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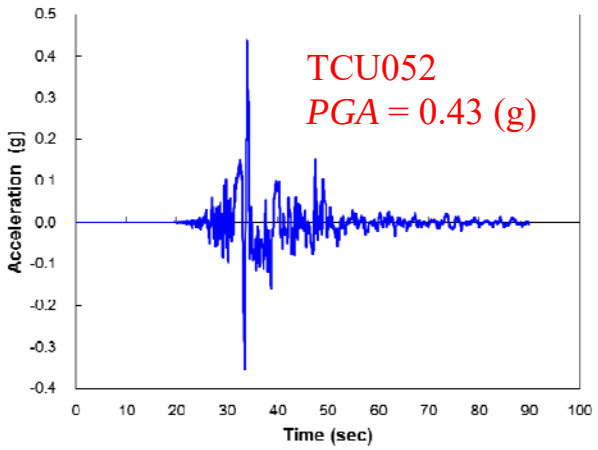
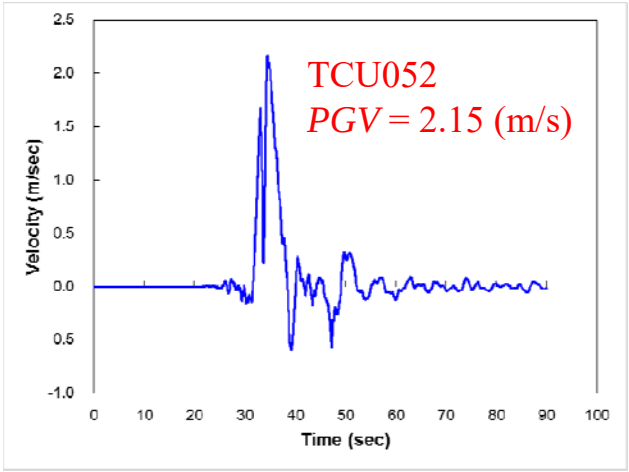
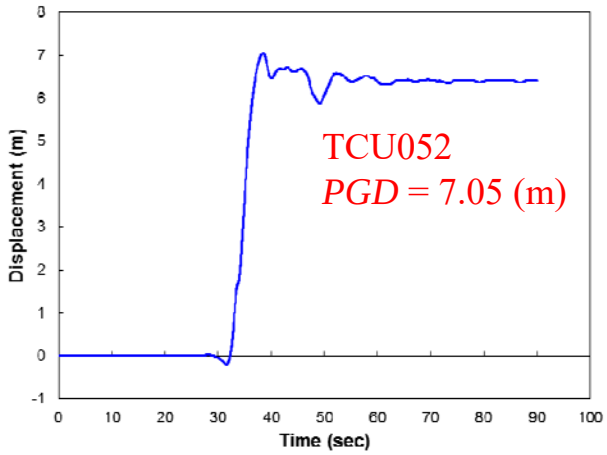
Multiscale Simulation of RC Structures under Near-Fault Ground Motion







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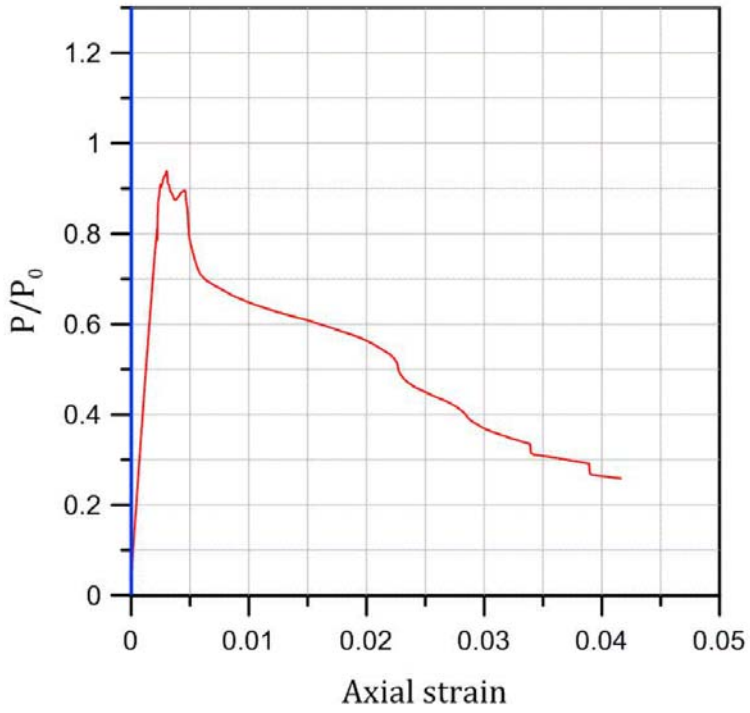
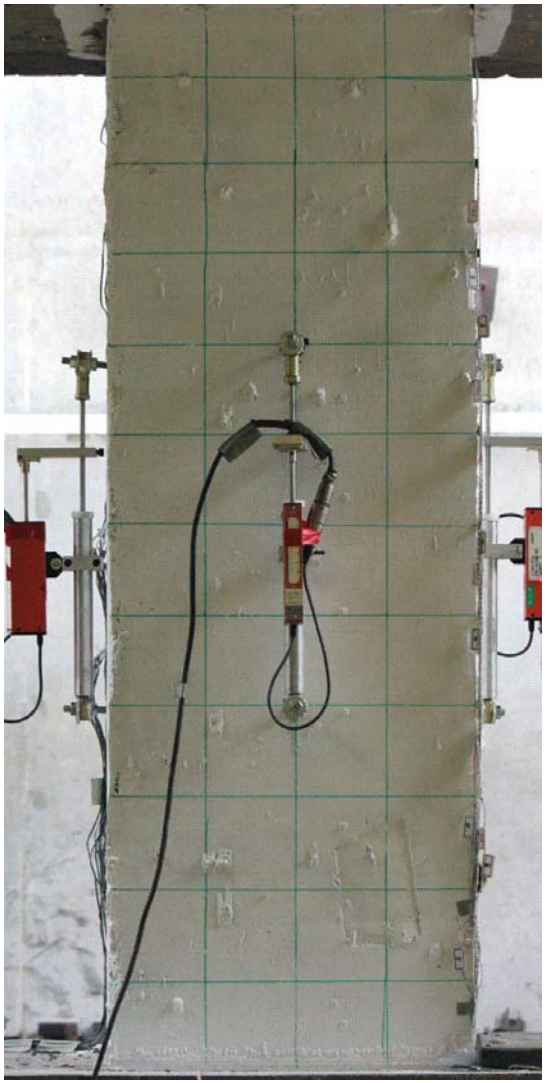
What do we need?

- Predict the responses
- Deep insight of the facture
- Improve the design





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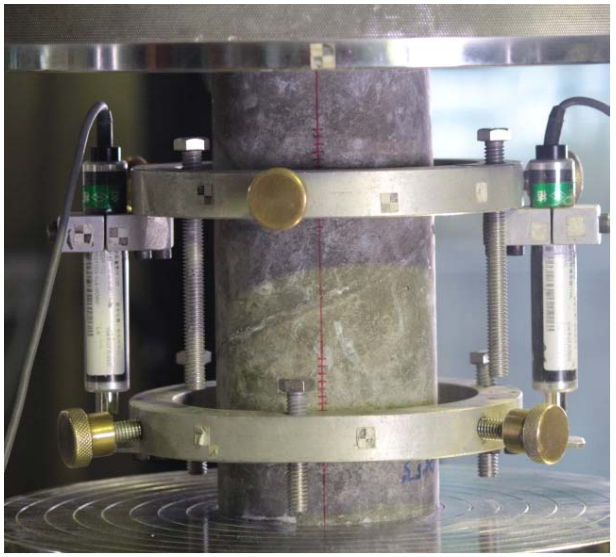
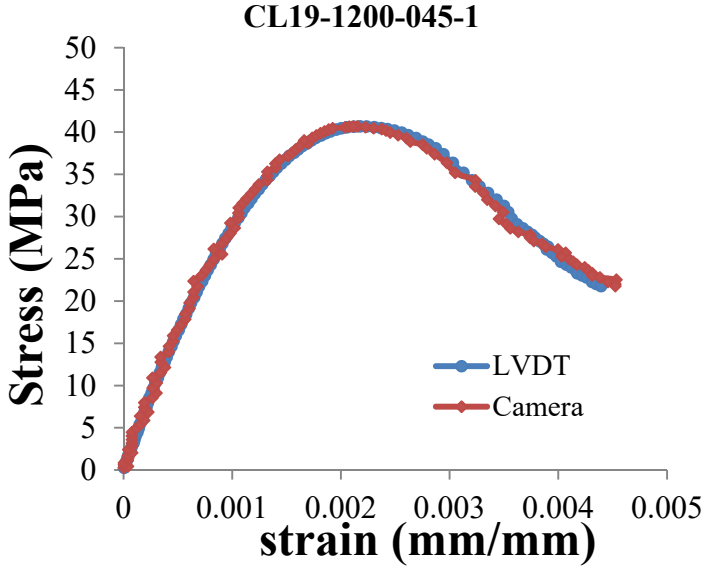
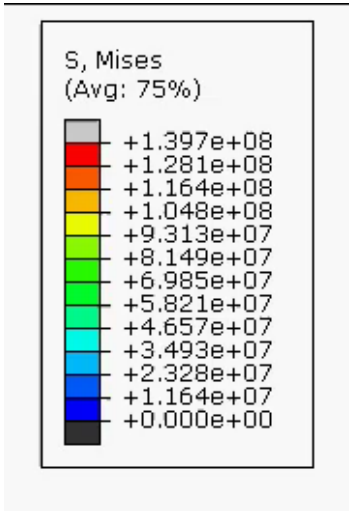
What can we do?

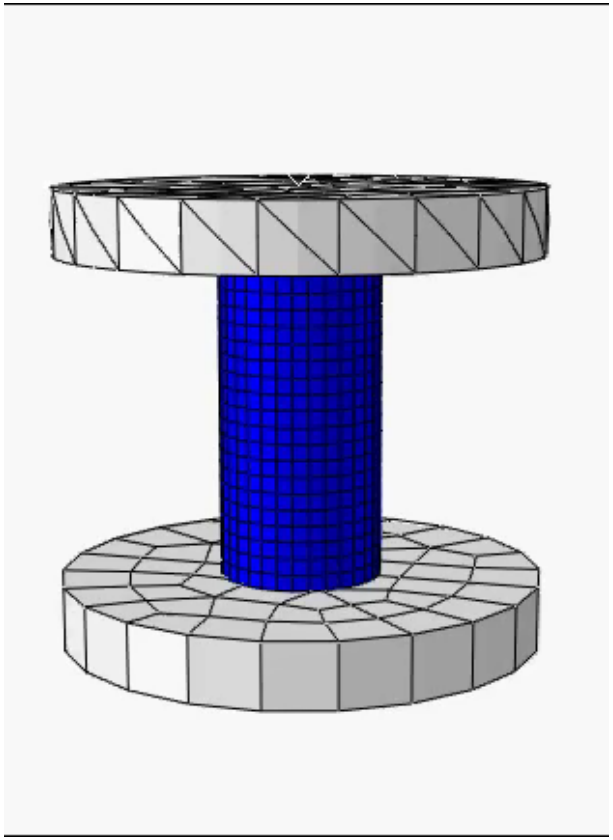
- Advanced computational method:
  - Cohesive-based Finite Element Method (FEM)
  - eXtend Finite Element Method (XFEM)
  - Discrete Element Method (DEM)
  - Peridynamics (PD)
- Multiscale simulation:
  - Constitutive law for concrete
  - Fracture of reinforced concrete members
  - Fracture of reinforced concrete structures

Constitutive law for concrete

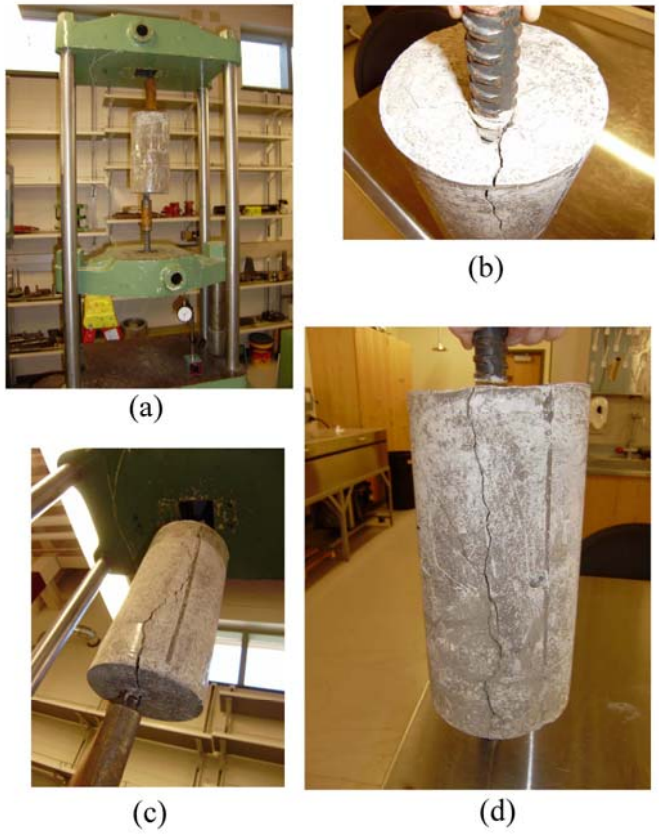


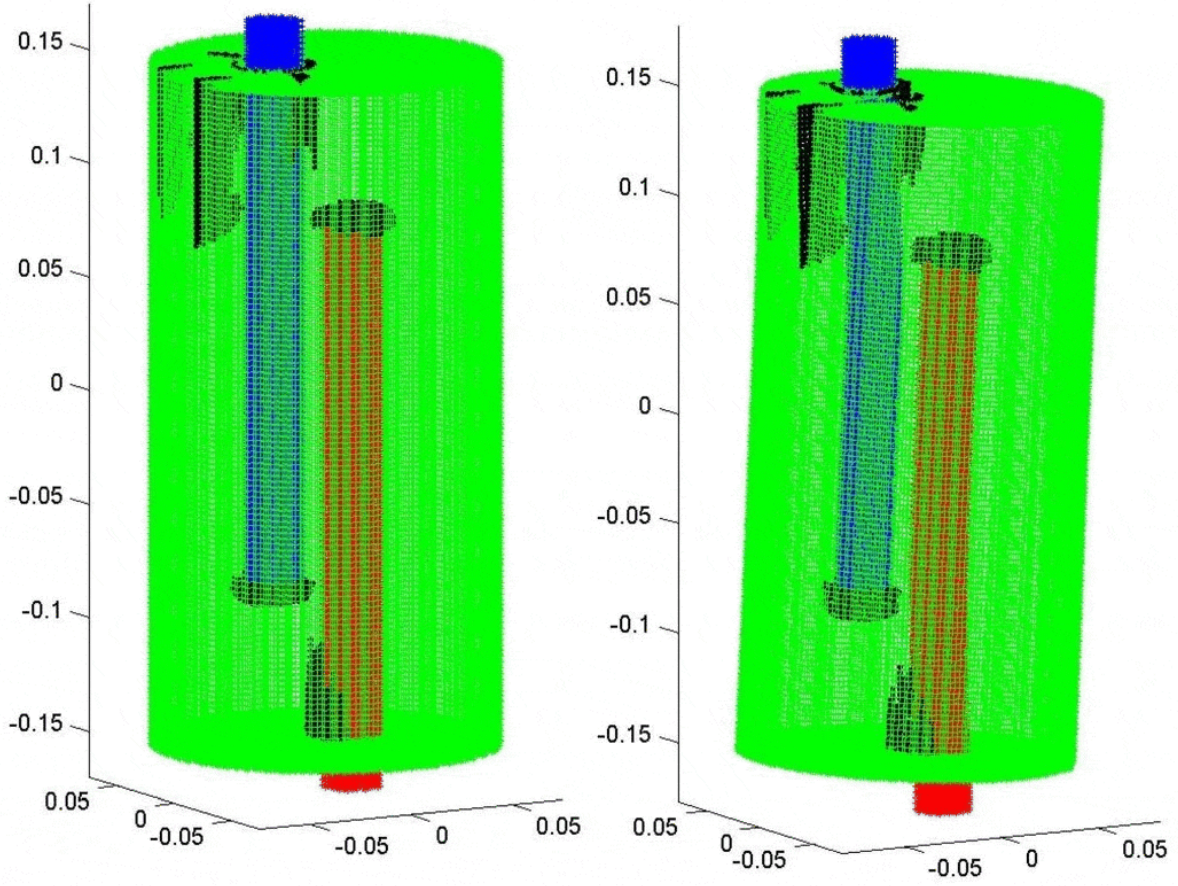






Fracture of reinforced concrete members





Gerstle, W., Sakhavand, N., and Chapman, S. (2010). "Peridynamic and Continuum Models of Reinforced Concrete Lap Splice Compared," in *Fracture Mechanics of Concrete and Concrete Structures - Recent Advances in Fracture Mechanics of Concrete*, Oh, B. H. *et al.* (eds), 2010 Korea Concrete Institute.

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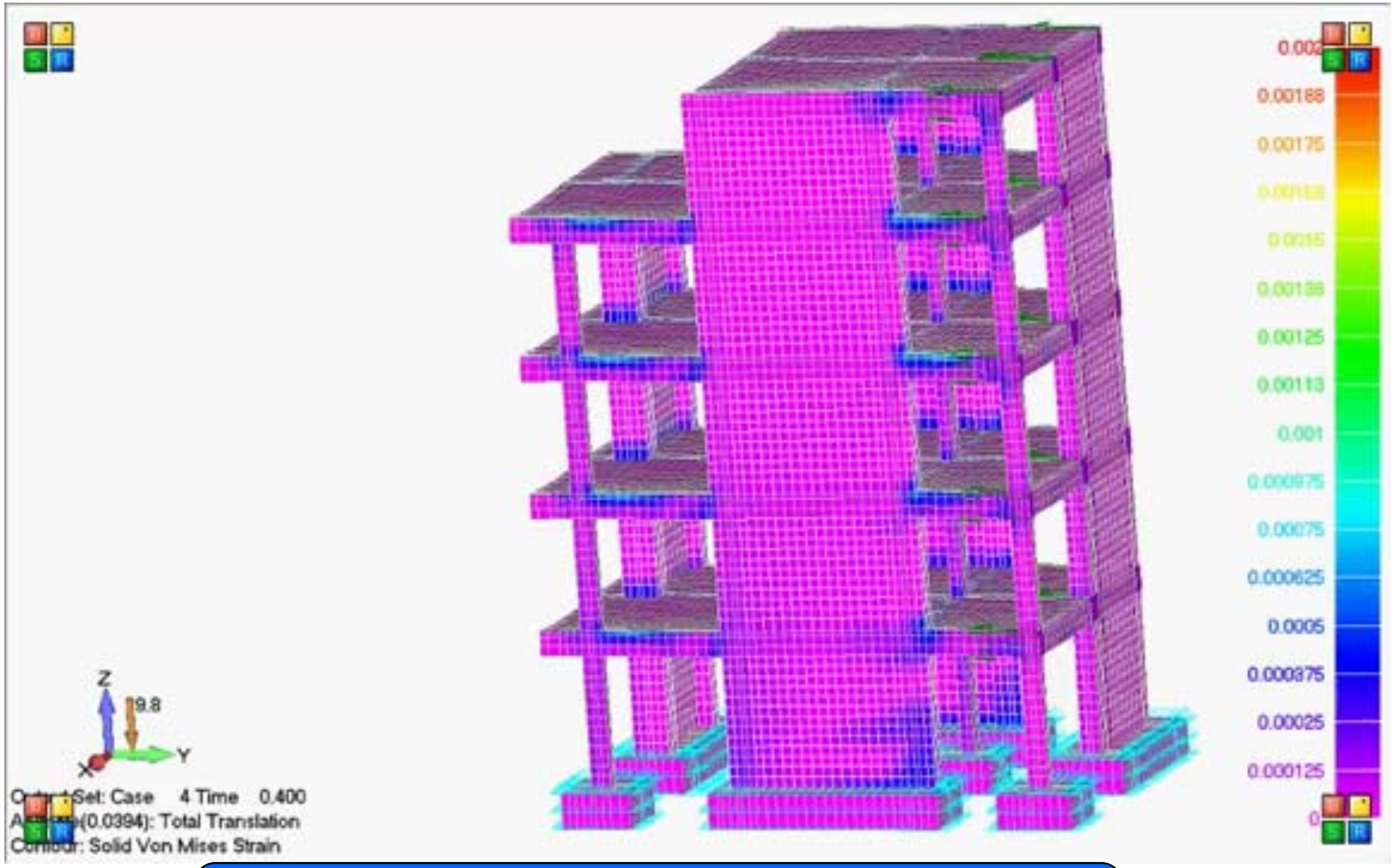
Fracture of reinforced concrete structures



ATENA, http://www.cervenka.cz/products/atena/
https://www.youtube.com/watch?v=vC0hqkBdbmo