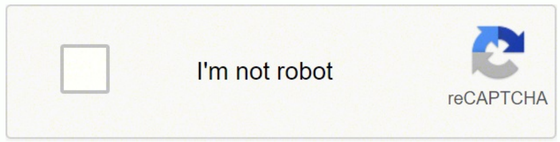

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How to build a balsa bridge

Contact Arkadium, the provider of these gamesEnjoy the best free online bridge game! Team up with a computer partner against opponents to test your skills in this great version of the classic card game. Balsa wood bridge building is an educational technology that is often used to promote subjects areas such as engineering, physics, static equilibrium and building trades. While some of the bridges are created during the regular school curriculum in high schools and colleges, much more popular application of this technology can be found in various competitions that bring together not only contestants from various schools but also hobbyist and engineers who want to be challenged by the various restrictions and challenges. Schools often include the balsa bridge building sessions in the curriculum, trying to promote practical application of knowledge that students learned during a section or unit covering a related physics or engineering topic. The core forces that govern the stability of loaded and unloaded bridges are Compression (pressing of the bridge component into itself, which eventually leads to buckling) and Tension (the force that wants to rip bridge’s components apart, which eventually leads to snapping). The bridge building is also used extensively as a tool that can guide students to understand the desired subject area better, learn more about structural design or the process of building bridge structures. The process of building small bridges involves taking small individual pieces (sticks) of balsa wood, modifying end points to fit the chosen design carefully gluing the pieces one to another until the fully functional bridge framework is created. While the bridges can also be created from smaller, lightweight and easily manageable building materials such as toothpicks or popsicle sticks, bridges created using balsa wood are much more durable and versatile. Because of this added layer of complexity, bridge building projects that are done before high school are usually not utilizing balsa wood. Balsa wood bridge competition requirements The goal of almost each balsa wood bridge competition is to build a bridge that can withstand the greatest weight before it fails. However since there is so much variety between each competition, students are often instructed to comply with a vast array of additional challenges, restrictions, and rules. Most common balsa wood truss bridge designs that are used in competitions are of course Warren, Pratt, and Howe. Advanced bridges are usually focused on designs based on arched, cantilever and bowstring bridges. Some of the most common competition requirements are: Requiring builders to achieve at minimum set bridge spanRestricting the maximum mass of the bridgeRestricting the physical size of the bridgeRestricting the size and shape of structural elements of the bridge (the individual pieces of balsa wood)Restricting the amount of glue that can be used during the constructionLimiting the types of glue that can be used for connecting pieces of balsa woodRequiring the minimum or maximum height of the roadwayRequiring that roadway remains drivable for the selected type of vehicle of the specified sizeRestricting the building techniques of the bridge (for example, banning the use of parallel joining pieces)Requiring the use of the specific truss designs (which is often done so that students can apply their knowledge from recent studies) Requiring the building of the specific types of bridges (bowstring, arched, cantilever, truss…)Limiting the use of paints or other forms of sealantLimiting the use of non-glue materials such as string wires, sticky tapes, gussets, pinsSetting limits on the angle at which bridge member pieces can be joined one to another (for example, at least 30 degrees).Limiting the use of laminationSetting the limits on the minimal and maximum width of the bridgeSetting the limits on how long balsa wood bridges have to be dried before they can be deemed eligible for competition While the bridges can be made from various types of woods, balsa remains one of the most popular because of its core properties. Pros of balsa wood material: CheapLightweightEasy to cut and sandChanges mass in different humidityCons of balsa wood material: Weaker than some other types of woodIt can have inconsistent density, which may lead to unexpected buckling or snapping when under strong loadThe best alternative to balsa wood is bass wood. It is heavier and more expensive, but it is also stronger, resistant to crushing, with same strength throughout entire stick, it can bend more, and it can hold together better at glued joints. Balsa wood bridge testing and scoring The main test for all balsa wood bridges is seeing how much downward force can it endure. The testing can focus on specific points on the bridge (it’s usually a middle of the bridge) and different ways of applying the force. Only when the bridge breaks can the judges determine how well made it is. If you are making your bridge for a competition, be ready to see it break. The bridges are usually tested using the following techniques: Hanging a weight (usually container that can be filled with various smaller weights) from the specified points on the bridge. The container is filled with known weights until the bridge breaks. Instead of weights, some competitions that value high accuracy add sand or water into the container until bridge breaks, and then measure the final weight of the container.Using a mechanical or pneumatic testing device that pushes down of the bridge until the bridge breaks. Some devices of this type can also exert predetermined forces or patterns of forces on the bridge. They can also save the bridge from being destroyed by sensing exactly when the bridge starts to buckle and executing immediate reduction of testing forces. Most competitions use the hanging weight testing since it is easy and cheap to setup, and also produces spectacular and dramatic bridge destruction events. Scoring of bridges is done using the following techniques: How much weight exactly each bridge can supportDetermining exact strength to weight ratio (or structural efficiency)Balsa wood bridge tips Before building bridge, create elaborate design plan that you will try to executeKeep the log of all your bridge designs, so that you can learn from your mistakesPractice, practice, practiceMeasure twice, cut once!Build your bridge away from humidityBuild your bridge in clean and well-lit areaMake sure you are managing sharp cutting tools properlyYou can remove humidity from your bridge by keeping it in a closed container with few grains of rice or silica gel packetsDon’t overdo the glue and keep your hands clean from oils and greaseTake advantage of lateral bracings, which will prevent your bridge from twistingYou will save money by buying balsa wood sheets and then cutting your piecesThe shorter the piece, the more forces it can endureBe careful not to sand too much material from balsa woodLearn the properties of your chosen glueDon’t leave your glue open after you use itThe best way to prepare for the competition is to build a bridge that you can fully test (and destroy). Leave enough time for building an another (and hopefully enhanced) bridge.If you can, record your tests using a camera. The best way to analyze what has caused the destruction of your bridge is to record the test using the high-framerate camera (many modern smartphones support this feature). How do you make a balsa wood bridge stronger? Restricting the physical size of the bridge. Restricting the size and shape of structural elements of the bridge (the individual pieces of balsa wood) Restricting the amount of glue that can be used during the construction. Limiting the types of glue that can be used for connecting pieces of balsa wood. How do you make a wooden bridge stronger? While connecting two sides, make triangles. If you really have time and want your bridge to be very strong, you may also divide each triangle to 3 smaller triangles. This will give additional strength to your bridge. You may also glue additional strips of pasta over the roadway. Can you make balsa wood strong? Balsa wood is a soft, spongy wood that’s prized for being so light that it can be cut using a craft knife rather than a saw. Combine the best of both worlds by hardening your balsa wood pieces after they’re cut or adding strength through double panes of reinforced wood. What’s the strongest bridge design? Even though the truss bridge design has been around for literally centuries it is widely regarded as the strongest type of bridge. The design itself looks extremely simple, so what makes it the strongest type of bridge and why?Sep 4, 2019. What makes a bridge so strong? Suspension bridges are strong because the force on the bridge gets spread out. The weight of the cars or trains or horses, whatever’s traveling across it, pulls on the cables, creating tension. Those cables then pull down on the towers and also pull on the anchors on either end of the bridge, to hold up the deck. How much weight can balsa hold? Since the “End Post” cross section is 1/2 x 1/2 or 1/4 inches squared, then if it was made of light balsa wood, it could tolerate at most a 170 pound load passing through it. Or, 170 x 2.56 = 435 pounds on top. Is balsa wood durable? In fact, balsa wood is often considered the strongest wood for its weight in the world. Pound for pound it is stronger in some respects than pine, hickory, or even oak. What are strong bridges made of? The four primary materials used for bridges have been wood, stone, iron, and concrete. Of these, iron has had the greatest effect on modern bridges. From iron, steel is made, and steel is used to make reinforced and prestressed concrete. What are the three strongest types of bridges? My hypothesis was that the arch bridge would be the strongest. The experiment involved building and testing the strength three bridge types (arch, beam, and truss) by increasing the amount of weight on each bridge while measuring how much each deflected (bent), and at what point the bridges failed (broke). What bridge design holds the most weight? The arch bridge can hold the most weight of the three, the deck truss bridge can hold an average amount of weight, and the beam bridge could hold the least amount of weight. This experiment tested the arch, deck truss, and beam bridges to see which could hold the heaviest amount of weight. How do engineers build strong bridges? They do it by carefully balancing two main kinds of forces called compression (a pushing or squeezing force, acting inward) and tension (a pulling or stretching force, acting outward), channeling the load (the total weight of the bridge and the things it carries) onto abutments (the supports at either side) and piers (Oct 16, 2020. What’s the strongest truss bridge design? In this experiment we have tested which type of truss bridge is the strongest, yet uses the least amount of material. Two of the most used truss bridges are of the Pratt and Howe design. Through our experiment it was found that the bridge design that minimized the maximum compression force was the Howe Bridge. What shape makes a good wooden bridge? What Shape Makes A Strong Bridge? Steel or wooden bridges often have triangle shapes as their main support structure, and you can often see them. A bridge with a truss is called a bridge. Due to the fact that they allow weight to be evenly spread throughout a structure, triangles are the strongest structural shape.6 days ago. What is the strongest glue for balsa wood? Gorilla Glue takes longer than average to dry, but forms a strong and rigid glue joint. The glue foams while it dries and penetrates the balsa wood to create a better and stronger hold than average glues. This glue has a unique quality of using water to dry instead of an absence of water like other glues. What can I spray on wood to make it stronger? Another excellent way to keep wood strong is to seal all the parts that let moisture go in. If you see a small portion of wood with exposed grain, then that’s an area to fill. You can use anything from epoxy to tung oil, linseed oil, and much more. Can you use superglue on balsa wood? Super Glue CA Thin formula is ideal for Balsa wood. Super Glue CA Thick Flex formula is ideal for basswood. Super Glue Accelerator quick-set spray to speeds up drying time when used with CA glues. CA Glues contain Cyanoacrylate; use with caution. Is Howe or Pratt truss stronger? The Pratt truss disspipated the load more efficiently than the Howe truss, although both truss bridges dissipated the force significatnly more effectively than the beam bridge. In addition, the Pratt truss deflected the least and held the most, on average, while the beam bridge deflected the most and held the least. Which bridge design can have the longest span? Suspension bridges have the longest spans of any type of bridge. Cable-stayed bridges, the next longest design, are practical for spans up to just over 1 kilometre. Therefore, as of 2021, the 29 longest bridges on this list are the 29 longest spans of all types of vehicular bridges (other than floating pontoon bridges). What are the 3 main types of bridges? Three basic types of bridges used in transportation are: beam and truss bridges, arch bridges and suspension bridges. Related Posts

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