Instrument BEER

Design of the experimental cave

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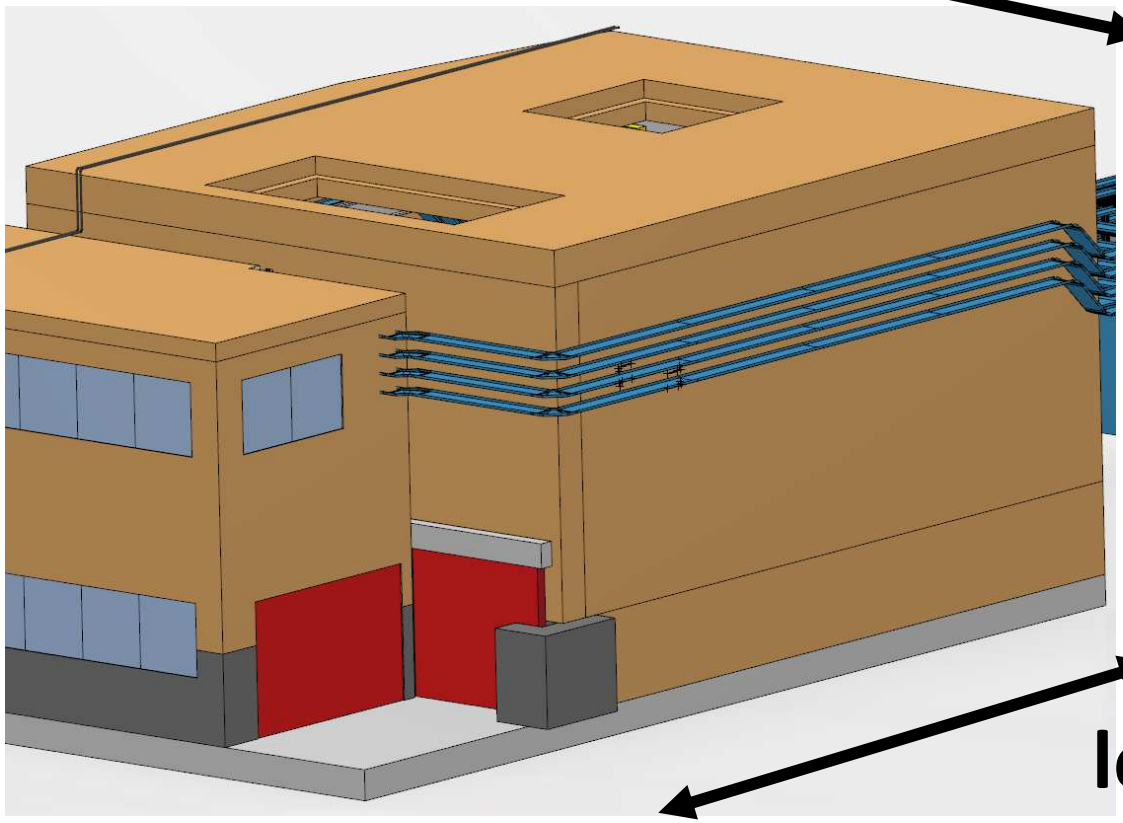
EC: External dimensions

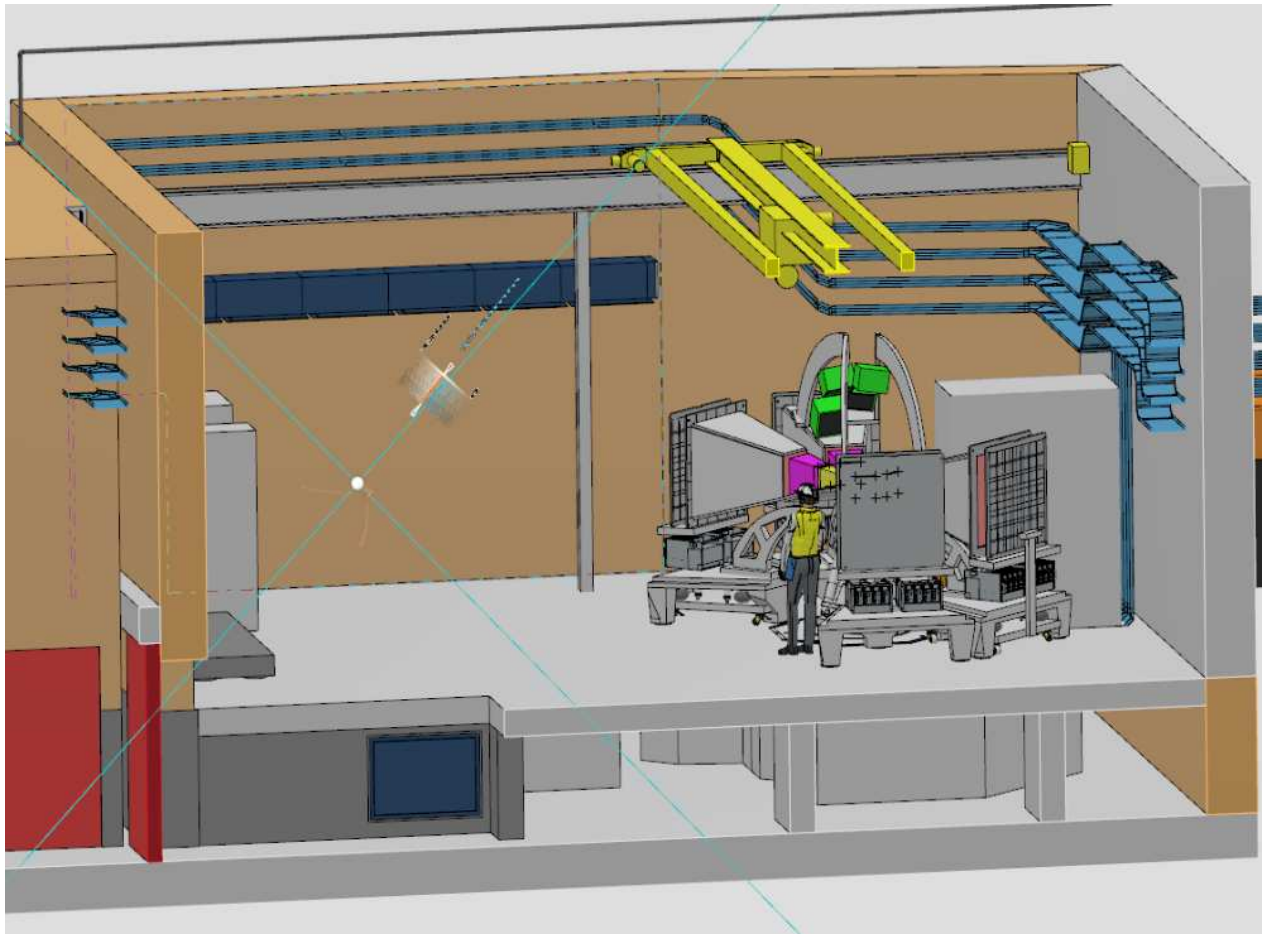


width
~11,0m

height
~7,5m

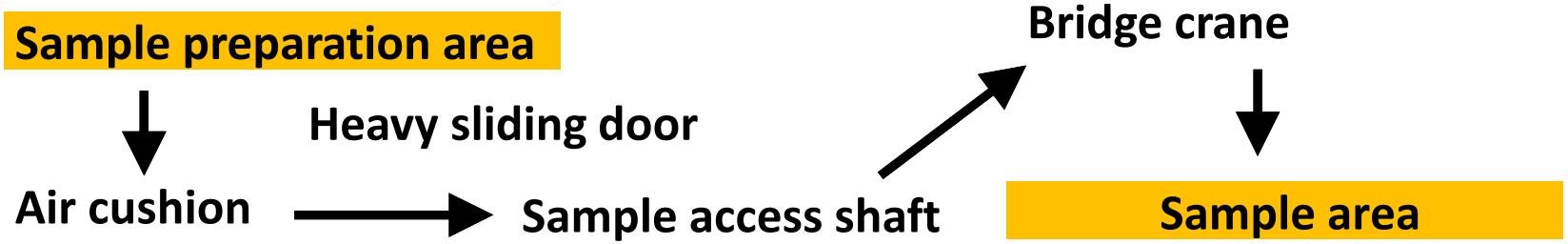
length
~13,0m

Conceptual solution

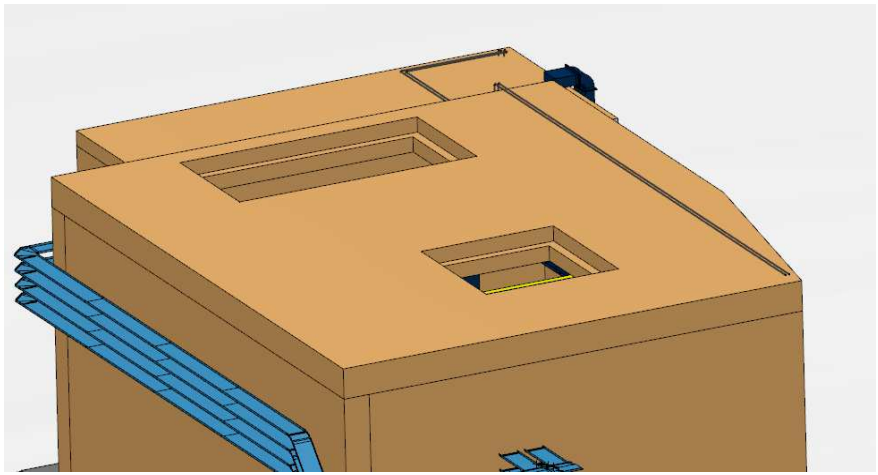


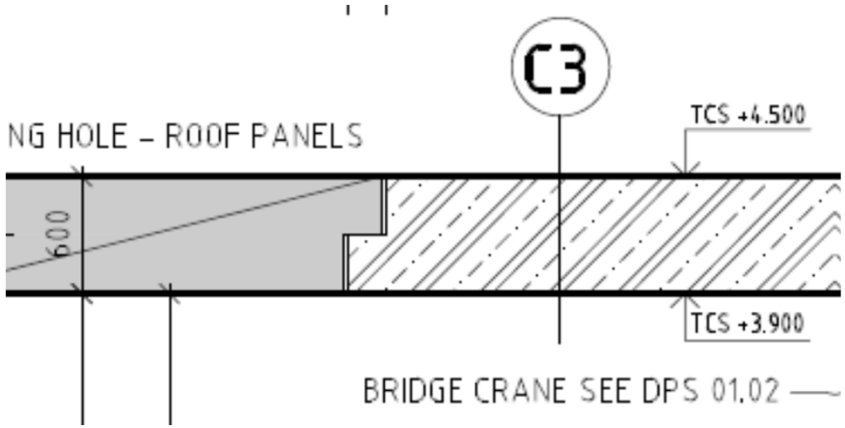
- **Large interior space**
- **Simple geometry**
- **Elevated EC floor**
- **Sample access in the bottom part**

?ample logistics



Main structure parts: Ceiling





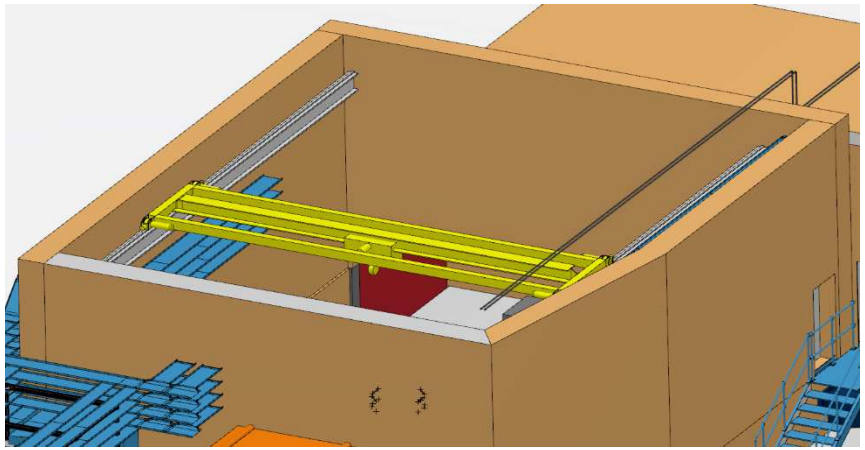
Material:

- Cast reinforced conrete, thickness of 600 mm
- Tiles containing B4C, thickness from 3 to 8 mm (tiles in development)

2x openings for occasional access

covered by pre-cast concrete blocks

Main structure parts: Walls



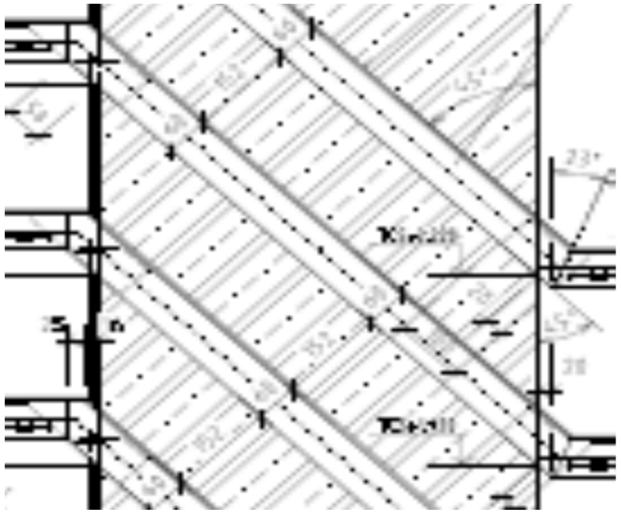
Material:

- Cast reinforced conrete, thickness of 600 mm (front wall) and 550 mm (other walls)
- Tiles containing B4C, thickness from 3 to 8 mm (tiles in development)

Openings for cable trays

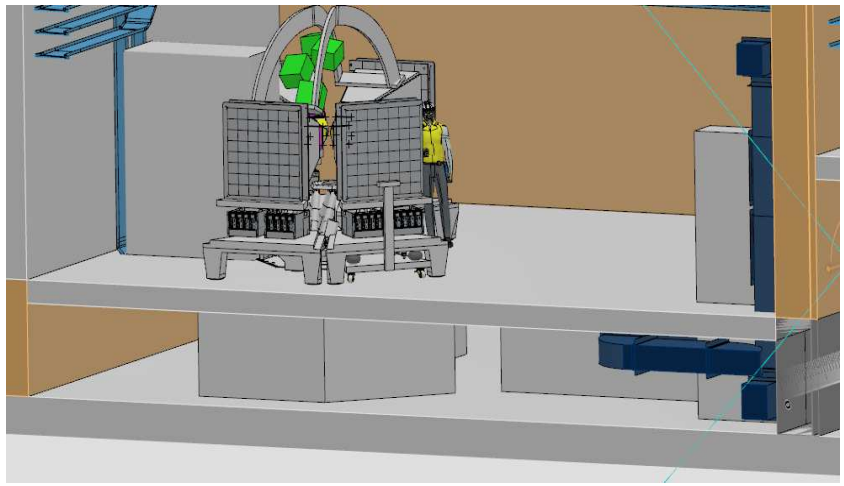
Direct openings at an angle of 45 °

EC interior



exterior

Main structure parts: EC Floor



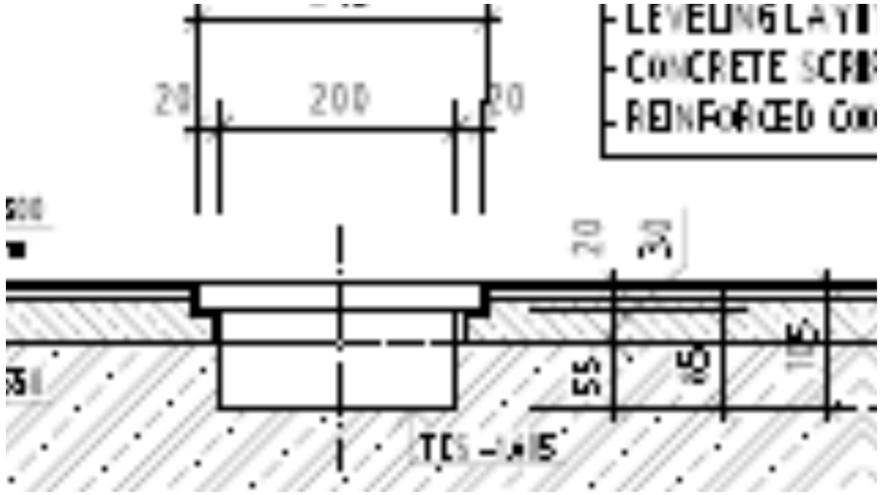
Material:

- Cast reinforced conrete, thickness of 300 mm
- Floor tiles containing B4C, thickness from 3 to 8 mm (tiles in development)
- Final epoxy layer providing flatness

1,5 m above the hall floor

Load capacity from 4 t/m2 to 5 t/m2

Preparation for later installation of detector frames



Basis for structural calculations

Thicknesses and material composition defined by radiation safety analysis.

- **EN 1990: Eurocode:** Basis of structural design

- **EN 1991: Eurocode 1:** Actions on structures, Part 1-1 General actions - Densities, self-weight, imposed loads for buildings

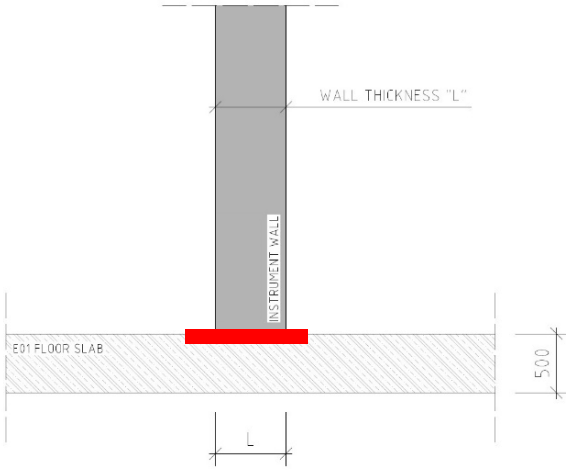
- **EN 1992: Eurocode 2:** Design of concrete structures, Part 1-1: General rules and rules for buildings

Load assessment

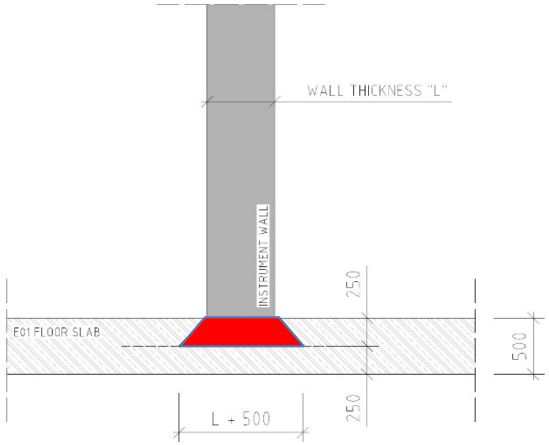
Hall E01: Where is the level of the limit load capacity 20 t/m2?

A/ On the surface of the floor slab?

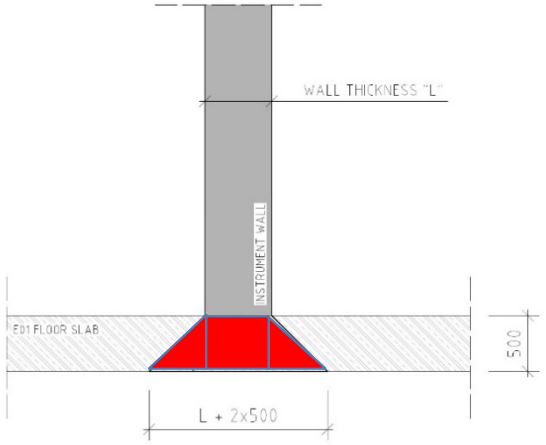
The strictest variant



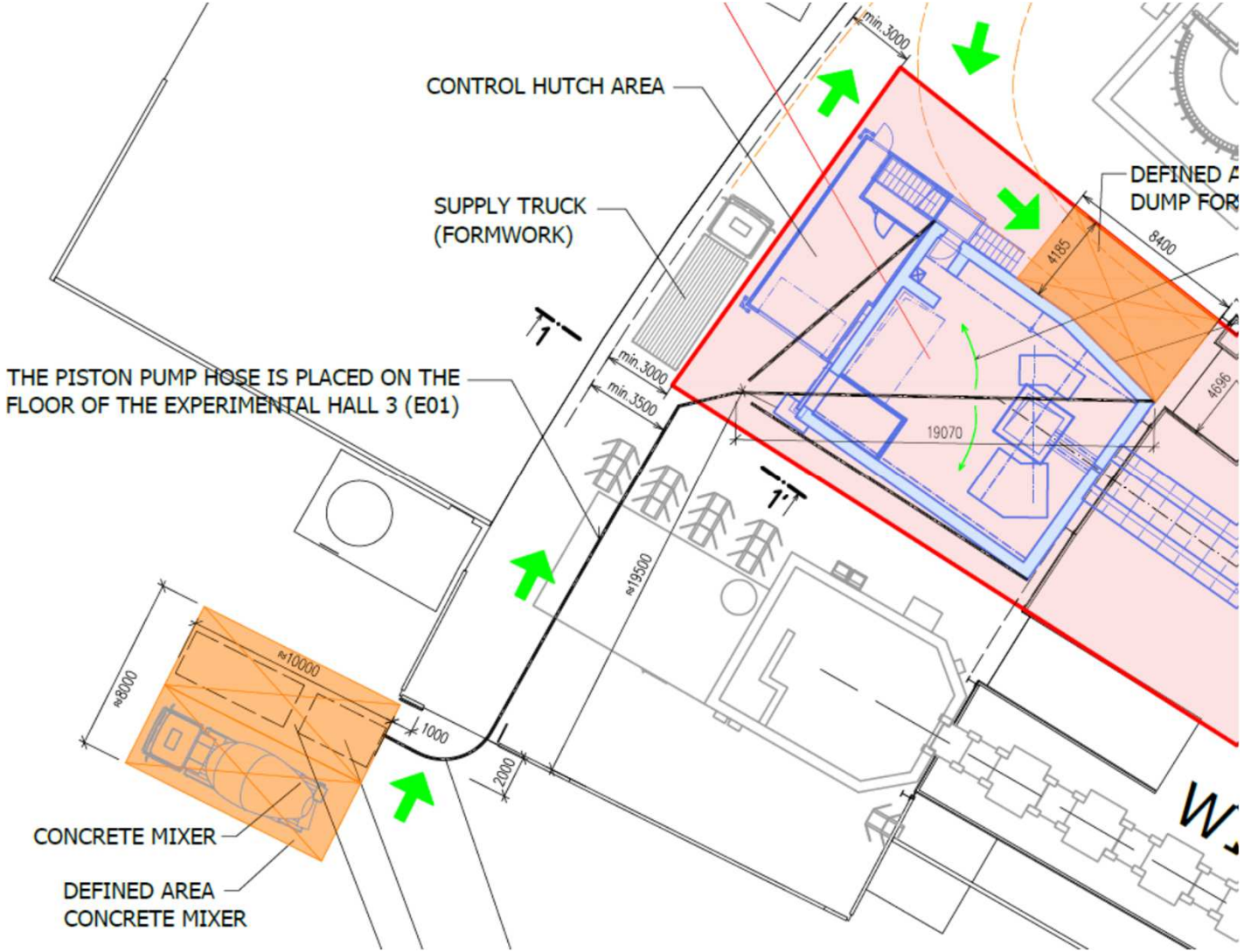
B/ On the floor slab center line?



C/ Under the floor slab?



Implementation plan

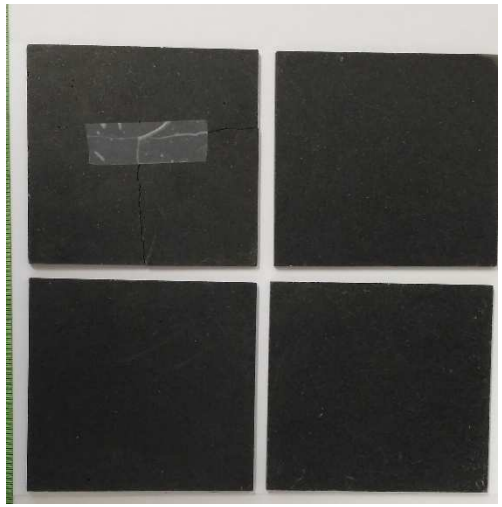


Tiles containing B4C

Currently in development

1/ Epoxy tiles with B4C

+ good mechanical parameters
- low fire resistance



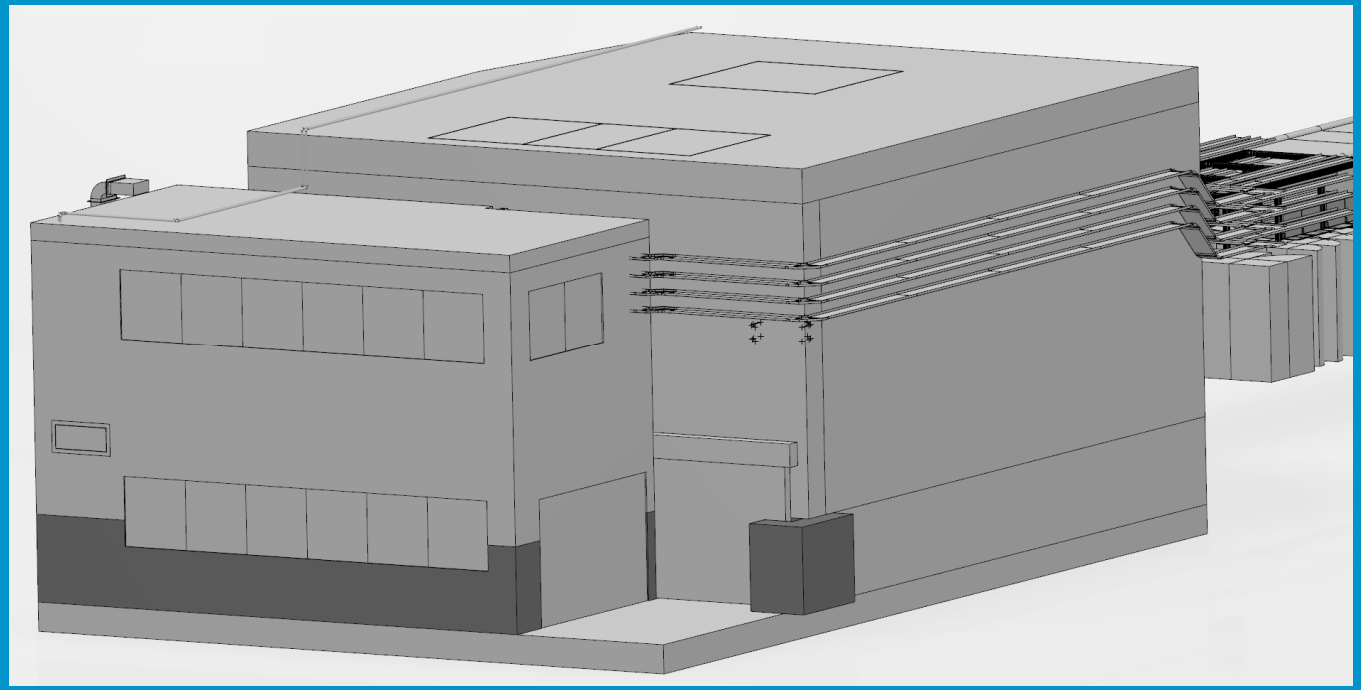
2/ Tiles made of float glass with silica sand and with B4C

+ able to meet fire requirements
- no mechanical parameters, fragile (in our case)

3/ „cold“ ceramics tiles with B4C

+ good in terms of manufacturing, fine surface
- containing gypsum (chemical analysis currently underway)

EUROPEAN SPALLATION SOURCE



Thank you for your attention.