

## **IART-071**

### **Development of a Debonding Monitoring System for Reinforced Concrete (RC) Structures Strengthened with Fiber Reinforced Polymer (FRP) Composite Overlays**

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#### **Abstract**

This project will develop a debonding monitoring system for fiber-reinforced polymer (FRP) layers commonly used for retrofitting and strengthening reinforced concrete (RC) beams and slabs. Recently, the usage of FRP overlays for civil infrastructure retrofit and rehabilitation has been increased due to outstanding strength and lightweight of the FRP materials. However, the strength and stiffness improvement of host RC structures can be achieved only when proper bonding between the host structure and the added FRP layers is guaranteed. We proposed to develop a sensing system and monitoring methodology that can continuously inspect the bonding condition of the FRP layer with response to the host structure.

This proposed research intends to extend ongoing research in active sensing to debonding monitoring in FRP strengthened RC structures. This imposes various technical challenges because the wave propagation characteristics of the FRP strengthened RC structures are very different from those of steel plate or girder structures. Therefore, fundamental understanding and research in guided wave propagations should be performed in parallel with experimental investigations. As for the experimental investigations, the PI has teamed up with Professor Kent Harries at University of Pittsburgh to execute necessary monotonic and fatigue load tests of FRP strengthened RC beams with instrumented active sensing devices.