



Digital Reuse: Leveraging technology for a circular built environment

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Buildings are major contributors to climate change. Reusing buildings and materials in a circular economy is a promising solution, but we need methods and tools to support it. Therefore, we develop digital innovations to support the reuse of concrete, a ubiquitous construction material that represents 7-8% of global CO₂ emissions.

Part of a European project:

ReCreate
Reusing precast concrete for a circular economy



Cooperating academic institutions



TU/e Eindhoven University of Technology

Tampere University

b-tu Brandenburg University of Technology Cottbus - Senftenberg

The built environment accounts for:

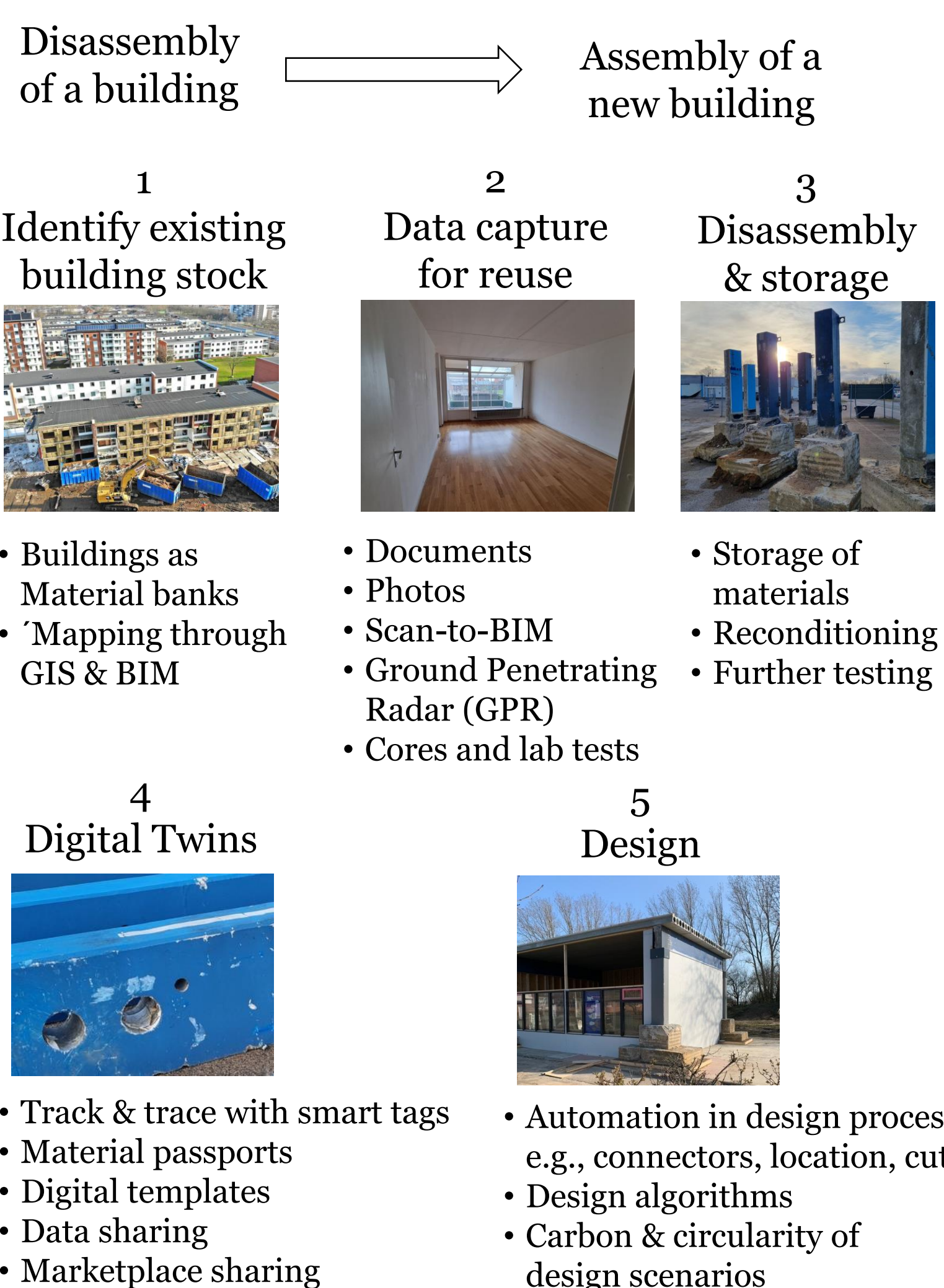
- 40 % of global carbon emissions
- 50% of all extracted materials
- By 2060, building stock will double
- By 2060 global material use will double
- 11% of global emissions are from materials and construction

Level(s) 1/3 EU's waste comes from construction

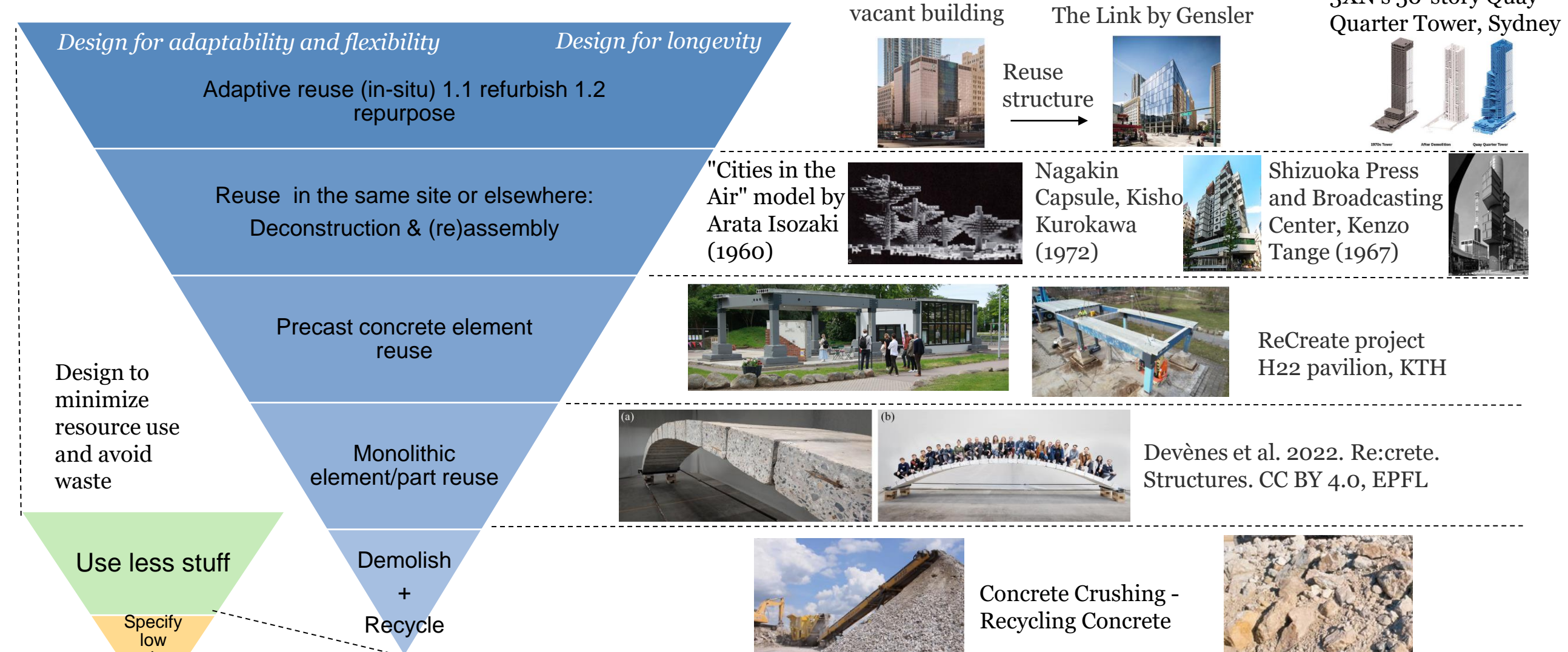


- Example of Kingdome in Seattle, built in 1976 and demolished in 2000. Sometimes structures have a short life span.
- Demolition poses health and safety risks, and considerable costs, produces waste, and requires careful planning and cleanup.

Digital tools and steps that facilitate the reuse process for buildings



Perspective on reuse of buildings: Where do we stand?



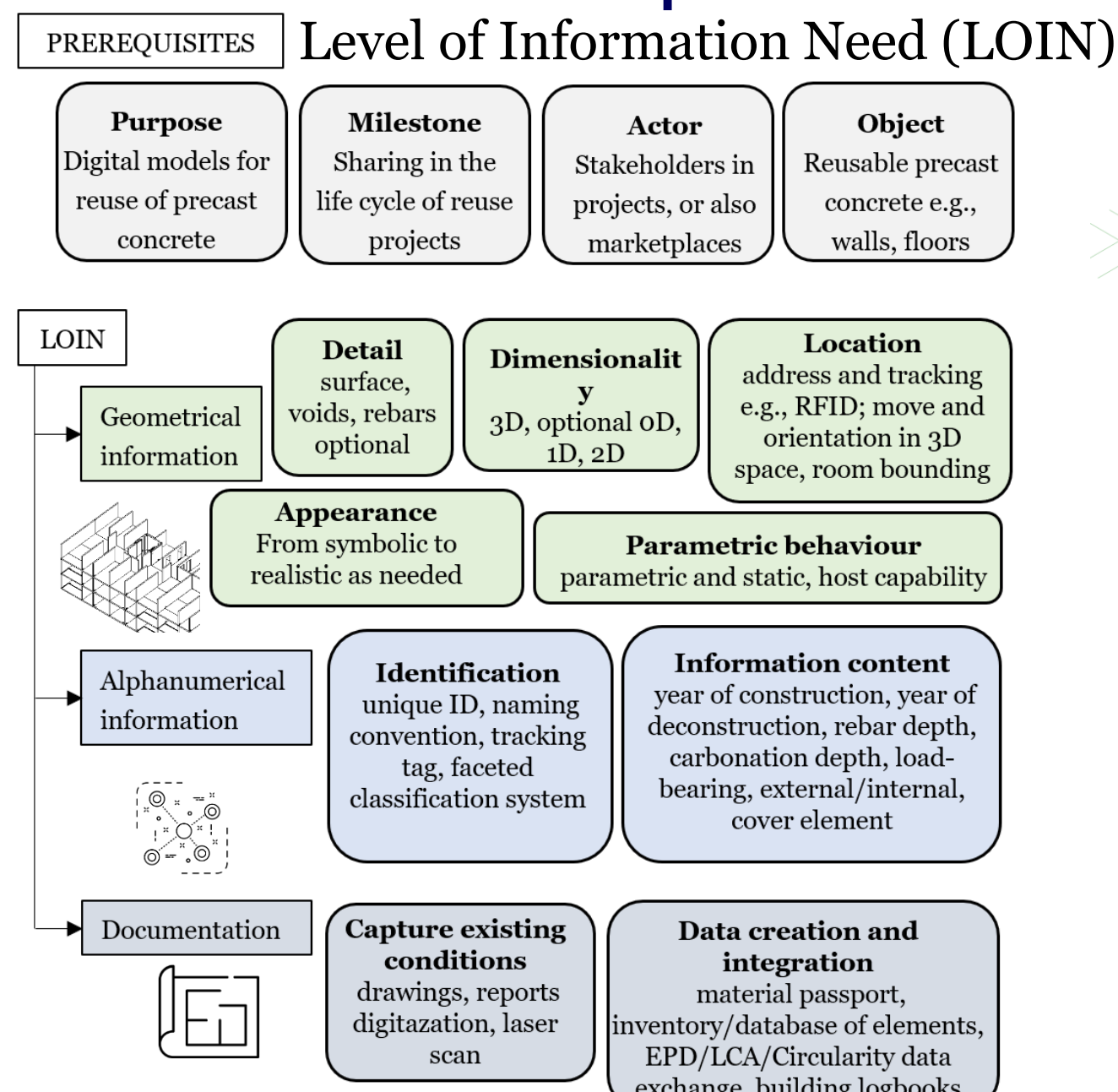
- In many cases, concrete buildings are demolished for reasons other than structural capacity
- Concrete has the potential for a very long lifespan (durability, reuse, interventions).

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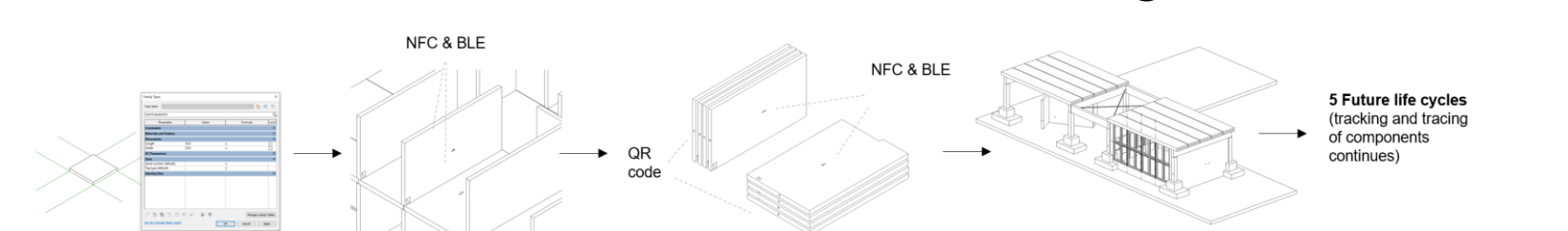


Digital reuse guidelines – taking the EN 17412 standard a step forward

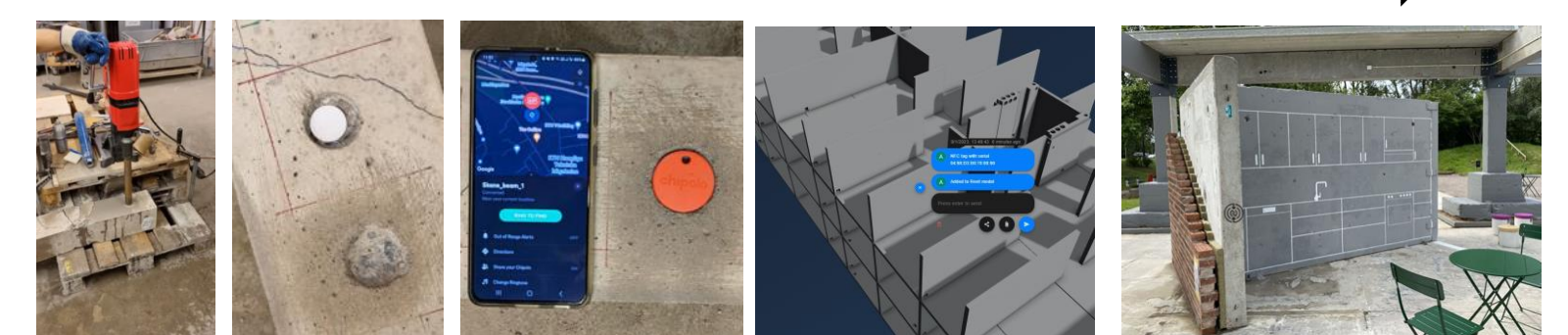


Our work on concrete tracking

- New digital workflows, towards 3D model-based data flows & management



- Testing of smart tags



Tested NFC & Bluetooth → Material Passport → Marketplace/ information sharing → Digital twins

References

Paper on tracking

Paper on digital guidelines

Blog Post