Improving unpacking behaviour in particle bed Concrete 3D printing

iPAT
Institut für Partikeltechnik

bachelor-, studies-, master thesis

As part of TRR277 – AMC, additive manufacturing processes in construction are being investigated at TUM and TU Braunschweig. One of the processes is concrete 3D printing using selective cement activation (SCA). In this process, components are printed layer by layer by performing the following steps: 1) A layer of sand/cement mixture is applied and compacted, and 2) Water is selectively introduced to activate the cement. Once the component has been printed, it must be removed from the non-activated particle bed. This step is currently one of the biggest challenges in the industrial use of SCA.

As part of a student thesis, the aim is to investigate how the material composition influences unpacking.

Work packages:
- Characterising the raw material
- Preparing the material mixtures
- Characterising the material mixtures

Methods:
- Dynamic image analysis
- Ring shear testing
- Introducing vibrations for enhanced material flow

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