

March 2014

Public strategy – Structural Analysis and Concrete Structures Research Group

Research focus

Research in structural analysis and concrete structures, and in theories of plasticity

Subject explanation

The theory of plasticity is well known and provides obvious opportunities in terms of design of structures and understanding of physical behavior. There is a need for further research in the use of the theory of plasticity.

The development has been and remains to be on using increasingly stronger concrete and less ductile reinforcement. There is a need for methods that can handle the less ductile material with respect to the ultimate limit state. With the larger strengths it is also necessary to achieve a more detailed knowledge of the behavior in the serviceability limit state. Another important issue is the behavior of reinforced concrete structures in cases where the structural strength is determined by failure in the concrete.

Notwithstanding the use of the stronger and less ductile materials the theory of plasticity will remain an extremely important theory for design and understanding of structural behavior. However, the theory should be supplemented by other theories which are also based on energy principles.

Applications

The main advantage regarding the application of the theory of plasticity is the good agreement between theory and tests, the consistent results and the simple models. It is well known and highly appreciated in industry, that complex problems can very often be treated safely and simply by plastic modeling.

Main purpose:

- Teaching basic and advanced courses in structural analysis and concrete structures. The main focus is directed toward energy principles in general and with particular emphasis on plasticity.
- Seek new insights regarding structures in general and concrete structures specifically by the use of both theoretical and experimental approaches. This is to achieve a better understanding of the physical behaviour aimed at optimal design of structures.

Disciplines

- Reinforced concrete structures
- Elastic and plastic analyses
- Structural behavior; ultimate and serviceability behaviour
- Laboratory testing
- In situ measurements
- Conceptual design of structures