CHALMERS

Förstärkning av befintlig infrastruktur

Workshop BBT 2018-04-23
Säkerhet hos befintliga armerade betongkonstruktioner med nedbrytningsskador

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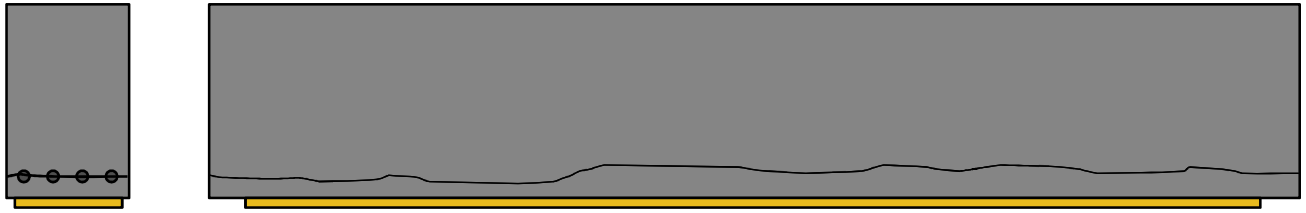
Research interests - FRP strengthening

- What we have done/can do today:
  - Strengthening of concrete structures for SLS and ULS by means of an innovative, competitive FRP strengthening system using pre-stressed Carbon FRP laminates
    (4 times more effective compared to existing FRP solutions on the market)
  - Strengthening of steel beams for ULS and FLS with regard to both short and long-term (Environmental durability) effects
  - Environmental durability of GFRPs and CFRPs at material level and FRP-steel joint level

Repair and strengthening of corroded concrete structures

- Research has typically been done on sound structures
- Some strengthening methods can even decrease the capacity of corroded structures…



- Need methods to confine the bars:
  - For beams possibly wrapping.
    Design methods taking the corrosion damages into account are missing.
  - For slabs?

Research needs - FRP strengthening

- Strengthening of old concrete structures
  Complex failure modes involving e.g.
  - corrosion cracking and delamination,
  - adhesion between new and existing materials
- Strengthening of old concrete bridges against fatigue
- Long-term durability of FRP-concrete joints
  (especially in Nordic environment)
- Integration of structural monitoring into strengthening systems
  (e.g. fiber optics in bonded strengthening laminates)

Research interests- FRP structures

- What we have done/can do today:
  - FRP-FRP connections (bolted and adhesive joints)
  - Design of full FRP bridges according to existing guidelines (Identification of knowledge gaps and contribution to TC 250/WG4)
  - Contribution in design of the first bridge project (Klaffbron) in Malmö (FRP deck system on steel girders)
  - Contribution in design review of Neptuni bridge in Malmö (full FRP pedestrian bridge)
  - LCC and LCA of FRP structures

Research needs - FRP structures

- Stability of thin-walled FRP shells and plates
  (contribution to upcoming Eurocode for FRP structures)
- Fatigue strength of FRP members and bolted connections
- Manufacturing of high sandwich structures for long span applications
- Long-term behavior of Glass FRP elements
  with regard to sustained loads and creep
- Industrial manufacturing and integrated design of FRP bridges
  (whole chain process)

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