University at Buffalo
Department of Civil, Structural and Environmental Engineering
School of Engineering and Applied Sciences

ENGINEERING SEMINAR

Structural Performance of Post-Tensioned Spliced Girder Bridges

Chris S. Williams, PhD

Assistant Professor of Civil Engineering, Purdue University

Abstract

Modern spliced girder bridges consist of precast, pretensioned girder segments joined together at cast-in-place splice regions and made continuous through post-tensioning. Although the use of spliced girders has gained popularity for moderate-span bridges in recent years, research is needed to understand their behavior and verify if design calculations accurately predict their strength. Questions arise when considering the effects of post-tensioning ducts within the thin webs of spliced girders and the discontinuity created at the cast-in-place splice regions. Based on these uncertainties, a large-scale experimental program was conducted to evaluate the strength and behavior of spliced I-girders. The research focused on two primary objectives: (1) evaluate the effects of post-tensioning ducts on the shear strength and behavior of thin-webbed girders, and (2) investigate the behavior of the cast-in-place splice regions where two precast, pretensioned girder segments are joined. The talk will summarize the large-scale testing program and the key findings from the study. The presentation will include discussions on the effects of the duct material (steel vs. plastic) and the structural details within the cast-in-place splice regions.

Biography

Dr. Chris Williams is an Assistant Professor of Civil Engineering at Purdue University in West Lafayette, IN. His research interests include the behavior of reinforced and prestressed concrete structures, the repair and strengthening of concrete bridges, the strut-and-tie method, and large-scale structural testing. His past work has led to a significant contribution to bridging the gap between strut-and-tie modeling research in the laboratory and the implementation of the strut-and-tie method in the design office. His current research includes topics such as the load rating of deteriorated box beam bridges, shear-friction with high-strength reinforcement, and the effects of fire on prestressed concrete members. Dr. Williams is a member of Subcommittee 445-D, Shear Databases, in which he serves on the shear-friction task group, and an associate member of ACI-ASCE Committee 445, Shear and Torsion. He is also a consulting member of the PCI Committee on Bridges (COB) and the COB Spliced Post-Tensioned Precast Bridges subcommittee.

Date: Friday, December 7, 2018 Time: 11:00 AM
Location: 140 Ketter Hall, North Campus, University at Buffalo