



Student Steel Bridge Competition

2022 Compete from Campus Guidelines

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SSBC Compete from Campus

In lieu of in-person events, AISC offers a Compete from Campus option provided it is safe to do so given any restrictions put in place by a team's school. Teams that participate in a Compete from Campus Regional Competition will be eligible to qualify for the National Finals. Wild card eligibility rules will still apply. Visit aisc.org/ssbccompetefromcampus for resources and updates as they are made available.

Questions & Clarifications

John Parucki
National Head Judge
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- Compete from Campus Guide Clarifications and Setup

University Programs
universityprograms@aisc.org

- General SSBC Questions
- Compete from Campus Judge Sourcing Assistance

Questions and clarifications regarding the SSBC rules will still be handled through the normal clarifications process and can be submitted to the Rules Committee through [this form](#).

Virtual Regional Competition

All schools in each region will compete against each other virtually. The number of schools eligible to be invited to the National Finals will follow [Rule 4.4.2](#). Schools must submit their entries to the Host School by the required date.

PLANNING

In order to mimic the conditions of an in-person Regional Competition, all parts of the competition should be completed on the same day. The sequence of events should occur in the following order:

1. Construction
2. Aesthetics
3. Loading*
4. Weighing

*If your team cannot perform construction and loading in the same location due to facilities limitations, the bridge may be moved after Aesthetics to the loading area. Force shall not be applied to the bridge except as necessary to move it. For example, leaning or sitting on the bridge is not allowed between the completion of construction and the end of the Compete from Campus events.

Due to the nature of the Compete from Campus version of the competition, some rules have been adjusted to ensure as much consistency as possible between the teams taking part in the Compete from Campus competition.

APPROVAL FROM SCHOOL

When planning for the Compete from Campus program, teams should ensure that they have received all necessary permission from their school through their faculty advisor to participate in this type of activity. A plan for usage of facilities and personnel as well as policy compliance for safety and health may be needed.

SAFETY

In order to keep participants and judges safe, carefully consider the materials used for decking, safety supports, and load. AISC recommends that teams review construction and loading plans and material purchase lists, with their faculty advisor, campus head judge, lab or facilities manager, and any other relevant parties.

SCHEDULE

The Host School will set a time frame during which all Compete from Campus events must occur and the deadline for submission of records. Records may be due up to a week before the awards presentation in order to give judges adequate time to review submissions and determine final scores and rankings. Construction estimates are due to the Host School before the die roll.

MATERIAL AND EQUIPMENT

Teams are responsible for obtaining any material and equipment needed to participate in the Compete from Campus program. Schools may wish to request assistance from local AISC member fabricators through a [local fabricator partnership](#).

DECKING

Decking should be applied to the bridge to hold the load according to [Rule 12.2](#). Preferred decking is steel bar grating identified as W-19-4 (1" x 1/8"). The dimensions of a unit of grating are approximately 3'-6" x 3'-0" x 1" and the weight is approximately fifty pounds. If the preferred material, bar grating, is not available, an alternate object for decking that is the same width and has adequate capacity may be used. Suggested alternatives include the following:

- 1/4" steel plate
- Plywood - 2 layers 3/4" thick APA RATED SHEATHING (48/24), STRUCTURAL I, OR STURD-I-FLOOR (24 oc)

For lighter weight decking material, additional load should be added to the decking so that the initial load is at least 50 pounds, which is the weight of bar grating.

SAFETY SUPPORTS

Place safety supports under the decking according to [Rule 12.3](#). Alternatives to jack stands used at regional and national competitions are given in [Rule 12.3](#) and include the following:

- Nested stacks of plastic buckets
- Timbers
- Sand bags
- Masonry units



Stacked plastic buckets can be used as safety supports under decking.

LOAD

Any 50 pound and 75 pound load can be used for the lateral load test described in [Rule 11.4](#). Alternatively, the lateral load can be applied by a team member using a spring scale that clearly shows that 50 pounds are being applied laterally to the bridge.

Load used for testing vertical deflection of the bridge shall meet the recommendations in [Rule 12.4](#). Alternatives to steel angles are given in the Rules.

Deflection during vertical loading must be measured although there is no requirement for how deflection is to be measured. The most basic approach could be marking lines on a measurement stick after the preload has been placed on the bridge. These lines represent the initial position of the bridge. Once fully loaded, another set of lines are marked on the measurement stick to represent the fully loaded position of the bridge. The measured distance between these lines represents the deflection of the bridge. A line indicating the maximum vertical deflection limit of 2 ½ in. may be used as a guide during loading to easily verify compliance during the loading process.

Other methods may be used but should remain stable and functioning through the lateral sway that occurs during the vertical loading process. Devices like plunger type dial calipers and other similar types must use a measuring surface on the bridge or decking that is flat and much larger than the ¾ in. maximum sway allowed during

loading. Beware that if the measuring system is compromised by losing contact with the bridge due to movement during the test, then the bridge must be rebuilt and tested per [Section 11.5.4](#) of the Rules. Whatever method is used, it is important that the deflection measurement is presented to the hundreds of an inch, be as accurate as possible, and be safe for the judges to use.

JUDGING

PREPARATION

Appoint one to three judges at least one month before the Compete from Campus event. These may be professors, local engineers, steel fabricators, or others familiar with the competition rules. The judges can be affiliated with the team's school but cannot be a member of the SSBC team. Appoint one of the judges as the campus Head Judge who will sign the certification attesting that all rules were followed to the best of their knowledge. The team's faculty advisor may serve as a judge only if all other options have been exhausted.

Assistance from AISC

If a team is struggling to find a local volunteer to serve as campus Head Judge, AISC will assist them. To request assistance from AISC, teams should email Kristi Sattler (sattler@aisc.org). Once requested, AISC will notify local AISC members to contact the team captain if interested.

Commitment

The campus Head Judge position is expected to require the following time commitment:

- Review of rules and guidelines (~2 hours)
- Pre-competition planning with team (~2 hours)
- Review online training materials for judges (1 hour)
- On campus competition facilitation (~5 hours)

Training

AISC will provide online training materials for judges in February prior to the competition.

DOCUMENTATION

The official Compete from Campus competition judging form packet can be printed using the SSBC Scoring Spreadsheet which is available for download on the AISC [SSBC website](#). The competition judging forms should be filled out by the campus Head Judge. These forms are used to capture contact information for the competing school and to document construction, loading, and weighing phases of the competition.

Page 8, "Team Contract Fine - National Competition Only", can be ignored and does not need to be filled out. It is important that all information be written clearly.

Compete from Campus competitions require that the campus Head Judge and Team Captain read and accept the competition "Honor Code" before submitting their completed judging form packet. Honor code forms for each person can be found on pages 9 and 10 of the competition judging form packet.

The Team Captain should provide a copy of the completed judging form to the campus Head Judge for later reference in case AISC has any questions. This may be in electronic or paper form.

CONSTRUCTION

Construction will take place in the same manner that it would for an in-person Regional Competition and is based upon the regulations specified in [Section 10](#) of the Rules. Bridge members, tools, nuts, and bolts are staged for construction and inspected by the judges (see [Section 8](#) and [Sub-Sections 10.2.3, 10.2.4, 10.2.5, and 10.6](#) for details). Timed construction will be observed by the judges and should be recorded on video. Judges inspect the assembled bridge per [Section 9](#) of the Rules and allow for corrections as described in [Section 9.4](#) of the Rules.

PREPARATION

A relatively flat open space is required for construction with minimum dimensions of 53 feet by 15 feet. This space can be indoors or outdoors with no specific restriction on the type of flooring. However, be aware that some types of floors have the potential to be damaged during the bridge construction process.

Mark out the construction site on the floor or ground. The 2022 [Host Guide](#) contains instructions on how to mark the site with tape. Use the Site Plan for Virtual Participation found at the end of this document. The transportation zone on the cantilevered side of the bridge (see NOTE 2 in [DWG 1](#) of the Rules) has been shortened to 10'-0" for all teams Competing from Campus to maintain consistency and to facilitate finding a facility that can fit the site. The campus judge(s) shall verify site plan markings prior to starting the event.

PERFORMANCE

Construction will be evaluated in the same manner as it would during an in-person Regional Competition. The judge(s) shall complete all pre-construction checks to ensure that bridge members, tools, nuts, and bolts are compliant with the rules prior to the start of construction (see [Section 8](#) and [Sub-Sections 10.2.3, 10.2.4, 10.2.5, and 10.6](#) for details). The judges will commence timed construction, watch for violations of safe construction practices, assess penalties associated with accidents and maintain the official construction time ([Section 10](#)). After timed construction, structural specifications ([Section 9](#)) will be checked by the judge(s).

Measuring tapes, rules, levels, and handmade templates should be used to check for dimensional requirements to the best of the judge'(s) abilities. Templates can be made out of any fairly rigid material such as a stiff cardboard, if needed.

DOCUMENTATION

A wide frame video that captures the whole construction site shall be taken from the start of timed construction to the completion of inspection of the bridge.

The campus Head Judge should complete the appropriate sections of the judging form.

AESTHETICS

Aesthetics will be judged based on the bridge's appearance and the poster describing the design of the bridge. The poster must meet all of the requirements specified in [Section 6.2.1.2](#) of the Rules but will be submitted electronically. The bridge's appearance will be judged based on a series of photos taken by a team member immediately after completion of the construction event so as to capture the bridge in its as-built state. The bridge's appearance will be judged on the basis of [Rule 6.2.1.1](#). Judging for Aesthetics will be completed by a panel of regional judges after all teams have submitted their competition packages so that the same set of judges can evaluate all of the bridges in the region.

DOCUMENTATION

Submit a PDF file of your poster.

Submit the following photos of your bridge with your competition package. The photos must be taken immediately after the completion of the construction event.

- North, south, east, and west elevations
- Overhead photo (does not need to be directly overhead)
- One of each connection type

LOADING

Accuracy and availability of measurement equipment cannot be guaranteed across all teams. By participating in the Compete from Campus competition, teams accept the loss of consistency that occurs when teams are not judged using the same equipment.

Safety is the main priority during load testing. Safety precautions provided in [Section 11.1 and 11.2](#) of the Rules shall be followed for all load testing. The judge(s) have ultimate authority to stop load testing if it is deemed unsafe for any reason. If the testing is deemed unsafe, the bridge will only be eligible for the Aesthetics award and will be deemed to have failed the load test event.

PREPARATION

A relatively flat surface with dimensions larger than the bridge is required for load testing. Due to the potential for damage to the floor as a result of bridge failure or dropping of any weights, it is suggested that plywood or other protective material be used to cover the floor in the area where load testing will occur. Steel plates of the same thickness can be used under the four footings of the bridge to provide a rigid bearing surface.

The lateral load test can be conducted using any system that can apply a 50 lb horizontal load. The application of the horizontal load can be accomplished through the use of a pulley system allowing the 50 lb load to hang vertically (see the 2022 [Host Guide](#) for the device used for Regional Competitions) or through a spring scale that is attached to the top of the stringer and pulled horizontally to maintain 50 lbs of force. A plumb bob will be required to ensure that the sway does not exceed 0.75 in.

The vertical load can be applied using any materials that will fit in a stable manner on the decking of the bridge such that a load of 1,700 lbs can be added to one bridge deck and 800 lbs can be added to the other bridge deck. Possible materials used for loading may include but are not limited to steel angles, sand bags, and concrete blocks.

All Compete from Campus teams will apply load at locations corresponding to the die roll. The die roll will be announced by the Host School approximately two weeks before the submissions are due.

Use the [Vertical Load Test Plan for Compete from Campus Competition](#) for details in regards to where bridge decking should be placed and vertical deflection checked.

Note that safety supports shall be positioned so that no portion of the load will drop more than approximately 4 in. if the bridge collapses. The safety supports should support the bridge decks in multiple locations so that in the event of the bridge collapsing, the potential for the weight sliding off of the decking is limited.

PERFORMANCE

Lateral and vertical loading will follow the same procedures provided in [Section 11](#) of the Rules.

The lateral load test shall follow the procedure outlined in [Section 11.4](#) of the Rules. The use of a plumb bob attached to the location where the lateral load is being applied and centered on a 1 ½ in. diameter circle taped to the floor prior to the application of the load will provide a straightforward means of determining whether the ¾ in. maximum sway requirement is met.

The vertical load test shall follow the procedure outlined in [Section 11.5](#) of the Rules. The sequence in which the load is applied is specified in [Section 11.5.3](#) of the Rules. This loading sequence shall be followed as closely as possible at the discretion of the judge. Prior to loading, a means of vertical deflection measurement in both required locations shall be put into place. Loading shall be stopped immediately if the deflection exceeds 2 ½ in., a decking unit or some of the load falls off the bridge, or the bridge collapses or a dangerous collapse is imminent in the opinion of the judge. If loading is stopped for any of these reasons, then the bridge is deemed to have failed the vertical load test. Deflections causing (i) the bridge to touch safety supports or the floor, (ii) rupture of a member, weld, or bolt, (iii) slip in an interlocking connection, (iv) buckling, and/or (v) excessive side sway are all conditions that will prompt the judge to declare the bridge unsafe and loading will be stopped.

DOCUMENTATION

Submit a video that captures the lateral and vertical load test.

The campus Head Judge will record vertical deflection measurements on the judging form.

WEIGHT

Bridges are weighed immediately after the load test event. All bridges shall be weighed, including those that fail one of the load tests.

PERFORMANCE

Weigh the bridge. The use of four scales, with one placed under each footing, provides the optimal means for measuring the total weight of the bridge. The weight at each footing shall be recorded. If it is impractical to weigh the entire bridge at one time, its individual parts may be weighed and summed to obtain the total weight of the bridge.

DOCUMENTATION

Enter the weight of the bridge on the judging form.

SCORING

For the Compete from Campus Competition, the competition categories of aesthetics, construction speed, lightness, stiffness, construction economy, construction efficiency, and cost estimation will be applied as stated in [Section 6](#) of the Rules.

HONOR CODE

PERFORMANCE

The team certifies that the rules were followed to the best of the judges' and team's knowledge, and all observed violations were recorded on the judging forms.

DOCUMENTATION

The campus Head Judge and Team Captain should sign the certification statement included in the judging form.

APPEALS

A penalty, decision, measurement, score, condition of competition, or interpretation of rules may be appealed only by the captain and only to the campus Head Judge. The campus Head Judge will not hear the appeal if he or she is approached by anyone other than the captain.

The appeal must be made as soon as possible after the situation becomes apparent. The campus Head Judge will hear the appeal as soon as possible and may interrupt the competition. If the captain does not consent to the decision of the campus Head Judge, the captain shall write an explanation on the data form before signing it. Participants are reminded that civility and ethical behavior are expected during the competition and particularly concerning appeals.

The SSBC Rules Committee will only consider those appeals that allege errors in interpretation of rules, and only if those appeals were made to the campus Head Judge during the Compete from Campus event.

DOCUMENTATION

Appeals should be submitted along with the competition records following the procedure in [Section 15.1.3](#) of the Rules.

SUBMISSION

The appeal must be made within two days after the conclusion of the competition event. The appeal will be forwarded to the SSBC Rules Committee for their evaluation. The only redress that may be made is an invitation to participate in the National Finals if the SSBC Rules Committee is convinced that the appeal is valid and that the appealing team should have qualified for the National Finals.

RECORDS

Submit your records to AISC through the Host School.

Record a video to document the construction and load testing portions of the competition. Be sure to record your video in landscape mode for a full view of the construction site. Post the video on YouTube or another platform that can be accessed by the judges. In order to keep the video private, you may change the viewing setting to unlisted so that only those with the URL can view it. Submit the URL.

Submit a scanned copy of the completed judging form that has been signed by the campus Head Judge and Team Captain.

Records to Submit

Your submission should include:

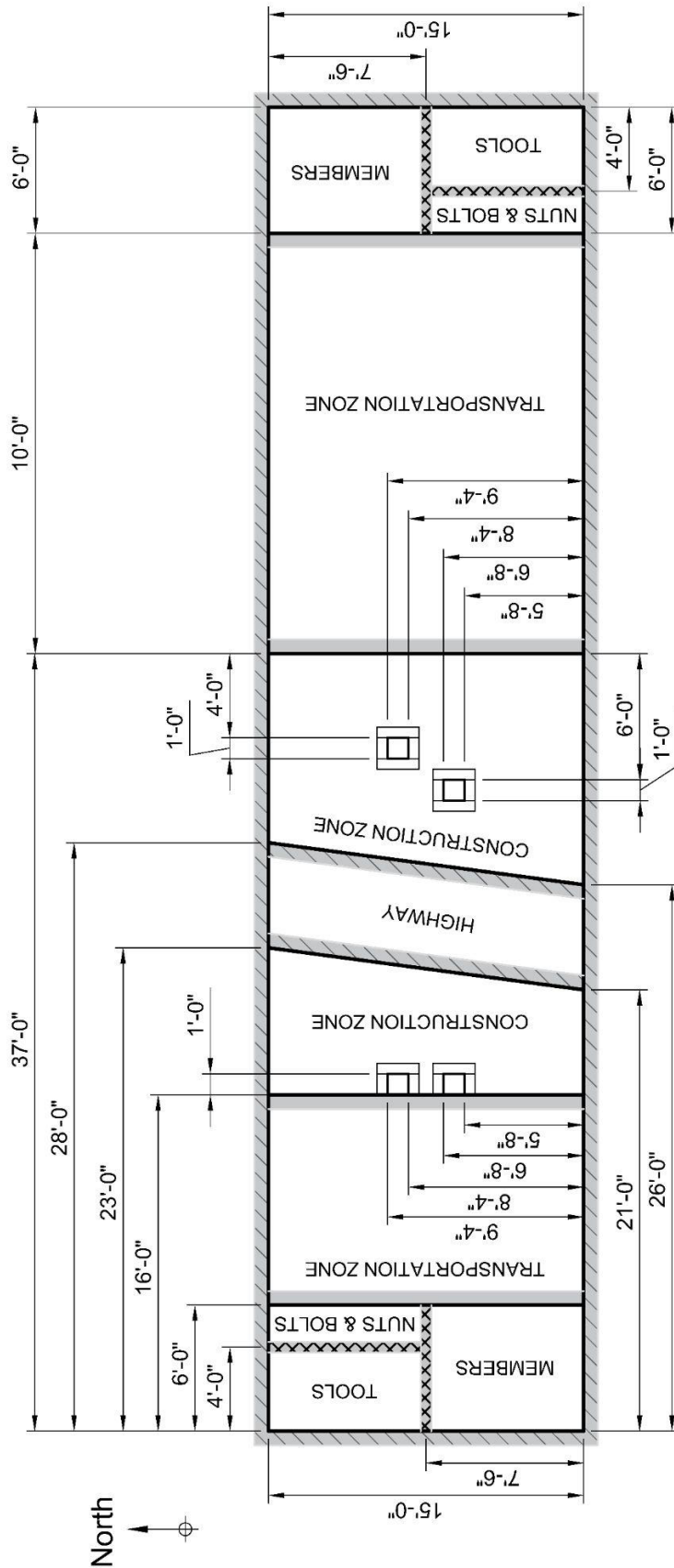
- Video URLs of the competition:
 - Construction (*landscape required*)
 - Lateral load test
 - Vertical load test
- Judging Form (PDF)
 - Construction
 - Loading
 - Weight
 - Certification statement signed by the Head Judge and Team Captain
- Aesthetics Poster (PDF)
- Aesthetics Bridge Photographs (.jpg or .png format)
 - North, south, east, and west elevations
 - Overhead photo
 - One of each connection type
- Any other information requested by the Host School

APPENDIX

1. Preparation Checklist
2. Construction Lane Taping Plan

PREPARATION CHECKLIST:

- Find Suitable Venues:
 - [Construction](#) (& Aesthetics)
 - [Loading](#)
- Gather Competition Materials:
 - Online References:
 - [2022 Rules & Clarifications](#)
 - [Compete from Campus Guidelines](#)
 - [Site Plan Diagram](#)
 - [Taping Plan](#)
 - Printed Materials:
 - Judging Forms
 - Honor Code Certification Statement
 - [¾" Radius Target](#)
 - Construction, Loading and Weight:
 - [Passageway](#) template
 - Tape measure
 - Magnet
 - 3'-0" level ([Rule 9.3.7](#))
 - 2 Timers (Phone may be used)
 - Tape for site layout
 - [Safety Supports](#)
 - [3'-0" x 3'-6" Decking](#) (2)
 - Method of checking member dimensions ([Rule 8.2.2.2](#))
 - [2,500 lbs of Loading Weight](#)
 - [Method to monitor vertical deflection](#)
 - Plumb bob
 - [Method to apply 50lb. lateral load](#) (ex: fish scale)
 - [Load Bearing Plates](#) (*optional*)
 - [Scales](#) (4 is ideal. Minimum of 1 required)
- Review construction and loading plans and material purchase lists with Faculty Advisor, campus Head Judge, lab or facilities manager, and any other relevant parties
- Receive all necessary permissions from school through Faculty Advisor
- Confirm one to three campus judges within one month of the event. Appoint one of the judges to be the campus Head Judge.
- [Camera to record competition submissions](#)
- Submit all documentation by Host School's deadline



▬	Bridge out of bounds (i.e. builder can step on tape but bridge cannot touch tape)
▨	Out of bounds (i.e. stepping on tape is a penalty)
▩	Dimensions to CENTER of tape. Builder can step on tape but parts cannot touch tape during construction
—	Edge of tape line

2022 SSBC COMPETE FROM CAMPUS - TAPING PLAN

*Use diagonal measurements to check square