against a structure

Lateral Shoring

Shoring used to counteract horizontal loads being placed on a structure following failure of structural components due to natural or human-made events

LCES

Acronym that stands for Lookouts, Communications, Escape routes, and Safety zones

Lever

A simple machine that transfers force from one place to another and changes the force's direction

Light Metal Buildings

Light metal buildings are normally one-story, pre-engineered buildings sheathed with metal siding and roofing. They are often combined with wood or light-gauge metal interior partitions and mezzanine or have masonry, precast, tilt-up, or metal interior or exterior walls.



Live Loads

Vertical forces imposed on a structure from furniture, people, or moveable partitions

Load Angle Factor

A calculation to determine the load on each leg of a sling; formula is *Length of sling leg* ÷ *Height to the hook*

Load-Resisting Systems

The elements of a structure designed to transfer loads to the ground through interconnected structural components or members

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M

Manufactured Pneumatic Shoring System

Manufactured shores comprised of variable length struts and accessories designed to configure struts into vertical or lateral shoring systems

Mechanical Advantage (MA)

The ratio between the output forces a machine exerts to the input force that is furnished to that machine to do work

Mechanics

The act of applying a machine to an object to make it move

Mid-Point Bracing

The component of a shore used to brace rakers or posts at mid-point

Mobile Home

A structure constructed on a portable steel base frame with very light, metal walls that are covered with sheetrock or wall board

Mortar

A mixture of Portland cement and water with sand and lime

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O

One-Way Slab

A concrete slab that is supported on two opposite sides causing loads to be transferred only in one direction

Operational Work Area

An area established to control access to the rescue work site except for assigned Task Force (TF) members and other local rescue personnel involved in an operation and to provide safe and secure work areas for the personnel supporting the rescue operations

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P

Pan Joists

Deep concrete ribs that are usually about 6 in. wide and are spaced 24–36 in. apart

Partially Framed Vertical Load System

External walls form the unframed section and are load bearing while the framed section is comprised of posts and beams erected to replace load-bearing internal portions

Plastic Bending

A nonlinear behavior in members made of ductile materials that frequently achieve greater bending strength

Plastic Hinge

The deformation of a section of beam where plastic bending occurs

Portland Cement

A fine gray powder that is mixed with water and aggregates to form concrete

Post

The vertical component of a shore that supports the weight being collected by the header and transfers it to the sole plate where it is distributed

Powered Air-Purifying Respirator (PAPR)

A battery-operated respirator that uses filters or absorbent material to remove airborne contaminants from the breathing air before the air is inhaled



Precast Concrete

Concrete that has been cast at a location other than the place it is to remain

Precast Concrete Frame Buildings

Structures constructed with precast columns, beams, and slabs; some buildings may have cast-in-place floor fill

Prefabricated Door/Window Shore

A reusable alternate to the built-in-place door and window shore; main advantage is to allow preconstruction a safe distance from the dangerous wall or collapse zone

Pulley

A simple machine used to change the direction of effort

Punching Shear

Occurs where a flat, two-way concrete slab is connected to a column and the tendency of the slab is to drop as a unit around the column

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R

Rack

The leaning of walls due to lateral forces

Raker

The component of a shore that is a post-like member that extends diagonally from the wall plate to the sole to support a leaning wall

Raker Cleat

The components of a shore that are connected to deliver shear forces from the horizontal or vertical component of the sloped raker into the wall plate and sole

Rapid Structure Triage

A method for pre-prioritization and identification of structures for a large incident

Reinforced Concrete

Concrete that contains an arrangement of reinforcing bar (rebar) for additional strength



Reinforcing Bar (Rebar)

Rebar is a steel bar or mesh of steel wires used in reinforced concrete and reinforced masonry structures to strengthen and stabilize the concrete in tension. Rebar's surface is often patterned to form a better bond with the concrete.

Relief Cut

A cut into concrete to address tension and shear versus compression

Risk/Benefit

The determination of whether the risk of a task is worth the benefit

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S

Self-Contained Breathing Apparatus (SCBA)

An SCBA is a device worn by rescue workers, firefighters, and others to provide breathable air in an Immediately Dangerous to Life or Health (IDLH) atmosphere. An SCBA typically has three main components: a high-pressure tank, a pressure regulator, and an inhalation connection (mouthpiece, mouth mask, or face mask) connected together and mounted to a carrying frame.

Shackle

A removable link to connect wire rope, chain, and other fittings for lifting

Shear

Two forces applied directly toward each other (offset) through an object.

Shear Wall/Box Building

Shear walls/box buildings are buildings with exterior walls that provide bearing strength as well as seismic resistance. They may or may not have interior, structural walls. Floors and flat or sloped roof planes form the horizontal surfaces to complete the boxes with the walls forming the sides.

Shim

Any piece of lumber, wedge-shaped or flat, that is used to fill in voids between a shore and the structure

Shrinkage Crack

Cracks that occur in concrete slabs, beams, walls, and columns within 60 days of the pour, after the concrete is allowed to dry out



Simple Machine

Rigid or resistant bodies that have pre-defined motions and are capable of performing work; consist of inclined planes, levers, pulley wheels, gears, ropes, belts, and/or cams

Simple Mechanical Advantage (MA) System

One rope is routed between pulleys on the anchor and load, and all of the pulleys that move (i.e., the "traveling pulleys") do so at the same speed and in the same direction as the load

Sleeve Anchor

A torque controlled anchor that has an undercut shaft that is inserted into the hole and a sleeve device that expands as a cone at the bottom of the shaft is pulled through it when the fastener is tightened

Sling Angle

The angle formed between a horizontal line and a sling leg

Sloped Floor Shores

A shore that is built in pairs and is similar to a laced post shore; used to support damaged and sloped concrete floors

Sole Plate

The horizontal component of a shore that transmits the load to the floor or ground

Solid Sole Raker

A shore used in incidents where access to the base of the wall is unencumbered

Spalling

The loss of concrete surface material when subjected to heat, the force of breaking and breaching, or the expansion of moisture

Split Sole Raker

A shore used in incidents where access to the base of the wall is obstructed

Step Cut

A step cut is used during a lift-out operation when the slab is thicker than what can be cut with one pass of a circular saw. Two cuts are made parallel to one another the width of the saw blade guard. The concrete is then chipped out between the two cuts forming a trench. This allows the saw to complete the cut through the full depth of concrete.



Steel Angle

An L-shaped piece of metal used with wedge anchors, screws, and/or through bolts to create a lifting point

Steel, Moment Frame Building

A steel, moment frame building is a structure constructed with heavy structural steel. All steel-framed buildings get their basic structural support for the building weight from a skeleton (or frame) composed of horizontal steel beams and vertical steel columns.

Steel T

A T-shaped piece of metal used to create a lifting point

Stitch Drill

Bore holes that are partially or completely drilled through the concrete in a close stitch pattern within a predetermined area to place the concrete in shear or tension

Structural Durability

The ability to repeatedly sustain reversible stresses in the inelastic range without significant degradation; essential for a moment frame structure

Supplied Air Breathing Apparatus (SABA)

SABA supplies air to the wearer for virtually unlimited amounts of time via an air source (e.g., large bottles or compressor) outside the area of use. It can be used in toxic environments as well as oxygen-deficient atmospheres.

Suspension/Tension Systems

Not commonly used in building structures but are most commonly seen as bridges

Swivel Hoist Ring

A device that can be attached to concrete using an expansion anchor, concrete screw, or through bolt; ring's loop pivots 180 degrees and the ring's base swivels 360 degrees

Synthetic Sling

A lifting sling made from nylon, polyester, aramid, Kevlar®, Dacron®, polyethylene, or Nomex® fibers and are best to use in situations where their stretch and flexibility are needed to mold to the shape of the object and grip the object securely

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T

T-Spot Shore

A temporary shore used to initially stabilize damaged floors, ceilings, or roofs, so that the more substantial shoring can be constructed at less risk

Temperature Crack

Cracks that are caused by changes in temperature and occur in roughly the same pattern as shrinkage cracks

Tension

Two forces being applied through an object at 180 degrees to each other, usually along the long axis

Tension Crack

Cracks that occur in concrete slabs and beams when bending-caused tension forces stretch the reinforcing steel

Tilt-Up Concrete Wall Buildings

Structures constructed with long span roofs of 50 or more feet and floors of 25 or more feet; buildings may have wood floors, concrete floors, steel framing with concrete-filled metal deck floors, or up to 1½ in. concrete fill on wood floor

Torsion

The action of twisting or the state of being twisted, especially of one end of an object relative to the other; common in concrete frame structures when URM infill is placed within the concrete frames on the exterior property line walls for fire resistance

Traveling Pulley

A pulley that is attached to the resistance that moves and changes direction

Truss

A framework, typically consisting of rafters, posts, and struts, supporting a roof, bridge, or other structure

Two-Post Vertical Shore

A vertical shore that can be partly prefabricated then assembled in the danger area



Two-Way Flat Slab

A solid concrete slab that is supported on four sides only by columns and the load is carried in two directions

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U

Unframed Vertical Load Systems

Consist of bearing walls for vertical supports; normally have shorter spans and more redundancy and tend to perform better under extreme loading

Unreinforced Masonry (URM) Buildings

Structures constructed with URM-bearing walls, wood floors, and wood interior, bearing and non-bearing partitions; tend to lack strap anchors and ties; tends to be brittle with little capacity to resist unanticipated loads

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V

Vertical Hitch

A hitch that supports the load with a single leg of rope, chain, or webbing and the full load is carried by the single leg (one straight piece of chain/rope/webbing)

Vertical Load-Resisting Systems

Systems that transfer a load from the source to the ground; vertical loads include gravity, dead loads, live loads, and impact loads

Vertical Shoring

Shoring used to counteract the forces of gravity on the structure following failure of structural components due to natural or human-made events

Vertical Support Members

Structural members that provide lateral stability that allow compression without buckling.

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W

Waffle Slab

A waffle slab is a two-way slab where the slab is poured over square, steel voids so that ribs are formed in the concrete. The voids are omitted at and near the columns, in order to allow the full thickness of the concrete to resist punching shear stresses.

Wall Plate

The component of a shore that collects the load from the wall or other vertical surface

Wedge

Two wooden incline planes married together and placed under the bottom of the post or at the end of a raker

Wedge Anchor

A torque controlled anchor that has an undercut shaft that is inserted into the hole and a wedge device that expands as a cone at the bottom of the shaft is pulled through it when the fastener is tightened

Weight

The force of the Earth's gravity on a mass sitting on its surface

Wetting

The application of water from tool attachments or from manual spray devices to keep blades and chains cool and lubricated and to keep down dust

Window/Door Cleat

The component of a window or door shore that is used to support or strengthen the window/door opening

Wire Rope

A rope made from several strands of high-strength steel that are laid together, usually around a central core

Wood Frame Building

A structure constructed with a light frame of 2 in. x 4 in. or 2 in. x 6 in. wood framing or light-gauge steel framing; some may be unframed



Working Load Limit (WLL)

The maximum working load of a device as determined by the manufacturer

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