

# CONSTRUCTION RESEARCH CONGRESS 2024

*CONTRACTING, DELIVERY, SCHEDULING, ESTIMATING,  
ECONOMICS, AND ORGANIZATIONAL MANAGEMENT AND  
PLANNING IN CONSTRUCTION*

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SELECTED PAPERS FROM THE CONSTRUCTION RESEARCH  
CONGRESS 2024

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# Preface

The Construction Research Congress (CRC) 2024 Organizing Committee, Iowa State University (ISU), the Construction Research Council, and the Construction Institute (CI) of the American Society of Civil Engineers (ASCE) are pleased to present the CRC 2024 Proceedings. CRC is one of the leading international conferences in the area of construction engineering and management. The Congress is held in the United States every two years, which offers the host university the opportunity to welcome colleagues from around the world for an interactive exchange of ideas, knowledge and research findings. CRC 2024 was hosted by Iowa State University and held in Des Moines, IA on March 20-23, 2024. CRC 2024 was part of the second joint conference of the Construction Research Congress and the Construction Institute Summit. This combination of academic and industry expertise promoted wide-ranging discussions on finding real solutions to the most pressing societal and industry problems related to construction.

The theme of the CI & CRC Joint Conference was: "Constructing Connections Across Research and Industry." The joint conference's technical program provided insights on the latest research and industry practices that will lead to next generation techniques, technologies, and strategies to meet the 21st century challenges in construction and the built environment. This unique setting allowed academic and industry peers from around the world to share insights with one another to promote progress in both research and practice.

The Conference Proceedings contain 389 peer-reviewed technical papers, which were developed from over 680 abstract submissions. All submissions went through a two-step review process with a minimum of two external reviewers per paper, by a scientific community of hundreds of international construction experts. The work was exhibited at the conference in short presentations. The resulting proceedings are divided into four volumes:

- Volume I: Advanced Technologies, Automation, and Computer Applications in Construction (138 papers)
- Volume II: Sustainability, Resilience, Infrastructure Systems, and Materials Design in Construction (82 papers)
- Volume III: Contracting, Delivery, Scheduling, Estimating, Economics, and Organizational Management and Planning in Construction (74 papers)
- Volume IV: Health and Safety, Workforce, and Education (95 papers)

On behalf of the Organizing Committee, Iowa State University, the Construction Research Council and the ASCE Construction Institute, we hope that the CRC 2024 proceedings reflect the connection made between research and industry in the CRC and CI Joint Conference as well as our community's research and its potential to better our industry.

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Finally, the editors would like to thank all of our colleagues who provided reviews for submitted papers. We are grateful for your contributions to the success of the conference.

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