



Student Steel Bridge Competition

2022 Host Guide

Revision 2 (01.20.2022)



**Smarter.
Stronger.
Steel.**

ASCE AMERICAN SOCIETY
OF CIVIL ENGINEERS

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Revision 2 (01.20.2022)

- Updated [Vertical Deflection Measurement Device Instructions](#) (in the [Equipment Guide](#))

Revision 1 (01.17.2022)

- New section [1.6 Insurance Coverage](#)
- Updated equipment checklist for [Lateral Load Station Setup](#)

Part One

Overview

Thank you for hosting a Regional Competition for the Student Steel Bridge Competition. While not exhaustive, this guide has been designed to assist you in the effective planning, organization, and administration of a safe, quality and fun competition.

Our Vision

Empower students to acquire, demonstrate, and value the knowledge and skills that they will use, as the future generation of design professionals, to contribute to the structural steel design community and construction industry in the United States.

Our Mission

Challenge students to extend their classroom knowledge to a practical and hands-on steel-design project that grows their interpersonal and professional skills, encourages innovation, and fosters impactful relationships between students and industry professionals.

History

The American Institute of Steel Construction (AISC) and the American Society of Civil Engineers (ASCE) are the organizing sponsors of the Student Steel Bridge Competition (SSBC). The SSBC began in the 1980s as an AISC competition between three universities in Michigan. Over the years, it has expanded to include over 200 participating schools. In 2022 there will be 20 SSBC Regional Competitions in North America, with the top finishers of the Regional Competitions advancing to the National Finals.

1.1 Support from AISC

This Host Guide is intended to support the planning of the SSBC events, and it provides information about elements of the competition, including venue requirements, details about the standardized equipment, and preparation checklists for the Hosts and Judges.

The Regional Competitions will be held during ASCE Student Symposia, and the Host School should work directly with ASCE to coordinate and plan the events.

Any specific questions about this guide or the support from AISC can be directed to AISC University Programs at universityprograms@aisc.org.

Host Stipend

As an organizing sponsor of the SSBC, AISC will provide each Host School with a \$2,000 stipend check to help offset the costs of the competition. Hosts can expect to receive this check in the fall prior to the competition. Note that only hosts of North American Regional Competitions are eligible to receive this stipend.

Call for Volunteers and Sponsors

The Host School is primarily responsible for recruiting volunteers and event sponsors for their Regional Competition. However, AISC will provide assistance by contacting their membership base with a call for volunteers, as described in the section for Judges and Volunteers. All volunteer assignments, scheduling, and communication should be coordinated by the Host School.

Similarly, AISC solicits their membership base for sponsorships for the overall SSBC program. If there are any companies and/or individuals that are interested in sponsoring a specific Regional Competition, the information will be shared with ASCE who will distribute it to the respective Host School. It is the Host School's responsibility to work directly with the sponsors to communicate sponsor benefits and event information.

1.2 General Competition Structure

The Regional Competitions are organized independently by Host Schools under the guidance of ASCE and are held during ASCE Student Symposia. The top finishers of the North American Regional Competitions, with the exception of Guest Competitors, qualify to compete at the National Finals. See the Rules for more information.

The Rules Document

All of the Regional Competitions as well as the National Finals are based on the same [Rules](#) document that describes the competition and states the official Rules. The Rules are developed by the SSBC Rules Committee and are changed every year. The current Rules must be used without modification for every Regional Competition and the National Finals, so that bridges from all regions may compete nationally without disadvantage.

AISC maintains a website, aisc.org/ssbc, where the Rules can be downloaded and Rules questions are addressed. Rules questions may be submitted only through the official online forms. Rules questions are reviewed by the SSBC Rules Committee, and the Rules clarifications issued by the Rules Committee are posted online for access to all competitors.

Host School

The Host School is responsible for all aspects of planning and setup of the event. This includes making venue arrangements, communication with participants, recruiting of volunteers, fundraising, setup and cleanup, and coordination with ASCE. The Host School invests a great deal of time and resources into preparation for the event in addition to participating in the event with a competing team of students.

Well in advance of the competition, the Host School should alert participants of any local conditions that may affect the competition. The Host School should provide each competitor with a schedule of events, a map to the contest site, and travel recommendations.

Competition Participants

Student teams from approximately 200 schools are expected to participate in the SSBC at the Regional Competition level. These teams consist of undergraduate and/or graduate students from colleges and universities with an ASCE student chapter that is in good standing with ASCE. Refer to the Rules for more information about eligibility.

Composition of regions and teams will be based on the ASCE Student Conference divisions with rare exception. The top teams at North American Regional Competitions will advance to the National Finals.

Guest Competitors

Schools that do not meet the full eligibility requirements may participate as Guest Competitors in Regional Competitions at the discretion of the Host school and ASCE. Refer to the Rules for more information.

1.3 Judges & Volunteers

Head Judge

The Head Judge is the person with full authority over the conduct of the competition, safety, and interpretation of the Rules. There is a Head Judge at each Regional Competition. The National Head Judge serves as the Head Judge for the National Finals.

The role of the Regional Head Judge is to work with the Host School organizing committee to determine competition setup and judge assignments prior to the competition and to also direct the other judges during the competition. In many regions, the Head Judge returns to the role each year. Regional Head Judges will attend an online training session led by the National Head Judge.

Judges

Judges assist the Head Judge with the conduct of the competition, safety and interpretation of the Rules. Judges are assigned to moderate each event of the competition: aesthetics, construction, lateral loading, vertical loading and weighing. They have complete and final authority for enforcing the Rules of the contest. Judges are directed and empowered to halt any activities they deem hazardous. Competitors should be respectful of the judges at all times.

of Judges Required

The Host School recruits volunteers that serve as judges. In many regions, there is a regular group of people who volunteer to serve as judges year after year. Additional judges will likely need to be recruited by the Host School. The Host School should recruit judges who will be fair, unbiased, and competent. The Regional Competition Head Judge will direct the Host School on the exact number of judges needed, but the Host School may use the table below as a guide:

Lane/Station	Minimum # of Judges per Lane/Station
Construction	3-5 Judges
Lateral Load Station	1 Judge
Vertical Load Station	1-2 Judges
Weight Station	1 Judge

Judges Meeting

The Regional Head Judge will manage and lead the work of the other judges. A meeting with all judges should be held at the discretion of the Head Judge. This may be an in-person meeting at the Regional Competition or an online meeting before the Regional Competition. Host Schools work with their Regional Head Judge to determine what support or facilities from the Host School is needed.

At the Judges Meeting, questions regarding the Rules and procedures should be discussed and resolved. In addition, the duties of each judge should be defined. The judges should be prepared to answer questions about how the Rules are applied. Procedures for teams to file an appeal to resolve protests are described in the Rules document. Learn more about this meeting in the Judges Meeting section of this guide.

Guidelines for Judges

Before the Judges Meeting, each judge should carefully study this guide and the current Rules and the Official Clarifications.

Judges are reminded that competitors have invested significant amounts of time and money in their bridges. They will expect judges to make accurate measurements, keep careful records, ensure that data is entered into the scoresheet correctly, understand and enforce the Rules, and be fair in all decisions. Interactions with competitors must be collegial and professional regardless of how the competitors may present themselves.



Judge giving instructions at load station

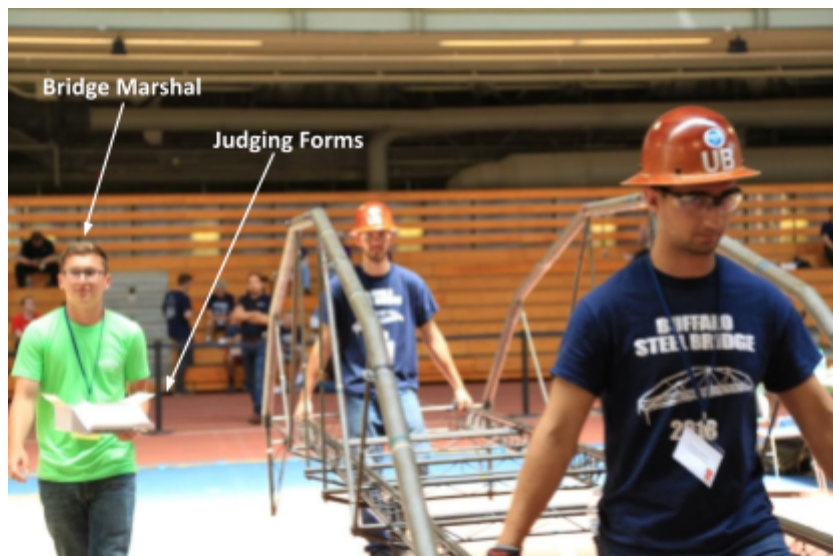


Judges at work during bridge construction

Marshals

At the National Finals and some Regional Competitions, marshals are used to escort bridges through the complete construction and testing sequence. The duties of the

marshals are to carry the judging forms from station to station, ensure that the bridge is not altered or enhanced after the erection phase, note damage to the bridge as it is moved, and assist those entering scoring data in resolving any questions regarding the completed judging forms.



Other Volunteers

The Host may have other volunteers at the competition that work on a variety of tasks such as team registration, equipment preparation, and venue setup and cleanup. The table below shows the estimated minimum number of recommended volunteers needed based on the size of the Regional Competition. Please keep in mind these are only estimates and could differ based on unique conditions and overlap with other ASCE Student Symposium events. The Host School must take great care in determining the volunteer needs for their specific events.

	2-5 teams	6-11 teams	12-17 teams	18+ teams
Main Competition floor taping & setup (allow for 4+ hours)	3	3-4	4-5	5-6
Equipment preparation	1-2	1-2	2	2-3
Registration/check-in	1	2	2-3	2-3
During event (runners, meals, etc)	1	2	3	4
Clean up	3	3	4	5

Recruiting Volunteers & Judges

Steel fabrication companies are good sources of judges. Structural engineers, erectors, architects, and others associated with the steel construction industry also make good judges. No previous engineering or competition experience is required.

AISC Call for Volunteers

AISC will provide additional support by contacting our membership base with a call for volunteers in January. AISC's members will express their interest through an interest form, and the responses will be shared with ASCE, who will distribute them to the respective Hosts to use as they see fit. The Host will handle scheduling and assignments with the volunteers directly.

1.4 Equipment

AISC has standardized and provided the necessary equipment for every SSBC Regional Competition, including steel angels, grating, measuring devices, and safety supports. The equipment belongs to the Region, and it is the responsibility of the Host Schools to transfer, inventory, and store the equipment each year.

The Team Resources page at aisc.org/ssbc contains the inventory lists for all Region. Refer to [Appendix 2: Equipment Guide](#) for instructions on how to operate some of the items.

Special Note for 2022

For the 2022 Regional Competitions, AISC will coordinate transportation arrangements so that the equipment arrives on the Host School's campus in the fall prior to the 2022 competition. The 2022 Host School is responsible for coordinating the transfer of equipment to 2023 Host School after the Regional Competition after the competition.

Equipment Inventory

Upon receiving the equipment, the Host School should conduct an inventory of all items. The Host School should notify ASCE of any damaged or missing equipment by December through the symposium planning forms. AISC will provide replacements of certain items.

Storage

The Host is responsible for storing the region's equipment for the current competition year until the next Host School takes possession, which is typically immediately following the Regional Competition.

Approximately 200 square feet of space is needed to store the equipment. Access by forklift may be required for pallets carrying the loading angles. It is the Host School's responsibility to unload, maintain, and reload the equipment to be handed off to the next Host School. As of 2022, the equipment is typically stored on pallets:

- Angle Pallets: The steel angles will come on 3ft x 3ft pallets holding 1,250 lbs each. The angle pallets can be stacked, but it depends on the resources available and how Hosts load them into the storage location. For example, to stack the pallets, Hosts will need access to a forklift.
- Misc 4ft x 4ft Pallets: The 4x4 pallets will have a max weight of 1,250 lbs and cannot be stacked.

Packaging Equipment

The equipment should be packaged so that it will not be damaged or lost in transport to the next Host School.

Recommendations for Packing Equipment

- Place all small materials such as clipboards, tape measures, stop watches, small wood blocks, magnets, etc. in boxes. Clearly label the contents of each box on two sides of the box and tape it closed.
- Organize the pallets of angle to include (50) angles per pallet. Tie the angles down to the pallets with straps or rope.
- Organize other large items such as the lateral load device, steel plates, jack stands and wood templates on pallets. Tie the materials down to the pallets with straps or rope and shrink wrap the pallet.

Shrink Wrap Tip

The most common method for packaging the pallets is to use shrink wrap. Start at the bottom and wrap around all sides by circling around the pallet, covering as much area and space as possible; there shouldn't be any openings where the wrapping could potentially tear.

Pallet Example

Pallets are labeled and numbered



Angles are sorted on pallets by 50 angles and strapped



Jack Stands are organized on a pallet and shrink wrapped

All other materials are on a pallet and shrink wrapped. Wood Materials and Boxes are packaged together on one pallet



Preparation for Professional Delivery

If the equipment is being transported via a professional shipping company, the equipment will often be transported on open-air flatbed trucks. All equipment should be safely secured and packaged for transit prior to the driver's arrival.

Alternate Equipment

Some regions have an alternate (non-AISC provided) set of equipment. This equipment may be used in lieu of the AISC equipment at the discretion of the Regional Competition Head Judge. Any requests for substitution should be coordinated with and approved by the Regional Competition Head Judge in advance of the competition.

1.5 Host Planning Timeline & Checklist

Below is an example planning timeline and checklist. Note that this list is not exhaustive, and each Host may have specific and unique needs. However, this should help get you started on the planning process.

March - September

- ☐ Review this Host Guide
- ☐ Select competition date(s) and venue(s). Make reservations and sign any necessary contracts.
- ☐ Determine the storage location for competition equipment

October - November

- ☐ Receive and inventory equipment
- ☐ Determine number of judges and volunteers that will be needed
- ☐ Develop a plan to recruit judges and volunteers
- ☐ Determine Regional Competition Head Judge
- ☐ Receive Host Stipend check from AISC

December - January

- ☐ Continue planning activities for venue logistics
- ☐ Coordinate with Head Judge to plan Judges Meeting and event logistics
- ☐ Recruit judges and competition volunteers

6-8 Weeks Before Event

- ☐ Finalize competition schedule and venue logistics
- ☐ Develop Main Competition & Aesthetics layouts
- ☐ Finalize recruitment of judges and volunteers
- ☐ Send event details to judges, volunteers, and any sponsors who plan to attend the event
- ☐ Start developing event program

3-4 Weeks Before Event

- ☐ Finalize Main Competition layout
- ☐ Finalize Aesthetics layout
- ☐ Finalize any instructions for competitors, such as unloading and loading
- ☐ Confirm all judges and volunteers, as well as any sponsors who plan to attend the event. Ensure that they have received event details and instructions.

- ☐ Finalize event program
- ☐ Develop plan for transporting all equipment to the venue
- ☐ Develop plan for inventorying and packing equipment after competition
- ☐ Order any materials needed for packing equipment after competition

2-3 Weeks Before Event

- ☐ Inventory and test equipment at least two weeks before the Regional Competition. Review the equipment for a final time to ensure that no items have been damaged or gone missing while in storage.
- ☐ Receive awards plaques from AISC
- ☐ Check awards plaques for any damage during shipping

After the Event

- ☐ Submit competition scoresheet to AISC
- ☐ Complete transfer of equipment to next year's host by assisting them with inventory and packaging equipment
- ☐ Thank judges, volunteers, and sponsors

1.6 Insurance Coverage

AISC maintains general liability insurance for the North American Regional Competitions, and a certificate of insurance (COI) is available upon request. In order to obtain a COI, please [download the request form](#) and follow the instructions.

Safety is paramount in all initiatives at AISC and ASCE. Hosts are expected to follow this practice and take every precaution to ensure their committee and all participants are safe while engaging in SSBC activities. However, accidental instances of property damage, personal injury or loss may occur during official SSBC activities and events. If a situation arises, any losses or injuries should be reported to AISC immediately.

Report an Incident

If an incident occurs during the SSBC Regional Competition, the Host School and/or committee members present must take the following steps immediately:

1. Secure the personal safety of all involved. If someone is seriously hurt, call 911.
2. Document the incident:
 - a. Gather the contact information for all persons involved.
 - b. Take photos of any damage to personal or private property as well as any injuries.
 - c. Write up a brief description of the events that occurred, including the date and time of the incident.
3. Send the documentation as detailed above to the following parties:
 - a. Mike Mospan, AISC Director of Finance & HR (mospan@aisc.org)
 - b. Wendy Jimenez, AISC Accounting Manager (jimenez@aisc.org)
 - c. Kristi Sattler, AISC Senior Engineer - University Relations (sattler@aisc.org)
 - d. cc: Melissa Prelewicz, ASCE Director, Member Communities (mprelewicz@asce.org)
 - e. cc: Jennifer Upmeyer, ASCE Administrator, Student Conferences and Competitions (jupmeyer@asce.org)

Part Two

Events and Venues

The SSBC Regional Competition can be a one-day or two-day event at the discretion of the Host School, depending on the number of participating teams and available facilities. For regions with more schools or regions where the pace of competition may be slow, it may be more reasonable to spread the competition events over two days. Required events include the following:

- Registration/Check In
- Captains Meeting
- Judges Meeting
- Aesthetics
- Main Competition
- Awards Presentation (banquet optional)

Sample Regional Competition Schedule

A sample schedule is shown below for the typical Regional Competition.

Typical Schedule	
7:00 a.m. - 8:00 a.m.	Judges Meeting
7:00 a.m. - 8:00 a.m.	Check in and Aesthetics Setup
8:00 a.m. - 9:00 a.m.	Captains Meeting
9:00 a.m. - 9:30 a.m.	Aesthetics Judging
9:30 a.m. - 5:00 p.m.	Main Competition*
Noon - 2:00 p.m.	Lunch
Part of Symposium Awards	Awards Ceremony

* During the Main Competition, there are typically multiple lanes running simultaneously (i.e. construction, loading, and weight). Approximate times per team are provided in [Section 2.5 Main Competition](#) to help you make estimates for your Region.

2.1 Registration / Check-in

Before the competition begins, participating students and volunteers should check in with the Host School. The registration table should be in an easily accessible location, that is advertised to the participants prior to the competition. At registration, guests should receive any information they will need for the competition.



Successful registration table set up example

It is recommended that an event program be distributed to all attendees with more details about the competition, including, the order for the Main Competition, instructions for dropping off the bridge at the competition site, and layouts for Aesthetics and the Main Competition. This could be a printed-out program that is distributed at check in and/or it could be an electronic version that is distributed to teams in advance of the competition.

Host Preparation

- ❑ Confirm that all teams and judges know the check-in location and time well in advance of the competition.
- ❑ Prepare check-in items for volunteers, sponsors, and judges in addition to attendees.

2.2 Team Captains Meeting

General Information

During the Captains Meeting, the Rules and Official Clarifications are reviewed and questions are answered by the Regional Competition Head Judge for the last time before the competition begins. The flow of the competition, competition order, and competition floor layout are usually discussed at this meeting. Local site conditions are also discussed.

It is a critical event that occurs before teams take to the floor to build their bridges, and therefore, all captains are required to attend. The captain should report back to his/her team and inform them of pertinent information that was discussed.

This meeting is typically conducted by the Head Judge who may invite other judges. Participation in this meeting is often restricted to just team captains and the judges for reasons such as room size limitations.



Head Judge listens to a question



Student asks a question

Captains Meeting Venue Requirements

Suitable venues may include classrooms and lecture halls with an audio/visual system and a white/black board or flip chart. There should be enough seating for team captains, other team representatives, and any judges who wish to attend. The Captains Meeting typically lasts between one to two hours.

Host Preparation

- ❑ Coordinate with the Head Judge while planning this meeting. The Head Judge leads the meeting, but all judges should be invited to attend.
- ❑ Confirm that all teams and judges know the location and time of the meeting well in advance of the meeting day.
- ❑ Confirm that all teams know if the meeting is restricted to only team captains or if other team members may attend.

The Host should provide the following:

- ❑ A venue that can accommodate the expected crowd. Microphones and an A/V system may be necessary in some cases.
- ❑ A white/black board or flip chart on an easel for people wishing to sketch scenarios that clarify their questions and/or answers.
- ❑ A copy of the Rules and the current Official Clarifications for the judge conducting the meeting.
- ❑ Sign-in sheet.

2.3 Judges Meeting

General Information

The Regional Competition Head Judge should hold a meeting for the judges before the competition. This can be an in-person meeting on the day before the competition or an online meeting held in advance of the competition. This meeting typically consists of an overview of the Rules, anticipated violations, and techniques for determining compliance with the Rules. Host Schools work with their Regional Competition Head Judge to determine what support or facilities from the Host School is needed.

Judges Meeting Venue Requirements

A variety of spaces may be suitable for an in-person meeting, so please discuss the venue needs with the Regional Competition Head Judge. If the Regional Competition Head Judge is unable to provide venue specifications, AISC suggests reserving a room on campus, such as a classroom.

Host Preparation

- ☐ Coordinate all Judges Meeting logistics with the Head Judge.
- ☐ Reserve the on-campus venue if requested by the Head Judge.
- ☐ Confirm the location and time for the Judges Meeting at least two months prior to the event, and make sure that all judges know the event details.

Head Judge Preparation

- ☐ Coordinate all Judges Meeting logistics with the Host.
- ☐ Coordinate with judges on assignments.
- ☐ Review Rules prior to attending.

Judge Preparation

- ☐ Review Rules prior to attending.

2.4 Aesthetics

General Information

Aesthetics judging typically takes place before the Main Competition. During Aesthetics judging, all of the bridges will be erected and on display at the same time in the same location.

Aesthetics consists of three parts: Appearance, Name and Poster Board. The Rules do not give any specific guidance on how to combine these three components to arrive at a final ranking of the participating bridges. The Head Judge at each Regional Competition can determine the process that will be used. At the National Finals where 40+ bridges are ranked, the official scoring spreadsheet is used to determine aesthetics scores and the aesthetics rankings.



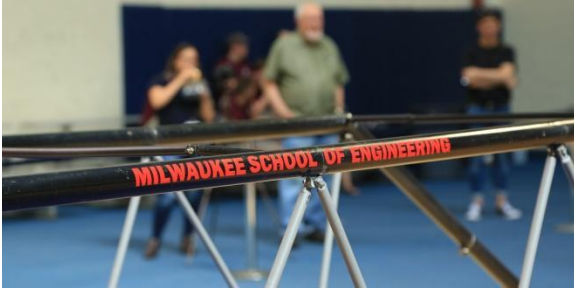
Bridge with school name clearly labeled and poster

Appearance

This is very subjective and is based solely at the judges' discretion.

Name

The name of the school should be displayed on the bridge so that it is easily identified by the judges. It is recommended that letters are at least 1 inch tall and that the full name of the school is used.



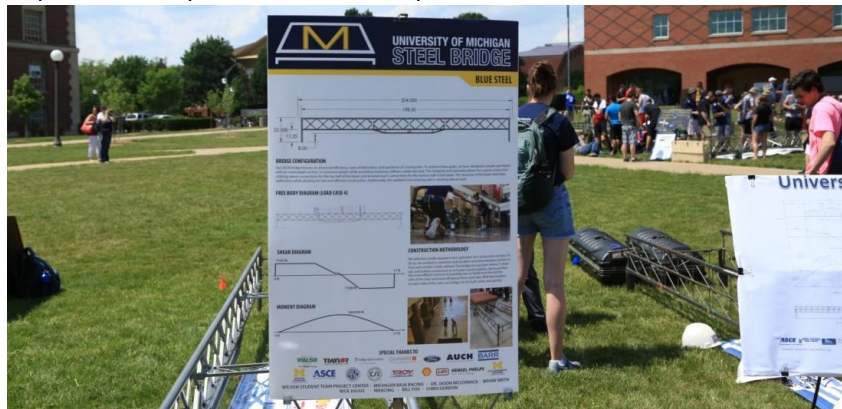
Good example of school name on bridge



Good example of school name on bridge

Poster Board

The Rules list required components for the poster.



Poster at Aesthetics

Aesthetics Venue Requirements

A variety of spaces may be suitable, including plazas, baseball fields, and gyms. Each bridge requires an area of approximately 8'x24' (this includes aisle space between bridges). Locations for bridge unloading and loading also must be determined.

A sample layout can be found in [Appendix #3: Sample Aesthetics Layout](#).

Host Preparation

- ☐ Recruit judges and volunteers.
- ☐ Confirm that all teams and judges know when and where Aesthetics is to be held well in advance of the meeting day.
- ☐ Provide instructions, such as a venue plan, that indicates where each team should set up their bridge. A committee member or volunteer should be present to provide instructions for setup upon a team's arrival.

The Host should provide the following items at Aesthetics:

- ❑ (1) Copy of the [Rules and Official Clarifications](#)
- ❑ A set of aesthetics judging forms (printed from the [scoring spreadsheet](#)) for each Aesthetic Judge, if needed.
- ❑ Pencils and clipboards for each judge.
- ❑ Computer with the scoring spreadsheet on it. The results of the Aesthetics judging must be entered while the judges are all present and with the bridges still on display so that they can break any ties if necessary.

Judge Preparation

- ❑ Review Aesthetics Rule requirements.
- ❑ The Head Judge and/or Host should assign a panel to score the bridges (three to six works well).

2.5 Main Competition

General Overview

Approximately 10,000 square feet (includes space for spectators) of level floor space is required for the main competition. Typically, construction lanes, lateral loading stations, vertical loading stations, one weigh station, and a scoring station are operating simultaneously at a Regional Competition.

There are seven stages to the main competition. Each stage is explained in further detail in a separate section of this guide, along with setup instructions. Approximate times per team are noted below.

1. Pre-Construction [15 minutes]
2. Construction [20 minutes on average; will vary from 5-45 minutes]
3. Post- Construction [20 minutes]
4. Lateral Load Test [20 minutes]
5. Vertical Load Test [45 minutes]
6. Bridge Weight [5 minutes]
7. Data Entry [10 minutes]

Main Competition Venue

Approximately 10,000 square feet (includes space for spectators) of level floor space is required for the main competition. A venue that is indoors or weather resistant with a concrete floor surface is ideal. Some indoor facilities, such as athletic facilities with sensitive floors, may require installation of a protective layer of plywood. For outdoor venues, paved areas, such as parking lots, work well.

Hosts should follow the following guidelines when reserving a main competition space:

- A smooth and level ground surface is needed at the location where bridges are constructed and dimensions are checked since clearances are measured from the ground. Load testing requires rigid (i.e. Portland cement concrete) pavement that is level and smooth. If rigid pavement is not accessible, provision must be made to prevent bridges from sinking during load testing. AISC provides steel plates in the standardized equipment to assist with this. Floor areas where bridges will bear should lie in a common plane.
- If any competition event is located outside, a rain alternate must be booked as an alternate

- Ample parking should be available near the competition venue for judges and competitor loading and unloading. Bathrooms should be available near the competition venue, as well.
- The Host is responsible for setting up the competition space prior to the event. This includes taping and protecting the floors. The setup must be completed at least four hours prior to the competition start, which should be allocated for in the venue reservation contract. AISC recommends that the venue reservation includes at least 24 hours prior to the competition start time for setup.
- There must be a power source for the scoresheet computer.

Competition Space Layout

Hosts should create a plan of the competition space that shows each station in order to determine if there are any space conflicts and to aid in setup. See [Appendix 1: Sample Competition Layout](#) for an example. This should be reviewed by the Regional Head Judge.

Safety Gear

Before the start of Construction and Vertical and Lateral Loading, judges should verify that all participating team members are wearing proper safety equipment. Proper safety equipment includes



Student dressed in proper safety gear

- Hardhat
- Protective eyewear
- Work gloves
- Construction boots

Lunch

If the competition is expected to run through lunch time, a meal should be provided for the judges, other volunteers and competitors. Judges and volunteers may not have

time to leave the competition floor, so it is recommended that the Host School provides lunch to these people.

Host Preparation

- ❑ Test all competition equipment at least two weeks in advance to ensure that everything is functioning properly.
- ❑ Protect the floor if required by the venue.
- ❑ Set up the competition space at least four hours prior to the event. The Host must have all competition lanes and stations completely ready prior to the start of the competition.

Judge Preparation

- ❑ Review Rules.

2.6 Construction Area Setup

Equipment

At each construction station, set out all equipment. The following items are provided by AISC and should be found in the equipment shipment. The quantities are the required number of items per construction lane.

1	Plywood template for stringer
1	Plywood template for ground clearance (1/2" x 4" x 7-1/2")
1	Wood box for member check
2	2"x4"x 6" Wood block with 25 ft string line
1	Magnet
1	4"-0" Level
1	Flashlight
2	Stopwatch
2	Tape measure (25 ft minimum)
5	Clipboard
1	Roll of tape
1	1/8" x1" x3" Steel bar
1	1/4" x1" x3" Steel bar

Additionally, the Host will need to provide the following new plywood templates for 2022. The quantities are the required number per construction lane:

1	Plywood template for backspan clearance (1/2" x 2'-0" x 1'-10)
1	Plywood template for cantilever clearance (1/2"x 2'-0" x 1'-4")

Tape

The Host should purchase additional tape for the construction lanes. A variety of masking tape, duct tape, and other types can be used to tape the floor. The selected tape should be tested to ensure that it adheres to the competition floor surface but does not damage the floor. Colored tape that contrasts with the floor surface is recommended so that it is easily seen by judges. Clear tape can be used over the masking tape in the footing and river bank areas for protection.

Host Preparation

- ❑ Have the construction site completely ready prior to the start of the competition. This includes setting out the equipment for each stage.
- ❑ Test the equipment in advance to ensure that everything is functioning properly.
- ❑ If the Host is unfamiliar with construction, go to [YouTube](#) and search for "steel bridge competition" to see a variety of construction videos.

The following items should be provided by the Host for each construction lane:

- ❑ (1) Copy of the [Rules and Official Clarifications](#)
- ❑ (10) Data entry sheets printed from the scoresheet (can be printed in black and white)
- ❑ Pencils
- ❑ Tape for marking site layout
- ❑ All items in the equipment list (refer to the tables at the beginning of this section)

2.7 Pre-Construction

Pre-Construction Equipment

The following equipment will be used by the judges during this phase:

- ☐ Tape measure
- ☐ Magnet
- ☐ Wood box for member check
- ☐ Clipboards and pencils
- ☐ Data entry forms printed from the scoresheet

The data entry forms are designed to act as a checklist to confirm that all Rules are reviewed.



Staging area with bridge ready to go

General Information

Once the team begins to move their equipment and materials into the staging area, the judges can start checking all items for compliance with the Rules using the data entry sheets. Everything that goes into the staging area is subject to the Rules. Any noncompliant item will be penalized.

Judges should verify that competitors are wearing the required safety equipment correctly. See the Rules for details.

Competitors are responsible for making sure that all bridge components and construction aids are placed in the staging area as specified in the Rules. Competitors are encouraged to be efficient in laying out their items so as to not inhibit the flow of the competition.

After the judges have completed the check, the team captain is to sign the bottom of the pre-construction checklist. The team captain's signature indicates that they understand and accept any penalties that have been levied. The team captain should be given time to check the Rules and make any appeals necessary to the Head Judge before signing the form.

Common Violations

There are several common violations. Some are design issues and others are either fabrication or erection issues. The following sections are intended to alert the judges and competitors. Read the Rules for complete information.

Member Size Limits

It would appear that the majority of violations to this rule result from designers pushing the specified limits. The judges will try to orient the member in the most advantageous position to get it in the box, but if it doesn't fit EASILY into the box, a penalty is imposed.



Bolt, Nut, and Hole Specifications

Bolts and loose nuts must not be modified in any way (they may be painted) from their purchased condition. Bolts may not be ground to a point on their ends. Nuts may be welded to members. Holes must meet certain requirements specified in the Rules.

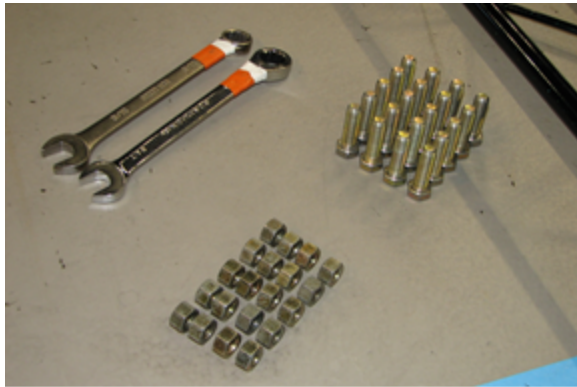
Tool Size

All tools must meet the requirements specified in the Rules.

Item Layout

There are several specific requirements about where particular types of items can be placed. Watch for how competitors lay out their items in the staging yard.

Certain items are to be in designated locations in the staging yard, and nuts and bolts may be in contact with each other. However, every member, tool, loose nut and bolt must be in contact with the ground. In the provided image, some of the nuts and bolts are not in contact with the ground and hence are illegal. This must be fixed before timed construction.



Permissible way to lay out items



Illegal way to lay out items

Appeals

Teams may appeal certain decisions after Construction by following the Rules.

2.8 Construction

Construction Equipment

The following equipment will be used by the judges during this phase:

- ❑ Stopwatches
- ❑ Clipboards and pencils
- ❑ Data entry forms printed from the scoresheet

The data entry forms are designed to act as a checklist to confirm that all Rules are reviewed.

General Information

The team captain notifies the lead lane judge that the team is ready to start. The lane judges verify that the site is ready, and then they start the team with a countdown.

Make sure that two stop watches are in use during construction. If any judge calls out "stop," the stopwatch is paused as well as any activity on the floor. Judges will stop the construction of the bridge if any of the Rules are violated. As specified in the Rules, the team captain is told the reason for the stop work order and is given a short time to consider with the team how they can build the bridge without violating the Rules.

At no time should the judges or spectators make suggestions to the team on how they can comply with the Rules. Judges shall only tell them what the Rules will not allow them to do.

If the team is unable to find a means for constructing the bridge according to the Rules, then the Head Judge is called in to rule the bridge as being ineligible to complete. The Head Judge marks the applicable ineligibility on the construction checklist and has the team captain sign the bottom of the form. If a bridge is ruled as being ineligible, it is removed from the remainder of the competition and does not proceed to the subsequent stations and load tests.

Accidents, as defined in the Rules, do not result in stop time. One lane judge should have primary responsibility for keeping the checklist for construction and will record accidents as they occur. Judges will call out accidents as they occur.

Accidents must be rectified immediately. For example, if a builder drops a fastener in the water, a builder must retrieve the fastener immediately. If a builder has to create another accident by stepping in the water to retrieve the errant fastener they are not

assessed for the necessary accident. If a builder does not move to rectify the accident, then the judge may call the accident again and again until it is rectified. See the Rules for a full explanation of accidents.

Time is complete when the team captain indicates that they are done and the judges ensure that all items and people are where they should be per the Rules.



Team during construction



Team during construction

Appeals

Teams may appeal certain decisions after Construction by following the Rules.

2.9 Post-Construction

Equipment

The following equipment will be used by the judges during this phase:

- ❑ Plywood templates for clearances
- ❑ 1/8"x1"x3" steel bar
- ❑ 1/4"x1"x3" steel bar
- ❑ Tape measure
- ❑ 4 foot level
- ❑ Flashlight
- ❑ Clipboards and pencils
- ❑ 2"x4"x6" wood blocks with 25-foot string line

General Information

Once timed construction is complete, the team can do no more work on the bridge. The judges then inspect the bridge for compliance with the Rules. Any violations are recorded on the judging form. Teams are only allowed to repair certain violations as dictated in the Rules. Certain violations must be fixed. If it is not possible to fix these problems, then the bridge will be ruled ineligible for any awards by the Head Judge and will not be approved for load testing.

Once the judges finish their work, they meet with only the team captain to review the results. If the team captain disputes the findings or asks for clarifications, he/she works with the lane judges to resolve the issues. If the disputes are not resolved, the Head Judge is called in to make a ruling. At the end of this process, the team captain is to sign the bottom of the form which, along with the rest of the judging forms, is moved with the bridge to the next station. Teams may appeal certain decisions after the competition by following the Rules.

Common Violations

There are several common violations that seem to occur. Some are design issues, others are either fabrication or erection issues. The following sections are intended to warn bridge designers and judges of these persistent problems.

Clearance

Clearance requirements are outlined in the Rules, and clearance problems can be common at the competition, as teams feel the need to push these limits.

The clearance is measured with plywood templates. Alternatively, the judges may measure from a taut string line if there is a question of the flatness of the floor. The height and type of this clearance varies from year to year and is likely to be different than shown in the accompanying images.



Plywood templates for passageway and ground clearance checks

Connections

Be sure to read this section of the Rules carefully. We tend to see quite a few violations of these Rules.

Appeals

Teams may appeal certain decisions after Construction by following the Rules.

2.10 Transportation from Station to Station

General Information

While transporting the bridge from the erection site to the loading areas, it is possible that the fasteners may fall out or other damage occurs. If this happens, the marshal or a judge should immediately notify the Head Judge. The bridge may be ruled ineligible to finish the competition.

Care should be taken during transport and staging to ensure that the bridge is not 'preloaded' either by bouncing or other means that would remove as-built slack from the bridge. Marshals and judges should make sure that no one leans or sits on a bridge. At Nationals, if such situations arise, the Head Judge will make the team disassemble their bridge and start over again. There are safeguards put in place to ensure that the rebuild cannot improve on the original performance (but you can do worse!), so don't mess with the bridge!



Competitor sitting on a bridge

Host Preparation

- ❑ When designing the overall competition floor plan, consider the flow of bridges from station to station.

2.11 Lateral Load Station Setup

Equipment

At each lateral load station, set out all equipment. The following items are provided by AISC and should be found in the equipment shipment. The quantities are the required number of items per lateral load station.

1	Lateral load stand
1 set	Rope lanyard, carabiners, and dog collar
1 set	Eye bolt with two different-sized slotted square plates
1	Steel grating (no tabs)
3	Loading angles (25 lb. each)
1	Tape measure (25 ft minimum)
1	Clipboard
1	Laser plumb-bob
4	AAA batteries
1	Roll of tape
4	Paper sway target with 3/4" radius

Host Preparation

- ☐ Review Rules.
- ☐ Have the lateral load stations completely ready prior to the start of the competition.
- ☐ Test the equipment in advance to ensure that everything is functioning properly.

The following items should be provided by the Host for each lateral load station:

- ☐ (1) Copy of the [Rules and Official Clarifications](#)
- ☐ Pencils

2.12 Lateral Load Test

At the lateral load station, the judge makes sure that all team members have the required safety gear. One piece of grating and 75 pounds of load are added to the bridge as specified by the Rules. The judge installs the laser plumb bob and paper target. The competitors may provide lateral restraint to the bridge.

Competitors may provide their own lateral restraint devices to resist sliding. Note that any device used must only prevent sliding and cannot prevent uplift or rotation. The devices must not do damage to the floor. It is most common for competitors to use their feet as the restraining devices.



Lateral load test station



Use of an object (steel angle) to resist sliding

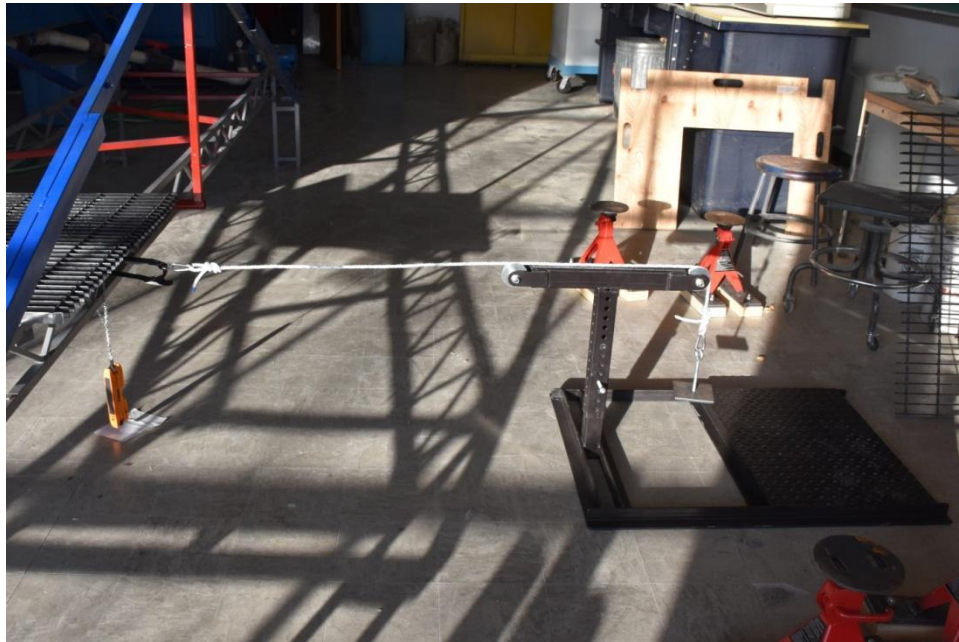


Pushing down on bridge is not permitted



Foot of competitor used to prevent sliding

A pulley system is used to apply the lateral load to the bridge. The lateral load pulley stand should be set up next to the bridge. On one end of the pulley, a dog collar is attached to the bridge stringer. On the other end of the pulley, loading plates are applied by a team member. This person should stand on the stand in order to prevent slip of the pulley stand during loading.



Lateral load pulley stand

Judge Preparation

- ☐ Review Rules.
- ☐ Test the equipment in advance to ensure that everything is functioning properly.

2.13 Vertical Load Station Setup

At each vertical load station, set out all equipment. The following items are provided by AISC and should be found in the equipment shipment. The quantities are the required number of items per vertical load station.

8	Safety support jack stands
4	Steel bearing plates (24" x 24") if needed
2	Steel grating with tabs
100	Loading angles (25 lb. each)
2	Vertical deflection measurement device
1	2"x4"x 4" Wood block
1	Tape measure (25 ft minimum)
1	Clipboard
2	Laser plumb-bob
4	AAA batteries
1	Roll of tape
4	Paper sway target with 3/4" radius
1	2" x 4" x 3'-6" Wood piece
2	C-clamp

Host Preparation

- ☐ Test the vertical deflection measurement devices and replace batteries prior to the competition, per the Equipment Guide.
- ☐ Have the vertical load stations completely ready prior to the start of the competition.
- ☐ Protect the floor if required by the venue.
- ☐ Require that all volunteers working in the loading areas wear sturdy shoes (leather boots are preferred).

The following items should be provided by the Host for each vertical load station:

- ☐ (1) Copy of the [Rules and Official Clarifications](#)
- ☐ (3) Binder clips
- ☐ Pencils

2.14 Vertical Load Test

At the vertical load station, the judge will first confirm that all team members have the required safety gear. The judge then will have the team position the bridge in the loading area.

The load judge will place the safety supports such that the grating will not fall more than a few inches in the event of failure and that the maximum allowed deflection is still permitted. These safety supports are modified jack stands.

Once the safety supports are in place, the load judge will carefully locate the grating on the bridge and have the team apply the preload.

The sway targets and vertical deflection measuring devices are then installed. Initial readings are recorded on the judging form for the load station. The Team Captain should be invited to verify the setup and initial readings.

Loading is done manually by team members, and it should be conducted in a safe, smooth, and continuous manner. Teams should not be allowed to stop the loading to look at gages or develop strategy. All teams should load in the same manner. Judges may stop loading for safety reasons or if the bridge exceeds sway or deflection limits.



Vertical load station

At the end of the load stage, the judge will record the deflection readings and allow the Team Captain to verify the readings.

After the last deflection reading, the team should unload the bridge safely and quickly. Note that the bridge does not pass the load test until it is fully unloaded. If it collapses at any time, the team will be penalized according to the Rules.

Do not touch the deflection measurement devices during loading or unloading. If the devices are compromised in any way by anyone during load testing, then the bridge must be disassembled and the team must start the entire competition sequence again in accordance with the Rules. The reason for this is that the initial loading will take out any slack in the joints; reloading the bridge has the potential to result in smaller deflections than would have been seen in an uninterrupted first loading.

When all is done and recorded, the judge reviews the data form with the team captain. The team captain signs the form when all questions have been resolved, and the forms are given to the marshal who accompanies the bridge to the next station.

Judges Preparation

- ☐ Review Rules.
- ☐ Recommend sturdy shoes to volunteers working in the loading area.
- ☐ Test the equipment in advance to ensure that everything is functioning properly.
- ☐ For safety reasons, do not stick your head or any other body part under the bridge to read gages or for any other reason. Competitors must be encouraged to keep their feet from under the bridge as well. Bridges may fail quickly and without warning.

2.15 Weight Station Setup

Equipment

At each bridge weight station, set out all equipment. The following items are provided by AISC and should be found in the equipment shipment. The quantities are the required number of items per weight station.

1	Clipboard
4	Scales

Additionally, the Host should provide plywood pieces to protect the tops of the scales. Each piece should be 11 x 11 inches and at least 1-in thick.

Weight Station Host Preparation

- ☐ Have the weigh station completely ready prior to the start of the competition.
- ☐ Test the equipment in advance to ensure that everything is functioning properly.

The following items should be provided by the Host for each weight station:

- ☐ Pencils
- ☐ (4) Plywood pieces to protect the top of the scales.

2.16 Bridge Weight Station



Bridge on the scales to measure weight

General Information

The goal at this station is to determine the weight of the bridge to the nearest pound. A scale will be positioned under each leg of the bridge.

The judging forms and scoring spreadsheet have space to record four measurements. The weighing judge should not add up the values. The spreadsheet will compute the total weight.

The team captain should verify all weight measurements and certify the results by signing the judging form. The judging forms are then sent with the team captain to the data entry station, if this is the end of the judging, or to the next station.

2.17 Data Entry Station

General Information

Only the marshal (if assigned) and the team captain should go to the data entry station. The marshal may help resolve any issues with interpreting the handwriting of the judges. A judge should also be assigned to either oversee or actually do the data entry.



Data from score sheets is entered to the computer spreadsheet

It is best if the team captain reads off the data as the computer operator inputs the values. The two of them should verify that all data is entered correctly.

Once the data is input from the judging forms, the data entry person prints out a copy of the results for the team captain to review. The team captain is responsible for verifying that the scoring computations are correct.

Once all concerns are resolved, then the team captain signs the printout and returns it to the data entry person who staples the printout to the judging forms. The marshal is free to go at this point.

An additional copy of the team's results are printed so that the team captain has something to share with the team. An electronic version may also be shared. The team

captain should be informed that the results are not final until a second check is made after the competition.

At the end of the competition, the Head Judge (or someone designated by the Head Judge) should review the judging forms and scoring spreadsheet to double check that all data was input properly. If a discrepancy is found during this later check, the affected Team Captain should be contacted before the awards ceremony.

After the results from all teams have been entered, follow the instructions in the scoresheet to determine the final results.

Submit Scoresheet to AISC

The Host School should submit the completed scoresheet to ssbcscorekeeper@aisc.org by following the instructions in the document. The Rules Committee must have the scoresheet as soon as possible after the competition so that they have a basis for evaluating appeals. Also, AISC cannot send invitations to the National Finals until the scoresheet is received. AISC will post the scores to aisc.org/ssbc.

The judging data forms should be sent with the scoresheet. Once the Host School receives an email confirming that the scoresheet and data forms have been received, they may dispose of any paper copies.

Host Preparation

- ☐ Assign one committee member or trusted volunteer to run the scoresheet table.
- ☐ Locate the data entry station away from prying eyes.
- ☐ Submit the scoresheet and scanned physical judging data forms to ssbcscorekeeper@aisc.org immediately following the competition.

The following items should be provided by the Host for the data entry station:

- ☐ Table and chairs
- ☐ Power source, extension cords, power strip
- ☐ Computer with scoring spreadsheet
- ☐ Printer with paper and ink/toner
- ☐ Pen
- ☐ Stapler with plenty of staples
- ☐ Copy of the [Rules and Official Clarifications](#)
- ☐ Internet (if necessary)

2.18 Awards Ceremony

The awards ceremony can be as simple as a presentation of the awards on the main competition floor or can be part of a larger awards ceremony or banquet as part of the ASCE Student Symposium. In addition to the presentation of the awards, the ceremony should also include an acknowledgement of the sponsors and volunteers.

Plaques

AISC will provide plaques for the competition to be distributed at the awards ceremony. These will be shipped to the Host School to arrive two weeks ahead of the Regional Competition. The Host School should review all plaques upon receiving them to check for any damage during shipping.

There will be a total of 24 plaques:

- 1st, 2nd, and 3rd Place Overall
- 1st, 2nd, and 3rd Place Construction Speed
- 1st, 2nd, and 3rd Place Lightness
- 1st, 2nd, and 3rd Place Aesthetics
- 1st, 2nd, and 3rd Place Stiffness
- 1st, 2nd, and 3rd Place Economy
- 1st, 2nd, and 3rd Place Efficiency
- 1st, 2nd, and 3rd Place Cost Estimation

Venue

Possible venues may include auditoriums, large lecture rooms, and banquet facilities. Seating should be provided for all participants and any sponsors, judges, and volunteers who wish to attend. Depending on the size of the venue, a microphone and A/V equipment may also be helpful.

Host Preparation

- ☐ Review the plaques when they arrive to check for damage during transport.

The following items should be provided by the Host for the awards ceremony:

- ☐ Table for displaying awards. It is recommended that the plaques are organized in the order that they will be announced.
- ☐ Microphone and/or A/V equipment, as necessary.

Part Three

Appendix

Appendix 1: Sample Competition Layout

The following drawing is an example of a competition space layout. The number of stations will vary from region to region.

Appendix 2: Equipment Guide

This guide gives detailed instructions on how to use certain equipment provided for the competition. This document is not a comprehensive explanation of the competition Rules and equipment. Instead, it is intended to highlight equipment that may be new to users.

The Host School should review the guide in order to verify and test the equipment before the competition. The Head Judge should also review this guide in its entirety and share pertinent information with other judges.

Note that the Rules change from year to year. The photos are shown as examples, and bridges may not match the configuration shown for this year's competition.

Appendix 3: Sample Aesthetics Layout

Competition Order

Team #	Competition Order	Team #	Competition Order
1	Brigham Young University	22	University of Alaska, Anchorage
2	University of Colorado Denver	23	Case Western Reserve University
3	Clarkson University	24	North Dakota State University
4	SUNY Canton	25	Arkansas State University
5	University of Connecticut	26	New York City College of Technology
6	University of North Carolina at Charlotte	27	Missouri S&T
7	Norwich University	28	Lafayette College
8	Youngstown State University	29	University of California, Berkeley
9	University of Oklahoma	30	The College of New Jersey
10	University of Florida	31	University of Akron
11	Kennesaw State University	32	Louisiana State University
12	Kansas State University	33	University of Texas at San Antonio
13	Alaska Fairbanks	34	Michigan Technological University
14	Cooper Union	35	University of Wisconsin Madison
15	Southern Illinois University	36	Oregon Institute of Technology
16	West Virginia University	37	Utah State University
17	Louisiana Tech University	38	Drexel University
18	South Dakota State University	39	Purdue Northwest
19	University of Puerto Rico at Mayagüez	40	Texas A&M University
20	University at Buffalo	41	Catholic University
21	Christian Brothers University		

Aesthetics Bridge Set Up Layout



Appendix 4: Construction Lane Taping Plan

This drawing provides guidance on how to tape the construction lanes. It shows which dimensions are critical during setup and which side of the tape dimensions should be taken. Note that one dimension may be reduced by the Host if local conditions cannot accommodate the full length. If this dimension must be reduced, all construction lanes at the event must be the same.

***** COMING SOON *****