Asia & Japan Steel Bridge Competition 2026

Rules 1.0

1. Introduction

The Asia - Japan Joint Steel Bridge Competition (ASBC & JSBC2026) is a competition where students design, fabricate, and erect a bridge themselves to experience the true joy of "Monozukuri" (making things).

The objectives of the competition are as follows:

- To cultivate basic engineering knowledge application and problem - solving skills through the competition ("Monozukuri").
- To foster a spirit of cooperation among students and participants.
- To promote interaction between students across different teams and schools.
- To learn design and fabrication techniques and kno wledge from seniors, faculty, and other teams.

[Notes on Venue Use]

- Safety shoes must be worn during erection and loading.

1.1 Competition Overview

1.1.1 Each team must design a bridge in accordance with this rulebook.

1.1.2 The competition consists of four categories: "Construction Competition," "Aesthetic Competition," "Presentation Competition," and "Loading Competition."

1.1.3 Evaluations will be conduc ted for five categories: "Construction Points (Construction Category)," "Structural Points (Structural Category)," "Aesthetic/Design Points (Aesthetic Category)," "Presentation Points (Presentation Category)," and "Overall Points (Overall Category)," using the methods specified in Section 4.1.

1.1.4 For the Construction, Structural, Aesthetic, and Presentation categories, the top two teams with the fewest points (the top two with the most votes for Aesthetics, and the top two with the highest points for Pr esentation) will be awarded. For the Overall category, the top three teams will be awarded.

1.1.5 Participating students from universities and National Institute of Technology in Japan must be covered by their schools' "Personal Accident Insurance for Stud ents Pursuing Education and Research (Gakkensai)" or individual accident insurance. Participants from abroad are required to purchase travel insurance that includes coverage for injuries. Please note that credit card travel insurance is generally inadequat e and should not be used as a primary policy. The organizers take no responsibility for any injuries occurring during the competition, including the fabrication stage.

1.2 Definition of a Bridge

1.2.1 In this rulebook, only those that satisfy the following conditions are defined as a bridge:

(1) The bridge must comply with the basic conditions shown in Section 2.1.

(2) The bridge must satisfy the lateral stability check shown in Section 3.2.10.

(3) In the loading competition, the bridge must be capable of being loaded without the "collapse" designated in Section 3.4.6.

1.2.2 Any bridge that does not satisfy the conditions in 1.2.1 will be disqualified from the Construction, Structural, and Overall categ ories. For the Aesthetic category, votes will be multiplied by 0.8, and for the Presentation category, points will be multiplied by 0.8 before evaluation.

1.3 Ensuring Safety

1.3.1 Safety is the highest priority, and sufficient consideration must be given to safety in all processes related to the competition.

1.3.2 Safety in the Design Stage: The bridge, each member, and the joint structures fabricated by the participating teams must all follow the provisions of this rulebook and be designed to have a safe structure.

1.3.3 Safety in the Fabrication Process: In all fabrication stages, students must have a thorough understanding of the use of tools and power machinery for welding, cutting, grinding, drilling, etc., and must work with the utmost care. Fabricati on must be carried out after reviewing the safety management manuals of each school and receiving safety education.

1.3.4 Safety on the Day of the Competition:

(1) Long pants, gloves, helmets, safety goggles, and safety shoes must be worn appropriately.

a) Fingerless gloves or extremely thin gloves (for cooking or medical use) must not be used (Photo 1.1).

b) Protective clothing such as long pants and gloves must be prepared by each individual.

c) Participation in inappropriate attire, such as wearing sanda ls or shorts, is not permitted.

d) If the participant wears glasses, wearing safety goggles is not required.

(2) If the judge determines that a builder or loading worker is about to perform a dangerous act, the judge has the authority to order the suspensi on or, in some cases, the cancellation of the competition.

1.3.5 Erection acts that lack consideration for safety in the construction competition, or bridges that cannot be safely loaded using the decks and weights lent by the organizers in the loading competition, may be subject to deliberation even after the competition and may result in penalties determined by the Competition Organizing Committee. If the act is malicious, it may result in

disqualification.

Photo 1.1 Too thin gloves

---

2. Bridge Design Conditions

2.0 Background Setting

The target area features a rias coastline facing the Sea of Japan, with several settlements and fishing ports scattered around the mouths of rivers flowing into the bay. Movement between these communities currently depends on roads that take significant detours around the rivers and inlets. The resulting long travel times have become a major challenge for daily life, tourism, and fishing activities. To address this issue, a plan has been established to cons truct a new bridge that crosses the river mouth and directly connects these areas.

The river mouth is contiguous with the bay and is a hub for active fishing operations, with many vessels navigating the area daily. Therefore, the bridge must provide suffic ient vertical clearance beneath the structure to ensure it does not obstruct the passage of fishing boats. Furthermore, as the target area is a scenic region surrounded by the coastal landscapes of the Sea of Japan and rolling mountain ranges, the newly co nstructed bridge is required to feature an aesthetic design that harmonizes with the surrounding natural scenery.

Based on these conditions, this competition focuses on the production of a bridge model for a single-span bridge crossing a river mouth. On th e day of the competition, the bridge models will undergo assembly, exhibition, and load testing. Participants will be comprehensively evaluated on structural performance, constructability, and aesthetic quality.

2.1 Basic Conditions

2.1.1 The erection sit e is a rectangular field measuring 11m in length and 2.5 m in width.

1. A 1.8 m wide navigation channel is located near the center of the bridge span for vessel traffic.

2. The boundaries between the river, navigation channel, riverbank, staging yard , piers, and the overall erection site are as shown in **Figure 2.1** .

2.1.2 The bridge must be installed upon the piers.

2.1.3 From the completion of the construction competition until the commencement of the loading competition, no part of the bridge shall protrude below the top surface of the piers. Over the navigation channel, a clearance of at least **350 mm** must be maintained between the top surface of the piers and the lowest point of the bridge (refer to **Figure 2.4 (b)**).

2.1.4 Piers are fixed at designated positions and cannot be moved.

2.1.5 At all times after erection, the bridge must remain in contact only with the top surfaces of the four piers at all times, including during loading. Furthermore, for each individual pier, a portion of the contact area between the pier and the bridge must be within the designated range **(Figure 2.3)** .

2.1.6 The bridge must be capable of supporting the loads under the conditions specified in Section 3.5.

2.1.7 Piers are fixed at the intervals shown in **Figure 2.2** (4600 mm longitudinally and 1000 mm transversely). Refer to **Figure 2.3** for the specific shape of the piers used in the construction competition.

2.1.8 The bridge must maintain a clear, unobstructed "vehicle traffic space" for two lanes (each lane: 325 mm wide × 300 mm high) over the entire length of the bridge (at least 4000 mm), considering both longitudinal and transverse gradients of the road surface (**Figure 2.4**).

2.1.9 No gradient shall be applied to the vehicle traveling surface. (Forms with a graded road surface, such as an arched " Drum bridge " style, are prohibited.)

2.1.10 The bridge must be designed to hold a wooden deck for weight loading (600 × 600 × 50 mm; hereinafter referred to as the "deck") at the designated location. Note that the wooden deck used on the day of the competition will be a "stringer pallet," with the stringers oriented perpendicular to the bridge axis.

2.1.11 A deck must be stably supported by two cross beams and must not come into contact with the bridge at any point other than the cross beams.

The deck must be stably supported by two floor beams and must not come into contact with any other part of the bridge. These two floor beams under the deck must be positioned at a distance of 200 mm from the center of the span on each side (**Figure 3.3**).

2.1.12 Cross beams must be at least 650 mm in length. The cross beams supporting the decks must be transverse members perpendicular to the bridge axis.

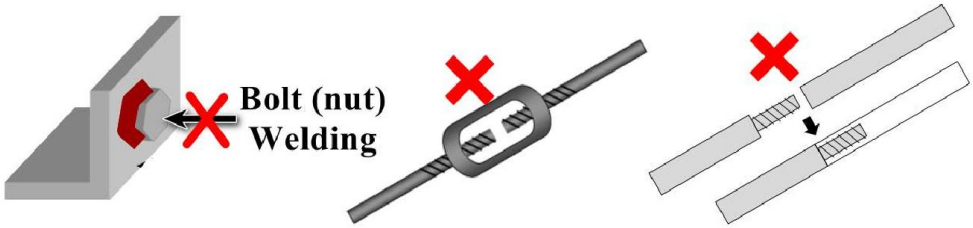
2.1.13 A minimum of six (6) cross beams, including those directly under the decks and the end cross

beams, must be installed within the bridge.

2.1.14 During the on-site erection phase, the bridge must be assembled using only fasteners (bolts, nuts, and washers), wire connectors, and turnbuckles.

1. Welding or bolting may be used during the fabrication phase, but the use of welding at the erection site is strictly prohibited.
2. Connections using only bolts and nuts are permitted; washers are optional. Integrated fasteners (e.g., flange bolts/nuts) are permitted. The use of spring washers is prohibited.
3. Each team must prepare their own tools (spanners, ratchets, adjustable wrenches, podgers, etc.).
4. Power tools (battery-operated or external power) cannot be used during the erection phase.

2.1.15 No threading shall be applied directly to the members.



2.1.16 The bridge must be fabricated using steel.

1. For the purposes of this competition, "steel" is defined as an alloy steel exhibiting ferromagnetism. Aluminum and stainless steel are prohibited.
2. Steel materials with a minimum specified tensile strength of 500 N/mm² or higher (JIS) must not be used.
3. The use of soldering or brazing for joining steel is not permitted.
4. Painting, stickers, and other decorations may be applied to the bridge.

2.1.17 Except for the wire rope members specified in 2.1.18, members must maintain a constant shape and dimension during and after erection.

1. A single member must fit within a volume of either **150 × 150 × 800 mm** or **300 × 300 × 200 mm**, and its weight must not exceed **10 kgf** (see **Figure 2.5**).
2. Pre-assembled units (via welding or bolting) are considered a single member if they fit within these dimensions. These connections must not be loosened or removed during the competition.
3. Members and "construction blocks" (pre-assembled units of multiple members) must undergo only negligible changes in shape or size due to deformation during construction and loading.

2.1.18 Temporary members may be used during erection.

1. Temporary members are permitted for purposes such as temporary fixation.
2. Temporary members must not touch the river or riverbank (e.g., bents are prohibited).
3. Temporary members must be clearly labeled "Temporary Member".

4. No temporary members shall remain attached to the bridge at the finish of erection.

2.1.19 The bridge must be assembled using all members prepared in the staging yard . Fasteners, tools, and temporary members may remain in the yard.

2.1.20 No electrical, electromagnetic, hydraulic, or other mechanical sensors or control systems shall be incorporated into the bridge. (Examples: wires, conduits, batteries, motors, pistons, pressure vessels, pre-loaded springs, etc.)

2.1.21 After bridge erecti on is complete, no energy or impact shall be applied to the bridge.

(1) Examples include, but are not limited to: exerting mechanical, magnetic, fluidic, or any other physical forces; emitting sound, light, magnetic waves, vibrations, or light waves; tran sferring heat via conduction or convection; and conducting electrical currents.

(2) This excludes forces necessary for competition management (such as those related to loading tests or the relocation of bridges) and external factors or environmental change s beyond the participants' control (such as wind, ambient temperature, or sunlight).

2.2 Other Conditions

2.2.1 Any bridge type is acceptable provided the basic conditions are satisfied.

2.2.2 Connection structures where members are likely to slip out, separate, or fail easily are prohibited to ensure safety during loading.

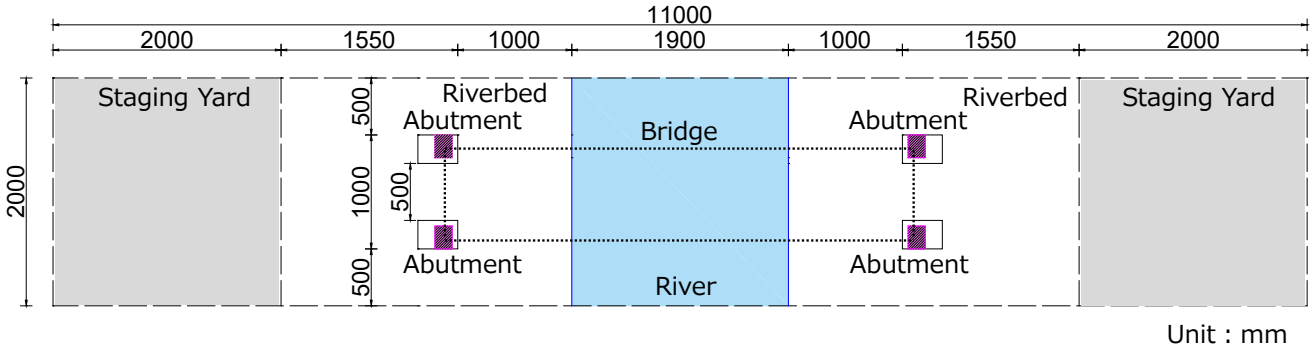


Figure 2.1 Construction site

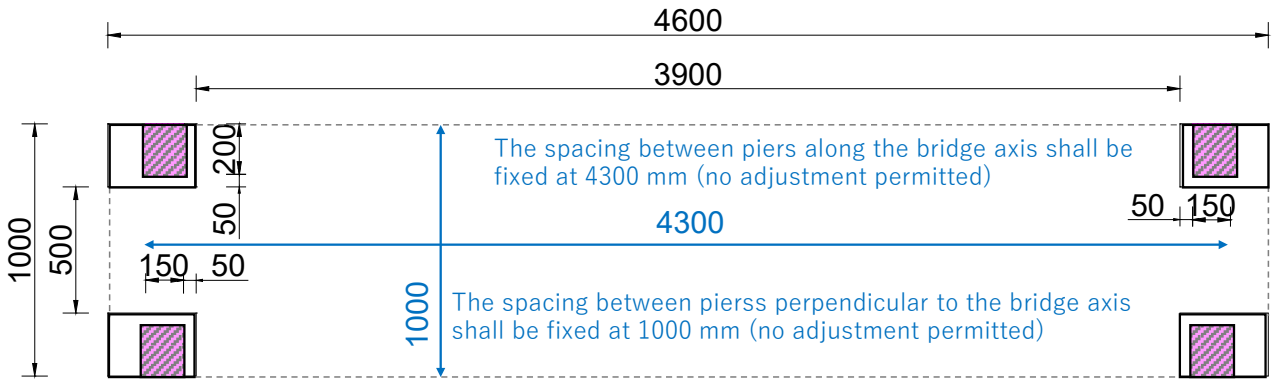


Figure 2.2 Pier placement and bridge Installation positions (Unit: mm)

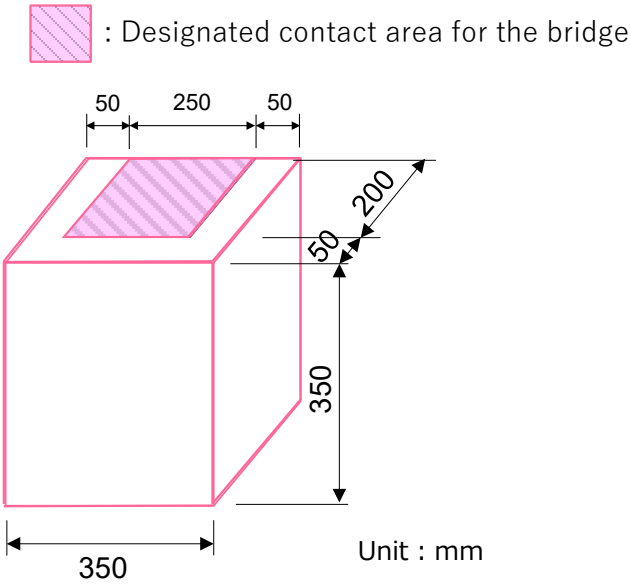
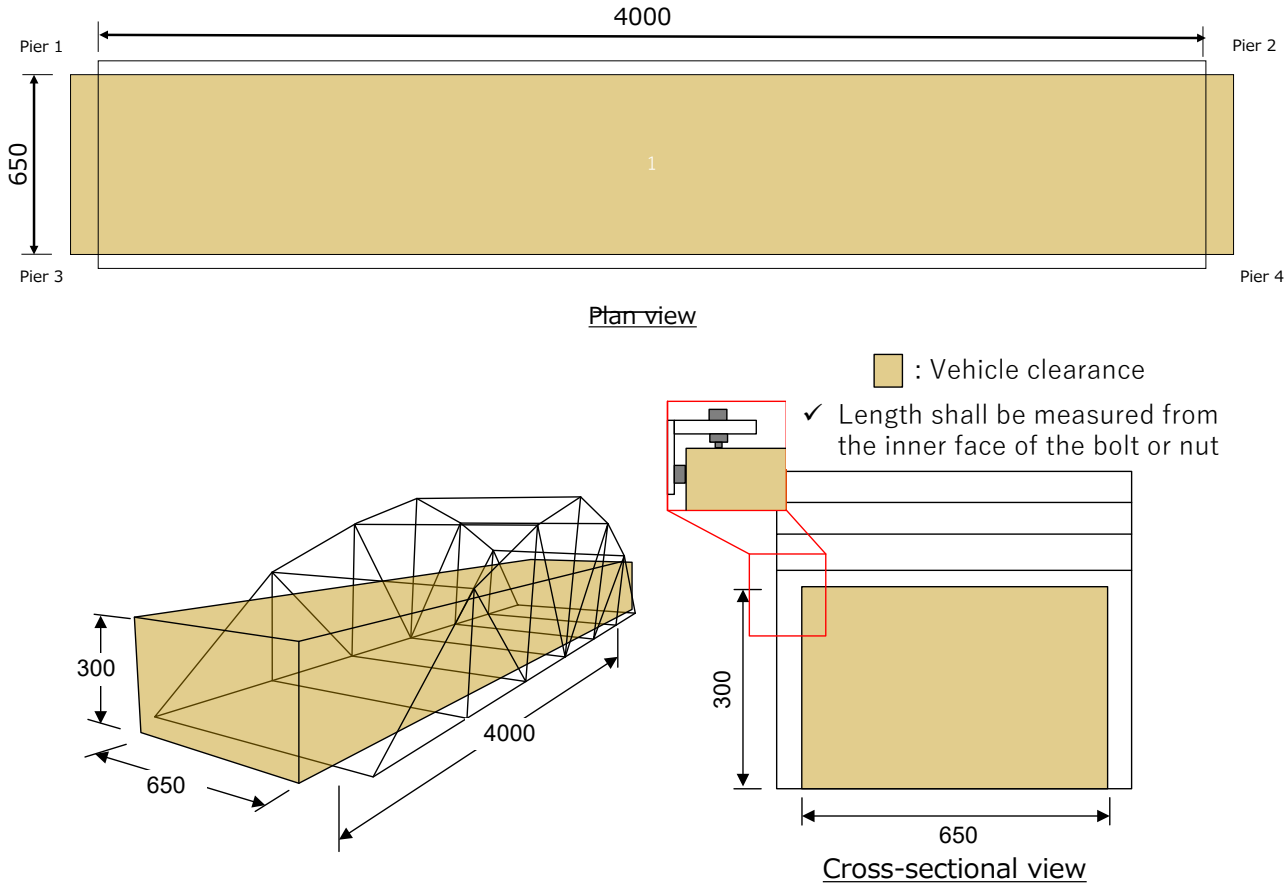
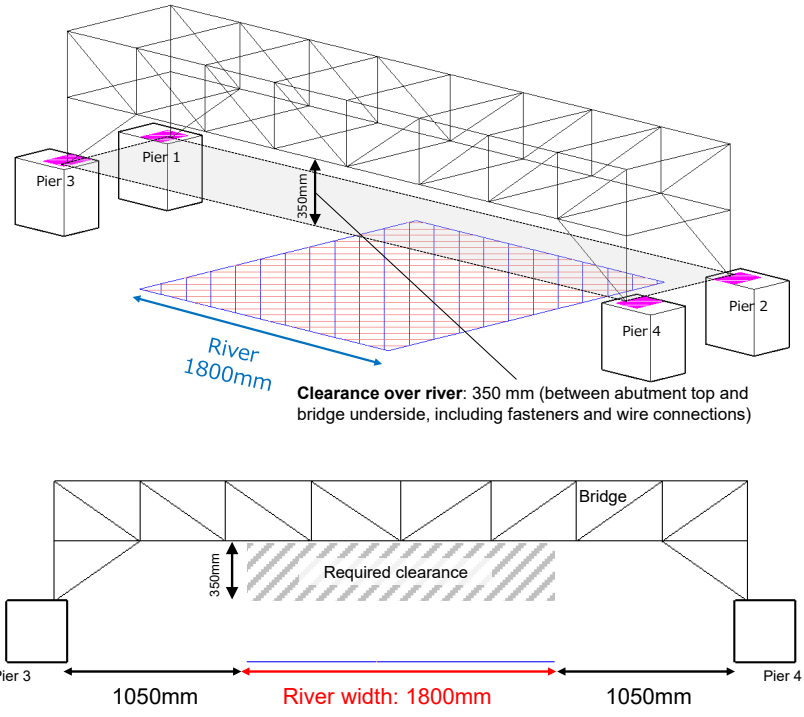


Figure 2.3 Pier dimensions for the erection competition and designated contact areas for the bridge. The bridge must be touched to the pink area of the pier after the construction. Bridge member must **not** touch the pier except the pink area

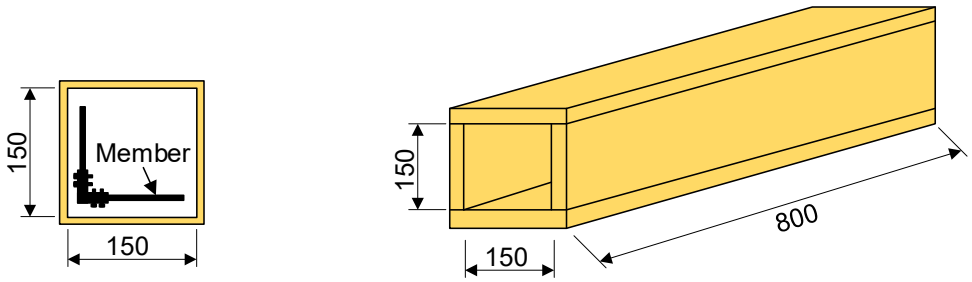


(a) Vehicle clearance

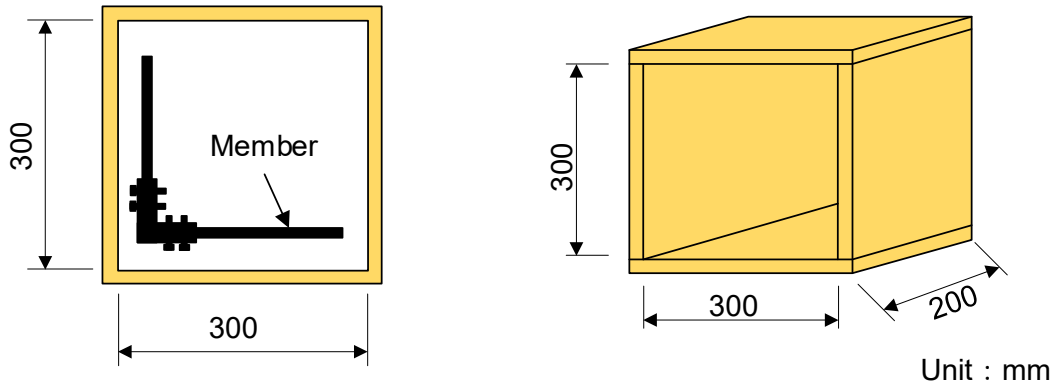


(b) Clearance over the river (Top: Bird's-eye view; Bottom: Side view)

Figure 2.4 Vehicle clearance and vertical clearance over the river



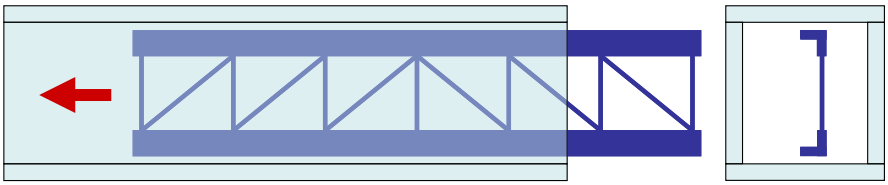
Box A to check the size of a bridge member



Unit : mm

Box B to check the size of a bridge member

Inspection of member dimensions



All members must fit completely within any one of the specified boxes.

Cross section

Figure 2.5　Dimensions limits

---

3. Competition Overview and Procedures

3.1 General

3.1.1 Participating teams must pre‐register the team name, builders (erection workers), and a site supervisor.

3.1.2 One team leader shall be selected from among the builders.

3.1.3 One site supervisor may be arranged separately from the builders.

1. The site supervisor may provide advice regarding the erection work.
2. Observers and visitors, including faculty members (excluding builders and the site supervisor), must observe from outside the erection site and are prohibited from giving specific

instructions or safety warnings to the builders.

3.1.4 The team leader must attend the Captains' Meeting held prior to the competition.

1. At the Captains' Meeting, the compliance of the bridge with these rules will be verified.
2. The competition subcommittee will facilitate the meeting, proceeding in a Q&A format with each team leader.
3. Matters not specified in these rules will be discussed and decided upon during the meeting.

3.1.5 No protests or questions will be accepted after the conclusion of the Captains' Meet ing; the judging panel will make decisions as appropriate. Cases that may violate erection/loading rules or acts lacking safety will be subject to deliberation by the Competition Organizing Committee.

3.2 Construction Competition

3.2.1 Judges will measure the time required for bridge erection and any necessary repairs.

3.2.2 The time limit for erection is 30 minutes. If this limit is exceeded, erection must be halted.

3.2.3 If the time limit is exceeded, builders and the bridge must be moved outside the ere ction site. Subsequently, builders may complete the assembly outside the designated co nstruction site.

3.2.4 Pre-competition Inspection: Immediately before the competition, judges will perform the following checks and provide safety guidance:

1. Member Size Inspection:
   a) Judges will randomly select members to verify they fit within the boxes (150×150×800 mm or 300×300×200 mm).
   b) Use of temporary members must be declared to the judges in advance.
2. Verification of Builders:
   a) Builders are divided into " Ground builders " and "Barges."
   b) The maximum number of builders (total of ground builders and barges) is seven (7).
   c) Builders must carry their own protective equipment (helmets, safety glasses/goggles, gloves, safety shoes) and tools.
3. Verification of Site Supervisor:
   a) A maximum of one (1) site supervisor is permitted.

3.2.5 Start and Completion of Erection:

(1) Erection start s:

a) Only members, fasteners, tools and temporary members may be placed in the staging yard. Small containers (e.g., paper cups) containing only fasteners are permitted.

b) All items must be placed on the ground.

i. Members and temporary members must not be pre-connected or touching each other. Tools must not touch fasteners.

ii. Fasteners (bolts, nuts, washers) may touch each other in the staging yard.

iii. Tools must not be kept in pockets, pouches, or cups (though empty pouches/cups may be worn).

c) Ground builders must wait in the staging yard with hands off the members.

d) Barges must wait within the river area (including the navigation channel). Tools must be

handed over by Ground builders after the start.

e) The judge will declare the start and begin timing after confirming all items above.

(2) Time measurement will be paused if:

a) An act potentially causing injury is observed.

b) A violation of safety management rules is observed.

c) Once corrected, builders and materials will be returned to their state prior to the pause, and time measurement will resume.

(3) **Completion** : Erection timing ends when all ground builders return to the staging yard and the team leader declares **"Construction finish "**. Barges must remain in the river area at this moment.

(4) **Post-Completion:** No items (tools, surplus fasteners, etc.) shall be left on the piers.

(5) **Temporary Members:** All temporary members must be placed back in the staging yard upon completion.

3.2.6 Erection Rules:

1. Only judges, the site supervisor, and builders are permitted within the erection site.
2. Moving or supporting a " construction block" (multiple members) outside the staging yard requires at least two (2) builders. A single builder may move one (1) member.
3. Builders must support any unstable or non-self-supporting parts to prevent them from falling into the river or behind the piers.
4. No items shall be brought into or taken out of the site during the timed period.
5. Items may be placed on the bridge or piers temporarily, provided they are stacked flat and stable.
6. Assembly of the bridge must not take place within the staging yard or its overhead space.
7. The bridge structure must be supported by hands only (no knees, arms, etc.).
8. Kneeling is permitted, but sitting or lying down is prohibited for safety reasons.
9. Builders must maintain situational awareness and communicate verbally to avoid collisions or falling members. Serious or repeated safety violations may lead to disqualification.
10. **Working Space:** The allowable space is limited to a height of 2m from the ground (Figure 3.1). Members must not exit this space, though a builder's limb may momentarily do so.

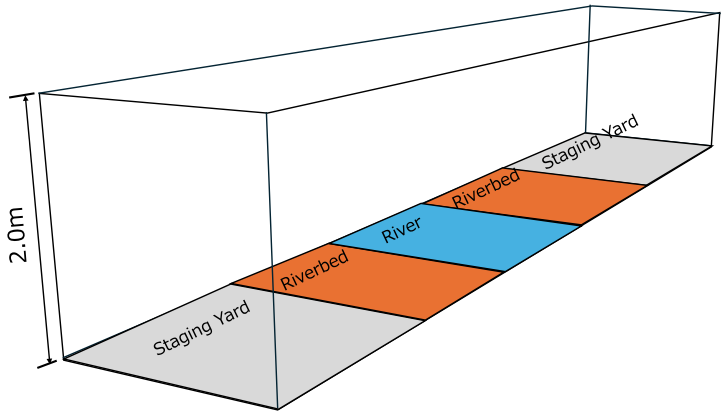


Figure 3.1 Working space

3.2.7 Violations and Accidents:

1. For safety violations, timing stops for an explanation. Items must be returned to their pre-violation positions before resuming.
2. For minor accidental violations (dropping fasteners, accidental river entry), timing continues, but penalties (Section 6.4) apply.
3. In case of injury or illness, the leader must inform the judge to pause timing. Substitutions are permitted upon resumption.
4. Penalties will be reported by the judges at the end of the session.

3.2.8 Repairs:

1. If additional work is needed after the " Construction finish " declaration, the leader may request a "Repair" session.
   a) Judges may also mandate repairs (e.g., tightening bolts/turnbuckles, retrieving tools, removing temporary members).
   b) Erection rules apply during repairs.
   c) The worker count is treated as the same as the main erection.
   d) **Repair time is calculated at 150% (1.5x) of the actual time spent.**
2. Repairment time measurement ends when all builders return to the yard and the leader declares "Construction finish ".

3.2.9 Structural Verification: After erection /repair, judges will verify the contact areas on the piers and the under-bridge clearance. The bridge will then be moved to a temporary storage area for detailed rule compliance checks.

3.2.10 Lateral Stability Check: A horizontal load of approx. 5 kgf will be applied to the center of the main girders. Lateral displacement must be within 30 mm.

3.2.11 Weight Measurement: The total weight will be measured using four scales (Figure 3.2). Decks, tools, and posters are not included in the bridge weight.

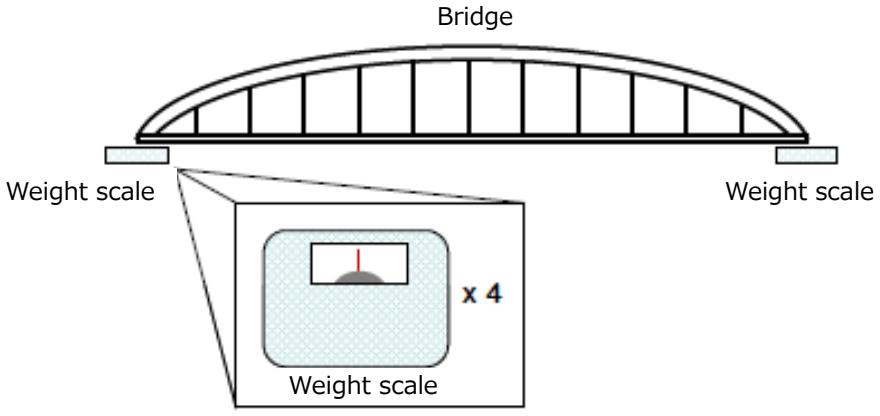


Figure 3.2 Weight measurement

3.2.12 Prohibited Acts:

1. Working outside the site.
2. Moving piers.
3. Using power tools.
4. Throwing items or holding them in the mouth.
5. Reusing dropped fasteners.
6. Reusing dropped tools/connectors unless spares are exhausted (must declare to judge).
7. Using lubricants on-site.
8. Using the bridge to support body weight (standing , sitting, etc.).
9. Working while lying down or sitting on the ground or river within the installation site.
10. Crossing the river.
11. Moving blocks alone.
12. Placing items on the ground outside the yard.
13. Applying body weight to connect members or correct strain.

3.3 Aesthetic and Design Competition

3.3.1 Judges and teams will score bridges based on balance, proportion, elegance, finish, and presence.

3.3.2 Each team shall have one (1) vote, and each judge shall have three (3) votes. Teams are not permitted to vote for their own bridge.

(1) Judges shall record the names of the top teams (up to three) and the reasons for their evaluation on the scoring sheet.

(2) Voting may be based on the judge's subjective impression (voting sheets will be distributed on the day of the event).

3.4 Presentation

3.4.1 One representative from each team shall present an overview of their bridge (including features, design, fabrication, innovations in installation, challenges faced during production, etc.) to the panel of judges and participants. The judging panel (guests) and participating teams will then vote to determine the rankings.

a) Each team is allotted three (3) minutes for their presentation. There will be no Q&A session.

b) Presentations should generally be conducted by projecting materials (such as PowerPoint or PDF files) onto a screen using a PC projector.

3.4.2 The judging panel and each team shall have three (3) votes. Teams are not permitted to vote for their own bridge.

3.5 Loading Test

3.5.1 Team members perform the loading under judge supervision.

3.5.2 Initial deflection (Step 0) is measured after placing decks.

3.5.3 A total of 240 kgf of weights are loaded onto the center-span decks (Figure 3.3). The placement of weights on the deck is as shown in Figure 3.4.

3.5.4 Vertical displacement at the span center is measured 30 seconds after loading.

(1) Deflection shall be measured at the underside of the deck installed at the center of the span.

(2) The displacement gauges shall be positioned 75 mm from the edge of the deck width toward the span side (Figure 3.4). The recorded value shall be the average of the measurements taken at two points across the width of the bridge.

3.5.5 Compliance: Penalties (Section 6.3) apply if:

(1) The wooden deck must be supported stably and horizontally by two or more floor beams (transverse beams).
(2) The wooden deck shall not come into contact with any members other than the floor beams.
(3) No fasteners shall come into contact with the wooden deck.
(4) The two floor beams are not in the positions designated in Figure 3.3.
(5) The bridge must not come into contact with any area outside the designated pier aera from before loading until the end of the loading test.

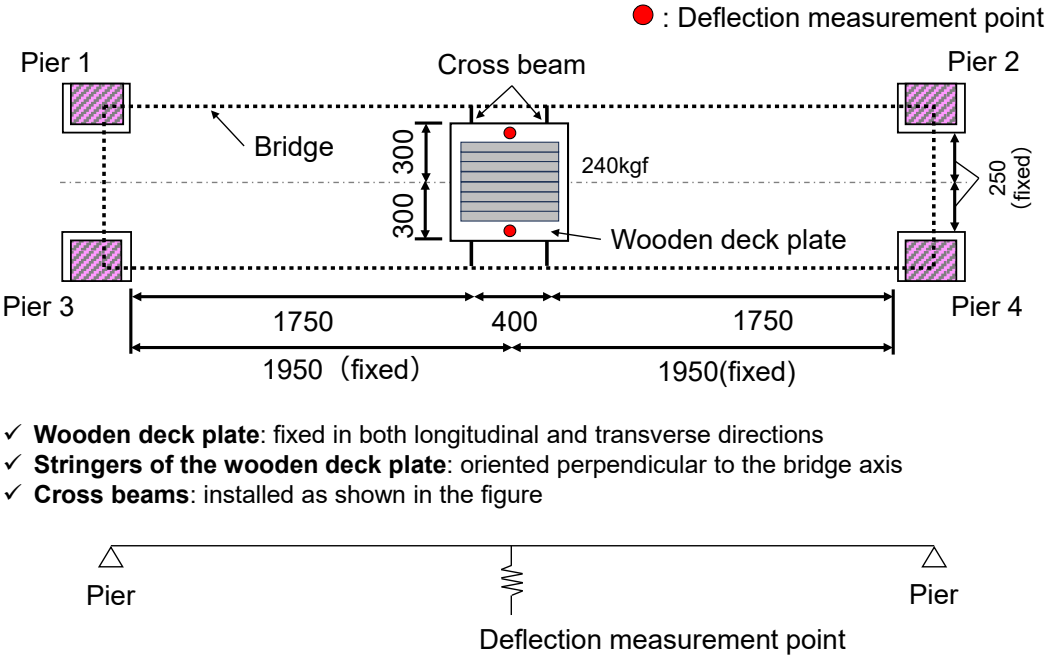
3.5.6 The following occurrences shall be deemed a "collapse," resulting in disqualification from the Installation, Structural, and Overall categories. Furthermore, the total votes in the Aesthetics/Design and Presentation categories will be multiplied by 0.8 (rounded down to the nearest whole number).

(1) If the wooden deck exhibits unstable behavior or falls during the loading competition.
(2) If either displacement exceeds $\pm 25mm$ at any time during the loading competition, even momentarily.
(3) If the difference in displacement between the two gauges exceeds $\pm 10mm$ at any time during the loading competition, even momentarily.

3.5.7 Safety stoppers shall be inserted under the girders at the mid-span and the cantilever portions to prepare for a sudden bridge collapse.

3.5.8 Judges may terminate the competition if they determine that the loading procedure poses a risk of injury to workers or bystanders, or if the bridge is likely to suffer collapse, excessive deflection, or lateral overturning.

3.3



- ✓ **Wooden deck plate**: fixed in both longitudinal and transverse directions
- ✓ **Stringers of the wooden deck plate**: oriented perpendicular to the bridge axis
- ✓ **Cross beams**: installed as shown in the figure

Figure 3.3 Loading Locations and Deflection Measurement Points (Unit: mm)

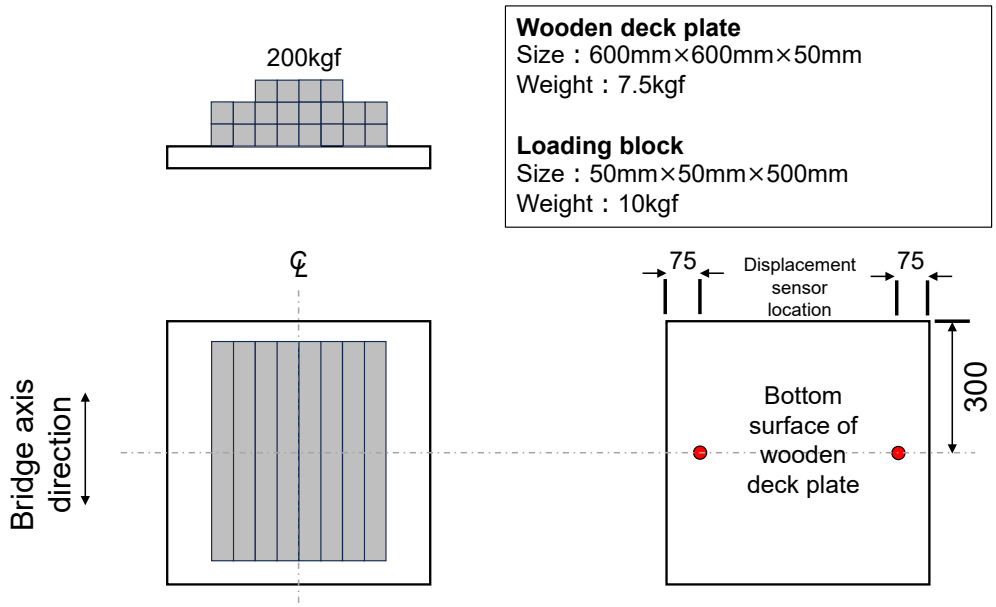


Figure 3.4 Overview of Wooden Deck and Weight Placement (Unit: mm)

4. Awards and Scoring

4.1 Awards

4.1.1 In this competition, points are calculated for five categories: Construction, Structu re, Aesthetic s, Presentation, and Overall. The top two teams with the lowest points in each category (the top three teams for the Overall category) will be awarded.

4.2 Construction Points

4.2.1 Construction Points C_c are calculated using the following formula:

$$C_c(points) = \{Total\ numver\ of\ Builders + Total\ Construction\ time(min)\} \times 20$$

4.2.2 The total number of builders is calculated as follows:

(1) Total Number of Builders = (Number of Ground builders) + (Number of Barges × 1.5)

a) If a site supervisor is arranged, one (1) person shall be added to the total.

b) If the builders on the competition day differ from those registered, the higher number shall be used.

c) No reduction in the count will be considered if a builder leaves during the construction competition.

d) While a smaller number of builders is advantageous for scoring, the construction may be halted if a lack of safety precautions is observed.

4.2.3 Total Construction Time (minutes) is calculated as follows:

Total Construction Time = Time taken for Erection(min) + 150% of Time taken for Repairs(min) + Penalties [converted to time(min)]

4.2.4 If the total construction time exceeds 30 minutes, the construction points will be calculated using the following conditions, regardless of the actual number of builders or time:

(1) Builders: 1 ground builder, 6 barges, and 1 Site supervisor.

(2) Erection Time: 60 minutes.

4.3 Structural Points

4.3.1 Structural Points Cs are calculated using the following formula:

$$C_S(points) = Bridge\ Weight(kgf) \times 10 + \delta \times 100$$

4.3.2 The Bridge Weight in 4.3.1 is calculated as follows:

Bridge Weight (kgf) = Actu al Bridge Weight (kgf) + Penalties (kgf)

Note: Penalties (kgf) refer to penalties converted into weight.

4.3.3 Coefficient δ

This is a coefficient related to the bridge's deflection, calculated as follows:

a) If the bridge deflection upon completion of loading is within ±1 mm of the target deflection (5 mm): $\delta = 0.$

b) If the deflection exceeds ±1 mm from the target deflection (5 mm):

$$\delta = |Actural\ Declection(mm) - 5|$$

4.4 Aesthetic s Points

4.4.1 Rankings will be determined by voting.

4.4.2 In the event of a tie in the number of votes, the team with lower Structural Points will be ranked higher.

4.4.3 The evaluation coefficient Y_A, used in the calculation of Overall Points, is determined based on the Aesthetic and Design ranking.

4.5 Presentation Points

4.5.1 Rankings wiill be determined by vote.

4.5.2 In the event of a tie in total scores, the team with lower Structural Points will be ranked higher.

4.5.3 The evaluation coefficient Y_P, used in the calculation of Overall Points, is determined based on the Presentation ranking.

4.6 Overall Points

4.6.1 Overall Points are calculated by multiplying the weighted sum of Construction Points Cc and Structural Points Cs by the Presentation evaluation coefficient Y_p and the Aesthetic s evaluation coefficient Y_A:

$$Overall\ Points = (0.7 \times C_S + 0.3 \times C_C) \times Y_P \times Y_A$$

4.6.2 Calculation of Evaluation Coefficient s $Y_P \times Y_A$

The evaluation coefficients for Presentation Y_P and Aesthetics Y_A are determined based on their respective rankings according to **Figure 4.1** .

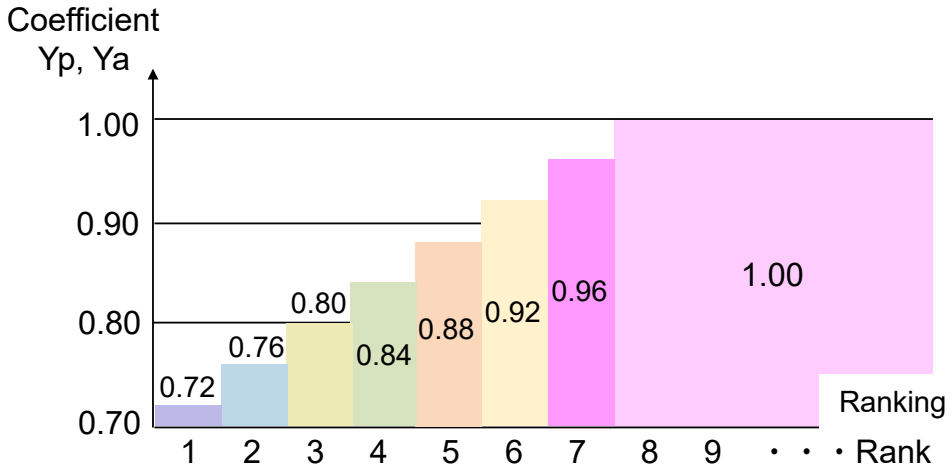


Figure 4.1 Conversion of Rankings to Evaluation Factors Y_P and Y_A

5. Terms and Definitions

5.1 Builders (Erection Workers)

Refers to the students who participate in the construction competition within a team. Registration is required.

5.2 Ground builders

Refers to the builders who perform erection work on the ground area.

5.3 Barges

Refers to the builders who perform erection work within the river.

5.4 Site Supervisor

Refers to a student, other than the builders, who gives instructions verbally during the construction competition. Registration is required.

5.5 Bridge m ember

A rigid component fabricated to fit within a box measuring either 150 × 150 × 800 mm or 300 × 300

× 200 mm.

5.6 Construction block

A pre-assembled unit consisting of up to three (3) members joined together in the staging yard.

5.7 Erection Assembly

A continuous group of assembled members during the construction competition, a portion of which is in contact with the pier or piers.

5.8 Fasteners

Refers to steel bolts, nuts, and washers. Bolts must be steel hex bolts ~~specified in JIS B1180 or JIS B1189~~

1. Bolts, nuts, and washers must not be fixed by adhesives, welding, or other means. However, the use of products where the bolt/nut and washer are integrated is permitted.
2. Bolts with a nominal length (not under -head length) of 75 mm or more shall not be used.
3. Bolts must not be processed or modified.
4. Painting is permitted.
5. Washers are optional, not required.

5.9 Temporary Members

1. Temporary members may be used for purposes such as the temporary fixation of members during erection.
2. The use of temporary members in contact with the ground, such as bents, is not permitted.
3. Temporary members must be labeled "Temporary Member" in advance.
4. No temporary members shall remain attached to the bridge body at the conclusion of erection.

5.10 Joints Between Members

1. Joints must be designed so that members do not easily slip out, separate, or fall off.
2. When using fasteners, each connection between members must be joined by at least one fastener. After tightening the nut, the end of the bolt must protrude beyond the surface of the nut.

---

6. Penalties

6.1 Penalties shall be imposed for failure to comply with rules or instructions as follows.

6.2 Penalties incurred during the construction competition will be converted into "Erection Time,"

while other penalties will be converted into "Bridge Weight."

6.3 Penalties Converted into Bridge Weight

6.3.1 Member Size Restrictions

(1) (Total weight of the violating member and fasteners [kgf]) × 5 + 5 kgf.

(2) The minimum weight of a violating member is defined as 1 kgf for this calculation.

6.3.2 Maintaining Under - Bridge Clearance (Including navigation channel clearance)

If the violation amount 0<x<5(mm), +10 kgf

If the violation amount 5<x <10 (mm), +20 kgf

If the violation amount 10<x(mm) , + Total dead weight of the bridge

(however, if the dead weight is less than 30 kg, it shall be taken as +30 kgf).

6.3.3 Vehicle clearance is not provided

Add total bridge weight as penalty.

6.3.4 Out - of - Range Contact or Position

Bridge contact outside the designated areas on the piers, or the bridge supports not remaining vertically above the designated pier range: +30 kgf.

6.3.5 Misplacement of Cross Beams or Deck Contact

Insufficient number of cross beams in the specified positi on/direction, or decks in contact with members other than cross beams: +30 kgf.

6.3.6 Non - Standard Fasteners or Insufficient Bolt Length

Use of fasteners outside specified JIS standards or insufficient bolt protrusion: +5 kgf per location.

6.4 Penalties Co nverted into Erection Time

6.4.1 Dropping of Members, Tools, etc.

The number of occurrences during erection will be counted.

6.4.2 Dropping of Fasteners (bolts, nuts, washers), Wire Connectors, or Turnbuckles

(Number of items dropped) × 5 sec.

6.4.3 Dropping of Tools

(Number of tools dropped) × 10 sec.

6.4.4 Dropping of Members, Temporary Members, or Construction block s

(Number of items dropped) × 20 sec.

6.4.5 Dropping of the Erection Assembly

(Number of occurrences) × 20 sec.

6.4.6 River entry (Grou nd builders)

(1) Counted even if only clothing, pants, or shoes touch the river area: (Number of occurrences) × 5 sec.

(2) For malicious cases (e.g., continuing encroachment after warning): Additional 20 sec.

6.4.7 Land entry (Barges)

(1) Counted even if only clothing, pants, or shoes touch the land area: (Number of occurrences) × 5 sec.

(2) For malicious cases (e.g., continuing encroachment after warning): Additional 20 sec.

6.4.8 Instructions or advices from persons other than erection builders and site supervisors

(Number of instructions) × 40 sec.

6.4.9 Time Limit (30 Minutes) Over

Construction points will be calculated based on 1 Land Worker, 6 Barges, 1 Site Supervisor, and an erection time of 60 minutes.

6.4.10 Prohibited act

When prohibited act is found , the competition may be suspended or additional penalties may be imposed.

7. Miscellaneous

7.1 For any actions or matters not specified in this rulebook, penalties shall be determined through consultation by the judging panel.

7.2 This rulebook and FAQs are posted on the official websites:

(http://bricom.jp/) and (https://www.facebook.com/Japan.Steel.Bridge.comp/).

7.3 Updates to the rulebook will be notified via the website. Please check the website regularly to stay informed of the latest vers ion.

7.4 After referring to past years' and JSBC202 6 Q&As (updated as needed), if you have questions regarding this rulebook, contact:

Assistant Professor Yuma Sugimoto

Department of Systems Innovation Engineering, Faculty of Science and Engineering, Iwate University

Email: ysugimot@iwate-u.ac.jp

(Note: Please be aware that responses may take time.)

7.5 For questions regarding implementation guidelines, venue, or operations other than these rules, contact:

Associate Professor Keigo Suzuki

Department of Architecture and Civil Engineering, School of Engineering, Unviersity of Fukui

Email: suzuki-k@u-fukui.ac.jp