2025 CLARIFICATIONS Updated 5/9/2025

Q8.1 Do specialty bolts and nuts that can be purchased fit the definition of "commercially available"? *Justice Gorsline, Missouri University of Science and Technology*

A. A bolt or nut that can be purchased off the shelf or ordered online from a company's typical inventory is considered "commercially available". If the bolt or nut needs to be designed and manufactured specifically for use in the steel bridge competition, then it is not considered "commercially available". Any bolt or nut must also meet the additional requirements for loose bolts (Sub-Section 8.2.3) and loose nuts (Sub-Section 8.2.4) and may not be mechanically modified in any way from the way that it is received, except it may be painted. [8.2, 8.2.3.1, 8.2.3.2, 8.2.4.1, 8.2.4.2]

Q8.2 May a turnbuckle-tie rod assembly be used as part of the bridge? *Kimberly Molina, University of Texas at Arlington*

A. No. The bridge shall consist of only nuts, loose bolts and members. A turnbuckle is either a member by itself or if welded to a member then it is part of that member. Since a turnbuckle has threaded holes, it violates the rule that holes in a member or in a part of a member shall not be threaded. There will be a penalty if a turnbuckle is used as a nut unless it is threaded over its full length and has the external shape of a single hexagonal prism over its full length. [8.2.1, 8.2.2.1, 8.2.2.6, 8.2.4]

Q8.3 What is the maximum allowable diameter of a loose bolt? *Andrew Tolentino, California Baptist University*

A. There is no restriction on the diameter of loose bolts used for connections. [8.2.3]

Q8.4 May a threaded rod be welded to the bridge? *Daniel, California State Polytechnic University, Pomona*

A. A threaded rod is not considered a bolt and can be welded to the bridge. Once welded to the bridge, the threaded rod is considered part of the member to which it is welded. However, the welded threaded rod cannot be used to connect two members at the end of timed construction and any location where the welded threaded rod comes in contact with another member would create a location where a connection is required. Keep in mind that the bright silvery or colored coating on a threaded rod often contains zinc and cadmium that can create hazardous fumes at welding temperatures, so use of uncoated threaded rods is suggested when they are to be welded. Clarification Q9.3 also contains further information in regards to temporary connections. [8.2.2.5, 8.2.3, 8.2.3.1, 8.2.3.2]

Q8.5 May chamfered bolts be used as loose bolts for connections? *Jok Garang, University of Waterloo*

A. Yes, provided that they are commercially available, have a head, and have not been mechanically altered or modified to create the chamfer. Many commercial bolts have chamfered ends. These bolts are okay for use in connections provided all the requirements of Sub-Section 8.2.3 are met. [8.2.3, 8.2.3.1, 8.2.3.2]

Q8.6 How is the rigidity of a member evaluated? *Joel Harkness, Liberty University*

A. A member is considered rigid if it retains its shape and dimensions during timed construction and does not have moving or flexible parts. The member also must not have parts that are cables. [8.2.2.1]

Q9.1 At what angle does a bend in a plate involved in a connection require the surfaces on either side of the bend to be treated as separate faying surfaces? *Chris Teeter, Milwaukee School of Engineering*

A. An intentional bend of any angle that is placed in a plate used in a connection requires the portions of the plate on either side of the bend to be treated as a separate faying surface. Note that a bolt penetrating the bend would not penetrate either of the faying surfaces since the hole for the bolt would not be completely within either of the faying

surfaces. Examples of connections involving bent plates can be found in the 'Connection Safety Examples' document on the Team Resources page of the SSBC website. [9.5.2.1, 9.5.2.2]

Q9.2 Does the north side stringer extend past the east footing on the north side such that it has the same length as the south side stringer (i.e. is the north side stringer cantilevered)? *Jakob Ramos, The College of New Jersey*

A. No. All stringers terminate in their respective footings. The north side stringer has a minimum length of 15'-6" and a maximum length of 16'-6" while the south side stringer has a minimum length of 19'-0" and a maximum length of 20'-0". The plan view of the bridge envelope is shown in DWG 2. [9.3.5, 9.3.6]

Q9.3 Does the restriction on cam locks, dovetails, tube-in-tube/sleeved and other mechanical/interlocking connections apply to temporary connections created during timed construction? *Antonio Juarez Rivera, Universidad Panamericana*

A. The Connection Safety requirements specified in Sub-Section 9.5 are checked by the judges after the termination of timed construction. There is no restriction on how connections are made during timed construction if they are accomplished in a safe manner and do not require the occurrence of an accident. [9.4, 9.4.1, 9.5, 10.1, 10.3, 10.4]

Q9.4 Does a simple double shear connection between two members violate the requirement that each connection contain at least one and at most two faying surfaces associated with each member being connected? *T.J. Boylan, Florida Institute of Technology*

A. No. A simple double shear connection between two members creates two faying surfaces associated with each of the members being connected. Further examples of legal and illegal connections with multiple faying surfaces can be found in the 'Connection Safety Examples' document on the Team Resources page of the SSBC website. [9.5.1, 9.5.2]

Q9.5 If a contact surface between members transitions from a gradual curve without an inflection point to a flat region, is this considered a single faying surface? *Joel Harkness, Liberty University*

A. Yes. A gradual curve without an inflection point that transitions to a flat region is considered a single faying surface. However, if the gradual curve without an inflection point transitions to a flat region on both sides of the curve, then it will be considered a corner and both flat regions will be considered separate faying surfaces. [9.5.1, 9.5.2, 9.5.2.2]

Q9.6 What is the allowable distance between the top of the stringers and the outside vertical boundary of the bridge envelope shown in the Section Drawings of the Bridge Elevation Drawing? *Nicco Tebbano, Rensselaer Polytechnics Institute*

A. No specific dimensional requirement is called out for the distance between the top of the stringers and the outside vertical boundary of the bridge envelope in the Section Drawings of the Bridge Evaluation Drawing because the passageway that is defined by the stringer template and the tops of the stringers is not required to be centered within the bridge envelope. The requirements are that the bridge be no wider than 5'-0" at any location along the span and that the bridge provide a straight, clear decking support location conforming to the stringer template. [9.2.1, 9.3, 9.3.3, 9.3.8, 9.3.8.1, 9.3.8.2]

Q9.7 Is there a maximum number of members that can be connected with one bolt? *Jorge Sánchez, Universidad Autónoma del Estado de México*

A. No. There is no restriction on the number of members that can be connected with a single bolt provided that the bolt's nominal length does not exceed 3" and all Connection Safety requirements (Sub-Section 9.5) are met. [8.2.3.2, 9.5, 9.6]

Q9.8 May there be parts of a member that help retain a nut in its place such that once the nut is dropped into its position, a bolt can be threaded into the nut and the bolt and nut can be tightened without the need for the nut to be constrained with a tool? *Rich Teising, Vanderbilt University & Emily Hadden-Ford, Lehigh University*

A. Yes, provided that these parts of the member do not contact another member creating additional faying surfaces and provided that the nut and threaded end of the bolt are visible to be able to check compliance with the Connection Safety requirements (Sub-Section 9.5) [9.5, 9.5.4, 9.6]

Q9.9 May the surface of a member that serves as the outer ply of a connection be fabricated with a notch the size and shape of a bolt head, such that the bolt head fits into the notch when installed in the connection and as a result does not turn when tightening the nut? *Nicco Tebbano, Rensselaer Polytechnic Institute*

A. Yes. However, the bolt head must be inspectable, and the bolt head must not be able to pass completely through the outer ply of the connection (i.e. the notch depth must be less than the thickness of the steel making up the outer ply of the connection). [9.5, 9.5.3, 9.6]

Q9.10 May a faying surface have a hole in it if that hole is not intended to be penetrated by a loose bolt and the same faying surface is penetrated by a loose bolt with a nut elsewhere to create a connection? *Everardo Solis, University of California Berkeley*

A. Yes. There is no restriction on the presence or dimensions of holes in a faying surface that are not intended for bolts provided that the faying surface is penetrated elsewhere by a loose bolt that is secured with a loose nut. [9.5, 9.5.1, 9.5.2, 9.5.2.3, 9.5.3, 9.5.4, 9.6]

Q9.11 Does there need to be a continuous plane formed by the top of each stringer such that the rabbets of the stringer template are in contact with the tops of the stringers at all times over the length of the stringers? *Caylin Schnoor, Roger Williams University*

A. Yes. The stringers shall provide a contiguous top surface. This surface must be free of obstructions that would prevent the stringer template from sliding along the top of the stringers while the top of the rabbets in the template are in contact with the tops of the stringers. Any element that obstructs the rabbets, including, but not limited to gusset plates, nuts, and bolts is in violation of Sub-Section 9.3.8. However, Sub-Section 9.3.10 allows for a horizontal separation not exceeding 1/4" at the top of a stringer where two members are adjacent and an elevation change not exceeding 1/8" at the top of a stringer where two members are adjacent. Further information can be found in the 'SSBC Section 9 Stringer Overview' guide found on the Team Resources page of the SSBC website. [9.2.1, 9.3.8, 9.3.8.1, 9.3.8.2, 9.3.9, 9.3.10]

Q9.12 If two identical plates that are welded to separate members have a cutout within them, how many faying surfaces are created if these two plates are placed in contact to create a connection? *Kenneth Torrico-Pardo, George Mason University*

A. One faying surface is created requiring at least one loose bolt secured with a loose nut to penetrate it to meet the construction safety requirements. The presence of the cutout does not create a separate faying surface if there is continuous contact between the two plates over the faying surface. [9.5, 9.5.1, 9.5.2, 9.5.2.3, 9.5.4]

Q9.13 If the cross-section of one member contacts the cross-section of another member, is a faying surface created? *Mathew Greene, SUNY Canton*

A. Yes. Any location where there is contact between two members requires a connection and creates a faying surface that must meet the requirements of Sub-Section 9.5 no matter how small the area of contact is. [9.5.1, 9.5.2]

Q9.14 Can a legal connection be made where two tubes from different members are in contact with each other? *Mathew Greene, SUNY Canton*

A. The answer depends on how the tubes associated with the different members are in contact with each other. For two tubes associated with separate members that each have a sidewall in contact with the other, the sidewalls that

are in contact become the faying surfaces. If the faying surfaces are then penetrated by a bolt that is no more than 3" long, all other requirements of Sub-Section 9.5 are met, and the connection is inspectable, then it is a viable connection. If the cross-section of one tube associated with one member is in contact with a tube from another member, then the connection will not be legal since the cross-sectional area does not provide adequate thickness to be penetrated by a bolt. Further information can be found in the 'Connection Safety Examples' document on the Team Resources page of the SSBC website. [8.2.3.2, 9.5.1, 9.5.2, 9.5.3, 9.5.4, 9.6]

Q9.15 Are there any restrictions on the size of a faying surface? *Mathew Greene, SUNY Canton*

A. No. A faying surface can be any size provided there is continuous contact between the two members over the faying surface and the faying surface is large enough to be penetrated by a bolt. [9.5, 9.5.1, 9.5.2, 9.5.2.3, 9.5.2.4]

Q9.16 May a tube be used as a bolt spacer if the tube is welded to a member? *Mathew Greene, SUNY Canton*

A. Once a component is welded to a member, it becomes part of that member and is not treated any differently than any other part of the member. For a part of a member to be used as a bolt spacer, it must not violate any of the connection requirements in Sub-Section 9.5. Further information can be found in the 'Connection Safety Examples' document on the Team Resources page of the SSBC website. [8.2.3.2, 9.5.1, 9.5.2, 9.5.3, 9.5.4, 9.6]

Q9.17 May a stringer sag under self-weight provided that the bridge maintains a straight, clear decking support location conforming to the Stringer Template detail on the Bridge Elevation Diagram? *Connor Lowery, Arkansas State University*

A. Yes, the stringer may sag under self-weight provided that the tops of the stringer are no more than 1'-11" and no less than 1'-7" above the surface of the rivers, ground, and footings. However, if the judges deem the sag in the stringer to be too extreme for safe loading of the bridge, then loading will not commence and the bridge will not be eligible for awards, except aesthetics and video. [9.2.1, 9.2.2, 9.2.4, 9.3.7, 9.3.8, 11.2.11.1]

Q9.18 May parts of the bridge extend past the end of the stringer in the east-west direction as long as they remain in the bridge envelope even if they obstruct the passage of the stringer template after the termination of the northside stringer on the east end of the bridge where only the south side stringer is in contact with the rabbet of the stringer template? *Robert Connor Emerson, University of Tennessee*

A. Parts of the bridge may extend past the end of the stringer in the east-west direction provided they remain within the bridge envelope, but they must not obstruct the passage of the stringer template along the full length of the south side stringer. [9.2.1, 9.3.5, 9.3.6, 9.3.8, 9.3.8.1, 9.3.8.2, 9.3.9, 9.3.10]

Q9.19 Does a hole in the top of a stringer where the top of a bolt head sits level to the top of the stringer violate the requirement of there being no abrupt changes in elevation and no obstructions along the top of a stringer within a member? *Antonio Juárez Rivera, Universidad Panamericana*

A. If the top of the bolt head is even with the top of the rest of the stringer such that the stringer template can slide smoothly over it, then the bolt head is not considered to be an obstruction. If the hole in which the bolt head is located extends over the full width of the top of the stringer, then this location would be considered a transverse split in the top of the stringer that violates Sub-Section 9.3.9. [9.3.8, 9.3.8.1, 9.3.8.2, 9.3.9]

Q9.20 May a tube-in-tube connection be used if the intent of the connection is to enhance ease of construction rather than to resist movement? *Caleb Pilafas, Lipscomb University*

A. No. Tube-in-tube connections are not allowed. [9.5.2.5]

Q9.21 Does the full width of the top of the stringer of one member have to be within the allowed 1/4" longitudinal separation with the top of the stringer of the adjacent member? *Veronica McRae, Lakehead University*

A. No. Only a portion of the top of the adjacent stringers needs to be within the allowed 1/4" longitudinal separation to be considered continuous. [9.2.1, 9.3.8, 9.3.10]

Q9.22 Is there an addition to the total time or any additional penalty for utilizing the 5-minute connection correction period discussed in Sub-Section 9.4.4? *Zoe Ohl, Lafayette College*

A. No. A 1 minute penalty is assessed for each connection safety violation identified by the judge and each connection identified by the team as in need of repair. No additional penalty is assessed for utilizing the 5-minute correction period to fix these violations or connections in need of repair. [9.4, 9.4.4]

Q10.1 Must tools that are assembled during timed construction be disassembled before timed construction is completed? *Noah Sternick, Lafayette College*

A. No. Tools only need to be on the ground in the staging yard or in a builder's possession at the end of timed construction. [10.2.3, 10.2.4, 10.9.1]

Q10.2 During construction may builders assemble individual pieces into larger assemblies in the staging yard? *Kimberly Molina, University of Texas at Arlington*

A. No. Although members may touch within the staging yard without penalty, they are not allowed to touch once they leave the staging yard unless they are in contact with a constructed portion. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.4.4]

Q10.3 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 tightening of nuts and bolts? *Nicco Tebbano, Rensselaer Polytechnics Institute*

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. Usability requirements and connection requirements specified in Sub-Sections 9.3 and 9.5 of the SSBC Rules, respectively, will only be checked upon completion of construction. [9.4, 9.5, 10.1, 10.3]

Q10.4 Is there a maximum height that the bridge can reach during timed construction? *Nicco Tebbano, Rensselaer Polytechnics Institute*

A. The maximum height that the bridge can reach during timed construction is dictated by the venue where the competition will take place and whether the height of the bridge is causing safety concerns in the opinion of the judges. Safe construction practices need to continually be maintained. [10.1, 10.3, 10.3.1, 10.3.14]

Q10.5 At the end of timed construction, does a tool need to be in the same staging yard as where it was located at the start of timed construction? *Dean DiDomenico, Drexel University*

A. No. At the end of timed construction tools do not need to be returned to the same staging yard where they were located at the start of timed construction. At the end of timed construction, a tool must be in contact with the ground in either staging yard or in a builder's (or barge's) possession. [10.9.1]

Q10.6 Once a member is placed in contact with the ground within a footing, does it need to remain in contact with the ground in that footing throughout timed construction? *Dean DiDomenico, Drexel University*

A. No. A member placed in contact with the ground within a footing may be removed from that footing during timed construction. If the member is no longer in contact with a constructed portion when removed from the footing, it becomes an individual member again. If the member being removed from the footing is still part of a constructed portion of the bridge, the builder (or builders) moving the constructed portion shall at no time support the entire weight of the bridge or constructed portion. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.4.4]

Q10.7 May two members be assembled together while not in contact with a constructed portion of the bridge to create a constructed portion of the bridge? *Nathan Neblett, Old Dominion University*

A. No. A member may only come in contact with another member that is part of the constructed portion of the bridge. A builder must be inside the construction zone when touching a constructed portion of the bridge or when installing a member on a constructed portion of the bridge. Any constructed portion also must start on the ground within a footing. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.4.4]

Q10.8 If two separate constructed portions come in contact with each other during timed construction, are they considered a single constructed portion even if they are not connected with a bolt and nut? *Sukhdeep Chopra, University of British Columbia*

A. Yes. A constructed portion is defined in the glossary of the SSBC 2025 Rules as 'a single member in contact with the footing, or two or more members in contact with one another, with or without loose nuts and loose bolts, assembled during timed construction by builders on the ground in the construction zone.' Once two separate constructed portions of the bridge come in contact, they become a single constructed portion. The single constructed portion may later be separated again into two separate constructed portions provided each constructed portion is in contact with the ground within a footing. Any contact with a constructed portion by a builder or a tool held by a builder must occur with the builder in the construction zone. [10.1.7, 10.3.10, 10.3.11]

Q10.9 May a tool support the entire weight of an assembly of multiple members that is not in contact with the ground if the tool is attached to a constructed portion of the bridge? *Nathan Neblett, Old Dominion University*

A. No. The assembly being supported by the tool is not a constructed portion since it is not in direct contact with a constructed portion of the bridge and is not in contact with the ground within a footing. This situation violates the restriction on a builder who is outside of the staging yard simultaneously supporting or touching with tools more than one member that is not a constructed portion. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.4.4]

Q10.10 Are the members within a constructed portion required to be connected with a bolt and nut during timed construction? *Calli Nelson, Boise State University*

A. No. Connection Safety requirements (Sub-Section 9.5) are only checked after the completion of timed construction. A member becomes part of a constructed portion once it is in contact with a constructed portion. [9.4, 9.5, 10.1.7, 10.3.10, 10.9.1]

Q10.11 May a tool touch the ground within a footing? *Calli Nelson, Boise State University*

A. No. Only members may touch the ground within a footing during timed construction. [10.4.3]

Q10.12 May bolts or nuts come in contact with a member outside of the construction zone? *Jamie Danis, Vanderbilt University*

A. Yes. Bolts and nuts may contact a member outside the construction zone. A bolt also may be placed into a hole in a member outside the construction zone and then transported to the construction zone. However, a bolt and nut may not be used to connect one member to another member outside of the construction zone. [10.1.5, 10.3.7, 10.3.11]

Q10.13 May a tool be placed on the ground within a footing allowing a portion of the bridge to be suspended by that tool? *Joe Pavia-Jones, University of Alaska Anchorage*

A. No. A tool may not touch the ground within a footing and the constructed portion of the bridge must start in the footing. A suspended portion of the bridge is not a constructed portion because no member is in contact with the ground within a footing. Multiple members are not allowed to be in contact with each other since they are not part of a constructed portion. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.4.3, 10.4.4]

Q10.14 May a member be installed on a constructed portion of the bridge if that member extends past the construction zone boundary into the transportation zone during installation? *Joe Pavia-Jones, University of Alaska Anchorage & Travis Weber, University of Wisconsin-Madison*

A. Yes, provided that all parts of the bridge remain within the site boundary. Since a builder must be in the construction zone 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]

Q10.15 May the combining of multiple tools to create an assembled tool during timed construction occur outside of the construction zone? *Joe Pavia-Jones, University of Alaska Anchorage*

A. Yes. The combining of tools to create an assembled tool may occur anywhere within the construction site during timed construction. [10.2.4, 10.9.1]

Q10.16 May a constructed portion support a tool during timed construction that is then used to slide members along the length of the bridge? *Lleyke Dunnican, Rutgers University*

A. Yes. There is no restriction on 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. However, a tool held by a builder may not be in contact with more than one member that is not part of a constructed portion of the bridge. A member may be slid along a tool that is supported by the bridge, but that member is not a part of a constructed portion unless it is in direct contact with a constructed portion. If the member being slid is not part of a constructed portion, it may not be in contact with another member. [10.1.2, 10.1.7, 10.2.4, 10.3.7, 10.3.11, 10.4.4]

Q10.17 If a member not in contact with a constructed portion of the bridge is in contact with a tool that is in contact with the constructed portion of the bridge, is that member part of the constructed portion of the bridge? *Christopher Acosta, California State University of Northridge & Chloe Ferlito, University of Waterloo*

A. No. A tool cannot be a constructed portion of the bridge. Therefore, a member touching a tool is only part of the constructed portion of the bridge if the member is also in contact with a constructed portion. A builder who is outside of the staging yard also cannot simultaneously support or touch with a tool more than one member that is not a constructed portion. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.4.4]

Q10.18 If a member is stacked on top of another member that remains unconnected, but rests on top of a constructed portion of the bridge, is the added member considered part of the constructed portion of the bridge? *Chloe Ferlito, University of Waterloo*

A. Yes. Once a member is in contact with a constructed portion of the bridge, it becomes a part of the constructed portion whether or not it is connected with a loose bolt and loose nut. If another member were to be placed in contact with that first member that is already in contact with the constructed portion of the bridge, then it would also become part of the constructed portion of the bridge. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.4.4]

Q10.19 May a tool be used to partially support a constructed portion of the bridge? *Chloe Ferlito, University of Waterloo*

A. Yes. Provided that the constructed portion being supported remains in contact with a footing. A tool must not support a segment of members that are in contact with each, that are not part of the constructed portion of the bridge, and those members are not allowed to be in contact with each other without being part of the constructed portion. If a builder is holding the tool that is supporting the constructed portion, then the builder must be within the construction zone (or the barge holding the tool must be within the river). Safe construction practices also must be followed. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.3.14, 10.4.4]

Q10.20 May a pouch containing nuts, bolts, and/or tools be passed between builders after the start of timed construction? *Antonio Juárez Rivera, Universidad Panamericana*

A. No. A pouch must be worn by a builder (including barges) at the start of timed construction and cannot be removed from a builder during timed construction. All nuts and bolts must be in separate containers at the start of timed construction, but may be combined into a single container and passed between builders once timed construction commences. Tools must be in contact with the ground in the tool area of the staging yard at the start of timed construction and can be passed between builders once timed construction begins. [10.3.3., 10.6.1.1. 10.6.1.2, 10.6.1.3, 10.6.2, 10.6.3]

Q10.21 May builders deliberately commit accidents during construction after the 30-minute mark or during the repair period (Sub-Section 9.4.4.) without penalty and without being required to undo work completed while committing the accident? *Jason Hascall, Regional Head Judge*

A. Yes. After the 30-minute construction mark or during the repair period accidents are no longer noted by the judges. If it is after the 30-minute construction mark, then 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 construction mark or during the repair period. However, safety regulations provided in Sub-Section 10.3 will continue to be enforced to maintain the safety of everyone involved in the competition. [9.4.4, 10.3, 10.4, 10.7, 10.8.1]

Q10.22 May a constructed portion of the bridge be lifted such that it is in contact with the ground within at least one footing? *Aaryk Iwamoto, University of Hawaii at Manoa*

A. Yes. A constructed portion of the bridge only needs to be in contact with the ground within one footing to ensure that a builder or builders is not supporting the entire weight of the constructed portion and for the assembly of connected members to be considered a constructed portion. A builder must be inside the construction zone to touch (or touch with a tool) a constructed portion of the bridge. [10.1.7, 10.3.7, 10.3.10, 10.3.11, 10.3.12, 10.3.14]

Q10.23 May a builder step on the ground within a footing? *Aaryk Iwamoto, University of Hawaii at Manoa*

A. Yes. There are no restrictions on a builder entering or standing in the area designated as the footing. The footing area is considered part of the construction zone. [10.1.4, 10.2.1, 10.3.1, 10.4.1]

Q10.24 May bolts of different sizes and lengths be in the same container at the start of timed construction? *Travis Weber, University of Wisconsin-Madison*

A. Yes. The requirement is that loose bolts and loose nuts are in separate containers. No distinction is made for different sizes or lengths of loose bolts or loose nuts. [10.6.1.2, 10.6.1.3]

Q10.25 May an assembled tool that is in the possession of a builder at the end of timed construction cross the vertical plane of the staging yard boundary or the vertical plane of the construction site boundary? *Zoe Ohl, Lafayette College*

A. A tool may cross the vertical plane of the boundary between the staging yard and the transportation zone since it only needs to be in contact with the ground in the staging yard or in possession of a builder at the end of timed construction. However, at no time should any construction activity, including the movement of a tool, occur outside the site boundary as this has the potential to expose builders, judges, host personnel, and spectators to risk of personal injury. [10.1.2, 10.3.1, 10.9.1]

Q10.26 May an object be securely attached to a builder's clothing or shoe prior to the start of timed construction, and may that object then come in contact with the ground outside the staging yard? *Max Lenk, University of Wisconsin, Platteville*

A. Only clothing, pouches, and personal safety equipment may be worn by builders at the start of timed construction. An additional object attached to a piece of clothing or shoe that is outside the usual usage and definition of clothing or does not meet the definition of a pouch or does not serve as personal protective equipment

is considered a tool and cannot be worn at the start of timed construction. An item that is not typical clothing and bears on the ground will result in a penalty for a tool touching the ground outside the staging yard. If the object is required to bear on the ground outside the staging yard to complete construction of the bridge, then construction will be stopped and the bridge will not be eligible for awards in any category, except for aesthetics and video, for circumventing the intent of the competition and rules. [3.3, 10.1.5, 10.1.6, 10.2.3, 10.3, 10.3.2, 10.3.3, 10.3.8, 10.4, 10.4.1, 10.4.2, 10.4.3, 10.6.1.1, 10.6.2]

Q10.27 May a builder's foot be in contact or on top of a constructed portion of the bridge if their other foot is fully in contact (heel and toe) with the floor? *Max Lenk, University of Wisconsin, Platteville*

A. Yes, provided that the position of the builder is deemed safe by the judges and the foot on the ground remains in full contact with the floor at all times that the builder's other foot is in contact with the bridge. [10.3, 10.3.8]

Q11.1 Is a bridge in violation of the required 7" clearance above the surface of the ground (Sub-Section 9.3.4) if it deflects during vertical loading such that a 7" clearance is no longer present? *Juanandres Alvarez, University of Texas at El Paso*

A. No. The Usability requirements in Sub-Section 9.3 are only checked after the completion of timed construction and before the bridge is load tested. However, if any measured deflection downward exceeds 3" or the measured sway exceeds 3/4", then loading will be stopped and the penalty specified in Sub-Section 11.5.2 will be applied. [9.3, 9.3.4., 11.5.2]

Q11.2 Will vertical load be placed on the east end of the bridge such that it will only be supported by the south side stringer? *Alma Mata, San Jose State University*

A. No. Details of the possible vertical load placement locations are provided in Table 7.1 and the vertical load test plan in Drawing 5. [7.1, 11.5]

Q11.3 Where will the lateral load be applied during the lateral load test? *Zoe Ohl, Lafayette College*

A. The lateral load is applied to the bridge as close to the top of the stringer as possible. [11.4.2]