

Report on the First "Builders of the Future" Contest



ASCE members with Anne Ellis

Introduction

The "Builders of the Future" contest, organized by ASCE Mexico Section and CEMEX, aims to foster innovation in civil engineering through the development of projects that contribute to sustainability and the infrastructure of the future.

In this first edition, students from various universities across Mexico participated in a competition designed to promote visionary solutions aligned with the United Nations' Sustainable Development Goals (SDGs) and ASCE's Future World Vision (FWV) concept. Through this event, teams not only presented innovative ideas but also had the opportunity to receive mentorship from industry experts and connect with industry leaders.

This report details the structure of the contest, the participants, the standout projects, and the impact generated at the CEMEX Sustainable Summit, where the winning team was announced and key initiatives regarding the future of engineering were presented.

The "Builders of the Future" contest was developed in four key stages, from registration to the in-person final at the CEMEX Sustainable Summit.

◆ 1. Registration and Requirements

- ◆ Teams of 3 to 5 students.
- ◆ Option to have a mentor.
- ◆ Submission requirements:
 - 5-minute video.
 - Technical document (maximum 5 pages).

◆ 3. Evaluation Criteria

The projects were evaluated in five categories with the following weighting:

- ✓ Innovation and creativity (40%)
- ✓ Sustainability (20%)
- ✓ Value proposition (15%)
- ✓ Efficiency and feasibility (15%)
- ✓ Communication (10%)



◆ 2. Evaluation and Selection of Finalists

- 1 Verification of requirements: Review of submissions.
- 2 Preselection: Judges evaluated and selected the top 5 teams.
- 3 Finalists' Mentorship: Personalized guidance from experts.
- 4 Final at the CEMEX Sustainable Summit: Presentation to the jury and the public.

◆ 4. Prizes and Recognition

- 🏆 1st place: Trip to the CEMEX Global Innovation Center in Switzerland and participation in the Seed Program.
- 🏆 2nd and 3rd place: LEED Green Associate certification course or equivalent.
- 📄 Finalists: Recognition at the CEMEX Sustainable Summit.

This contest and the activities carried out at the CEMEX Sustainable Summit are aligned with the vision of the American Society of Civil Engineers (ASCE), which promotes sustainability, innovation, and a commitment to the future of civil engineering. ASCE seeks to encourage a professional practice that not only addresses current infrastructure needs but also focuses on developing resilient and sustainable solutions that benefit future generations.

It is based on ASCE's Sustainable Solutions and Innovation Contest.

Preselection Stage

In the preselection stage, a total of 17 judges were called to evaluate the projects submitted by the participating teams. The judges had a highly specialized profile, composed mainly of professionals from the civil engineering sector, sustainability experts, academics with extensive experience in applied research, and leaders from the construction industry. This multidisciplinary group allowed for a comprehensive evaluation of each project, ensuring that both technical and social/environmental aspects of the proposals were considered.

During this phase, the teams were evaluated according to a pre-established rubric that considered key factors such as innovation, technical feasibility, and potential social and environmental impact. The projects that received the highest scores moved on to the next phase, where a deliberation meeting was held. In this meeting, the judges discussed the most outstanding proposals in depth, compared the presented ideas, and debated which ones had the greatest potential for feasibility and a more significant positive impact. After this comparative analysis, the top 5 projects were selected to move on to the final phase of the contest.

Mentorship for Finalists

Once the finalist teams were selected, participants had the opportunity to interact with experts in various areas related to civil engineering, sustainability, and technology. Through personalized mentorship, the finalists were able to share their projects with the experts, receive detailed feedback, and make significant adjustments to their proposals. This mentorship allowed the teams to improve the quality of their projects, optimize their approach, and increase the likelihood that their ideas would be effectively and sustainably realized.

The mentorship focused not only on technical aspects but also on communication strategies, economic feasibility, and the adaptability of the projects in a real-world context. This support was crucial for strengthening the projects and preparing them for the final presentation before the expert jury at the CEMEX Sustainable Summit.

The "Builders of the Future" contest generated significant interest among civil engineering students and related fields, resulting in high participation. **More than 140 projects were registered**, presented by teams from various universities across Mexico.

However, only 95 projects met all the requirements outlined in the contest guidelines and were considered eligible for evaluation.

The diversity of the projects was a standout feature of this edition of the contest. The teams addressed a wide range of topics, such as:

- Sustainability in construction: Projects focused on reducing environmental impact and using eco-friendly materials.
 - Emerging technologies: Innovative solutions in the use of automation, artificial intelligence, and data analysis to optimize construction.
 - Smart and resilient cities: Proposals that include adaptive infrastructure to combat climate change and new technologies to improve urban quality of life.
 - Energy efficiency and resource use: Ideas aimed at improving the efficiency of energy, water, and materials use in construction projects.
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Finalist Projects



Project: CONCRETE LIGHT
Institution: UNAM FES Acatlán

Abstract:

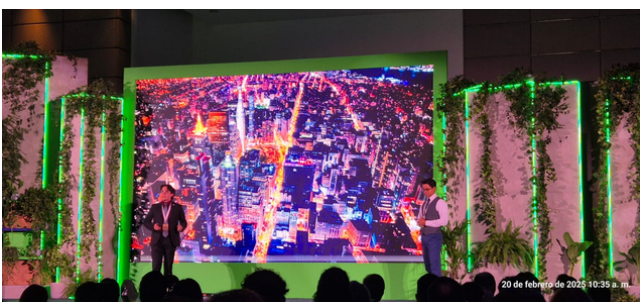
A concrete capable of generating electricity. This innovative material incorporates thermoelectric sensors that harness the temperature difference between the concrete and its surroundings to produce electrical energy. The heat absorbed by the concrete during the day is converted into a clean and renewable energy source. The sensors integrated into the concrete capture this thermal energy and convert it into electricity through the Seebeck effect.



Project: Rain Trees
Institution: IPN Tecamachalco

Abstract:

The project "Attraction Garden: Shared Flow and Irrigation" emerges as an architectural and landscaping response to two recurring issues in Cuautitlán Izcalli: urban flooding and the scarcity of potable water. It combines strategies for collecting, retaining, and filtering water with an attractive design that is accessible to the community.



Project: Carbon Concrete
Institution: UNAM FI

Abstract:

This project presents a modular system that captures and injects CO₂ into concrete, reducing carbon emissions from cement production. By converting CO₂ into a durable component, the system offers a scalable and eco-friendly solution that decreases the environmental impact of the construction industry while promoting sustainable practices.



Project: Living River
Institution: Centro

Abstract:

Our proposal aims to transform public spaces through the integration of natural elements, such as rivers, to improve urban connectivity. We focus on leveraging these environments as key points for transportation and outdoor activities, promoting a reconnection between communities, cities, and nature. This vision fosters a more harmonious relationship with the environment while promoting sustainable mobility and strengthening social cohesion.

Winner Team



Project: NanoLux
Institution: ITESM- Estado de México

Abstract:

The NanoLux project is an advanced intelligence system for detecting cracks in structural concrete. It consists of two parts: microcapsules mixed into the concrete mix and an external sensor that can make the microcapsules emit fluorescence to map them. This fluorescence may deplete or diminish due to interactions with the concrete once the capsule breaks, indicating that the concrete has suffered a crack. Any variation in fluorescence is captured and processed to generate a report, determining the condition of the building and whether it is at risk of collapse.

The CEMEX Sustainable Summit was held with the aim of bringing together experts, innovators, and industry leaders in the construction field to discuss and share sustainable solutions for the major urban challenges of the future. The event focused on crucial topics such as urban resilience, sustainability in construction, and the decarbonization of the industry.

One of the most notable sessions was the intervention of Anne Ellis, who presented ASCE's vision on sustainability, addressing the importance of integrating sustainable engineering practices into all infrastructure projects. She also discussed the Future World Vision project.

During the summit, various conferences were held with international leaders in sustainability and construction, including Hessam Azari from MIT, who presented the latest technological innovations in concrete construction that could transform the industry, and Mónica García, an expert in urban development, who spoke about the importance of smart cities.

It was an opportunity to strengthen collaboration between the ASCE Mexico Section, students, and associated civil engineering professionals. This gathering allowed for the exchange of valuable ideas and discussions about potential future activities that could benefit society.

Furthermore, it was an ideal occasion to reinforce the connection between the ASCE Mexico Section and its members, promoting greater participation and collaboration within the community. Section members made sure to promote ASCE's vision and goals, highlighting the importance of moving toward a more sustainable future in the field of civil engineering.

A highlight of the summit was the conversation with Anne Ellis. This talk was an invaluable opportunity for all ASCE members, both students and professionals, as it allowed for direct discussion of relevant topics and strengthened the relationship among ASCE members. The conversation proved to be very beneficial, providing a clearer vision of the society's future goals and the importance of collaboration within the ASCE community to face future challenges.





Recognition Awarded by the ASCE Mexico Section to the Finalists

