

PROJECT FACTS

UNIVERSITY OF KENTUCKY CENTER FOR APPLIED ENERGY RESEARCH

PARTICIPANTS

UK Center for Applied Energy Research
&
Koppers Industries, Inc.
Updated 8/16/04

SPONSORS

U.S. Department of Energy

COST SHARING

DOE : \$49,286
UK : \$49,963

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CARBON MATERIALS

Coal-Derived Pitch Fiber Fly Ash Reinforced Concrete

This project is a result of the integration of two developing areas of value-added products derived from coal. The first area is the production of low cost discontinuous carbon fiber from coal-derived pitch. The second is the utilization of coal combustion fly ash in concrete. In this study, pitch derived from two sources were fabricated into discontinuous carbon fiber and used as reinforcement in fly ash concretes. The addition of fiber in concrete allows stress transfer across a matrix crack to improve toughness, impact resistance and fatigue endurance in the concrete. Pitch fiber fly ash concrete composites will be fabricated. The physical properties of the composites will be measured and compared to fly ash concrete. The effect of pitch fiber type, fiber loading, fiber length and mixing technique will be investigated to determine their effect on composite properties. Upon completion of laboratory testing, a full scale field test (2 m³ pour) of a pitch fiber reinforced fly ash concrete will be performed.

This project demonstrates that coal-derived materials can be performance and cost competitive alternatives to traditional concrete reinforcements and may demonstrate another market for coal derived materials.



Above: Concrete test cylinders and mortar bars containing carbon fiber.

Right: Optical micrograph showing carbon fiber in a concrete matrix.

