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2025 Concrete Canoe Competition Request for Information Summary

RFI No: 1 Hydrated Lime

SECTION: Exhibit 5

QUESTION: This year, there is a limitation on the amount of hydrated lime that can be included in a concrete mixture. There is also a limitation on the combined amount of hydraulic cement and hydrated lime in the mix design. I would like to ask if hydraulic lime - whether that's natural hydraulic lime, or other types of hydraulic lime - is considered separate from both hydraulic cement and hydrated lime for the purposes of these limitations. Following from that question, are there any restrictions on the amount or percentage of hydraulic lime that can be added to the mix design?

RESPONSE: Any hydrated lime meeting the ASTM requirements listed in Exhibit 5 is allowed. The quantity of hydrated lime is limited by percent mass of the total cementitious materials per Exhibit 5. Additionally, the total hydrated lime plus the amount of hydraulic cement used cannot exceed the restrictions in Exhibit 5. To illustrate how those requirements are viewed, we present the following:

Compliant: Mixtures contains 400 lb/yd3 of fly ash, 400 lb/yd3 of portland cement. Hydraulic Cement is less than or equal to 50% of mass of cementious materials

Non-Compliant: Mixture contains 400 lb/yd3 of fly ash, 400 lb/yd3 of portland cement and 140 lb/yd3 of hydrated lime. Lime is 15% of mixtures mass, but hydraulic cement + hydrated lime was 57%, which exceeds the allowable amount.

RFI No: 2 Project Proposal Submission Deadline

SECTION: 4.2.3

QUESTION: The date for online submissions is stated to be Friday, February 13, 2025. February 13, 2025 is a Thursday. Can you clarify the actual date?

RESPONSE: The deadline for online submissions is Thursday February 13, 2025.

RFI No: 3 Preliminary Design Report Page Restrictions

SECTION: 5.4.3

QUESTION: 5.4.3 Preliminary Design Report states there is a 9 page maximum. 5.4.3.1 Project Management states a 4 page maximum but is in the same format as the subsequent sections 5.4.3.2 to 5.4.3.8. Is the Project Management formatting incorrect and are these meant to be included in the 4 page maximum?

RESPONSE: Section 5.4.3 Preliminary Design Report has a maximum of 9 pages. These 9 pages are distributed between Project Management (5.4.3.1) at 4 pages maximum and Technical Design Construction Support (5.4.4) at 5 pages maximum.

Project Management (5.4.3.1) encompasses sections 5.4.3.2 - 5.4.3.8. These sections, together, have a maximum of 4 pages. Technical Design Construction Support (5.4.4) encompasses sections 5.4.4.1 - 5.4.4.4. These sections, together, have a maximum of 5 pages.

The project management formatting is a bullet point error and should match the technical design construction support. We appreciate you bringing this error to our attention.

RFI No: 4 Abbreviated School Names

SECTION: 6.6.1

QUESTION: Our school abbreviation is less than 5 letters long (the official abbreviation is 4 letters). Since there is no other official abbreviation that can be used, we were wondering if we can use the 4 letter abbreviation (or an unofficial one) or would we have to put the full name on the canoe?

RESPONSE: As stated in the RFP (Section 6.6.1), there are two stipulations regarding the use of abbreviations: 1) recognized abbreviations from the school's official website are acceptable, but 2) the name must be at least 5 characters long.

This stipulation would prohibit the use of the 4 letter abbreviation.

This stipulation would also prohibit the use of any abbreviation that is not recognized by the school on the school's official website.

Teams are welcome to reach out to the school's administration to determine if there is a recognized abbreviation that could be used, provided the requirements of Section 6.6.1 are satisfied.

In the absence of any abbreviation that satisfies the requirements of Section 6.6.1, teams would be required to use the full name of the school.

To give some context on why this rule exists: the judging panel and C4 need to be able to identify canoes/schools while teams race. The names need to be easily distinguishable from the shore line. Anything less than 5 letters may lead to either 1) repeat or nearly identical abbreviations or 2) canoes being too hard to identify from afar.

RFI No: 5 Towing Performance Load Case Analysis

SECTION: 5.4.4.2, Exhibit 9

QUESTION: The RFP says that the canoe "may be required to be towed to shore by the safety boat" and asks us to "Detail your team's analysis of this load case." How exactly is this load being applied? Is it by tying a rope or something similar around the canoe? Or is it something else? And how much force is being applied by towing the canoe? I am not sure how the towing force is applied to the canoe.

RESPONSE: As stated in the RFP (Section 5.4.4.2), this performance load case is purely hypothetical. However, it may be a good idea to provide some context on this topic to help teams understand why we're asking this in the first place.

Every once in a while, a canoe capsizes during the prototype demonstrations and needs to be towed to shore. Towing can mean many things – a rope tied around the bow/stern, a rope wrapped around the hull at any point and held tight, a paddler in the water holding a rope while gripping the bulkheads of the canoe, or many other options (there are too many to list). The point being, the method that the canoe is towed back to shore can have an effect on how the load is distributed through the hull, but the actual method is ultimately up to the folks in the water to implement. Sometimes this results in canoes cracking to the point of not being able to continue racing.

Context aside, this component of the analysis is more of an engineering thought exercise than anything else. C4 would like teams to think critically about the methods they can use to get their canoe back to

shore safely, and then determine a rational approach that shows the canoe can withstand being transported in that manner. Please note that the restrictions listed in Exhibit 9 regarding permitted equipment still apply to this scenario.

As for how much force is being applied by towing the canoe? That is up to the teams to determine, but we can give you a couple hints: 1) it would be safe to assume that at least one rope is available for towing; 2) determine (or make an assumption about) the max speed that the safety boat will be traveling at in this condition; and 3) make some engineering assumptions about how that speed translates to an applied force.

RFI No: 6 Client Scope Change

SECTION: 1.3, Exhibit 1

QUESTION: There is no additional information given about the Client Scope Change. What area of the scope will this affect and to what degree? e.g. Hull Design, Mix Design, Technical Proposal, etc.

RESPONSE: Given that the Client Scope Change is a new addition this year, it would have been a good idea for C4 to provide a contextual comment about what this may entail for teams in the RFP. If C4 opts to include client scope changes in future years, we'll be sure to call this out in the RFP to clarify things further.

With that part out of the way, in industry, sometimes the client changes their mind about what they want developed/built/designed or how they want something to ultimately be delivered. These are elements that are truly unknown to consultants ahead of time – the client can change their mind at any point in time, for whatever reason they so choose. This will happen on many projects you contribute to over the course of your career. How you respond to these changes is the interesting part.

It is C4's intent to give you a little taste of what a scope change could be, but we are not completely evil – we have decided to tell you when it is coming – November 11, 2024. A big part of why C4 is asking for this, is that we want to see how teams adapt on the fly to changing requirements. While C4 cannot go into detail about the specifics surrounding the client scope change, we will say this: 1) the client scope change could affect any of the components of the RFP; 2) while it could affect any component, it will not change your teams core designs; and 3) teams should continue to develop all required deliverables as outlined in the RFP.

RFI No: 7 Carbon Produced from Pyrolysis

SECTION: Exhibit 5

QUESTION: This is a solid material in the form of carbon produced from pyrolysis, or the thermal decomposition of biomass in a near-anaerobic environment. If un-milled, it can be used as a Type S admixture, which complies with ASTM C494. This material can also potentially be used as a powder pigment under ASTM C979 if milled. We're seeking clarification on how to address using this material, given that it could be used as either an admixture or as a pigment.

RESPONSE: Per "EXHIBIT 5: Technical Specifications for Concrete and Reinforcement" of the RFP, if the proposed material is commercially available and manufactured to meet either the ASTM C494 standard for a Type S admixture or ASTM C979 for a concrete pigment, then it is permitted for use in a concrete mixture. If the material is used as an admixture in its un-milled state, it should conform to

ASTM C494, Type S. It the material is used as a powder pigment in it's milled state, it should conform to ASTM C979.

RFI No: 8 Presenter Roles and Conflicts of Interest

SECTION: Spirit of the Competition, Section 3.1 - Registered Participants, Exhibit 3, Section 8 - Technical Presentation

QUESTION: If a member of the symposium planning committee is taking part in the recruitment of judges for the concrete canoe competition, can that planning member also be a registered participant (specifically a presenter) for the same competition?

RESPONSE: While not explicitly prohibited in the RFP, it would be ethically inappropriate for a member of the symposium planning committee, who is involved in the recruitment of judges, to also participate as a registered competitor.

Consider the following real-world case: an engineer from a consulting firm serves as a consultant to a city. When the city issues a request for qualifications (RFQ), the engineer's firm submits a proposal. Normally, the city's selection committee includes the consultant engineer, but in this scenario, the engineer would need to recuse themselves from the committee to avoid the appearance of bias. The perception of bias can be just as damaging as acting on that bias.

This case highlights a broader issue that C4 has yet to formally address: conflicts of interest. While a full exploration of this topic is beyond the scope of an RFI response, the concern is relevant to the principles outlined in Page 6 of the RFP ("Spirit of the Competition"). The core issue is that, even in the absence of malicious intent, an optics problem arises. An external party might perceive that a planning committee member responsible for recruiting judges could receive preferential treatment during the competition, leading to suspicions of quid pro quo arrangements.

In professional practice, engineers are expected to recuse themselves from situations where a conflict of interest-or the perception of one-arises. To maintain fairness and uphold the integrity of the competition, a similar approach should be adopted here. The student planner in question can continue to assist with logistical tasks such as scheduling and coordinating facilities, but the responsibility for recruiting judges should be assigned to another team member or a faculty advisor. This will help preserve the spirit of the competition and mitigate any appearance of bias.

RFI No: 9 Certification Letter Requirements

SECTION: 5.6.5

QUESTION: Section 5.6.5 states "if no Technical Data Sheet is available from the manufacturer, provide a certification letter on company letterhead." Can C4 go into more detail as to what a certification letter must consist of and appropriate company letterhead. We have confirmation that a pigment we want to use is accordance with ASTM C979 through a typed-up document sent to us, but do not know if that is enough.

An example would be appreciated.

RESPONSE: We appreciate the question and the forethought behind it. Ultimately, the certification letter must include one of the following:

Company Letterhead: A signed certification confirming that the material meets the required specifications. Testing data that supports the certification is encouraged.

OR

Printed Correspondence that includes: an email signature block containing the company name and relevant contact information, contact details of the individual certifying the material (not a generic phone number or email address), a statement certifying that the material meets the required specifications.Testing data that supports the certification is encouraged.

While we cannot provide a specific example, as each company and testing agency formats their certifications differently, teams should be aware that the certification letter and/or printed correspondence may be subject to back-checking by C4 and/or the judges. As such it does need to be up-to-date with accurate contact and company information.

RFI: 10 Latex Emulsion TDS Requirements

SECTION: Exhibit 5

QUESTION: In the Latex Emulsions section (Exhibit 5), it states "Latex emulsions can be used in either re-dispersible powder form or as a liquid formulated for use with hydraulic cements that meet ASTM C1438 Type II requirements." Does the technical data sheet for the latex emulsion explicitly have to state Type II requirements? Please advise.

Many material data sheets we reviewed for latex emulsions did not specify typing. Further review also showed Type II as general use.

RESPONSE: Yes, verification any latex used meets Type II should be included. In industry, we wouldn't want to assume a product meets a standard and/or type without written verification. There are 2 classification types for latex under ASTM C1438. Type I -- for use in areas not exposed to moisture. Type II -- for general use. Concrete canoes will inherently be exposed to moisture, which is why Type II is specified in Exhibit 5. In this instance, where a technical data sheet does not specifically provide the classification the product meets, we would suggest contacting the manufacturer's technical services to have them provide written verification the latex meets the ASTM C1438, Type II. Include any letter or email received from the manufacturer with the technical data sheet as part of the team's Materials Notebook.

RFI: 11 Hydrated Lime Limits Clarification

SECTION: Exhibit 5

QUESTION: In the response to RFI No. 1, posted on Sept 6, it is stated that "the quantity of hydrated lime is limited by percent mass of the total cementitious materials per Exhibit 5,". However, in Exhibit 5 of the RFP, it is only stated that "Hydrated lime may be used but is limited to 15% (by mass)," without clarification on if it is 15% by mass of the cementitious materials or the mass of the mixture as a whole.

Would it be possible to clarify if the 15% mass limitation applies to the mass of cementitious materials or the mixture as a whole?

RESPONSE: If hydrated lime is used, it is limited to 15% (by mass) of the total cementitious materials (cm) content. In addition, hydraulic cement (c) + hydrated lime cannot exceed 50% (by mass) of the total cementitious materials (cm) content.

The example from RFI 1 to show a non-compliant mix includes 400 lb/yd3 of fly ash, 400 lb/yd3 of portland cement and 140 lb/yd3 of hydrated lime -- which exceeds the allowable 50% limit of hydraulic cement (c) + hydrated lime. In order to make this a compliant mix, the portland cement and hydrated lime would need to be reduced. A mix with 400 lb/yd3 of fly ash, 280 lb/yd3 of portland cement and 120 lb/yd3 of hydrated lime would meet the limits outlined.

RFI:12 NewCem Plus 50/50 Fly Ash/Slag

SECTION: Exhibit 5

QUESTION: We are requesting approval to use the NewCem 50/50 Fly Ash/ Slag mix as a replacement for individual cement slag and fly ash.

The individual products comply with: Coal Ash: C618 (Class C or F), Slag Cement: C989 (Grade 80 minimum)

The product currently complies with NewCem Plus 50/50 Fly Ash/ Slag Mix: ASTM Specification C-1697

The team's due diligence completed includes: The NewCem Plus 50/50 Fly Ash/Slag mixture meets the ASTM C-1697 Standards per the material data sheet linked above. In the ASTM C-1697 standard it requires that the Coal Fly Ash in the combination mixture meets ASTM Specification C618 and the Slag cement meets ASTM Specification C989.

ASTM C989 for the specification of the Slag Cement only applies to grades at or above 80 which meets the standards listed in Exhibit 5 of the ASCE 2025 Concrete Canoe Request for Proposal document. The material data sheet for the NewCem Plus 50/50 Fly Ash/Slag shows the CaO percentage meets the Class F fly ash requirements which meets ASTM C618. ASTM C618 for the specification of Fly Ash meets the standards listed in Exhibit 5 of the ASCE 2025 Concrete Canoe Request for Proposal document.

RESPONSE: To begin, this is a beautifully crafted and researched approval product request. Thank you for your efforts and information.

C4 takes no exception to this product's use. ASTM C1697 approves SCM blends like this for use provided that the individual components meet the respective ASTM standards the team has provided above. The team should produce proof and documentation for each of the materials of compliance as well as the language of ASTM 1697 and other ASTM standards as applicable. Since the team states knowledge of the materials compliance with ASTM C618 and C989, at minimum, these should be provided.

RFI: 13 Number of Stain Coats Allowed

SECTION: 6.6.2

QUESTION: In 6.6.2 it is stated that powdered and liquid dyes can be used with up to two coats recommended. Please clarify that this wording allows for more than two coats of stain on the canoe.

RESPONSE: "Up to" refers to a maximum, a ceiling, a limit. Using three coats (or any number larger than 2) would not be "up to" it would be "more than" or "exceeding." The maximum number of stain coats is two.

RFI: 14 Chitosan Speciality Admixture

SECTION: Exhibit 5

QUESTION: Our team would like to use chitosan. Since we would be using this product as a specialty admixture (strength enhancing), it must comply with ASTM standard C494 (Type S). Since this product is still under research and development for use in construction, there is not yet an applicable standard that we have been able to find.

The team ran comparative strength tests using previous team's concrete canoe mixtures and plans to compare against another strength enhancing admixture, Master X-Seed 55. Both products work to increase the strength of concrete and allow for reduced cementitious material in mix design. This is beneficial because it can reduce the carbon footprint of a mix associated with cementitious material manufacturing. However, Chitosan takes it a step further because it is derived from natural sources as opposed to chemical manufacturing. Chitosan is a by-product of the seafood industry and can also be derived from plants.

By using chitosan, we are able to repurpose a waste product. Furthermore, since chitosan is from a natural source, it offers the potential to decompose more effectively at the end of its lifecycle.

RESPONSE: C4 acknowledges the creativity, ingenuity, and thoughtfulness behind the proposed use of the material, as well as the team's efforts to assess its impact on their mix design. However, C4 does not approve the material for use at this time.

The requirements for Type S admixtures go beyond strength; they also emphasize the principle of "do no harm." At this stage of the competition, the team is unlikely to meet the necessary strength benchmarks at 3, 7, and 28 days, as well as at 6 months and 1 year. Additionally, testing for freeze-thaw durability, shrinkage, and other factors would be required. Given that the competition season does not allow for a full year of testing, there isn't enough time to demonstrate compliance with ASTM C494 standards.

While C4 sees potential in this material, the competition owner wants assurance that the materials used are proven, ASTM-compliant, and free from risks that could cause future issues. Some materials may experience a decrease in strength over time, and the owner, who would be investing in the canoes, wants to avoid this possibility.

RFI: 15 Theme Copyright Permission

SECTION: Exhibit 3 – Ethics and the Competition

QUESTION: I am writing to inquire about the use of a local event name for our upcoming project. We have written and explicit consent from the City to use their event as a theme for our canoe. However, while we do not have explicit consent from the parent company on which the event is based, we have been informed that the company spokesperson working with the city is aware of our use of this theme.

I would add that the City also does not have consent to use the brand's logos, and we do not plan on using those logos either. However, the event name includes the brand name, which the City does have permission to use.

We understand that the City works closely with the brand to carry out related activities, and we want to ensure that we comply with any additional guidelines for incorporating the event name into our project. Could you please confirm if we are allowed to proceed and share any relevant restrictions or branding guidelines?

RESPONSE: The team would be allowed to use any branding, assets, likeness, etc that they have explicit permission to use. It would be recommended to provide at competition the letter of permission and any pertinent information regarding the assets the team is allowed to use. The team should be careful to not use items, brands, logo, likeness, etc that belong to the parent company.

RFI: 16 Trademark Concerns

SECTION: Section 5.2 – Pictures, Figures, Graphics, and Infographics; Exhibit 3 – Ethics and the Competition

QUESTION: We were wondering if choosing the theme of "Mario", or "Mario Kart" would bring about copyright or trademark issues. May we choose such a theme? We are curious if the chosen theme needs to be non-trademarked.

RESPONSE: Ultimately, it is the team's responsibility to ensure they are not infringing on a trademark or copyright by talking to their Faculty Advisor, per the pre-qualification submittal. C4 cannot and will not approve the use of specific Intellectual Property, trademarks, or copyright.

If there is potential for a trademark or copyright issue, teams should request permission to use the trademarked or copywritten materials directly from the Owners of said materials. This permission to use trademarked/copywritten material must be explicitly granted by the Owner of the material to the team making the request.

We would recommend that you review the response to a previous RFI related to the use of trademarked/copywritten materials as well for additional information.

RFI: 17 Bondo use on Mold construction

SECTION: Exhibit 5

QUESTION: Section 6.2 states that "The Final Product Prototype shall be constructed with components that are categorized under and comply with Concrete, Reinforcement, or Flotation requirements presented herein." Additionally, the Final Product Prototype Deduction Score Card states "Use of Bondo®, epoxy, or similar materials for construction or repairs will results in no final product points".

Our team understands that the prohibited materials are not allowed to be incorporated into our final prototype, but would like clarification on whether the prohibited materials may be used to create the canoe mold.

RESPONSE: Exhibit 5 states: "Bondo®, epoxy or similar materials are not permitted as materials in the concrete mix, reinforcement installation, placements or connection and shall not be in any way present in or on the canoe before, during, or after casting."

The final product score cards statement of "Use of Bondo®, epoxy, or similar materials for construction or repairs will results in no final product points" refers to the restrictions presented around the use of these products "in the concrete mix, reinforcement installation, placements or connection and shall not be in any way present in or on the canoe before, during, or after casting."

So you have interpreted the rule as it was intended. The Bondo®, epoxy, or similar materials cannot be used in or on the canoe in anyway. There are no rules currently that restrict it's use for the mold construction and, under the Spirit of the Competition, teams should take special care to not allow residual Bondo®, epoxy, or similar materials that have not yet hardened to be absorbed or allowed to integrate with wet concrete.

RFI: 18 Required Submissions due November 1, 2024.

SECTION: 4.2.2

QUESTION: Please clarify that the Project Delivery Schedule is not part of the Nov 1, 2024 submissions, since it is not mentioned in Section 4.2.1, 4.2.2, and Exhibit 1, yet Exhibit 12 states that it must be submitted.

RESPONSE: Correct, the Project Delivery Schedule is not part of the submissions required on November 1, 2024. However, all elements of 4.2.1 and 4.2.2 are required to be submitted by November 1, 2024, which includes the Research and Development Schedule.

RFI: 19 Towing Conditions for Load Case

SECTION: 5.4.4.2

QUESTION: This year, the structural analysis includes a requirement to consider a load case where the canoe capsizes and is towed to shore, regardless of the load case governing the primary analysis of our canoe. We want to clarify the exact towing conditions: how the boat will be towed and if possible at what expected speed. In previous competitions, we have seen various methods such as ropes used, someone holding the gunwale, a rowboat, and a motor-powered boat. Depending on the specific conditions, this affects where the load is applied and the amount of force.

If it is not possible to determine the exact method to be used, it would be helpful if guidance could be provided on what scenario is acceptable for us to analyze to meet this requirement even if it is not what actually occurs during competition.

RESPONSE: Please review RFI #5. If additional questions arise post-review, submit a follow-up RFI.

RFI: 20 Chemical Accelerants

SECTION: Exhibit 5

QUESTION: Our team would like to know if the use of concrete accelerants are allowed? We could not find anything about accelerants, so we were curious. The reason we ask this is because it would assist our aggregates with staying in place and settling in one spot. Chemicals like calcium chloride that help the concrete set faster.

RESPONSE: Review the table in Exhibit 5, under the Admixtures heading. It shows that "Water Reducing & Set Control" admixtures must adhere to ASTM C494. "Set Accelerating" admixtures are a type of "Set Control" admixture.

ASTM C494 includes 8 different "Type" designations (Type A thru G, and S). ASTM C494 Type C are specifically for accelerating admixtures and Type E are for a combination water-reducing and accelerating admixtures. Therefore, an accelerating admixture would need to meet ASTM C494 Type C or Type E.

RFI: 21 Aggregate Properties Reporting

SECTION: Exhibit 6

QUESTION: To ensure a correct and accurate mix design table, our team requests clarification regarding the level of precision that aggregate properties should be reported. Exhibit 6, within the section titled "General Comments," states that aggregate absorption and moisture content values must be reported to the nearest 0.1%. However, values shown in the "Example Reporting" section within Exhibit 6 report these values, aggregate absorption and moisture content, are reported to the nearest 1%.

RESPONSE: Per the second bullet point under the General Comments for Exhibit 6, report aggregate absorption and moisture content values to the nearest 0.1%. C4 appreciates the team catching the missing significant figures in the calculations and will make note to correct for future years.

RFI: 22 Aesthetics - Concrete Stamping

SECTION: 6.6

QUESTION: Is stamping the concrete allowed? We are looking to add a stamped design into the bulkhead of the canoe which would then leave an imprint of our stamp design.

RESPONSE: Yes, stamped concrete is permitted as an aesthetic technique. Teams should consider including a sample as part of their cross-section display, as appropriate.

RFI: 23 Admixture specific gravity and solids content

SECTION: Exhibit 5

QUESTION: Our team is researching a latex component for our mix design. It is compliant with ASTM C1438 standards, however, the technical data sheet provided for the product does not include the specific gravity value or the solids content. We have reached out to the company to retrieve this information, but how would C4 suggest determining the solids content and the specific gravity of the product. Could we use the solids content of a similar product that is also compliant with the ASTM

standards in our mix calculations? Additionally, could we use the specific gravity that we calculate based on given data?

RESPONSE: There are a number of ways to measure the specific gravity of liquids including pycnometers and hydrometers. Your faculty advisor should be able to direct you to appropriate equipment and test methods if available at your laboratory.

Teams should not use the solids content of a "similar product." Solids content is often determined by evaporating the water in an oven if the supplier can't supply it. You should consult the SDS and your laboratory supervisor and health and safety officer before doing this to verify the safety of heating the admixture.

If teams conduct their own testing, provide your test results as part of the MTDS Notebook clearly showing how you arrived at your result(s) (ex: show the individual measurements taken and any calculations for arriving at your result(s)).

RFI: 24 Paddles vs Oars/Oarlocks

SECTION: Exhibit 9

QUESTION: Are paddles allowed to be used as oars in a rowing motion with each paddler having two paddles? For the oarlock, can it be a section of the canoe made of concrete that extends past the typical top of canoe to have paddles inserted to row? Also is it possible to use an attached prefabricated oarlock on the canoe?

RESPONSE: In short, no. Oars and paddles are not the same. Oars are used with an oarlock, as the team mentioned, and a paddle is used with both hands without an oarlock. Additionally, one "rows" with an oar and "paddles" with a paddle. These techniques are different. The rules outline acceptable equipment able to be used in races, which are paddles and not oars.

However, we appreciate the creativity and are, admittedly, deeply curious about how this would work on a concrete canoe.

RFI: 25 Gypsum, Calcium Carbonate and Sodium Hydroxide

SECTION: Exhibit 5

QUESTION: No specific conflicts were identified with other sections of this year's RFP. However, the RFP lacks specific guidance or ASTM standards on the use of Gypsum, Calcium Carbonate, and Sodium Hydroxide in Exhibit 5, which prompts this clarification request.

We seek clarification on whether Gypsum, Calcium Carbonate, and Sodium Hydroxide (solid and liquid forms) can be used as materials in concrete mixtures for the project. The RFP does not specify guidelines or restrictions regarding these materials. Could the committee confirm their acceptability or provide recommended usage standards if applicable?

We have not conducted specific testing on these materials yet, but we are willing to provide relevant technical specifications and data sheets if needed.

RESPONSE: Calcium carbonate could be used as either a supplementary cementitous material (SCM), or as an aggregate. To be used as a supplementary cementitous material, the calcium carbonate needs to meet ASTM C1797. If the particle size does not meet ASTM C1797, the calcium carbonate would be classified as an aggregate. Teams should provide information as part of their MTDS Notebook supporting use of calcium carbonite as either a SCM meeting ASTM C1797 or an aggregate.

Gypsum would be allowed, but would count as part of the hydraulic cement (c) content and contribute to the 50% maximum (by mass) amount of hydraulic cement rule. Gypsum used would need to meet ASTM C22, with information showing compliance to the ASTM included as part of the MTDS Notebook.

Both powder and liquid types of sodium hydroxide would be allowed and should be considered as a powder or liquid admixture. If liquid sodium hydroxide is used, teams should include information as part of the MTDS Notebook from the team detailing the concentration of sodium hydroxide used.

Make sure to consult faculty advisor and university health and safety officer before using any of these materials in the laboratory for special handling and personal protective equipment requirements.

RFI: 26 Preliminary Design Report Page Restrictions

SECTION: 5.4.3

QUESTION: 5.4.3.1. Project Management states that "The overall Project Management section is limited to 4 pages maximum. Unless otherwise stated in the subheaders below, subsections have no length restriction" while not specifying which subheaders this page count refers to. The only subheaders that have specific page requirements are 5.4.3.2. and 5.4.3.8., Key Team Roles & Organizational Chart and Research and Development Cost - Fee Schedule respectively. If 5.4.3.1. applies to the remaining subsections, the total page count of the 5.4.3. Preliminary Design Report will be 6 pages, as opposed to the 9 stated in the Concrete Canoe RFP. Please advise which subheaders 5.4.3.1. Project Management applies to.

RESPONSE: Please see response to RFI #3.

RFI: 27 Bulkheads

SECTION: General

QUESTION: Can we produce a prototype canoe without bulkheads?

RESPONSE: Bulkheads are not required per the RFP.

RFI: 28 Gypsum

SECTION: Exhibit 5

QUESTION: In the cover letter it is stated that a standard is going to be provided for gypsum in the Mix Design Section; however, in the mix design section no information or regulations are provided. Is this information going to be listed in an addendum or released in the near future?

RESPONSE: Gypsum would be allowed, but would count as part of the hydraulic cement (c) content and contribute to the 50% maximum (by mass) amount of hydraulic cement rule. Gypsum used would need to meet ASTM C22, with information showing compliance to the ASTM included as part of the MTDS Notebook.

RFI: 29 Boat and School Name

SECTION: 6.6.1

QUESTION: We are looking for clarification regarding the boat name and school name. The RFP states that, "Recognized abbreviations from the school's official website are acceptable, but the name must be at least 5 characters long." Do both names need to be at least 5 characters or just the school name?

RESPONSE: The character requirement for the name applies to the school name, but not to the canoe name.

RFI: 30 Darapel S80 Admixture

SECTION: Exhibit 5

QUESTION: The team has emailed the supplier and has received a response stating that the material complies with ASTM C494 Type S but it is not on the current data sheet. The email has a company letterhead and is attached. Darapel S80 is used to make the concrete hydrophobic. This is done to increase the lifespan of the concrete canoes in order to be used for practice after the competition.

RESPONSE: C4 does not see a question in this RFI, but assumes the team is asking for approval for this material. That being the case, please refer to RFI 9 for requirements if no technical data sheet exists which shows the correct ASTM standard.

RFI: 31 Admixture TDS with no ASTM

SECTION: 5.6.5

QUESTION: We are considering using an admixture that has a technical data sheet, but that sheet does not clarify the ASTM standard it falls under. After reaching out to the manufacturer, we were provided with a lab test report for a mix design listing all the materials in the mix including the admixture we are hoping to use. The conclusion of this report states that all materials were determined to be compatible with the appropriate ASTM we are looking to prove. This report has the company letterhead and information. Is this an appropriate supplementary report along with the datasheet to fulfill the requirements of 5.6.5?

RESPONSE: Teams should be cautious when using lab test data to prove compliance with ASTM standards. It's important to understand that compliance and compatibility are different. When presented with testing data for any materials, ensuring that results comply with the applicable ASTM is important. Of equal importance is that all of the required tests from the ASTM standard were conducted. Remember that the RFP requires compliance, not compatibility. Unless the team can prove full compliance or gain C4 "approved equal" concurrence on a specific product, the product would not be allowed.

RFI: 32 Liquid Latex Compliance

SECTION: 5.6.5

QUESTION: In the rules for the liquid latex, it is stated that the compliancy is C1438. However, I have heard from different places that C1438 and C1059 are the same thing. Can I have clarification on whether or not this is true? There seems to be no latex that complies with C1438. The provider said that their liquid latex modifiers are tested in hydraulic cement concrete and mortar as stated in the ASTM C1438. Let me know if you have any questions, thank you.

RESPONSE: C4 recognizes the challenge of finding products whose data sheets show compliance with ASTM 1438. Thus, we offer the following options for the Team's use.

- STYROFAN 1186 (BASF Corp.)
- TRINSEO MODIFIER A™/NA (TRINSEO LLC)
- Tylac 4190, 4191, 4193 (Mallard Creek Polymers)
- Quikrete Acrylic Fortifier No. 8610
- Rovene 4040 (Mallard Creek Polymers)

These products are, as of this RFI, pre-approved by C4 as meeting the intent of ATSM C1438 and are compliant with the RFP. Should a team wish to use another product, they must show that the intent of the standard is met.

RFI: 33 SILPRO C-21 ALL Scrylic

SECTION: Exhibit 5

QUESTION: We are requesting clarification regarding the use of SILPRO C-21 ALL ACRYLIC as a liquid for use in cement. Exhibit 5 states "as a liquid formulated with hydraulic cements that meet ASTM C1438 Type II requirements." Does this mean that the cement itself must meet the ASTM C1438 requirements or that the latex emulsion must meet the requirement?

RESPONSE: Please refer to the table above ther referenced line in Exhibit 5. The latex emulsion must meet the ASTM standard.

RFI: 34 Graphics - Stains - Inside/Outside

SECTION: 6.6.2

QUESTION: The RFP states "Stains can be applied to either the inside or outside of the canoe, but not both..." Do the top of the gunwales and top of the bulkheads count as "inside" or "outside" of the canoe or is it up to each team?

RESPONSE: For the tops of bulkheads and rails, teams are allowed to define these surfaces as either the inside or outside of the canoe for staining purposes. However, the definition must be consistent. Either the top of the rails and the top of both the bow and stern bulkhead are defined as the inside face of the canoe or the top of the rails and the top of both the bow and stern bulkhead are defined as the outside face of the canoe.

RFI: 35 Clarification on Stain Requirements

SECTION: 6.6.2

QUESTION: Does the statement "stains cannot be diluted with water, acetone, or other mediums." apply to all stains, including transparent stains, or strictly to acid stains? Also, are "semi-transparent" stains compliant with the RFP or are only "transparent stains" compliant?

RESPONSE: Semi-transparent stains are not compliant. The statement "stains cannot be diluted with water, acetone, or other mediums" applies to all stains.

RFI: 36 Canoe Material Components

SECTION: 6.2

QUESTION: How much of the physical modifications need to be made of concrete? For example, does a shelf or table attached to the hull need to be made of concrete?

RESPONSE: The Final Product Prototype's components must fit into one of three categories -- concrete, reinforcement, or flotation. Section 6.2 provides further information and exclusions.

RFI: 37 Pre-Impregnated Materials

SECTION: Exhibit 5

QUESTION: In Exhibit 5, the RFP states that "Pre-impregnated (pre-preg) materials containing resins that require heat for polymerization are also prohibited." Our team is wondering if C4 could clarify what the term "Pre-impregnated materials" implies about the mesh, and if this prohibits all resin-coated mesh? In other words, if we use a reinforcing mesh that has a resin coating, but we do not plan to apply heat to the canoe that will activate the polymerization, would this be allowed under the rules stated in Exhibit 5?

RESPONSE: Mesh materials that are coated in a resin, are not heated or otherwise chemically changed to alter the material properties, AND maintain the mesh open area requirements before being embedded in the concrete would satisfy the requirements of Exhibit 5 of the RFP.

RFI: 38 Display & Client Scope Change

SECTION: Client Scope Change

QUESTION: In the Client Scope Change Overview, C4 adds the option to create a luxury model, which will require an updated structural analysis, additional costs, and an updated schedule for our submittal. Our team is requesting clarification on whether this only applies to the canoe or if it includes the overall display as well. Will our updated schedule and cost implications also need to include luxury modifications to the overall display?

RESPONSE: To start, C4 would like to clarify that we are not intending for teams to physically produce any of the components of the proposed client scope change.

The client scope change is intended to be a thought exercise for teams to gain familiarity with how to respond when a client is entertaining a scope adjustment or considering executing a change order.

C4 is looking for the impacts related to redesign efforts, cost, and schedule. The submittal requirements for this proposed client scope change (the scope change memo, the schedule and cost impact, and the proposed fee) are to be contained within Appendix C of the Proposal.

The product display requirements should remain unchanged from the RFP.

RFI: 39 Aggregate Size

SECTION: Exhibit 5 & Mix Design Webinar

QUESTION: In the mix design webinar, on the aggregate slide, it states "Meeting the definition of 'fine aggregate' – ASTM C125 aggregate passing the 9.5-mm (3⁄8-in.) sieve and almost entirely passing the 4.75-mm (No. 4) sieve and predominantly retained on the 75-µm (No. 200) sieve". So this implies the aggregate needs to pass the 3/8-in sieve to be a fine aggregate, but does that mean aggregate bigger than this size cannot be used in the mix design? There is no mention of ASTM C125 or a maximum size for aggregate in the RFP.

RESPONSE: While there is no prescribed maximum aggregate size, C4 would like to state that using larger size aggregate than those meeting the definition of a fine aggregate may yield a concrete mixture and canoe hull that is excessively heavy.

RFI: 40 Re-use of Materials for Manufacturing Cost Estimate - Fee Schedule

SECTION: 5.4.5.5

QUESTION: The rules specify that reusing molds can be reflected in the Fee Schedule, can that be applied to other equipment as well? Specifically, an insulated box that our team constructed to store and aid our canoe during the curing process.

RESPONSE: Yes, reuse of equipment can and should be accounted for.

RFI: 41 Production Schedule Clarifications

SECTION: 5.4.5.7

QUESTION: In Section 5.4.5.7, it is stated that ASCE will provide all required facilities. Does this include a curing tank for the canoe? If so, will there be more than one available? Additionally, should holidays be considered for the production schedule?

RESPONSE: Section 5.4.5.7 states that "ASCE will provide all required facilities with basic infrastructure up to 1 million square feet (electricity, water, loading docks, storage, etc.). Teams will need to plan for standup and construction of their specific fabrication process (molds, mixing stations, sanding areas). Teams should assume a large empty space that can be adapted to any configuration deemed appropriate."

With this in mind, ASCE would not provide any components specific to a team's own manufacturing processes (like the curing tank mentioned in the question). Effectively, assume that ASCE is providing you with a blank canvas of a warehouse, and has graciously decided to also foot the bill for general utilities. Everything else beyond that is the team's responsibility. Holidays should be considered when developing the production schedule.

RFI: 42 Strands, Tendons, and Bars Used Alongside Mesh/Grid Reinforcement

SECTION: Exhibit 5

QUESTION: I would like to request clarification on whether the use of grid and mesh reinforcement is permitted in conjunction with strands, tendons, and bars as primary reinforcement. Specifically, I am asking if tendons and bars can be used for pretension the concrete canoe while still incorporating mesh/ grids as additional reinforcement.

If allowed Will the use of the combined reinforcement systems previously mentioned impact the calculation of the percent of open area?

RESPONSE: Exhibit 5 states the following: "Strands, Tendons, and Bars – are materials less than ½ inch wide used to make a reinforcement grid or used in pre- or post-tensioning. When used individually, they must meet thickness requirements but are not subject to percent open area. Grids consisting of strands, tendons, and bars are subject to thickness and percent open area requirements."

If the strands, tendons, and/or bars are being applied in a grid-like manner, they would be subject to the percent open area requirements. If they are used individually, they would not be.

Strands, tendons, and bars used as reinforcing in the manner described (as well as the grid/mesh reinforcement) would all be considered primary reinforcing and would be subject to the reinforcing thickness limitations described in Exhibit 5.

RFI: 43 Preliminary Design Report Page Maximum Clarifications

SECTION: 5.4.3

QUESTION: Section 5.4.3 - Preliminary Design Report states that it has a 9 page maximum. 5.4.3.1 - Project Management states that it has a 4 page maximum within 5.4.3. Which of the following subsections of 5.4.3 (Key Team Roles & Organizational Chart, Project Scope, Health and Safety, Project Management Plan (PMP), Quality Assurance and Quality Control, Research and Development Cost, Research and Development Cost - Fee Schedule) fall under the 4 page maximum stipulated in this section?

RESPONSE: This question has been answered via a previous RFI. Please review all RFIs prior to submitting a new one. If the team's RFI is related to a previous RFI, please mention it in the submitted information for the committee to consider.

RFI: 44 QUIKRETE Cement Material Compliance Question

SECTION: Exhibit 5

QUESTION: We are seeking clarification on whether QUIKRETE Portland Cement (Type I/II or IL) meets the requirements specified by the ASCE Concrete Canoe Competition guidelines for the concrete canoe mix design. The product states compliance with ASTM C150 and C595 specifications.

Please confirm if QUIKRETE Portland Cement (Type I/II or IL) is acceptable for use in the concrete canoe mix under the ASCE guidelines. If not, please provide recommendations on the appropriate cement type that complies with the ASCE requirements. Response Needed By: January 5, 2025

Our team read somewhere on an ASCE related site that Quikrete wasn't allowed to be used, but the cement we purchased is regular Portland Cement that is the Quikrete brand. We want to ensure that using this brand of cement is permitted prior to proceeding further into the project.

RESPONSE: Let's begin with the most critical aspect of this RFI: "somewhere on an ASCE-related site." The only authoritative and governing documents for this competition are the 2025 Concrete Canoe Request for Proposals (RFP) and the official RFI responses posted on the ASCE Concrete Canoe Facebook page.

No other websites, alternative rule sets, RFI responses, or word-of-mouth information should be used to determine whether a product is compliant. Teams must rely solely on this year's RFP to assess material compliance. Also, C4 does not approve materials on behalf of the team unless the team is seeking an "approved alternative." As such, for any material-related restrictions and governing standards, teams should thoroughly review Exhibit 5.

Next, the team requested a response by January 5, 2025. While C4 appreciates the use of clear deadlines in professional communication and encourages teams to adopt this practice, it's essential to recognize that the feasibility of such deadlines plays a significant role in demonstrating consideration and thoughtfulness - qualities that will serve team members well in their future professional interactions. Frankly, this request was ambitious at best.

Although C4 acknowledges the time-sensitive nature of material ordering, it is worth noting that the 2025 RFP has been available since September 3, 2024. This RFI was submitted at 4:00 AM ET on December 31, 2024, leaving an unreasonably short window for a response. It should be noted that, between the submission date and the requested deadline, the following events occurred: New Year's Eve, New Year's Day, two business days, and two weekend days. These constraints significantly limited the committee's ability to provide a timely response.

C4 would like to remind teams that the five professional volunteers on this committee strive to be as responsive and accessible as possible while balancing these responsibilities with our jobs and families. Teams must carefully consider the timing and impact of their requests. Many professionals, including members of this committee, use federal holidays to extend weekends and spend meaningful time with their families, stepping away from work and daily responsibilities.

To summarize this RFI, review Exhibit 5 of the 2025 RFP and consider the impacts of your timing requests, planning ahead whenever possible so that the team does not give the client two business days to respond to information that's been available for three months.

RFI: 45 Mearlin Super Copper Mica Powder

SECTION: Exhibit 5, 6.6.2

QUESTION: Our team would like to use mica powder in our mix. We are hoping to use this as an aggregate in our mix for its aesthetic qualities. We are unsure if using it in the mix as an aggregate for its aesthetics would mean it is bound by the Aggregates requirement in Exhibit 5 of the RFP or if it then becomes subject to and is governed by rule 6.6.2 Graphics. The retailer of this product sells this mica powder as an art supply and thus does not make any claims as to the ASTM standards it follows if it is added to concrete and we can not be certain it complies with ASTM C979 as required by Section 6.6.2

RESPONSE: The mica powder would need to be integrally mixed into a concrete mixture and satisfy requirements listed in Exhibit 5 for it to be used as an aggregate. Applying the mica powder to the surface, or mixing it in with a sealer/top coat would not be permitted, as mica powder used in this fashion would be considered a glitter, which is prohibited per Section 6.6.2.

RFI: 46 Slag Cement/Hydraulic Cement

SECTION: Exhibit 5

QUESTION: We are seeking clarification on whether slag cement falls under the category of hydraulic cement. If used in a mix would slag cement contribute to the 50% that is allowed to be hydraulic cement?

RESPONSE: C4 recognizes there is a smidge off ambiguity in Exhibit 5, as the table listing required ASTMs for cementitious materials is listed just after the hydraulic cement bullet points. This will be corrected for next year's RFP.

To clarify: slag cement is not a hydraulic cement and would not contribute to the 50% restriction noted in Exhibit 5. Slag cement should conform to ASTM C989 (Grade 80 Minimum). Hydraulic cement should conform to ASTM C150, C595, C1157, or C845.

RFI: 47 Seat Definition Clarification

SECTION: Exhibit 9, 6.2

QUESTION: In the Equipment section of Exhibit 9, the RFP says that seats are allowed to be used. Are the seats required to be made of concrete and attached to the canoe, or can they be made of other materials (eg. foam or other padding)? Additionally, if the seats are able to be detachable, could the seats be temporarily attached in some way, such as velcroing them to the concrete canoe? Or could the seats be attached to the paddler in some way without restricting the paddler's ability to exit the boat or cause any safety concerns?

RESPONSE:1) Seats are not required to be made of concrete and are not required to be permanently attached to the canoe. 2) Seats cannot be attached with Velcro to the canoe, as you would only be permitted to apply Velcro to the seat, not the canoe itself (final product needs to comply with "concrete, reinforcement, or flotation" requirements noted in Section 6.2. Velcro would not satisfy this requirement. 3) For safety reasons, seats may not be attached to paddlers.

RFI: 48 PureGRAPH Graphene

SECTION: Exhibit 5

QUESTION: Our team is hoping to use a material - PureGRAPH Graphene in our concrete mix as an alternative cementitious material and pozzolan evaluated under ASTM C1709 (per Exhibit 5). Our research to date has shown that the product, as well as other similar products are only available internationally, and do not test for compliance with ASTM C1709. We're reaching out to C4 to see if the material is acceptable for use.

RESPONSE: While C4 appreciates the desire to innovate by using newer materials in mix designs, teams should be reminded that the burden is on them to prove compliance with the applicable standards outlined in the RFP - in this case ASTM C1709. In the absence of formal testing for compliance completed by the manufacturer, teams would be required to test the full range of properties outlined in the ASTM, some of which can take upwards of 12 months for results. Assuming this data is not already readily available, teams won't be able to complete testing in time for competitions. With that in mind, C4 recommends that teams try other materials that do not require testing to prove compliance with ASTM C1709.

RFI: 49 Client Scope Change Memo

SECTION: Client Scope Change

QUESTION: The Client Scope Supplemental document provides a number of requirements to be included in Appendix C of the Project Proposal.

Specifically, the Supplemental Requirements section states that the 1-page max Scope Change Memo should be "...referencing specific items from the Key Assessment Areas presented above. Be sure to reference each of the main topics..." Those Key Assessment Areas are physical modifications as well as project management modifications.

However, the other two deliverables are 1/2 page on Schedule and Cost Impact, and another 1/2 page on proposed fee. This seems to cover the project management modifications, and would make it redundant to mention them in the scope change memo as well.

Please advise: Should the scope change memo include the team's proposed edits to the production schedule, cost plan, and project management plan, and then those things be redescribed and further analyzed in later sections, or is the memo intended to cover just the physical modifications, with those other areas addressed in the subsequent sections (Schedule and Cost Impact and Proposed Fee).

RESPONSE: The scope change memo should "reference" each of the main topics not necessarily analyze them. The detailed analysis should be presented in the subsequent Schedule and Cost Impact and Proposed Fee sections.

For example, the Scope Change Memo should discuss the changes being made, why those changes were decided on, what changes would occur to the overall project (which includes schedule and cost, and therefore fee), and what factors cause the change. The detailed Schedule and Cost Impact and Proposed Fee sections should then provide a deeper discussion of those two elements specifically. In these sections, teams should discuss specific tasks, materials, etc that are affected and provide analysis on their impacts to the overall production process.

It's important to remember that the Client Scope Change specifically mentions that the Schedule and Cost impacts refers to the research and development, while the Proposed Fee refers to the production cost. Consider how the development cost impact might be different from the ultimate cost of the individual and/or bulked canoe. Is there a way for the teams to minimize one or both of these to have a smaller impact on the client while also providing the luxury options? Is there value in having the changes impact the research and development more than the production or visa versa?

Keep in mind that the Scope Change Memo, Schedule and Cost Impact, and Proposed Fee can include graphics, tables, etc to help illustrate your point.

RFI: 50 Fully Transparent Stains

SECTION: 6.6.2 Graphics

QUESTION: The team is questioning the non permissibility of semi-transparent stains as stated by RFI 35. My team and I have not been able to find any type of concrete stain that is fully transparent with a VOC of 350 or less. Even when asking chat GPT to provide an example of a concrete stain that is fully transparent and that offers different colors it cannot find one. Clarification of this rule would be greatly appreciated specially since previous years have been able to use semi-transparent per their specifications.

RESPONSE: First, previously years have not necessary been allowed to use semi-transparent, per the RFP. Most notably, in 2024, the rules stated that "The stain(s) must generally be transparent in nature." There was no discussion of semi-transparent stains in the 2024 rule set. That said, we should not look to previous rules, but rather at the information provided by the 2025 RFP and the current RFI's posted. Per the 2025 information, the key term within 6.6.2 is transparent.

By definition, transparent means "allowing light to pass through so that objects behind can be distinctly seen."

With this definition in mind, the intent behind only allowing transparent stains is to allow the concrete to show distinctly through the stain -- after all your team has worked so hard to prove that concrete can be modeled into a canoe and be raced on open water, so you will want to show off that critical aspect of the design. The stains should not cover with color or hide the concrete underneath it. Said another way, the stain should not be "film-forming" and should not be able to peel off the concrete like a paint would.

The team is encouraged broaden their search to terms that can also mean transparent and to test out stains they are interested in using to confirm they meet the intent above. If, after testing and/or additional research, the team remains concerned, it is a best industry practice to note all assumptions about a deliverable within the deliverable itself. In this case, that could be the proposal or the MTDS.

C4 does however note the potential confusion from this RFI and will discuss ways to be more transparent in future rule sets.

RFI: 51 BEHR PREMIUM® Semi-Transparent Decorative Concrete Stain

SECTION: 6.6.2 Graphics

QUESTION: The team would like to apply a stain to the hardened concrete on the outside of our canoe with a sprayer so that we can create a design that matches our theme. The rules state (6.6.2) that stains must be transparent and with a VOC of 350 g/L or less. In RFI No. 35 11/19/2024 it was determined that "Semi-transparent stains are not compliant". However, most commercially available stains are marketed as "Semi-transparent". Would the product outlined below be considered as a violation of section 6.6.2? Further clarification between semi-transparent and transparent would be appreciated. The team is requesting the use of BEHR PREMIUM® Semi-Transparent Decorative Concrete Stain

RESPONSE: Please see the response to RFI # 50. Note the language surrounding the definition of transparent, C4's intent, and the discussion around "film-forming" stains.

RFI: 52 Bulkhead Top Location

SECTION: 6.6.2 Graphics

QUESTION: Our team hopes to include a 3d aesthetic element on top of our canoe's bulkhead. This element is intended to connect with aesthetic elements on the outside of our canoe using stain. We will be using stain on the outside per rules in 6.6.3, but our wish is to use staining also on the 3d element. Can C4 define the top of bulkhead as "outside" or "inside" of the canoe? Please advise.

RESPONSE: First, just as a note -- the question references Section 6.6.3 for use of stain on the outside of the canoe. However, Section 6.6.3 provides information related to concrete sealers, not stains. Stains requirements are provided in 6.6.2 Graphics.

For the tops of bulkheads and rails, teams are allowed to define these surfaces as either the inside or outside of the canoe for staining purposes. However, the definition must be consistent. Either the rails and the top of both the bow and stern bulkhead are defined as the inside face of the canoe, or the rails and the top of both the bow and stern bulkhead are defined as the outside face of the canoe.

RFI: 53 Structural Analysis Hand Calculations

SECTION: 5.4.6.3 Appendix C - Supporting Documentation

QUESTION: For the structural analysis portion of the project proposal, we completed a package of hand calculations supporting our structural analysis portion. Would this calculation package be acceptable to incorporate in Appendix C of the project proposal or would this calculations package count as documentation not specifically asked for by C4?

RESPONSE: Correct. The hand calculation package referenced in the question would not be something included for Appendix C and would be considered "additional information not specifically requested by C4." However, if the team's hand calcs are to support FEA modeling, then per 5.4.4.2, "If FEA modeling is used, the required additional spot check calculation must fit within this section of the proposal. No additional pages shall be used."

If the hand calcs don't fall into this category, the team could consider discussing in the Structural Analysis section of their Proposal, the hand calculations the team produced, and the value of

conducting hand calcs to backcheck and verify the structural analysis. The team could also consider including the package of hand calculations as part of their Project Display.

RFI: 54 Adhesive Logos with Symbols

SECTION: 6.6.2 Graphics

QUESTION: Are the guidelines in 6.6.2 the only approved methods for creating graphics? Our team would like to use adhesive emblems/logos. Section 6.6.1 states that "Adhesive lettering is allowed, but only for the school and canoe names." These emblems will not have letters on them. Are these graphics considered adhesive lettering?

RESPONSE: Adhesive lettering used for the canoe name and school name per 6.6.1 are the only type of adhesive appliqués that can be used. The team is correct that Section 6.6.2 outlines the requirements for creating aesthetic elements and graphics for the canoe. These requirements apply to permanent features that are part of the Final Product Prototype. For example, the team could use removable adhesive stencils to aid with applying stain, as long as the stencils are removed and are not part of the Final Product Prototype.

A few examples of general methods that could be considered, but not limited to include concrete stains, integrally colored concrete, 3D elements, sandblasting, acid etching, concrete inlays, concrete tiles, or some combination of these. The team would need to develop their own techniques to apply these methods and verify those techniques fall within Section 6.6.2 and the RFP requirements.

RFI: 55 Powder Pigment Dye

SECTION: 5.6.5

QUESTION: we want to use a powder pigment dye for our concrete mix but it does not have a technical data sheet, only a safety data sheet. It is color blasts premium dry pigment made from direct colors. After speaking to their team, we know it meets the ASTM standard as per the RFP but we don't know what to do about the technical data sheet for the materials notebook.

RESPONSE: In the event a technical data sheet is not available, provide a letter or email directly from the manufacturer (not a 3rd party vendor) confirming the product meets or exceeds the requirements of the relevant ASTM. Refer to RFI 9 for additional information and requirements that need to be included. Note, this should be incorporated as part of the MTDS Notebook.

RFI: 56 Polystyrene Beads

SECTION: Exhibit 5

QUESTION: Are we allowed to use expanded polystyrene beads as part of our mix design?

RESPONSE: The team should refer to Exhibit 5 for concrete mixture constituent requirements. For example, if the team is considering using this product as an aggregate -- review the Aggregates section in Exhibit 5 to check and verify the product meets the requirements that are outlined.

RFI: 57 Primary Reinforcement Layering Scheme Clarification

SECTION: 5.4

QUESTION: Within the Project Proposal section (5.4) both 5.4.4.3 Mix Design and 5.4.4.4 Construction process ask that we describe the primary reinforcement layering scheme. We interpret this as describing the testing considerations and results within the Mix design section but are unsure of what the RFP is asking for us to further describe within the construction process section as the description of placement is included in separate verbiage in the same section. To avoid redundancy, we are seeking a clarification on what information regarding the primary reinforcement is considered as part of the Mix Design and what is considered part of the Construction Process.

RESPONSE: Section 5.4.4.3 Mix Design says to describe the "Primary reinforcement considered, tested, and used, and layering scheme chosen." The information presented here should include the primary reinforcement layering scheme as it relates to the concrete composite. Section 5.4.4.4 Construction Process says to include "...method of mixing and placement of concrete reinforcement, layering scheme, curing..." This section does not specifically refer to the "primary reinforcement layering scheme" but rather is referencing the overall layering scheme of the constriction process for the canoe. For example, teams using pre- or post-tensioning, bearing plates, strands, tendons, bars, structural ribs, or other permanent elements of the canoe should consider including information related to how and where the location and layering of these elements are during the construction process.

RFI: 58 Cross-Section Clarification

SECTION: Section 7.3.2

QUESTION: Section 7.3.2 states a full-scale model "cross-section" of the canoe must be displayed alongside the canoe. Can C4 clarify what it defines as a valid cross-section? Specifically, does representing the raw and finished stages of the middle canoe satisfy this requirement or should teams also include elements only occurring at end-caps?

For our bulkheads, we plan to include a 3D element constructed of flotation and concrete. This 3d element is purely aesthetic to complete the look of the canoe and is not present in any other section of the canoe. Additionally, bulkheads are constructed after initial curing of the canoe and have additional reinforcement only present at the end-caps.

RESPONSE: A valid cross-section contains all of the elements outlined in section 7.3.2 and fits within the spacial parameters provided in the same section.

The language in Section 7.3.2 uses words like "representing" and "should illustrate." So, teams should show representative elements of the "concrete casting, finishing, and reinforcement techniques" and "include the mold" to illustrate the various stages and all elements of the final prototype.

Keep in mind, the RFP states that the cross section must be full-sized model. It does not state that the cross section is a replica of a specific portion of the canoe.

RFI: 59 Client Scope Change Evaluation

SECTION: 5.1

QUESTION: According to the client scope change "The Client Scope Change deliverable will be compiled in Appendix C of the Proposal, following formatting requirements in section 5.1 of the RFP." However, there is no points accorded to appendix C in the scoresheet on page 63 of the RFP. Does that mean that the client scope change submission is not evaluated in the project proposal, nor in any other evaluations ? If it is not the case, how will it be evaluated?

RESPONSE: The client scope change will be evaluated as part of the Overall portion of the Proposal Rubric.

RFI: 60 Concrete Cylinder Colors

SECTION: 7.3.4

QUESTION: In addition to display materials, concrete cylinders are requested for compliance checks. The RFP requests that cylinders represent the colors that are used within the canoe. This year, our design incorporates multiple colors following the rules set within 6.6.2 in which the main mix design is unchanged besides pigmentation. We would like to clarify whether or not we need to present a cylinder for each of different colors or if one cylinder, representative of the primary mix design featuring one of the colors, is sufficient.

RESPONSE:The team must provide one cylinder per mix supplied in the mix design spreadsheet deliverable. If a single mix is provided on the prototype in a variety of colors, teams are required to provide one cylinder. C4 encourages the team to provide the cylinder in one of the colors used on the canoe prototype.

RFI: 61 Production Schedule Page Limit

SECTION:

QUESTION: After completing the 5-year production schedule, we have determined that the complete Gantt chart with its details cannot fit in a 11 in. x 17 in. page. Is it possible to allow more than one page for the Production Schedule? If not, what is the suggested method for this schedule?

RESPONSE: No additional pages are allowed.

While the ultimate determination reside solely with the team, C4 encourages teams to review the level of detail provided and determine what detail provides value to the client and what detail is superfluous. Just because the task occurs doesn't mean the client has interest in that task. Ask yourselves (or perhaps a professional mentor, faculty advisor, professor, etc) what would be of interest to them. Then, use your best engineering judgement to achieve the task at hand.

As C4 has mentioned repeatedly, there is an art to simple communication, less is more, and de-cluttering data so that everyone can understand an implement the engineered plan.

RFI: 62 Legal Rib Materials

SECTION: Exhibit 5, Section, 6.6, and Section 6.2

QUESTION: Is 1/4" (inner diameter) PVC a legal material for ribs, when incased in concrete? Is spray insulation foam a legal reinforcement material, when used in conjunction with PVC for Ribs?

RESPONSE: C4 will not provide material approval via RFIs. C4 will only be reviewing approved equals and providing guidance where we agree the RFP is unclear.

On this matter, the team should review the allowable materials in Exhibit 5 and Section 6.6 and Section 6.2. For example, 6.2 states "The Final Product Prototype shall be constructed with components that are categorized under and comply with Concrete, Reinforcement, or Flotation requirements presented herein." So, the PVC material and the spray insulation foam in question would be required to be categorized per 6.2 and, then, meet the category requirements. If the material fell into multiple categories, it would need to meet all requirements of the separate categories.

Team's are responsible to prove compliance by using data available to them, help from advisors and local professionals, and their best engineering judgement.

RFI: 63 Vetrofluid

SECTION: 6.6.3

QUESTION: The team is attempting to use Vetrofluid which is a silicate based penetrating sealer manufactured by Ecobeton. Vetrofluid complies with the required VOC content for penetrating sealers of less than 350 g/L as specified in the RFP. The product was approved per RFI No. 79 on 01/23/2023 in the 2022-2023 edition of the competition, and the 2022-2023 RFP requirements of concrete sealers were the exact same as this year's requirements. We want to ensure that this decision still holds true for this year's competition. The sealer penetrates the concrete with "select silicates" as per the product's MTDS. Vetrofluid has a VOC content of 0 g/L.

RESPONSE: As previous mention both in the RFP and various RFIs, team should not look to rules sets, RFI responses, or material approves for previous years. Only those related to the 2025-2026 competition season are valid. Teams are required by the RFP to prove compliance with this year's RFP and RFIs.

C4 will not provide material approval via RFIs. C4 will only be reviewing approved equals and providing guidance where we agree the RFP is unclear. On this matter, the RFP is clear and the team is encouraged to read the relevant sections and use their best engineering judgement.

RFI: 64 Removable Concrete Piece

SECTION: Section 5.4, Section 5.6, Section 6.2, Section 6.4, Section 6.7

QUESTION: Our team would like to have a removable concrete piece that would solely be for aesthetics only and used only when judging. This piece would be removed and kept safe during travel and races.

RESPONSE: Per Section 6.7 Durability and Repairs - which states "canoes should be durable enough to survive the rigors of the symposium competition, the society-wide competition, and transportation to and from the various events" - C4 is not convinced that the team's removable pieces aligns with RFP and the Spirit of the Competition. This request appears to imply that only part of the canoe is being raced rather than the entire structure.

That said, C4 will not issue a verdict on this RFI request but will outline relevant competition elements impacted by a removable piece. These references may not be exhaustive.

Safety

- The connection must not pose a safety hazard to paddlers on race day. Any protruding connection material must not create a risk of injury in an emergency.

Mix Design & Material Compliance

- The connection material must align with RFP classifications for concrete, reinforcement, or flotation. The team must specify the applicable category.
- The canoe's official weight at the Society Competition must include the removable piece.

Technical Report/Presentation

- The connection and removable piece must be included in Appendix B calculations.
- The team must discuss how this component relates to mass production.
- The cost of the connection and removable piece must be reflected in the fee schedules.
- The team must address the value this feature offers to the client and consumer.
- The team must be prepared to justify compliance with Section 6.7.

Summary

With these competition elements, the team is instructed to use their best engineering judgement. Compliance with the RFP remains the team's responsibility and is subject to review by competition judges at both the local conference and, if applicable, the Society level.

RFI: 65 Oven-dry vs Saturated-surface Dry Specific Gravities of Aggregates

SECTION: Exhibit 6

QUESTION: This question seeks to clarify how oven-dry and saturated-surface dry specific gravities of aggregates relate to each other. Both in Exhibit 6 (p. 48) of the RFP and in the Absolute Volume example calculation in the Mix Design Webinar (slide 21), it is stated that "it can be shown that for the shale (SG.SSD = 1.55; A = 13%), the SG.OD is 1.75." The Mix Design Webinar gives the calculation as follows: SG.SSD = SG.OD * (1 + A). It seems that there is a mistake either in the example of the shale or the equation. We are requesting that this discrepancy be resolved.

RESPONSE: Good catch! There is indeed a typo here -- the OD and SSD subscripts are flipped. The sentence in Exhibit 6 and the Mix Design Webinar slide 21 should read: "For example, it can be shown that for the shale (SG.OD=1.55; A=13%). the SG.SSD is 1.75"

And you get a bonus typo! As we were checking the numbers in Exhibit 6 (yes--we ran hand calcs!) we also found a typo on page 47 under the Proposed Mixture Proportions and in the Mix Design Webinar slide 19. The pumice aggregate is listed as 600 lbs (dry). This should be 550 lbs (dry), as used/shown later in the Exhibit 6 example.