

1. Please note: the first several kits that were sent out contained an error in rules. A 10-inch-long block of wood (rather than a 14-inch-long block) will be used to test the cable-stayed and suspension bridges.

2. If your team proposal/report portfolio is determined to be complete by the judges, you will be invited to the 2014 Bridge Challenge. Are there any costs from the local district associated with the schools participation in this competition?

Each three-member team with one advisor/chaperone will receive mileage reimbursement for one vehicle based upon the State of Michigan Mileage Reimbursement Rate, currently at \$0.39 per mile. If you decide to travel with two teams plus chaperones in a larger vehicle, the reimbursement rate is currently \$0.55 per mile. If you have several teams coming to the Challenge in a bus, please contact Julie VanPortfliet at 906 786-1830, ext. 317, to discuss reimbursement rates.

Breakfast and lunch on the day of competition will be provided at the hotel. No other meals will be provided or reimbursed.

Each three-member team with one advisor/chaperone will be allowed two overnight rooms at the Amway Grand Plaza in Grand Rapids. If your team consists of males and females, please contact Julie VanPortfliet. With special approval, you will be allowed to have three overnight rooms. You must reserve the rooms with your own credit card. Upon check-in, the overnight charges for these rooms will be transferred to MDOT's bill for payment.

3. Are college engineering students allowed to assist high school bridge challenge teams?

Yes, college students may assist students as long as the high school students do all of the work.

4. For the cable-stayed bridge, the supports are 12 inches apart. How far can the deck extend beyond the supports?

There is not a minimum length for this bridge – the deck may extend beyond the supports as far as you want.

5. For the cable-stayed bridge, is there a minimum or maximum height for the towers?

The towers must function as a cable-stayed bridge tower – there is not a minimum or maximum height for the tower.

6. Please explain what "supporting calculations" are.

Supporting calculations are actual calculations that are used to design the bridge. Calculations can be for things such as strength-to-weight ratio, material density, deflection, or any calculation pertaining to the designing of the bridge.

7. Can the bridge deck be attached to the towers with the beams?

No. If the bridge being worked on is a suspension bridge, then the rules state that the "bridge must perform like a self-anchored suspension bridge." The definition of a Self-Anchored Suspension Bridge is a [suspension bridge](#) in which the main cables attach to the ends of the deck, rather than to the ground via large anchorages. The design is well-suited for construction in areas of unstable soils where anchorages would be difficult to construct.

The reason the rules state self-anchoring is because there will not be any anchors available outside of the tester for the string to attach. By using the basic definition of a suspension bridge, if the bridge deck attaches to the towers, then it would no longer be a "suspension bridge." It would be a hybrid truss/suspension and therefore disqualified according to the AASHTO rules stating that "the suspension bridge shall be designed and built to perform like a self-anchored suspension bridge." Students will have to demonstrate this to the judges when testing.

8. Can a beam be used to connect the top of the two towers?

No. A beam cannot be used to tie the towers together. If a beam were to be used, the bridge would no longer act as a suspension bridge.

9. Can students use a lap joint?

Yes, the lap joint is permitted, but the joint is limited to 3/8 inches for the length and width.

10. Can pieces be glued on the edge of one piece to the side of the next?

Yes. At the joints, more than one layer may be required. These joints may not exceed 3/8 inches in thickness. A multi-layered joint may not exceed 3/8 inches in length.

11. Does the bridge deck need to be greater or equal to 2 inches or can it be less than 2 inches?

There is not a restriction for the minimum width of the bridge. The maximum width of the bridge or tower base is 4.5 inches.

12. Can we have CAD design in 2-D, three views, or does the drawing need to be in 3-D?

CAD drawings can be in 2-D.

13. Can we print the CAD drawing on 11-inch x 8.5-inch paper with 2:1 scale or do we need to submit the .dgn file?

Students must use the Bentley MicroStation PowerDraft program and follow the print instructions included in the step-by-step video. The drawing will print on 8.5-inch x 11-inch

paper. If the print instructions are not followed, the bridge will be disqualified from the bridge challenge. A .dgn file is not required.

14. The guidelines say we are limited to the supplies in the challenge kits. Are we limited to the amount in the challenge kit?

Students are limited to the amount in the challenge kit. You cannot add more items to the kits. You can purchase more supplies to build a test bridge.

15. If someone has designed their bridge but not built it yet, would they be able to put much into the tables other than the bridge member information? If they have not tested it yet, and therefore have no calculations, is it acceptable to insert into the proposal that "data will be forthcoming following future testing"?

If ModelSmart is used, students could make a table of design versus breaking load. The table would consist of a main design, then simple modifications and how the modifications affect the breaking load. The different types of designs versus the different breaking loads could be used to create a table. A table could be as simple as time spent versus progress, i.e., "Planning stage: 6 hours - 5% progress of entire project. Design stage: 30 hours - 35% progress."

There are several variations that would work, so students need to be creative. Calculations should be done prior to building the bridge and must be included in the proposal.

16. Are we allowed to use double members – like what is shown in the ModelSmart booklet on pages 7-9?

According to our rules, no, you cannot use double members.

17. I remember reading somewhere during the registration process that I can change group members up to a certain date. Is this true? I have a few people wanting to switch teams.

You can switch team members up until Feb. 20, 2015. Teams must contact Julie VanPortfliet at 906-786-1830, ext. 317, before the change can be completed.

18. Can the balsa wood be bent to make an arch, either by steam or soaking, or is this against the rules?

You are allowed to bend the balsa wood.

19. Can the wood from the kits be shaped to any specification, or must it still resemble the stick as it came to us?

The wood can be reshaped, cut, split, etc., as long as it is the balsa wood originally sent to you.

20. Can we paint the bridge?

Painting the whole bridge is not acceptable. However, you can paint decorations or your name on the bridge. Be careful not to paint the joints in a way that it looks like lamination. In the first specification, it states "additional materials may be used for decorations or visual aids."

21. Are we allowed to use hot glue?

No, you can only use the glue included in your bridge challenge kit.

22. Can a truss pass over another truss, or is that lamination?

Balsa directly on balsa is lamination.

23. The test support apparatus is intended to have two, and only two, supports as shown in the packet's diagram. Please confirm.

The Pitsco Tester will be set up as shown in each team's rule packet.