BRONE

DRONE FACILITY FOR TESTING SENSORS AND DATA COLLECTION FOR USE IN DRONE-BASED INSPECTION OF INFRASTRUCTURE AND BUILDINGS.

InnoBYG
Innovation for bæredygtigt BYGGERI
AN INNOBYG PROJECT

KNOWLEDGE PARTNERS

DANISH TECHNOLOGICAL

DTU Technical University of Denmark

INNO DRONE
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BRONE: Experiences and Lessons

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Building and Construction Division

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BRONE in a nutshell

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The **BRONE Living Lab** is a collaborative outdoor space where companies can test their existing solutions and demonstrate new concepts.

The core project objectives are to:

a) establish a living lab for test / development of drone-based inspection;

b) experiment by testing drone-based inspection technologies;

c) share knowledge;

d) foster new research and product development ventures.

From BRAINSTORMING → to LIVING LAB ACTIVITIES

BRONE Phase 1 – Brainstorming

Participants: **Dansk Drone Kompagni, Drone Harmony, Drone Systems, Easy Inspect, Scopito, Spotland, and STO Danmark**

2. Technologies

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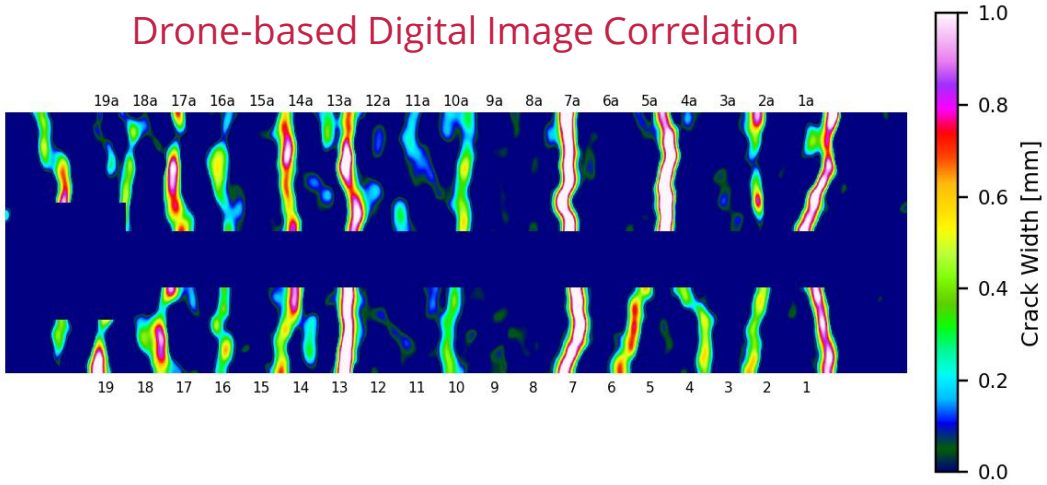
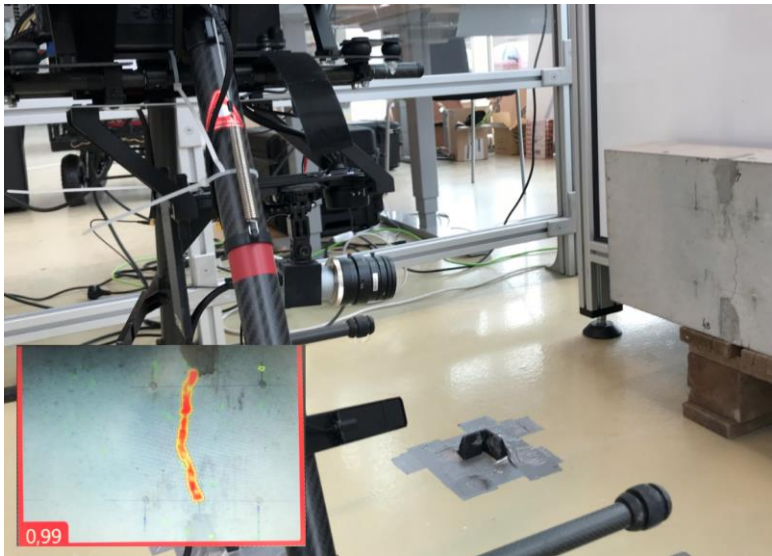
WHICH TECHNOLOGY EXPERIMENTS SHALL WE FOCUS ON?

- Artificial-Intelligence-based inspection → detecting anomalies in concrete/masonry;
- LIDAR and other sensors → monitoring relative deformation on existing structures;

Drone-based Digital Image Correlation





2. Technologies

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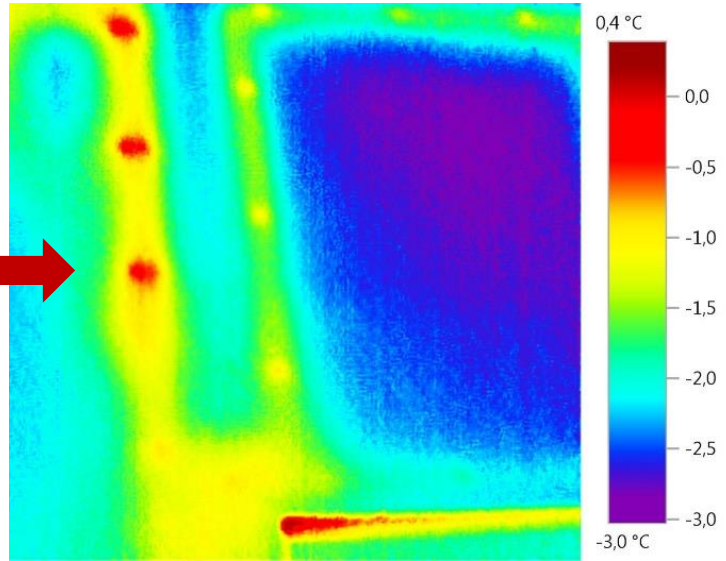
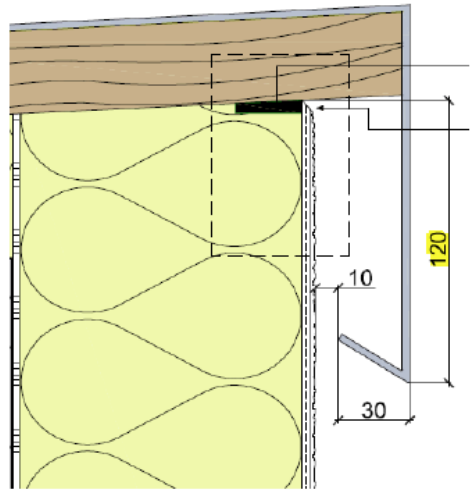
WHICH TECHNOLOGY EXPERIMENTS SHALL WE FOCUS ON?

- Thermal cameras → heat-maps of concrete elements (e.g. on-site QC);
- Façade elements monitoring → alignment/surface area in existing buildings (QC);





2. Technologies

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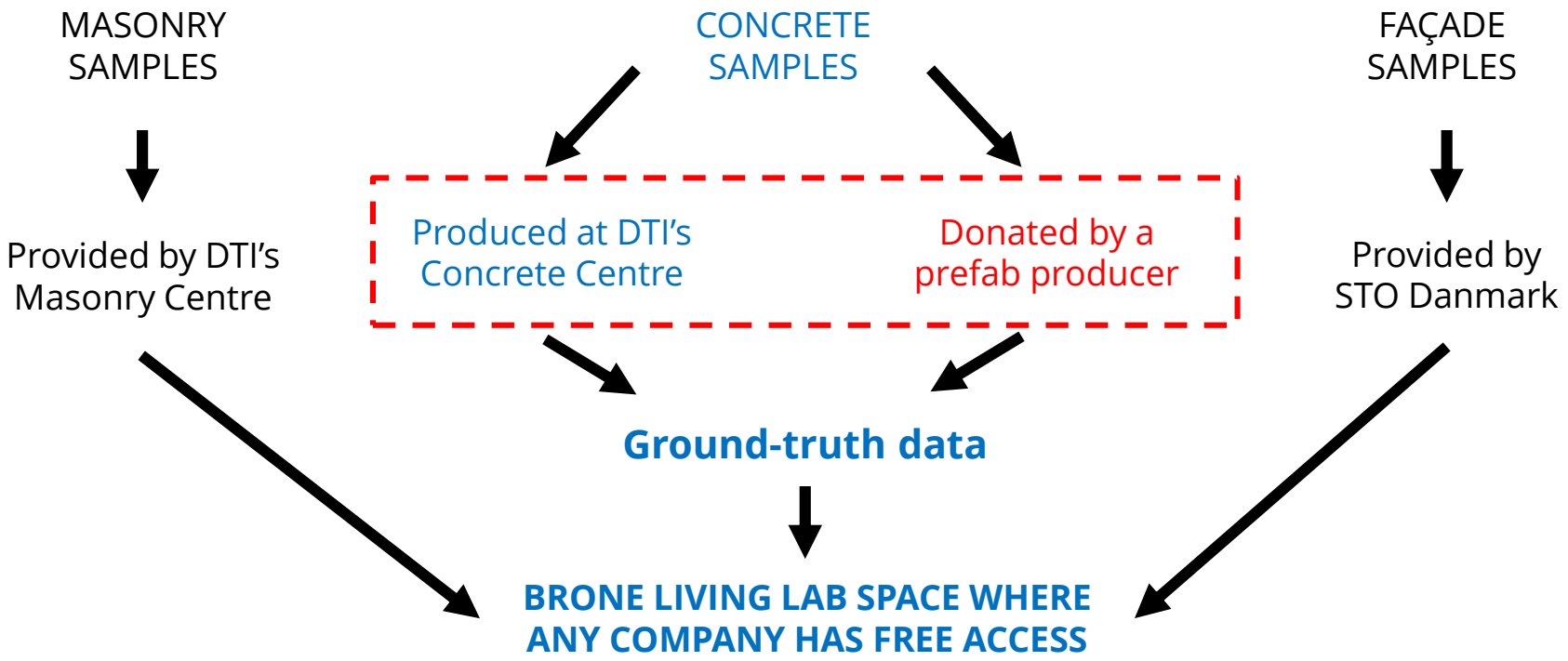
DAMAGE ASSESSMENT IN BUILDING AND INFRASTRUTURES



3. BRONE Mock-up

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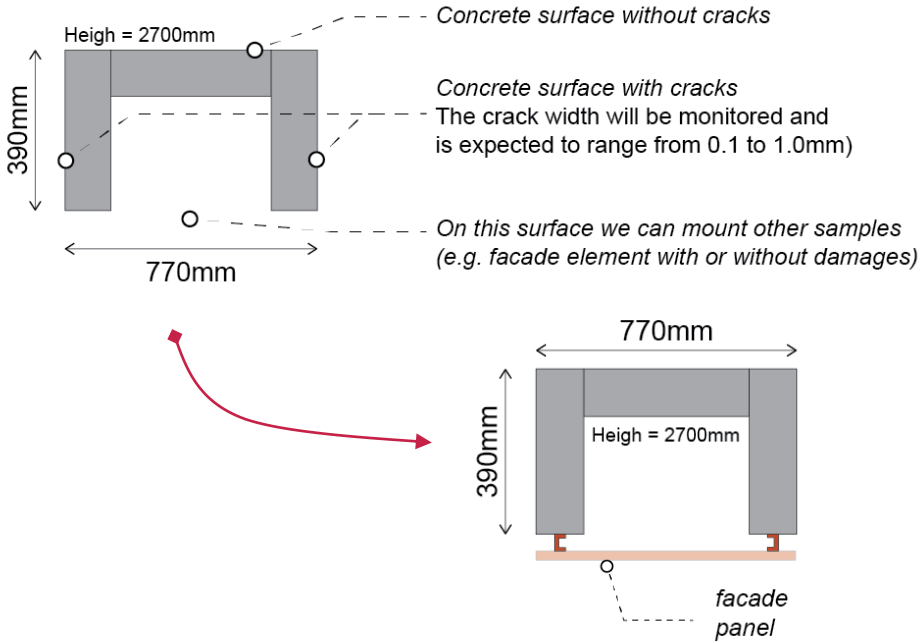
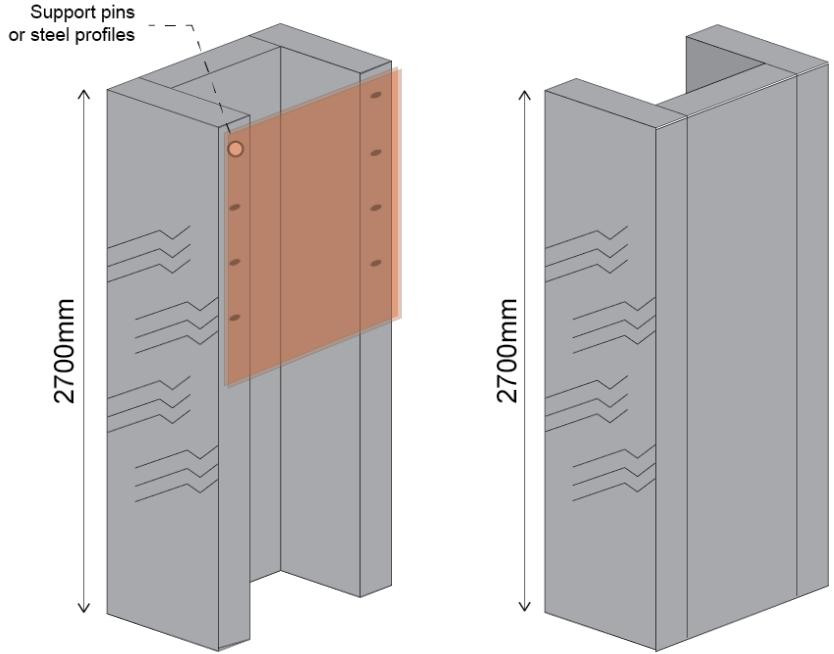
BRONE MOCK-UP

Top view: Large-scale concrete sample



Perspective



3. BRONE Mock-up

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BRONE MOCK-UP – Individual samples before 4-Point Bending Testing

3. BRONE Mock-up (Testing)

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3. BRONE Mock-up (Results)

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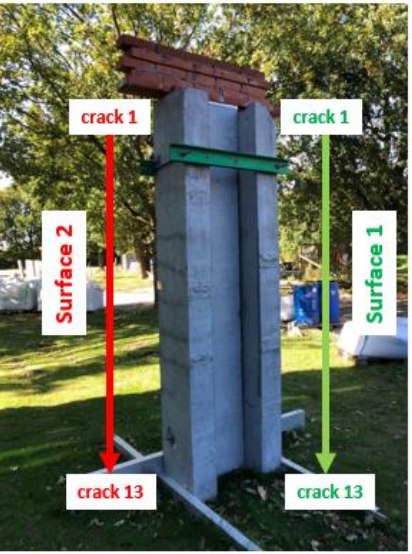

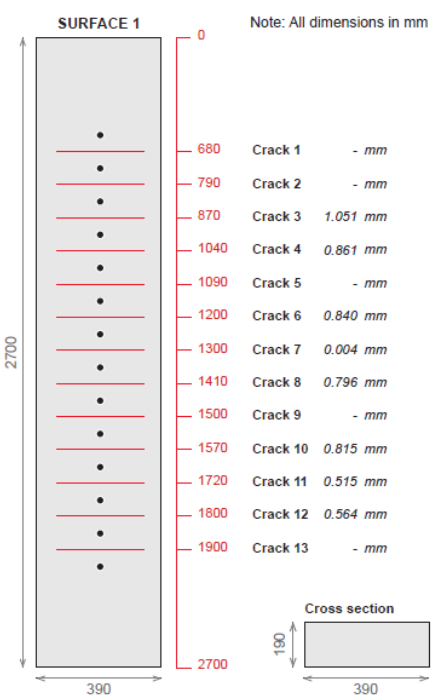

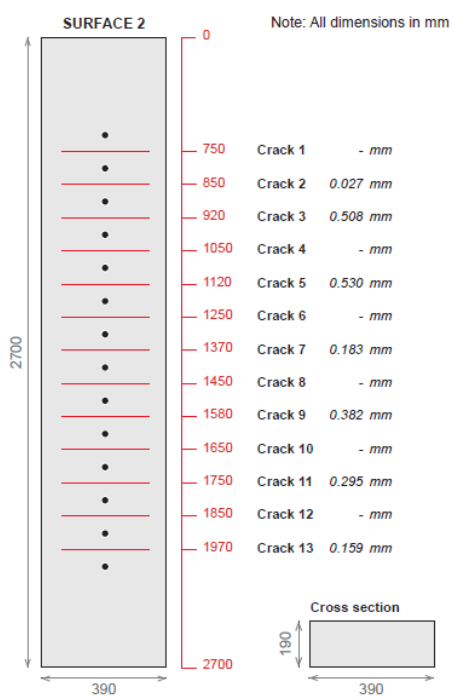

BRONE Phase 2 – Living Lab

4. BRONE Living Lab

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TECHNOLOGIES

- Artificial-Intelligence (Crack detection)
- AI-assisted inspection (Point cloud)
- Laser scanning (Digital annotation)
- Numerical modelling (moisture ingress)

easy@inspect SPOTLAND

DTU Danmarks Tekniske Universitet

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sto Omsorgsfuldt byggeri.

BRONE SAMPLE

AI-based crack detection analysis (threshold = 0.15):

(x) Crack: 0.000

( ) No Crack:

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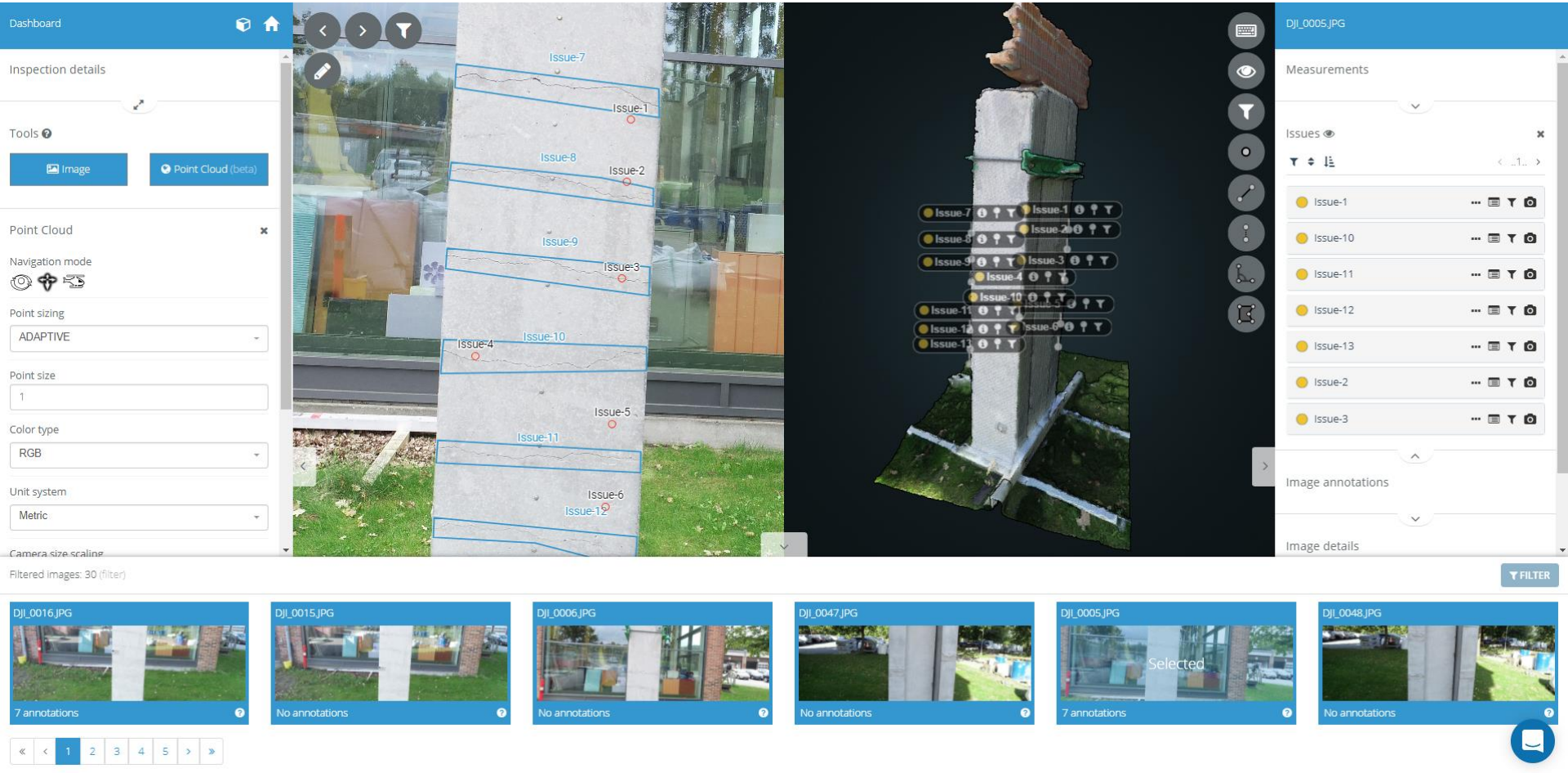
4.2 Concrete Inspection (Inspection Cloud)

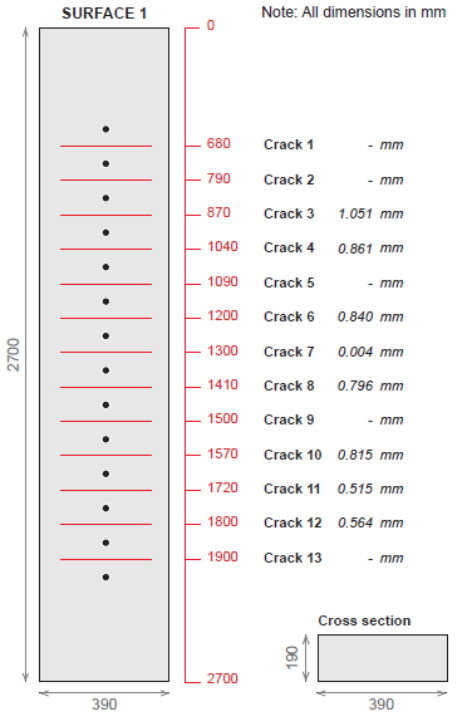
easy inspect

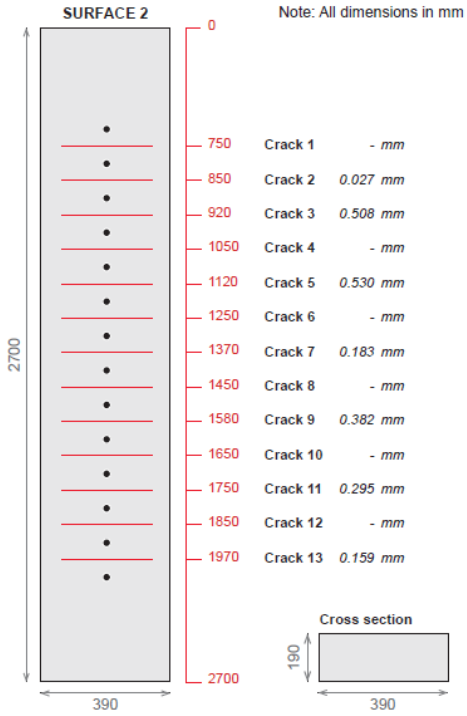


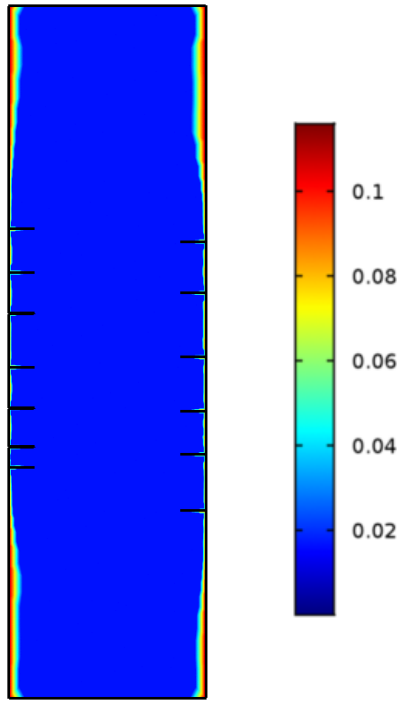
4.2 Laser Scanning (Point Cloud)

4.4 Numerical Modelling

Moisture ingress model based on crack width (>0.1mm)







Thank you for your attention and participation

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