DOWNLOAD PDF LIST OF DIFFERENT TYPES OF BRIDGES

Chapter 1 : What are six different types of bridges? |

Fixed - Fixed bridges are the type of bridges that have no movable parts.. Movable - As opposed to fixed bridges, moveable bridges have moveable blog.quintoapp.com types of bridges are usually used on bridges that are used over bodies of water where boats and ships pass through.

Check new design of our homepage! Their design depends on their function. To know about the various types of bridges, read on ScienceStruck Staff Last Updated: A bridge connects two far-off points thus reducing the distance between them and bringing them within reach. Here, we take you through all the different types of bridges, and tell you about the civil engineering and aesthetics they involve. Its type is Viaduct arches supported by piers. It is of the cable-stayed type. Its type is single-arch. Arch Bridge It is arch-shaped and has supports at both ends. Its weight is borne by these supports. Etruscans and ancient Greeks were aware of the concept of arches since a long time. But Romans were the first to discover the use of arches in bridge construction. Arch bridges have now evolved into compression arch suspended-deck bridges that enable the use of light and tensile materials in their construction. Moon arch, pointed arch, deck arch and two or three storied arches are some arch bridge designs. It is meters in length. Beam Bridge A beam bridge was derived from the log bridge. It is built from shallow steel beams, box girders and concrete. Highway overpasses, flyovers or walkways are often beam bridges. A horizontal beam supported at its ends is roughly how the structure of this bridge is. Its construction is the simplest of all bridge types. Its design should be such that it does not bend under load. So its top surface is compressed and the bottom surface is under tension, which helps the beam remain in a straight line. Fast Fact The longer a beam bridge, the weaker it is. Typically, beam bridges are not more than 76 meters long. Cable-stayed Bridge Structured similar to a suspension bridge, the difference lies in the way it supports load. In this bridge type, cables are attached to the towers, which bear the load. Two variants of cable-stayed bridges are harp and fan. In the harp design, cables are attached to multiple points of the tower in a parallel manner. In the fan variant, all the cables connect to the tower or pass over it. Cable-stayed bridges are much stiffer than suspension bridges. The cables serve as a good support for the bridge deck. Also, any number of towers can be used and it requires less cable than a suspension bridge does. Quick Fact Skybridge, Canada is the longest transit-only cable-supported bridge in the world. Cantilever Bridge Cantilevers are structures that project along the X-axis in space. They are supported on one end only. Bridges intended to carry lesser traffic may use simple beams while those meant to handle larger traffic make use of trusses or box girders. In a typical cantilever bridge, cantilever arms extending from opposite ends meet at the center, while in a suspended span design, they do not meet. The Forth Bridge in Scotland is a railway bridge using the cantilever design and is one of the oldest known cantilever bridges. San Francisco-Oakland Bay Bridge that is feet long is another known example of a cantilever bridge. Drawbridge The term is used to refer to a bridge-like structure which is movable. Typically, a drawbridge opens up to extend over the distance it is meant to span. A castlebridge, for example, opens like a door, serving as a doorway to the castle. It could be in the form of a plank that is pivoted to the center that rotates along a designated circumference. This type of construction is often used above tidal waters, where the water levels rise and fall. A vertical lift bridge is a drawbridge that moves vertically in a plane parallel to its deck. Bascule bridges are drawbridges that swing up and down to facilitate boat traffic. Suspension Bridge It is a bridge suspended from cables. Suspension cables are anchored at each end of the bridge. The load that it bears converts into the tension in the cables and is transferred to the towers. Cables stretch beyond the pillars up to the dock-level supports further to the anchors in the ground. This bridge can span long distances and resist earthquakes. It requires less construction material, so the construction costs are less. Truss Bridge It is built by connecting straight elements with the help of pin joints. Triangular units connected at joints form the skeleton of a truss bridge. Owing to the abundance of wood in the United States, truss bridges of the olden times used timber for compression and iron rods to bear tension. They became common from the s to the s. Truss is the oldest form of modern bridge design. Quick Fact Deck truss railroad bridge that extends over the Erie Canal is one of the many famous truss bridges. For more on this bridge type, go through Truss bridge design and types. Quebec Bridge, the longest cantilever bridge span, has a riveted steel truss structure. A log of wood floating on water might have inspired man to build bridges for the very first time!

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Chapter 2 : Bridge Basics - A Spotter's Guide to Bridge Design

List of bridge types. Jump to navigation Jump to search. Here are all types of bridges. Type Sub-type Length range Complexity Image Longest span Longest total Arch.

Different bridge styles distribute stresses different ways. Engineers must take the length and width of the bridge, local environmental conditions and building materials into account to decide what type of bridge to build. To know what kind of bridge is realistic for what environment, then knowing about the 6 different types of bridges is important. Using the wrong type can result in disasters affecting travel and safety. Arch as Simple Bridge Arch bridges use arches as the main structural component. Basic arch bridges are differentiated from one another by the number of hinges used to allow the bridge to accommodate different loads and stresses. Arch bridges include those where the arch is underneath the bridge and not above it, provided the trusses are arranged vertically and not diagonally. Basic Beam Bridge Construction Beam bridges are very basic bridge constructions that have pieces supported on either end of the bridge. Modern bridges frequently use leg supports to distribute the load. Two main types of leg supports are used: Beam bridges work much like a log overlapping the two sides of a ravine. An example of a beam bridge is the Lake Pontchartrain Causeway in southern Louisiana. Cable-Stayed Bridge Structures Cable-stayed bridges are one of two bridge types preferred for longer bridges. Columns are erected as support with cables to support the deck of the bridge. The design is similar to a suspension bridge but instead of the deck being curved, it is flat. Cantilevered Bridge Types Kinds of bridges also include cantilevered bridges which are built around horizontal structures supported on only one end. Some cantilevered bridges are very similar in appearance to arch bridges; however, they are supported by diagonal bracing rather than vertical bracing. These types of cantilevered bridges are known as spandrel braced. The other type of cantilevered bridge is the cantilever through truss formation, where trusses are either above the bridge or both above and below. An example of a cantilevered bridge is the Queensboro Bridge. Suspension Design Bridges The suspension design is another one of the 6 kinds of bridges for long spans with pylons or towers as the main supports. Ropes or cables reach from the supports to hold the bridge and traffic weight. With only the supports in the ground, suspension bridges respond to wind and traffic. The Simple Bridge With Trusses The truss bridge is a simple bridge design that includes most covered bridges. Two main kinds of bridge types of uncovered truss bridges are used:

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Chapter 3 : Six Main Types of Bridges | Synonym

Below is the list of 5 main types of bridges: Girder bridges Arch bridges Cable-stayed bridges Rigid Frame Bridges Truss bridges. It is the most common and most basic bridge type. In its simplest form, a log across a creek is an example of a girder bridge; the two most common girders are I-beam girders and box-girders.

Spreads load fairly evenly between members Fairly simple design Poorer performance under concentrated loads Increased constructibility due to additional members Best Used For: It does however have similar pros and cons to the Pratt Truss and although it is not widely used, it is a strong design. A member may be in compression under one load scenario and in tension under another. This can mean the structure may not be able to be optimally designed - since An example of a K-Truss setup and its reaction under an applied load is shown below. Learn more about our SkyCiv Truss Calculator. Compressive members are shown as green and tension as red. Advantages Reduced compression in vertical members Possible reduction in steel and cost if designed efficiently Disadvantages Increased constructibility due to additional members Howe Truss Howe trusses are essentially the opposite of Pratt trusses in terms of geometry. In fact, looking at a Pratt truss upside-down will visualize a Howe truss of sorts. The entire structure is still relatively the same, but the diagonal braces are now occupying the opposite or the unoccupied joints. This switch in position of the diagonal members has a very important effect structurally. A Pratt truss above and a Howe Truss below Previously, we discussed how Pratt trusses have their vertical members in compression and diagonal members in tension upon the application of a gravity loads at the joints of the top chord. For Howe trusses, the reverse becomes true as diagonal members are now in compression, while the vertical loads are in tension. Howe Truss Calculator As they are similar in structure with Pratt trusses, their uses are generally the same. To maximize the efficiency of the truss, the truss can be loaded at the joints of the bottom chord. Roof trusses can be loaded with a ceiling loads for example. Another thing to note is that, depending on the geometry and loading, Pratt trusses can have more unloaded members than Howe trusses. As the top chords are sloping downward from the center, the V pattern becomes noticeably smaller. As Fink trusses rely more on diagonal members, they can be very efficient at transmitting loads to the support. Derivatives of the Fink truss include the Double Fink and the Fan truss types. Double Fink trusses are essentially Fink trusses that repeat the pattern twice on either side. If the most basic Fink truss can be characterized by a double-V, then a double fink would look like a double-W. Fink Truss Calculator Gambrel Truss In the exterior, a gambrel truss have two different slopes, where the slope gets steeper from the center. Due to outward-protruding shape, gambrel trusses can be effective to be fitted with a hollow center, which can be used as a storage area. As such, the upper section of a barn is usually shaped in a gambrel. In the case of a barn, as the members are usually constructed with wood, the structure acts more like a frame than a truss. Derivatives of the gambrel include the Mansard roof, which is also called a French roof, hence its popularity in France.

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Chapter 4 : Advantages & Disadvantages of Types of Bridges | Sciencing

To be able to serve various roles, carry different types of weight, and span terrains of various sizes and complexities, bridges can strongly vary in their appearance, carrying capacity, type of structural elements, the presence of movable sections, construction materials and more.

Typical bridge designs include beam, truss, girder, suspension, arch, cable and cantilever. Forces that come into play in bridge design and engineering include compression, tension or stretch, deck flexibility, torsion or twisting and shear, the force that stresses the bridge materials laterally across the bridge deck. One of the oldest arch bridges still in use today, a testament to its Roman engineering, includes the Ponte dei Quattro Capi bridge which dates back to 62 B. Beam, Truss and Girder Bridges The beam, truss and girder bridges work simply, much like laying a plank between two banks. Piers or posts on either end support a flat bridge deck that spans the gap between the posts. The bridge deck consists of beams, like hollow box girders, an open frame or truss that spans the posts or supports on either end. The bridge deck must withstand compression above and tension from below. Most of the covered bridges found in New England, represent these types of bridges made from wood. Economical because of the abundance of wood, beam bridges are not as strong as steel and require constant maintenance. One of the oldest engineered bridges, the arch bridge, supports a deck built above two abutments that serve as the curved arch. Made from masonry and stone, the arch design prevents any one area of the bridge receiving too much tension. With abundant building materials, arch bridges are durable and strong, requiring little to no maintenance. Sciencing Video Vault Suspension Bridges The first suspension bridges date back to the 15th century and typically span waterways, because the bridge deck requires little to no access from below to build. Tall pillars support this bridge, evenly spaced across the span as needed, from which massive wires on either side sweep from pillar to pillar. From these sweeping wires suspenders hang vertically to hold up the bridge deck. The tension in the cables and the compression from the pillars work together to cancel out the force of gravity, making them strong and efficient. These bridges can span great distances once the pillars are in place, but they are costlier to build, require extensive upkeep and the bridge decks can move and twist when exposed to fierce winds. Cantilever Bridges Cantilever bridges offer a way to build a continuous bridge across multiple supports to effectively distribute the load evenly. A portion of the bridge provides an anchor that supports a bridge deck that extends to either side of the support that requires precise counterbalance engineering. The advantage of building this bridge design comes during the construction phase. But cantilever bridge designs do require precise engineering because the counterbalance weights can affect their strength if incorrect, especially if contractors build the segments slightly differently.

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Chapter 5 : What are the different types of bridges

The three basic types of spans are built up with beams, girders or trusses. Arch bridges belong to either simple or continuous (hinged). A cantilever bridge may also comprise of a suspended span.

Share on Facebook There are many different types of bridges around the world connecting masses of land that would otherwise be separated by water. There are many factors to consider when choosing the right type of bridge to use. Each type has its advantages. Some designs are better suited for a short bridge, while others allow a bridge to stretch for thousands of feet. There are four basic bridge types. The Arch Bridge The arch shape allows this bridge to support itself without the use of beams or piers. Some bridges are composed of one large arch or multiple small arches. Arch bridges are typically used for pedestrians, railways and vehicles. This type of bridge requires a very sturdy foundation. The arch bridge is one of the oldest types of bridges. It is composed of horizontal beams that are supported by strong, closely placed piers. Longer bridges need more piers, and the closer the piers are to each other, the stronger the bridge will be. A simple bridge, like a wooden board over a short river, does not require any piers. Its design is derived from the simple log bridge. This type of bridge is typically used when a large distance needs to be covered. The flexibility of these bridges prevent them from breaking under the pressure of weight and heavy wind. Early suspension bridges were made of rope or vine. These bars often are fixed into small triangles to create a strong support base. This bridge was popular and common from the s to the s. She became a contributing writer for "Nommo Newsmagazine.

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Chapter 6 : Types of Bridges - Girder Bridges, Arch, Cable-Stayed, Rigid Frame, Truss

Here, we take you through all the different types of bridges, and tell you about the civil engineering and aesthetics they involve. World's Longest Bridge Danyang-Kunshan Grand Bridge on the Beijing-Shanghai High-Speed Railway in China (kilometers long) is the longest in the world.

What are six different types of bridges? Chandler Jarrell Updated November 21, For millennia, humans have created bridges to get from one point to another. Depending on the distances between those points, the materials available and the type of land, different styles of bridges are used. Here is a list of six types of bridges that can be found around the world. Suspension bridge Suspension bridges date back to early s in England and Europe. These bridges are made up of a series of cables held up by suspension towers and an "anchorage" at either end. Because most of the weight is shifted through cables to the secure anchorages, suspension bridges can be built to cover distances of several thousand feet. Arch bridge Arch bridges are among the oldest bridges in the world. The physics of an arch bridge are similar to an arched doorway, in which pressure is pushed away from the top centre and down through the supporters on each end. This style of bridge remains popular, with builders finding materials that can handle compression even more effectively today than on earlier bridges. Truss bridge The truss bridge was one of the most popular types of bridges during the second half of the 19th century and the early 20th century. This was because these are ideal bridges for the use of wrought iron, a material that became widely accessible after the Industrial Revolution. As the name suggests, the design of the truss bridge includes a series of trusses, which, when placed together, form a framework of pressure-distribution along each side and on top of the bridge. Beam bridge The beam bridge is perhaps the most basic type of bridge. In its simplest form, the beam bridge is merely a plank supported by structures on either end. These support structures need to push inward so that they adequately absorb the tension of the beam. Depending on the length of the bridge, pillars may need to be placed in between each end for added support. Drawbridge A drawbridge is a type of movable bridge that has been in use for centuries. The idea behind the drawbridge is that it can be lifted when need be to let boats pass. The design was originally used for castles, which were surrounded by moats with drawbridges that could be raised to exclude unwelcome visitors. Today, drawbridges are more commonly seen over rivers with a lot of boat traffic. This style of bridge allows for any size ship to pass through without danger of striking the bridge. While drawbridges used to be manoeuvred by a series of pulleys, many today are mechanically operated by electronics. Cable-stayed Bridge Cable-stayed bridges are often confused with suspension bridges because of the similarities in appearance. The physics of the two bridges are quite different, however. The cables in a cable-stayed bridge are never suspended, but in fact pull tightly to the bridge deck from the tops of the pillars, causing the pillars to burden the entire load of the bridge. Although cable-stayed bridges are not usually the most economical style of bridge to erect, they are efficient, and many have received much adoration simply because of their beauty.

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Chapter 7 : Bridge Types - Different Types of Bridges

For millennia, humans have created bridges to get from one point to another. Depending on the distances between those points, the materials available and the type of land, different styles of bridges are used. Here is a list of six types of bridges that can be found around the world. Suspension.

Type Lister Types of Structures 8 In recent years, bridges are just structures used for sight-seeing. A bridge is just something that gets people, animals and vehicles from point A to point B. Here are just a few of the different types of bridges that are out there. These types of bridges are usually used on bridges that are used over bodies of water where boats and ships pass through. They are usually used when a bridge is being repaired as an alternative for commuters or traffic. A horizontal plank beam runs across the gap and is supported by columns piers underneath. The farther apart the spaces between piers the weaker the bridge is, which is why most beam bridges are less than meters in length. Not surprisingly, the arch bridge is one of the most naturally strong designs for bridges. The arches properly dissipate the force applied on the bridge, therefore taking away much of the tension coming from underneath the structure. It is easily characterized by having triangular units along the span of the bridge. Some designs have these triangular units above the beam through truss , while other have it below the beam deck truss. A suspension bridge can span as long as 4, meters. As its name suggests, the beam in the suspension bridge is suspended by supporting cables that run along two towers located in between two anchorages. The tension from the deck travels from the cables, dissipates through the towers, passes through the anchorages, and finally absorbed by the ground. Only difference is that the triangular units counterbalance each other with the use of an arm in between. Among the most notable cantilever bridges are the Quebec Bridge and Forth Bridge. The only difference between these two types of bridges is that in the cable-stayed bridge only one tower is needed. It is often used in constructing highways and railway bridges. Box girders can be made from concrete open top or steel orthrotropic deck. Essentially, a bascule bridge is a drawbridge wherein counterweights sink into the water to lift the panels of the bridge open to let ships and boats pass. One of the decks is usually used solely for vehicular traffic, while the other is used for pedestrian traffic. This way the pedestrians will have the awareness of walking across the Sacramento River. Located above the tops of Mount Mat Cincang in Malaysia, tourists who want to cross the bridge would have to ride a cable car to the top. These are the most commonly recognized types of bridges out there.

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Chapter 8 : Types of Bridges - STEM Grade 8

While we're on the subject of beams, it is worth noting the different types of beams. Beams can be made into different shapes, and used on any bridge type. The most simple is a solid square beam.

Bridge Types Types of Bridges Over the last several thousand years, bridges have served one of the most important roles in the development of our earliest civilizations, spreading of knowledge, local and worldwide trade, and the rise of transportation. Initially made out of most simple materials and designs, bridges soon evolved and enabled carrying of wide deckings and spanning of large distances over rivers, gorges, inaccessible terrain, strongly elevated surfaces and pre-built city infrastructures. Starting with 13th century BC Greek Bronze Age, stone arched bridges quickly spread all around the world, eventually leading to the rise of the use of steel, iron and other materials in bridges that can span kilometers. To be able to serve various roles, carry different types of weight, and span terrains of various sizes and complexities, bridges can strongly vary in their appearance, carrying capacity, type of structural elements, the presence of movable sections, construction materials and more. Bridges by Structure The core structure of the bridge determines how it distributes the internal forces of tension, compression, torsion, bending, and sheer. While all bridges need to handle all those forces at all times, various types of bridges will dedicate more of their capacity to better handle specific types of forces. The handling of those forces can be centralized in only a few notable structure members such as with cable or cable-stayed bridge where forces are distributed in a distinct shape or placement or be distributed via truss across the almost entire structure of the bridge. Arch Bridges Arch bridges â€” use arch as a main structural component arch is always located below the bridge, never above it. With the help of mid-span piers, they can be made with one or more arches, depending on what kind of load and stress forces they must endure. The core component of the bridge is its abutments and pillars, which have to be built strong because they will carry the weight of the entire bridge structure and forces they convey. Arch bridges can only be fixed, but they can support any decking fiction, including transport of pedestrians, light or heavy rail, vehicles and even be used as water-carrying aqueducts. The most popular materials for the construction of arch bridges are masonry stone, concrete, timber, wrought iron, cast iron and structural steel. The oldest stone arch bridge ever is Greek Arkadiko Bridge which is over 3 thousand years old. The longest stone arch bridge is Solkan Bridge in Slovenia with an impressive span of meters. Beam Bridges Beam bridges â€” employ the simplest of forms â€” one or several horizontal beams that can either simply span the area between abutments or relieve some of the pressure on structural piers. The core force that impacts beam bridges is the transformation of vertical force into shear and flexural load that is transferred to the support structures abutments or mid-bridge piers. Because of their simplicity, they were the oldest bridges known to man. Initially built by simply dropping wooden logs over short rivers or ditches, this type of bridge started being used extensively with the arrival of metalworks, steel boxes, and pre-stressed construction concrete. Beam bridges today are separated into girder bridges, plate girder bridges, box girder bridges and simple beam bridges. Individual decking of the segmented beam bridge can be of the same length, variable lengths, inclined or V-shaped. The most famous example of beam bridge is Lake Pontchartrain Causeway in southern Louisiana that is Truss Bridges Truss bridges â€” is a very popular bridge design that uses a diagonal mesh of most often triangle-shaped posts above the bridge to distribute forces across almost entire bridge structure. Individual elements of this structure usually straight beams can endure dynamic forces of tension and compression, but by distributing those loads across entire structure, entire bridge can handle much stronger forces and heavier loads than other types of bridges. The two most common truss designs are the king posts two diagonal posts supported by single vertical post in the center and queen posts two diagonal posts, two vertical posts and horizontal post that connect two vertical posts at the top. Truss bridges were introduced very long ago, immediately becoming one of the most popular bridge types thanks to their incredible resilience and economic builds that require a very small amount of material for construction. The most common build materials used for truss bridge construction are timber, iron, steel, reinforced concrete and prestressed concrete. The truss bridges can be both fixed and moveable. Cantilever Bridges Cantilever bridges â€” are somewhat similar in appearance to arch bridges, but they support their load, not through a vertical bracing but trough diagonal bracing with horizontal beams that are being supported only on one end. The vast majority of cantilever bridges use one pair of continuous spans that are placed between two piers, with beams meeting on the center over the obstacle that bridge spans river, uneven terrain, or others. Cantilever bridge can also use mid-bridge pears are their foundation from which they span in both directions toward other piers and abutments. The size and weight capacity of the cantilever bridge impact the number of segments it uses. Simple pedestrian crossings over very short distances can use simple cantilever beam, but larger distances can use either two beams coming out of both abutments or multiple center piers. Cantilever bridges cannot span very large distances. They can be bare or use truss formation both below and above the bridge, and most popular constriction material are structural steel, iron, and prestressed concrete. Tied Arch Bridges Tied arch bridges â€” are similar in design to arch bridges, but they transfer the weight of the bridge and traffic load to the top chord that is connected to the bottom cords in bridge foundation. The bottom tying cord can be reinforced decking itself or a separate deck-independent structure that interfaces with tie-rods. They are often called bowstring arches or bowstring bridges and can be created in several variations, including shouldered tied-arch, multi-span discrete tied-arches, multi-span continuous tied-arches, single tied-arch per span and others. However, there is a precise differentiation between tied arch bridges and bowstring arch bridges â€” the latter use diagonally shaped members who create a structure that transfer forces similar to in truss bridges. Tied arch bridges can be visually very stunning, but they bring with them costly maintenance and repair. Suspension Bridges Suspension bridges â€” utilize spreading ropes or cables from the vertical suspenders to hold the weight of bridge deck and traffic. Able to suspend decking over large spans, this type of bridge is today very popular all around the world. Because only abutments and piers one or more are fixed to the ground, the majority of the bridge structure can be very flexible and can often dramatically respond to the forces of wind, earthquake or even vibration of on-foot or vehicle traffic. Cable-Stayed Bridges Cable-stayed bridges â€” use deck cables that are directly connected to one or more vertical columns called towers or pylons that can be erected near abutments or in the middle of the span of the bridge structure. This is a very different type of cable-driven suspension than in suspension bridges, where decking is held with vertical suspenders that go up to main support cable. Originally constructed and popularized in the 16th century, today cable-stayed bridges are a popular design that is often used for spanning medium to long distances that are longer than those of cantilever bridges but shorter than the longest suspension bridges. The most common build materials are steel or concrete pylons, post-tensioned concrete box girders and steel rope. These bridges can support almost every type of decking only not including heavy rail and are used extensively all around the world in several construction variations. The famous Brooklyn Bridge is a suspension bridge, but it also has elements of cable-stayed design. Fixed or Moveable Types The vast majority of all bridges in the world are fixed in place, without any moving parts that forces them to remain in place until they are demolished or fall due to unforeseen stress or disrepair. However, some spaces are in need of multi-purpose bridges which can either have movable parts or can be completely moved from one location to another. Even though these bridges are rare, they serve an important function that makes them highly desirable. They are designed to stay where they are made to the time they are deemed unusable due to their age, disrepair or are demolished. Use of certain materials or certain construction techniques can instantly force bridge to be forever fixed. This is most obvious with bridges made out of construction masonry, suspension and cable-stayed bridges where a large section of decking surface is suspended in the air by the complicated network of cables and other material. Small and elevated bridges like Bridge of Sighs , ancient stone aqueducts of Rome such as Pont du Gard , large medieval multi-arched Charles Bridge , and magnificent Golden Gate Bridge are all examples of bridges that are fixed. Temporary Bridges Temporary bridges â€” Temporary bridges are made from basic modular components that can be moved by medium or light machinery. They are usually used in military engineering or in circumstances when fixed bridges are repaired, and can be so modular that they can be extended to span larger distances or even reinforced to support heightened loads. The vast majority of temporary bridges are not intended to be used for prolonged periods of time on single locations, although in some cases they may become a permanent part of the road network due to various factors. The simples and cheapest temporary bridges are crane-fitted decking made out of construction wood that can facilitate passenger passage across small spans such as ditches. As the spans go longer and loads are heightened, prefabricated bridges made out of steel and iron have to be used. The most capable temporary bridges can span even distances of m using reinforced truss structure that can facilitate even heavy loads. Moveable Bridges Moveable bridges â€" Moveable bridges are a compromise between the strength, carrying capacity and durability of fixed bridges, and the flexibility and modularity of the temporary bridges. Their core functionality is providing safe passage of various types of loads from passenger to heavy freight , but with the ability to move out of the way of the boats or other kinds of under-deck traffic which would otherwise not be capable of fitting under the main body of the bridge. Most commonly, movable bridges are made with simple truss or tied arch design and are spanning rivers with little to medium clearance under their main decks. When the need arises, they can either lift their entire deck sharply in the air or sway the deck structure to the side, opening the waterway for unrestricted passage of ships. While the majority of the moveable bridges are small to medium size, large bridges also exist. The most famous moveable bridge in the world is London Tower Bridge, whose clearance below the decking rises from 8. However, bridges can be versatile and can support many different types of use. Additionally, some bridges are designed in such way to support multiple types of use, combining, for example, multiple car traffic lanes and pedestrian or bicycle passageways such as a present on the famous Brooklyn Bridge in New York City. Pedestrian Bridges Pedestrian bridges â€" The oldest bridges ever made were designed to facilitate passenger travel over small bodies of water or unfriendly terrain. Today, they are usually made in urban environments or in terrain where car transport is inaccessible such as rough mountainous terrain, forests, swamps, etc. Since on-the foot or bicycle passenger traffic does not strain the bridges with much weight, designs of those bridges can be made to be more extravagant, elegant, sleek and better integrated with the urban environment or created with cheaper or less durable materials. Many modern pedestrian-only bridges are made out of modern material, while some tourist pedestrian bridges feature more exoteric designs that even include transparent polymers in the decking, enabling users unrestricted view to the area below the bridge. Car Traffic Car Traffic â€" This is the most common usage of the bridge, with two or more lanes designed to carry car and truck traffic of various intensities. Modern large bridges usually feature multiple lanes that facilitate travel in a single direction, and while the majority of bridges have a single decking dedicated to car traffic, some can even have an additional deck, enabling each deck to be focused on providing travel in a single direction. Double-decked Bridges Double-decked bridges â€" Multi-purpose bridges that provide an enhanced flow of traffic across bodies of water or rough terrain. Most often they have a large number of car lanes, and sometimes have dedicated area for train tracks. For example, in addition to multiple car lanes on the main decking, famous Brooklyn Bridge in NYC features an isolated bicycle path. Train Bridges Train bridges â€" Bridges made specifically to carry one or multiple lanes of train tracks, although in some cases train tracks can also be placed beside different deck type, or on different decking elevation. After car bridges, train bridges are the second-most-common type of bridges. First train bridges started being constructed during the early years of European Industrial Revolution as means of enabling faster shipment of freight between ore mines and ironworks factories. With the appearance of safe passenger locomotives and cars, the rapid expansion of railway networks all around Europe, US and Asia brought the need for building thousands of railway bridges of various sizes and spans. Pipeline Bridges Pipeline Bridges â€" Less common as a standalone bridge type, pipeline bridges are constructed to carry pipelines across water or inaccessible terrains. Pipelines can carry water, air, gas and communication cables. In modern times, pipeline networks are usually incorporated in the structure of existing or newly built bridges that also house regular decking that facilitates pedestrian, car or railway transport. Pipeline bridges are usually very lightweight and can be supported only with the basic suspension bridge construction designs. In many cases, they are also equipped with walkways, but they are almost exclusively dedicated for maintenance purposes and are not intended for public use. Aqueducts Aqueducts â€" are ancient bridge-like structures that are part of the larger viaduct networks intended to carry water from water-rich areas to sometimes very distant dry cities. Because of the need to maintain a low but constant drop of elevation of the main water-carrying passageway, aqueducts are very precisely created structures that sometimes need to reach very high elevations and maintain rigid structure while spanning large distances. The largest aqueducts are made of stone and can have multiple tiers of arched bridges created one on top of each other. The modern equivalent of the ancient aqueduct bridges are pipeline bridges, but while the viaduct network used natural force of gravity to push water toward the desired destination, modern pipeline networks use electric pumps to propel water and other material. Commercial Bridges Commercial bridges â€" These are bridges that host commercial buildings such as restaurants and shops. Most commonly used in medieval bridges created in urban environments where they took advantage of the constant flow of pedestrian traffic, today these kinds of bridges are rarely constructed with a notable amount of them being found in modern India. Medieval bridges are much more commonly known for their commercial applications. Italy is home to two of the best known commercial bridges in the world â€" the famous multi-tiered Ponte Vecchio in the city center of Florence, and brilliant white Rialto Bridge that spans the scenic Grand Canal in Venice. Both feature numerous shops that offer tourist memorabilia and jewelry. Types by Materials The core function of the bridge is to span a stable decking intended for the transport of pedestrians, cars or trains while enduring weight of its core structure, the weight of the traffic, and the natural forces that slowly but surely erode its durability. Various materials can help bridge designers to achieve their goal, and provide stable and long-lasting bridges that require varying levels of maintenance and in cases of historic bridges, restorations. Here is the breakdown of all the common types of materials that are used in historical and modern bridge building:

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Chapter 9 : List of bridges - Wikipedia

The five bridge types are arch, beam, beam, cable-stayed, suspension, and truss. Other variations include cantilever and moveable bridges. Use the K'nex pieces to explore the various types of bridges.

It is the most common and most basic bridge type. In its simplest form, a log across a creek is an example of a girder bridge; the two most common girders are I-beam girders and box-girders used in steel girder bridges. Examining the cross section of the I-Beam speaks for its so name. The vertical plate in the middle is known as the web, and the top and bottom plates are referred to as flanges. A box girder takes the shape of a box. The typical box girder has two webs and two flanges. However, in some cases there are more than two webs, creating a multiple chamber box girder. Other examples of simple girders include pi girders, named for their likeness to the mathematical symbol for pi, and T shaped girders. Since the majority of girder bridges these days are built with box or I-beam girders we will skip the specifics of these rarer cases. However, if the bridge contains any curves, the beams become subject to twisting forces, also known as torque. The added second web in a box girder adds stability and increases resistance to twisting forces. This makes the box girder the ideal choice for bridges with any significant curve in them. Box girders, being more stable are also able to span greater distances and are often used for longer spans, where I-beams would not be sufficiently strong or stable. However, the design and fabrication of box girders is more difficult than that of I beam. For example, in order to weld the inside seams of a box girder, a human or welding robot must be able to operate inside the box girder. Arch bridges pose a classic architecture and the oldest after the girder bridges. Unlike simple girder bridges, arches are well suited to the use of stone. Arches can be one of the most beautiful bridge types. Arches use a curved structure which provides a high resistance to bending forces. Arches can only be used where the ground or foundation is solid and stable because unlike girder and truss bridges, both ends of an arch are fixed in the horizontal direction i. Thus, when a load is placed on the bridge e. Like the truss, the roadway may pass over or through an arch or in some cases. Structurally there are four basic arch type bridges: Hinge-less Three hinged Tied arches The hinge-less arch uses no hinges and allows no rotation at the foundations. As a result a great deal of force is generated at the foundation horizontal, vertical, and bending forces and the hinge-less arch can only be built where the ground is very stable. However, the hinge-less arch is a very stiff structure and suffers less deflection than other arches. The two hinged arch uses hinged bearings which allow rotation. The only forces generated at the bearings are horizontal and vertical forces. This is perhaps the most commonly used variation for steel arches and is generally a very economical design. The three-hinged arch adds an additional hinge at the top or crown of the arch. The three-hinged arch suffers very little if there is movement in either foundation due to earthquakes, sinking, etc. However, the three-hinged arch experiences much more deflection and the hinges are complex and can be difficult to fabricate. The three-hinged arch is rarely used anymore. The tied arch is a variation on the arch which allows construction even if the ground is not solid enough to deal with the horizontal forces. Rather than relying on the foundation to restrain the horizontal forces, the girder itself "ties" both ends of the arch together, thus the name "tied arch. Another type of bridge is the cable stayed bridge. A typical cable stayed bridge is a continuous girder with one or more towers erected above piers in the middle of the span. From these towers, cables stretch down diagonally usually to both sides and support the girder. Steel cables are extremely strong but very flexible. Cables are very economical as they allow a slender and lighter structure which is still able to span great distances. Though only a few cables are strong enough to support the entire bridge, their flexibility makes them weak to a force we rarely consider: For longer span cable-stayed bridges, careful studies must be made to guarantee the stability of the cables and the bridge in the wind. The lighter weight of the bridge, though a disadvantage in a heavy wind, is an advantage during an earthquake. However, should uneven settling of the foundations occur during an earthquake or over time, the cable-stayed bridge can suffer damage so care must be taken in planning the foundations. The modern yet simple appearance of the cable-stayed bridge makes it an attractive and distinct landmark. The unique properties of cables, and the structure as a whole, make the design of the bridge a very complex task. For longer spans where winds and temperatures must be considered, the calculations are extremely complex and would be virtually impossible without the aid of computers and computer analysis. The fabrication of cable stay bridges is also relatively difficult. The cable routing and attachments for the girders and towers are complex structures requiring precision fabrication. There are no distinct classifications for cable-stayed bridges. However, they can distinguish by the number of spans, number of towers, girder type, number of cables, etc. There are many variations in the number and type of towers, as well as the number and arrangement of cables. Typical towers used are single, double, portal, or even A-shaped towers. Cable arrangements also vary greatly. Some typical varieties are mono, harp, fan, and star arrangements. In some cases, only the cables on one side of the tower are attached to the girder, the other side being anchored to a foundation or other counterweight. Rigid frame bridges are sometimes also known as Rahmen bridges. In a standard girder bridge type, the girder and the piers are separate structures. However, a rigid frame bridge is one in which the piers and girder are one solid structure. The cross sections of the beams in a rigid frame bridge are usually I shaped or box shaped. Design calculations for rigid frame bridges are more difficult than those of simple girder bridges. The junction of the pier and the girder can be difficult to fabricate and requires accuracy and attention to detail. Though there are many possible shapes, the styles used almost exclusively these days are the pi-shaped frame, the batter post frame, and the V shaped frame. The batter post rigid frame bridge is particularly well suited for river and valley crossings because piers tilted at an angle can straddle the crossing more effectively without requiring the construction of foundations in the middle of the river or piers in deep parts of a valley. V shaped frames make effective use of foundations. Each V-shaped pier provides two supports to the girder, reducing the number of foundations and creating a less cluttered profile. Pi shaped rigid frame structures are used frequently as the piers and supports for inner city highways. In these types of bridges the frame supports the raised highway and at the same time allows traffic to run directly under the bridge. Of all the types of bridges, truss bridges are most common, usually in steel bridges. Trusses are comprised of many small beams that together can support a large amount of weight and span great distances. In most cases the design, fabrication, and erection of trusses is relatively simple. However, once assembled trusses take up a greater amount of space and, in more complex structures, can serve as a distraction to drivers. Like the girder bridges, there are both simple and continuous trusses. The small size of individual parts of a truss make it the ideal bridge for places where large parts or sections cannot be shipped or where large cranes and heavy equipment cannot be used during erection. Because the truss is a hollow skeletal structure, the roadway may pass over or even through the structure allowing for clearance below the bridge often not possible with other bridge types. Trusses are also classified by the basic design used. The most representative trusses are the Warren truss, the Pratt truss, and the Howe truss. The Warren truss is perhaps the most common truss for both simple and continuous trusses. For smaller spans, no vertical members are used lending the structure a simple look. For longer spans vertical members are added providing extra strength. Warren trusses are typically used in spans of between m. The Pratt truss is identified by its diagonal members which, except for the very end ones, all slant down and in toward the center of the span. Except for those diagonal members near the center, all the diagonal members are subject to tension forces only while the shorter vertical members handle the compressive forces. This allows for thinner diagonal members resulting in a more economic design. The Howe truss is the opposite of the Pratt truss. The diagonal members face in the opposite direction and handle compressive forces. This makes it very uneconomic design for steel bridges and its use is rarely seen. Stay informed - subscribe to our newsletter.