

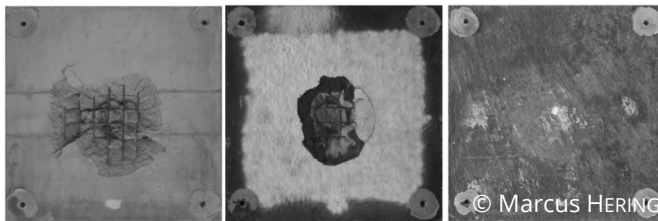
Franz BRACKLOW – Doctoral Project A5/II

## STRENGTHENING ON THE REAR SIDE OF FLAT, STIRRUP- REINFORCED SOLID CONSTRUCTION ELEMENTS AGAINST IMPACT



### 1 STATE OF THE ART

- Investigation of RC plates and strengthened RC plates under impact loading: different strengthening configurations → qualitative increase of impact resistance
- Influence of stirrup reinforcement on behavior of RC plates



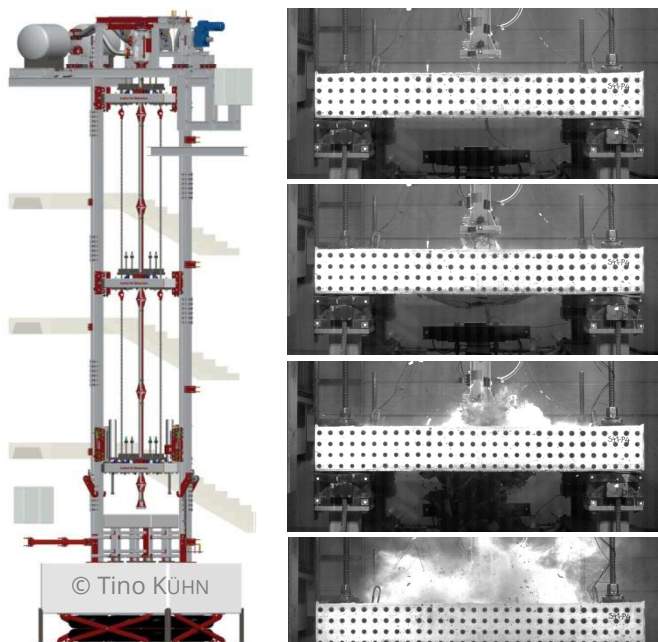
Bottom view of a non-strengthened RC plate (left) and of a RC plate strengthened with SHCC (middle) and with SHCC + carbon textile (right)

#### Open Questions:

- Quantitative influence of strengthening layer on the perforation limit
- Influence of shear reinforcement on the design of the strengthening layer

### 2 OBJECTIVES

- Investigation of perforation of non-strengthened and strengthened RC plates under impact loading
- Investigation of strengthening layers on RC plates with stirrup reinforcement



Drop tower facility in the accelerated configuration

### 3 METHODS

- Continuation and extension of research of project A5/I
- Experimental investigation of RC plates under impact using drop tower facility of the Otto-Mohr-Laboratory
- Investigation of reinforced RC slabs with and without strengthening layer
- Analysis of damage level of stirrup reinforced RC plates

#### Specimen parameters:

- Varying shear reinforcement (with/without stirrups) of the RC base plates
- Varying strengthening configuration

#### Testing parameters:

- Varying impact velocities
- Varying damage levels (global and local behavior)

#### RC-plate configurations:

Bending reinforcement  
Shear reinforcement (stirrup)

#### Strengthening layers:

Textile-reinforced concrete  
Fiber-textile reinf. concrete



#### Aims:

- Estimation of perforation limits
- Enhancement of damage description
- Extension and validation of the engineering model

### 4 PLANNED COLLABORATIONS

- H. LE XUAN (A1/II): examination of textiles with in-situ measurements in impact experiments
- M. A. B. BEIGH (A3/II): testing SHCCs with sustainable matrices in impact experiments
- L. LEICHT (A6/II): strengthening layers on the impact far side and impact near side
- L. C. DURAN VERGARA (C1/II): photogrammetric evaluation of impact experiments
- A. CHIHADDEH (B4/II): experimental determination of parameters for numeric failure simulation
- I. DE P. SALGADO (C2/II): experimental data for sustainability and resilience evaluation
- F. CONRAD (C3/II): experimentally measured values for data-driven methods