PCI Precast/Prestressed Concrete Institute

Daniel P. Jenny Research Fellowship Awards for 2022

The PCI Research and Development Council (Greg Force, outgoing chair; Andrew Osborn, incoming chair) is pleased to announce the award of four Daniel P. Jenny Research Fellowships for the 2022-2023 academic year. The fellowship recipients are Kaixin Chen, Amjad Diab, Noran Shahin, and Furkan Turan.

The fellowship program connects students and faculty with precast producers and industry experts to advance research in precast concrete, providing a valuable experience to the student, faculty, and the precast concrete industry. PCI especially thanks all producers who provide in-kind support for universities proposing research ideas.

Friction-Based Force-Limiting Connections for Jointed Precast Concrete Structures
University: University of California San Diego
Faculty advisor: Georgios Tsampras, Ph.D.
Producer support: Clark Pacific
Additional support: Scan-Pac Manufacturing, Inc.

The vision of the proposed research is to contribute to the improvement of the seismic response of precast concrete buildings by reducing the magnitude and the variability in floor accelerations and force responses. The goal of the proposed research is to develop a friction-based force-limiting connection with reliable long-term force- displacement response that it can be used between horizontal diaphragm-to-wall joints in earthquake-resilient precast concrete buildings. The friction-based force- imple to manufacture, low-cost, and non-proprietary. It will be reusable and able to withstand multiple earthquake events without damage.

Kaixin Chen

Shear Strength of UHPC Members
University: The University of Texas at Austin
Faculty advisor: Anca. C. Ferche, Ph.D.
Producer support: Standard Concrete Products
Additional support: Wiss, Janney, Elstner Associates, Inc.

Ultra-high performance concrete (UHPC) characteristics make it possible, in some cases, to significantly reduce or eliminate conventional reinforcement, reduce congestion, and allow for thinner sections. The anticipated outcome and impact of the proposed research is the development of a rational shear design equation that will increase the accuracy of the current procedure developed in the PCI Report. This will allow engineers to be more certain and decisive in their design, and will have a direct impact on advancing the implementation of PCI-UHPC members.

Amjad Diab

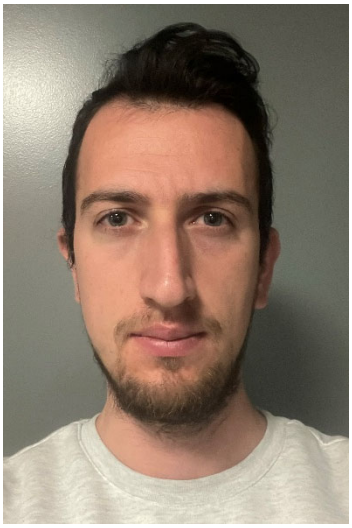
Shear Behavior of PCI-UHPC Members Considering Size Effects
University: University of Houston
Faculty advisors: Dimitrios Kalliontzis, Ph.D.
Producer support: Tindall Corporation

PCI-UHPC promises to revolutionize the approach to structural design with the ability of reducing or eliminating the use of shear reinforcement and applying larger prestressing forces to the members. The goal of the proposed research is to better understand the member size effects on the shear behavior of PCI-UHPC members and assist in refining the shear design equations considering these effects. Understanding the size effects in PCI-UHPC members will help improve the design equations to safely utilize PCI-UHPC in new innovative precast members.

Noran Shahin

Economical, high flexural strength concrete for crack-free precast concrete products
University: State University of New York at Buffalo
Faculty advisors: Pinar Okumus, Ph.D. and Ravi Ranade, Ph.D.
Producer support: Gate Precast Company, Tindall Corporation,
Additional support: Association for Bridge Construction and Design of Western New York

The objective of this project is to investigate the use of steel wool in concrete to increase its crack resistance (fracture toughness and flexural strength) and enable economical, crack-free precast concrete products. Unlike most studies that have focused on higher compressive strength (common UHPC's) for structural products, the focus of this project will be on high tensile strength for structural and architectural products. This project will create a concrete mix that is cost efficient and has a high crack resistance for precast concrete products using steel wool.



Furkan Turan