

Harlem Avenue Underpass Project

Village of River Forest
John P. Rigas
Village President

Village of Oak Park
David Pope
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Village of Forest Park
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Mayor

Glossary of Common Bridge Terms:

ABUTMENT – A substructure element supporting each end of a single span or the extreme ends of a multi-span superstructure and, in general, retaining or supporting the approach embankment.

APPROACH SPAN – The span or spans connecting the abutment with the main span or spans.

BEAM – A linear structural member designed to span from one support to another.

BENT – A substructure unit supporting each end of a bridge span; also called a pier; made up of two or more columns or column-like members connected at their top most ends by a cap, strut, or other member holding them in their correct positions.

BOX GIRDER – A support beam that is a hollow box; its cross-section is a rectangle or square.

CAISSON – "Caisson" is the French word for "box." A caisson is a huge box made of steel-reinforced and waterproof concrete with an open central core. At the base of the caisson is its "cutting edge" of plate steel. In a suspension bridge the caisson becomes the foundation, the pier, supporting for the bridge's towers.

CAST-IN-PLACE – Concrete poured within form work on site to create a structural element in its final position.

CATWALKS – Temporary foot bridges, used by bridge workers to spin the main cables (several feet above each catwalk), and to attach the suspender cables that connect the main cables to the deck.

CHORD – A horizontal member of a truss.

COLUMN – A vertical structural member that transfers dead and live load from the bridge deck and girders to the footings or shafts.

COLUMN CROSS BRACE – Transverse brace between two main longitudinal members.



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DAMPING – The action of reducing the vibration of an object. This tends to return the vibrating object to its original position.

DEAD LOAD – A static load due to the weight of the structure itself.

DECK – The roadway portion of a bridge that directly supports vehicular and pedestrian traffic.

DECK BRIDGE – A bridge in which the supporting members are all beneath the roadway.

DECK TRUSS – A bridge whose roadway is supported from beneath by a truss.

DIAGONAL – A sloping structural member of a truss or bracing system.

EXPANSION JOINT – A joint designed to provide means for expansion and contraction movements produced by temperature changes, load, or other forces.

FATIGUE – Cause of structural deficiencies, usually due to repetitive loading over time.

FLUTTER – Self-induced harmonic motion. A self-excited aerodynamic instability that can grow to very large amplitudes of vibrations.

FOOTING – The enlarged, lower portion of a substructure that distributes the structure load either to the earth or to supporting piles; the most common footing is the concrete slab; “footer” is a colloquial term for footing.

GIRDER – A main support member for the structure that usually receives loads from floor beams and stringers; also, any large beam, especially if built up.

HANGER – A tension member serving to suspend an attached member.

HINGE – A point in a structure at which a member is free to rotate.

JOINT – In stone masonry, the space between individual stone; in concrete, a division in continuity of the concrete; in a truss, the point at which members of a truss frame are joined.

LIVE LOAD – Vehicular traffic, wind, water, and/or earthquakes.



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MAIN BEAM – A beam supporting the spans and bearing directly onto a column or wall.

MEMBER – An individual angle, beam, plate, or built piece intended to become an integral part of an assembled frame or structure.

OSCILLATION – A periodic movement back and forth between two extreme limits. An example is the string of a guitar that has been plucked. Its vibration back and forth is one oscillation. A vibration is described by its size (amplitude), its oscillation rate (frequency), and its timing (phase). In a suspension bridge, oscillation results from energy collected and stored by the bridge. If a part of the bridge has to store more energy than it is capable of storing, that part will probably fail.

PIER – A vertical support or substructure unit that supports the spans of a multi-span superstructure at an intermediate location between its abutments.

PILE – A vertical shaft driven into the ground that carries loads through weak layers of soil to those capable of supporting such loads.

PILE BENT – A row of driven or placed piles with a pile cap to hold them in their correct positions; see Bent.

PLATE GIRDER – A large, solid web plate with flange plates attached to the web plate by flange angles or fillet welds. Typically fabricated from steel.

PORTAL – The clear, unobstructed space of a bridge forming the entrance to the structure.

PRE-CAST GIRDER – Fabricated off site of Portland Cement Concrete, reinforcing steel, and post-tensioning cables. These girders are shipped to the construction site by truck and hoisted into place by cranes.

REINFORCED CONCRETE – Concrete with steel reinforcing bars bonded within it to supply increased tensile strength and durability.

RESONANCE – The regular vibration of an object as it responds in step (at the same frequency) with an external force.

RIGID FRAME BRIDGE – A bridge with moment-resistant connections between the superstructure and the substructure to produce an integral, elastic structure.



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SHAFT – A verticle load bearing structure that uses end bearing and friction to support loads.

SPAN – The distance between piers, towers, or abutments.

STABLE – The ability of a structure to resist forces that can cause material deformation or structural collapse.

STAY – Diagonal brace installed to minimize structural movement.

STRINGER – A longitudinal beam supporting the bridge deck.

SUBSTRUCTURE – The parts of a bridge that are below the bottom of the girders. Pilings, shafts, spread footings, and colums may be part of the substructure.

SUPERSTRUCTURE – The parts of a bridge that are above the bottom of the girders. Girders, bridge deck, and bridge railing are parts of the superstructure.

TENSION – A force that pulls or stretches.

TIE – A member carrying tension.

TORSION – A twisting force or action.

TRESTLE – A bridge structure consisting of spans supported upon frame bents.

TRUSS – A rigid, jointed structure made up of individual straight pieces arranged and connected, usually in a triangular pattern, so as to support longer spans.

TRUSS BRIDGE – A bridge having a pair of trusses for the superstructure.

WEB – The portion of a beam located between and connected to the flanges.

WELDED JOINT – A joint in which the assembled elements and members are united through fusion of metal.

