

# 2020

AMERICAN SOCIETY OF CIVIL ENGINEERS®  
NATIONAL CONCRETE CANOE COMPETITION™

## REQUEST FOR PROPOSALS



**Date:** September 6, 2019  
**To:** ASCE Student Chapter and Concrete Canoe Teams  
**Subject:** Request for Proposal – 2020 Concrete Canoe

1801 Alexander Bell Drive Reston, VA 20191-4382  
(800) 548.2723 toll free (703) 295.6300 intl  
(866) 902.6249 fax ■ www.ASCE.org

Dear ASCE Student Chapter and Concrete Canoe Teams:

The Committee on National Concrete Canoe Competitions (CNCCC), a subcommittee of the American Society of Civil Engineers (ASCE), is considering the use of a standardized design for future concrete canoe competitions. As such, the CNCCC is soliciting pre-qualified ASCE Student Chapters to submit their Technical Proposal as a response to this Request for Proposal (RFP) Solicitation and to develop a full-scale prototype of a concrete canoe. ASCE will then invite qualifying teams to a national event held at the University of Wisconsin-Madison in June 2020 to present their project, where a panel of national judges will evaluate and award the winning team with a contract to provide the standard design for future ASCE competitions. (*This is a hypothetical situation for this year's competition*)

The following documents will support this RFP (anticipated release dates are also provided):

- Addendum #1: Presentation Q&A – Release Late October 2019
- Addendum # 2: Durability & Repairs – Release Early November 2019
- RFI Summary – Release Early February 2020

If there are any major clarifications needed, additional addendums will be released, as needed. Release announcements would take place on the CNCCC Facebook page, as well as the ASCE Concrete Canoe website at <https://www.asce.org/concrete-canoe-rules-regulations/>.

All teams wishing to participate shall respond by submitting their **Preliminary Project Delivery Schedule** and **Pre-Qualification Form** by **November 1, 2019**. All teams shall submit their **Technical Proposal & MTDS Addendum** by **February 17, 2020**. Please refer to the *Submission Requirements and Deadlines* section in the RFP for additional details regarding proposal formats, number of copies, and other requirements.

Sincerely,

**COMMITTEE ON NATIONAL CONCRETE CANOE COMPETITIONS**



Andres Guerra, PhD, PE, M. ASCE  
Chair, CNCCC (2020)

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## INTRODUCTION

Since the early 1970s, ASCE student chapters have been constructing and racing concrete canoes. During that time, canoe mixes and designs have varied, but the long-established tradition of teamwork, camaraderie, and spirited competition has been constant. Teams, their associates, judges, and all other participants are expected to maintain and build upon this tradition.

The objectives of the National Competition are as follows:

- Providing civil engineering students an opportunity to gain hands-on, practical experience and leadership skills by working with concrete mix designs and project management.
- Building awareness of the versatility and durability of concrete as a construction material among civil engineering students, educators and practitioners, as well as the general public.
- Creating awareness of concrete technology and application among civil engineering students, educators and practitioners, as well as the general concrete industry.
- Generating and increasing awareness of ASCE's and national sponsors' commitment to civil engineering education among civil engineering students, educators and practitioners, as well as the general public.
- Increasing awareness of civil engineering as a dynamic and innovative profession essential to society among industry leaders, opinion makers and the general public.
- Increasing awareness of the value and benefits of ASCE membership among civil engineering students, professionals, faculty in order to foster lifelong membership and participation in the Society.

While the intent of the competition is to learn and build experience both technically and socially, students are a short step from being practicing engineers involved in projects that are critical to society's welfare.

Ethics, professionalism, civility and respect are the cornerstone of every successful competition, and ASCE expects professional conduct from all participants. To preserve the quality of this competition and to improve the quality of future competitions, ASCE enforces high standards.

## AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)



The American Society of Civil Engineers (ASCE) is the oldest national engineering society in the United States. Founded in 1852 with 12 members, the Society was created to disseminate information among engineers who were building the roads, canals, bridges and railroads of a young nation.

Today, ASCE has more than 150,000 members, including some 15,000 of whom are international members residing outside the United States. Individual professional engineers rather than companies or organizations hold membership. The members are organized geographically into ten regions, 75 sections, 155 branches, 106 Younger Member Groups and 380 student chapters in North America and around the world. Student Chapters sponsor meetings, educational outreach, conferences, student competitions, social events and other activities to help future engineers become better prepared for their careers. Numerous scholarships and awards are made available for deserving students of civil engineering.

A Board of Direction governs the Society. The Board, which includes ASCE officers and representatives elected by the membership, establishes all policy for the organization. A staff of 250 implements the policies; the vast majority of staff work at ASCE International Headquarters located in Reston, Virginia.

For more information, visit <http://www.asce.org>.

## R. JOHN CRAIG MEMORIAL AWARD

The concept of a National Concrete Canoe Competition™ has been around for many years. In the mid-1980s Dr. R. John Craig, a professor at the New Jersey Institute of Technology and member of the ASCE Committee on Student Services (CSS), and other members of CSS began to formulate plans for more uniform Regional Competitions and formalized a plan to study the feasibility of a National Competition.

In the spring of 1985 Dr. Craig first brought his grand vision of a National Concrete Canoe Competition™ to ASCE. He was instrumental in bringing delegates from all over the country to meet one auspicious day in New York City at the executive conference of the ASCE National Headquarters. During this meeting the feasibility of conducting a National Concrete Canoe Competition™ was discussed, preliminary rules prepared, and a formal recommendation to proceed was drafted.

In the fall of 1985, the preliminary rules were presented to the Committee on Student Services (CSS). During the next year discussions regarding sponsorship were conducted with Master Builders, Inc. and ASCE Headquarters. After almost two years of committee debate, while meeting at the fall 1987 ASCE National Convention the Educational Activities Committee (EdAC) adopted the preliminary rules and established a standing task committee to implement the rules and requirements.

In the winter of 1987, just as the first National Competition was in sight, Dr. Craig was diagnosed with a rare inoperable brain tumor. He passed away just two months before his dream of a National Concrete Canoe Competition came to fruition. In June of 1988 the first National Competition was held in East Lansing, Michigan hosted by Michigan State University.

In the spring of 1989, CSS approved the formation of a permanent subcommittee to ensure the execution of the National Concrete Canoe Competition. Through the efforts and dedication of individuals like Dr. R. John Craig their efforts have established this National Concrete Canoe Competition™.

In that spirit ASCE has dedicated the Coed Sprint Race as a memorial to the teamwork and dedication of Dr. R. John Craig. It is our distinct honor to present the *R. John Craig Memorial Award* to the school that best exemplifies the spirit and cooperative ideals of the Competition by placing first in the Coed Sprint Race each year.

## 1.0 REQUEST FOR PROPOSAL

The Committee on National Concrete Canoe Competitions (CNCCC), a subcommittee of the American Society of Civil Engineers (ASCE), is considering the use of a standardized design for future concrete canoe competitions. As such, the CNCCC is soliciting pre-qualified ASCE student chapters, herein after referred to as “Teams,” to submit their *Technical Proposal* as a response to this Request for Proposal and to develop a full-scale prototype of a concrete canoe. Ultimately, the selected team will be awarded a contract to provide the standard design for future ASCE competitions. (**Note:** *a standardized design is a hypothetical situation for the purpose of identifying an end goal for this Request for Proposals and the competition.*)

Teams are to construct a prototype canoe with the durability to withstand the rigors of a series of race demonstrations consisting of 200- and/or 400-meter sprints with 180-degree hairpin turns, and a 200-meter slalom course, including the transportation to and from various venues. Team will need to research, design, procure & test materials, and construct a full-scale prototype in full compliance with this solicitation. This Request for Proposal includes specifications, constraints, and other requirements.

Furthermore, teams shall provide their *Technical Proposal* to be evaluated by a panel of judges and will follow up by meeting regionally to showcase their prototype, provide a technical presentation, and have a live race demonstration.

ASCE will then invite qualifying teams to a national event held at the University of Wisconsin-Madison in June 2020 to present their project, where a panel of national judges will evaluate and award the winning team.

### 1.1 Request for Information (RFI)

*Requests for Information* (RFI) are to be directed via e-mail to [cnccc@asce.org](mailto:cnccc@asce.org). Official responses will be posted to the CNCCC Facebook page (<https://www.facebook.com/ASCENCCE>). **The cut-off date for submitting an RFI is Wednesday, January 15, 2020.**

### 1.2 RFP Documents

The following documents, as part of this RFP will be provided to proposers:

Request for Proposal – Release Early September 2019

RFP Addendum #1: Presentation Q&A – Release Late October 2019

RFP Addendum #2: Durability & Repairs – Release Early November 2019

RFI Summary – Release Early February 2020

If there are any major clarifications needed, additional RFP addendums may be released, as needed. Release announcements would take place on the CNCCC Facebook page, as well as the ASCE Concrete Canoe website at <https://www.asce.org/concrete-canoe-rules-regulations/>.

## 2.0 ELIGIBILITY

A team may register up to a maximum of five (5) male and five (5) female participants. Registered participants are eligible to present at the Technical Presentation and/or participate in the prototype race demonstration. Substitutions will be allowed up to the time of on-site registration. No substitutions shall be permitted after on-site registration has been completed. Each team shall designate two (2) registered participants as team captains.

Teams may be invited to the National Competition by placing as the top qualified team at one of the nineteen (19) ASCE Student Conference Concrete Canoe Competitions (Conference Competitions), as the host school of the National Competition, or as a designated Wildcard.

All qualifying teams must represent an ASCE Student Chapter and shall meet the requirements outlined in *Attachment 1: Student Chapter and Participant Eligibility*

### 3.0 PRE-QUALIFICATION FORM

The *Pre-Qualification Form* (see *Attachment 2*) is required to be completed and signed off by each team, including signatures from the team's project manager and the ASCE Student Chapter Faculty Advisor.

### 4.0 SUBMISSION REQUIREMENTS AND DEADLINES

#### 4.1 Conference / Team Folders

The main folder contains a folder for each Student Conference, and within each Conference Folder is a folder for each school in that conference. This is a Read/Write link (no delete).

*/Organizational/Department/SYM Programs/CSM/eRoom/2020 Conf Technical Proposals*

Click the hyperlink to access: [Technical Proposal Submissions](#)

#### 4.2 Required Submissions and Schedule

Teams shall meet all submission deadlines listed below. Submissions not received by the deadlines or partial/incomplete submissions will be penalized. Conference host schools shall not change or amend any of the submission requirements. If a host school does, teams are directed to only follow the requirements listed below.

- (1) **Preliminary Project Delivery Schedule** – All teams are to upload their schedule to their respective folder, no later than 11:59 pm [Eastern] Friday, November 1, 2019.
- (2) **Pre-Qualification Form** – All teams are to complete their *Pre-Qualification Form* and upload it to their respective folder no later than 11:59 pm [Eastern] Friday, November 1, 2019.
- (3) **Technical Proposal & MTDS Addendum Submission (CONFERENCE)** – the following formats and number of documents are required:
  - Five (5) Bound Hard Copies of *Technical Proposal* and *MTDS Addendum* to the address provided by the Conference Host School received by Monday, February 17, 2020.
  - Upload PDF version of *Technical Proposal* and *MTDS Addendum* to their respective folder no later than 11:59 pm [Eastern] Monday, February 17, 2020.
  - File names shall be in the form of "School Name – Canoe Name – Document – Year.pdf" (examples: *South Central Louisiana State University – The Mud Dawg – Proposal - 2020.pdf*; *South Central Louisiana State University – The Mud Dawg – MTDS – 2020.pdf*)

(4) **Technical Proposal & MTDS Addendum Submission (NATIONAL)** – the following formats and number of documents are required:

- Six (6) Bound Hard Copies of *Technical Proposal* and *MTDS Addendum* received no later than 5:00 pm EDT, Tuesday, May 19, 2020 at the following address:

ASCE Student Services  
1801 Alexander Bell Drive  
Reston, VA 20191  
Attn: 2020 NCCC

- Upload PDF version of *Technical Proposal* and *MTDS Addendum* according to the instructions in their Letter of Invitation no later than 5:00 pm EDT, Tuesday, May 19, 2020.
- File names shall be in the form of “School Name – Canoe Name – Document – Year.pdf” (examples: *South Central Louisiana State University – The Mud Dawg – Proposal - 2020.pdf*; *South Central Louisiana State University – The Mud Dawg – MTDS – 2020.pdf*)

### 4.3 Summary of Important Dates/Deadlines

ITEM	DATE
<b>Issuance of 2020 Request for Proposal Solicitation</b>	September 6, 2019
<b>Deadline for Submission of <i>Preliminary Project Delivery Schedule</i> and <i>Pre-Qualification Form</i></b>	November 1, 2019
<b>Last Day to Submit RFI to the CNCCC</b>	January 15, 2020
<b>ASCE Student Chapter Annual Reports/Dues Deadline</b>	February 1, 2020
<b>Issuance of RFI Summary</b>	On or about February 1, 2020
<b><i>Technical Proposal</i> and <i>MTDS Addendum</i> Deadline (CONFERENCE)</b>	February 17, 2020
<b>ASCE Student Conference Competitions</b>	Early March to Late April 2020
<b><i>Technical Proposal</i> and <i>MTDS Addendum</i> Deadline (NATIONAL)</b>	May 19, 2020
<b>2020 ASCE National Concrete Canoe Competition, hosted by University of Wisconsin-Madison, WI</b>	June 13-15, 2020

### 5.0 TECHNICAL PROPOSAL and MTDS ADDENDUM

Each team shall provide their *Technical Proposal* which details their approach to meeting the requirements of the Request for Proposal solicitation as it pertains to the various areas related to the design and construction of the concrete canoe such as concrete and composite development and testing, project management, innovations and sustainable aspects of the design. In addition, teams will also submit a containing their Material Technical Data Sheets (MTDS) as a supplement (herein referred to as *MTDS Addendum*) to this *Technical Proposal*. Information for the submission format is provided in the following subsections.

## 5.1 General Requirements

- 8 ½ in. by 11 in. pages
- Construction Drawing & Specifications and Project Schedule – 11 in. x 17 in. pages
- All pages – ½ in. margins on all sides (*MTDS are not subject to this requirement*)
- English, 12 pt. normal width character spacing, at least single spaced
- Times New Roman, Arial, or Calibri font
- Section headings and subheadings may be of any legible font type or size
- Hard copies shall be single-sided
- Section and Appendix dividers are permitted, but are not required
- All dimensions throughout are to be reported in English units
- Pictures, renderings, illustration, graphs, figures, etc. are permitted
  - Team should avoid the use of copyrighted or trademarked materials, unless there are granted permission to use them
  - Items from publications must be properly referenced
  - Items developed and owned by the team do not need to be referenced (for example, photographs depicting a construction method can be used regardless of the year it was taken, as long as it is representative of what is being proposed for this submission.)

## 5.2 Technical Proposal – the document submission must adhere to the following format:

- a. **Front Cover**
- b. **Cover Letter & Project Understanding** – Serves as a response to the Request for Proposal solicitation. Must include, at a minimum, statements certifying that
  - The design and construction of the canoe has been performed in full compliance with the specifications outlined in the *Request for Proposal*.
  - The team acknowledges that Material Technical Data Sheets (MTDS) and Safety Data Sheets (SDS) have been reviewed by the team, and the team acknowledges receipt of the *Request for Information* (RFI) Summary and that their entry complies with responses provided.
  - The anticipated registered participants are qualified student members and National Student Members of ASCE and meet all eligibility requirements (include the names and ASCE National Member ID Numbers).

The letter shall be signed by at one (1) team captain and the ASCE Student Chapter Faculty Advisor certifying that the information presented in the *Technical Proposal* and *MTDS Addendum* is valid. The phone number and e-mail address for both the team captain and the faculty advisor shall be provided.

- c. **Table of Contents** – list the various sections and appendices of the *Technical Proposal*. The pages should be numbered as appropriate.
- d. **Executive Summary** – Highlight why the team is best suited to be awarded this contract to provide the standardized design for future ASCE concrete canoe competitions. Touch on innovative features of the hull design, structural analysis, mixture design, construction, project management, and sustainability, as applicable. Provide a summary of the canoe prototype dimensions (at a minimum: length, width, depth, thickness, and weight) and concrete properties (at a minimum: density, including both the wet (plastic) and oven-dried unit weights, compressive strength, tensile strength, concrete composite flexural strength, concrete slump/spread, and concrete air content). Strength tests should also indicate age of testing (i.e.: 7-day, 28-day, etc.).

Concrete and canoe properties shall be reported in English units to the accuracies outlined in the industry standards (e.g., ASTM C39, C138, C109 and C496, etc.) and as outlined in the table below. These shall be used as the official properties used for any compliance checks.

PROPERTY	REPORTED ACCURACY (to the nearest..)
Strength	10 psi
Density (hardened concrete)	1 lb/ft <sup>3</sup>
Density (fresh concrete)	0.1 lb/ft <sup>3</sup>
Slump, Spread	¼ inch
Weight	1 lb
Air Content	0.1 %

Additional information deemed appropriate by the team may be incorporated as well and is at the discretion of the team (*Page Limit – 2 max.*)

e. **Introduction to the Project Team**

- a. ASCE Student Chapter Profile (*Page Limit – 1*)
- b. Project Team
  - i. Core Team Members, including roles and responsibilities (*Page Limit – 1*)
  - ii. Organizational Chart – include team member names, role(s), tasks, or areas in which they made contributions at any time during the project. Include the year (Fr., So., Jr., Sr., Grad) for all members. Indicate team captains. (*Page Limit – 1*)

**Sections f. through j. is restricted to a total page limit of 10 max. The topics below should be covered in a manner that best demonstrates to the panel of judges how overall approach to the project and design best meets the intent of the Request for Proposal. The one-page Detailed Cost Assessment (as discussed in Section g.) is considered part of the 10-page limit.**

- f. **Technical Approach to the Overall Project** – Demonstrate a thorough understanding of the proposal requirements and sequence of tasks as it relates to development of a canoe design in terms of its hull configuration, structural capacity, material selection and testing, and constructability.

Present the overall approach and any goals set for the hull design in relation to the RFP. Provide a description and reasoning of the selected hull geometry and general design. Discuss any structural element choices, including all applicable dimensions and any specific relevant features of the design.

Discuss the approach to structural analysis and determination of the material design requirements, including quantitative results from the analysis, loading cases, support conditions, assumptions, and analysis tools used. Describe material property values/design specifications for the concrete, reinforcement, and composite. For simplicity, structural analysis is to be limited to 2-D analysis only, based on concepts of mechanics of materials, strength of materials, and reinforced concrete design.

Present the general approach for how the team planned to develop research and test, along with any goals set, to meet the requirements of the RFP. Provide a description of the concrete and reinforcement materials considered and selected. Include quantitative test results of mixtures tested

and selected. Refer to standard test methods where possible. Provide the physical properties and composition of the aggregate sources, including specific gravity, absorption and particle size. Discuss the admixtures tested and how it affects the concrete behavior. Discuss any primary reinforcement considered, tested, and used and the reasons for this selection, including the layering scheme chosen. Discuss new or innovative ideas, materials, and methods that were implemented in the development of the concrete composite and the impacts on budget, schedule, and safety.

Describe the construction process including form material selection, form construction, methodology of mixing and placement of concrete and reinforcement, layering scheme, curing, form removal, concrete finishing, and aesthetics. Include discussion of new or innovative ideas implemented in the construction of the mold and/or canoe and their impacts on budget, schedule, and safety.

- g. **Approach to Scope, Schedule, and Fee** – Present the team’s project management scheme and planning process as it relates to budget, schedule, scope, and risk management. Discuss the financial and resource allocation associated with material procurement and construction. List anticipated major milestone activities and how these were determined and will be achieved. Present critical path activities and describe how this critical path was determined. Identify hurdles that pose the most risk to critical path activities and how these hurdles affected the planning process.

Provide one-page itemized fee summary sheet for the following:

- Projected total hours (including a breakdown of person-hours) dedicated to project management, hull design, structural analysis, mixture design development, mold construction and canoe construction, and the preparation of this submission, presentation, and display. Exclude any time associated with paddling practice.
- Costs of materials based on the amounts needed for producing one single canoe.
- Lump sum fee for mold construction.
- Estimated shipping cost of the canoe and display (lump sum) from point of origin to Madison, WI. State the type of shipping method that is used.

Hourly rates, material costs, and appropriate multipliers, are provided in *Attachment 4: Detailed Cost Assessment*.

- h. **Approach to Health & Safety** – Discuss the team’s safety program and implementation as it applies to the overall project, including at a minimum, material testing and construction.
- i. **Approach to Quality Control and Quality Assurance** – Discuss the quality control and quality assurance (QA/QC) practices as they apply to concrete mixing and concrete placement during the construction of the canoe prototype. In addition, discuss the QA/QC plan/program as it relates to non-construction related aspects of the project. Items to consider include material procurement and compliance review, document tracking and review, training, and work product review.
- j. **Approach to Sustainability** – Highlight aspects of the materials being used, incorporated into the construction process, and other facets of the overall project as they relate to the three pillars of sustainability: social, economic, and environmental impacts.
- k. **Construction Drawings & Specifications** – Present isometric, elevation, plan, and typical composite cross-section views of the canoe and mold with applicable dimensions and other details as needed to construct. Additional details, cross sections, etc. may be added to clearly present construction techniques. Provide any relevant specifications as deemed essential by the team as drawing notes. *(Page Limit – 2 max.)*

- l. **Project Schedule** – Provide a complete project schedule from issuance of Request of Proposal solicitation to the National Competition at the University of Wisconsin-Madison. (*Page Limit – 1*)
- m. **Appendix A – Mixture Proportions and Primary Mixture Calculation** – Provide a *Concrete Mixture Data Table* (see *Attachment 2: Technical Specification for Concrete and Reinforcement*) for each mixture used. Mixtures which differ in color only shall be considered as one mixture and one table shall be presented (note on the table that color varies).

For the primary mixture, provide a detailed, step-by-step calculation of the yielded mixture proportions, including the determination of volumes of the concrete constituents, gravimetric air content, w/c and w/cm ratios, and wet unit weight, and aggregate proportioning requirements. This table (in Word format) is available for download at <https://www.asce.org/concrete-canoe-rules-regulations/> (*Page Limit – none*)

- n. **Appendix B – Structural Calculations** – Provide detailed, step-by-step example calculations (showing all relevant equations, variables and inputs including proper units) for the determination of internal stresses for the following scenario:
- Two (2) 200 lb paddlers and a load of cargo that is equivalent to an 80 lb/ft distributed load applied to a 5-ft length of the canoe that acts along the longitudinal centerline of the canoe and is centered along the length of the canoe.
  - Paddlers are to be considered as point loads positioned at locations equal to 15% and 85% of the total length of the canoe (as measured from the bow)

The cross-section that is to be analyzed is the one at the point of maximum moment under this loading condition. For these calculations, neglect the contribution of reinforcement (i.e., use a non-transformed cross-section).

The following shall be provided in the calculation: list of all assumptions (cite references as applicable), free body diagram with all relevant point and distributed loads and their respective values, resulting shear (V) and bending moment (M) diagrams, cross-sectional properties including applicable dimensions, and values of compressive, tensile, and shear stresses for the load case described above (2 paddlers and 80 lb/ft distributed load).

In addition, for this same cross-section, but not specific to any load case, show the diagrams, calculations, and values for:

- 1) the bending moment at which cracking of the concrete begins to occur, and
- 2) the ultimate bending moment, including the effects of reinforcement, if relevant.

Use the principles of the mechanics of materials. The cross-sectional properties of the representative section are to be approximated by hand calculations (i.e., the use of exact values from programs such as AutoCAD are not permitted). (*Page Limit – 5 max.*)

- o. **Appendix C – Hull Thickness/Reinforcement and Percent Open Area Calculations** – Present the measurements and calculations of the reinforcement and hull thickness for the various canoe elements (i.e., walls, ribs, gunwales, thwarts and bulkheads) and percent open area as applicable. (*Page Limit – 2 max.*)

- p. **Appendix D – References** – ASTM and/or other industry standards, technical software, and published material, shall be cited and properly referenced, as applicable. Any professionally acceptable reference style can be used, as long as, the reader is able to use the references to find the sources of information. *(Page Limit – none)*
- q. **Appendix E – Supporting Documentation** –
1. Pre-Qualification Form
  2. Acknowledgement of RFP Addendum(s) – a form will be provided with the issuance of RFP addendums
- r. **Back Cover**

### 5.3 Material Technical Data Sheet (MTDS) Addendum

Provide MTDS for each of the materials used in the canoe itself along with a Summary Table that summarizes all the materials used in the canoe prototype, that at a minimum, includes the complete brand name (include company name), type of material (ie: Water Reducer, Reinforcing Mesh) and applicable industry standard. Include web links (such as URLs) to individual pages of MTDS. Safety Data Sheets (SDS) are not equivalent documentation for MTDS and shall not be provided.

The MTDS must provide current information clearly verifying that the materials used in the canoe comply with all the specifications (ex: a cement MTDS should show compliance with the applicable ASTM outlined herein). If there are multiple different products on a MTDS, circle, highlight, or identify which product is being used. In the event the information is not provided (such as proprietary reasons), a letter from the company (on letterhead) certifying that the materials used follow the specifications shall suffice and shall be submitted to the CNCCC for its review and approval, prior to its inclusion in the *MTDS Addendum*. Contact information of the individual providing the letter shall be included.

Some reinforcement materials from local stores may not have an official MTDS available; however, a printout (from the store website or from the packaging) showing basic strength properties of the material may be included instead.

If you are in doubt of a product or MTDS, contact the CNCCC for review.

Example:

Product Name	Type	ASTM	Link
Euclid – Pastol 5000	Water Reducer	C494 Type A & F	<a href="https://www.euclidchemical.com/files/Pr oductFiles/tds/plastol_5000.pdf">https://www.euclidchemical.com/files/Pr oductFiles/tds/plastol_5000.pdf</a>

## 6.0 CANOE HULL DESIGN PROTOTYPE

Teams will design a canoe hull and conduct a structural analysis on their proposed designs to establish the concrete properties needed. After research and testing, the team will construct a full-scale canoe prototype of their proposed design ahead of their Conference event.

### 6.1 Dimensional Constraints

**6.1.1 Length** – the maximum longitudinal hull dimension is restricted to 22 feet.

**6.1.2 Other Dimensions** – are not regulated and their values are at the sole discretion of the team.

### 6.2 Canoe Material Components

The Final Product Prototype shall be constructed with components which may be categorized under and comply with **Concrete, Reinforcement, or Flotation** requirements presented herein. All flotation and reinforcement must be encased in concrete.

**Exclusions:** lettering, sealers, damage repairs (tape), and added flotation needed to pass the flotation test.

#### 6.2.1 Gunwale

The gunwale shall be finished to prevent injury to the paddlers (i.e., no exposed reinforcement or sharp edges. Foam pipe insulation foam may be used as gunwale protection and may be taped to secure it.

### 6.3 Concrete Materials, Mixtures, and Reinforcement

Concrete mixtures shall be developed using concrete materials and reinforcement that complies to the specification in *Attachment 3: Technical Specifications for Concrete and Reinforcement*. Teams should consider setting up a research and testing regime that allows for testing of individual materials, concrete mixtures, and composite elements.

### 6.4 Flotation

In the event a canoe becomes submerged, canoes should be designed and constructed to be able to pass the flotation test by the buoyant design of the canoe. Flotation material shall be limited to within 3 feet of the bow and stern sections and encased in concrete.

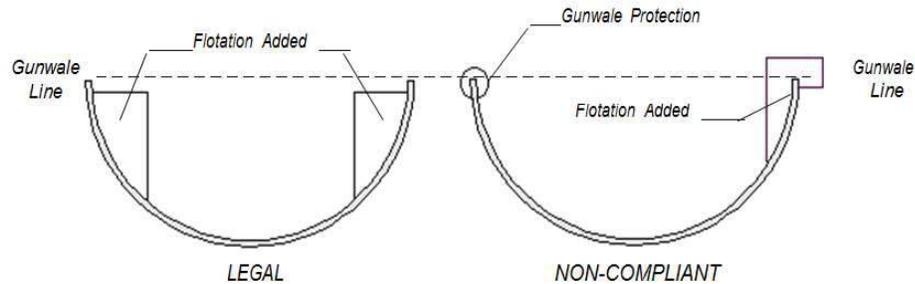
#### 6.4.1 Flotation Test

The canoe shall pass a flotation test whereby the canoe floats generally horizontal, with the canoe floating at the water surface, within two (2) minutes of being filled with water. Teams shall submerge their canoe by whatever means necessary (such as, filling the canoe with buckets of water, tilting the canoe so that water fills in, pushing it downward, etc.) and are solely responsible for handling the canoe to meet the requirements of the test. Gunwale caps are not permitted on the canoe during the flotation test. Once the canoe has been certified as passing, gunwale caps may then be added.

Canoes that do not pass the flotation test on the first attempt will automatically be assessed a deduction on the Final Product Prototype.

## 6.4.2 Additional Flotation

If a canoe does not pass the flotation test, teams shall be required to add additional flotation materials until the canoe does pass the test to the satisfaction of the judges and/or the CNCCC. Any added flotation shall be below the gunwale line. Gunwale caps shall not be permitted to serve as flotation material. Flotation added at the Conference Competition shall remain in place for canoes that qualify for the National Competition. At the National Competition, the canoe with its added flotation shall be considered “as built, as delivered” and shall be judged accordingly.



At the time of judging, any gunwale caps and coverings shall be removed. Aesthetics judging may take place before or after the canoe has been certified as passing the flotation test. If judging takes place after the flotation test, teams that required additional flotation to pass the test may temporarily remove the added flotation to be judged. After judging has been concluded, the teams shall place the flotation back in its original position.

## 6.5 Finishing & Aesthetics

### 6.5.1 Canoe & School Name

The name of the school and canoe shall be prominently displayed on the exterior of the canoe, above the waterline, on both sides, with individual letters. The school and canoe name shall consist of letters between 4 and 6 inches high. Recognized abbreviations for the official school name, which are used by the school’s official website are permitted. The use of adhesive lettering is limited to the lettering used for the school and canoe names. The minimum name length is 5 characters.

### 6.5.2 Graphics

Graphics created using concrete coloring agents and pigments within the concrete mix design (i.e., integrally colored concrete) are not limited in dimension or frequency. Any coloring agents or pigments used shall be in accordance with ASTM C979. The use of stains and/or paints of any kind is prohibited.

### 6.5.3 Concrete Sealers

Only clear, non-pigmented concrete sealers may be applied to the canoe. The sealer may be either:

- a. silane- or siloxane-based penetrating sealer with a VOC of less than or equal to 350 g/L, or
- b. liquid membrane-forming compound for curing and sealing that is compliant with ASTM C1315 requirements (there are no VOC requirement with this option)

Post-manufacturer additives such as glitter or other particulate material are not permitted. The application of sealer to any portion of the canoe shall be limited to a maximum of two (2) coats, following the manufacturer's recommended procedure for application and thickness.

## 6.6 Durability and Repairs

Canoes should be tough enough to survive the rigors of the Conference Competition, the National Competition, and transportation to and from the various events. Following the completion of the slalom races and the preliminary sprint races, all canoes shall be removed from the water, assembled in a common place, and inspected by the judges and/or CNCCC members for durability. *RFP Addendum #2*, to be issued in early November 2019, will discuss in detail, the criteria for how durability will be assessed. *RFP Addendum #2* will also cover repairs during and between Competitions.

## 6.7 Official Weigh-In

At the National event, canoes are subject to an official weigh-in with the measured weight compared to the weight reported in their *Technical Proposal*.

## 7.0 PROTOTYPE DISPLAY REQUIREMENTS

### 7.1 General

Teams will have the opportunity to showcase their canoe on display, along with having a Project Display to highlight the processes and materials from the project and have a cross-section of the canoe representing its construction (canoe and mold).

### 7.2 Restrictions

*Project Display* – the display, as a whole, shall fall within a 4 ft (W) by 8 ft (L) by 7 ft (H) space.

- a. Displays must be designed that they can be judged from the front (not a walk-around)
- b. Displays must be designed to be self-supporting. Nothing shall be taped, mounted or attached in any form or manner to any surrounding trees, walls, doors, or floors, etc.
- c. Displays shall not include electronic devices (such as, but not limited to, laptops, lighting, sound or video equipment, radios, loudspeakers or any other noise-creating devices).
- d. No sponsor-related items (such as sponsor list, logos, etc.) shall be part of the display.

### 7.3 Requirements

Alongside the canoe prototype, the Project Display is where a team will showcase their approach to the design, research, testing, and construction. At a minimum, teams will need to include what is outlined in 7.3.3. Teams should also include what they deem appropriate to fully convey the strengths of their Proposal.

### 7.3.1 Canoe Cross-Section

A full-scale model cross-section *representative* of both the raw and finished canoe shall be presented alongside the canoe. The cross-section shall demonstrate the concrete casting, finishing, and reinforcement techniques used, including showing the mold. The cross-section, including any stand, shall fall within a 4 ft (W) by 4 ft (L) by 7 ft (H) space, separate from the Product Display.

### 7.3.2 Canoe Stands

The canoe is to be displayed on stands which hold the canoe approximately 4 feet off the ground.

### 7.3.3 Required Information and Samples

The following shall be provided as part of the display. Samples of aggregates, mineral fillers, and fibers shall be provided in transparent containers and labeled accordingly.

- Individual sample(s) of concrete aggregate, 500 mL (min.)
- Individual sample(s) of mineral fillers, 500 mL (min.)
- Composite sample(s) of concrete aggregate + mineral filler, 500 mL (min.)
  - Composite blends should be of the same proportion of each concrete mixture.
- Concrete cylinder(s) of each mixture, 3 in. or 4 in. diameter, split in two halves
  - If several colors of a given concrete mixture is used, provide only one (1) sample of that mixture (i.e., samples of each color are not required).
- Raw reinforcement samples
  - *Mesh and Grids* – A 12 in. x 12 in. (min.) square sample of each reinforcement material
  - *Strips, Tendons and Bars* – If the reinforcement is “as-received” as a rolled strip (less than 12 in. wide), a 12 in. long sample strip shall suffice. If bars, tendons or strands are utilized, a sample of 12 in. (min.) length shall be provided.
- For any fibers used in the concrete mixtures, individual sample(s) of 50 mL (min.)
- One (1) hard-copy of *Technical Proposal*
- One (1) hard-copy of *MTDS Addendum*

In addition, the following items are to be readily available for compliance checking:

- Seats/Mats for measurement check
- Life Jackets & Paddles
- **[Nationals Only]** Concrete cylinders (unbroken) 3 in. or 4 in. diameter cylinder, oven-dried, of each concrete mixture used for unit weight verification.
  - These should be prepared per ASTM C39. The sample(s) shall be a quality control (QC) test cylinder taken at the time of construction and be representative of the in-place density, color, consistency and make-up of the concrete(s) used.

## 8.0 TECHNICAL PRESENTATION

### 8.1 General

**8.1.1 Time Limit** – Each team will be afforded the opportunity to present a 3-minute long presentation, followed by an additional 10-minute period for questions by a panel of judges. At the end of 3 minutes, the presenters will be cut off by a signal (alarm, gavel, etc.) The panel will evaluate the presentation based on what has been presented within that timeframe.

**8.1.2 Presentation Focus** – The presentation should focus on the primary aspects of the design, construction, and technical capabilities. Briefly summarize the major aspects of the project, with the intent of demonstrating why your team, design, and prototype should be selected by the panel of judges for the standardized design. (*recall this is a hypothetical scenario to provide an end goal for the RFP and the competition*)

**8.1.3 Language** – All presentations are to be presented in English.

**8.1.4 Presentation Order** – shall be randomly selected and shall be provided to the teams no later than the time of on-site registration. The presentations, including the question and answer period, shall be open to the public for viewing.

**8.1.5 Equipment** – The host school shall provide electrical outlet access, a projection screen, and a projector unit for use during the presentations. A room diagram shall be provided by the host school a minimum of two weeks prior to the event. The individual school making a presentation shall furnish any additional equipment necessary.

## 8.2 Presenters

**8.2.1** Presenters may be any of the registered team members who officially sign-in at registration. Presenters are considered those with speaking parts and individuals operating the computer or projectors.

**8.2.2** Teams shall make a live presentation. The use of video shall be permitted. Teams shall not pre-record any speaking parts. No handouts or other materials shall be given to the panel as part of the presentation.

**8.2.3** Any registered participant on a team may be on stage to participate in the question and answer period.

## 8.3 Question and Answer Session

Following the 3-minute presentation, teams will need to set themselves apart by displaying their knowledge to the panel by answering questions related to their presentation and Technical *Proposal*.

Additional information will be available in *RFP Addendum #1 - Presentation Q&A*, to be released late October 2019

## 9.0 CANOE PROTOTYPE PERFORMANCE DEMONSTRATION

Each team will be afforded the opportunity to demonstrate the racing capabilities, handling performance, seaworthiness, and durability of their full-scale prototype. This will be accomplished by a series of races focused on assessing both straight-line speed and turning capabilities under various loading conditions. A total of five (5) types of races are to be held (weather conditions permitting): women’s slalom (2 women), men’s slalom (2 men), women’s sprint (2 women), men’s sprint (2 men), and co-ed sprint (2 men and 2 women).

## 9.1 Demonstration Course

### 9.1.1 General Requirements

The bow of the canoe shall remain the bow of the canoe throughout each race in consideration of a successful negotiation of a turn or finish buoy.

Different colored buoys shall mark the race course lanes. The Slalom and Sprint courses must meet the alignment, distance, spacing, and turns as noted in *Attachment 5: Race Regulations and Safety*; however, these are subject to site-specific conditions and limitations.

### 9.1.2 Conference and National Competitions

For all conference competitions all sprint races shall be 200 meters. For the national competition, the co-ed sprint race will be increased to 400 meters.

## 9.2 200-meter Slalom Course

The slalom course shall consist of the following, subject to site conditions:

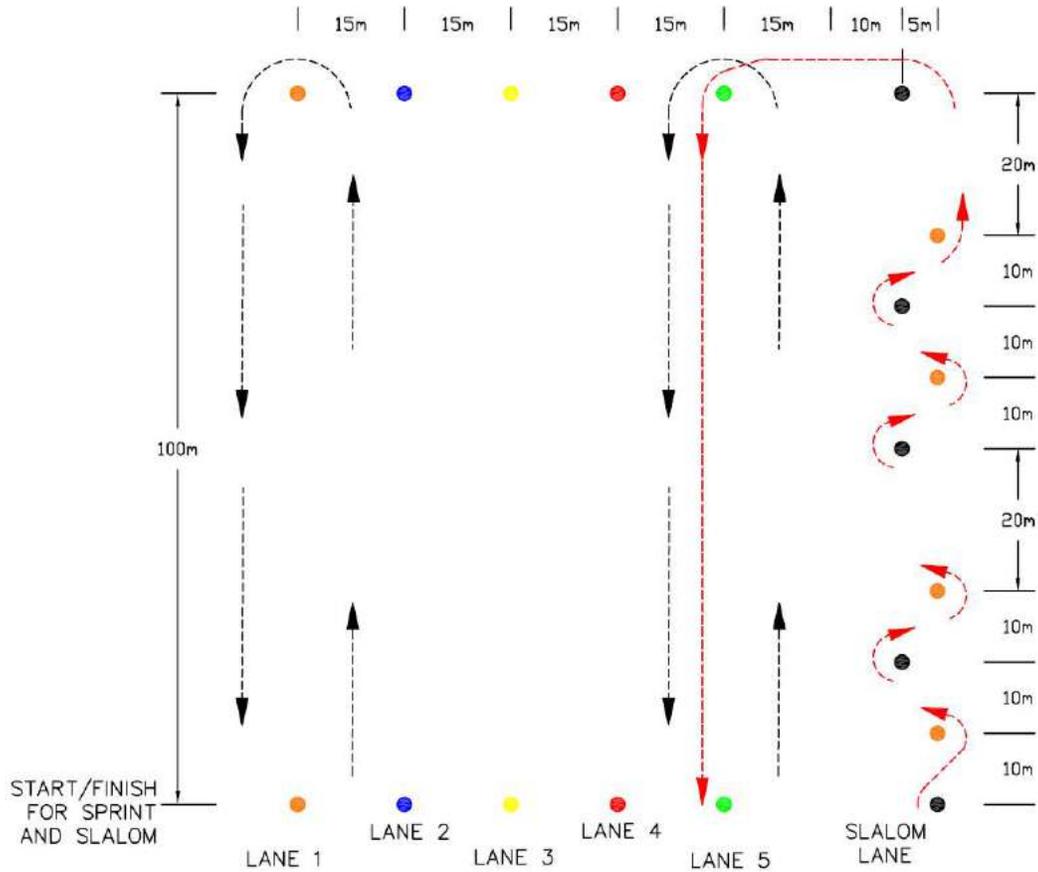
- a. The men's and women's slalom course will be nominally a 200-meter race consisting of a slalom course through the first 100 meters out (*actually a little longer with the slalom turns*), a 180° turn, and 100 meters straight back.
- b. At Conference Competitions, the course shall begin with a slalom course consisting of seven (7) buoys. Each slalom buoy shall be staggered 5 meters transversely from each other. Buoys shall be longitudinally spaced at 10 meters with 20 meters between the third and fourth buoy.

## 9.3 200- and 400-meter Sprint Course

A sprint course shall consist of the following subject to site conditions:

- a. The men's and women's sprint course will be a 200-meter race consisting of a straight course 100 meters out, a 180° turn, and 100 meters back.
- b. For conference competitions, the co-ed race will also be a 200-meter race.
- c. For the national competition, the co-ed race will be a 400-meter race and shall consist of two (2) laps of the sprint course.
- d. Lanes shall be no narrower than 15 meters.

**Example Race Course Layout**



Note that the slalom race return path is around the buoy for lane 5. This is to provide adequate space to prevent interference between a team heading away from the starting line and a team returning to the finish line. This reduces the time it takes to run the slalom race at both regionals and nationals by allowing the next team to start before the previous team finishes the race. The host school can also choose other layouts for the return path that allow the next team to start before the previous team finishes so long as there is adequate space to prevent interference between a team heading away from the starting line and a team returning to the finish line.

**10.0 EVALUATION**

**10.1 General**

The evaluation of the teams will be divided into four (4) categories:

Categories	Maximum Points
Technical Proposal	25
Technical Presentation	25
Final Product Prototype	25
Race Demonstration (5 events)	25
Total Possible	100

In a situation where none of the race events can take place, the overall competition score shall be based solely on the results of the technical portion of the competition (Technical Proposal, Technical Presentation, and Prototype) with the maximum possible score being 75 points.

## 10.2 Evaluation Panel

Each event shall be evaluated by a panel of judges. The minimum number for any given event is three (3) and the maximum is five (5). It is the intent of the CNCCC that the same judges will evaluate each portion of the competition.

## 10.3 Evaluation Scoring

Evaluation points will be allotted per placement according to the following table:

Place	Maximum Points					
	Technical Categories			Race Categories		
	Technical Proposal	Technical Presentation	Final Prod. Prototype	Slalom	Tandem Sprints	4-person Sprints
First	25.0	25.0	25.0	5.0	4.5	6.0
Second	22.5	22.5	22.5	4.5	4.0	5.4
Third	20	20	20	4.0	3.6	4.8
Fourth	17.6	17.6	17.6	3.5	3.1	4.2
Fifth	15.0	15.0	15.0	3.0	2.6	3.6
Sixth	12.5	12.5	12.5	2.5	2.2	3.0
Seventh	10.0	10.0	10.0	2.0	1.8	2.4
Eighth	7.5	7.5	7.5	1.5	1.4	1.8
Ninth	5.0	5.0	5.0	1.0	0.9	1.2
Tenth	2.5	2.5	2.5	0.5	0.4	0.6

Competition Points for Technical Proposal, Technical Presentation and Prototype are awarded per *Attachment 6: Evaluation Forms*.

Placement in each category is determined by the ranking of the overall scores, and in the case of races, the overall time. In the event of a tie, the average of the raw scores will determine the actual placing. If the tie remains after averaging the raw scores, then the tie will remain.

The Technical Proposal, Technical Presentation, and Prototype will be ranked for each judge independently from 1st to  $n$ th place (with  $n$  being equal to the number of teams competing) for each category. The aggregate of the independent rankings of each judge will be averaged to determine the overall rank for the entry and scores will be assigned based on the scoring table for places 1 through 10. Raw scores will be used in the event of a tiebreaker for the categories.

## 10.4 Summary of Deductions / Disqualification

### 10.4.1 General

These deductions may also be referenced in other sections of this document and/or the scoring sheets. **It is highly suggested that the judges contact the CNCCC regarding situations that may not be covered to determine the appropriate course of action.**

### 10.4.2 Deductions

The Deduction Scorecards determine a deduction unit that is the input into the electronic scoresheet and is used to adjust the final scores for each judge for each school. Each deduction unit is one (1) percent of the difference between the pre-deduction highest and lowest score by judge for that particular portion of the competition and is calculated for each judge.

### 10.4.3 Disqualification

Teams may be disqualified (DQ) from the competition for the following:

- a. Failure to follow student eligibility requirements
- b. Violations under the *Spirit of the Competition* [at the discretion of the CNCCC and/or Judges] or under the *Ethics and the Competition*
- c. Failure to follow academic year, repair/reconstruction, and material requirements
- d. Sportsmanship and interference requirements
- e. Failure to follow safety rules

## 10.5 Appeal of Deductions

During the competitions, the judges and/or CNCCC shall inform the team captains about the deductions that have been assessed. The team captains will then be afforded the opportunity to appeal the deductions through a written response that will then be reviewed by the judges. **Designated team captains are the only individuals that may appeal the deductions.** The decisions of the judges following their review are final and the judges will accept no further appeals beyond those decisions. The judges may contact the CNCCC to ensure that the proper deductions are made and for any additional guidance.

**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.**

The following sections detail the process of teams being informed of the deductions, the team captain's appeal (if they choose to do so), and the rendering of the final decision of the judges following their review of the appeal.

If the team chooses to appeal deductions, the team captains will have until the date/time specified to submit to the Head Judge or CNCCC member a completed *Deduction Scorecard* (with signature), *Appeals Form*, and any supporting documentation. The judges shall review the appeal, render their final decision, and inform the team captains of the decision. Upon being informed of the judges' decision, no further appeal may be filed

## 10.6 TIEBREAKER (FINAL OVERALL STANDINGS)

Ties in the final standings for the competition overall shall be broken. In such cases, a tie breaking score, *TBS*, shall be calculated according to the following formula:

$$TBS = \frac{25}{100} \left( \frac{\sum DPP}{NOJ} \right) + \frac{25}{100} \left( \frac{\sum OPP}{NOJ} \right) + \frac{25}{100} \left( \frac{\sum FPP}{NOJ} \right) + RP$$

Where: *DPP* = Technical Proposal event points for a given judge  
*OPP* = Technical Presentation event points for a given judge  
*FPP* = Final Product Prototype event points for a given judge  
*NOJ* = number of judges  
*RP* = unmodified race points

The calculation of the *TBS* shall not change the standings for team placement in any given technical scoring part. Of the teams tied for overall winner or overall second place, the team with the highest *TBS* shall be awarded the place in contention.

If a tie still exists for first and/or second place after the tie breaking scores have been determined, then the judges shall determine the overall winner for the competition position. The judges may choose to base their decision on whatever criteria they deem appropriate. The judges' criteria and decision shall be final and may not be appealed.

## Attachment 1: Student Chapter and Participant Eligibility

### REGISTERED PARTICIPANTS

Registered participants (for both Conference and National Competitions) shall meet all the following requirements:

- a. Be an undergraduate student majoring in engineering or engineering technology during the 2019/20 academic year (August 2019 to June 2020). Students do not need to be enrolled during the entire year (e.g., students graduating in December, or students not in school during the fall term but in school for the spring term.) Students that graduate during the academic year and have begun graduate studies during the same academic year are eligible to compete;
- b. Be members of an ASCE Student Organization in good standing;
- c. Be National Student Members of ASCE. ASCE student membership numbers shall be required upon registration; and
- d. Have contributed to the design and construction of the concrete canoe during the current academic year.

### STUDENT CHAPTER ELIGIBILITY FOR NATIONAL COMPETITIONS

To facilitate broader participation by ASCE Student Chapters in Student Conference activities, ASCE Headquarters stresses the importance of the Student Conference as an event that is much more than a qualifying round for national competitions. As such, all ASCE Student Chapters must meet the following eligibility requirements to participate in an ASCE-sponsored national competition:

- 1) Be in good standing with ASCE:
  - a. Have submitted their Annual Report and paid their annual dues, as received by ASCE, prior to the start of the Student Conference; and
  - b. Have submitted their student chapter full Annual Report in time to be graded (reports submitted on or before February 1, 2020 meet this qualification) AND have received a minimum score of 40 points out of a possible 100. **Student Chapters that submit an EZ annual reporting form do not qualify;** and
  - c. Act appropriately. As representatives of ASCE and the civil engineering profession, all competition and conference participants are expected to and must act professionally and courteously. The use of alcohol, marijuana, or other controlled substance is strictly prohibited.

*Note: Invitations to Conference and National Competitions are a privilege, not a right. Failure to act appropriately can result in letters of reprimand, mandatory behavior management plans, and loss of invitations to further competition for individual institutions and/or entire conferences.*

- 2) Attend and participate in their assigned Student Conference as shown through their school's:
  - a. Good faith participation in the Student Conference Business Meeting (at least one (1) student representative present at the **start** of the Business Meeting);
  - b. Good faith participation in the Student Conference Paper Competition, including submission and presentation by at least one (1) member of the ASCE Student Chapter. Note that any papers/presentations created for any other competition **do not count** as an entry into the Student Conference Paper Competition; and
  - c. Meeting any additional requirements of Student Conference participation set by the Student Conference at the previous year's business meeting or in their written and approved by-laws, standing rules, or constitution.

## **QUALIFIERS**

The National host school has the choice of competing in the current year or deferring their entry until the following year. The National host school must compete at their respective Conference Competition the same year they intend to compete in the National Competition.

Conference level competitions are required to meet certain standards. To earn an invitation to the National Competition, a student team shall qualify through participation in its assigned Conference Competition. There must be at least three (3) eligible ASCE Student Chapters that are official members of the Conference participating in the concrete canoe competition to constitute a qualified Conference Competition. In addition, the Conference Competition must be hosted by a school that is an official member of the Conference. Only one (1) team from any given school can compete in a Conference Competition.

ASCE student chapters hosting conferences may invite Official Guest teams, which are teams from colleges or universities that have an official ASCE student chapter that is not assigned to any Student Conference. Official Guest teams are eligible (if they meet the other requirements) to be invited to the national competition. Official Guest teams may compete in only one Student Conference per year. ASCE Student Services shall be notified by the Student Conference Host School of an Official Guest team prior to the start of the Student Conference. Notification can be by e-mail to [student@asce.org](mailto:student@asce.org). Conference assignments are listed in the ASCE Official Registrar at [www.asce.org/or/](http://www.asce.org/or/), and conference host chapters are listed at [www.asce.org/student\\_conferences/](http://www.asce.org/student_conferences/).

## **WILD CARD TEAMS**

In addition to the top qualified team from each Conference, up to six (6) teams, geographically disbursed, may also qualify to participate at the National Competition as a designated Wildcard. Wildcard teams must:

- Score in the top one-third (1/3) of all Annual Student Chapter Reports,
- Respond to a notice from ASCE with a Statement of Interest, and
- Finish overall within the top half (1/2) of their respective Conference Competition.

All student chapters that place within the top one-third (1/3) of all Annual Reports will receive an email notice immediately after the reports are scored. The notice will ask teams to respond with a Statement of Interest within two (2) weeks of receipt, signed by their Department Chair and ASCE Chapter Faculty Advisor. After all student conferences are complete, all teams that placed in the top half (1/2) of their respective competitions will be cross referenced with those that submitted a Statement of Interest. From that group, up to six (6) teams will be selected randomly to be invited to the National Competition. A given conference cannot have more than one (1) Wildcard team selected in a given year. No team can be selected as a Wildcard in consecutive years.

## **ETHICS AND THE COMPETITION**

According to the ASCE Code of Ethics, Canon 5, “Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.”

In the context of this contest, “unfair competition” may include conduct such as the following:

- 1) Failure to provide proper credit for past teams, plagiarism, or any other false statements concerning the source of material used in the contest;

- 2) Taking other people’s designs, artwork, or other creative content without permission (for an overview of Intellectual Property Laws, including Trademark and Copyright, visit <http://fairuse.stanford.edu/overview/introduction/intellectual-property-laws/>); and
- 3) Any false or malicious statements about other teams, members, or others involved in the contest.

### **SPIRIT OF THE COMPETITION**

The judges and/or the CNCCC may take disciplinary action, including warnings, point deductions, or disqualification of a team or entry for inappropriate use of materials, language, alcohol, uncooperativeness, or general unprofessional behavior or unethical behavior of team members or persons associated with a team. The judges and/or the CNCCC have the final authority to determine what constitutes a violation of the “Spirit of the Competition” and may take appropriate action towards point deduction or disqualification.

## **Attachment 2: Pre-Qualification Form**

***Upload this form by November 1, 2019 to***

/Organizational/Department/SYM Programs/CSM/eRoom/2020 Conf Technical Proposals  
[https://files.asce.org/xythoswfs/webui/xy-e3641772\\_1-t\\_mBQlj8oR](https://files.asce.org/xythoswfs/webui/xy-e3641772_1-t_mBQlj8oR)

*Teams may copy the following form and type out the responses.*

## Pre-Qualification Form (Page 1 of X)

\_\_\_\_\_  
 (school name)

We acknowledge that we have read the 2020 ASCE National Concrete Canoe Competition Request for Proposal and understand the following (*initialed by team project manager and ASCE Faculty Advisor*):

The requirements of all teams to qualify as a participant in the Conference and National Competitions as outlined in Section 2.0 and Attachment 1. \_\_\_\_\_

The requirements for teams to qualify as a potential Wildcard team including scoring in the top 1/3 of all Annual Reports, submitting a Statement of Interest, and finish within the top 1/2 of our Conference Concrete Canoe Competition (Attachment 1) \_\_\_\_\_

The eligibility requirements of registered participants (Section 2.0 and Attachment 1) \_\_\_\_\_

The deadline for the submission of *Preliminary Project Delivery Schedule* and *Pre-Qualification Form* (uploaded to ASCE server) is November 1, 2019; 11:59 p.m. Eastern \_\_\_\_\_

The last day to submit *ASCE Student Chapter Annual Reports* to be eligible for qualifying (so that they may be graded) is February 1, 2020 \_\_\_\_\_

The last day to submit *Request for Information* (RFI) to the CNCCC is January 15, 2020 \_\_\_\_\_

Teams are responsible for all information provided in this *Request for Proposal*, any subsequent RFP addendums, and general questions and answers posted to the ASCE Concrete Canoe Facebook Page, from the date of the release of the information. \_\_\_\_\_

The submission date of *Technical Proposal* and *MTDS Addendum* for Conference Competition (hard copies to Host School and uploading of electronic copies to ASCE server) is Monday, February 17, 2020. \_\_\_\_\_

The submission date of *Technical Proposal* and *MTDS Addendum* for National Competition (hard copies to ASCE and uploading of electronic copies to ASCE server) is May 19, 2020; 5:00 p.m. Eastern. \_\_\_\_\_

\_\_\_\_\_  
 Project Manager (print name) (date)

\_\_\_\_\_  
 (signature)

\_\_\_\_\_  
 ASCE Student Chapter Faculty Advisor (print name) (date)

\_\_\_\_\_  
 (signature)

## Pre-Qualification Form (Page 2 of X)

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*(school name)*

***In 150 words or less, provide a high-level overview of the team's Health & Safety (H&S) Program. If there is currently not one in place, what does the team envision their H&S program will entail?***

***In 150 words or less, provide a high-level overview of the team's current QA/QC Program. If there is currently not one in place, what does the team envision their QA/QC program will entail?***

***Has the team reviewed the Department and/or University safety policies regarding material research, material lab testing, construction, or other applicable areas for the project?***

***The anticipated canoe name and overall theme is – (please provide a brief description of the theme. The intent is to allow ASCE to follow up to determine if there may be copyright or trademark issues to contend with, as well as to provide insight)***

***Has this theme been discussed with the team's Faculty Advisor about potential Trademark or Copywrite issues?***

***The core project team is made up of \_\_\_\_ number of people.***

***Provide an estimated project budget for the year (including materials, transportation, etc.). Base this on real costs (not costs provided in the Detailed Cost Assessment). List and approximate (percentage (%)) of overall anticipated financial sources for the upcoming year (University, material donations, sponsors, monetary donations, etc.)***

## **Attachment 3 – Technical Specifications for Concrete and Reinforcement**

### **GENERAL**

Each concrete mixture developed shall comply with all the requirements of this section. The use of pre-packaged or pre-mixed concrete, mortar, or grout is not permitted. Bondo®, epoxy or similar materials are not permitted as a component of the mixture itself or integrated as part of the final product prototype as an aid during the placement of concrete (becomes part of the canoe), as a modifier of the reinforcement, or as a means of adhering flotation material. Teams should develop a reinforcement scheme using materials that meet percent open area (POA) requirements with the total thickness of the reinforcing layers is equal to or less than 50% of the total thickness of the reinforced composite, and the reinforcing materials do not have post-manufacturer applied coatings that enhance the properties of the reinforcement.

### **REQUIREMENTS**

**Composite Thickness** – the ratio of the total measured thicknesses of the primary reinforcement to the total thickness of the canoe wall or structural element at any point in the canoe shall not exceed 50%. All canoe elements, including but not limited to, the hull, ribs, gunwales, thwarts, bulkheads, etc., and the connections of structural elements to the canoe wall are subject to this rule.

**Number of Concrete Mixtures** – limited to a total of three (3) concrete mixture designs while any given mixture(s) can be produced in a multitude of colors.

**Primary Reinforcement** – All primary reinforcement shall be covered in concrete. All materials not part of a concrete mixture or a floatation material shall be classified as reinforcing material and shall comply with the specifications outlined below.

### **MATERIALS**

**Cementitious Materials, Alternative Supplementary Cementitious Materials (ASCM) and Pozzolans** – any type of commercially available, inorganic cementitious binder, either hydraulic, non-hydraulic, or a combination of these is permitted. Any hydraulic cement used must meet the requirements of either ASTM C150, ASTM C595, or ASTM or C1157. Depending on the type used, the pozzolans should meet the requirements of either ASTM C618 (Class C, F, or N), ASTM C989 (Grade 100 minimum), or ASTM C1240 specifications. The hydrated lime should meet the requirements of either ASTM C207 (Type S or N) or ASTM C821 specifications. Alternative cementitious materials and pozzolans evaluated using provisions of ASTM C1709 are also permitted. If non-commercial products are being considered, approval by the CNCCC shall be obtained prior to their use.

**Aggregates** – Any natural, manufactured or recycled aggregate is permitted, and its proportioning shall meet both of the following requirements:

- Regardless of source, the total aggregate volume shall be 30% (min.) of the total volume of any concrete mixture.
- The amount of aggregate consisting of expanded (porous) glass, cenospheres, or combination of the two, shall be limited to no more than 70% of the total aggregate volume.

**Mineral Filler** – The portion of any aggregate source that passes the No. 200 (75 µm) sieve shall be classified as *mineral filler* and is not be considered in the volume of the aggregate calculation as defined above.

**Fibers** – for secondary reinforcement, dispersed within the concrete, are permitted.

**Admixtures** – Water-Reducing and Set-Controlling Admixtures (ASTM C494), Air-Entraining Admixtures (ASTM C260.), and Coloring Admixtures/Agents and Concrete Pigments (ASTM C979) are permitted.

The use of bonding adhesives (ASTM C1059), waste latex paints, and latex emulsions (ASTM C1438) is prohibited.

Specialty admixtures shall meet the requirements of ASTM C494 Type S, Specific Performance Admixtures. Epoxy resins, their curing agents, asphalt emulsions, or similar materials shall not be considered specialty admixtures and are strictly prohibited. Teams wishing to incorporate a material as a specialty admixture that does not fall under ASTM C494 Type S, is not commercially-available or specifically made for use in concrete and have questions or concerns of whether it is an acceptable material shall contact the CNCCC for a determination of its applicability.

The solids content of dyes and admixtures in powder form are to be accounted for in the determination of solids content. Disregard the contribution of solids from other admixtures.

**Curing and Sealing Compounds** – concrete may be cured using liquid membrane-forming compound (ASTM C309 and/or ASTM C1315) or CNCCC-approved equivalent. Any compound applied is limited to a maximum of two coats following the manufacturer’s procedure for application and thickness.

**Mesh and Grids** – All materials serving as primary reinforcement shall have sufficient open space to allow for the mechanical bonding of the concrete composite as measured by its *percent open area* (POA). Solid mats or plates for reinforcing are not permitted. Pre-impregnated (pre-preg) materials which contain resins and require heat to complete polymerization, are not permitted. Solid mats and plates are described as materials that require additional bonding agents or post-manufacturer perforations to keep the reinforcement from delaminating (i.e., there is a lack of open space between the reinforcement sufficient for mechanical bonding).

The minimum percent open area (POA) of any layer of reinforcing material is 40%. The determination of the POA is obtained by the following equation:

$$POA = \frac{\sum Area_{open}}{Area_{total}} \times 100\%$$

where:             $Area_{open}$  is the total open area (i.e., the area of the apertures)  
                        $Area_{total}$  is the total area of the reinforcement specimen

Teams are permitted to modify a given mesh by removing strands as needed to achieve the required POA. Teams may fabricate meshes or grids by placing (weaving, tying) material in the “as-received” condition. Once fabricated, teams are not permitted to treat the material (e.g., apply coatings or heat). The “as-received” condition is defined as a commercially available “off the shelf” product directly available to a consumer which has not been modified by a third-party (for example, fiberglass can be used as is, but to have a third-party make a grid out of it, then “delivering” it to the team and then considering it “as-received” is not allowed).

**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.

**Bearing Plates and Fasteners** – used for pre- or post-tensioning of tendons are permitted and are not subject to the thickness or percent open area requirements on the following page. The location of the bearing plates is limited to within 2 feet from the bow and stern sections. The thickness of any bearing plate itself is limited to ¼ inch.

MIXTURE: \_\_\_\_\_

CEMENTITIOUS MATERIALS							
Component	Specific Gravity	Volume	Amount of CM				
Cement, <i>c</i>		ft <sup>3</sup>	lb/yd <sup>3</sup>	Total cm (includes <i>c</i> ) _____ lb/yd <sup>3</sup> <i>c/cm</i> ratio, by mass _____			
Cementitious Material 1, <i>cm<sub>1</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
Cementitious Material 2, <i>cm<sub>2</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
Cementitious Material 3, <i>cm<sub>3</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
FIBERS							
Component	Specific Gravity	Volume	Amount of Fibers				
Fiber 1, <i>f<sub>1</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>	Total Amount of Fibers _____ lb/yd <sup>3</sup>			
Fiber 2, <i>f<sub>2</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
AGGREGATES (EXCLUDING MINERAL FILLERS PASSING NO. 200 SIEVE)							
Aggregates	Expanded Glass (EG) or Cenosphere (C) <sup>1</sup>	Abs (%)	SG <sub>OD</sub>	SG <sub>SSD</sub>	Base Quantity, <i>W</i>		Volume, <i>V<sub>agg, SSD</sub></i>
					<i>W<sub>OD</sub></i>	<i>W<sub>SSD</sub></i>	
Aggregate 1, <i>agg<sub>1</sub></i>	Yes / No	%			lb/yd <sup>3</sup>	lb/yd <sup>3</sup>	ft <sup>3</sup>
Aggregate 2, <i>agg<sub>2</sub></i>	Yes / No	%			lb/yd <sup>3</sup>	lb/yd <sup>3</sup>	ft <sup>3</sup>
Aggregate 3, <i>agg<sub>3</sub></i>	Yes / No	%			lb/yd <sup>3</sup>	lb/yd <sup>3</sup>	ft <sup>3</sup>
LIQUID ADMIXTURES							
Admixture	lb/ US gal	Dosage (fl. oz / cwt)	% Solids	Amount of Water in Admixture			
Liquid Dye, <i>ld</i>			%	lb/yd <sup>3</sup>	Total Water from Liquid Admixtures, $\sum W_{adm}$ _____ lb/yd <sup>3</sup>		
Admixture 1, <i>adm<sub>x1</sub></i>			%	lb/yd <sup>3</sup>			
Admixture 2, <i>adm<sub>x2</sub></i>			%	lb/yd <sup>3</sup>			
SOLIDS (DYES, POWDERED ADMIXTURES, AND MINERAL FILLERS)							
Component	Specific Gravity	Volume (ft <sup>3</sup> )	Amount (lb/yd <sup>3</sup> )				
Solid Component of Liquid Dye, <i>S<sub>ld</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>	Total Solids. <i>S<sub>total</sub></i> _____ lb/yd <sup>3</sup>			
Powdered Admixture, <i>S<sub>p admix</sub></i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
Mineral Filler (Passing No. 200 sieve), <i>mf</i>		ft <sup>3</sup>	lb/yd <sup>3</sup>				
WATER							
			Amount		Volume		
Water, <i>w</i> , [ $=\sum (W_{free} + W_{adm} + W_{batch})$ ]			w/c ratio, by mass _____	lb/yd <sup>3</sup>	ft <sup>3</sup>		
Total Free Water from All Aggregates, $\sum W_{free}$				lb/yd <sup>3</sup>			
Total Water from All Admixtures, $\sum W_{adm}$			w/cm ratio, by mass _____	lb/yd <sup>3</sup>			
Batch Water, <i>W<sub>batch</sub></i>			_____	lb/yd <sup>3</sup>			
DENSITIES, AIR CONTENT, RATIOS, AND SLUMP							
Values for 1 cy of concrete	cm	Fibers	Aggregate (SSD)	Solids, <i>S<sub>total</sub></i>	Water, <i>w</i>	Total	
Mass, <i>M</i>	lb	lb	lb	lb	lb	$\sum M$ : lb	
Absolute Volume, <i>V</i>	ft <sup>3</sup>	ft <sup>3</sup>	ft <sup>3</sup>	ft <sup>3</sup>	ft <sup>3</sup>	$\sum V$ : ft <sup>3</sup>	
Theoretical Density, <i>T</i> , ( $=\sum M / \sum V$ )	lb/ft <sup>3</sup>		Air Content, Air, [ $= (T - D) / T \times 100\%$ ]			%	
Measured Density, <i>D</i>	lb/ft <sup>3</sup>		Air Content, Air, [ $= (27 - \sum V) / 27 \times 100\%$ ]			%	
Total Aggregate Ratio <sup>2</sup> ( $=V_{agg, SSD} / 27$ )	%		Slump, Slump flow, Spread (as applicable)			in.	
EG+C Ratio <sup>3</sup> ( $=V_{EG+C} / V_{agg, SSD}$ )	%						

1. Indicate if aggregate is expanded glass (EG) (i.e., Poraver™ or similar product) and/or cenospheres (C).

2. Ratio of total aggregate volume (in percent) compared to the total volume of concrete (min. allowable is 30%)

3. Ratio of combined volume of expanded glass (EG) and cenospheres (C) ( $V_{EG+C}$  (in percent)) compared to the total aggregate volume of aggregate in SSD condition ( $V_{agg, SSD}$ ); (max. allowable is 70%)

## TERMS AND FORMULAS

<b><i>Abs</i></b>	= absorption of an aggregate, whether taken as a whole, the coarse, or the fine aggregate, %.
<b><i>admx</i></b>	= admixtures
<b><i>air</i></b>	= gravimetric air content, per ASTM C138, %.
<b><i>agg</i></b>	= aggregate
<b><i>c</i></b>	= cement
<b><i>cm</i></b>	= cementitious materials (including cement)
<b><i>c/cm</i></b>	= ratio of cement to cementitious materials, by mass, <i>dimensionless</i>
<b><i>cwt</i></b>	= hundred weight of cementitious material (example 750 lb/yd <sup>3</sup> of cm is 7.5 cwt)
<b><i>f</i></b>	= fibers
<b><i>ld</i></b>	= liquid dyes
<b><i>M</i></b>	= mass, <i>lb</i> .
<b><i>MC<sub>total</sub></i></b>	= total moisture content referenced to the oven-dried condition of the aggregate, %.
<b><i>MC<sub>free</sub></i></b>	= free moisture content, referenced to the saturated, surface-dry condition (SSD), of the aggregate, %.
<b><i>mf</i></b>	= mineral fillers (i.e., aggregate-like materials passing the No. 200 sieve (75μm))
<b><i>D</i></b>	= measured density (wet, plastic) of concrete test cylinders, per ASTM C138, <i>lb/ft<sup>3</sup></i> .
<b><i>T</i></b>	= theoretical density of concrete (zero air voids), per ASTM C138, <i>lb/ft<sup>3</sup></i> .
<b><i>S<sub>ld</sub></i></b>	= solids in liquid dyes
<b><i>S<sub>p admx</sub></i></b>	= solids of powdered admixtures
<b><i>S<sub>total</sub></i></b>	= total solids of liquid dyes, powdered admixtures, and mineral fillers, <i>lb/yd<sup>3</sup></i> .
<b><i>SG<sub>SSD</sub></i></b>	= specific gravity, in the saturated, surface-dry condition, of aggregate, <i>dimensionless</i> .
<b><i>SG<sub>OD</sub></i></b>	= specific gravity, in the oven-dried condition, of aggregate, <i>dimensionless</i> .
<b><i>V</i></b>	= volume, <i>ft<sup>3</sup></i> .
<b><i>V<sub>agg,SSD</sub></i></b>	= volume, in the saturated, surface-dry condition, of aggregate, <i>ft<sup>3</sup></i> .
<b><i>EG</i></b>	= expanded glass
<b><i>C</i></b>	= cenospheres
<b><i>V<sub>EG+C</sub></i></b>	= volume, in the saturated, surface-dry condition, of aggregate classified as expanded glass or as cenospheres, <i>ft<sup>3</sup></i> .
<b><i>W<sub>SSD</sub></i></b>	= mass, in the saturated, surface-dry condition, of aggregate per unit volume of concrete, <i>lb/yd<sup>3</sup></i> .
<b><i>W<sub>OD</sub></i></b>	= mass, in the oven-dried condition, of aggregate per unit volume of concrete, <i>lb/yd<sup>3</sup></i> .
<b><i>W<sub>stk</sub></i></b>	= mass, in the stock moisture condition, of the aggregate per unit volume of concrete, <i>lb/yd<sup>3</sup></i> .
<b><i>w<sub>admx</sub></i></b>	= the mass of water in the admixtures, per unit volume of concrete, <i>lb/yd<sup>3</sup></i> .
<b><i>w<sub>batch</sub></i></b>	= the mass of water to be batched per unit volume of concrete when the aggregates are in a stock moisture condition, <i>lb/yd<sup>3</sup></i> .
<b><i>w<sub>free</sub></i></b>	= free water carried into the batch by a wet per unit volume of concrete, <i>lb/yd<sup>3</sup></i> .
<b><i>w/c</i></b>	= water to cement ratio, by mass, <i>dimensionless</i> .
<b><i>w/cm</i></b>	= water to cementitious material ratio, by mass, <i>dimensionless</i> .

## TERMS AND FORMULAS

*Each one of these formulas should be applied to each aggregate source:*

$$Abs = \frac{W_{ssd} - W_{od}}{W_{od}} \times 100\%$$

$$MC_{total} = \frac{W_{stk} - W_{od}}{W_{od}} \times 100\%$$

$$MC_{free} = MC_{total} - Abs$$

$$W_{SSD} = \left(1 + \frac{Abs}{100\%}\right) * W_{OD}$$

$$w_{free} = W_{OD} \times \left(\frac{MC_{free}}{100\%}\right)$$

Note that  $w_{free}$  can be a negative number indicating a dry and absorptive aggregate.

$$W_{stk} = W_{SSD} + w_{free}$$

Then, for the mixture as a whole:  $w_{batch} = w - (w_{free} + \sum w_{adm})$

*The following formula should be applied to all admixtures in liquid form:*

$$w_{adm} = dosage \text{ (fl oz/cwt)} * cwt \text{ of cm} * water \text{ content } (\%) * 1 \text{ gal/128 fl oz} * lb/\text{gal of admixture}$$

*The following formula should be applied to liquid dyes only:*

$$S = dosage \text{ (fl oz/cwt)} * cwt \text{ of cm} * solid \text{ content } (\%) * 1 \text{ gal/128 fl oz} * lb/\text{gal of admixture}$$

## Attachment 4: Detailed Cost Assessment

### LABOR COSTS

Total billable Direct Labor (DL) shall be calculated using the Raw Labor Rates (RLR). Labor Hours spent on the project (HRS), and the multipliers for Direct Employee Costs (DEC), Indirect Employee Costs (IEC), and Profit (P).

The formula for Direct Labor (DL) is as follows:

$$DL = [\Sigma(RLR*HRS)]*(DEC + IEC)*(1+P)$$

Each team shall develop a Table of Billable Direct Labor Rates for the classifications of personnel used in the project.

- **Direct Employee Costs (DEC)** are those costs associated with employee taxes, benefits, insurance, and vacation. A multiplier of 1.50 shall be used to calculate the Direct Employee Costs.
- **Indirect Employee Costs (IEC)** are all project expenses and costs incurred other than direct employee costs such as general administrative costs for office or lab space rent, vehicle use, general liability insurance, advertising to solicit participation, telephone and utilities, testing equipment rental, etc. Normally, the multiplier to determine the IEC is calculated as the sum of the actual general overhead and administrative expenses divided by the total billable direct labor. However, to simplify the calculation for the indirect employee costs, a multiplier of 1.30 shall be used.
- A **Profit Multiplier (P)** of eighteen percent (18%) shall be applied to labor.

### EXPENSES

Expenses (E) shall include both materials costs and other project direct expenses not specifically covered. Total expenses shall be calculated using the Materials Costs (MC), Direct Expenses (DE) and Markup (M).

The formula for Expenses (E) is as follows:

$$E = (\Sigma MC + \Sigma DE)*(1+M)$$

- **Materials Costs (MC)** shall be determined using the materials rates described on the following page.
- **Direct Expenses (DE)** shall include, but are not limited to, costs of outside consultants and other direct expenses related to either the research and development or construction phases of the project. This does not include costs such as transportation of canoe, race equipment, or other costs associated with racing the canoe.
- A **Markup (M)** of ten percent (10%) shall be applied to both material costs and direct expenses.

**LABOR AND MATERIAL RATES****Raw Labor Rates (RLR)**

Principal Design Engineer	\$50/hour
Design Manager	\$45/hour
Project Construction Manager	\$40/hour
Construction Superintendent	\$40/hour
Project Design Engineer (P.E.)	\$35/hour
Quality Manager	\$35/hour
Graduate Field Engineer (EIT)	\$25/hour
Technician/Drafter	\$20/hour
Laborer/Technician	\$25/hour
Clerk/Office Admin	\$15/hour

In the situation where one person acts to serve in multiple functions, raw labor rates shall be applied according to the task being performed.

**Outside Labor Costs**

Outside Consultants	\$200/hour
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An outside consultant shall be defined as anyone contributing to the project that is not a student as previously defined.

**Material Costs**

Cement	\$0.03/lbs
Fly Ash	\$0.02/lbs
Silica Fume	\$0.44/lbs
Slag	\$0.02/lbs
Metakaolin	\$0.37/lbs
VCAS	\$0.32/lbs
Polypropylene Fibers	\$0.93/lbs
PVA Fibers	\$1.05/lbs
Superplasticizer	\$8.79/gal
Water Reducer/Retarder	\$5.50/gal
Air Entraining Admixture	\$3.34/gal
Mid-Range Water Reducer	\$7.16/gal
Liquid Curing Compound	\$11.00/gal
Lightweight Agg. (ASTM C330)	\$0.05/lbs
Expanded Glass	\$0.25/lbs
Cenospheres	\$0.18/lbs
Reinforcing Steel	\$0.15/lbs
Steel Wire Mesh (WWM)	\$0.31/ft <sup>2</sup>
Fiberglass	\$0.12/ft <sup>2</sup>
Carbon Fiber	\$6.32/ft <sup>2</sup>
Kevlar	\$2.42/ft <sup>2</sup>

For any materials not included in this, submit an RFI to the CNCCC for a unit price to be provided.

## **Attachment 5: Race Regulations and Safety**

### **GENERAL**

The race demonstration of the canoe prototypes will consist of five (5) types of races: women's slalom (2 women), men's slalom (2 men), women's sprint (2 women), men's sprint (2 men), and co-ed sprint (2 men and 2 women).

### **RACE RULES**

The following general rules apply to the paddlers:

- a. Good faith efforts are made to start and finish all races. Should issues arise that may compromise the structural integrity of the canoe or the safety of the paddlers, teams must exercise good judgment in determining the safest course of action.
- b. Teams shall use the same registered individuals in both the preliminary and final heats of any race.
- c. In the event of an injury that prevents a paddler from further competition after the preliminary race has been completed, the injured person or a substitute shall be in the canoe in subsequent races. The substitute passenger shall be one of the original five (5) of the same gender registered on the team and shall not be allowed to paddle.
- d. If a team cannot field the proper number of paddlers of the required gender, registered substitute passengers of opposite gender shall be used, but substitutes shall not be allowed to paddle.

Teams competing in the slalom races shall compete against the clock in a timed single event. All other races shall include timed preliminaries and finals. The top five canoes advance to the grand final and the next five canoes advance to the petite final based on qualifying times in the preliminaries. Points shall be awarded based on the finish times in the finals. If finals cannot be conducted or the host school determines before the race competition starts that separate finals heats will not be run; the preliminary times shall be used as the final times.

For all sprint races, if a team qualifies for a final event but cannot start the event, that team does not receive points and the team's slot is conceded to the team with the next best preliminary sprint time. For final sprint races, if a team starts a race in a canoe deemed race-worthy by the judges, but is unable to complete the race, they are awarded the points corresponding to completing the race in last place in that final event.

In a situation where all the race events cannot be conducted (for example, the slalom races were completed but the sprint races could not be completed), the race scores for all of the completed races shall be accounted for in the overall competition score. By no means should the race scores be adjusted to account for races not held/completed.

### **CONFERENCE EVENTS**

Depending on the number of entrants at the conference competitions, host schools shall decide on having grand and/or petite finals for the various sprint races. The host school shall inform all teams prior to the competition of the race setup.

**Lane Position and Heat Assignments** - Lane position and heat assignments shall be randomly selected before the competition begins and shall be provided by on-site registration. The conference and national host schools shall provide a diagram or map to the participants outlining the layout of the course prior to the races. Sprint course turn direction (left/right) shall be determined prior to races.

**Interference** - In situations where there is lane interference and/or when canoes collide, paddlers must immediately STOP, hold paddles above their heads and discontinue racing. If interference occurs, the team captain shall appeal directly to the head judge. Once presented with the appeal, the judges shall:

- a. Allow any team(s) directly affected by interference the option to rerun the heat in a timed event. Times from the rerunning of the heat shall be used as the official time for the heat. Heats shall be rerun after a minimum of ten (10) minutes to allow paddlers to prepare themselves.
- b. Disqualify a team that has willfully interfered with another team. (If the interference is not deliberate, then the team should not be disqualified).
- c. Disqualify a team that willfully fails to adhere to course boundaries resulting in interference with another canoe. (If the interference is not deliberate, then the team should not be disqualified).

**If paddlers fail to immediately stop, raise paddles and continue to race, they cannot claim interference and will not be granted an opportunity to rerun their race.**

## **EQUIPMENT**

**Paddles** - shall be single-bladed and may be straight bladed or bent. Spare paddles are permitted in the canoe during the race demonstration.

**Seats and Mats** - dimensions of seats and mats are regulated to prevent them from serving as a structural component. Seats cannot exceed a 20" x 20" x 20" maximum. Mats cannot exceed a 20" x 30" x ½" thick maximum. Seats and mats can be used together, at the same time, by one paddler. Alternatively, knee pads are permitted.

**Fixed Paddler Restraints** - Straps, seatbelts, Velcro®, suction cups or any other item that attaches the paddler to the canoe or that interferes with the paddler safely exiting the canoe in the event of capsizing, are not permitted. The judges and/or CNCCC will prohibit the use of any paddler restraints if safety is deemed an issue.

**Slip Resistant Materials** - Use of non-skid tape or other slip resistant material is not permitted.

**Spray Skirts** - Post-construction applied devices that prevent water from entering the canoe, such as spray skirts, are not permitted.

## **RACE POINTS & PENALTIES**

A buoy is successfully negotiated when the entire canoe passes on the proper side of the buoy. A canoe may touch a buoy but the top of the buoy must stay above the waterline on the proper side of the canoe until the canoe has entirely passed. A canoe's time shall not be considered final until all buoys have been properly negotiated. All slalom buoys must be attempted. The following corresponding penalties shall be assessed as defined below:

Description of Infraction	Penalty
Canoe crosses finish line in wrong lane	30 seconds
Turn buoy(s) not properly negotiated	DQ
Slalom: Missed buoy	30 seconds per buoy
Slalom: Bypass buoys to save time	DNF

For a team to successfully finish a given race, the bow of the canoe must cross the finish line with the same number of paddlers (in the canoe or touching the canoe) with which the race began.

### **DID NOT FINISH (DNF)**

If a canoe cannot complete a given race but is found to be seaworthy enough to continue to compete (a typical example is when a canoe becomes submerged during a race), then the team will be given a "Did Not Finish" (DNF) for that race (zero points for a given race). If other circumstances arise where a DNF may be applicable, judges shall contact the CNCCC to determine whether a DNF should be applied.

### **APPEALS**

Requests for rule interpretations and/or appeals during Competition shall be presented to the Conference Head Judge by the designated team captain(s). Such request or appeals must be lodged before the start of the next heat or in the case of the slalom races, before the next three (3) canoes finish the race. Appeals shall be made by a team captain. The decisions made by the judges and/or CNCCC concerning all aspects of the race and judging shall be final. Conference head judges may contact the CNCCC to clarify rule interpretations and to discuss appeals.

### **SAFETY**

Below are safety protocols which shall be followed for the canoe prototype race demonstration, followed by safety guidelines to consider for both the participants and host schools.

**Powered Rescue Boat** - At least one and preferably two powered rescue boats shall be on the water during all the races. If a powered rescue boat is not available, the races shall not take place.

If sustained winds at the race site are greater than 25 miles per hour or if wave heights are greater than 1 foot, the races shall not take place.

If the water temperature is less than or equal to 35°F and/or the combined air and water temperatures are less than or equal to 85°F, the races shall not take place. If the combined air and water temperatures are between 85°F and 120°F, the races may take place at the discretion of the safety director. However, there must be a warming area at the race site which holds a constant temperature of greater than 75°F, and two powered rescue boats shall be on the water during all the races.

**If lightning is encountered within 15 miles of the race site, the races shall not take place until there is at least 30 minutes of elapsed time since the last recorded strike within the 15 mile distance.**

Any entry deemed unsafe or hazardous by the judges shall not be permitted in the water unless corrective measures are taken. If corrective measures are not or cannot be made the entry shall be disqualified from further competition. If repairs must be made to an entry prior to any race, the judges may allow the entry to reschedule for a later heat, but prior to the next event.

### **Safety Director**

A safety director shall be in a strategic position to observe the activities, especially those near the starting and docking area. The safety director is responsible for stopping all activities involving violations of any of the safety rules.

In addition, the safety director is responsible for briefing paddlers on all known hazards prior to any paddling or racing, and as conditions warrant throughout the race competition.

### **Paddler Safety**

All paddlers shall be competent swimmers. All Paddlers shall wear a US Coast Guard-approved inherently buoyant (no inflatables) Type I, II or III Personal Flotation Device (life jacket) always while in a canoe during competition and/or practice. Wet suit buoyancy pads shall not be used as a substitute for the Coast Guard approved Personal Flotation Device.

### **Safety Guidelines**

***Participant safety is always the first priority.*** When scheduling and planning the races, consider all safety hazards, depending on location and circumstances, plan accordingly to mitigate them and decide what conditions would cause races to be cancelled. Each competition host has the authority to require safety equipment or procedures beyond the general requirements established for the National Competition. The recommendations below identify many common hazards, but not all eventualities are covered. It is strongly recommended that each hosting site perform a comprehensive evaluation of specific hazards and develop their own safety plan.

***Cold water*** can cause impaired judgment, loss of coordination and hypothermia within minutes. Paddlers, already excited about the races, may make unreasonably poor decisions when cold and becoming hypothermic. Being immersed in water as warm as 60°F can initiate Cold Water Shock. The American Canoe Association (reference below) recommends wetsuits for water temperatures less than 60°F and/or if the combined air and water temperatures are less than 120°F. Consider requiring wetsuits (full-body, sleeveless, or shortie depending on severity) and more safety boats to get paddlers out of the water quickly.

***Wind and waves, currents, obstruction and other rough water*** can more easily swamp and break canoes. Carefully evaluate the proposed race site during a variety of weather conditions to have a good sense for how the water behaves. Depending on seasonal weather conditions, water may be higher or lower. For the canoes, consider requiring integrated grab handles, provisions for tied-in air bags (common flotation for whitewater canoes), and more stringent flotation requirements. Just like cold water, more safety boats may be required.

***Hazardous wildlife*** in and out of the water can cause anything from skin irritations and allergic reactions to more serious lacerations. Be sure to alert participants and monitor activities carefully.

**Lightning and storms** are also very dangerous. Monitor the weather and remove everyone from the water when lightning and/or strong storms threaten.

### **Additional Safety References**

Following are a couple references to documents from the American Canoe Association ([www.americancanoe.org](http://www.americancanoe.org)) for further reading and planning race day safety.

American Canoe Association (2014). Best Practices for Paddlers and Paddlesport Programs [PDF document] URL [http://c.ymcdn.com/sites/www.americancanoe.org/resource/resmgr/sei-educational\\_resources/brochure\\_best\\_practices.pdf](http://c.ymcdn.com/sites/www.americancanoe.org/resource/resmgr/sei-educational_resources/brochure_best_practices.pdf).

American Canoe Association (2014). Cold Water Survival [PDF document] [http://c.ymcdn.com/sites/www.americancanoe.org/resource/resmgr/sei-educational\\_resources/brochure\\_cold\\_water\\_survival.pdf](http://c.ymcdn.com/sites/www.americancanoe.org/resource/resmgr/sei-educational_resources/brochure_cold_water_survival.pdf).

## **Attachment 6: Evaluation Forms**

### **GENERAL**

The scoresheets will be filled out by the judges individually. The individual judges' scoresheets shall not be requested or given out during the competition. The judges will come to a consensus on the deductions applicable to each team and complete (1) one deduction scoresheet to be given to each team.

The following in this attachment include the evaluation forms to be used by the judges. Note, *RFP Addendum #2* will include the full scoresheet for the Technical Proposal.

<b>Technical Proposal</b>		<b>25% of Overall Score</b>	
<b>School Name:</b> _____		<b>Possible Points</b>	<b>Score (whole numbers)</b>
<b>Canoe Name:</b> _____			
<b>Cover Letter, Table of Contents, Executive Summary, Intro to Project Team</b> Completeness		10	
<b>Technical Approach</b> – Completeness and applicability to the response of the RFP as it related to the requested information for the following areas: Hull Design Structural Analysis Research & Testing Concrete Materials and Final Mix Selection Research & Testing of Reinforcement and Final Composite Material Selection Construction Process		60	
<b>Scope, Schedule, and Fee</b> Scope & Project Management Schedule (Critical path, milestones, etc.) Fee Summary Sheet		15	
<b>Health &amp; Safety</b> Overall and Material Testing & Construction		10	
<b>Quality Control &amp; Quality Assurance</b> Construction Related Non-Construction Related		10	
<b>Sustainability</b> – Completeness and applicability to the response of the RFP		5	
<b>Construction Drawings &amp; Specifications (11x17)</b> - Clarity & Ease of Understanding		10	
<b>Project Schedule (11x17)</b> - Completeness & Ease of Understanding		5	
<b>Concrete Mixture Materials and Proportions</b> Compliance of Materials to Proposal Specifications (MTDS Addendum) Completeness of Mixture Design Tables Correct Math (all mixtures) & Thoroughness of Sample Mix Calculation		25	
<b>Structural Calculations</b> Thoroughness & Clarity of Calculation and Correct Math		10	
<b>Hull Thickness/Reinforcement and Percent Open Area</b> Thoroughness & Clarity of Calculation and Correct Math		5	
<b>Innovation</b> - Incorporation of new, innovative ideas and concepts in the development of the prototype design, material testing, concrete mixture, construction, etc.		15	
<b>Overall</b> Conciseness and Clarity Presentation of Information Overall Layout and Format Quality of Writing		20	
<b>Subtotal</b>		<b>200</b>	
<b>Academic Judging – Technical Proposal Total</b>			

<b>Technical Presentation</b>		<b>25% of Overall Score</b>	
School Name: _____ Canoe Name: _____		<b>Possible Points</b>	<b>Score (whole numbers)</b>
Scorecard to be included in: <i>RFP Addendum 2: Presentation Q&amp;A</i>			
Comments:			
<b>Subtotal</b>		<b>100</b>	
<b>Deductions:</b> Sponsorship or commercialism violation: <i>15 points</i> Failure to adhere to live presentation format: <i>No Presentation Points</i>			
<b>Academic Judging - Technical Presentation Total</b>			

# FINAL PRODUCT PROTOTYPE SCORE CARD

Evaluation Sheet from Judge: \_\_\_\_\_

Enter a numeric value (whole numbers) in category and tally the total score.

	Name of School	Canoe Workmanship (0 to 30 Points,)	Exterior and Interior Finish (0 to 25 Points)	Cross- Section Workmanship (0 to 20 Points)	Product Display (0 to 25 Points) <i>Required Items &amp; Overall</i>	Durability (0 to 5 Points) <i>*To be completed after Prelim Races*</i>	Total (100 pts. max)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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17							
18							
19							
20							
21							
22							
23							
24							
25							

## FINAL PRODUCT PROTOTYPE

Below are a list of descriptions, guidelines, and things to consider while judging the Final Product Prototype. Note that these are not to be thought of as an “all-inclusive list.” Ultimately, it is up to each individual judge to provide a score for each category and provide consistent scoring from school to school.

**Canoe Workmanship** – The intent of Canoe Workmanship is to evaluate the build quality of a canoe. Most items in this category are related to construction of the canoe itself. Some things to consider include, but are not limited to:

- are there noticeable cold joints in the concrete;
- the “lumpiness” of the concrete;
- the consistency of the wall thickness;
- the consistency of concrete color(s);
- the consistency of concrete materials (i.e. are there clumps of fibers visible, are there other areas the concrete was clearly not mixed well, etc.);
- is there any cracking or micro-cracking;
- is any reinforcement mesh visible;
- if there is any concrete chipped off (either due to poor construction or mishandling of the finished canoe);
- are there any other general quality control issues

**Exterior and Interior Finish** – The intent of the Exterior and Interior Finish is to mostly evaluate the post-construction processes and general aesthetics. Some things to consider include, but are not limited to:

- the smoothness of the finish;
- if there are noticeable voids/ “bug holes” in the concrete;
- the intricacy of graphics;
- how ‘clean’ the edges of the graphics are;
- the execution of various techniques used for creating the aesthetics (i.e. colored concrete, sand blasting, 3-D elements, etc.);
- evaluation of the overall theme and how it fits with the aesthetics/graphics

**Cross-Section Workmanship** – The intent of the Cross-Section Workmanship is to evaluate how well the cross-section represents all the processes and materials used to fabricate the canoe. Some things to consider include, but are not limited to:

- is the cross-section full scale and is the mold shown
- is the cross-section representative of the construction process actually used;
- are all the layers of concrete shown and demonstrate the concrete casting process;
- are all the materials used shown (i.e. reinforcement, mold, graphics application, sealer, etc);
- are all the processes clearly labeled;
- if applicable, are there any components highlighting new or innovative processes;
- is the entire process from start to finish easy to follow

**Product Display** – The intent of the Product Display is to evaluate how creatively and effectively the display showcases the overall “big picture” of the entire canoe/cross-section/table display setup while incorporating all the required display items. Some things to consider include, but are not limited to:

- how the product display is organized and is it easy to find various components;
- are all the required sample items present and of proper size;
- are the items labeled and easy to read;
- if applicable, are there any components highlighting new or innovative processes;
- if there are more than the required items on the product display, do they help to provide insight to various tests or research performed during the project;
- are the product display, cross-section, and canoe stands effectively integrating the canoe theme
- is sustainability highlighted as relevant

**Durability** – See section 6.6 Durability and Repairs. In addition, see **RFP Addendum #2**, released in Early Nov. 2019.

## INSTRUCTIONS - DEDUCTION SCORE CARDS

### Instructions:

1. The Conference/National Judges shall come to a consensus on the determination of any infractions made by the team regarding the competition event (i.e., Technical Proposal and Final Product Prototype).
2. Judges shall circle the unit value of the deduction in the “Deduction” column. The units of the deductions for the infractions are standardized (i.e., cannot be higher or lower than what is prescribed).
3. The Head Judge shall tally the deductions and initial his/her name next to it. At the National Competition, a CNCCC member may tally the deductions in lieu of the Head Judge; however, the judges will make the determination of the infractions.
4. The total amount of deductions can exceed 100 units.
5. The Head Judge (or CNCCC member) shall provide all team captains with these forms to inform them of the deductions being assessed against them. Teams with no deductions will also be provided with these forms to assure anonymity.
6. The team captains shall indicate if they agree with the infractions and deductions or if they wish to appeal any of the infractions by signing the form. Teams that wish to appeal the infractions shall be given a reasonable amount of time to review the rules, obtain their supportive documentation, and provide the judges with their response. Teams are strongly cautioned to be able to substantiate their appeals.
7. The Head Judge (or CNCCC member) shall indicate the day and time (deadline) that the team captains have to submit the completed and signed form to the judges or CNCCC member.
8. Following the receipt of the form, the judges shall re-evaluate any infractions that the teams may appeal given the supportive documentation that they provide, and render their final decision on the form. The Head Judge shall input the official total deduction, sign off on the form, and inform the team captains of the judges’ decision. Once this is done, no further appeals regarding this matter will be entertained.
9. All appeals shall be handled prior to the Awards Ceremony. The final tally shall be inputted on the paper copy of the score sheet and in the electronic score sheet which is then officially ratified by the Head Judge. At the National Competition, the Head Judge and the CNCCC will ratify the scores.
10. Members of the CNCCC will either be on-call (during conference competitions) or on-site (during the national competition) and are available to provide guidance, clarification, and interpretation of the rules and regulations for the judges. During the competitions, teams are given the option to request that the judges contact the CNCCC for rule interpretation (see Request for Clarifications and Appeals).



# FINAL PRODUCT PROTOTYPE DEDUCTION SCORE CARD

School: \_\_\_\_\_

**Infraction**

**Deduction**

*(Circle those that apply)*

- |   |                         |
|---|-------------------------|
| A. Canoe not built within current academic year; cannot race due to design or safety issues, or cannot complete preliminary sprint and endurance events | No Final Product Points |
| B. Reinforcement thickness exceeds 50% of canoe thickness   | No Final Product Points |
| C. Use of Bondo®, epoxy, or similar materials for construction  | No Final Product Points |
| D. Use of more than 3 concrete mixtures   | No Final Product Points |
| E. Use of prohibited materials  | No Final Product Points |

Nationals Only

- |  |           |               |
|--|-----------|---------------|
| F. Reported concrete oven dry unit weight compared to measured unit weight | 0-5 Units | ___ Units     |
| G. Reported weight of canoe not within ±10 lbs. of the measured weight     |           | 15 Units      |
| H. School granted permission to repair /reconstruct canoe                  |           | 25 / 50 Units |
| <b>Flotation Test:</b> PASS / FAIL   |           | 50 Units      |

**Total Deductions (Final Product Prototype)** \_\_\_\_\_ Units

Please provide information on the infraction(s) being applied:

\_\_\_\_\_

\_\_\_\_\_

Teams shall have until (day/time) \_\_\_\_\_ to either agree with the infractions listed above or to appeal the decision and provide supportive documentation.

- We agree with the infractions and deductions applied to the Technical Proposal
- We wish to appeal the following infractions *(circle those that apply)*:

A B C D E F G H

\_\_\_\_\_  
**Team Captain**

\_\_\_\_\_  
**Team Captain**

Upon review of the Appeal Form (and any supportive documentation) provided by the team captain:

- The deductions originally determined by the judges shall stand.
- The deductions for the following infractions shall be rescinded (circle those that apply):

A B C D E F G H The total deduction for the Final Product Prototype is \_\_\_\_\_ Points.

\_\_\_\_\_  
**Head Judge**

# REQUEST FOR CLARIFICATIONS AND APPEALS

**Instructions:** Completed forms must be submitted by a Team Captain to the Head Judge. Requests will not be considered once the competition has concluded. All decisions of the judges are final.

**School Name:**

**Team Captain(s):**

**Nature of Inquiry:**

- ( ) Technical Proposal
- ( ) Technical Presentation
- ( ) Final Product Prototype
- ( ) Race Demonstration
- ( ) Other: \_\_\_\_\_

**Briefly Describe Nature of Inquiry or Appeal: (Continue on reverse side if more space is needed).**

**[Conference Only]** We formally request that the CNCCC member on-call be contacted in order to obtain an official interpretation or clarification regarding this matter.

**Rules & Regulations Section(s) Referenced:**

**Team Captain's Signature:** \_\_\_\_\_

**Team Captain's Signature:** \_\_\_\_\_