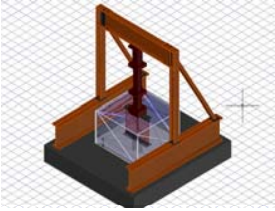
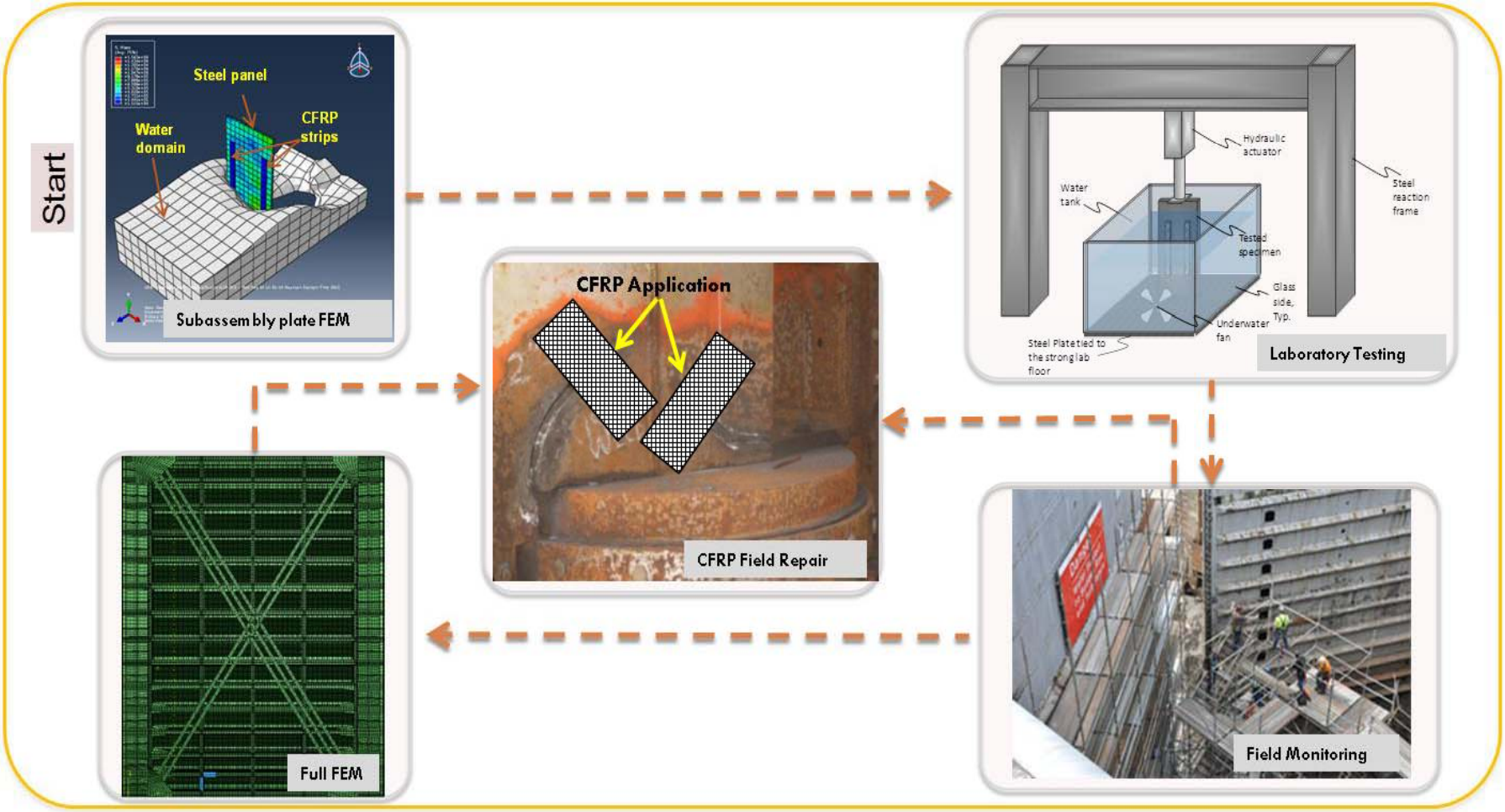


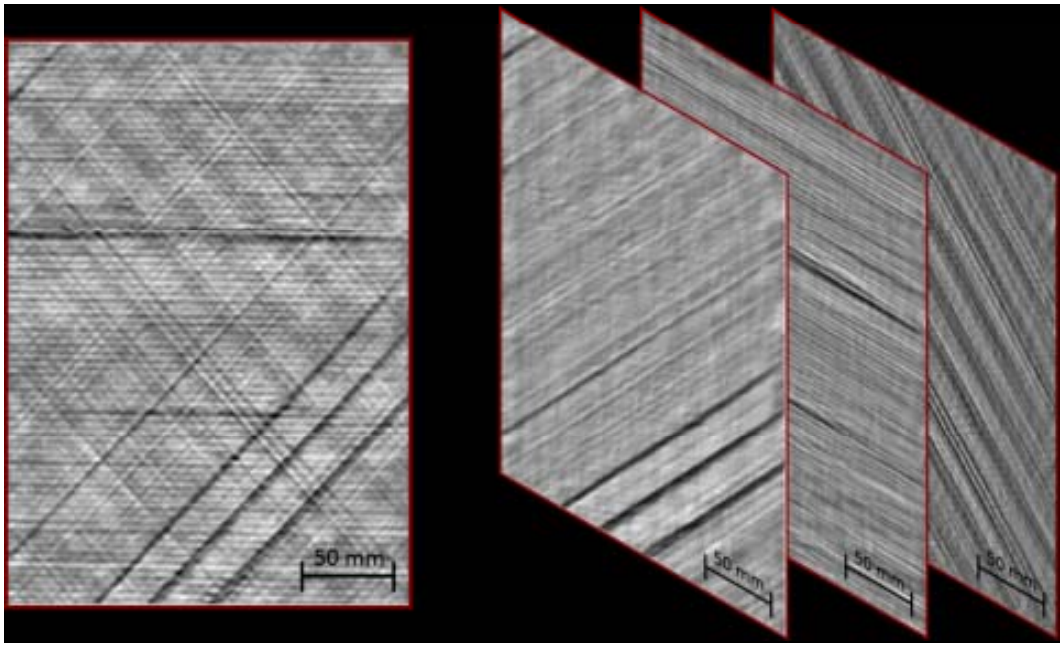
- PI - Dr. Guillermo A. Riveros
- Current methods used for the repair of steel bridges are accepted as the state-of-practice to repair SHS
  - Methods have proven to be ineffective as a result of the excessive deterioration
  - Bridge-based crack repair methods were developed for mitigating cracks under Mode I loading - SHS experience a combination of various loading modes
- Need development of repair methodologies that are pertinent to SHS
  - Carbon Fiber Reinforced Polymer (CFRP) composites for the repair of fatigue cracks can result in a significant increase in fatigue life.

Research Stages and Framework



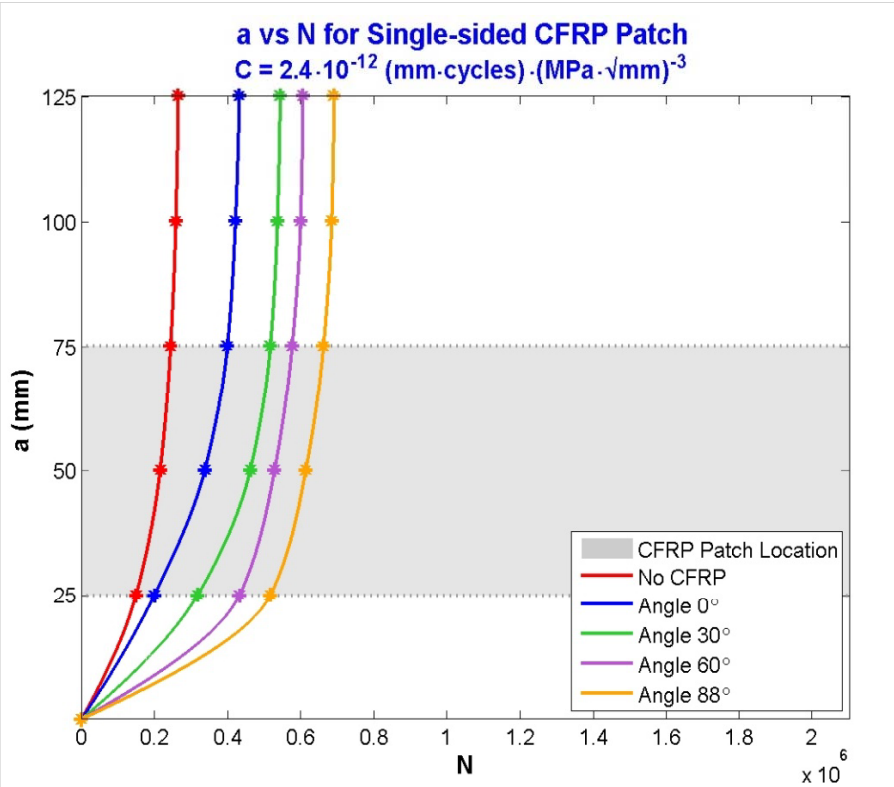
CFRP/Steel Corrosion

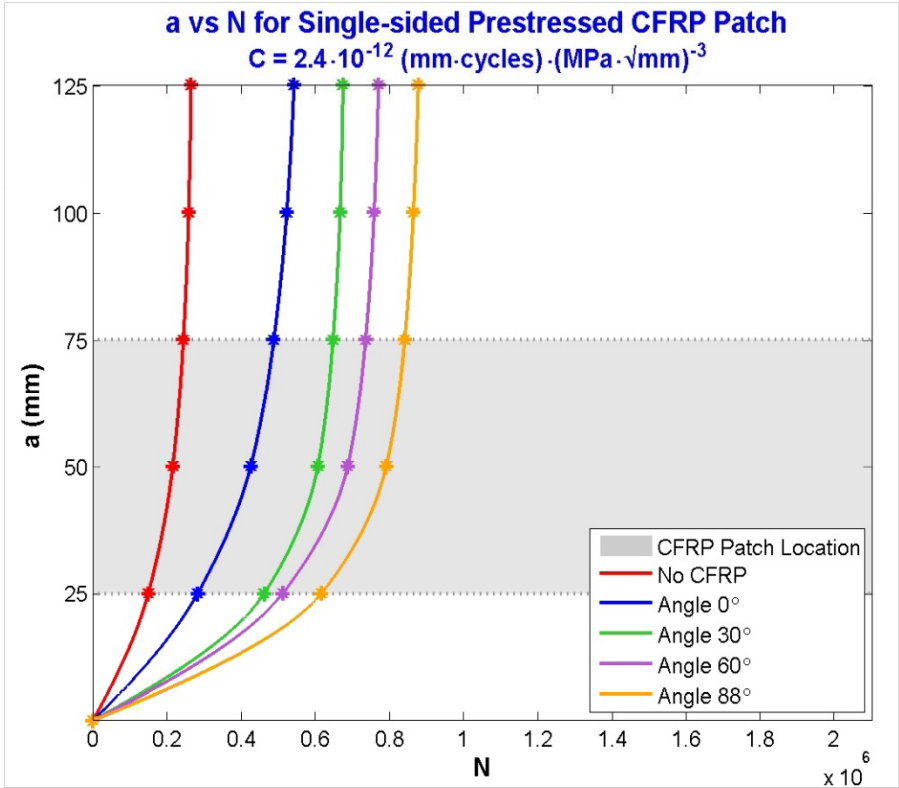
- Galvanic corrosion could be avoided by adding a layer of GFRP between the CFRP and the steel (likely to be used)
- Galvanic Corrosion conducted at a later stage



Results: *N vs a* Single-Sided Patch

- a vs N comparing CFRP vs no CFRP with and without prestressing





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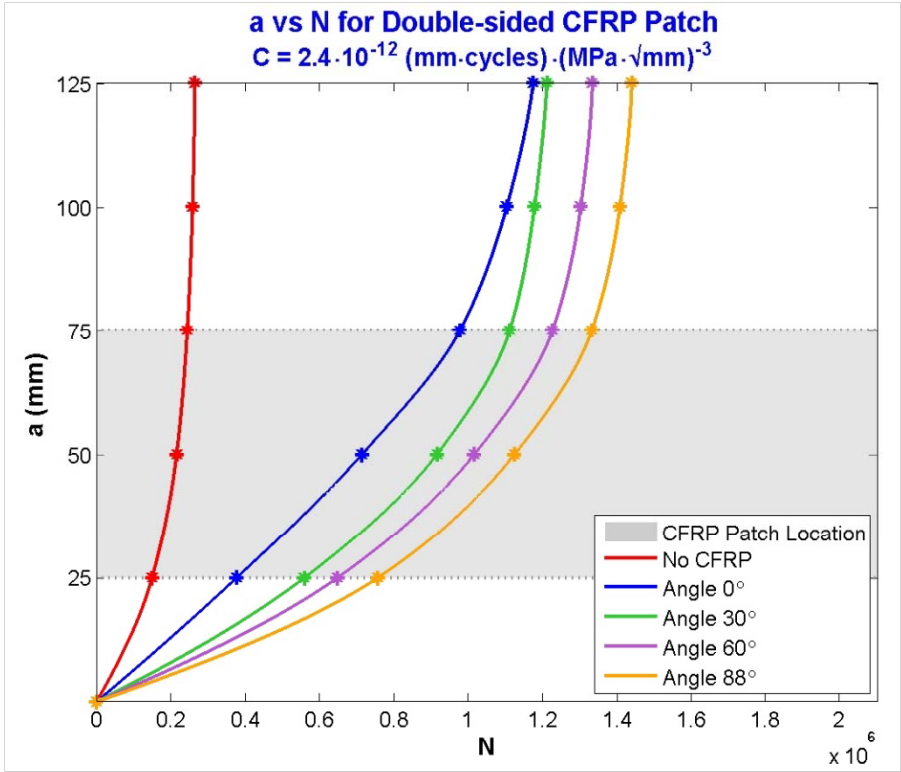

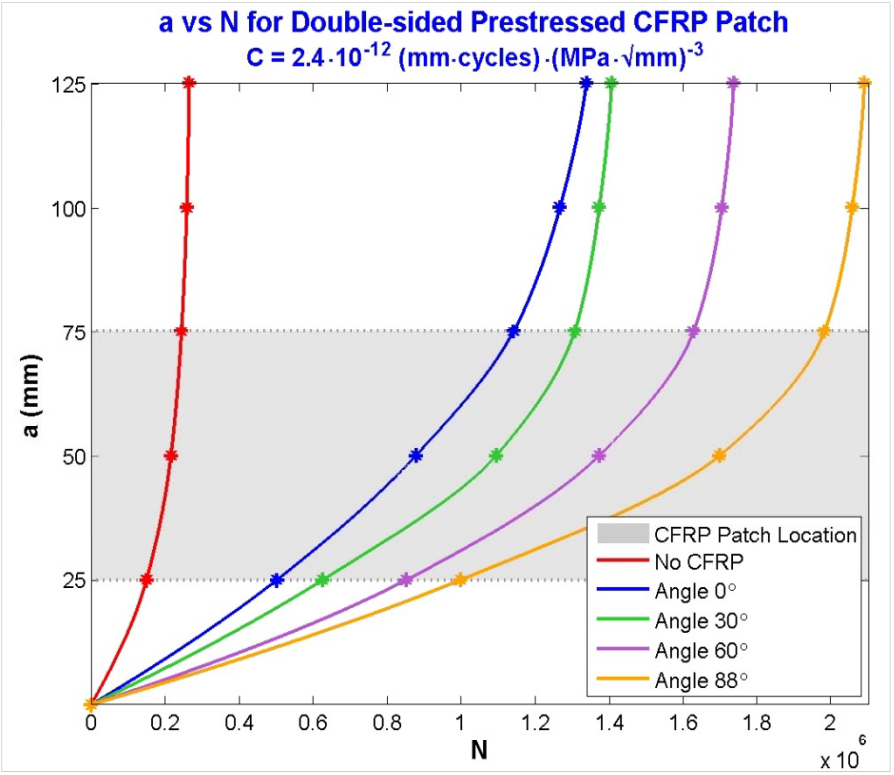

BENEFITS TO THE ARMY CORPS OF ENGINEERS

- An effective fatigue retrofit approach for one mode of cracking is clearly ineffective for another mode of cracking.
- Integrity of the SHS needs to be ensured through continuous inspection and repair.
- Development of an effective and economical retrofit practices will result in continuous operation with high level of safety without the need for continuous or closely spaced inspection intervals and emergency closures.
- Successful implementation of advanced and effective retrofits will result in mitigating the level of risk associated with possible catastrophic failure.