

Ting GONG – Doctoral Project A3/I

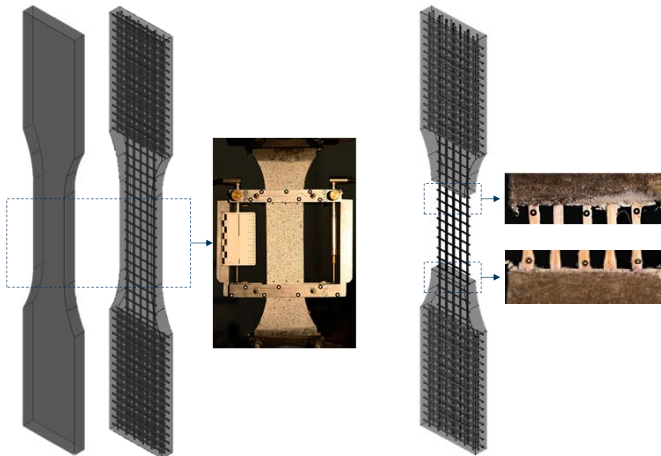
# TENSILE BEHAVIOR OF HIGH-PERFORMANCE CEMENT-BASED COMPOSITES WITH HYBRID REINFORCEMENT SUBJECTED TO QUASI-STATIC AND IMPACT LOADING

## 1 OBJECTIVES

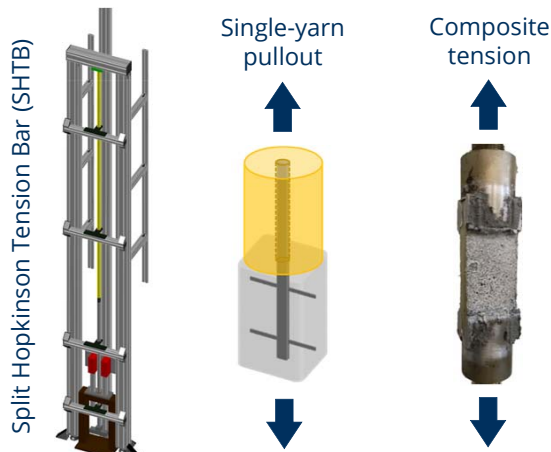
- Investigating the synergetic effects of different hybrid-fiber reinforcements
- Characterizing the bond properties of embedded yarn with surrounding matrix
- Studying the strain rate effects on tensile properties of the composites and their constituents

## 2 METHODS

- Quasi-static tension experiments on composites, textiles and single yarns

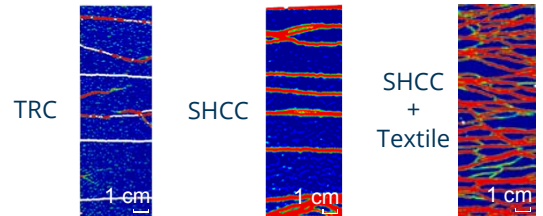
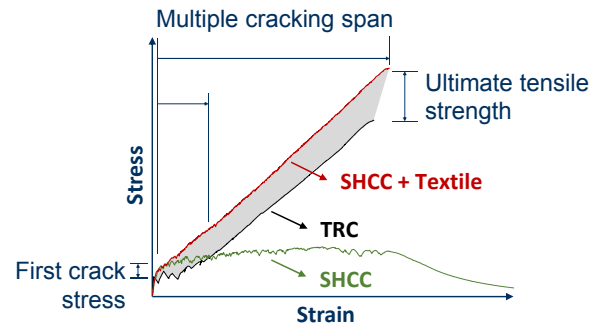


- Impact experiments with Split Hopkinson Tension Bar (SHTB)
- Optical measurements of deformations and crack analysis using Digital Image Correlation
- Quasi-static and dynamic single-yarn pullout experiments
- Analytical modelling of pullout-slip response of the textile yarns

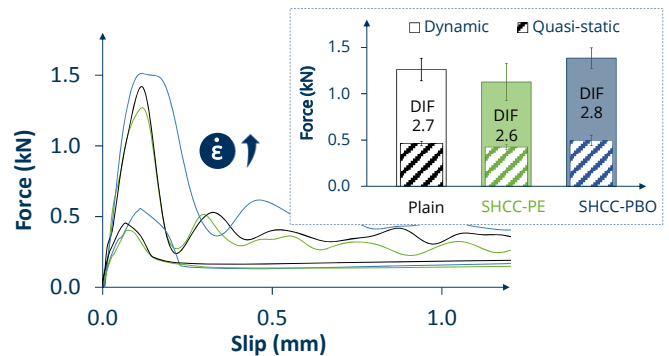


## 3 RESULTS

- Pronounced improvement in mechanical properties of hybrid fiber composites compared to SHCC and TRC
- Superior crack control with finer crack pattern and smaller crack width
- Improved robustness of the mechanical properties



- Rate sensitive yarn-matrix bond with positive effects on the composite behavior under dynamic loading



## 4 COLLABORATIONS

- AA. HERAVI (A4/I) and I. CUROSU (Postdoc): TRCC under impact tensile load  
GONG et al. App. Sci. (2019)  
HERAVI et al. Cem. Concr. Comp. (2020)
- F. LIEBOLD (C1/I), I. CUROSU (Postdoc) and D. VO (A1/I): Crack pattern and crack width analysis using DIC of composites reinforced with polymer textiles  
GONG et al. Materials (under review)