2018-2019

INTERNATIONAL STUDENT CONCRETE COMPETITION

BUILT2LAST

RESILIENCE DESIGN CHALLENGE

#BUILT2LAST

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ACSA

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INTRODUCTION

The Association of Collegiate Schools of Architecture (ACSA) is pleased to announce the 2018-2019 Built2Last | Resilience Design Challenge, International Student Concrete Design Competition. Administered by ACSA and sponsored by the Portland Cement Association (PCA), the program is intended to challenge students, working individually or in teams, to investigate an innovative application of portland cement-based materials to achieve resilient design objectives.

OPPORTUNITY

This concrete competition offers students the opportunity to design an environmentally responsible RECREATION CENTER that integrates a secondary purpose of post-disaster neighborhood support for community continuity through the inherent attributes of concrete applications.

CONCRETE

In its simplest form, concrete is a mixture of paste and aggregates. The paste, composed of portland cement and water, coats the surface of the fine and coarse aggregates. Through a chemical reaction called hydration, the paste hardens and gains strength to form the rock-like mass known as concrete.

Within this process lies the key to a remarkable trait of concrete: it's plastic and malleable when newly mixed, strong and durable when hardened. These qualities explain why one material—concrete—can build high-rise skyscrapers and houses, bridges and basements, sidewalks and superhighways. You can find more information on concrete and portland cement by visiting the Portland Cement Association's Web site at www.Cement.org.

RESILIENT DESIGN

The Resilient Design Institute states, "Resilience is the capacity to adapt to changing conditions and to maintain or regain functionality and vitality in the face of stress or disturbance. It is the capacity to bounce back after a disturbance or interruption.

Resilient design is the intentional design of buildings, landscapes, communities, and regions in response to these vulnerabilities. As used by the Resilient Design Institute, resilient design focuses on practical, on-the-ground solutions."

INNOVATION

The purpose of this competition is to explore and create innovative ideas and applications utilizing portland cement- based solutions for resilient designs.

DESIGN FOCUS

The focus of this competition is to craft an investigation, identify a design improvement and create a solution containing concrete or concrete products as key building materials.

CRITERIA FOR JUDGING

Criteria for the judging of submissions will include: concrete as the primary structural material, creative and innovative use of concrete in the design solution, successful response of the design to its surrounding context, the creative and clear approaches to the design, successful response to basic architectural concepts such as human activity needs, structural integrity, and coherence of architectural vocabulary.

RECREATIONCENTER

Community recreation centers are taking on new vitality, as focal points around which communities and neighborhoods can come together, to engage in play and collective use. While these buildings may be small and compact, they contribute to the city, by transforming the public spaces around them into places where the interaction of communities goes beyond the simple inhabitation of buildings. Additionally, recreation centers can assume a secondary role of primary importance – as a hyper-local operational hub for residents in the event of a natural disaster. These recreational centers represent a distributed network operating on the local level, which can function as disaster shelters, and post disaster operations and command centers. Recreation centers often serve as a level playing field, where a wide range of users can meet for the common purpose of recreation and play. These centers serve as hubs for local communities, with more nuanced characteristics than the city as a whole, and those characteristics are reflected in the buildings and public spaces and in the community's neighborhoods, local heritage, people and culture.

RESILIENT INITIATIVES

Concrete structures play a critical role in making communities stronger and safer. Inherently fire, flood and impact resistant, concrete provides resilience for a range of natural and man-made events. Concrete can be incorporated in several key aspects to make projects more durable and disaster resistant. For example, concrete wall, floor and roof systems offer an unsurpassed combination of structural strength and wind resistance. Hardened and non-combustible exterior finishes for walls and roofs of a home or business provide the best combination of strength and security. In addition, the inorganic composition of cement based materials do not burn, rot, rust or offer a food source for mold and insects.

Resilient communities start with comprehensive planning, including stricter building codes that produce robust structures with long service lives. It is common for emergency service facilities such as hospitals, and fire and police stations to be designed to a higher standard, with the expectation that these will remain operational during and after a disaster event. More durable buildings with high-performance features that incorporate concrete and concrete products can offer enhanced community continuity.

Buildings and structures with resilient design and materials are not only better able to recover following disasters, such as hurricanes, tornados, fires, earthquakes and floods, they are also the new "green" buildings. Builders, architects, and designers have come to recognize that more durable public buildings, homes, and businesses reduce the impact entire communities have on our planet. As the most used man-made material on the planet, concrete has a significant CO_2 footprint, which invites considerations for how to optimize impact reductions through resilience, as well as whole building life cycle impacts and other strategies.

Conceptually strong proposals should incorporate aspects of resilience, in which projects not only utilize the durable properties of concrete but also passive resilient programming strategies, which allow alternative uses of space during and immediately after disaster scenarios. Projects should attempt to utilize what is already known of concrete's properties, while also advancing imaginative proposals with emerging concrete technologies. Combinations of proven and newly emerging concrete strategies and applications will be highly considered. In addition to material properties, innovative environmental attitudes should be expressed in each proposal, suggesting larger roles in the built environment, including concrete's benefits in the heat island mitigation, stormwater management, passive solar, thermal mass, and other passive strategies which enable continued functionality in post disaster events.

The challenge of this program is to address two scales of thought seemingly at odds. While natural disasters are something that don't have locality…they generically cover most parts of the globe…how can local responses be developed to address these universal issues? The question posed is how a recreation center can contribute locally to the city, generating a new typology for communities and concrete together. The jury will select winners based on the extent students have developed resourceful ways to integrate portland cement-based solutions into their design to achieve resilient development objectives.

PROGRAM

RECREATION CENTER REQUIREMENTS

Design an environmentally responsible Recreation Center / Disaster Relief Center, focusing on inherent material attributes through architectural design to preserve tomorrow's resources. This building should be designed in a way to function as a shelter in place and disaster command center during and immediately following natural disasters such as hurricanes, tornadoes, floods or wildfires. Buildings should incorporate post disaster resources, such as temporary housing, auxiliary power, community communications, food and water distribution, sanitary services, minor medical services, etc. to support relief operations after the event.

The functional and programmatic requirements for the Recreation Center spaces are outlined below. The area allocations are suggestions only and may be altered. Solutions should observe the total gross square footage, within a range of plus or minus ten percent.

RECREATION / DISASTER COMMAND CENTER

DIGITAL LIBRARY / DIGITAL COMMAND CENTER

The Digital Library is conceived of as a large reading room with tables and furniture to accommodate digital media equipment, primarily an array of computers, and other audio visual equipment.

Communal area w/ space for 25 computer stations	1,000 sq ft
IT Closet	150 sq ft
IT Offices	200 sq ft
Digital Library Total	**1,350 sq ft**

INDOOR CLASSROOM / POST EVENT MEDICAL + SPECIAL NEEDS SHELTER

An indoor classroom for private classes / meeting groups.

Classroom	400 sq ft
Closet	100 sq ft
Classroom Total	**500 sq ft**

INDOOR GYM / STORM SHELTER & POST EVENT SHELTER

An indoor gymnasium, for a variety of recreational activities, to be utilized as a storm shelter when needed.

Central Court, (42' x 50')	2,100 sq ft
Storage	200 sq ft
Public Restrooms (M/F 500 sq ft each)	1,000 sq ft
Kitchen/ Concessions	1,000 sq ft
Gym Total	**4,300 sq ft**

OUTDOOR CLASSROOM

An outdoor classroom area for lectures and performances. Open air but with a sense of enclosure.

Classroom	400 sq ft
Classroom Total	**400 sq ft**

EXTERIOR PLAZA WITH GYM with PLAYGROUND / POST EVENT DISTRIBUTION CENTER

This plaza will serve as a public space for outdoor recreational activities, as well as a post event distribution site for food/water/community communications. Materials should be a blend of cast concrete, 50% permeable pavers and grass / garden plantings.

Plaza	5,000-10,000 sq ft
Plaza Total	**5,000-10,000 sq ft**

INDOOR Total Square Feet 6,150 sq ft, (net) **7,380 sq ft (gross)**
(Including 20% allowance for Mechanical, Structural & Circulation)

OUTDOOR Total Square Feet 5,400 sq ft, (net) **5,000-10,000 sq ft (gross)**

SITE & CONSTRUCTION

SITE

The site for this competition is at the discretion of students and/or faculty sponsors. Requirements, however, are for the site to be located in an urban context. The site needs to be adjacent to a major avenue for ease of public use and access for vehicles entering and exiting the facility. Submissions will be required to explain graphically or otherwise the site selection and strategy.

HAZARD TYPES

Designers are encouraged to investigate the nature of the potential natural disaster in the locale of their proposed site. Only one primary hazard need be considered for the purposes of the competition. Additional consideration for secondary impacts (short to medium term loss of power, water, communications, shelter, etc.) should be evaluated and integrated into the design strategy. Often, loss of shelter and disruptions of power, water, food and medical supply distribution accompanies natural disaster, increasing the risk for loss of life, property and spread of disease.

CODE INFORMATION

Refer to the International Building Code and the local zoning ordinance for information on parking requirements, height restrictions, set backs, easements, flood, egress and fire containment.

CONSTRUCTION TYPE

The design project must use portland cement-based applications (site cast, pre-cast, post tensioned, tilt-up, shot-crete, concrete masonry and pavers, etc.) as a key building material for the structure and site-work. Strategies should integrate resilience and whole building life cycle impact reductions (environmental, social, and economic) for the project using innovative methods of structure, fabrication and/or construction.

DRAWINGS

REQUIRED DRAWINGS

It is required that each presentation address, but not be limited to, the specific criteria outlined in the design challenge through the following required drawings:

- site plan showing the surrounding buildings and streets, topography and circulation patterns;
- floor plans;
- elevations and building sections sufficient to show site context and major program elements
- drawings that best show the relationship between portland cement-based materials and resilient design objectives, such as floor plans, elevations and sections;
- detail drawing(s), either two or three-dimensional, illustrating the key elements of infrastructure and building systems;
- a three-dimensional representation in the form of axonometric, perspective, or model photographs.

All drawings should be drawn at a scale appropriate to the design solution and include a graphic scale and north arrow as appropriate.

RESOURCES

Entrants are encouraged to research references that are related to both the topic of the competition and precedent projects that demonstrate innovative use of timber such as those listed below. An intention of all ACSA competitions is to make students aware that research is a fundamental element of any design solution.

Industry Resources

The Portland Cement Association and its allied partners offer numerous resources for ideas or inspiration that may be helpful as students conduct their background research.

• Portland Cement Association	Cement.org
• National Ready Mixed Concrete Assoc.-Build with Strength Program	BuildWithStrength.com
• National Concrete Masonry Association	NCMA.org
• Precast / Pre-stressed Institute	PCI.org
• Post Tensioning Institute	Post-Tensioning.org
• Concrete Reinforcing Steel Institute	CRSI.org
• Insulated Concrete Forms Manufacturers Association	ICF-MA.org
• National Precast Concrete Association	NPCA.org
• Interlocking Concrete Pavement Institute	ICPI.org
• Tilt-up Concrete Association	Tilt-up.org
• American Shotcrete Association	Shotcrete.org

Other Key Resources

Federal Emergency Management Agency (FEMA)
Safe Rooms for Tornadoes and Hurricanes:
Guidance for Community and Residential Safe Rooms
fema.gov/media-library/assets/documents/3140

AWARDS

The design jury will convene in Summer 2019 to select winning projects and honorable mentions. Winning students, their faculty sponsors and schools will receive cash prizes and software totaling nearly $37,000. A total of $10,000 in cash prizes will be distribution in the following manner:

$10,000

First Prize	
Student/Team	$ 3,500
Faculty Sponsor	$ 1,100
Second Prize	
Student/Team	$ 2,500
Faculty Sponsor	$ 850
Third Prize	
Student/Team	$ 1,500
Faculty Sponsor	$ 550

In addition, each winning school will receive a complete package of PCA's **StructurePoint** software, a retail value of $8,900.

> **StructurePoint** combines concrete design software with an array of structural engineering resources to offer a convenient single point of access for design software, support, product specifications, educational tools, and technical information. The software productivity suite provides programs for the analysis and design of reinforced concrete buildings and structures. More information is available at www.StructurePoint.org

Winners and their faculty sponsors will be notified of the competition results directly. A list of winning projects will be sent to all participating faculty sponsors, as well as posted on the ACSA website at www.acsa-arch.org. Prize-winning submissions will be exhibited at the ACSA Annual Meeting and the AIA National Convention and posted on the ACSA and Portland Cement Association websites.

TIMELINE

Fall 2018	REGISTRATION BEGINS (no registration fee)
April 3, 2019	REGISTRATION DEADLINE
May 22, 2019	SUBMISSION DEADLINE
Summer 2019	WINNERS ANNOUNCED
Fall 2019	COMPETITION SUMMARY PUBLICATION

COMPETITION RULES

ELIGIBILITY
The competition is open to all ACSA member schools (full, candidate, and domestic or international affiliates). All student entrants are required to work under the direction of a faculty sponsor. Entries will be accepted for individual as well as team solutions. Teams must be limited to a maximum of five students.

FACULTY RESPONSIBILITY
The administration of the competition at each institution is left to the discretion of the faculty sponsor(s) within the guidelines set forth in this document. Work on the competition should be structured over the course of one semester during the 2018-2019 academic year.

REGISTRATION
Faculty who wish to enroll students must complete an online Registration Form (available at www.acsa-arch.org/competitions) by April 3, 2019. Complete a form for each individual student or team of students participating. Students or teams wishing to enter the competition on their own must have a faculty sponsor, who should complete the form. There is no entry or submission fee required to participate in the competition. Each registered student and faculty sponsor will receive a confirmation email that will include information on how to upload your final submission online.

EVALUATION CRITERIA
Each faculty sponsor is expected to develop a system to evaluate the work of the students using the criteria set forth in this program. In addressing the specific issues of the design challenge, submissions must clearly demonstrate the design solution's response to the following requirements:

- the skill to integrate portland cement-based materials to achieve resilient design objectives;
- an original design innovation;
- a response to central architectural concepts such as human activity needs, climatic considerations, structural integrity, site planning, creative insight, coherence of architectural vocabulary;
- clear and comprehensible design.

COMPETITION RULES

DIGITAL PRESENTATION FORMAT

Submissions must be designed on no more than four 20" x 20" digital boards. **The names of student participants, their schools, or faculty sponsors, must NOT appear on the boards.**

All boards are required to be uploaded through the ACSA website in Portable Document Format (PDF) or Image (JPEG) Files. Participants should keep in mind that, due to the large number of entries, preliminary review does not allow for the hanging end to end display of presentation boards. Accordingly, participants should not use text or graphics that cross over from board to board.

DESIGN ESSAY

A brief essay, 500 words maximum, (in English) is required as part of the submission describing the most important concepts of the design project. Keep in mind that the presentation should graphically convey the design solution and context as much as possible, and not rely on the design essay to convey a basic understanding of the project. The names of student participants, their schools, or faculty sponsors, must NOT appear in the design essay.

ONLINE PROJECT SUBMISSION

Entries must be uploaded through the ACSA Competition website at www.acsa-arch.org/competitions by 11:59 pm, Pacific Time, on May 22, 2019. If the submission is from a team of students all student team members will have the ability to upload the digital files. Once the final submit button is pressed no additional edits, uploads, or changes can be made. Once the final Submission is uploaded and submitted each student will receive a confirmation email notification.

A final submission upload must contain the following:

- Completed online submission information including all team members and faculty sponsors;
- Each of the four 20"x20" boards uploaded individually as a high resolution Portable Document Format (PDF) or Image (JPEG) Files;
- A Design Essay.

Winning projects will be required to submit original files/images for use in competition publications and exhibit materials.

INFORMATION

Program updates, including information on jury members as they are confirmed, may be found on the ACSA website at www.acsa-arch.org. ACSA and PCA reserve the right to publish drawings, written descriptions, photographs of entries and the names of student entrants, without compensation.

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COMPETITION SPONSORS

The **Portland Cement Association** (PCA), founded in 1916, is the premier policy, research, education, and market intelligence organization serving America's cement manufacturers. PCA members represent 93 percent of U.S. cement production capacity with facilities in all 50 states. PCA promotes safety, sustainability, and innovation in all aspects of construction, fosters continuous improvement in cement manufacturing and distribution, and generally promotes economic growth and sound infrastructure investment.
www.cement.org

CO-SPONSORS

Build with Strength (A Coalition of the **National Ready Mixed Concrete Association**)
Our mission is to educate the building and design communities and policymakers on the benefits of ready mixed concrete, and encourage its use as the building material of choice for low- to mid-rise structures. No other material can replicate concrete's advantages in terms of strength, durability, safety and ease of use.

StructurePoint originated over half a century ago as the Engineering Software Group of the Portland Cement Association (PCA) in 1957. StructurePoint's primary vision is to achieve a world of safe, sustainable, and durable reinforced concrete structures by providing focused software as the essential tool for structural engineers.

ADMINISTRATIVE ORGANIZATION

Association of Collegiate Schools of Architecture (ACSA)
Leading Architectural Education & Research
ACSA is a nonprofit organization founded in 1912 to enhance the quality of architectural education. School membership in ACSA has grown from 10 charter schools to over 250 schools in several membership categories. Through these schools, over 5,000 architecture faculties are represented in ACSA's membership. In addition, over 500 supporting members composed of architectural firms, product associations, and individuals add to the breadth of ACSA membership. ACSA, unique in its representative role for professional schools of architecture, provides a major forum for ideas on the leading edge of architectural thought. Issues that will affect the architectural profession in the future are being examined today in ACSA member schools.
www.acsa-arch.org