

Terms and Definitions

AASHTO - American Association of State Highway and Transportation Officials. This organization is responsible for maintaining the Bridge Specifications (among other less important things).

Abutment – a substructure supporting the end of a superstructure that retains or supports the approach embankment. See also retaining wall and wing wall



ADT – Average daily traffic

AISC – American Institute of Steel Construction

Approach Slab – The approach slab provides a transition between roadway pavement and the bridge. An approach slab is used to prevent settlement of the approach pavement.



ASD - Allowable Stress Design. Also called working stress method. Replaced by Load Factor Design in the early 1980's but still allowed as alternate design method, and used to design decks.

As-Built Plans – Plans issued after the construction of a structure reflecting any and all field changes made to the final design.

Axle Load – The total load on a truck axle. For most design vehicles this is twice the wheel load.



Backfill – Retained fill as in the region behind an abutment backwall and beneath the approach. This view shows the strips attached to an RE wall.

Backwall – The topmost portion of an abutment above the elevation of the bridge seat that functions as a retaining wall with a live-load surcharge or as a support for the bridge deck and the approach slab. In this case, the wall is an RE wall.



Batter Pile – A pile which is inclined in order to resist large lateral loads.



Beam – A horizontal member supporting vertical loads



Beam Seat – refers to the surface on which a bearing rests.



Bearing Pad – A pad consisting of layers of synthetic rubber and steel plates that supports bridge members and transmits the loads from the superstructure to the substructure. They allow deflections due to longitudinal expansion of the bridge and vertical deflection of the beams. See also Elastomeric Pad. Other bearing types are plate bearings (below left) and rocker bearings (below right).



Bent - A substructure unit supporting the superstructure. It is usually a frame consisting of a cap, columns and footings





Berm – A shelf or level region in front of the cap on an end bent.

BFI - Bridge Foundation Investigation. The geotechnical lab's report telling us the type of foundation (pile type or spread footing) and the capacities of the piles (or soil), based on analysis of soil survey.

BFPR - Back Face Paving Rest. This marks the beginning and ending points of the bridge, located at the interface of the end bent and the paving rest. See also paving rest.





Box Culvert – A culvert made out of a reinforced concrete box structure.

Box Girder – A superstructure design which utilizes a box-shaped trunk providing good torsional rigidity.



Brace – A structural member which is placed diagonally in order to provide stiffness to a frame.



Bulb Tee - A prestressed beam shape developed in the 1990's with a wide top flange (the "tee") and a compact bottom flange (the "bulb"). It comes in 54", 63", and 72" standard sizes.



caisson



Rebar cage for caisson

deep foundation - a type of foundation distinguished from shallow foundations by the depth they are embedded into the ground. There are many reasons a geotechnical engineer would recommend a deep foundation over a shallow foundation, but some of the common reasons are very large design loads, a poor soil at shallow depth, or site constraints (like property lines). There are different terms used to describe different types of deep foundations including the pile (which is analogous to a pole), the pier (which is analogous to a column), drilled shafts, and caissons. Piles are generally driven into the ground in situ; other deep foundations are typically put in place using excavation and drilling. The naming conventions may vary between engineering disciplines and firms. Deep foundations can be made out of timber, steel, reinforced concrete and prestressed concrete.

Cap - The top of a bent, it supports the bridge beams and behaves like a continuous beam.



Cap Step - a level part of a cap that supports a beam. Beams at different elevations will sit on cap steps of different elevations.



Cast-in-place – Refers to concrete which is poured and cured in its final location in the field. This is a caisson poured in place with the rebar extending out to tie to the columns.



Chamfer - a diagonally cut off corner of a shape. Rectangular concrete sections have chamfers so the corner won't crack off and look irregular. Compare with fillet.

Cheekwall – A concrete wall, typically joined to an abutment wingwall used to shield pedestals, bearings, and stringer ends.



Coping - the concrete between the top of the beam and the bottom of the slab. The depth of coping varies along the length of the beam to account for differences between roadway grade along the beam and the grade of the top of the beam. See D Dimension

Crash Wall - A wall constructed for the protection of the RR when horizontal clearance is not achieved



Cover – The distance between the exposed surface of a concrete element and the topmost surface of the reinforcing steel.

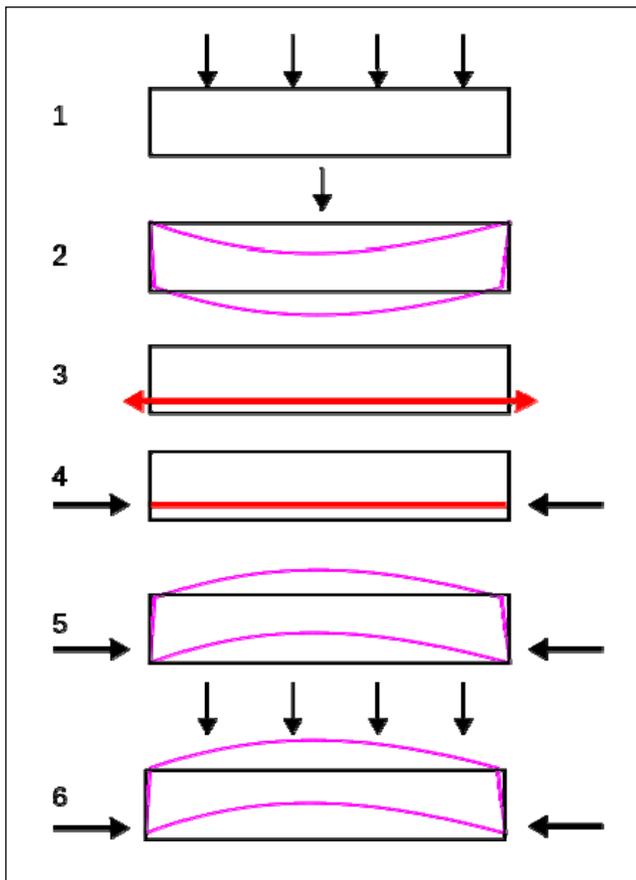
Cross Frame – Steel elements, comprised of crossing, steel angles which are placed in an “x” configuration to act as diaphragms.



Culvert – A structure through which runoff flows. See also Box Culvert.

Curved Girder – A girder which is curved in the horizontal plane to accommodate the overpass horizontal alignment.





D Dimension - The distance from the top of slab to the top of beam over the bearing. It includes the slab and the coping.

Deck Drain - A hole formed in the deck at the face of barrier to drain water. Not used over roadway travel lanes, end fills, railroad right of way, or closer than 5 feet to a bent. NOT used on a high side of a superelevated bridge.

Development Length - The length of rebar required to provide enough bond with the surrounding concrete to develop full tension capacity of the rebar. See AASHTO

DFD - Distribution Factor for Deflection. Total number of wheel lines divided by number of beams.

DFM - Distribution Factor for Moment. How live load is distributed to beams acting in unison. See AASHTO Table 3.2.3.1

DFV - Distribution Factor for Shear. Maximum number of wheel lines that will distribute to a beam based on simple spans between beams. This is important near the ends of bridge where there isn't much deflection and on exterior beams.

Diaphragm - A concrete or steel stiffening member placed transversely in a span to provide lateral stability for beams and make the beams act in unison in resisting live loads.



Dowel Bar - Any short round bar, but typically it refers to the steel dowel bar formed into a cap, extending through a hole in the bearing pad, and into a chase in the bottom of the beam to hold the beam in place.

Effective Width – In composite construction, the width of a concrete slab which functions as the top flange of a composite T-section.

Edge Beam - A concrete stiffening member placed transversely at the end of a span to provide additional deck support at the discontinuity in a deck at the centerline of the bent.
Embedment Length - The length of rebar required to provide enough bond with the surrounding concrete to provide any usable tensile strength in the bar. See AASHTO



Elastomeric Pad –

A pad made of layers of synthetic rubber and steel plates which compresses under loads. The two plates in the top and bottom are called load plates. See Bearing Pad.



Embankment – A raised area of fill surrounding a structural component.



Embedment Length – The length of rebar required to bond with the surrounding concrete in order to provide the necessary tensile strength to resist the moment in the member



End Bent - The bent at the end of the bridge, consisting of cap, wingwalls, and piles. Also sometimes called an abutment, though really an abutment consists of the embankment as well as the end bent.



Endpost - A structure at the end of a bridge barrier or parapet that the guard rail is connected to. See Ga. Std. 3054.



Expansion Joint - A joint allowing expansion. Their width is dependent on the amount of movement they are to accommodate. Deck joints are always maintenance problems.

Fall Line - A geologic discontinuity in GA running from Augusta to Columbus defining the boundary between the Piedmont Region and the Coastal Plain. Metamorphic (gneisses and schists) and plutonic igneous rocks (ex: granite) can be found above the fall line. South of the line, only sediments and sedimentary rocks are present, comprising Georgia's Coastal Plain. It is called the Fall Line because the first falls or rapids in rivers encountered as one comes inland from the ocean are usually found at this boundary. The fall line for bridge design is loosely based on this line. Bridge decks north of this line are given additional cover over the top layer of reinforcement as protection from salts used in de-icing. See Design Memos, chapter 4.

Fall Line in Butts County



Falsework – A temporary support structure made of steel or wood. Typically used for formwork or erection of a structural member.



Fascia Beam - When a multi-span bridge is in a visible area and beams of different spans have different depths, a fascia beam is sometimes used on the exterior of the shorter spans to match the deeper beams of the longer span.

Fillet - (pronounced "fill-it") The additional material placed in the joint where two members come together. This is done to prevent a crack from forming along the interface. Compare with chamfer.

Filter Fabric - Plastic fabric placed underneath riprap to keep the underlying soil from eroding away.

Fixed Support – A support designed to accommodate rotation only.



Flange – The top and bottom horizontal component in a girder

Footing – The base to a column or wall which transfers loads from the substructure to the subsoil.



A floodplain or flood plain is a flat or nearly flat land adjacent a stream or river that stretches from the banks of its channel to the base of the enclosing valley walls and experiences flooding during periods of high discharge.



Form – A temporary structure which acts as a mold for a concrete element until the element has the required strength to support itself, or metal deck forms which are used to support the concrete until curing and are left in place afterwards.



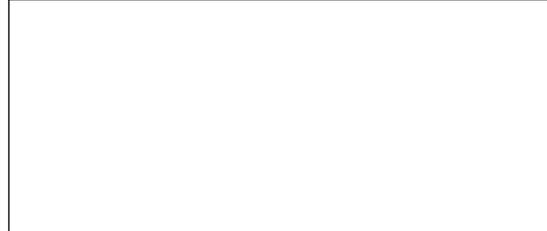
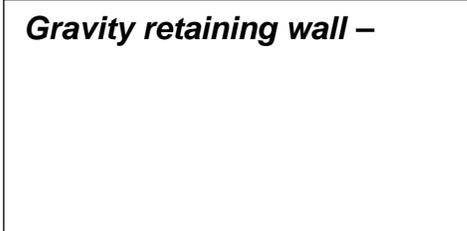
FPA - Future Paving Allowance. A load allowance that allows additional deck material to be placed as the wearing surface needs to be repaired. 15 psf or 30 psf.

Framing Plan – A plan view of the bridge used to show the layout, geometry and properties of superstructure primary and secondary members.

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Girder – commonly used to refer to a primary member placed along the longitudinal axis of a bridge. Used interchangeably with the term stringer.

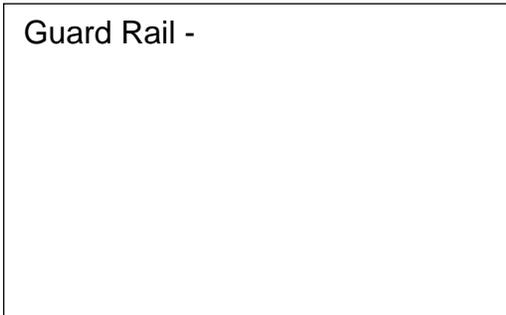
Gravity retaining wall –



Grooved Concrete - Shallow transverse cuts on a bridge deck that provide better drainage and traction. Use of grooving is dependent on traffic counts and route status. See MOG.

Group Loading - Combination of load, wind stream flow, etc.) tha

Guard Rail -



Hammerhead Pier – Used to describe the geometry of a pier with a cap similar in shape to a hammer.

Haunched Girder – A member whose cross-sectional depth varies from support to support.



Heave - The upward movement of soil which can be caused by moisture, excavation, pile driving, etc.

Hooks - Rebars are bent at the end when the bar needs to develop in a shorter length than the development length.

Impact – A factor used to describe the dynamic effect of a vehicle moving across a bridge.

Inventory Rating – The load capacity of a bridge under normal service conditions (55% of yield strength)

Jacking – The lifting of an element or group of elements using hydraulic or other types of jack and if needed, a temporary support system.

Jersey Barrier – A concrete barrier named after the New Jersey DOT, which first developed it. Also known as traffic barrier, median barrier and concrete barrier.

Lane Loading – A hypothetical design loading used to simulate a train of trucks moving across the bridge.

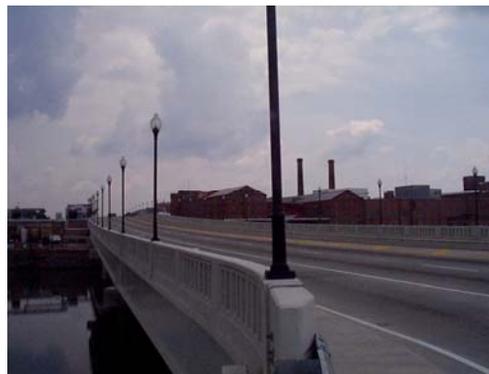
Live Load – A temporary, moving load such as vehicular traffic

Load Rating – A value indicating the load capacity of a bridge

Load Plate - A steel plate in the top and bottom of a neoprene bearing pad that distributes the weight of a beam evenly over the entire bearing surface. (See elastomeric pad)

Longitudinal – Used to describe the axis of a bridge which proceeds from abutment to abutment.

Strength reductions. Currently used and predecessor of LRFD.



Metal Deck Forms – Corrugated galvanized steel stay-in-place deck forms that span between beams and hold up the wet concrete during a deck pour.

MSE Wall



Military loading – A loading configuration used to simulate heavy military vehicles passing over a bridge.

Negative Moment – Bending moment which causes tension in the top fiber and compression in the bottom fiber.

Overlay – See wearing surface

Parapet – A concrete barrier. Typically refers to a barrier placed on the outside face of the bridge deck



Pile casing-



Paving Rest - Part of the endwall on which the approach slab rests.



PDO - Plan Driving Objective. The required tip elevation of piles in a foundation and their design capacity. This comes directly from the BFI.

Pier - A bridge substructure unit. See bent.



Pile - A steel or concrete member driven into the ground that provides support for a bridge due to friction with the surrounding soil and end bearing of the tip on a hard subsurface layer.



Pile Bent - A substructure unit consisting of a cap and piles only where a pile is driven under each beam.

Plate Girder -

rested on piles. Compare with spread footing.



Posted Bridge -



Post-Tensioning - When hardened concrete is stressed to give it better performance under design loads. Usually consists of steel strands passing through ducts formed in the concrete then grouted in place ("internal" post-tensioning).

PSC Beams - Prestressed Concrete Beams (AASHTO Types I, I Mod, II, III, IV, V)



PSC Panels - Prestressed Concrete Deck Panels. Similar to metal deck forms but at 4 inches thick, these panels serve a permanent structural purpose to the bridge and contain the lower layer of deck reinforcement



Rail on top of barrier

Riprap—also known as **rip rap**, **rubble**, **shot rock**, **rock armour** or **Rip-rap**—is [rock](#) or other material used to [armor shorelines](#), streambeds, bridge abutments, pilings and other shoreline structures against [scour](#), water or ice erosion.



RE Walls – A proprietary retaining structure which



Bridge scour is the removal of [sediment](#) such as [sand](#) and [rocks](#) from around [bridge abutments](#) or [piers](#). Scour, caused

Screed – In its simplest form, a long section of metal or wood which is used to smooth the surface and consolidate freshly poured concrete. See



Sheet Piling - Sheet piling is a form of driven piling using thin interlocking sheets of steel to obtain a continuous barrier in the ground. The main application of sheet piles is in [retaining walls](#) and [cofferdams](#) erected to enable permanent works to proceed. Normally, vibrating hammer, t-crane and crawler drilling are used to establish sheet piles

Seal Concrete - Low-grade concrete poured after pile driving into a wet cofferdam so that water in a cofferdam can be pumped out without the bottom of the cofferdam blowing out because of



Shim Plate - *A galvanized steel plate placed on top of a bearing pad to provide a level bearing surface for an inclined beam. "Shim" also refers to thin steel plates in a neoprene bearing pad that prevent the sides of the bearing pad from bulging out and*



Slab Overhang - *The portion of the slab overhanging the exterior bridge beam.*

Slope Paving - Slope protection under bridges shall generally be provided under the end spans of grade separations and interchange structures and to prevent erosion and provide slope stability



Spur Dike - An earth embankment projecting upstream from bridges with wide flood plains to prevent the abutment from scouring out.

Stilling Basin - A pool, usually lined with reinforced concrete, located below a [spillway](#), gate, or valve into which the [discharge](#) dissipates energy to avoid downstream channel [degradation](#).



Stirrups - Rebars placed transversely in a member to provide resistance to shear.

Substructure - Everything in a bridge below the bearing pad. Includes the cap, column, and footings.

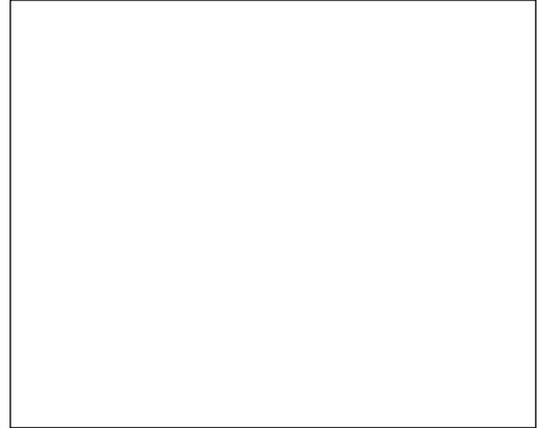


Superstructure - Everything in a bridge above the cap. Includes barrier, deck, beams and bearing pads

A suspension bridge is a type of bridge in which the deck (the load-bearing portion) is hung below suspension [cables](#) on vertical suspenders.

A **cable-stayed bridge** has one or more *towers* (or *pylons*), from which [cables](#) support the bridge deck.

A suspension bridge is a type of bridge in which the deck (the load-bearing portion) is hung below suspension cables on vertical suspenders.





Tower Bent - A pile bent with two rows of piles battered in opposing directions from the cap to give the bridge longitudinal stability.

Transverse – Used to describe the axis of a bridge which is measured perpendicularly to the longitudinal axis (from wingwall to wingwall)



Wingwall - At abutments, a wall along the side of the bridge and integral with the end bent to hold back earth held behind the end of a bridge.



PSC Panels – The term "prestressed concrete" (also known as pre-tensioned concrete) means that wet concrete is poured onto steel strand which has been tensioned. After the concrete has reached the required strength the strand is de-tensioned, the cured concrete adheres and bonds to the strand and when the tension is released it is transferred to the concrete as compression by static friction. This gives the panels additional strength and enables them to flex under load without detriment.

Caisson – a hollow watertight box which is used to construct pier foundations in water channels. The caisson is sunk where the pier is to be constructed and eventually becomes part of the pier itself.



Grooved Concrete - Shallow transverse cuts on a bridge deck that provide better drainage and traction. Use of grooving is dependent on traffic counts and route status. See MOG.

Group Loading - Combination of loads and forces (e.g., dead load with live load, wind stream flow, etc.) that a structure must be able to withstand.

Guard Rail – A protective rail installed on road sides for automobile safety.

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Longitudinal – Used to describe the axis of a bridge which proceeds from abutment to abutment.

LRFD - Load Resistance Factor Design. A new design method, not yet in use, using statistical models to determine load factor increases and strength reductions. Currently we use LFD which is sort of a lite version and predecessor of LRFD.



Metal Deck Forms - **Corrugated galvanized steel stay-in-place deck forms that span between beams and hold up the wet concrete during a deck pour.**



MSE Wall – soil constructed with artificial reinforcement, such as walls and retaining walls



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Negative Moment – Bending moment which causes tension in the top fiber and compression in the bottom fiber.

Overlay – See wearing surface

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Pile casing- concrete or fiberglass casing which encloses a metal pile to protect it.



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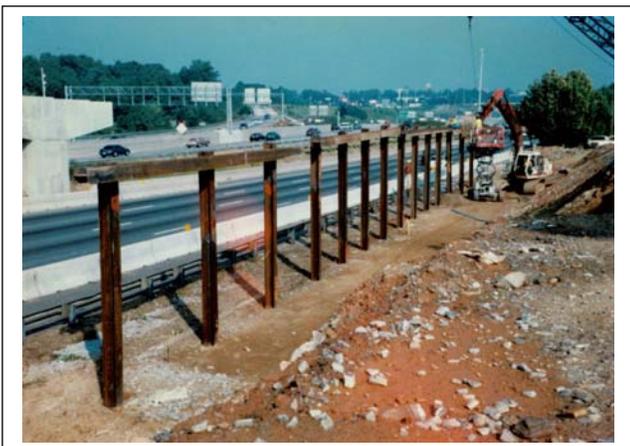


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Pile Footing - A footing supported on piles. Compare with spread footing.

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Type V shown.



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Rail, Barrier - bike or pedestrian rail attached to the parapet to protect bicyclists and pedestrians. RR and Highway bridges also use fence rails to keep people from jumping off the bridge or throwing things onto traffic, trains or RR ROW.

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RE Walls – A proprietary retaining structure which uses galvanized steel strips attached to panels placed in granular backfill.



Strips attached to panels and backfilled.



Bridge scour is the removal of sediment such as sand and rocks from around bridge abutments or piers. Scour, caused



Screed – *In its simplest form, a long section of metal or wood which is used to smooth the surface and consolidate freshly poured concrete. See mechanical screed to the right.*



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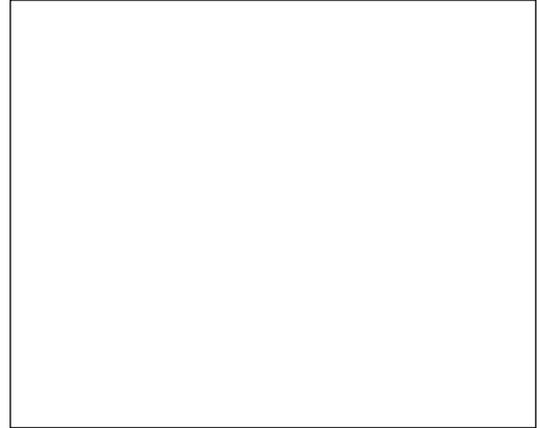


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