



Experimental Layout

Pedro Reszka

Building

- Built in the 1960s
- 23 storeys
- Reinforced concrete
- 6 apartments / floor

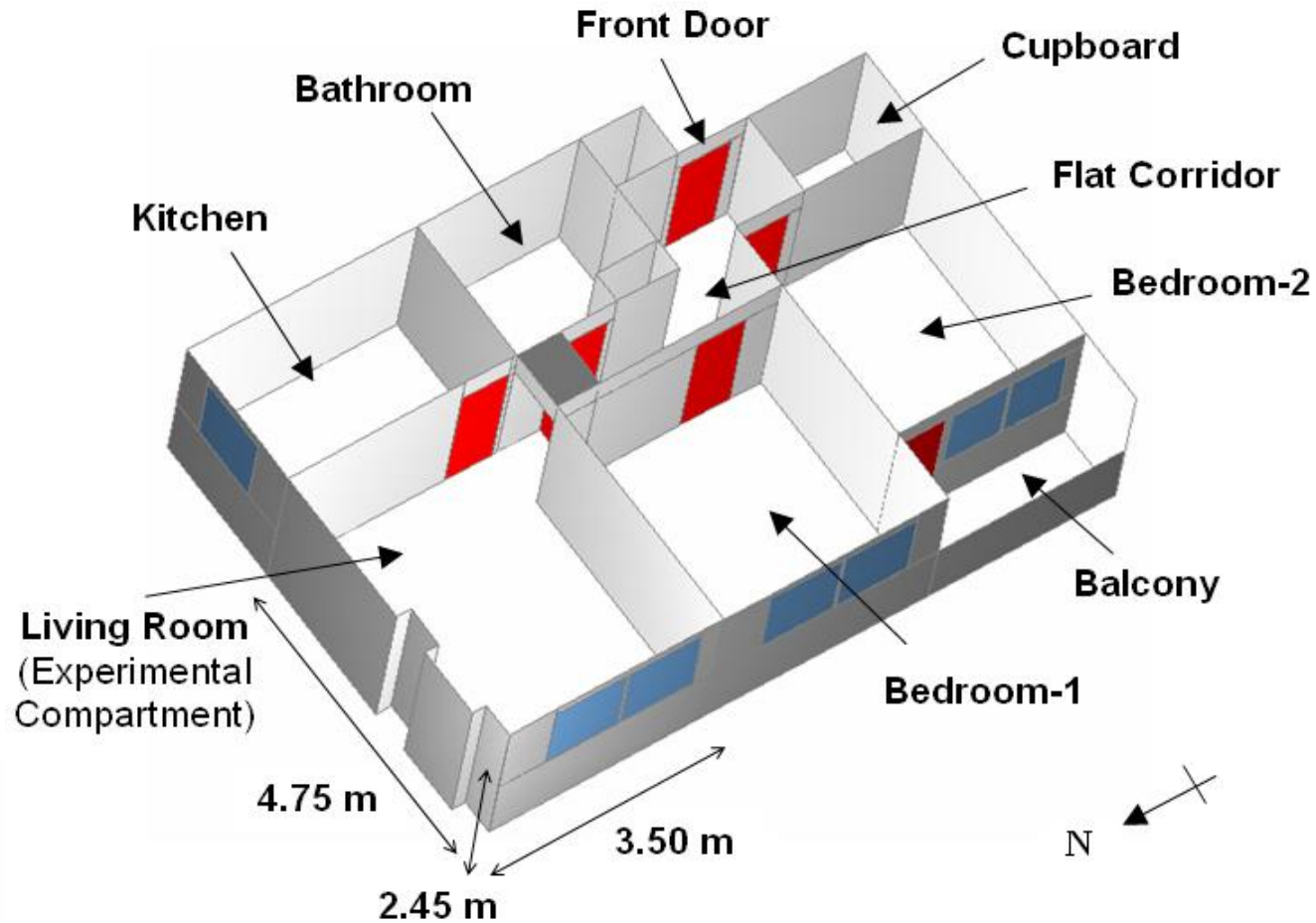


Experimental Compartment

- 2 identical rooms for tests 1 & 2
- 4th & 2nd floor
 - Gap to prevent damage



Experimental Compartment



Layout

- All flat contents removed
- Wall between main compartment and kitchen replaced by LSF wall
- Both compartments identically re furnished
- Most of the fuel concentrated at the back of the room
 - ISO room corner test
 - Robust to environmental variables
- Rest of rooms empty



Layout



Layout



Fuel Load

- Representative of typical office space
 - ➔ Main fuel source: sofa (IGNITION POINT)
 - ➔ Fuel density: 32 kg·m⁻² wood



Instrumentation

- Highest possible resolution
 - *Field* measurements
- >1000 measurements carried out



Instrumentation: internal

- Gas phase T° measurements:
 - K-type thermocouples
 - Arranged in TC trees:
 - 20 trees per experimental compartment
 - 12 TCs in each rack
 - Also, 5 trees along the window (6 TCs each)



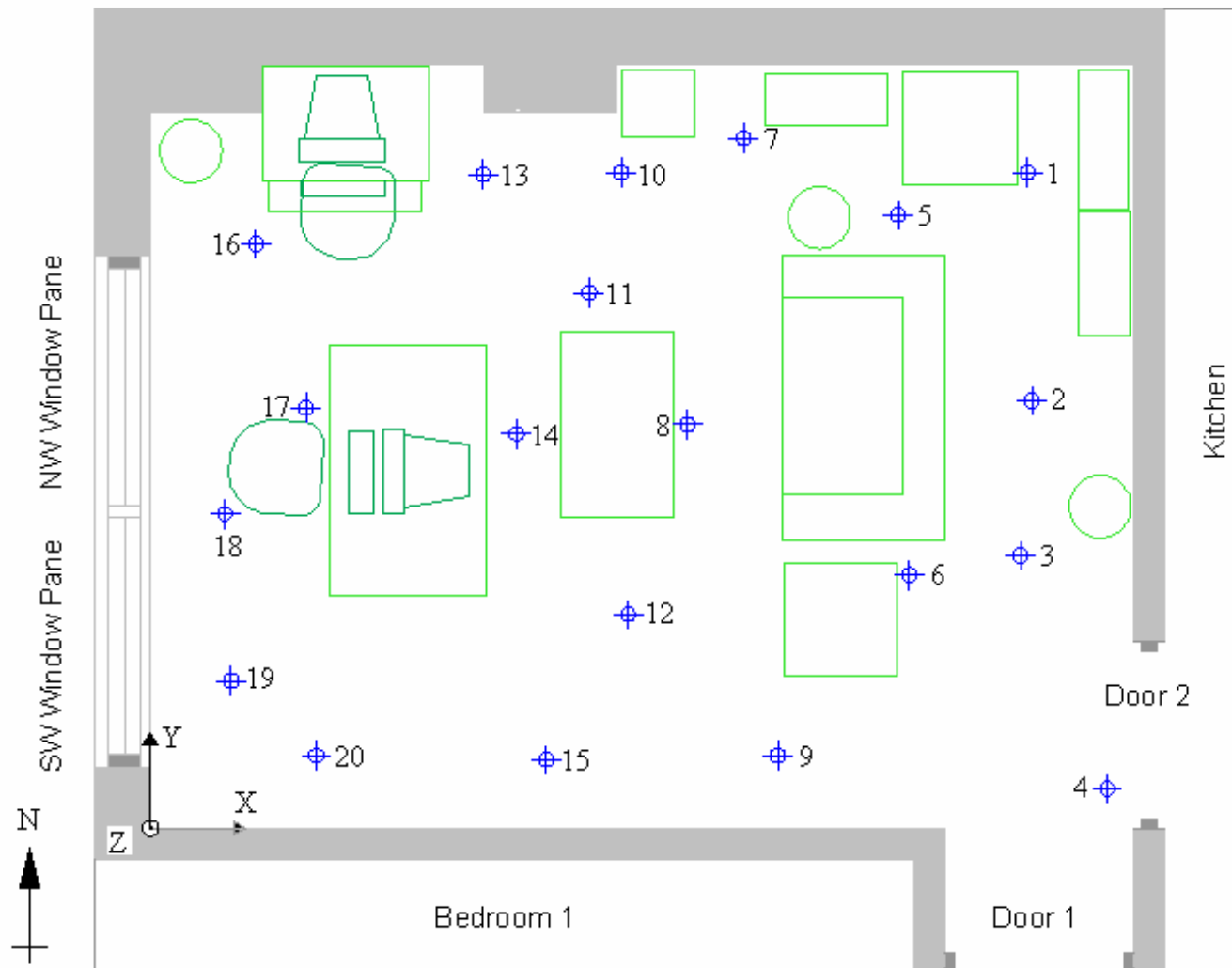
Instrumentation: internal



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Instrumentation: internal



Instrumentation: internal

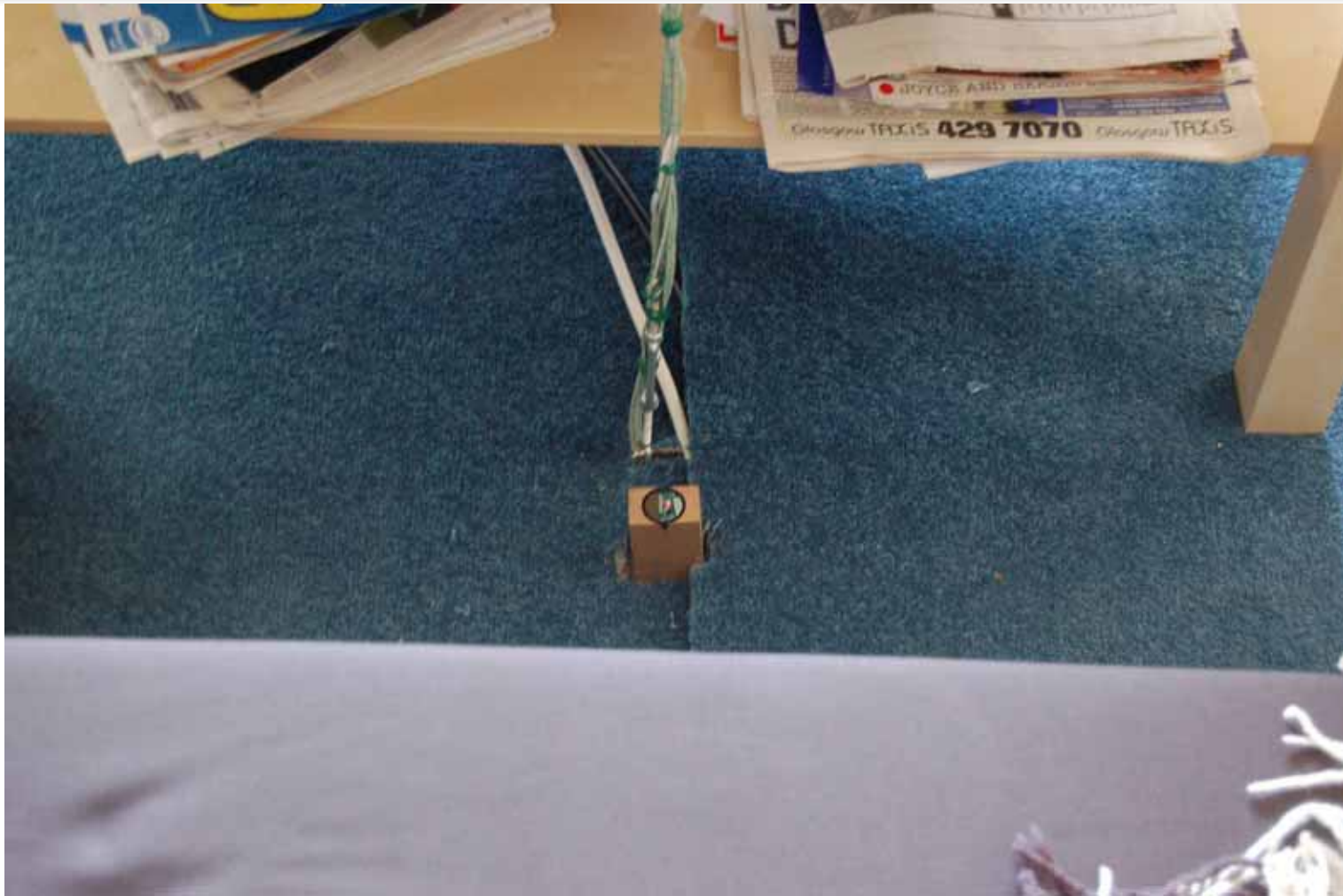
- Smoke density measurements
 - Home made, simple and inexpensive:
 - Laser pointer and a photodiode
 - 8 sensors placed in each compartment
 - 5 horizontal
 - 3 vertical



Instrumentation: internal



Instrumentation: internal



Instrumentation: internal

- Air velocity measurements
 - Bidirectional velocity probes
 - Can account for changes in neutral plane
 - 3 in each doorway
 - Only for test 1



Instrumentation: internal

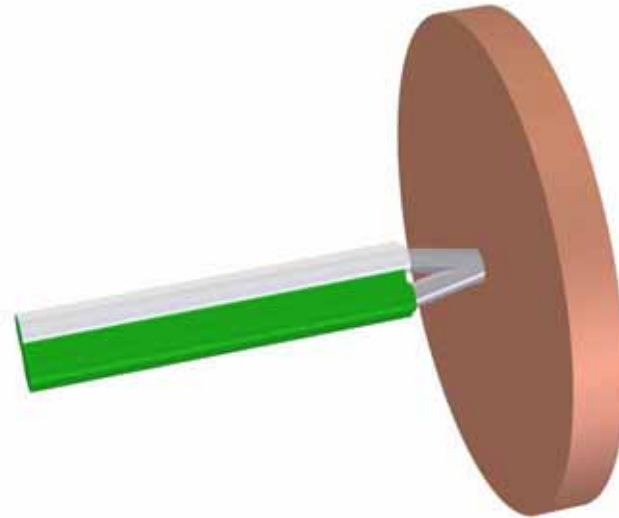


Instrumentation: internal

- Heat flux measurements
 - Home made, simple and inexpensive:
 - TC attached to a copper disc (Thin skin calorimeter)
 - Net heat flux can be related to T° rise
 - 9 placed on the ceiling
 - 20 placed on the LSF wall (test 1)
 - 9 on equivalent wall in test 2



Instrumentation: internal



Instrumentation: internal



Instrumentation: internal

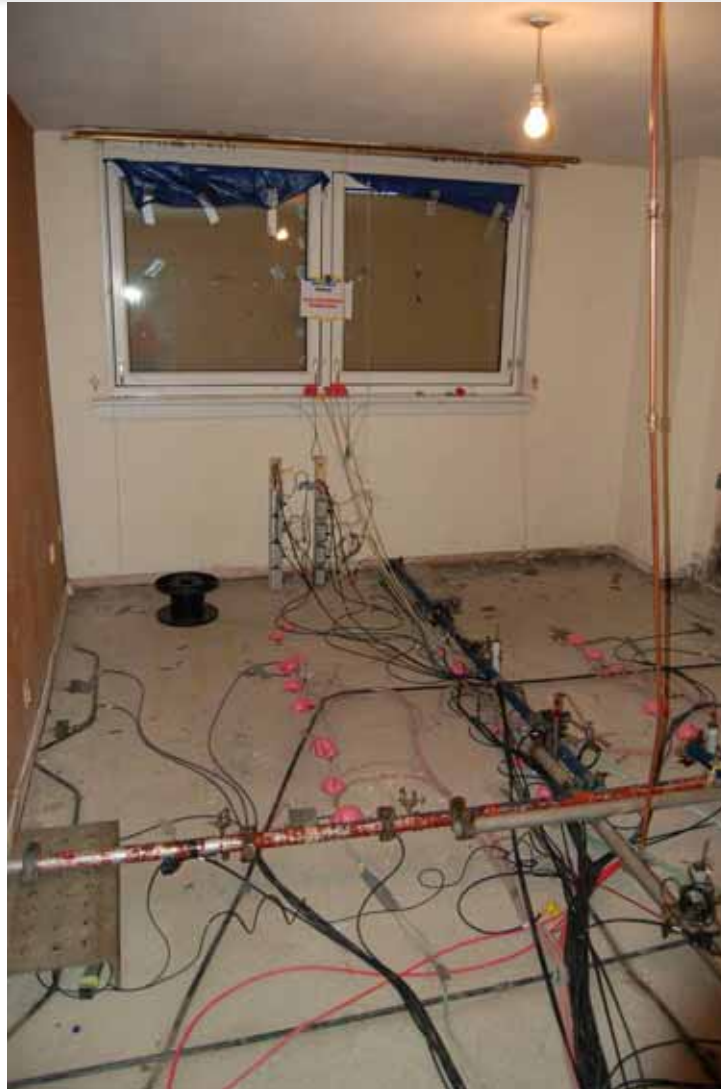


Instrumentation: internal

- In depth temperatures
 - LSF wall
 - Ceiling slab
- Structural measurements
 - Deflection: ceiling slab – partition wall
 - Strain: slab
- Visualization
 - 6 network cameras in compartment
 - 1 in corridor & 1 in flat entrance



Instrumentation: internal



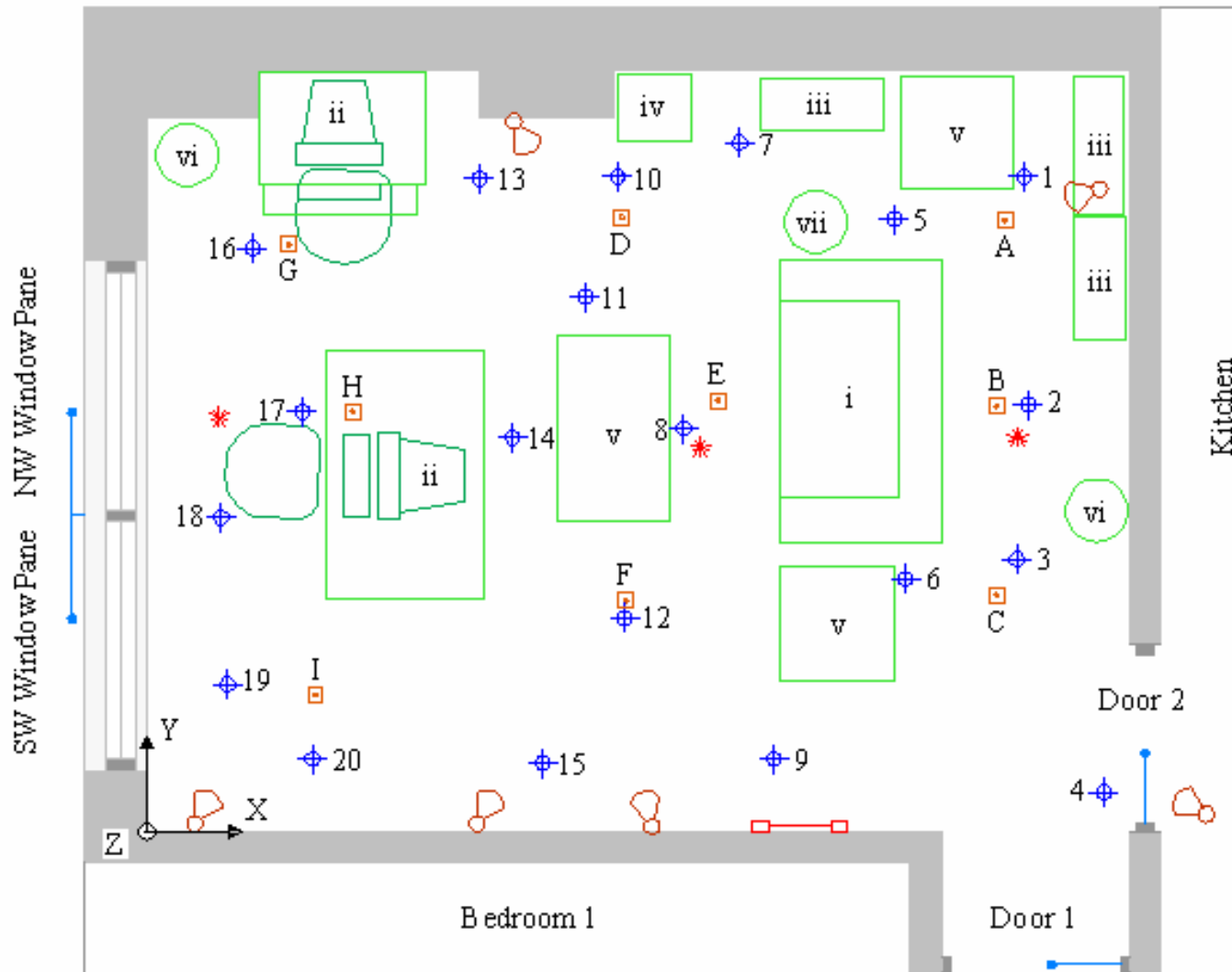
Instrumentation: internal



Instrumentation: internal



Instrumentation: internal



Instrumentation: external

- Only for test 1
 - 19 TC racks – 8 thermocouples each
 - 20 heat flux meters
 - 8 velocity probes
 - 3 network cameras



Instrumentation: external



Instrumentation: external



Data logging



Data logging



Additional tests

- FRP plates & rods
 - Mounted on ceiling
 - TCs and strain gages
- PMMA slab
 - Flame spread predictions
 - ➔ Fire Grid
 - TCs and heat flux meters



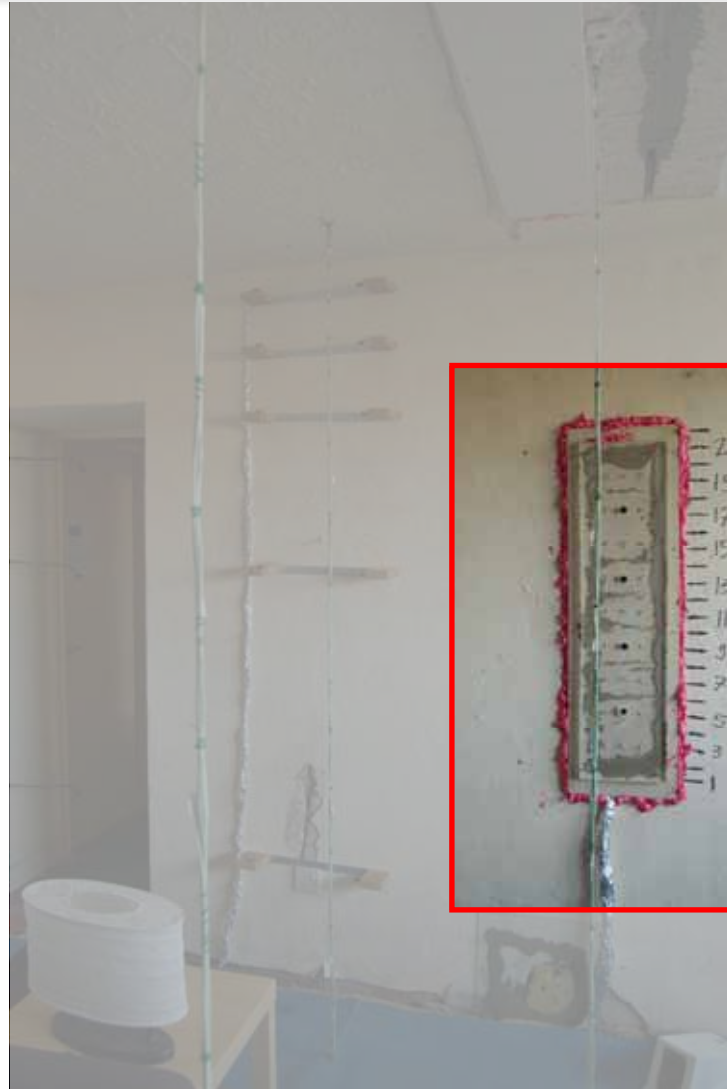
Additional tests



Additional tests



Additional tests





Thank you for your attention

Coordinate System

