

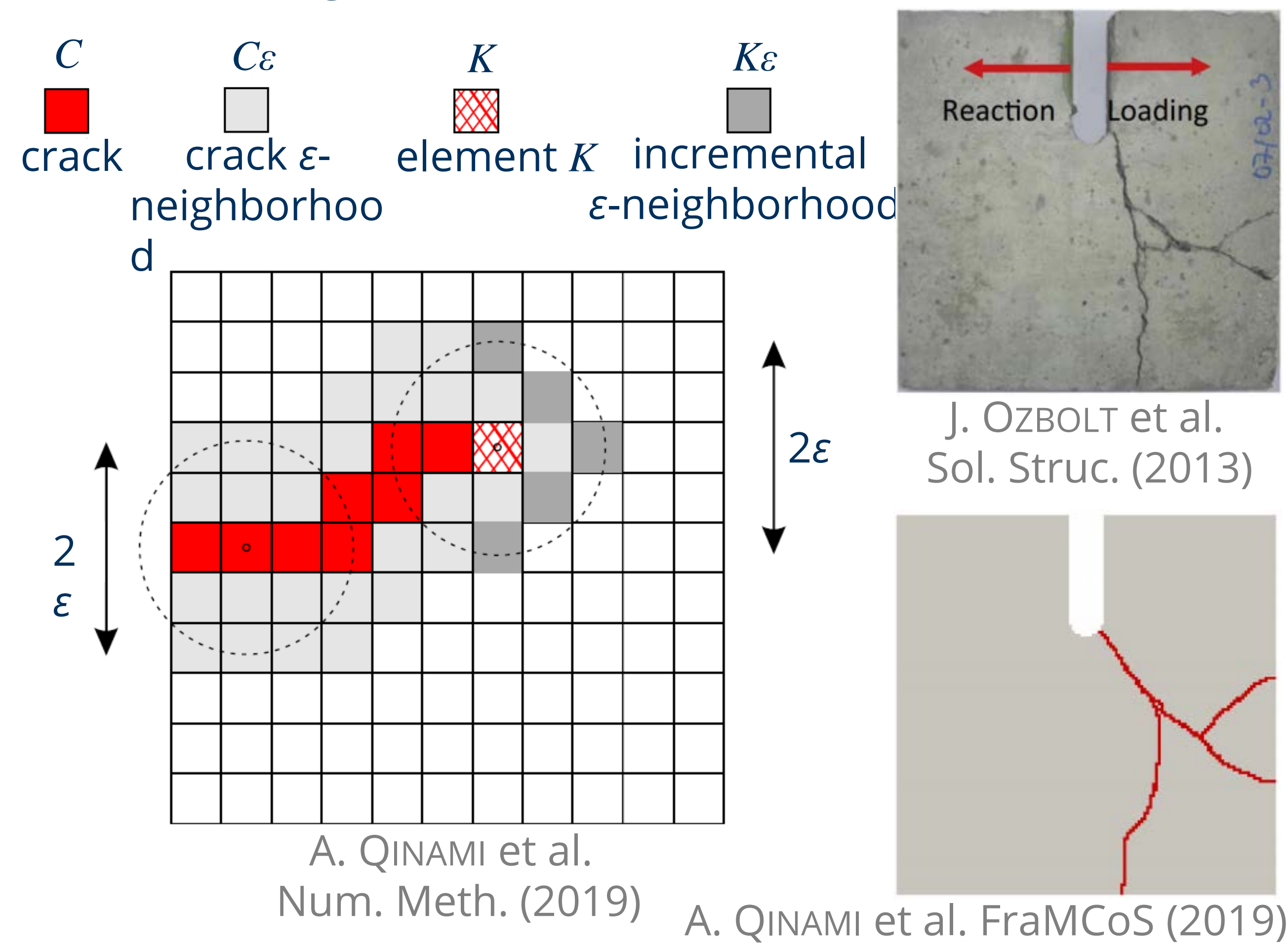
Ahmad CHIHADAH – Doctoral Project B4/II

FAILURE SIMULATION OF STRUCTURES UNDER IMPACT LOADING STRENGTHENED BY MINERAL BONDED COMPOSITE LAYERS



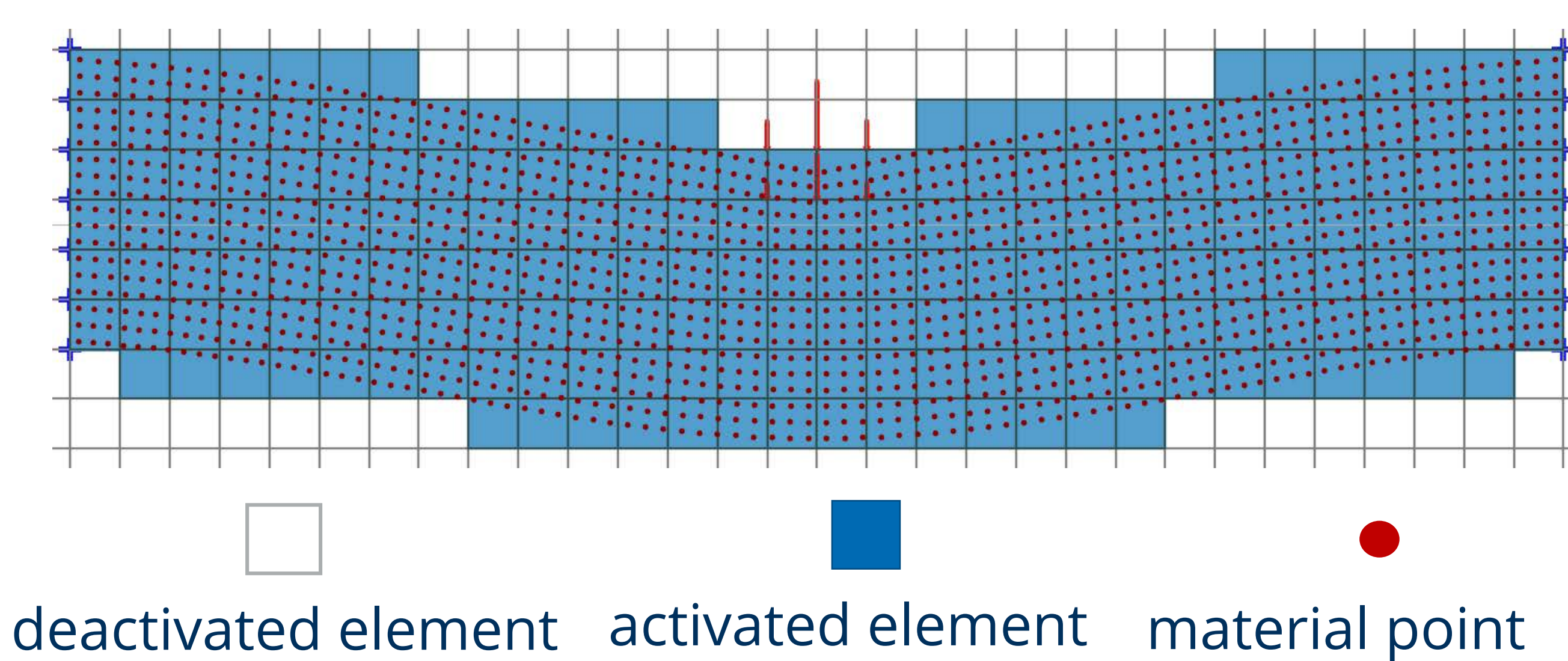
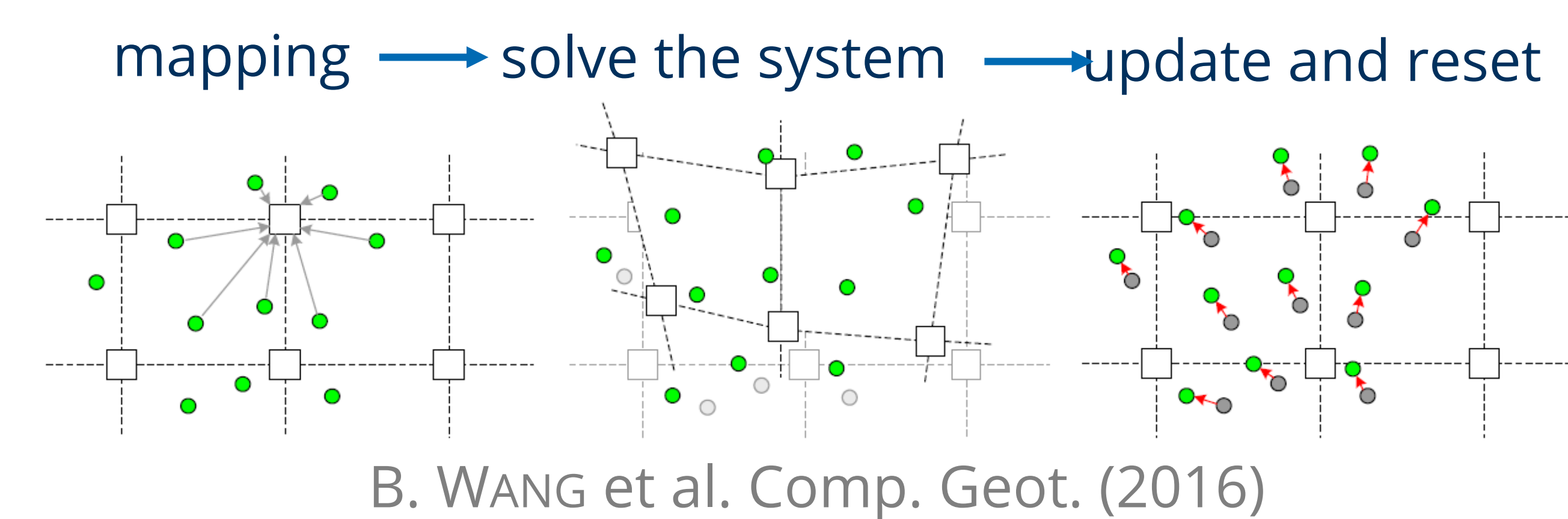
1 STATE OF THE ART

- Development of fracture eigeneration approach for crack simulation
- Implementation of strain rate dependent concrete damage material model
- Coupling of eigeneration approach with the damage model using Finite Element Method (FEM)



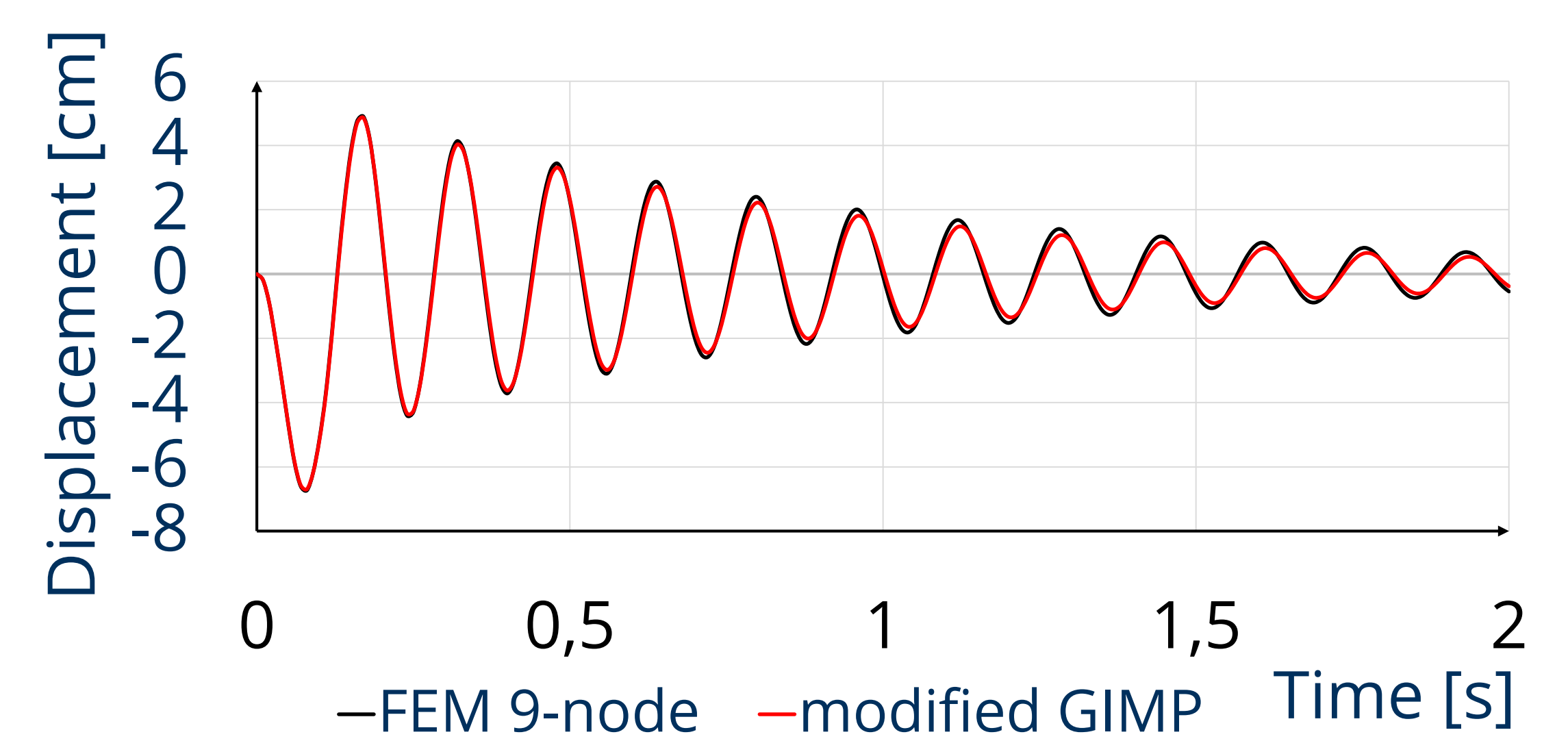
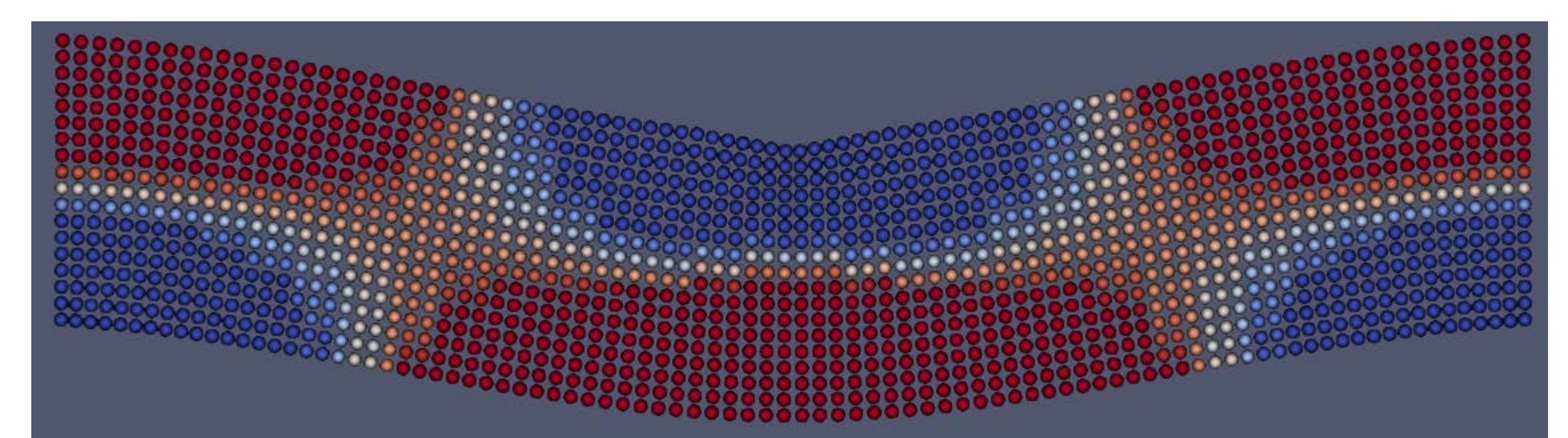
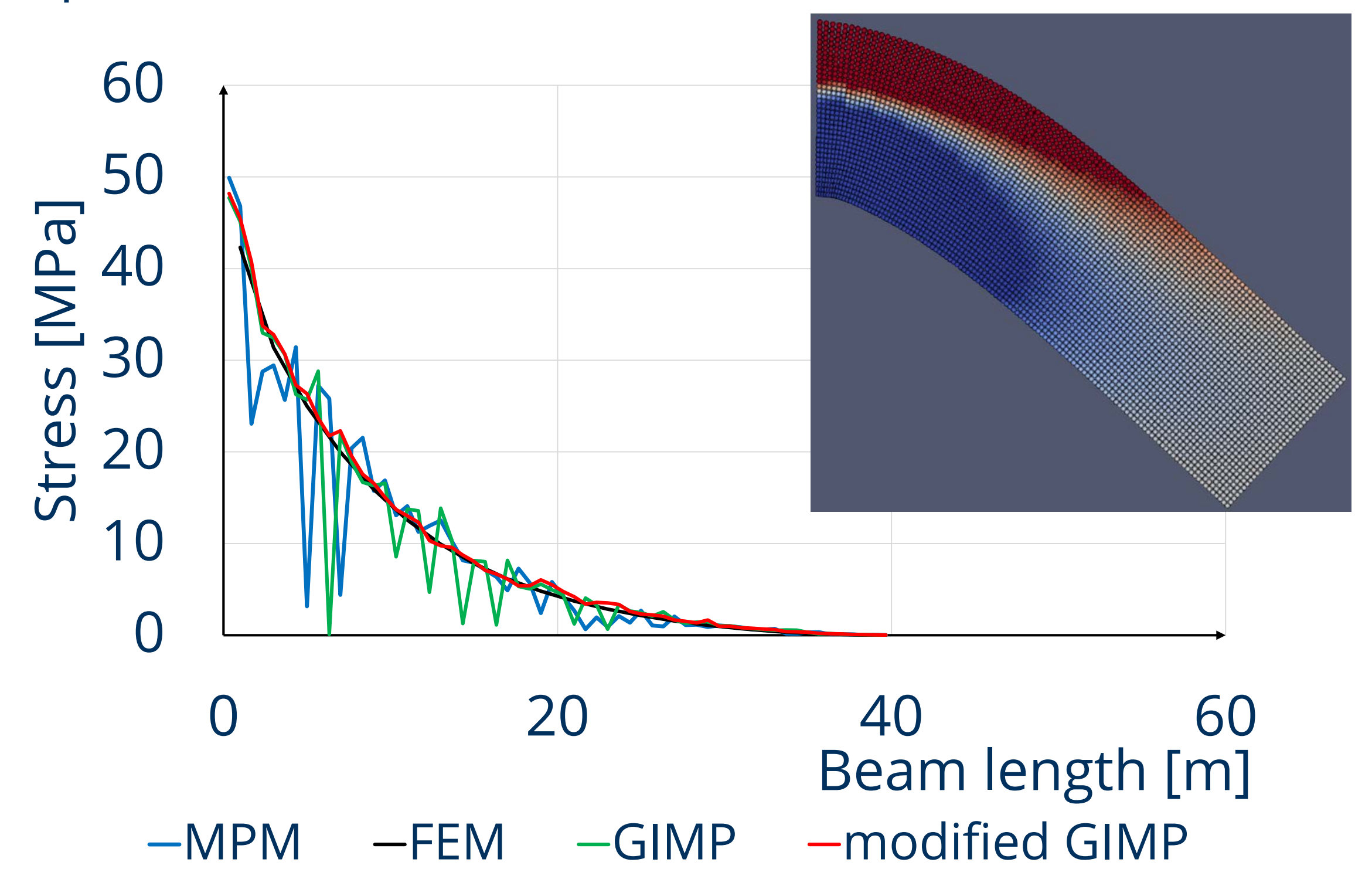
2 OBJECTIVES

- Implementation and development of Material Point Method (MPM) to overcome problem of highly distorted elements in FEM
- Apply the eigeneration approach using the MPM with extension to include large displacements
- Further development of the used approach to model concrete strengthened by SHCC



3 METHODS

- Implementation of Generalized Interpolation Material Point Method (GIMP)
- Modify GIMP to further reduce the stress oscillation problem in MPM



4 PLANNED COLLABORATIONS

- F. BRACKLOW (A5/II): Strengthening on the rear side of flat, stirrup reinforced solid construction elements against impact
- M. BEIGH (A3/II): Sustainable and impact resistant composites
- A. TAWFIK (A4/II): Characterization of the shear resistance of mineral-bonded composites under impact loading
- H. KNOBLOCH (B1/II): Multiscale simulation of the fracture behaviour of fiber-reinforced concrete under impact load
- J. STÖCKER (B3/II): Mesomechanical modelling of hybrid reinforced concrete structures at impact loading
- A. QINAMI (B4/I): Simulation of the failure of reinforced concrete structures under impact