MarTREC
Maritime Transportation Research & Education Center

MarTREC UTC Project Information Form
USDOT Tier 1 University Transportation Center
Agency ID or Contract Number DTRT13-G-UTC50

Project Title: Corrosion-Tolerant Pre-Stressed CFRP Fatigue Retrofits for Improved Waterway Lock Reliability
Project Abstract (Brief Description): Locks are essential to waterway transport for many river and canal systems, allowing passage of ships through areas of differing water elevation. Over 23M cargo tons passed US Army Corps locks in January of 2015 alone, and 19 locks aid water transport throughout Arkansas, Louisiana, and Mississippi. These waterway locks typically consist of large steel gates that are subject to large alternating forces as water levels are changed, and as lock gates open/close. Repeated loads, corrosive waterway environments, and component geometry can all contribute to fatigue/fracture issues that can limit lock gate service and inhibit the overall reliability of waterway transport. Unfortunately, fatigue issues within steel lock gate components are often only evident once the gates are emptied for routine service, or once serviceability is interrupted by structural failures. Lock service interruptions/repairs are costly (temporary repairs to the Montgomery Lock & Dam =$3.5M) but manageable from a fatigue perspective. Research into cheap, corrosion-tolerant fatigue retrofit solutions is needed. The following project addresses fatigue issues within lock gates, identifying critical components and exploring methods for preventing fatigue cracks for the entire gate component service life. The use of carbon fiber reinforced polymer (CFRP) plates will be explored along with innovative pre-stress and bonding strategies to fine-tune component stresses and achieve infinite component fatigue life.
Describe Implementation of Research Outcomes (or why not implemented) - Place any photos here *To be determined upon conclusion of the project*:
Impacts/Benefits of Implementation (actual, not anticipated) *To be determined upon conclusion of the project:*
Web Links: martrec.uark.edu
Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): $154,500+$77,250=$231,750
Project Start and End Dates: 07/01/16-06/30/18
Principal Investigator(s) and Contact Information: Gary Prinz (PI) and Clint Wood (Co-PI)
Principal Investigator Institution (University): University of Arkansas