

The Summer Undergraduate Research Fellows hip (SURF) Symposium  
4 August 2016  
Purdue University, West Lafayette, Indiana, USA

### **Strength of Reinforced Concrete Beams with High-Strength Steel**

Brian C. Rogers, Aishwarya Puranam, Santiago Pujol  
School of Civil Engineering, Purdue University

#### **ABSTRACT**

Structures are commonly made of reinforced concrete, which is a composite material made of concrete and steel reinforcement. Using high-strength steel, with yield stress larger than 100 ksi, could help reduce the quantity of steel required in structural members, thus reducing costs and improving constructability. The hypothesis being tested is that smaller quantities of high-strength steel reinforcement (HSSR) can be used in place of conventional steel in reinforced concrete beams while maintaining similar strength and deformation at failure. Two reinforced concrete beams with two different types of longitudinal steel reinforcement were constructed. The beams were 18 in. wide, 30 in. deep and 58.5 ft long. The beam with HSSR had approximately half the quantity of longitudinal reinforcement leading to reduced material costs and simpler construction. Numerical analyses indicate that the two beams will have comparable strengths and deformation capacities indicating that conventional steel can be replaced by HSSR.

#### **KEYWORDS**

Reinforced concrete, high strength steel, beams, strength, grade 120, grade 60