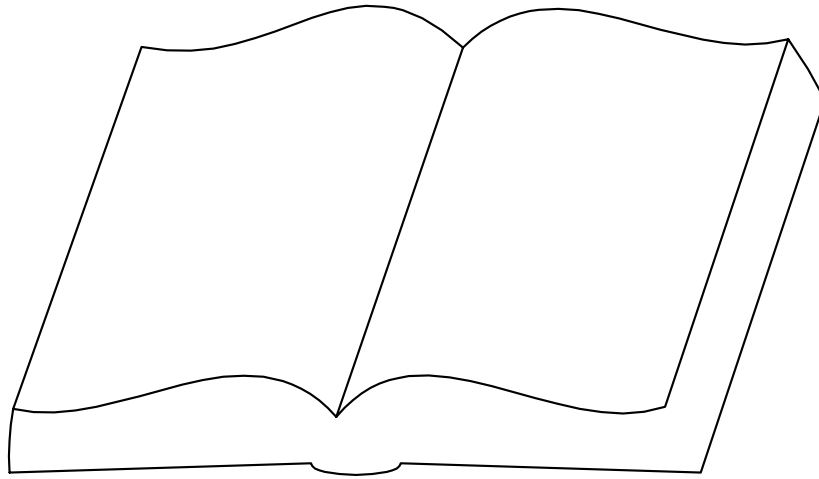


# **APPENDIX D**

## **GLOSSARY OF TERMS**



**A**

**AADT** - Average Annual Daily Traffic.

**AASHTO** - American Association of State Highway and Transportation Officials.

**Abutment** - A bridge substructure element which supports the ends of the superstructure. Usually supports or retains the approach embankment.

**Admixture** - Material other than Portland cement, aggregates and water added to concrete to vary the properties or handling qualities of the concrete.

**A.D.B.E.** - As Directed By Engineer

**Approach Slab** - A reinforced concrete mass placed on the approach roadway adjacent to and usually resting on the abutment backwall. This slab functions as a structural member, transferring live load forces directly to the abutment, preventing these forces from being transferred to the abutment by the backfill.

**Approach Pavement** - Section of roadway, which adjoins the approach slab, or abutment, if no approach slab, is present.

**ASTM** - American Society for Testing and Materials.

**Authority** - New York State Thruway Authority.

**B**

**Backfill** - Material placed adjacent to a substructure element, to fill the unoccupied portion of the foundation excavation.

**Backwall** - The portion of an abutment above the bridge seat, functioning primarily as a retaining wall with a live load surcharge. It may also support the bridge deck, approach slab and/or joint system.

**Barrier** - A reinforced concrete element used in place of railing to contain traffic.

**Batter** - The inclination from the vertical of a pile or the face of a wall.

**BD** - Bridge Design sheets detailing the current design policies of **NYSDOT**.

**Beam** - A horizontal member forming part of the frame of a structure. It rests on supports and carries loads.

**Bearings** - Structural elements that are the interface between the superstructure and the substructure, designed to accommodate translation and rotation.

**Bent** - A rigid frame usually consisting of a truss or beam rigidly supported by columns.

**Berm** - A slightly graded surface, adjacent to an abutment or wingwall. An easily traversable area provided to allow access to substructure elements and bearings for inspection and maintenance.

**Binder** - A plant mix of open graded aggregate and bituminous material, which constitutes the lower layer of the surface course.

**Blanketed Strands** - A technique used in prestressed concrete fabrication where a section of the prestressing strand is placed inside a conduit to prevent bond with the concrete in that particular area. Also referred to as debonded or unbonded strands.

**Block** - See **Cope**.

**Blockout** – (1) An area of a concrete pour which, through the use of some type of forming, results in an absence of concrete. This is commonly done to facilitate the placement of other elements after the concrete has cured. (2) A short section of structural tubing or “W” section mounted to the front of a guide rail post behind the guide rail to offset the rail from the post.

**Boring** - A long cylindrical portion of earth removed by mechanical means, to evaluate the properties of the soil.

**Bridge** - A structure, including supports, with a span not less than 6.0 meters, as measured along the centerline of roadway, erected over a depression or an obstruction, such as water, highway or railway and having a track or passageway for carrying traffic or other moving loads.

**Bridge Seat** - That part of a substructure unit, which acts as a support for the superstructure. Normally, pedestals carrying bearing devices rest on this surface.

## C

**C.I.P. (Cast-in-Place) Piles** - A pile formed by driving a thin steel shell fitted to a temporary pile, called a mandrel, removing the mandrel, and filling the shell with concrete. Usually designed as a friction pile.

**C.R.S.I.** - Concrete Reinforcing Steel Institute.

**Caisson** - A hollow, watertight structure used as an underwater foundation for a bridge.

**Camber** - As applied to bridge girders, an increase or decrease in vertical curvature, intended to compensate for dead load deflection and roadway profile, and to achieve a more aesthetic appearance.

**Cantilever** - A projecting structural member, rigidly supported at one end only.

**Capbeam** - The topmost piece or member of a pier, serving to distribute the loads to the columns and hold them in their relative positions. Also referred to as a **Piercap**.

**Cement** - A powdered substance, made of burned lime and clay, mixed with water and sand to make mortar or with water, sand and stone to make concrete. The mixture can be molded or poured to set as a solid mass.

**Centerline-of-Bearings** - The line which passes through the center of a series of bearings at each bearing location.

**Chamfer** - A beveled edge or corner, as on a concrete structure.

**Chloride** - A component of most commonly used deicing agents. Intrusion of chloride into concrete can induce corrosion of reinforcement.

**Closed-Cell Foam** - lightweight, elastic compressible, impermeable material used as a joint sealer.

**Cofferdam** - A water-tight structure built around a foundation site to keep water out of the excavation.

**Cold Joint** - A joint in a concrete structure made by placing fresh concrete against older, cured or partially cured concrete, or a joint made by placing hot bituminous mixture against a bituminous mixture that has cooled.

**Column** - A vertical member, resisting stresses due to axial forces and/or moments, and having in general, a considerable length in comparison with its transverse dimensions.

**Composite** - A member made up of two or more materials with different moduli of elasticity (E), which act as a single unit when subject to loading.

**Concrete** - A mixture of aggregate, water and a binder, usually Portland cement, which hardens to a stone-like mass.

**Contraflexure, Point of** - The location on a structural element where bending stresses reverse sign.

**Cope** - To remove or cut a section of material, such as a flange or web, to provide clearance for intersecting members. If material is removed from a flange on one side of the web only, it is referred to as a **Block**.

**Corbel** - A constructed piece or part, projecting from the surface of a wall, column or other portion of a structure, to serve as a support for another member.

**Core** - A cylindrical portion of bituminous pavement or concrete, removed to evaluate the properties or condition of the material.

**Countersunk Fastener** - A fastener whose head has been machined to fit into a specially-prepared, tapered hole, which will leave the head flush with or below the adjacent surface.

**Cover** - The clear thickness of concrete between a reinforcing bar or prestressing strand and the surface of the concrete.

**Coverplate** - A plate used in conjunction with other structural shapes to provide additional section.

**Creep** - An inelastic deformation that increases with time under constant stress usually in reference to structural concrete.

**Cross-Slope** - The grade or gradient of a roadway, perpendicular to the station line or **T.G.L.**

**Crown** - The crest line of the roadway.

**Culvert** - Any structure under the roadway, with a clear opening of less than 6.0 meters, measured along the center of the roadway.

**Curb** - A stone, concrete, steel, asphalt or wooden barrier, paralleling the side limit of the roadway, to guide the movement of vehicle wheels and also direct water runoff to intended areas.

**Curtain Wall** - A wall not designed to support loads other than its own weight. Usually placed for aesthetics on an abutment to hide the ends of the superstructure.

## **D**

**DB (Design Bulletin)** - Issued by the Office of Facilities Design to set policy concerning design activities and contract documents.

**De-watering** - The removal of water, usually via pumps, from an area, such as within a cofferdam, to allow construction access.

**Dead Load** - All current and future permanent gravity loads applied to and including the self-weight of the structure.

**Dead Man** - A passive buried object used as an anchor.

**Debonded Strands** - See **Blanketed Strands**.

**Deck** - A structural component or components that transfer loads to the primary structural members such as stringers, floor beams, girders, etc. A deck is usually steel reinforced concrete but others include unfilled or filled steel grating, timber, and composites.

**Design High Water (DHW)** - The statistically probable maximum water elevation at a specific location with a specified recurrence interval.

**Design Life** - The projected life (in years) of a new structure or structural component under normal loading and environmental conditions before replacement or major rehabilitation is expected.

**Development Length** - Length of embedded reinforcement, beyond a critical section, in a concrete member, required to fully develop the capacity of the reinforcement (see **Imbedment Length**).

**Diaphragm** - Transverse structural members, either concrete or steel, that furnish lateral support to beams or girders.

**Dowels** - Short bars embedded in two adjacent parts of a concrete structure to hold the parts in place and to transfer stress.

**Downhand** - A welding position synonymous with flat position fillet or groove weld, as opposed to horizontal, vertical or overhead position. The preferred term is flat position.

**DSD** - Director, Structural Design Bureau.

**E**

**Earthwork** - All work involving the excavation and placement of earthen material.

**EI (Engineering Instruction)** - An official written document issued by NYSDOT transmitting technical, procedural and other matters relative to engineering policy.

**E.I.C.** - Engineer-In-Charge.

**Elastomer** - A polymeric material that elastically deforms under horizontal and rotational loading. It is the major component of an elastomeric bearing.

**Embankment** - A raised mass of soil or rock used to carry a road over a low area. A fill, the top of which is higher than the ground next to it.

**Engineer** – Usually refers to the construction Engineer-In-Charge but may also indicate the Project Thruway Liaison or Design Engineer.

**Epoxy** - A two component, durable, corrosion-resistant resin, used in surface coatings and glues.

**Expansion** - To make or become larger in size usually due to thermal effects.

**Expansive** - Tending to expand or to cause expansion.

**Extrados** - The intersection of the curved back or upper surface of an arch with a vertical plane perpendicular to the centerline of the structure (see **Intrados**).

**F**

**Fascia** - The lateral outermost vertical surface of a bridge. Usually used to identify the vertical surface along the lateral edge of a deck. Also, sometimes used to describe the outermost beams or girders of a bridge.

**Fatigue** - A condition resulting from repeated applications of stress, which can lead to cracking and failure.

**FHWA** - Federal Highway Administration.

**Fixity** - The resistance to rotation and translation.

**Flame Cut** - A term applied to a cutting process used to sever metals. Requires heating metals to a molten state, and then applying high pressure air to remove molten metal.

**Flange** - The projecting portion of a beam, channel or column.

**Flat Position** - See **Downhand**.

**Flexure** - The elastic movements, generally bending, of a structural component.

**Footings** - A substructure component that transmits loads either directly to soil or rock, or to piles.

**Fracture-Critical Member (FCM)** - Tension members or tension components of members whose failure would be expected to result in collapse of the structure.

**Freeboard** - The vertical distance between the lowest point on a superstructure and the water surface below it, at design high water.

## **G**

**Gage** - The spacing of rows of holes in a structural member. This may be measured between adjacent hole centerlines or from an edge to the centerline of a hole.

**Gall** - To gouge by rubbing or friction.

**Galvanize** - A process in which a zinc coating is applied to metal components to protect against corrosion.

**Girder** - Primary supporting member of a structure. For bridge applications it may refer to a built-up plate girder, rolled beam or concrete member.

**Gusset Plate** - A plate used to connect various components of a structure, such as chord members of a truss; diaphragms to girders; and lateral bracing to girders.

## **H**

**H-Piles** - Piles that are comprised of rolled Steel-H sections. H-Sections are used because their web and flange widths and thickness are approximately the same. H-Piles are generally bearing piles used when driven to bedrock and/or when utilizing integral abutments.

**Hardened** - Generally refers to heat-treated steel. Hardening increases strength and

toughness, and reduces plastic deformation when loaded beyond the elastic limit.

**Haunch** - An increase in depth of a structural member, usually at points of intermediate support. In bridge decks, a 50 mm minimum haunch is specified to provide for variation in the camber of steel girders and to act as a construction tolerance.

**Header** - A piece laid across the thickness of a wall or over an opening.

## **I**

**Integral Abutment** - Abutment which displays a rigid connection to the superstructure. The resulting forces and movement are taken up by the H-Piles, which are founded in holes preaugered for a certain distance.

**Intrados** - The curve of intersection of the soffit plane and a vertical plane parallel to the centerline of the roadway (see **Extrados**).

**Imbedment Length** - Length of imbedded reinforcement in a concrete member, required to fully develop the capacity of the reinforcement. In the case of tensile reinforcement, the imbedment length is equal to the **Development Length**.

**Inventory Rating** - The vehicle load level which can safely utilize an existing structure for an indefinite period of time. Generally based on 55% of the yield strength of the weakest member (see **Operating Rating**).

**Isotropic** - Having the same properties in all directions.

### **J**

**Jointless** - A structure in which all expansion and contraction movement is taken up beyond the beginning and end of that structure.

### **L**

**Lateral Bracing** - The system of members that help to resist bending about the weak axis of a primary member by sharing the loads with adjacent primary members. Lateral bracing is normally placed at the bottom flange line to resist wind forces.

**Live Load** - The live load shall consist of the weight of the applied moving load of vehicles, cars and pedestrians.

**Live Load + Impact** - This value represents the weight of the applied moving load of vehicles, cars and pedestrians plus a percentage of said load based on the span length.

### **M**

**Mainline** - Thoroughfare which carries vehicles from interchange to interchange. Usually used in reference to the section of the Thruway from Milepost 0.00 (New York City line) to Milepost 496.00 (Pennsylvania state line).

**Masonry Plate** - A steel plate that is part of a

bearing assembly, in contact with and fastened to the pedestal of a bridge substructure.

**Membrane** - A thin lining of material which serves as a barrier between different materials.

**Metalizing** - A protective coating used in lieu of painting or galvanizing structural steel. This process involves blast cleaning and thermal spraying of steel with a zinc rich coating.

**Monolithic** - A uniform, single unit. Commonly used in reference to a bridge deck, in which the structural deck and the wearing course are poured as one single, homogenous unit.

**Mortar** - In cement concrete, a mixture of cement, sand, and water that fill the spaces between and binds the particles of coarse aggregate.

**MS-18** - Loading consisting of a tractor truck with semi-trailer or the corresponding lane load as illustrated in the current AASHTO Standard Specifications.

**Multi-Rotational Bearings** - Also known as "pot" bearings due to their appearance. These bearings allow rotation and translation with loads greater than 890 kN.

### **N**

**Navigable Waterway** - A waterway whose channel has sufficient depth and width so as to afford passage to vessels, and is so designated by the United States Coast Guard.

**Neoprene** - A durable, synthetic rubber which is resistant to the effects of exposure to oil and other petroleum products.

**Non-Composite** - A member made up of two or more materials with different moduli of elasticity (E), which do not act as one unit when subject to loading.

**NYSDOT** - New York State Department of Transportation.

**NYSTA** - New York State Thruway Authority.

## **Q**

**Operating Rating** - The absolute maximum permissible load level to which a structure may be subjected on an occasional basis. Generally based on 75% of the yield strength of the weakest member (see **Inventory Rating**).

**Ordinary High Water** - The stream depth at a structure under average yearly high water flow rates.

**Ordinary Water** - The stream depth at a structure under normal flow rates.

**OSHA** - Occupational Safety and Health Administration.

## **P**

**Pedestal** - A concrete support on the top of an abutment bridge seat or pier capbeam that

receives the bearing assembly.

**Peel-Off Capacity** - The measure of the resistance a bonded surface has to separation when a load is applied normal to and away from the bonded surface. Measured in Newtons per linear meter.

**Pier** - A support for a bridge superstructure at intermediate point(s) between the abutments.

**Piercap** - See **Capbeam**.

**Piles** - Vertical or slightly battered members, embedded partly or entirely in the ground, used to provide support for a structure where the soil bearing capacity is inadequate.

**Piles, Bearing** - Piles which act as compression members and derive their primary support capacity from their being driven to bear on a layer of hard strata. Normally, steel H-piles are designed as bearing piles.

**Piles, Friction** - Piles which derive their primary support capacity from the friction forces, which develop between the pile surface area and the surrounding strata. Normally, cast-in-place concrete piles are designed as friction piles.

**Pitch** - The clear distance between spiral reinforcement for one complete revolution (used in spiral reinforced concrete columns), also the distance between centers of fasteners or fastener holes along a gage line.

**Plinth** - An enlarged base of a concrete wall or column, used to increase the cross-sectional area.

## **APPENDIX D**

**Polyethylene** - A lightweight, water-resistant thermoplastic resin.

**Polytetrafluoroethylene (PTFE)** - A low friction surface used in certain types of bridge bearings.

**Polymer** - A natural or synthetic compound consisting of similar molecules linked together.

**Polyurethane** - A thermoplastic or thermosetting resin used in tough, resistant coatings and electrical insulation.

**Post-Tensioning** - To induce compressive stress into a structural member by tensioning steel cables or rods while the member is in its final position under its full design static loading.

**Preauger** - To drill insitu material before driving a pile (as in integral abutments).

**Precast** - To fabricate concrete elements in a controlled environment, prior to erection or installation.

**Prestressing Concrete** - A method of shop fabrication of concrete beams, whereby steel strand, cables or bars are placed in tension prior to the placement of the concrete, and then released after the concrete has cured. This prestressing of the beams acts to lessen the tensile forces in the concrete. If tensioning is done after the concrete is placed, the process is referred to as **Post-Tensioning**.

**Proprietary** - From a single source or supplier.

## **GLOSSARY**

**PVC** - Polyvinylchloride. A flexible thermoplastic material composed of polymers of vinyl chloride.

### **R**

**R.O.W.** - Right of Way. The area occupied by and adjacent to the Thruway, which is owned by the Authority.

**Radiograph** - A photographic record produced by the passage of x-rays or gamma rays through an object onto a film. Generally used for testing welded splices in tension areas of primary members.

**Retrofit** - To make a change or modification to an existing detail for the purpose of upgrading the detail to current standards.

**Rigid Frame Structure** - Bridge structure with rigid connections between the superstructure and substructure that do not allow any relative rotation or translation between elements.

### **S**

**S.I.P. Forms (Stay in Place Forms)** - Devices used to support deck concrete, as it is placed, which remain in place after construction.

**Scuppers** - Drain inlets to divert surface water from bridge decks.

**SDL** - Superimposed Dead Load. These loads are placed after the structural deck has cured and are therefore resisted by the composite

section. They include, but are not limited to: separate and future wearing course, curbs, sidewalks, railings, fencing, barrier and possibly utilities.

**Seismic** - Pertaining to earthquakes.

**Service Life** - The projected remaining life (in years) of an existing structure or structural component under normal loading and environmental conditions before replacement or major rehabilitation is expected.

**Service Load** - The actual, real-life loads, and combinations thereof, such as dead, live, wind and earthquake, which are assumed to actually occur when the structure is in service. It is important to note that "factored loads" are not service loads.

**Shoving** - Horizontal displacement of bituminous pavement due to the action of traffic generally resulting in the bulging of the surface.

**Simple Span** - A span supported on both ends with no intermediate supports.

**Skew Angle** - The acute angle formed by the intersection of the line normal to the centerline of roadway with a line parallel to the centerline of bearings.

**Sleeper Slab** - A short reinforced concrete slab located under the approach slab and either under the rigid cement concrete approach pavement or abutting the flexible asphalt concrete approach pavement to support the pressure relief joint material or the expansion joint, respectively.

**Slip Critical** - A connection that derives its strength from the friction forces exerted on component layers when the fastener is tightened to the required specification.

**Spall** - Concrete broken from the surface of a concrete mass.

**Span** - The length of a structure between centerlines of bearings.

**Spirals** - Continuously wound bar or wire in the form of a cylindrical helix, such as spiral shear connectors used prior to the development of stud shear connectors. Cylindrical reinforcement used for containment reinforcement of compression members (other than piles) in concrete structures.

**Splice** - To join one or more materials together by various means, including welding, bolting or tying.

**SSPC** - Steel Structures Painting Council.

**Stiffener** - As applied to a steel girder, a vertical or horizontal steel plate or angle used to give additional shear strength and/or prevent web buckling.

**Stirrup** - A steel bar in a reinforced concrete beam that is used to resist both shear and diagonal tension stresses. It is usually bent in the shape of a "U".

**Strand** - Any of a group of steel wires twisted together to form a rope or cable.

**Stringer** - A bridge deck support member that is parallel to the length of the bridge centerline, and normally supported by floorbeams.

**Stub Abutment** - An abutment with individual column pedestals supported directly on the footing.

**Stud Shear Connectors** - A welded fastener used at the junction of the girder and slab to develop the shear resistance necessary to produce composite action.

**Subbase** - The material located above the subgrade surface of a road section.

**Substructure** - That part of a bridge structure below the bearings of spans, skewbacks of arches and top of footing of rigid frames, including abutments, wingwalls, and piers.

**Superelevation** - The percent grade of the cross slope between the inside and outside edges of a roadway on a horizontal curve radial to the curve.

**Superstructure** - That part of a bridge structure above the bearings.

**Swale** - The depressed area of a deck or roadway at the shoulder used to draw and/or divert water runoff from the travel lanes.

### T

**Tack Weld** - A weld made to hold parts of a weldment in proper alignment until final welds are made. For bridges, tack welds that are not incorporated into the final weld are

prohibited.

**Tendon** - A tensioned element, generally high-strength steel wires, cable, rod, strands, bars or bundles thereof, used to impart compressive stress to a member.

**T.G.L.** - Theoretical Grade Line

**Tremie** - An open-ended pipe, used to place fresh concrete vertically without segregation. It is usually used for placing concrete in water. An "Elephant Trunk."

**Truss, Plane** - A system of structural members all lying in one plane and joined together at their ends to form a rigid framework.

**Truss, Space** - A system of structural members in space, joined together at their ends in a manner forming a rigid structure.

### U

**U-Walls** - Abutment wingwalls that are oriented parallel to the centerline of the roadway.

**Ultimate Strength or Ultimate Stress** - The highest ordinate on the stress strain curve, i.e. the maximum tensile stress of the material.

**Unbonded Strands** - See **Blanketed Strands**.

**V**

**Viscosity** – The measure of the internal friction of a fluid, caused by molecular attraction, which makes it resist a tendency to flow.

**Vulcanization** - The process of treating crude or synthetic rubber or similar plastic material chemically to give it useful properties (as elasticity, strength and stability). Process used to bond steel bearing plates to elastomeric material in the fabrication of elastomeric bridge bearings.

**W**

**Waling** - Transverse member (usually a small steel W - section) attached to vertical sheet piling used to distribute load contain a sheet pile structure.

**Washer** - For bridges, a hardened cylindrical plate under the turned element of a fastener used to prevent galling of the base metal. For other purposes, washers may be beveled to fit tapered flanges, or may be used to prevent the turned element from rotating.

**Watershed** - The region or area drained by a river system or other body of water.

**Waterstop** - Usually a flexible device, placed in adjacent concrete pours, to prevent the flow of water through the joint.

**Wearing Course** - The top layer of a pavement surface course.

**Weathering Steel** - Steel with a chemical

composition such that its oxidation product (rust) acts as a protective coating. The steel is designed to remain unpainted, however it may be painted if desired.

**Web** - The metal plate connecting the upper and lower flanges of a girder or rail, designed to resist shear forces by itself; and flexure in conjunction with the flanges.

**Weld** - A localized coalescence of metals produced either by heating to suitable temperatures, with or without the application of pressure, or by the application of pressure alone, and with or without the use of filler metal. For bridge applications, deposited metal may be in the form of fillet or groove welds.

**Wingwall** - A part of a bridge abutment adjacent to the main body of the structure, which is used to retain the approach fill.

**Y**

**Yield Strength** - The stress at which the material shows a specified limiting plastic strain, usually 0.1 or 0.2 per cent (0.001 or 0.002 mm/mm).

**Z**

**Zinc** - Hard bluish metal used in alloys because of its resistance to corrosion. The primary element used in the galvanizing or thermal spraying processes.