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„Print houses – Additive manufacturing of buildings with mobile 3D-printer“

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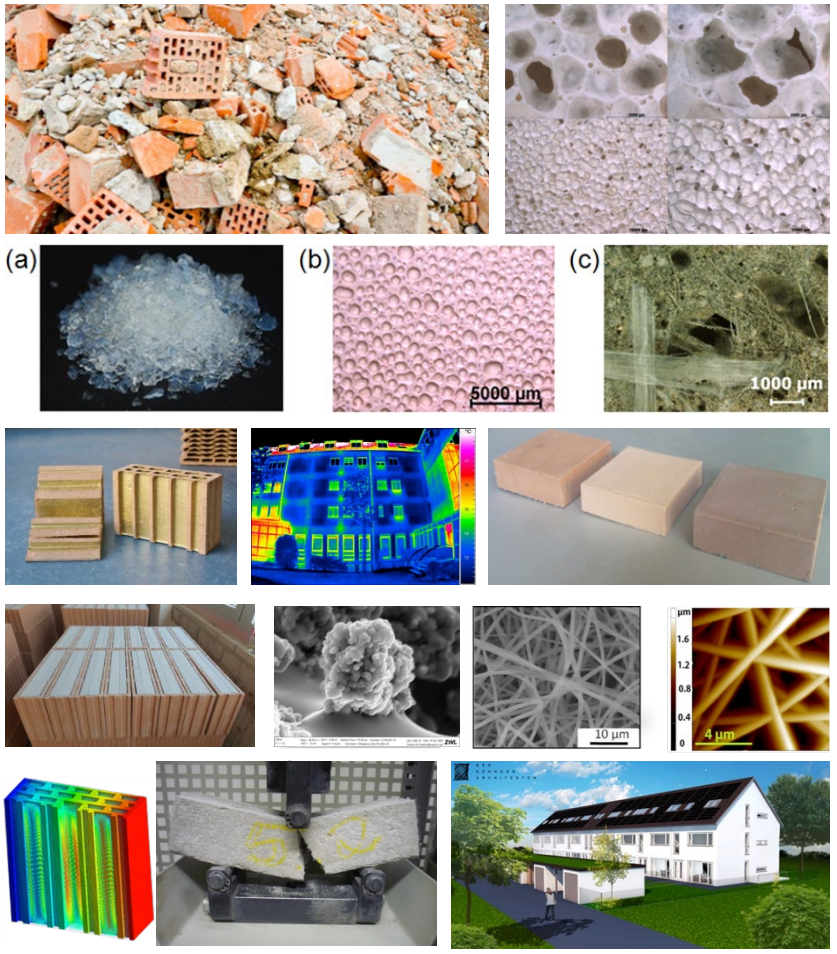
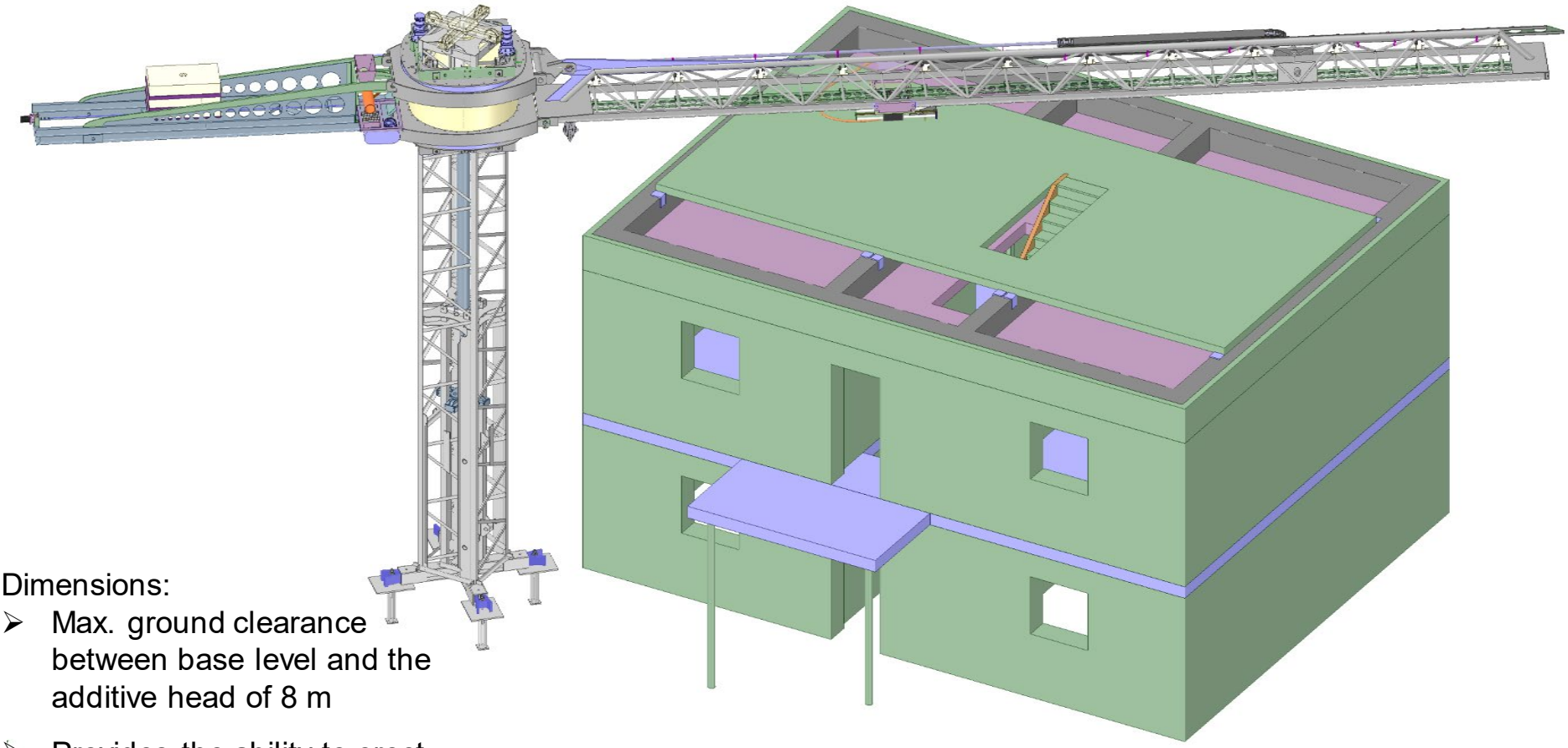
Group of Prof. Dr. Krcmar: Energy efficient materials

Activities

- Highly heat-insulating building materials
- Bricks, mortar, thin-layer mortar, plaster
- Archive-concrete, prefabricated components
- Geopolymers
- Insulating materials (Nanofibers + Aerogels)
- Construction of energy-efficient buildings
- Energy-efficient building facades
- Recycling of building materials (Cradle to Cradle)
- Heat-insulating coatings
- Easy-to-clean-effect on building materials
- FEM-simulations (heat- & noise insulation)
- Different laboratory testings
- Building-projects



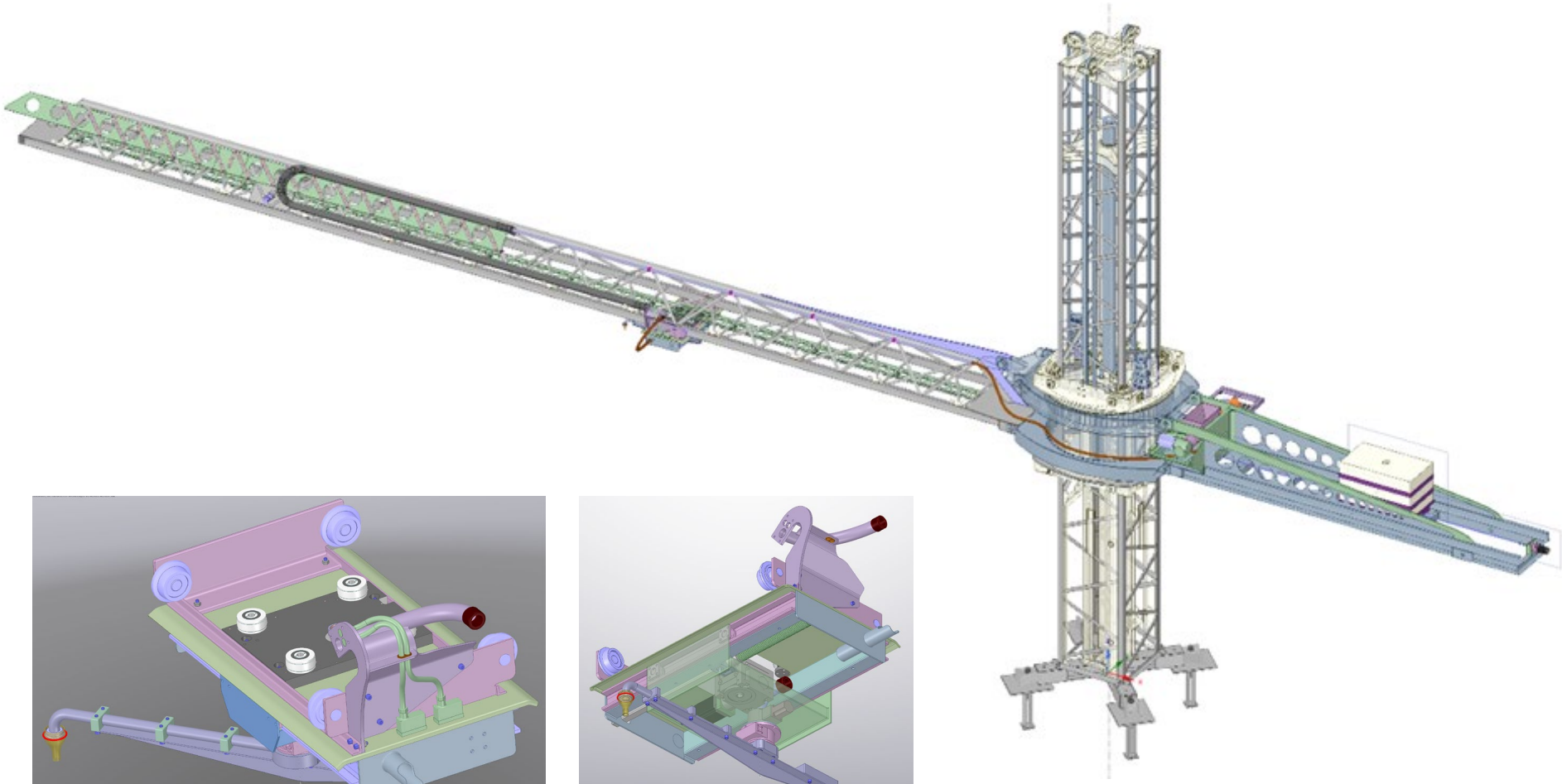
Print houses – Additive manufacturing of buildings with mobile 3 D-printer



Dimensions:

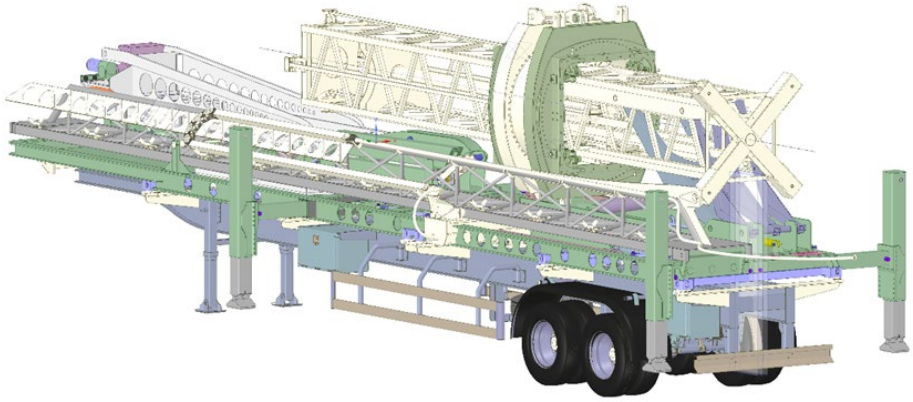
- Max. ground clearance between base level and the additive head of 8 m
- Provides the ability to erect decend 2-storey buildings.

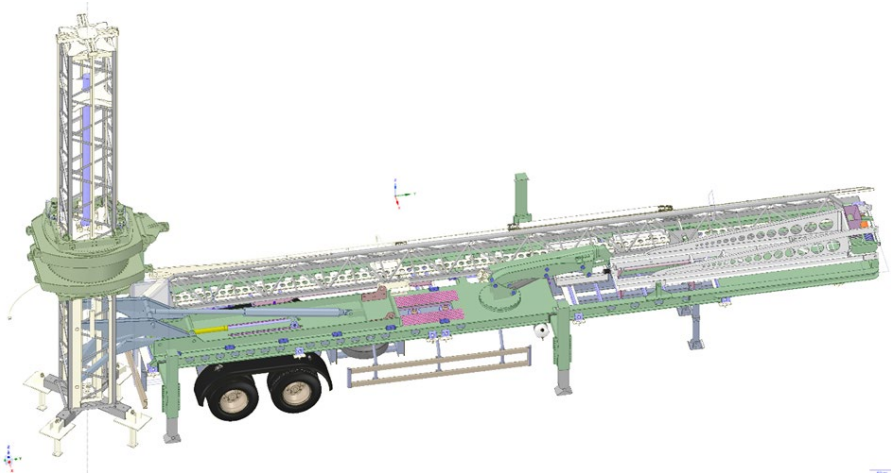
Additive Construction Robot (ACR) in working position

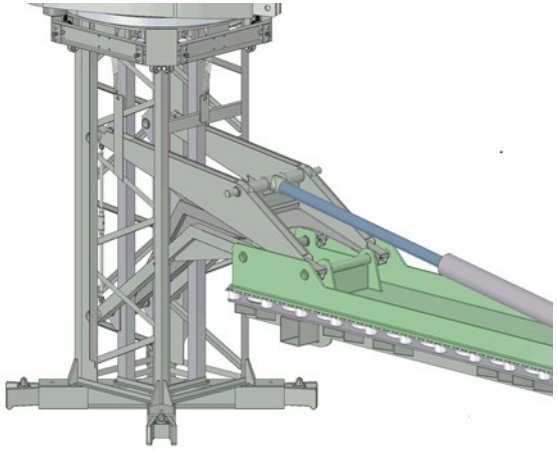


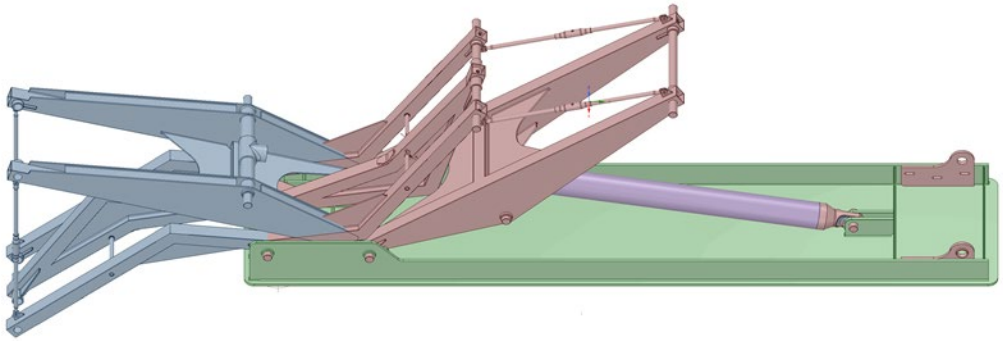
Swiveling printer arm on trolley

Transport and installation of the ACR, loading kinematics

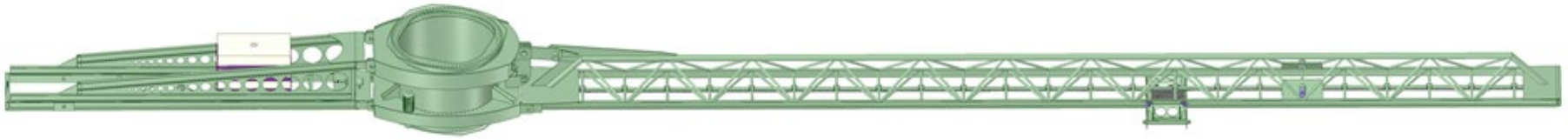




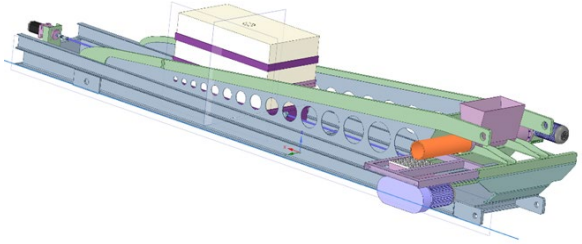




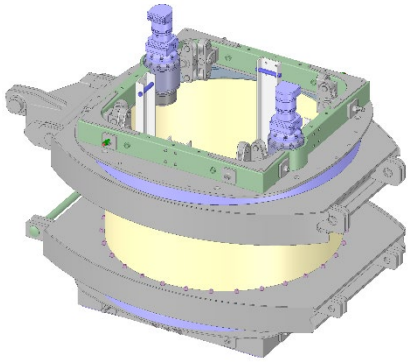
Pivot assembly



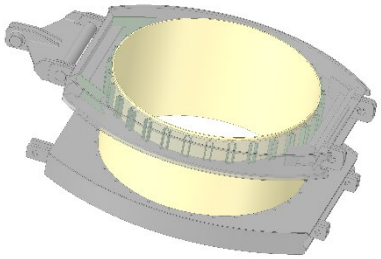
Range 15 m, with counterweight



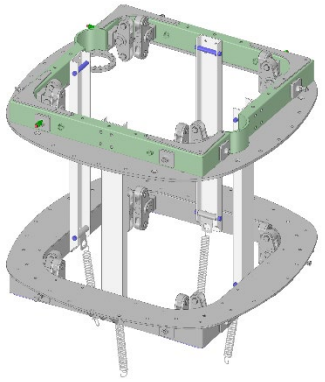
Conductor bridge with counterweight



Complete sliding sleeve



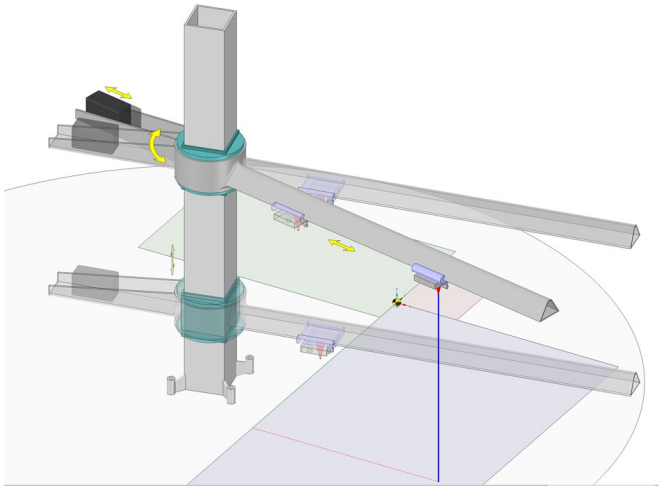
CentreBox with circuit points for conductor bridges

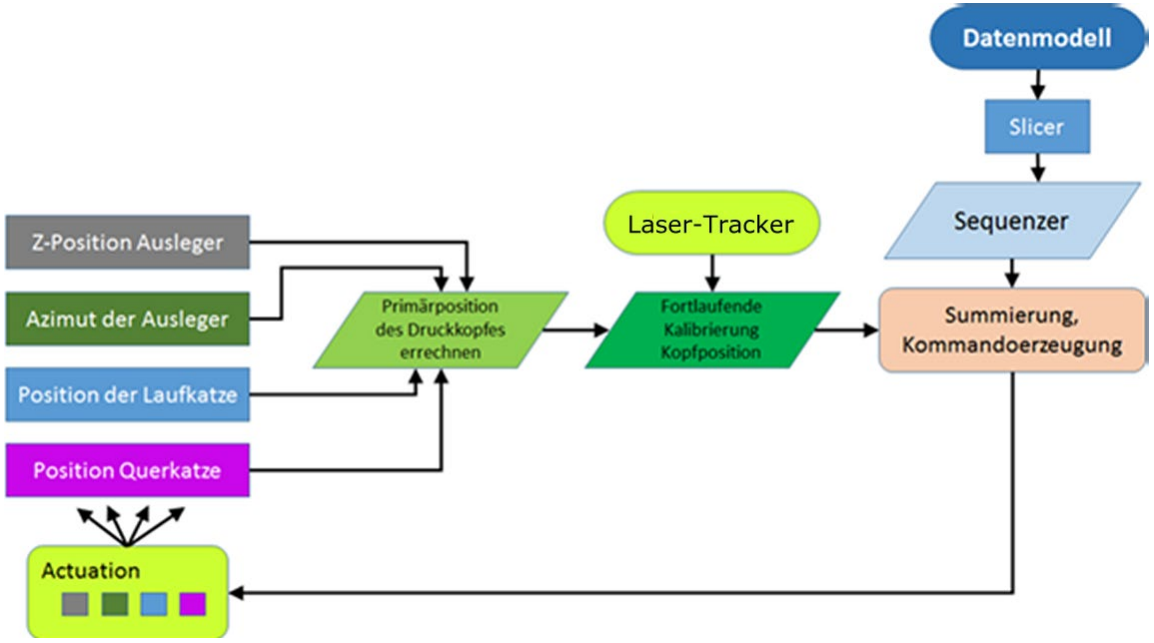


Vertical guide for sliding sleeve

Position determination by laser tracker system and control of the 5-axis drive for the printer head

„5-DoF actuation arrangement“





Project duration: 4 years Estimated costs: 1.9 Mio €

4 project phases

Phase I: Detail construction main boom, optimization mortar mixer, mixing nozzle, R & D binder building compounds, determination of material parameters, installation components, setting up the fully equipped main boom on prototype lift

Phase II: Detail construction slewing operation with fully equipped counterjib, balance control for swivel assembly, commissioning mortar mixer and mixing nozzle, optimizing binding materials on pumping operation and miscibility, material-technical parameters, 3 D-pressure tests with pilot plant, determination of material parameters

Phase III: Detail construction mast with sliding sleeve, ACR completion installation of mortar mixer and mixing nozzle in ACR, adjusting binding materials on pumping operation and miscibility, 3 D-test prints with pilot plant, installation of components in mast, determination of material parameters

Phase IV: Detail construction trailer with on-board crane, loading kinematics, transport and installation of the ACR, optimization of binding materials for test prints of the demonstrators, determination of material parameters of the demonstrators

Project partners

1. Idea generator and designer: R. Gehrmann
Creation of technical overall concept, provision of crane system

2. Research partner 1: University of applied sciences Nuremberg / EnCN, Prof. Dr. Krcmar
R & D of highly insulating binder compound mixture

3. Research partner 2: University Halle-Wittenberg, Prof. Dr. Dr. Pöllmann
R & D of highly strength binder compound mixture

4. Industrial partner 1: FIXIT GRUPPE
Producer of building materials

5. Industrial partner 2: SÜDSTAHL GmbH & Co. KG
Steel construction

6. Industrial partner 3: ThyssenKrupp
Slewing bearings, slewing rings, slew drive

7. Industrial partner 4: HEXAGON
Position determination by means of tracker system

Further industrial project partners

Contact adress for project participations

We are looking for:

- Further potential project partners, like from EU countries, who want to participate in the project !
- Draft of a project outline is available !

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Thank you for your attention !