

Spring 2021 Symposium of Student Scholars

Non-Rigid Formwork Systems for Reinforced Concrete Structures

by

Sean Sadler

Undergraduate Student

Department of Civil and Construction Engineering

Kennesaw State University

1100 South Marietta Pkwy SE, Marietta, GA 30060

(470) 725-0722

Ssadler5@students.kennesaw.edu

This research investigates the use of non-rigid formwork and the techniques aiming to create more efficient concrete forms. During casting, concrete takes the shape of its formwork; traditionally, these formworks are made of rigid materials like steel or wood. The results are prismatic members, which are not optimized for material usage but only for simplicity in construction. Most of the research in the area focuses on improving the constituent materials, while the formworks have remained unchanged throughout the years. By using the approach described in this study, optimized shapes are achieved. These geometries can save up to 30% of the material while maintaining the same strength. In this study, we investigated the structural capacity of reinforced concrete members built with this technique along with the necessarily solutions to perform better casts.

Formworks were improved with each cast until a consistent method of creating the desired beam shape was achieved. Using both software and standard laboratory tests, the data were collected and analyzed. The results show that flexible forms can create more environmentally friendly concrete structures. Our research also opened up new questions. How can the processes be more streamlined, and are there real-world applications?

Research Faculty Advisor

Giovanni Loreto, PhD

Assistant Professor

Department of Architecture, College of Architecture and Construction Management

Kennesaw State University

1100 South Marietta Pkwy, Marietta, GA 30060

470-578-4507

gloreto@kennesaw.edu