

# Nondestructive Evaluation of Fiber-Reinforced Polymer Composites



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## Education:

Hope College, Assistant Professor of Engineering (2005-); Ph.D., Civil Engineering, University of Florida (August 2005); M.S., Structures and Foundations, University of Central Florida (1998); B.S., Civil Engineering, University of Central Florida (1996)

## Areas of expertise:

Infrared thermography, Non destructive evaluation, Experimental load testing of reinforced concrete, Rehabilitation of existing structures, FRP composites applied to reinforced concrete, Numerical modeling of heat transfer processes

## Grants and awards

National Science Foundation Graduate Research Fellowship (2002-2005); Robert D. Kirsten Graduate Fellowship (1996-1998); Best Overall Technical Paper Award; Kutarba, M.P., Brown, J., and Hamilton III, H.R., "Repair of Corrosion Damaged Concrete Beams with Carbon Fiber-Reinforced Polymer Composites", American Composites Manufacturers Association Annual Conference (October 2004)

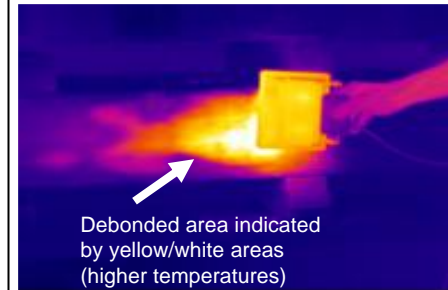
## Key publications and presentations

Brown, J. and Kunnath, S.K., "Low-Cycle Fatigue Behavior of Reinforcing Steel Bars", *ACI Materials Journal* (2004)  
 Brown, J. and Hamilton III, H.R., "Phase Thermography Inspection of Multi-Layer FRP Composites Bonded to Concrete", *SAMPE 2004*  
 Brown, J., and Hamilton III, H.R., (2004). "Infrared Thermography Inspection Procedures for the Non-Destructive Evaluation of FRP Composites Bonded to Concrete," *ASNT: Structural Materials Technology VI 2004*

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This Interstate-10 overpass was damaged by an over-height vehicle and repaired w/ FRP composites. This research investigates the installation quality and long-term durability of FRP repairs for civil infrastructure. Infrared thermography was used as a nondestructive evaluation tool. The primary goal is to develop an inspection procedure for FRP composites used to strengthen reinforced concrete.



Heat is applied to the surface of FRP composites and an IR camera is used to collect full-field temperature data. Unbonded areas appear as "hot-spots" in thermal images. Quantitative analysis of temperature vs. time response of unbonded areas can indicate important characteristics of the defect such as depth beneath the surface and size.

