2024 CLARIFICATIONS Updated 4/4/2024

Q4.1 When is the Steel Bridge Competition Report due? *Aya Ibrahim, Northwestern University*

A. There is no Steel Bridge Competition Report required for either the Regional Competitions or the National Finals. The only report that is required is the ASCE Student Chapter Report that was due on February 1, 2024 and participation of a team's school in the ASCE Student Symposium Paper Competition in order for a team to be eligible for the National Finals. Teams are required to have a poster describing their design that is present during aesthetics judging. [4.3.2.1, 4.4.1.1, 4.4.1.2, 6.2.1.2]

Q6.1 What are the submission deadlines for the competition? *Nereli Garcia, University of Texas Rio Grande Valley*

A. Teams are required to submit a Student Steel Bridge Competition – ASCE Student Chapter Participation Form in order to receive their competition stipend. The SSBC Intent and Eligibility Acknowledgement Form is part of that submission. While the deadline on these forms states November 3, 2023, the forms are still active so teams should submit them ASAP if they have not done so already. These forms can be found on the ASCE website here. Teams should also check with their Regional Host School to see if any further submissions are required. Deadlines associated with requirements for an ASCE Student Chapter to be in good standing are February 1, 2024 with the requirements listed in Sub-Section 4.3.2.1. Teams will need to submit their cost estimations at their Regional Competition prior to the selection of the load case. Submissions for the optional video award are due April, 29, 2024 and submissions for the optional Team Engagement Award are due April 1, 2024. [4.3.2.1, 6.2.8, 6.2.9, 6.4.1]

Q6.2 May a school's name, used for permanent identification, extend over two members of the bridge or must it be contained within a single member? *Andrew Crawford, University of North Carolina, Charlotte*

A. A school's name may extend over two members provided that the space between the different parts of the name is within reason such that someone looking at the bridge can easily identify the school to which it belongs. One portion of the school name on one member and a second portion of the school name on the adjacent member is within acceptable limits. [6.2.1.1.3]

Q6.3 What is meant by 'single beam that represents one of the decking support bridge stringers' in Sub-Section 6.2.1.2.1 of the SSBC Rules? *Berit Klein, University of Minnesota – Twin Cities*

A. The poster should contain an analysis of a single beam that represents one of the bridge stringers. For this analysis, the whole length of the stringer can be simplified to a single member, rather than considering the connections between the individual members making up the stringer. In the analysis, supports should be modeled at the location of the piers and the load shall be placed at a location representing one of the load cases. [6.2.1.2.1, 7.1]

Q7.1 May more than four team members move the bridge between different competition areas (i.e. construction zone and loading area, loading area and weighing area, etc.) after the completion of construction and inspection, even though only four team members are allowed to participate in load testing? *Aaron, South Dakota School of Mines & Technology*

A. More than the four team members participating in load testing may assist in moving the bridge if it is deemed necessary by the team for safety reasons and the situation is discussed with the head judge. Ideally, this conversation will happen at the Captains' Meeting. The additional team members helping with moving the bridge shall have at a minimum protective eyewear meeting ANSI standard Z87.1 and work gloves. Team members with steel toe or composite boots shall be closest to the corners of the bridge. Team members shall carry the bridge as close to the corners as possible so as not to apply unnecessary forces to the bridge. As soon as the bridge is moved, team members not participating in load testing must return to the spectator area of the competition floor. [5, 7.1(11), 11.2.1.3]

Q8.1 Is there a maximum allowable size for bolts and nuts? *Jared Brewster, Western Kentucky University*

A. No, provided all of the loose bolt, loose nut and connection requirements are met where the bolts and nuts are installed. There is a limit of 3" placed on the nominal length of loose bolts measured from the bottom of the head to the end. [8.2.3, 8.2.3.2, 8.2.4, 9.4, 9.5]

Q8.2 May a member be made up of parts that are bolted together? *Dominic Fosco, Tennessee Tech University*

A. No. Parts of a member must be welded together. Bolts and nuts must only be used for connections between members. Connections are subject to the requirements of Sub-Section 9.4. [8.2.2.1, 8.2.2.3, 8.2.2.4, 9.4]

Q8.3 May members be hinged to be able to fit into a right rectangular prism of dimensions of 3'-6"x6"x4" if they are stable and immobile at the end of timed construction? *Robert Moran, Virginia Military Institute*

A. No. Members must retain their shape, dimensions, and rigidity during inspection, timed construction and load testing with the exception of deformation associated with mechanical strain. [8.2.2, 8.2.2.1, 8.2.2.2, 10.6.4]

Q8.4 May a carriage bolt be used as a loose bolt in a connection and if so, can the hole in the member be designed such that the square neck of the carriage bolt is restricted from rotating? *Brian Cosgrove, University of Maine*

A. Yes, carriage bolts may be used provided that they are commercially available, have a head and are not modified in any way. They also may not exceed 3" in length measured from the bottom of the head to the end of the bolt. There is no restriction on the shape of the hole provided that it is small enough that the head of the bolt cannot pass through it. [8.2.3, 8.2.3.1, 8.2.3.2, 9.4.3]

Q8.5 May steel members or material from a previous year's bridge be used in this year's bridge? *Ian Formell, Bradley University*

A. Yes, provided that the member or material meets the requirements of the 2024 SSBC Rules. [8.1, 8.2, 8.3]

Q8.6 How is the box used to check whether members meet the dimensional requirements oriented? *Kenan Johnson, Saint Louis University*

A. Typically the box is oriented vertically so that there is a 6" x 4" opening at the top. However, there is no requirement in regards to the orientation of the box in the rules. As such, it is dependent on the box provided by the host school. [8.2.2.2, 12.6]

Q9.1 May the bridge exceed the 2'-6" height limitation during construction? *Landen Wynston, Illinois Institute of Technology & Genna Gaitan, Illinois Institute of Technology*

A. Yes, provided that safe construction practices are used. The dimensional requirements in Sub-Section 9.3 are checked with the bridge in its as-built condition after termination of timed construction and before the bridge is moved from the construction site or load tested. They do not apply during construction. [9.1, 9.3, 9.3.2, 10.3]

Q9.2 For a connection that has a corner, where there are separate faying surfaces on either side of the corner, would a single bolt that penetrates the corner count as penetrating both faying surfaces? *Joshua Willoughby, Kansas State University*

A. No. A bolt penetrating the corner would not penetrate either of the faying surfaces since the hole for the bolt would not be completely within either of the faying surfaces. The connection would be in violation of Sub-Section 9.4.2.3. [9.4, 9.4.1, 9.4.2, 9.4.2.2, 9.4.2.3]

Q9.3 May multiple members be penetrated by a single loose bolt utilizing more than one loose nut to make a connection? *Stefan Popescu, University of Southern California*

A. More than two members may be connected by a single loose bolt. Multiple nuts also may be installed on a single loose bolt provided that all nuts are fully engaged by the threads of the matching loose bolt. Nuts may not be used to separate different plies of a connection if at least one and at most two faying surfaces associated with each member being connected are not present. The contact surface between a nut and a member is not considered a faying surface. [9.4.2, 9.4.2.3]

Q9.4 Please clarify the meaning of Sub-Section 9.3.9. *Gavin Trinh, University of New Orleans*

A. Sub-Section 9.3.9 states that within a member that makes up the stringer, the top surface of the stringer must remain free of any gaps that extend the full width of the top of the stringer, protrusions that would prevent free passage of the stringer template, and abrupt changes in elevation or slope that would cause an uneven decking support surface. [9.3.8, 9.3.9, 9.3.10]

Q9.5 May a connection be created by inserting one member into another member and then bolting the members together with a loose nut and bolt? *Landen Wynston, Illinois Institute of Technology & Jack Treinish, United States Air Force Academy*

A. No. Any type of connection where one member is inserted into another member, such as a tube-in-tube/sleeved connection, violates Sub-Section 9.4.2.5, even if it utilizes a loose nut and bolt. [9.4.2, 9.4.2.5]

Q9.6 May a bolt hole be larger than the threaded diameter of the bolt? *Rebekah Higgins, Brigham Young University*

A. Yes, provided that the hole is small enough that the bolt head or nut cannot pass through the outer plies of the connection. [8.2.3, 8.2.4, 9.4.3]

Q9.7 When is the 5-inch vertical clearance between the ground and any part of the bridge measured? *Eduardo Aron, California Polytechnic State University, Pomona*

A. Dimensional requirements, such as the vertical clearance between the ground and any part of the bridge, are checked after termination of timed construction and before the bridge is moved from the construction site or load tested. [9.1, 9.3, 9.3.4]

Q9.8 If two members have a gap between them after the completion of timed construction and then end up touching during loading, will there be a penalty due to lack of a legal connection at that location? *Ben Schleh, Milwaukee School of Engineering*

A. No. The Connection Safety requirements specified in Sub-Section 9.4 are checked by the judges after the termination of timed construction and before the bridge is moved from the construction site or load tested. However, if teams attempt to gain an advantage by trying to circumvent the rules in the opinion of the judges or the judges determine that the bridge cannot be loaded safely, then the bridge may be deemed ineligible for awards, except aesthetics and video. [3, 5, 7.1, 9.1, 9.4]

Q9.9 May a groove be used to align parts at a connection? *Gabriel Massicotte-Duhamel, Ècole de Technologie Supèrieure*

A. Any location where two members touch requires a connection. As a result, the surfaces of the two members that are in contact within the groove become faying surfaces that must meet the requirements of Sub-Section 9.4.2. [9.4, 9.4.1, 9.4.2]

Q9.10 Are more than two faying surfaces allowed in a connection if three or more members are being connected at the same location? *Reed Edwards, Louisiana Tech University & Dominic LaSalle, University of Cincinnati*

A. There may be multiple faying surfaces at a connection depending on the connection's configuration. The maximum number of allowed faying surfaces at a connection is two associated with 'each' member being connected. Examples of legal and illegal connections with multiple faying surfaces can be found in the '9.4 Connection Safety Examples' document on the Team Resources page of the SSBC website. [9.4.1, 9.4.2]

Q9.11 May the members making up the stringer also serve other functions in the bridge? *Koryn Harms, Lipscomb University & Christopher Vreeland, University of New Mexico*

A. Yes. The stringer refers to the members whose top surfaces provide a contiguous decking support surface aligned longitudinally with the bridge. The members making up the stringer do not have to solely act as the decking support provided all the requirements in Sub-Section 9.2 and 9.3 for the stringers are met. The SSBC Definitions video on the Team Resources page of the SSBC website has further information in regards to stingers. [9.2.1, 9.2.2, 9.3.6, 9.3.7, 9.3.8, 9.3.8.1, 9.3.8.2, 9.3.9, 9.3.10]

Q9.12 What does 'aligned longitudinally along the bridge' mean with respect to the stringer? *Yongyi Qiu, Tongji University*

A. 'Aligned longitudinally along the bridge' means that the stringers extend parallel to the length of the bridge. This means that the stringers extend from inside the west end footing to inside the east end footing on the north and south sides of the bridge, respectively. The SSBC Definitions video on the Team Resources page of the SSBC website has further information in regards to stingers. [9.2.1, 9.2.2, 9.3.6, 9.3.7, 9.3.8, 9.3.8.1, 9.3.8.2, 9.3.9, 9.3.10]

Q9.13 May parts of the bridge exceed the height of the top of the stringers? *Yongyi Qiu, Tongji University*

A. Yes, provided that the all parts of the bridge remain within the bridge envelope, which has a maximum height of 2'-6", and the parts do not restrict the passage of the Stringer Template along the tops of the stringers. The SSBC Definitions video on the Team Resources page of the SSBC website has further information in regards to stingers, the bridge envelope, and the template. [9.3.2, 9.3.3, 9.3.7, 9.3.8, 9.3.8.1, 9.3.8.2]

Q9.14 In the Section A callout in Drawing 2, what are the dimensions of the width of the bridge envelope that extends past the top of the stringers? *Mony Samneang, San Jose State University*

A. The width of this part of the bridge envelope does not have a set dimension. It is dependent on the ability of the stringer template to pass freely along the length of the bridge while the rabbets are in contact with the tops of the stringers and the bridge maintaining a maximum width of 5' at any location along the span. [9.3.3, 9.3.8, 9.3.8.1, 9.3.8.2]

Q9.15 What determines whether there is one connection between members or there are multiple connections between members? *Stefan Popescu, University of Southern California*

A. Whether there is one or multiple connections between members is dependent on the configuration of the members with respect to each other and the points at which they come in contact. If the points of contact between members are discontinuous even though they are in the same plane, then each point of contact is considered a connection with a separate faying surface that must be penetrated by a bolt that is secured by a loose nut. If the point of contact is continuous, making a continuous faying surface, then the connection is treated as a single connection (see Examples 11(a), 11(b), 16(b), and 16(c) in the '9.4 Connection Safety Examples' document on the Team Resources page of the SSBC website). The number of bolts used to connect a member does not define the number of connections that are present. [9.4, 9.4.1, 9.4.2, 9.4.3, 9.4.4]

Q9.16 May a slotted hole that accepts a bolt be used in a connection? *Lauren Sorensen, Texas A&M University*

A. Yes. A slotted hole can be used to accept a bolt in a connection provided that if the slotted hole is in the outer ply of the connection no part of the slotted hole is large enough to allow the nut or bolt head to pass through it. [9.4.3]

Q9.17 Is a connection that consists of a round tube associated with one member that is then sandwiched between two separated halves of another round tube (each with faying surface that makes an arc of less than 180 degrees) associated with another member permitted? *Carly Woelfel, United States Military Academy*

A. No, such a connection is prohibited. The described connection is considered a sleeved connection since the only way to connect the two members is by sliding the inner round tube into the sleeve created by the two separate halves of the other round tube. [9.4.2.5]

Q9.18 When does a set of nested convex or concave surfaces become a tube-in-tube or sleeved connection? *Aaron, South Dakota School of Mines*

A. A set of nested convex or concave surfaces becomes a sleeved connection when the faying surfaces associated with the connection create an arc that is greater than 180 degrees. If the faying surface makes a closed circle then it is considered to be a tube-in-tube connection. See also Clarification Q9.17 for further information on sleeved connections. [9.4.2.2, 9.4.2.5]

Q9.19 May a connection between two members that make up the stringer contain a transverse gap, not more than ¼", across the top of the stringer where the two members come together and still meet the faying surface requirements specified in Sub-Section 9.4? *Logan Glazier, Vanderbilt University*

A. The allowable gap mentioned in Sub-Section 9.3.10 is at the top surface of the stringer (i.e. the surface that the decking sits on) where two members come together to make up the top surface of the stringer. This allowable gap typically does not make up a whole faying surface as there is not enough material to make a connection just at the top surface of the stringer within the confines of the 2024 SSBC Rules. The gap may be part of a larger faying surface based on the allowed minor, unintentional gaps between faying surfaces of members as noted in Sub-Section 9.4.2.4, but the faying surfaces of the members must have some point of contact and all connection requirements must be met. In order for the separation between the members to be excluded from faying surface requirements, the separation must be large enough so that it is not mistaken as a minor, unintentional gap at the discretion of the judges. Also see the '9.4 Connection Safety Examples' document on the Team Resources page of the SSBC website. [9.2.1, 9.2.3, 9.3.8, 9.3.8.1, 9.3.8.2, 9.3.10, 9.4.1, 9.4.2.1, 9.4.2.2, 9.4.2.3, 9.4.2.4, 9.4.2.5]

Q10.1 Are barges included in the Construction Economy calculation as both non-barge builders and barges since they are classified as builders in Sub-Section 10.1.3? *Dominic LaSalle, University of Cincinnati*

A. In the Construction Economy calculation, non-barge builders refers to builders who participate in construction outside of the river and cost $115,000 per person-minute. Barges are builders who participate in construction within the river and cost $230,000 per person-minute. [6.2.5, 10.1.3, 10.2.2, 10.4.2]

Q10.2 May builders deliberately commit accidents during construction after the 30-minute mark without penalty and without being required to undo work completed while committing the accident? *Stefan Popescu, University of Southern California*

A. Yes. After the 30-minute mark accidents are no longer noted by the judges since the construction time will be set to 180 minutes. As such, rules pertaining to accidents in Sub-Sections 10.4 and 10.7 no longer apply after the 30-minute mark. However, safety regulations provided in Sub-Section 10.3 will continue to be enforced to maintain the safety of everyone involved in the competition. [10.3, 10.4, 10.7, 10.8.1]

Q10.3 May a barge step over the bridge provided that the barge remains within the confines of the river? *Milo Vetter, Case Western Reserve University*

A. Yes, provided that the movement is accomplished in a safe manner. [10.3.8, 10.4.2]

Q10.4 Is it only necessary for a member to touch a constructed portion of the bridge to be considered a part of that constructed portion thereby allowing a builder to leave a member resting on a constructed portion of the bridge? *Stefan Popescu, University of Southern California*

A. Yes, contact with a constructed portion of the bridge is all that is needed during construction for a member to become part of that constructed portion. As a result, a builder may leave a member resting on the constructed portion of the bridge and that member would be considered part of that constructed portion. If that member is removed from

contact with the constructed portion, it then becomes a single member again. Note that all connection requirements must be met at the end of timed construction. [9.4, 10.1.7, 10.3.7, 10.3.8, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.9.1]

Q10.5 Is use of a barge optional? *Gavin Trinh, University of New Orleans*

A. Yes. There are no requirements that a team use a barge during construction. If a barge is used, a dock must be used at the beginning and end of timed construction. See also the definitions of Barge and Dock in the Glossary of the rules. [10.1.3, 10.2.2, 10.6.3, 10.9.1]

Q10.6 May a tool temporarily attached to a constructed portion extend over the transportation zone? *Rebekah Higgins, Brigham Young University*

A. Yes, provided that the tool remains within the site boundary. Since a builder must be in the construction zone in order to touch (or touch with a tool) a constructed portion of the bridge, any builder touching a tool that extends into the transportation zone must be in the construction zone when they are touching that tool. [10.1.2, 10.1.4, 10.3.11]

Q10.7 What are barges allowed to carry? *Jack Treinish, United States Air Force Academy*

A. Since a barge is just a builder who must remain in the river, they are allowed to carry members, tools, loose nuts, and loose bolts like any other builder. Barges must follow the same safety practices as any other builder. As with other builders, a pouch or other article of clothing must not be removed from a barge's person or held in a barge's hand. [10.1.3, 10.1.5, 10.3, 10.3.3]

Q10.8 May a constructed portion support a tool during timed construction and may this tool be slid along the constructed portion? *Eduardo Aron, California Polytechnic State University, Pomona*

A. Yes. There is no restriction in regards to a tool being supported by a constructed portion of the bridge provided that the builder is in the construction zone (or in the river if they are a barge) when the tool is placed in contact with the constructed portion. A tool may not be in contact with more than one member that is not part of a constructed portion of the bridge. The tool may be slid along a constructed portion of the bridge provided that the builder sliding the tool is in the construction zone or the barge sliding the tool is in the river. [10.2.4, 10.3.7]

Q10.9 May a pouch or other article of clothing be passed between builders as a tool? *Rod Betonio, University of British Columbia*

A. No. [10.3.3]

Q10.10 May multiple tools be combined to form an assembled tool prior to the start of timed construction? *Patricia Suayan, University of British Columbia*

A. Multiple tools may be combined to form an assembled tool prior to the start of timed construction provided that the assembled tool fits within a right rectangular prism of dimensions 3'-6"x6"x4". For an assembled tool that meets this requirement, the tool must be assembled prior to placing it in the staging yard for inspection before the start of timed construction. Once a tool is placed in the staging yard for inspection, it cannot be combined with other tools until the start of timed construction. If an assembled tool does not fit within a right rectangular prism of dimensions 3'-6"x6"x4", then the individual pieces must be placed in the staging yard and assembly of the tool must take place after the start of timed construction. [10.2.3, 10.2.4, 10.6.1.1, 10.6.1.4, 10.6.4, 10.9.1]

Q10.11 Is communication to construction team members from non-construction team members allowed during timed construction? *Eduardo Aron, California State Polytechnic University, Pomona*

A. Although not explicitly stated in the rules, non-construction team members are not allowed to communicate with construction team members during timed construction. Communication of spectators or non-construction team members with the construction team during timed construction (other than cheering the construction team on) will be considered interference with the competition. [10.2.1, 10.2.2]

Q10.12 During timed construction, do members that are part of a constructed portion of the bridge need to be bolted together? *Sean Waz, California State University, Northridge*

A. During timed construction there are no restrictions placed on how members are connected provided that safe construction practices are maintained. Connection requirements specified in Sub-Section 9.4 will only be checked upon completion of construction. If a member is removed or becomes separated from the constructed portion of the bridge, then it is again considered an individual member and subject to the requirements of individual members during construction. [9.4, 10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.13, 10.4.4]

Q10.13 May a member be slid on top of another member? *Sean Waz, California State University, Northridge*

A. Two or more members that are not part of a constructed portion of the bridge are not allowed to come in contact with each other during timed construction. A member that is in contact with a constructed portion of the bridge becomes a part of that constructed portion and can be slid along that constructed portion of the bridge provided it remains in contact with it throughout the sliding. The builder (or barge) that is sliding the member along the constructed portion must be in the construction zone (or river). If a member is removed or becomes separated from the constructed portion of the bridge, then it is again considered an individual member and subject to the requirements of individual members during construction. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.13, 10.4.4]

Q10.14 May a tool touch the ground within a footing during timed construction? *Eduardo Aron, California State Polytechnic University, Pomona*

A. No. [10.4.3]

Q10.15 May bolts be used to pull two members together during construction even if that bolt is not part of the final bridge? *Alexander Ferrari, Catholic University of America*

A. There is no rule that explicitly prohibits the use of a bolt to pull two members together during construction, but if the action is deemed unsafe by the judges, then construction may be stopped. Also, a builder may not support or touch, directly or with tools, more than one member that is not part of the constructed portion of the bridge. A builder may not touch, or touch with a tool, a constructed portion outside the construction zone. At the end of timed construction, all Connection Safety requirements in Section 9.4 of the SSBC Rules must be met. [9.4, 10.3.7, 10.3.11, 10.3.14]

Q10.16 During construction, may connections allow a part of the constructed portion of the bridge to pivot or rotate relative to another part of the constructed portion of the bridge in order to move the bridge part into final position prior to final tightening of nuts and bolts? *Ryan Sivinski, Colorado School of Mines*

A. Yes. There are no restrictions placed on connections or relative movement of pieces making up the constructed portion of the bridge during construction provided that safe construction practices are maintained. Connection requirements specified in Section 9.4 of the SSBC Rules will only be checked upon completion of construction. [9.4, 10.1, 10.3]

Q10.17 May a tool be used to support part of the weight of the constructed portion of the bridge provided that part of that constructed portion is in contact with the footing? *Landen Wynston, Illinois Institute of Technology*

A. Yes, provided that the builder holding the tool is within the construction zone (or the barge holding the tool is within the river) and safe construction practices are followed. [10.3.7, 10.3.11, 10.3.12, 10.3.14]

Q10.18 During construction are there restrictions on which members touch the ground within a footing? *Eduardo Aron, California State Polytechnic University, Pomona*

A. No. However, at the end of timed construction, the bridge must meet all dimensional requirements associated with Usability (Section 9.3 in the SSBC Rules). [9.3, 9.3.1, 9.3.4, 10.1.7, 10.3.10, 10.3.11, 10.3.14, 10.4.3, 10.4.4]

Q10.19 During construction may more than one member touch the ground within a footing? *Eduardo Aron, California State Polytechnic University, Pomona*

A. Yes provided that both members remain within the boundaries of the footing. Each member that touches the ground within a footing will be considered a constructed portion of the bridge. At the end of timed construction, the bridge must meet all dimensional requirements associated with Usability (Section 9.3 in the SSBC Rules). [9.3, 9.3.1, 9.3.4, 10.1.7, 10.3.10, 10.3.11, 10.3.14, 10.4.3, 10.4.4]

Q10.20 May tools and members be on the dock at the start of timed construction? *Ethan Stalder, Boise State University*

A. No. All tools and members must start in their designated areas in the staging yard. Tools and members are transferred to barges by non-barge builders. At no time, may a tool or member touch the river in the area that is designated as the dock. [10.1.5, 10.3.5, 10.3.7, 10.4.1, 10.4.3, 10.4.4, 10.6.1, 10.6.3]

Q10.21 During construction, how many members that are not part of a constructed portion of the bridge may be touched by a builder or a barge in the construction zone? *Aryan Padaniya, University of Texas at Arlington*

A. One. A builder or barge who is outside of a staging yard, including within the construction zone, may only touch, either directly or with a tool, one member that is not part of the constructed portion of the bridge. [10.3.7, 10.4.4]

Q10.22 May constructed portions of the bridge be started at multiple footing locations at the same time? *Aryan Padaniya, University of Texas at Arlington*

A. Yes. There may be multiple constructed portions of the bridge at the same time during construction. When two different constructed portions of the bridge come in contact, the two different constructed portions become a single constructed portion of the bridge. If a member is removed from contact with a constructed portion of the bridge, it becomes an individual member again. [10.1.7, 10.3.7, 10.3.10, 10.3.12, 10.3.13]

Q10.23 May a member be placed in the area designated as a footing and left standing on its own? *Aryan Padaniya, University of Texas at Arlington*

A. Yes, a member may be placed in the area designated as a footing and left standing on its own. Other members can then be added to it to expand the constructed portion of the bridge. If no members have been added to it, the member can be removed from contact with the footing. The member then becomes an individual member again if it is not in contact with a constructed portion of the bridge. [10.1.7, 10.3.7, 10.3.10, 10.3.12, 10.3.13, 10.4.3, 10.4.4]

Q10.24 Does a tool need to be rigid? *Aryan Padaniya, University of Texas at Arlington*

A. No. A tool does not need to be rigid, but it must fit within a right rectangular prism (i.e., box) of dimensions 3'-6" x 6" x 4" prior to the start of construction. [10.2.3, 10.2.4, 10.2.5, 10.6.1, 10.6.1.1, 10.6.1.4, 10.6.4, 10.9.1]

Q10.25 May a tool be modified during timed construction such that its dimensions no longer allow it to fit within a right rectangular prism of dimensions 3'-6" x 6" x 4" and does that tool need to fit inside this right rectangular prism at the end of timed construction? *Aryan Padaniya, University of Texas at Arlington*

A. Yes, a tool may be modified during timed construction such that it no longer fits within the specified dimensions of the right rectangular prism. The tool only needs to fit within the specified dimensions of the right rectangular prism prior to timed construction. Its dimensions will not be checked at the end of timed construction. [10.2.3, 10.2.4, 10.2.5, 10.6.1, 10.6.1.1, 10.6.1.4, 10.6.4, 10.9.1]

Q10.26 May a constructed portion of the bridge extend past the construction zone boundary into the transportation zone during timed construction? *Max Ludington, University of Wisconsin - Platteville*

A. Yes, provided that all parts of the bridge remain within the site boundary. Since a builder must be in the construction zone in order to touch (or touch with a tool) a constructed portion of the bridge, any builder touching, directly or with a tool, the constructed portion of the bridge that extends into the transportation zone must be in the construction zone. At the end of timed construction, all parts of the bridge must fit within the construction zone. [9.3.5, 10.1.2, 10.1.4, 10.3.11, 10.3.13]

Q10.27 Are the dock locations movable as long as they are attached to the construction zone? *William Skaggs, Northern Arizona University*

A. No. The dock locations will be located in the positions specified in DWG 1 of the SSBC Rules. [10.1.3, 10.6.3, 10.9.1]

Q10.28 May barges move within the river once a constructed portion of the bridge completely spans the width of the river? *William Skaggs, Northern Arizona University*

A. Yes, provided that they can do so in a safe manner. See also Clarification Q10.3. [10.3.8, 10.4.2]

Q10.29 May a barge have tools, loose nuts and/or loose bolts in their possession at the end of timed construction? *Colin Boyle, Cornell University*

A. As with any builder, a barge at the dock may have tools, loose nuts and/or loose bolts in their possession at the end of timed construction. [10.9.1]

Q10.30 May builders or barges use any extremity, such as a foot, to hold up a portion of the bridge? *Dominic Rodio, FAMU-FSU College of Engineering*

A. Yes, there are no restrictions on what extremity is used to hold the bridge. However, if the action is deemed unsafe by the judges, then the clock will be stopped and the builders will be asked to resume construction using safe procedures. [10.3.4, 10.3.7, 10.3.11, 10.3.12, 10.3.14, 10.4.3]

Q10.31 May tools required for stick welding be used during timed construction if they fit within a right rectangular prism (i.e., box) of dimensions 3'-6" x 6" x 4" and they do not require an external power supply? *Christopher Good, Lafayette College*

A. No. Welding is not allowed during timed construction due to the safety hazard posed to participants, judges and spectators as well as potential damage to the competition facility. As a result, welding equipment is not allowed in the staging yard. [5, 10.2.3, 10.2.4, 10.3]

Q10.32 May an assembly of multiple connected members that is part of the constructed portion of the bridge be slid along other parts of the constructed portion of the bridge? *Aryan Padaniya, University of Texas at Arlington*

A. Yes, provided that the sliding can be accomplished in a safe manner as deemed by the judges. An assembly of multiple connected members that is part of the constructed portion of the bridge may be slid along other parts of the constructed portion of the bridge provided that the assembly remains in contact with a constructed portion of the bridge that is in contact with the floor within a footing at all times. See also Clarification Q10.13. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.13, 10.4.4]

Q10.33 May an assembly of multiple connected members that is part of the constructed portion of the bridge be removed from contact with the constructed portion of the bridge if handled by the same number of builders as there are members in the assembly? *Aryan Padaniya, University of Texas at Arlington*

A. No. As soon as the assembly of multiple connected members is removed from contact with a constructed portion of the bridge, the assembly violates the requirement that a member that is not part of a constructed portion touches or is in contact with another member that is not part of a constructed portion of the bridge. A 15 second penalty will

be assessed and the team will be required to reestablish contact between the assembly and constructed portion prior to continuing construction. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.13, 10.4.4]

Q10.34 May the rigid containers that contain loose nuts and loose bolts in the staging yard be picked up after the start of timed construction? *Elise Hozeski, Wayne State University*

A. Yes. The rigid containers are treated as tools after the start of timed construction. [10.1.5, 10.3.4, 10.3.7, 10.4.3, 10.6.1.2, 10.6.1.3, 10.9.1]

Q10.35 Is there a limit on the number of rigid containers used to contain loose nuts and loose bolts prior to the start of timed construction? *Elise Hozeski, Wayne State University*

A. No, provided that all the containers fit within the 'Nuts & Bolts' area of the staging yard. [10.6.1.2, 10.6.1.3]

Q10.36 May the rigid containers used to contain loose bolts and loose nuts prior to the start to timed construction have compartments or subdivisions in them? *Elise Hozeski, Wayne State University*

A. Yes, but loose nuts and loose bolts must be in separate containers. [10.6.1.2, 10.6.1.3]

Q11.1 What does 'any measured deflection' refer to in regards to the vertical deflection limits specified in Sub-Section 11.5.2? *Gabriel Lesher, Cornell University*

A. 'Any measured deflection' refers to the deflection measured at either D1 or D2. A vertical deflection limit is violated if either of these measurements exceeds the specified limit. The SSBC Definitions video on the Team Resources page of the SSBC website has further information in regards to the measurement of deflections. [11.5.1.3, 11.5.2, 11.5.3]

Q11.2 What is the meaning of 'centered laterally on the decking unit' in regards to placing the 100 pounds of preload on each of the decking units for the vertical load test? *Diana Meza, Universidad Nacional Autonoma de Mexico*

A. 'Centered laterally on the decking unit' means that the preload should be placed on the decking unit such that it is evenly distributed between the north side and south side of the bridge. The north and south side stringers should be carrying roughly the same amount of preload. The intent is that the preload be centered on the decking unit in both directions. [11.5.3]