



Strengthening of gruvvägen bridge in Kiruna in Collaboration with Swedish Transport Administration and LTU

Research on application of fiber reinforced polymer materials in structural engineering

Fiber reinforced polymer (FRP) materials offer many advantages compared to traditional construction materials such as steel and concrete. Very high strength and stiffness, good durability and light weight of these materials have provided opportunities for developing sustainable solutions for maintenance of existing infrastructure as well as building new ones. The current research on application of FRPs in construction focuses on:

- Strengthening and repair of bridge structures using bonded FRP laminates
- Application of FRP composites for construction of full or hybrid FRP bridges
- Durability and long-term performance of FRP strengthening systems and structures

Application of Fiber Reinforced Polymer Composites in Infrastructure

Steel and Timber Structures research group, Chalmers

About Us

The Steel and Timber Structures research group is a part of the division of Structural Engineering at Chalmers with research focus on Steel, Timber and application of advanced FRP composite materials in structural applications. The research team is composed of eight researchers, postdocs and PhD students. The research on FRP composites covers a wide range of activities from numerical and analytical work to small and full scale experiments. Acquiring knowledge about materials, behavior of structures in short and long term and developing innovative solutions for problems in existing bridges are the core of the research work.



CHALMERS UNIVERSITY OF TECHNOLOGY

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Research on Strengthening of concrete beams with pre-stressed CFRP laminates at Chalmers



Strengthening of Nossan Bridge using pre-stressed CFRP laminates in collaboration with Swedish Transport Administration

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*Steel and Timber Structures
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Strengthening of a structure using pre-stressed CFRP laminates in Umeå

Projects

Selected projects

1. Low Disturbance Sustainable Urban Construction, Pantura (EU), 2011-2013.
2. Sustainable bridges (EU), 2003-2007.
3. Preparation for the first FRP road bridge in Sweden (Trafikverket), 2014-2015.
4. Effective construction and rehabilitation of bridges with focus on long-term performance and durability (Formas), 2012-2015.
5. Application of light FRP materials in bridges, LIGHTer (Vinnova), 2014-2015.
6. Application of FRP for construction of durable culvert bridges (Trafikverket), 2015.

Accomplishments and future research

The research work in the area of using FRP composites in construction sector began in 2002 at Chalmers and has resulted in publication of over 40 scientific documents in terms of papers, books, reports and patents. We have been involved in a number national and international projects on this subject. As the application of FRP materials has been proven to provide a sustainable solution in the construction industry, Swedish Transport Administration is preparing for the first full FRP road bridge in Sweden. Chalmers, as a partner with experience in this field, has had collaboration with TRV during the past two years on this project. A new research track which the group has invested on is the long-term performance and durability of FRP structures. This issue has been identified as one of the most important hindlers against widespread application of FRPs in bridge sector.



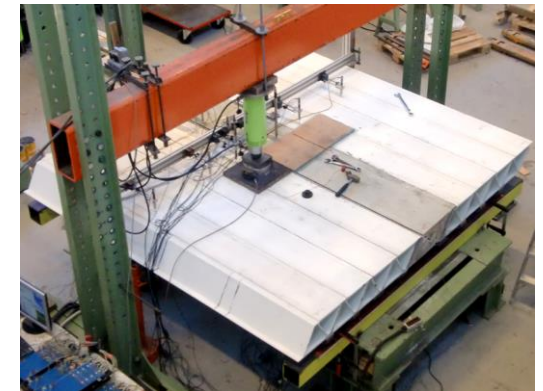
Steel-FRP adhesive joints after one year of immersion in salt water to be tested for evaluation of strength and stiffness degradation



Application of FRP composites in bridges: Installation of a light weight hybrid FRP bridge in Germany.

The vision of the research group is to build up a competence center for FRP in construction, especially bridge sector in Sweden and a research core on this subject at European level.

The research team has had a broad collaboration with industrial and academic partners in different national and international projects and is open for collaboration in relevant areas.



Testing of an innovative connection module for FRP deck panels at Chalmers