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Fire Resistance of FRP-Reinforced Concrete Members

Objective

To develop fire-resistance design guidelines for FRP-reinforced concrete structures.

Background

FRPs, or fibre-reinforced polymers, are high in strength, lightweight and non-corrosive. Their effectiveness as externally bonded repair materials is now widely recognized. But because they are relatively new, the extent of the role they could play in the repair of North America's crumbling infrastructure is not fully known, as only limited work has been done on their performance in fires. This has kept them from being used with confidence in buildings where fire safety is a critical design consideration.

Statement of Work

- Conduct fire-endurance experiments on columns, slabs, and beam-slab assemblies strengthened with carbon and/or glass FRP wraps and insulated with a specially designed fire-protection system.
- Develop computer models for predicting fire performance of FRP-reinforced concrete columns and beams.
- Develop design guidelines for evaluating the fire resistance of FRP-reinforced concrete members exposed to fires.

Expected Outcomes

- Data on the behaviour and performance of FRP-reinforced concrete members exposed to fires.
- Development and validation of numerical models that can predict structural behaviour in fires.
- Fire-resistance design guidelines for FRP-strengthened concrete structural members.

Partners

Members of the Intelligent Sensing for Innovative Structures Network (ISIS Canada) at Queen's University, Fyfe Co., and Degussa Construction Chemicals

Start/Expected Completion Dates

The project began in July 2002 and is expected to be complete in March 2007.

Project Manager

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For more information, see http://irc.nrc-cnrc.gc.ca/fr/frss/frc_hw_frp_e.html

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Typical circular, insulated FRP-strengthened concrete column before and after fire testing

