



Frequently Asked Questions March 2010

General

- A. The 2010 Rules and Regulations allow for a higher degree of flexibility in design, material and reinforcement choices.

If you are unsure whether something is permissible, assume that it is permissible ONLY if:

1. It does not compromise safety.
2. The rules and regulations do not specifically state that what you would like to do is not allowed.

- B. A question to the CNCCC will not receive a response if the rules and regulations related to the question are specific in what is required and obvious in what is not said.

The following examples:

- “The rules don’t mention a thing about displays. Are there displays this year?”
- “I can’t find anything restricting the use of end-caps. Are end-caps allowed?”

Apply the general guideline (1 and 2 above) and you will have the answers to these questions and other like them.

Section 1 – General Rules and Eligibility Requirements

Section 1.2 – Registered Participants

1.2.1 – Eligibility Requirements

QUESTION 1: I have a returning paddler who will be officially finished with school in this winter quarter. I understand that students must be at the undergrad level to compete as a paddler, would he still qualify? Also, if there is a possibility our team qualifies for the national competition, will he be able to paddle? Thank you for your time.

RESPONSE 1: Section 1.2.1 “Eligibility Requirements” on page 2 covers this topic.

QUESTION 2: One member of our concrete canoe team is not currently majoring in engineering but is a contributing member of our ASCE branch. Presently, he is a sophomore who transferred to our school this past year after attending a community college for one year. He is undecided on a major but is considering a math and science-related field, likely mathematics or teaching math. Given these circumstances - a student currently not majoring in engineering but with an interest in a math/science

related field and who has/will continue to take many of the pre-requisites needed for engineering- is he eligible to participate as a member of the our Canoe Team for the 2009-2010 academic year?

RESPONSE 2: As is stated in your question above, the rules EXPLICITLY state that team members (those that present at the academic presentation and/or paddle the canoe) must be majoring in engineering. The individual is not enrolled in engineering (regardless is that individual is enrolled in ASCE or not). This does not mean that this individual cannot be a contributor to the project (working on concrete, writing the technical paper, constructing the canoe, etc); however, it does prevent that individual from being one of the official team members.

QUESTION 3: At our university students are not accepted into the Civil Engineering Department until their Junior year therefore Freshmen and Sophomores are not technically in the major but are considered pre-engineering majors. If a freshman or sophomore is interested in participating for our team, are they considered to be majoring in engineering if they haven't been accepted into an engineering major yet but are planning to pursue engineering?

RESPONSE 3: In the scenario described above, the students would still be considered as majoring in engineering as they are pursuing their engineering degree. As long as they meet the other requirements (such as enrollment in ASCE chapter and have actively participated in the canoe project), they may be registered members of your team.

QUESTION 4: You have mentioned that those who are not one of the 10 "official" members of the team can still assist with the design, paper, and presentation. Can these people be mentioned in the project management chart? Can they participate in the actual presentation?

RESPONSE 4: The ten (10) official team members, maximum five (5) male and five (5) female, are the ones that represent the team in the presentation and/or races. The rules are fairly clear on this. Generally, schools have many more folks involved in the various aspects of the canoe project. All of the individuals that are part of the project can be mentioned in the PM chart (they are part of your team, regardless of whether they are part of the "official" representatives or not). Those not part of the official team cannot participate in the presentation (they can however, help prepare the PowerPoint slides, take the pictures or videos that are embedded in said slides, help with the script of the presentation, help prepare the presenters with practice questions, etc.).

QUESTION 5: We have a member of our organization who has been participating with our team's concrete canoe for the past three years; this will be her fourth year to participate. The rules state that you are only eligible to participate for three years, which would mean that she would not be able to participate in the races this year. However, her first year our school's canoe broke on the way to the Conference and we were not able to compete at all. Is she still eligible to participate in the races this year given these circumstances?

RESPONSE 5: The CNCCC views registered participation as being one of the official team members that registered on-site to compete at the conference and/or national competitions. That is, the team members are signing up with the intent of presenting and/or paddling. We further understand that there is some confusion at what "registration" is the official registration. Issues that normally occur at conference competitions such as "we registered some team members (as part of the packets that are normally done for conferences) but then they could not attend" or "we registered but before we even made it to the competition, our canoe broke/never was completed/etc." The CNCCC views the on-site registration as the official registration. The above question does not indicate whether to not the team

competed in the other portions of the competition, in particular, the oral presentation, which can be held without a seaworthy canoe. If the individual in question participated in a presentation (regardless of being able to compete in the races), then that individual has used a year of eligibility. If the individual was only slated to race and the canoe broke prior to the start of the competition (i.e., in transit) and a decision was made not to compete and therefore the team did not officially register on-site, then the year of eligibility was not used.

QUESTION 6: If one of our team members was part of the 10 official team members at a regional competition, from which we were disqualified for technical reasons (our ASCE chapter had been failed to produce an annual report or pay its dues), does this count as a year of official participation towards the three year rule?

RESPONSE 6: This would count as a year of eligibility regardless of the reason for the disqualification.

Section 2 – Canoe

Section 2.1 – Standardized Hull Design

QUESTION 1: According to section 2.1, "Teams shall not make any modifications to the hull design (i.e., increase/decrease in length, width, height and/or rocker; change in cross-section shape; etc.)." We understand and appreciate the idea of building the canoe to the specifications provided. We would like to know, however, if there is any room for deviation near the gunwales (purely for aesthetic purposes). Is it permissible to construct a canoe with deviations such as this since it does not really affect the overall hull design?

RESPONSE 1: The contours of the hull shape (which are the outside dimensions) are to be maintained up to and including the gunwale. Deviations are not to be made even for aesthetic purposes, which change the final dimensions.

QUESTION 2: During our review of the Rules and Regulations, we noted that the rocker for the 2009 canoe was 2.5 inches and the 2010 rocker is 3 inches. The Significant Changes document stated "One of the significant changes to the NCCC last year was the requirement for all teams to construct a canoe using a hull design that has been developed by the CNCCC. The CNCCC has decided to **reuse** the design for the 2010 competition." Is there a change in the hull design?

RESPONSE 2: The hull design used in 2009 is the same design being used for the 2010 competition. No changes have been made to either the AutoCAD drawings or the Excel Spreadsheet. Upon review of the coordinates in the stern stem section (see the Excel Spreadsheet), the CNCCC felt that the 3.0 inch rocker was more accurate of a description for that given section. We apologize for any confusion that this may have caused.

QUESTION 3: Section 2.1 of the rules states that "the canoe features an elliptical cross-sectional shape with 4-inch radial chines and flared sidewalls, 4 inches of bow rocker and 3 inches of stern rocker," however figure 2.1 does not show clearly from where this rocker is measured. Could this be clarified?

RESPONSE 3: Figure 2.1 in the Rules and Regulations is simply a schematic of the plan, elevation and cross sectional view of the canoe that is to be constructed by the teams. The CNCCC has provided the AutoCAD and Excel files on the ASCE website which should be used in the actual construction of the canoe. The measurements of the rocker should be easier to see on the files rather than the scaled down version that is Figure 2.1.

Section 2.6 – Seats and Mats and Section 2.7 – Slip Resistant Material

QUESTION 4: Seats cannot exceed a 20” x 20” x 20” maximum. Mats cannot exceed a 20” x 30” x ½” thick maximum. Seats and mats cannot be used together, at the same time, by one paddler. Section 2.7 - The use of non-skid tape or other slip resistant material is not permitted. From my experience as a paddler, everything gets slippery when it gets wet. What is considered a slip resistant material? Are teams allowed to use a silicon based or latex based material to custom fabricate seats or mats to the contours of the canoe? Given of course they are not stuck on to the canoe in any way shape or form. Would use of Polyurethane foam (expandable liquid foam) be permitted in creating seats or mats?

RESPONSE 4: You can create seats that conform to the contours of the canoe as long as you do not violate the dimension constraints provided.

QUESTION 5: Are the use of strap-on knee pads allowed if they are not made out of a skid-resistant material? Also, are the 20"x20"x20" seats allowed to be cut into a saddle-like shape and made of dense foam as long as they can be removed from the canoe? I realize these two types of padding cannot be used together.

RESPONSE 5: Kneepads are allowed regardless of the material that they are made off. The seats can be made out of any material and shaped in any way, shape or form (just think of it this way – make a 20” x 20” x 20” box; if the seat fits within the confines of that box, then it is allowed). Kneepads can be used in conjunction with either mats or seats; it is the mats and seats that are not allowed to be used together.

QUESTION 6: Section 2.7 states, "The use of non-skid tape or other slip resistant material is not permitted" Do this also excludes the possibility of adding sand or some fine aggregate/powder to the sealer or painting to make a rough surface?

RESPONSE 6: Teams are prohibited from adding solids to the stains and sealers (the noted exception being commercially available stain “thickeners” made specifically for acid stains). Painting is limited to the lettering of the canoe and school names; therefore, this alternative is not a viable option.

Section 2.10 - Flotation

QUESTION 7: Are we allowed to have a layer of foam throughout the inside of the canoe if concrete is layered on top of it and it is not showing? If we have a male foam mold, are we allowed to cut seats into the foam and then layer the rest with concrete so it is not exposed? Or are we not allowed to have individual cut out seats for each person and the canoe needs to be hollow on the inside?

RESPONSE 7: Section 2.10.1 states that “All flotation material that is incorporated into the canoe must be encased in concrete. Flotation can be placed at any location inside the canoe as long as it is

below the gunwale line.” So if the layer is encased in concrete, then it is acceptable. In regards to carving seats into a huge block of foam (male mold) and covering it in concrete, Section 2.10.1 is applicable here. It is noted that paddlers need to be able to safely exit the canoe. In addition, judges “might” consider that the foam is serving a structural purposes (not just flotation) or as a seat. Aesthetics should be taken into consideration as well.

Section 3 – Concrete

QUESTION 1: Does the concrete need to be done as a monolithic pour?

RESPONSE 1: No

QUESTION 2: How thick can our concrete be?

RESPONSE 2: The rules and regulations do not have a limit on the thickness of concrete, however, Section 4.3.1, Thickness (reinforcement) states that the “measured thickness (of the reinforcement) divided by the total thickness of the canoe wall or structural element (prior to staining or sealing) at any point in the canoe shall not exceed 50%.” Therefore, your concrete must be at least twice as thick at the reinforcement being used in a given section.

QUESTION 3: Does the "integrally colored concrete" used for "Finishing" have to meet "Section 3 – CONCRETE" specifications? Specifically the proportions of recycled aggregate in "3.2.2 Aggregate" and the maximum allowable cementitious material ratio in "3.3.1 Mass of Cementitious Materials".

RESPONSE 3: Absolutely. Section 3.0, General (Concrete) states that “Concrete mixtures, regardless of their use in the canoe, are defined as unique and independent mixes and shall comply with all of the requirements of this section.” The finishing primarily deals with the use of stains and sealers on the concrete. Integral colored concrete is just concrete that has pigment (liquid and/or dye) incorporated into the mixture during the batching process.

Section 3.2 – Materials

QUESTION 4: Are there any requirements or specifications for the water that we use in our mix?

RESPONSE 4: The Rules and Regulations do not list any particular standard for mixing water, however, the CNCCC wants it to comply with the ASTM standards for mixing water in concrete. The following is taken verbatim from the NRMCA publication on the topic: While the requirements for water were addressed in ASTM C 94, increased pressures on concrete producers to use process water from concrete production operations and other recycled sources created a need for a more comprehensive coverage on standards for water. This resulted in two new standards developed through the ASTM consensus process – one a specification for water and the other a test method that specifically covers measurement of density and solids content in process water: ASTM C 1602/C 1602M-04 - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete ASTM C 1603/C 1603M-04 - Standard Test Method for Measurement of Solids in Water ASTM C 1602 is a performance based specification that allows a concrete producer to qualify a source of water for use in concrete. The standard defines the following sources: Potable water – that which is fit for human consumption Non-potable water – other sources that are not potable, that might have

objectionable taste or smell but not related to water generated at concrete plants. This can represent water from wells, streams or lakes. Water from concrete production operations – process (wash) water or storm water collected at concrete plants. Combined water – a combination of one or more of the above defined sources recognizing that water sources might be blended when producing concrete. All requirements in the standard apply to the combined water as batched into concrete and not to individual sources when water sources are combined. Mixing water in concrete includes batch water added when ingredients are batched into a mixer, ice, water added by the driver, free moisture on aggregates and water introduced in any significant quantity when admixtures are used.

3.2.1 – Hydraulic Cement

QUESTION 5: This section states, "A maximum of 50% (by mass) of the cementitious materials used in any concrete mixture can consist of hydraulic cement meeting the requirements of Section 3.2.1.1" Can you please clarify your definition of "cementitious materials"? There has been confusion on our team for a few years as to whether materials refer to binders (i.e. portland cement, fly ash, metakaolin) or the entire concrete mixture (i.e. binders, aggregate, etc.).

RESPONSE 5: Section 3.2.1, "Cementitious Materials" covers this relatively clearly (the binders you have listed above are covered in the subsections). If the question pertains to the 50% mass, the intent is that upwards to 50% of the total mass of the cementitious materials content can (not must) be hydraulic cement (for example, if you have 800 pcy of cm, the maximum amount of hydraulic cement meeting Section 3.2.1.1 is 400 pcy).

QUESTION 6: Does 100% slag cement count towards the rule; "A maximum of 50% (by mass) of the cementitious materials can consisting of hydraulic cement"?

RESPONSE 6: The slag cement would count towards the determination of the percentage of cementitious materials. You will need to take into consideration if the slag cement is 100% slag (ASTM C989) or if you are considering the use of a portland-pozzolan blend (may be something like 70% slag and 30% portland cement; ASTM C 595). Both types may be referred to as "slag cement" by the manufacturers.

3.2.2 - Aggregate

QUESTION 7: So if you are using two mixes, each mix must be composed of at least 15% aggregate by weight and for each mix at least 50% of the total aggregate used per mix (25% of two types) must be recycled aggregate by weight? Or is the 50% by weight of recycled combined?

RESPONSE 7: Section 3.0, "General" states, "Concrete mixtures, regardless of their use in the canoe, are defined as unique and independent mixes and shall comply with all of the requirements of this section." If you have more than one mixture, each and every one of them must meet the specifications individually.

QUESTION 8: In Section 3 with regards to recycled aggregates, what is the definition of "different?" Does this refer to different sizes of the same brand, different brands, or different materials? For example would we be allowed to use Siscor glass spheres and K1 microspheres?

RESPONSE 8: The intent of requiring two “different” aggregates is to have teams look at the variety of materials that are out there that can be incorporated into concrete mixtures. Therefore teams should be looking at different types of materials. Different sizes of the same brand (such as the various grades of Poraver Siscorspheres™) only constitute one type of material. Different brands of the same material only constitute one type of material (for example, if one used shredded tires but one source is Firestone and the other is Michelin, it is still just shredded tires). This does not prevent you from using Siscor and K1 microspheres together, however, at least one other type of aggregate is going to be needed. Also, it is our understanding that Siscorspheres are considered to be made from post consumer glass (hence it meets the recycled definition). K1 microspheres might not meet the requirements of recycled material; if used, teams should ensure that they do if they intent on making that claim.

QUESTION 9: In regards to the recycled aggregate, what is the ruling if the aggregate is made (burned/cooked) by recycled oil? If it is allowed how would it tie into the 25% of the total weight?

RESPONSE 9: Section 3.2.2, “Aggregate” states that each mixture must contain a minimum of two (2) different recycled materials and that each recycled aggregate must make up at least 25% of the total amount of aggregate by weight. The recycled aggregates are the final processed material (crushed glass, crumb rubber, crushed concrete, etc.). Section 3.2.2 defines that recycling aggregate as processing used materials into new products in order to prevent the waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air and water pollution by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions as compared to virgin production. In the question above, if the aggregate itself a processed material that contains recycled oil, or is the aggregate a natural material that is processed using the oil (for example, an expanded shale that is bloated in a furnace that used the oil to generate the heat). If it were the former, than it would be considered a recycled aggregate. If it is the latter, then it is not a recycled aggregate but one that is processed/manufactured using sustainable practices.

QUESTION 10: We wanted to know if a 3M bubble glass product (.853mm) is legal product pertaining to the usage as a recycled aggregate.

RESPONSE 10: The link that was included with the question directly us to the 3M™ Glass Bubble product data sheet. According to the information provided by 3M, their K and S series glass bubbles are a chemically stable soda-lime-borosilicate glass. There are no claims of it being a recycled aggregate (whereas a similar product, Poraver, indicates that it is made from post consumer glass, hence a recycled material). Unless information is provided to the contrary, 3M glass bubbles do not meet the recycled aggregate criteria.

QUESTION 11: We wanted to know if pumice is legal product pertaining to the usage as a recycled aggregate.

RESPONSE 11: Pumice is a textural term for a volcanic rock commonly resulting from explosive eruptions (plinian and ignimbrite-forming) where gases from viscous magma nucleate bubbles cannot readily decouple from the viscous magma prior to cooling to glass (i.e. not having a

crystalline structure). The result is a solidified frothy lava composed of highly microvesicular glass pyroclastic with very thin, translucent bubble walls of extrusive igneous rock. (Source: Wikipedia)

In its natural form it cannot be construed in any way as a “recycled aggregate” it is igneous rock.

QUESTION 12: We are considering using crushed tiles as recycled aggregate. Would that work?

RESPONSE 12: While it might be obvious that the answer is “yes,” the technical response is “it depends.” This response below will be applicable to a variety of materials and the explanation that we provide should be fairly clear.

According to Section 3.2.2, Aggregate, “Recycling aggregate shall be defined as processing **used** materials into new products in order to prevent the waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air and water pollution by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions as compared to virgin production.” Basically, the aggregates that are being considered here are either by-products of a manufacturing particular process (for example, bottom ash and slags), which would enter the waste stream and would be disposed of elsewhere (i.e., a landfill) or post-consumer materials that are processed and reused (examples would be crushed glass, recycled concrete, crushed brick, etc.). The issue that we wish to cover is the post-consumer one. If one goes to their local home supply store and purchases a pallet of bricks or tiles, takes them to the laboratory and crushes them down to use as aggregate in the canoe, this would not be considered a recycled aggregate. If the same set of bricks and tiles were used in the construction of a building, then the building was demolished and the bricks and tiles were collected, taken to the laboratory and then crushed and used in the canoe, it would be considered a recycled aggregate.

The same goes with recycled concrete aggregate (RCA). If it were created from concretes used in building, highways, QC test cylinders, and yes, old concrete canoes, then it would meet the definition of a recycled material. Now, if you solely created a very lightweight concrete will no other intended purpose then to just crush it down and use it as aggregate in another concrete mixture, then you do not have a recycled material. So, if the tiles you plan on crushing have been used elsewhere and are then being reused as aggregate then it is considered recycled.

QUESTION 13: If we were to crush last year’s concrete canoe and use it as an aggregate, would it be acceptable to do this?

RESPONSE 13: Yes.

QUESTION 14: May we use blast furnace slag (a co-product of the iron production process) that is expanded or pelletized, as a recycled aggregate? I know that ground granulated blast furnace slag is used as a supplementary cementitious material but the slag I would like to incorporate into our concrete mix comes in sizes ranging from 1/2" to sand grades of aggregate.

RESPONSE 14: In a previous response (RESPONSE 12) regarding recycled aggregates from the same base material, we indicated that the combustion of coal results in the generation of a variety of by-products into the waste stream including bottom ash (which are granular pieces of material),

cenospheres which are a processed material and fly ash (usually Class C or Class F depending on the type of coal used) which is a pozzolan. The same would go for slag in that the equivalent of bottom ash would be a recycled aggregate as it is being taken from the waste stream (i.e., not going to a landfill).

QUESTION 15: If we take aesthetic rocks used in a previous canoe display and crush them into aggregates, would this constitute as recycled aggregate?

RESPONSE 15: This would not meet the definition of a recycled aggregate.

QUESTION 16: I have a few aggregate choices that may meet the requirements for recycled aggregates. They are bottom ash and fine silica sands. I would prefer to use the bottom ash since it has a lower Specific Gravity than the sand. Does this meet the requirement for recycled aggregate? The sand is extremely fine; finer than golf course sand trap sand. The sand would be screened to assure nothing incorporated would pass the #200 sieve. This sand is a waste product and has no particular use. I would prefer to use the bottom ash. Does that meet the requirements of "recycled aggregate"?

RESPONSE 16: The CNCCC sent out a response on 9.28.09 discussing recycled aggregates and the base materials that they come from. Bottom ash which is a granular material resulting from coal combustion meets the definition for recycled aggregate. So you have one of the two required aggregates for the concrete mixtures. Fine silica sand on the other hand is a natural occurring material (how would one consider it a waste product?). This does not mean that it cannot be used in the concrete, however, to consider it as a recycled aggregate would be incorrect.

QUESTION 17: If two aggregates are made from the same base material but processed into different types of aggregate, are they considered different recycled aggregates? For example, glass Sicospheres and crushed glass are both made from glass, but they have been processed in different ways, resulting in two very different aggregate materials.

RESPONSE 17: There is an understanding that various base materials may result in the production of several products that can be considered as recycled aggregate. We cite several examples below: Post-consumer glass – can be simply crushed into what is commonly referred to as “crushed glass” or “glass cullet.” Then there are proprietary processes that result in products such as Siscorsphere™ aggregate. · Coal – during the combustion of coal a variety of products are generated such as bottom ash (which are granular pieces of material) as well as cenospheres, which are a processed material. Fly ash, which is a pozzolan and not an aggregate, is also a by-product of coal combustion. · Wood – technically paper, cardboard, wood chips, saw dust, etc. would fall under this category. Given that the properties of the materials (specific gravity, particle size, strength, absorption, etc.) would be different, even if they were coming from the same base material, the CNCCC will consider them as different recycled materials. Therefore microsphere aggregate (such as Siscorsphere) and crushed glass would be considered as two different materials. Teams are cautioned to ensure that the products that they intend to use are meeting the recycled description.

QUESTION 18A: We would like to ask for clarification on several things regarding section 3.2.2. The rules say, "The aggregate(s) selected shall contain a minimum of two (2) different recycled materials in

accordance with Section 3.3.2. " (1) whether two different recycled materials means two different recycled aggregates or two different recycled materials within the mix; (2) whether this requires (2) different recycled all mixes used in the canoe. Scenarios such as the following confuse us: for canoe X we are using 2 mixes (1 and 2). If recycled aggregates A and B are used in Mix 1, do aggregates A and B still count as 2 different recycled materials if used in Mix 2; or must we have different recycled aggregates C and D in Mix 2? The rules also say, "Recycling aggregate shall be defined as processing used materials into new products in order to prevent the waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air and water pollution by reducing the need for "conventional" waste disposal, and lower greenhouse gas emissions as compared to virgin production." If used concrete containing lightweight sand was recycled and aggregates were separated and we were to use this lightweight sand, would it count as a recycled aggregate?

QUESTION 18B: This section states that two different recycled materials are to be used. How would the word "material" be classified? Is it two completely different materials (glass and rubber) or can it be similar products from two different companies. Glass spheres (Poraver) and ceramic spheres (Cenospheres) are what we have questions about.

QUESTION 18C: "The aggregate(s) selected shall contain a minimum of two (2) different recycled materials in accordance with Section 3.3.2. Each recycled aggregate must constitute at least 25% of the total amount of aggregate by weight." We would like to know if according to the ASTM standards, aggregates are defined on the gradation (size), therefore two different sizes constitute two different materials, than will two distinct sizes of the same material be considered two different aggregates, which in turn will comply with the competition's rules for the usage of 2 different materials?

RESPONSE 18: We have defined the recycled aggregate material issue in several previous responses. Teams may use different recycled aggregates made from the same base material (for example, crushed glass and Siscorspheres, both of which are made from post consumer glass). Obviously, two different types of materials (say, crushed glass and rubber tire chips) would suffice this requirement as well. Previous responses also discuss using various grades of the same product and different producers of same materials (i.e., brand names). Each and every concrete mixture used in the canoe, regardless of its use, shall meet the requirements as outlined in the rules and regulations. Therefore, each mixture used must have two recycled aggregates (minimum) in it. Teams can use the same two recycled aggregates in the mixes that they develop. So in the scenario that you outlined above, aggregates A and B can be used in Mixes, 1, 2, 3...n. In regards to recycling lightweight sand from a hardened concrete, we assume that the end result of the pulverization of the concrete will be recycled concrete aggregate (RCA) which definitely meets the requirements. The hydrated cement paste will stick to the sand and you will end up with chunks of concrete with the sand embedded within.

QUESTION 19A: Section 3.2.2 states that each recycled aggregate must constitute at least 25% of the total amount of aggregate by weight. First, does this mean that every recycled aggregate used must constitute at least 25% of the total? E.g. if 3 recycled aggregates are used in a mix (and those 3 are the only aggregates used), must all 3 constitute at least 25% of the total. Or would 10% of one and 45% each of the remaining two fulfill the requirement? Second, if a team were to choose to use an extremely lightweight aggregate, will the 25% by weight requirement still apply, or will they be able to use 25% by volume to meet the requirement?

QUESTION 19B: Must ALL recycled aggregates constitute at least 25% of the total amount of aggregate by weight or must A MINIMUM of TWO recycled aggregates constitute at least 25% of

the total amount of aggregate by weight? For example, is the following recycled aggregate composition acceptable? Recycled aggregate #1 contains 25% of total amount of aggregate by weight. Recycled aggregate #2 contains 25% of total amount of aggregate by weight. Recycled aggregate #3 contains 10% of total amount of aggregate by weight.

RESPONSE 19: The 25% for the recycled aggregate amount is in reference to the two (2) required recycled aggregates (also note that Section 3.3.2, Aggregate Proportioning, states that the amount of recycled aggregate must comprise a minimum of 50% of the total amount of aggregate by weight.). Teams can have more than two recycled aggregates, but only two need to meet the 25% requirement. Therefore in the scenario provided above, Aggregates A, B, and C (assume all recycled) can be proportioned 10%, 45%, and 45%, respectively, as B and C exceed the 25% requirement. In response to the second item regarding the use of extremely lightweight aggregate, the rules and regulations pertaining to aggregate content are based on weight percentages (in relation to the total aggregate content no volumetric values provided as it relates to aggregates. The 25% requirement would apply if the team were using only two recycled aggregates. If the extremely lightweight aggregate is not a recycled material or if the team has two other recycled aggregates (like in the paragraph above), then the 25% requirement is not applicable.

QUESTION 20: For aggregates that don't already have documentation proving they are inert (like recycled concrete canoes), does ASTM C311- "Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete" - with a test result of nearly 0% strength activity index suffice to prove aggregate do not react with the binding matrix?

RESPONSE 20: The evidence in the literature strongly suggests that the negative effects of recycled concrete aggregate (RCA) in the mix (increased absorption, reduced strength, lower stiffness) more than offset possible positive effects (activation of pozzolanic reaction by the alkali and calcium hydroxide in the residual paste or possibly additional hydration of unhydrated portion of cement particles). Running the pozzolanic activity index test will constitute an effort disproportional to the benefit. The CNCCC will consider RCA as inherently inert.

QUESTION 21: We have been researching ceramic microspheres made from fly ash production. They are recycled, however must we prove that they are inert and that they will not react? The website states they are inert however must further proof be provided by our team?

RESPONSE 21: Technical data sheets that state that the product is inert will suffice. Teams do not need to prove that they are inert.

QUESTION 22: In Section 3.3.2 aggregate proportioning the rules state "The composite gradation of the aggregates selected shall have no more than 5% (by weight) passing the No. 100 sieve (0.15mm)". In the past we have used ASTM C33 as a max/min value for the composite aggregate. Will this standard specification apply to this year's composite mix design?

RESPONSE 22: ASTM C 33 is not referenced in this year's version of the rules and regulations (it was not in last year's edition either) and therefore is not a specification for this year's aggregate.

QUESTION 23: Are there any aesthetic requirements for the aggregates? Can they be dark in color?

RESPONSE 23: The only requirements as noted in the Rules and Regulations pertain to gradation, amount (as it relates to unit weight of concrete) and recycled content.

QUESTION 24: In Section 3.2.2, it states "Each recycled aggregate must constitute at least 25% of the total amount of aggregate by weight." Can we assume that "weight" refers to dry weight of both the individual aggregates and total aggregate?

RESPONSE 24: Yes.

QUESTION 25: We have a question regarding the use of cenospheres. Reading through the FAQs hasn't really helped, as answers seemed to contradict themselves. This quote comes from response #14: "by-products into the waste stream including bottom ash (which are granular pieces of material), cenospheres which are a processed material" In addition, the company that sells them claims they are recycled (which seems to make the difference in things like brands of glass bubbles, response #5) This seems to state that cenospheres can be used because they prevent the materials they're made of from entering the waste stream. However, in response #18 its said "as well as cenospheres which are a processed material" which seems to indicate they do not qualify. We would like this clarified for sure as to whether or not cenospheres are a recycled material.

RESPONSE 25: Our response in the FAQ (#14) was dealing with slag and had made referenced to a previous response regarding recycled aggregates. The previous response stated that various by-products came from coal combustion such as bottom ash, cenospheres and fly ash. We have stated that recycled materials include by-products, which would enter the waste stream. Cenospheres fit that category.

QUESTION 26: If we use Cenospheres and Poraver glass beads, does that constitute as 2 different aggregates?

RESPONSE 26: Yes. Cenospheres are the by-product of coal combustion and Poraver is a post-consumer glass product. They are both considered in the family of microspheres, microballons, etc., but are from two different base sources. Both are considered recycled. Hopefully this will be the last question regarding these materials as numerous responses have been given regarding these two specific materials.

QUESTION 27: Would Bagasse ash be considered a recycled material to be used for our aggregate? It is the remnants from processed sugar cane.

RESPONSE 27: Based on our review of the literature, sugar cane Bagasse ash (SCBA) is an ultra fine material that is a cement replacement (i.e., pozzolanic material) and would fall under the "cementitious material" category and is not an aggregate. If additional information is provided to the contrary, the CNCCC will review and reconsider this position.

QUESTION 28: Would it violate the rules to use waste ink pigment left over from ink cartridges to color the canoe. A company donated the material to use as a research project and the school had a graduate student do research on the use of the material. Since there is no ASTM for using the material, does it violate the rules?

RESPONSE 28: We have received several questions regarding the use of waste ink as a pigment. Our official ruling is that the pigments used for the integral color of concrete (i.e., pigments mixed into the concrete itself) were to meet ASTM C 979 “Specifications for Pigments for Integrally Colored Concrete” (see Section 3.2.4.3). We are not considering this material to fall under “Specialty Admixtures” (Section 3.2.4.5), which is intended to cover items that currently do not have an industry standard. While this is an innovative application, it is not allowed under the current rules.

QUESTION 29: Is concrete pigment considered an aggregate?

RESPONSE 29: No

QUESTION 30: We have reviewed several design reports, which have been posted on various websites and noticed that the upper and lower limits of ASTM C33 gradation are presented on the sieve analysis curves. Is there a reason for this?

RESPONSE 30: Several years ago the rules and regulations specified that composite aggregate gradation needed to be within the specified limits of fine aggregate under ASTM C33. This specification is not in the current edition of the rules and therefore the limits are a carryover from previous competitions. The limits do not need to be shown.

Section 3.2.3 – Fibers

QUESTION 31: If using randomly oriented fibers, which are mixed into the concrete, may we vary the amount of fiber per batch? If we vary the amount of fiber per batch of concrete, will we no longer meet the rules in regards of having a homogeneous cross section (if my understanding of the rules is correct)?

RESPONSE 31: There are no rules that state that you must have a homogenous cross section in the canoe. You may batch concrete with different amount of fibers. In doing so, you are making a different concrete mixture and you will need to make sure that it is in compliance with the rules and regulations.

Section 3.2.4 – Admixtures

QUESTION 32: We are using some dry admixtures this year. Where should they go in the mix design table?

RESPONSE 32: Yes, dry admixtures should be provided in the mix design table (Table 3.1). We suggest that the section “Solids Content of Latex Modifiers” be adjusted to ‘Solids Content of Admixtures’ in this case. This way, the dry admixtures are incorporated into the table. If you are using latex as well, we suggest that the latex solids be the first entry under this section.

QUESTION 33: Is integral colors for the concrete allowed? We're looking at using an integral color admixture that has 70% solids instead of a stain. How do the finishing rules in section 5 apply?

RESPONSE 33: Section 3.2.4.3, Coloring Admixtures/Agents and Concrete Pigments, states that they shall meet the requirements of ASTM C 979 (Specifications for Pigments for Integrally Colored Concrete). Therefore they are allowed. Section 5 deals primarily with sealers and stains including the percent solids content (there is a mention of integral color as it relates to the use in the concrete to create graphics. There is no solid content limit for the color admixture. It just needs to meet ASTM C 979. With that being said, the integral color admixture is to be actually integrated (mixed into) the concrete (i.e., do not try to use the admixture itself as some sort of stain on the concrete).

QUESTION 34: I have questions with regards to the latex polymer modifier. I have been looking through ASTM C1438, type II standards to learn about this admixture and I am unsure to what specifications the latex polymer must meet. I have been given the impression that the latex polymer must meet testing standards when mixed with various concrete and mortar. Nowhere does it state specific qualities the latex must have, for example; total solids percentage, pH, Brookfield viscosity, Butadiene content percentage, and weight per gallon. Are there specific qualities the latex polymer must meet and where can I find them? Must the material testing data sheet (or product description) for the polymer specifically state that it meets ASTM C1438, type II standards?

RESPONSE 34: According to Standard Specification for Latex-Modified Concrete (LMC) Overlays (ACI 548.4-93) "There is no ASTM standard for these types of latexes at this time. When such a standard becomes available, it shall govern." The ACI document Guide for the Use of Polymers in Concrete (ACI 548-1) provides the following table of properties.

QUESTION 35: Section 3.2.4.5 states that specialty admixtures such as viscosity-modifying admixtures do not have ASTM standards and thus require pre-approval. The admixture that our team hopes to use is a viscosity-modifier known as V-Mar and is stated as a "High efficiency liquid admixture designed to enable production of Self Consolidating Concrete (SCC) by modifying the rheology of concrete". Will such admixture be allowed for us to use?

RESPONSE 35: V-Mar would be an allowable admixture.

QUESTION 36: Section 3.2.4.5 of the rules states that "Specialty admixtures, such as but not limited to, shrinkage reducers, integral capillary waterproofers, and viscosity-modifying admixtures, do not currently have ASTM standards. The use of these admixtures is not prohibited, but may require pre-approval by the CNCCC." Specifically what kind of approval is necessary, and when is it necessary?

RESPONSE 36: Generally, teams submit to the CNCCC via e-mail a request for approval of a specialty admixture along with a copy of a technical data sheet. We review the data and provide a private response, if requested, to the teams submitting the request. We highly suggest that you obtain approval prior to making your canoe.

Section 3.3.4 – Minimum Air Content

QUESTION 37: Minimum Air Content, states, "The minimum required air content for any concrete mixture is 6.0%, determined gravimetrically (ASTM C 138)." Would it be an acceptable test

deviation to determine the required air content on hardened concrete due to the difficulty of testing wet perlite, which is a part of the concrete mix? All other parts of the ASTM are adhered to.

RESPONSE 37: The gravimetric air content is mathematically computed knowing the volumes and weights of the various constituents in the concrete mixture (cementitious materials, aggregate, fibers, admixture solids, water and air). It is representative of the air content at the time of batching when you have achieved your goals of workability and unit weight of your plastic (wet) mixture. It is assumed that the aggregates have been conditioned to the saturated, surface dry (SSD) condition or that enough water was added beyond what is required for cement hydration to account for aggregate absorption. Since you should have known values of specific gravity, weight (mass), absorption values, etc., and you determine the unit weight of your plastic concrete, you can determine the gravimetric air content. The air content of hardened concrete can be different than the air content of the plastic concrete. For example, when you cast concrete cylinders you typically put them in 3 fairly even lifts and rod each lift 25 times with the upper lifts being rodded 1 inch into the lift below (there is tamping with a mallet after each lift). However, if you hand-place the concrete on the canoe mold, assume you are working it with hands and trowels; you may actually be making it denser on the mold (as compared to the cylinders). If one assume that mass is conserved, by making it denser you are changing the air content of the mixture. Looking at the other end of the spectrum, many teams are using lightweight aggregates that can have high absorption characteristics (such as perlite) and/or are very porous (like cenospheres and everyone's favorite, Poraver Siscorspheres). Depending on how they are conditioned, these aggregates can be filled with water, and then after the concrete hardens and is left to dry, the unit weight will change. If the concrete is bone-dry and then the unit weight is taken, one would miscalculate the air content since the air within the aggregate (for example, the air within the shell of the Poraver) would be included. That air (within the microsphere, microballon, etc) is not part of the air content of the concrete. The air content represents the air within the aggregate-paste matrix. Therefore we are using the gravimetric air content as the reference point. At this point in time, you should have enough data collected from your testing program to determine what you are batching, the properties of the materials that you are using to figure out your proportioning and hence your gravimetric air content.

3.4.1 – Mixture Proportions Table

QUESTION 38: On page C-1, General Comments, under the section on water. The first bullet says to include the amount of water needed to account for aggregate absorption, hydration and workability. The second bullet is for the amount of water added for aggregate absorption. At the end of the section it is stated that the total of all 3 categories is the "Total Water" for the mixture. Wouldn't this total water be including the aggregate absorption water 2 times?

Bullet 2 = 20 lbs for absorption

Bullet 3 = 5 lbs for admixtures

The total would be $260 + 20 + 5 = 285$. When the real total should only be 265 since aggregate absorption is counted 2 times.

RESPONSE 38: Appendix C states.... The amount of water needed for the mixture is broken down into three (3) categories:

- "Batched Water" is the total amount of water needed to hydrate the cementitious materials and for workability. As noted on Table 3.1, include the amount of water needed to account for aggregate absorption.

- “Total Water Added for Aggregate Absorption” is the amount of water needed to reach the saturated, surface dry (SSD) condition from the oven-dry condition, for all of the aggregates
- “Total Water from All Admixtures” is the amount of water from the admixtures.

Combined, these three (3) categories of water will give you the “Total Water” for the mixture.

We can understand the confusion that the word “Combined” gives. In this case, you are not summing up the three categories as you correctly point out that the water for absorption would be included twice. The Total Water is the sum of the Batched Water and the Total Water from All Admixtures. The Total Water Added for Aggregate Absorption is part of the Batched Water and is provided more for information purposes. So in the example you provided above, your Batched Water is 260 lbs (of which 20 lbs is for the aggregate), Admixture Water is 5 lbs, therefore your total water is 265 lbs.

QUESTION 39: According to the footnote for Specific Gravity in Table 3.1, “For aggregates, provide ASTM C 127 oven-dry bulk specific gravity.” However, this ASTM standard is specified for Coarse Aggregate. Since our aggregate cannot be classified as coarse aggregate, it seems that we should actually use ASTM C 128, which is specified for Fine Aggregate. Is this a mistake in Table 3.1?

RESPONSE 39: Use the ASTM standards that you see fit. It appears that C 127 would be more appropriate for the fine aggregate used in the canoes. One question for teams to ponder – even though the particle size of the aggregates used in the concretes for canoes meet the definition of “fine” by ASTM, is the methodology applicable to the type of materials used? Just something to think about

QUESTION 40: Is it a legal procedure to condition dry aggregates such that at the time of batching they have some moisture content up to SSD?

RESPONSE 40: It is actually the preferred procedure to condition aggregates to the saturated surface dry (SSD) condition prior to batching the aggregate into the concrete mixture. This would allow the water that is added for cement (cm) hydration to be used for hydration and not to be absorbed by dry aggregate. Now the real question is, why would you think it would be?

QUESTION 41: In the mix design table there is a section for "Solids Content of Latex Modifiers" so that the weight and volume of the solids portion of a latex is included in the unit weight and yield calculations. We think these calculations would also apply to any other admixture with a significant dosage and a high solids content, such as the 100% solids proprietary fiber dispersing admixture that our team uses. In the past we have included it under "Admixtures" with explanatory footnotes for the units and final yield calculations. Would it be more appropriate to include this dispersing admixture under "Solids Content of Latex Modifiers" and then rename the section "Solids Content of Admixtures"?

RESPONSE 41: Changing the section to “Solids Content of Admixtures” would be acceptable. If you are using latex modifiers as well, include that as your first solid content under that section.

QUESTION 42: In terms of legal mix designs, does that apply to all categories of the Table? For instance, in the "Non-SSD Proportions as Designed" Column, say our concrete has a designed air

content of 4%, but after mixing, the Yielded Proportions show a gravimetric air content of over the minimum required 6%. Would that be a legal mix even if it were designed illegally?

RESPONSE 42: The table is intended to show how you derived your final (yielded) mixture proportions in a step-by-step process from developing the proportions, batching it in the laboratory and then adjusting so that the “as design” proportions match up to what was achieved in the lab. It is the yielded proportions that the compliance will be based on. In the case that you have, you are stating that you originally had a mixture that was non-compliant but in the long run after batching it met the requirements (therefore, you would have a compliant mixture, assuming that the other requirements are in compliance as well). Likewise, you may have “as designed” proportions that you assume are in compliance, but after batching there is chance you are not in compliance (as designed air – 8%, but after batching you get 4%).

QUESTION 43: While doing our mix design calculations, we were computing the water in the admixtures. Our calculation uses the density of water while the White Paper (revised version) uses the density of the admixture. Can you please clarify which one it should be?

RESPONSE 43: The equation in the White Paper (revised version) for the water in the admixture is as follows: Water in admixture = dosage x cwt of cm x water content x (1 gal/128 fl oz) x (lbs/gal of admixture) The equation takes a dosage which is given in volume per weight (fl oz / cwt) and multiplies it by the weight of cementitious material. This will give you a volume (fl oz). This volume is then converted from fl oz to gallons. The resulting value is then multiplied by the weight per gallon of the admixture. This will give you the weight of admixture (lbs) needed for the mixture. At that point we know a percentage of that weight is water, so one can determine the amount of water. As a result, the weight per gallon (density) of admixture should be used and not the density of water.

QUESTION 44: We're saturating our aggregates before mixing. Does the water we put into saturating the aggregates count towards our w/c ratio? The rules state: "3.3.3 Allowable Water-to-Cementitious Materials Ratio - The maximum allowable water-cementitious materials ratio (w/cm) for any concrete mixture is 0.40. The water content of all admixtures shall be taken into account in the determination of the w/cm, except as noted in Table 3.1." Table 3.1 says: Water 1. Total Batched Water² 2. Water Added for Agg. Absorption 3. Total Water from All Admixtures³ Is point "2." where we would record the water added to saturate our sample, and then our w/c ratio includes "water added + water added to saturate the aggregate"? For example, we've calculated that to make our test samples we can use 242 grams of water to have a w/c ratio of 0.40. Is this "242 grams" include "water in saturated aggregate + water added when mixing"? Or do we not have to worry about the water that is in our saturated aggregate and all we have to do to achieve a w/c ratio of 0.40 is to add 242 grams of water?

RESPONSE 44: We are assuming that you are preparing (conditioning) the aggregates to the saturated-surface dry (SSD). The w/cm ratio is the ratio between the amount of water that is used to hydrate the cementitious materials (cm). The water that is added to the aggregates to reach the SSD condition is not available to hydrate the cm therefore it is not included in the determination of the w/cm ratio. In general, the “Total Water” is Total Water = Total Batched Water + Water from Admixtures and is equivalent to Total Water = Water for cm hydration + Water for Aggregate Absorption The “water added for aggregate absorption” is defined as Water for aggregate absorption = S (Absorption x Amount of Aggregate) You will compute the value needed for aggregate absorption and enter it into the table. Now, the answer you are seeking depends if you are assuming a w/cm ratio and are trying to determine the amount of water you need, or if you have used an amount of water and

are determining what the final w/cm ratio is. Let's use the 242 grams of water and a w/cm ratio of 0.40 in the example above. Also, let's assume that 40 grams of water is needed for aggregate absorption. If your aggregate is already in the SSD condition (you added 40 grams of water to it, let it sit overnight, etc), the next day you go and mix your concrete and then put the moist aggregate into the mixture and then add the 242 grams of water to it (based on 0.40 w/cm, you should be using 605 grams of cm). Now, if you did not condition the aggregate (and let's assume that the batched moisture content is 0%), and you added 242 grams of water to the 605 grams of cm and the dry aggregate, then 40 grams of the 242 grams of water goes to the aggregate, and the resulting w/cm ratio would be $202/605 = 0.333$

Section 4 – Reinforcement

QUESTION 1: I have a question regarding whether carbon-fiber reinforcement is permitted in the concrete canoe competition. The particular carbon-fiber provider I am looking into describes the fiber's constituent materials as follows "Continuous 50k carbon tows w/heat set over-wrap in fill and warp direction, impregnated with epoxy resin." While, in the NCCC rules for concrete canoe, Section 3.0, "Bondo®, epoxy or similar materials are not permitted at any time during the casting of the canoe (i.e., placement of concrete, reinforcement and flotation) but may be used in the construction of the canoe mold." We will not be using epoxy resin in our admixtures or cementitious materials, but is this carbon-fiber permitted as a reinforcement? My understanding of the material is that epoxy only holds the carbon fibers together to form a mesh, and should have no effect on the cementitious materials or admixtures. May we use this carbon-fiber reinforcement?

RESPONSE 1: According to the CNCCC Intent of Section 4 – Reinforcement, “the reinforcing materials do not have post-manufacturer applied coatings that enhance the properties of the reinforcement.” Based on the product data provided, the carbon fiber has a manufacturer applied epoxy and this is allowed. Basically, the product as received by the school from the manufacturer or supplier can be used as is. The “Bondo®, epoxy or similar materials” cited in Section 3 is to deal primarily with materials other than concrete that may be used to fill in divots or bugholes or repair pre-competition cracks, etc. however, they are just as applicable to placement of reinforcement (i.e., teams cannot apply epoxy to mesh and then place it in the canoe). You may use the carbon fiber reinforcement.

QUESTION 2: I have a questions regarding Section 3 "Bondo, epoxy or similar materials are not permitted at any time during the casting of the canoe (i.e., placement of concrete, reinforcement and flotation) but may be used in the construction of the canoe mold." and Section 4 "The reinforcing materials do not have post-manufacturer applied coatings that enhance the properties of the reinforcement." We are considering using a Carbon-Fiber net for our reinforcement of our canoe. The manufacturer's description states that the net will have to be cured with an epoxy promptly before placing on the wet concrete of the canoe "It is a wet lay up process that cures in place in epoxy overlays and becomes part of the overlay itself." Due to the wording of the NCCC rules I wanted to verify that this type of process would be allowed. The epoxy will only be on the carbon fiber net to hold it together before placement. There will be no epoxy used for patching or in any admixtures.

RESPONSE 2: This is not allowed. The reinforcement material is the carbon-fiber net; the epoxy required for the wet layup is the “post-manufacturer applied coating.”

QUESTION 3a: The reinforcement material we were planning on using is a carbon fiber net which is covered in an epoxy as part of the manufacturer's specifications. Normally the epoxy would be applied at the manufacturer's warehouse, but due to the odd shape of the canoe, we will be applying it ourselves. The epoxy would be completely dry before placement of the canoe. Is this type of reinforcement allowed?

RESPONSE 3: No. The carbon fiber reinforcement as received from the manufacturer is the reinforcing material. Applying epoxy to it after you receive it is a "post-manufacturer" coating, which is not allowed by the rules. The carbon fiber as received is allowed however.

QUESTION 4: "Solid mats and plates are described as reinforcing materials that require additional bonding agents or post-manufacturer perforations to keep the reinforcement from delaminating from the concrete composite (i.e., there is a lack of open space between the reinforcement sufficient for mechanical bonding to the concrete composite)." What I got from this quote is that we cannot use any bonding agents, such as epoxy, to glue a solid type of reinforcement (not mesh) to the concrete. Instead we were thinking of using a carbon fiber skeleton that we will make by soaking the carbon fiber in epoxy and forming it to our mold. We then will have a "dry" skeleton of the carbon fiber mesh which we will later put in the concrete. The carbon fiber is a mesh with grids that have the dimensions of 2x2 inches. The epoxy will not be used to glue the concrete to the reinforcement. Would this design fit the rules?

RESPONSE 4: See response to Question 3 above, this is not acceptable.

QUESTION 5: The section on reinforcing does not address if we may use two different types of reinforcing, and if it is legal to place them one over the other in certain sections boat. As long as both reinforcing materials meet the POA requirement and the combined widths do not exceed 1/2 of the Canoe width is this allowed?

RESPONSE 5: This is allowed (but it is the thickness not the width).

Section 5 – Final Product

QUESTION 1: Section 5.6 states that the sealer may be silane- or siloxane-based penetrating sealer with a minimum solids content of 20 percent and a VOC of less than or equal to 350 g/L. The VOC is different than last year's but was not included in the significant changes. Will you please confirm that the VOC has to be less than or equal to 350 g/L.

RESPONSE 1: The VOC limit has been reduced to 350 g/L (max). Please note that the Rules and Regulations are the official documents for the NCCC. The Significant Changes are a supplement document and provide highlights, but not all of the changes in the Rules are listed in it.

QUESTION 2: In Section 5.7.1, Material Technical Data Sheets, it states "Material Technical Data Sheets (MTDS) for each material used in the construction of the canoe shall be presented." Does this include materials used in the fabrication of the mold, but which are not present in the finished canoe?

RESPONSE 2: MTDS are not required for the products used in the mold.

QUESTION 3: Sect. 6.2.1 "Body text shall be in English and use 12-point, normal width character spacing..." This is regarding the design paper from my understanding. Sect. 5.2 the school name (no initials) and the canoe name shall be prominently displayed on the exterior of the canoe.... Nowhere does this section state that the name of the canoe has to be in English. Does the name on canoe itself (decals or stained) have to be in English? The name of the canoe in the design paper will be in English as stated.

RESPONSE 3: You are correct; there are no provisions within the Rules and Regulations that state that the canoe name is to be in English. Teams are allowed to name their canoe whatever they wish and it does not need to be English. For example, if you wish to name it "El Diablo" you can. You can call it that in the paper as well (and if you like, provide the English translation).

QUESTION 4: I wanted to know if this colored sealer, Sparta- Flex, could be used on our canoe. It is not a curing and sealing agent. It is a two part colored sealing agent that meets VOC and solids requirements for the sealers stated in the rules. Since it does not cure I did not know if it still could be used and if the ASTM C 1315 still needed to be considered.

RESPONSE 4: This material does not meet either ASTM C1315 or C309 and has a reported tensile strength of 4500 to 5000 psi. This material is not allowed to be used in the competition.

QUESTION 5: In Section 5.6 Concrete sealers, paragraph two it states, "If an ASTM C 1315 liquid membrane-forming curing and sealing compound is selected for use, it must be Type I (clear or translucent), Class A (non-yellowing) or Class B (moderate yellowing) with a VOC less than or equal to 350 mg/L". Does this imply that only the Class B is restricted to 350 g/L, or would a Type I Class A sealant that meets ASTM C 1315 also be restricted to a VOC of 350 g/L. (meaning a sealer is Type I Class A but the VOC is greater than 350 g/L, is this allowed).

RESPONSE 5: The sealer can be either Class A or Class B. Regardless of the class, the VOC (volatile organic content) must be equal to or less than 350 mg/L.

QUESTION 6: Section 5.4 regarding paint states that paint is restricted to the lettering used for school and canoe names. In years past as seen on pictures on the website, canoes have had different painted patterns or graphics ranging from stripes to school logos to even shark teeth on the front of the canoe. Are we allowed to do this for the 2010 competition? Can we use school logos and other graphics? Are they to be applied with paint or with stains? We were unsure and would appreciate any light on the matter.

RESPONSE 6: You may have patterns and graphics on your canoe. Outside of the canoe and school names (which can be painted or have vinyl lettering), these patterns and graphics can only be created using integral color concrete (i.e., concrete that is made with pigments that are batched and mixed into the concrete) and/or using acid- or water-based stains (the regulations are covered in Section 5).

QUESTION 7: Is it allowed to impress a design into the concrete while it is still wet?

RESPONSE 7: There are no rules or regulations that prohibit this, so the answer is yes.

Section 6 – Design Paper

QUESTION 1: Under Paragraph 2 of Section 6.2.1, it clearly states that a section heading shall be considered part of the body text and shall adhere to the margin requirements, however, later in the last paragraph of that section it says that section headings (“items”) may be incorporated into the header and footer and located outside of the body text limits. What is the intent or is this language contradictory?

RESPONSE 1: Section headings are to be included within the body text of the report in order to distinguish the sections from one another and shall follow the format for font, size, etc. as described in the rules and regulations. Generally, teams will place a variety of items in the header and/or footer of the various pages – page numbers, logos, quotes, school names, etc. including the section heading again. The pagination of the report is required, and the rest of the items are left to the school to decide what they wish to incorporate.

QUESTION 2: The significant changes document states that the Design Drawing included in the paper has been removed. Section 6.2.2 (g) of the 2010 Rules, however, states that we must submit a Design Drawing. Which is correct?

RESPONSE 2: Previous editions of the Rules and Regulations had two (2) design drawings that were part of the report. One was for the hull design and the other was for construction. Since teams have been given the hull design, that particular drawing is not longer required. The drawing which details the construction of the canoe (i.e., the mold) is required.

Section 7 – Engineer’s Notebook

QUESTION 1: This is a follow up question to the 9.28.09 CNCCC response to using crushed concrete (i.e. an old concrete canoe) for recycled aggregate. In the response it was stated that it would be permissible to crush an old canoe for recycled aggregate. Section 7.1.2 d. states: "Present MTDS for each of the materials used in the construction of the canoe, including but not limited to binders (other than cement), aggregate (other than natural or manufactured sands), chemical admixtures, paints, stains and sealers." If we were to crush an old canoe and use it as recycled aggregate, what documentation would be required for the engineer's notebook since there would not be and MTDS? In other words, what proof (if any) is necessary to show that we are in compliance with the rules?

RESPONSE 1: In this case, the school is the “manufacturer” of the aggregate (even if it requests an outside source to actually crush it). The technical data sheets could include the mix design sheets from the concrete canoe report (that provides the composition and unit weight of the material). Pertinent data that would be needed includes specific gravity and absorption (and these tests are ASTM standards that can be done by the schools). Data sheets prepared by the schools would suffice and it is highly recommended that a design professional and/or professor review them. In essence, you are making your own MTDS.

QUESTION 2: The section reads "Material Technical Data Sheets (MTDS) for each material used in the construction of the canoe shall be presented under Tab D of the engineers Notebook (Section 7.1.2.d)" We had a question regarding what information the MTDS sheets need to contain. We know that a MSDS is not proper documentation but some suppliers of our materials are confused as to what information it should contain. Are there certain pieces of information that must be in the sheet (such as

unit weight and any strength properties)? This is in conjunction with a previously asked question about what to do if we crush our own aggregate from old concrete. We are running lab tests to find the unit weight and gradation but should we also include the information from the concrete we are crushing?

RESPONSE 2: Suppliers, manufacturers, etc. should have some sort of product literature about the materials that they are providing. Depending on the product, it would list properties, standards met, etc. Most of the information could be found on the internet as companies will include product literature, MSDS, and technical specifications on their products. In regards to crushed concrete (say the school is doing it), you can create a form on school letterhead, and list the properties that you are providing (gradation, bulk density, absorption, etc) for the aggregate. You could also state the source of the concrete.

QUESTION 3: Is it acceptable to perform ASTM C 78 to determine the flexural strength of the concrete mixture instead of ASTM C 496 / 496M. We create panels representing the cross section of our canoe and test those because it also incorporates the reinforcing and hence gives a better idea of the flexural strength of the canoe.

RESPONSE 3: Teams should select the testing method that they feel is most appropriate. C 78 is a test methodology for measuring the flexural strength of beams while C 496 is the test methodology of measuring the tensile strength of cylindrical concrete specimens.

Section 9 – Final Product (Canoe and Cutaway Section)

QUESTION 1: Section 9.3 states that "A full-scale cutaway section representative of both the raw and finished canoe shall be judged as part of the Final Product and shall be presented alongside the canoe." Does the cutaway section have to represent the shape of the hull? If so, does it matter what section of the hull it represents (i.e. bow, middle, stern?)

RESPONSE 1: A full-scale cutaway section of the canoe inherently will represent the shape of the hull. The CNCCC does not specify what portion of the hull it represents. The goal is to show how the canoe is constructed (including the mold) and how the concrete is finished. Usually, the end sections are used because flotation tanks are used and teams show how those are encased.

QUESTION 2: Sect. 9.1.1 states "Canoes shall be displayed on display stands designed to support the canoe at a clear height of 2.5 to 4 feet below the canoe." From where is the height measured? If a team were to design their stands so the canoe sits at an elevated angle, how will the height be measured? Will it be measured from the base of the stand to the top of the stand even if a part of the canoe sits higher or lower due to the angle?

RESPONSE 2: First, they do not get measured and the values provided are for general guidelines. If the center of the canoe is 2.5 to 4 feet off the ground and there is some titling on either end, that is fine.

QUESTION 3: Section 9.3 CUTAWAY SECTION states that the cutaway section "shall demonstrate the concrete casting, finishing, and reinforcement techniques used (i.e., the three-foot section should show concrete placement and finishing in various stages). The cutaway section shall also show the mold" Does this mean that we should also show the layers of construction for the mold, since that relates to the casting of the boat?

RESPONSE 3: You may show the mold construction in layers if you wish but it is not necessary. The main reason for the cross section is to visualize the concrete/reinforcement placement in various stages on the mold.

QUESTION 4: In Section 9.1.1 General Requirements stated that canoes shall be displayed on display stands designed to support the canoe at a clear height of 2.5 to 4 feet below canoe. The statement only stated the clear height. Is there restriction on the width and length dimension of the display stand?

RESPONSE 4: There are no written restrictions regarding the width and length of the canoe stands. With that being said, we suggest that common sense and good judgment be used in creating the stands.

QUESTION 5: I have a question pertaining to the cutaway section. I understand that the length is required to be 3 feet, but does the location of the section along the canoe matter?

RESPONSE 5: The section of the canoe that the cutaway section represents is left up to the team. Typically, the bow or stern section is selected given that flotation tanks are installed and teams wish to show how that was constructed.

Section 10 – Product Display

QUESTION 1: Section 10.0 States that each team shall provide a Product Display with the following configuration: a. Conference Table – standard table, with maximum dimensions of 30” (W) x 96” (L) x 29” (H). Last year we created our own table that was oval shaped and fit within the dimensions. Is this an acceptable table or not?

RESPONSE 1: The Product Display is a TABLE TOP display. The Rule and Regulations (for the past several years) have stipulated that a standard conference table be used. However, we have seen various displays with tables that were built, even a dresser drawer (based on the concept of reusing it), etc. Therefore, to be absolutely clear on what is required and specified, we placed a picture of a standard rectangular folding conference table with maximum dimensions in the Rules. The table your team used last year is not acceptable this year.

QUESTION 2: The rules state “Each team shall provide a Product Display with the following configuration: a. Conference Table – standard table, with maximum dimensions of 30” (W) x 96” (L) x 29” (H). Each team shall provide their own table (may include a table cloth). We are using a table that is 30” (W) x 72” (L) x 29” (H), which is within the allowed dimensions. However, we wanted to add a rail to the front side of the table and in doing this, our table would extend 1/2” outside the allowed width. So, my question is, can we use a circular saw to cut off 1/2” of our standard table? Then we would add the rail on the front and we will be right at the specified 30” max width. I am not sure if we are allowed to cut the table. Please, let me know. Thank you.

RESPONSE 2: The intent is to make a tabletop display. All the table is to do is to hold the display. Do not modify the table.

Section 12 – National Qualifying Rules

Section 12.1 – Appeal Process

QUESTION 1: If during the competition the judges made a call (issued ruling) that our team disagrees with can this ruling be overturned by the CNCCC?

RESPONSE 1: During the course of the competition (that is technically the time up until the Awards Ceremony but generally should be considered time up immediately after the last event of the competition), there is an appeal process which affords the team captains the opportunity to appeal a decision (such as a deduction) made against them as well as rule clarifications. This is covered in Section 12.1, Appeal Process, and Section 13.7, Appeal of Deductions. Both sections state that “The CNCCC will not consider any appeals beyond the Conference Competition, nor will it overturn any of the conference judges’ decisions regarding the deductions assessed against a given team.” So, once the competition is over, the awards have been presented, the CNCCC does not consider any appeals from schools. During the course of the competition, several members of the CNCCC are on-call to assist the judges. This includes answering any questions that they may have and providing clarification to the rules. Teams should take into consideration that judges have only a couple of months (if not weeks and in some cases days) to try to comprehend all of the rules while the teams themselves have a 6 month head start. The judges will issue their deductions as they see fit based on the rules and the team captains can make appeals they see fit (which should be based on CNCCC rulings, citing of the rules and regulations, etc.). In addition, there is a “Request for Clarifications and Appeals” sample located in Appendix B-4. We have gone as far to include a box that states, “We formally request that the CNCCC member on-call be contacted in order to obtain an official interpretation or clarification regarding this matter.” With these measures in place, the CNCCC will assist the judges in regards to the ruling and the appeal at which time the judges can consider overturning a decision that they made. So the team has the right to know what deductions have been assessed against them and the team captains have the right to appeal these deductions including the right to ask for the CNCCC to be contacted. This includes the right to ask for an appeals/clarification form from the judges or the host school who might be handling the paperwork. Even with these measures in place, there have been instances where the CNCCC has been contacted by judges, schools, team advisors, etc. seeking clarifications to the rules after the competition is over. There should be no reason for clarifications to be requested after the competition – they should be handled prior to or during the competition. With that being said, the judges use the rules and regulations in order to officiate and score the events. Teams should know the rules, front to back, inside and out, and what is required of them in competition. The CNCCC is on-call to assist as requested.

QUESTION 2: This is a follow up question regarding the Appeals and Clarification process that was answered earlier (CNCCC overturning judges’ calls). What is/is not allowed to be appealed/clarified during the competition?

RESPONSE 2: The CNCCC has implemented an appeals process, which affords the team captains the opportunity to appeal a decision (such as a deduction) made against them as well as rule clarifications. In general, teams should focus their efforts towards their canoe, design paper, presentation, display board, etc. and file appeals or request clarifications, if needed, pertaining to them. Teams should not file appeals or request clarifications to “protest” against another team or teams. The CNCCC has taken measures with issuing Judges Guidelines, hosting two teleconferences prior to the conference competitions, and members will be on-call for the judges to contact during the course of the competitions. To answer the question of what can be appealed – basically, you would only need to

appeal a deduction that was assessed against your team that you feel or can show was incorrect. For example, if the judge felt you missed something in the Executive Summary, but you then show them that it was indeed in the Executive Summary. You will need to be able to substantiate your appeal. Now, for instance say your mix design table had 1000 pcy of cm and 500 pcy of water, but you wrote that the w/cm ratio was 0.40 (the maximum allowed). According to the table, the value has to be 0.50. You could not appeal and say you wrote the wrong number in and that it should have been 400 pcy of water. Likewise, if you design for 60 pcf concrete at 6% air and measured 57 pcf (but did not change any of the mixture amounts) and still reported 6% air when technically it would have to be less, you really cannot appeal it. Lastly, the CNCCC does not answer appeals after the competition is over. We have on occasion been asked to provide clarification on rules by students, advisors and judges, typically stemming from issues that occurred during the course of a competition. In the past, we have given clarification but never overturned a judges call. We will point out that most, if not all, of the issues that had arisen during the competition had been brought to the attention of the CNCCC, they would have been clarified and properly addressed and would have eliminated problems after the fact. With that being said, we will be instructing all of the head judges to contact the CNCCC prior to the end of the competition, that is, the end of the last event which is typically the races (and prior to the Awards) to ensure that all matters have been addressed. We will not address any clarifications after the competition is over.

Questions regarding rule interpretations should be directed via e-mail to cnccc@ermail.asce.org.

Official responses will come from CNCCC@asce.org. This e-mail account will be BLOCKED from receiving e-mail and is only intended to be used to send out responses and other announcements.