# BETONIARKKITEHTUURI 2030 - YKSINKERTAISESTI IKUISTA?

**KIMMO LINTULA** ARKKITEHTI SAFA
ARKKITEHTITOIMISTO K2S OY

PANTHEON, ROME

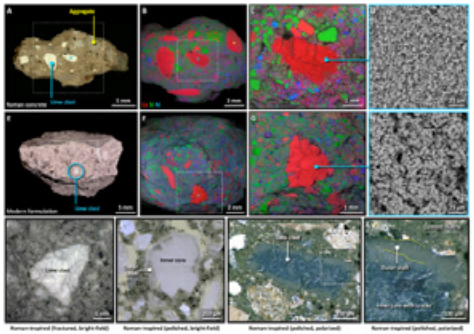


**Fig. 4. Compositional and morphological characterization of ancient and modern lime clasts.**
(**A** and **E**) Optical micrographs showing the conspicuous bright white color of the lime clasts, which can easily be identified from large-area elemental mapping via SEM-EDS (**B**, **C**, **F**, and **G**), are morphologically distinct from other calcareous aggregate material (denoted by a yellow asterisk) and exhibit a distinctive particulate microstructure (**D** and **H**). The dotted boxes in (B) and (F) denote the locations of the magnified views in (C) and (G), respectively. (**I**) A higher magnified view of a single fractured lime clast from our hot-mixed Roman-inspired concrete formulation. The visibly distinguishable periphery of these lime clasts [denoted by the "outer shell" labels in (**J**) and (**L**)] can be easily seen via both bright-field and polarized illumination of polished samples, while polarized illumination specifically emphasizes the high density of internal cracking in the clasts (K and L). The dotted box in (**K**) denotes the location of the magnified views in (L).

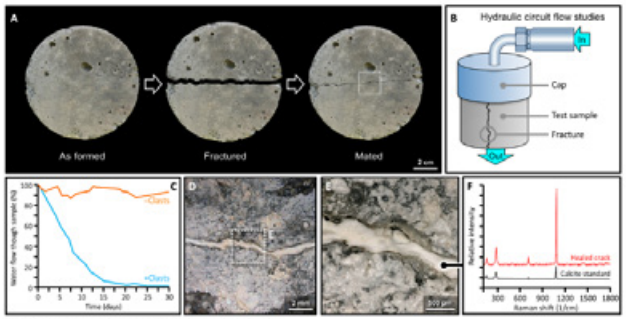



**Fig. 5. Modern mortar self-healing experiments.**
After casting, the Roman-inspired hot-mixed concrete samples were mechanically fractured and then re-mated (with a gap of 0.5 ± 0.1 mm) and preconditioned for our crack-healing studies (**A**). Using an integrated flow circuit (**B**), water flow through the sample over the course of 30 days was documented with a flow meter. Compared to the lime clast–free control (orange line), after 30 days, water flow through the lime clast–containing sample (blue line) ceased (**C**), and examination of the cracked surface revealed that it had been completely filled with a newly precipitated mineral phase (**D** and **E**), which was identified as calcite from Raman spectroscopy measurements (**F**).

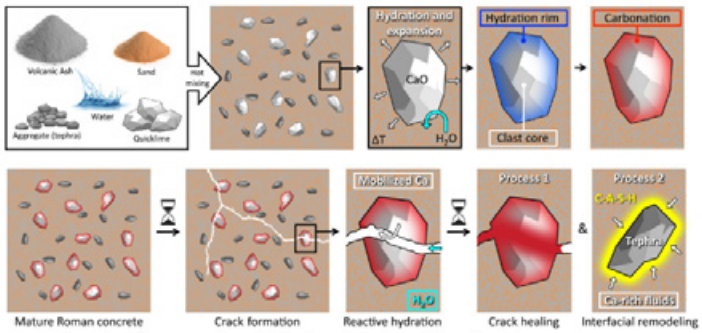
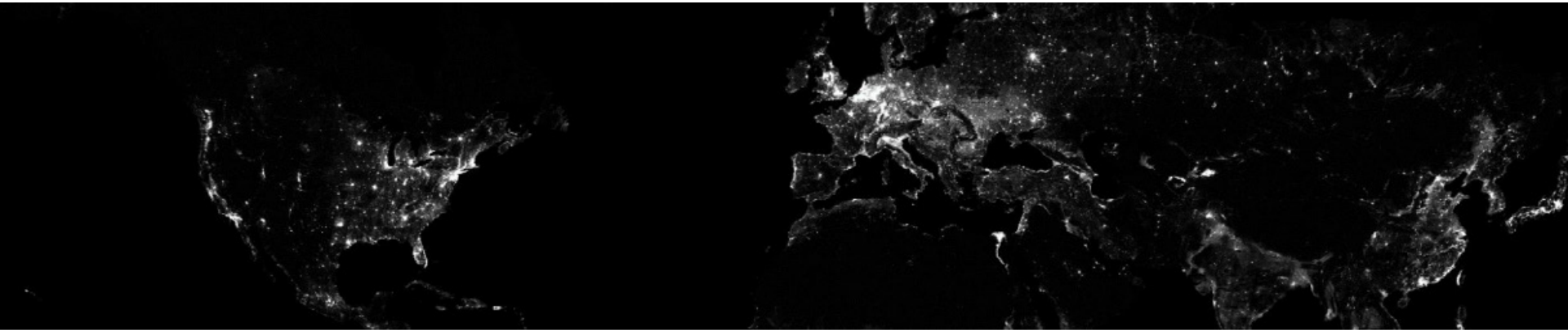
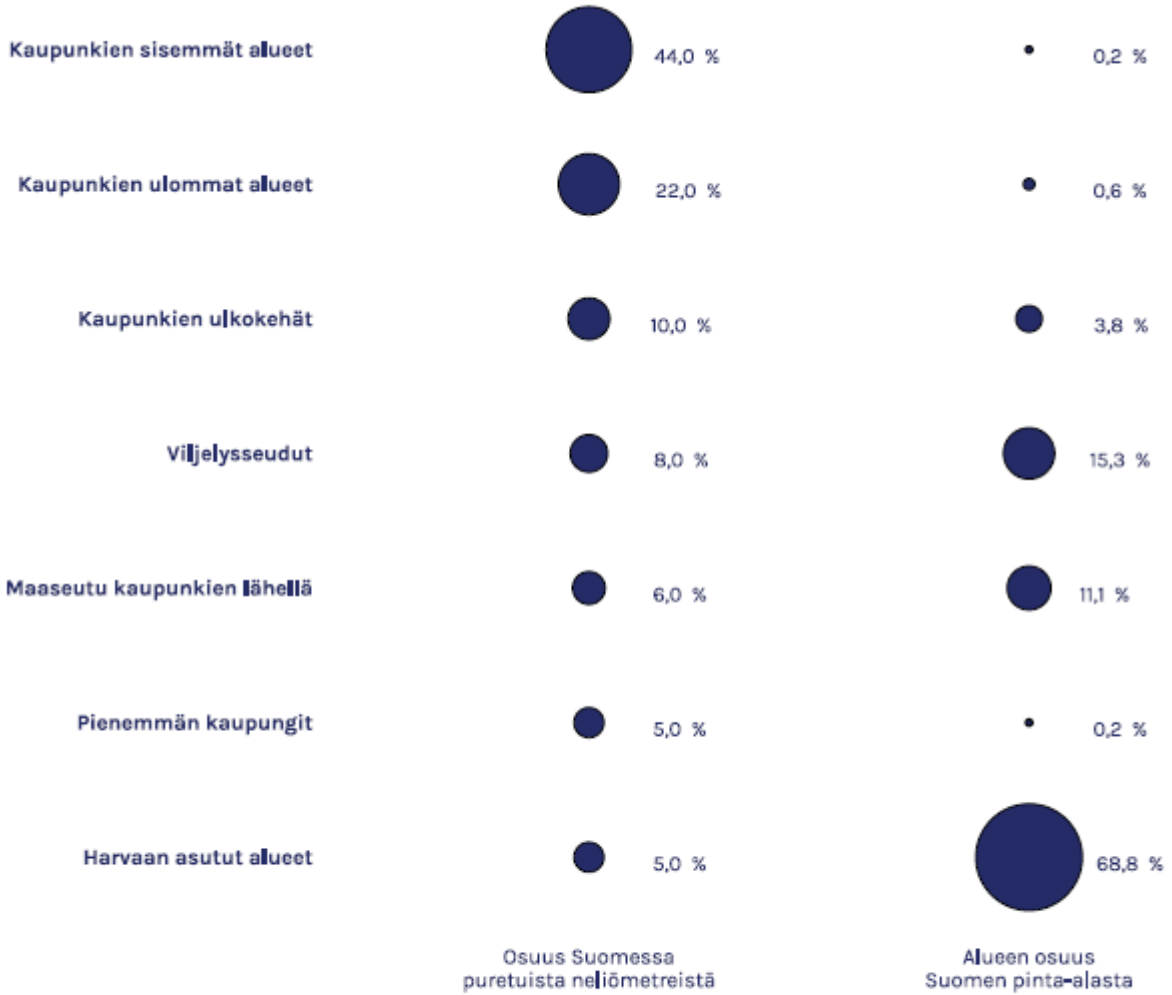


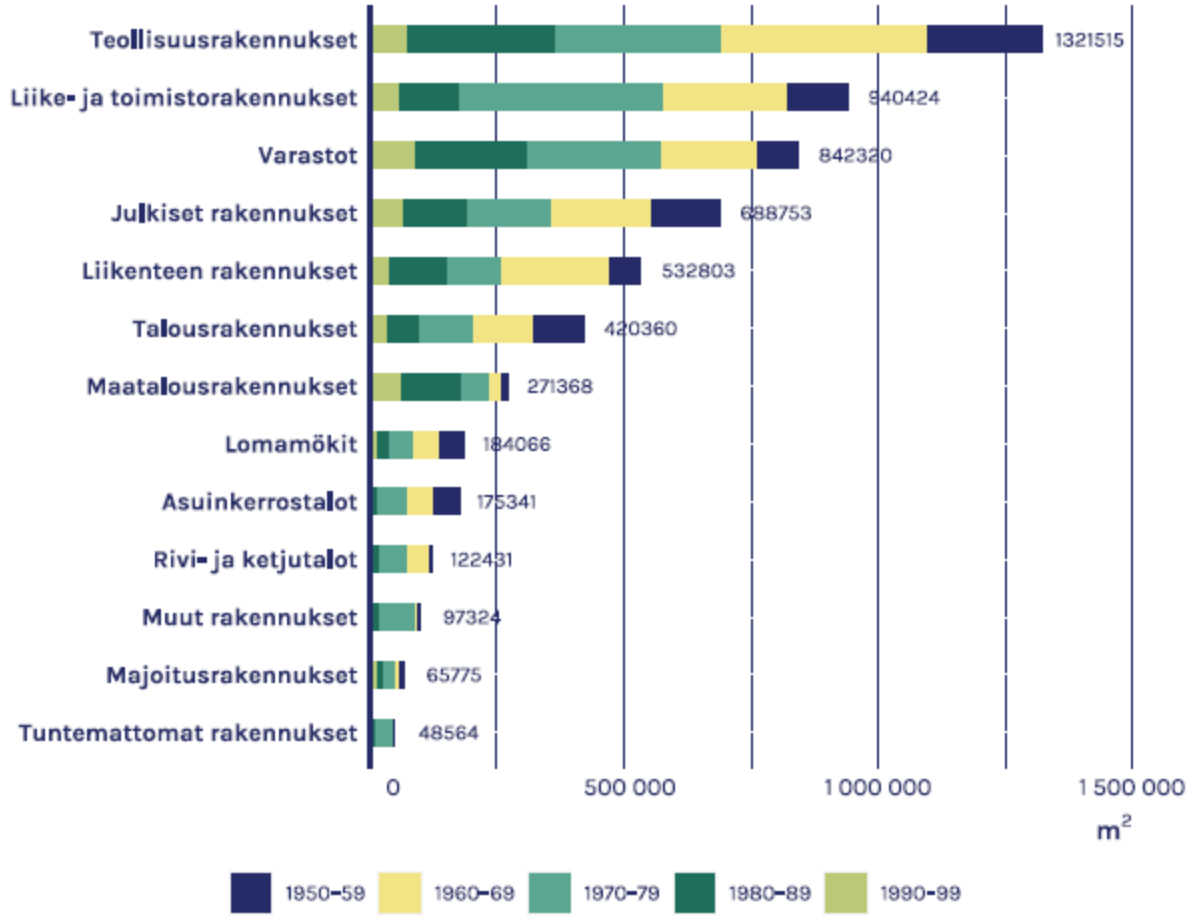

**Fig. 6. Schematic of the proposed mechanism for self-healing within ancient Roman mortars.**
Through the process of hot mixing, the calcium-rich lime clasts are encapsulated by the cementitious matrix, which, following the formation of a hydration rim, ultimately undergo carbonation (top row). Upon cracking (bottom row), water can infiltrate, transporting a calcium-enriched solution into the pore network to heal the damage (process 1) or serve as reactive calcium for post-pozzolanic reactions (such as C-A-S-H formation) at the interface between the volcanic tephra and the surrounding matrix (process 2).

SCIENCE ADVANCES:" **Mechanistic insights into the durability of ancient Roman concrete**"

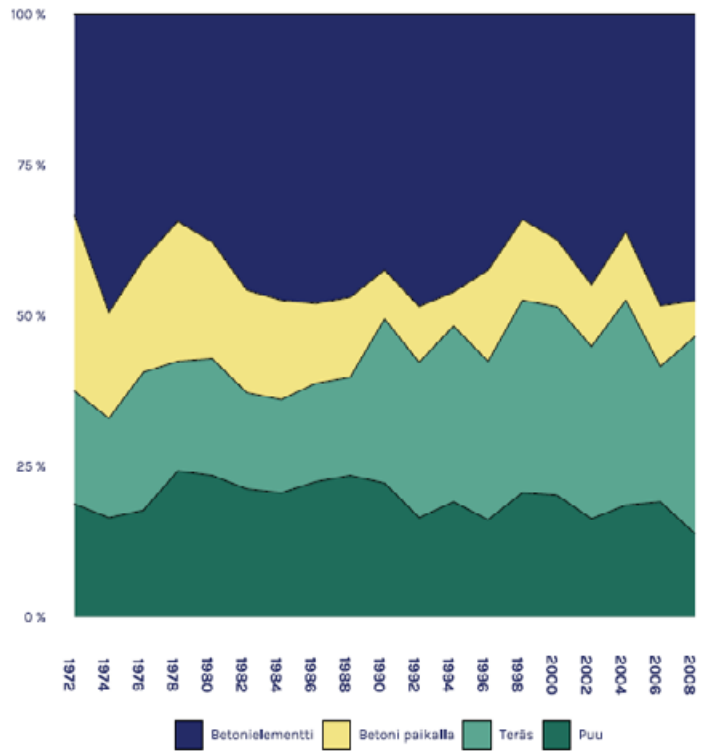




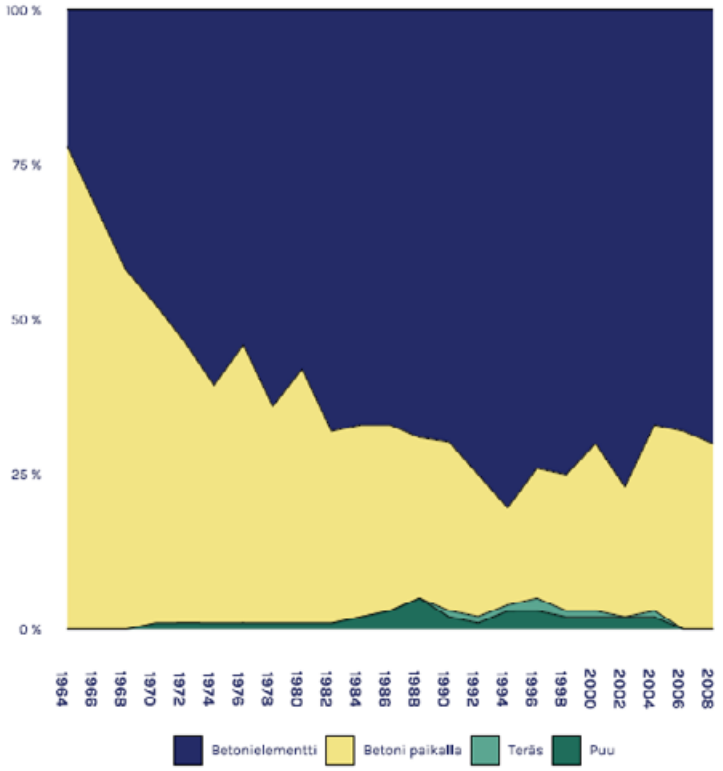

**Kuvio 11** Suomessa 2000–2012 purettujen rakennusten sijainti (Huuhka & Lahdensivu 2016, 80).



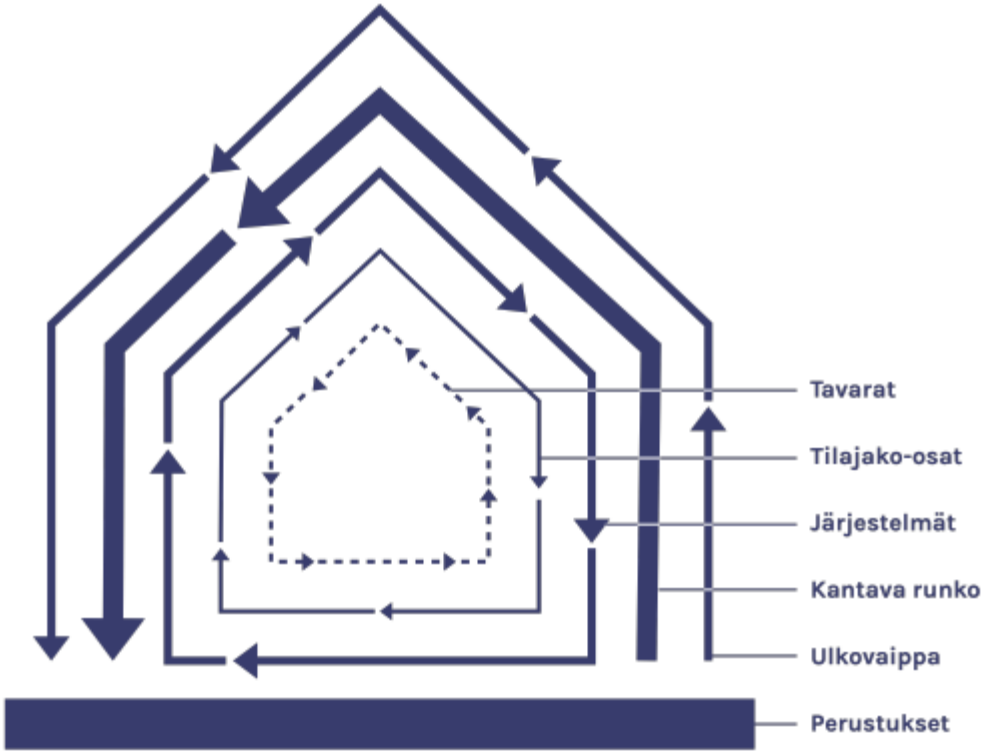

**Kuvio 8** Suomessa 2000–2012 purettujen 1950–90-lukujen rakennusten puretut neliömetrit ja käyttötarkoitus (Huuhka & Lahdensivu 2016, 85).



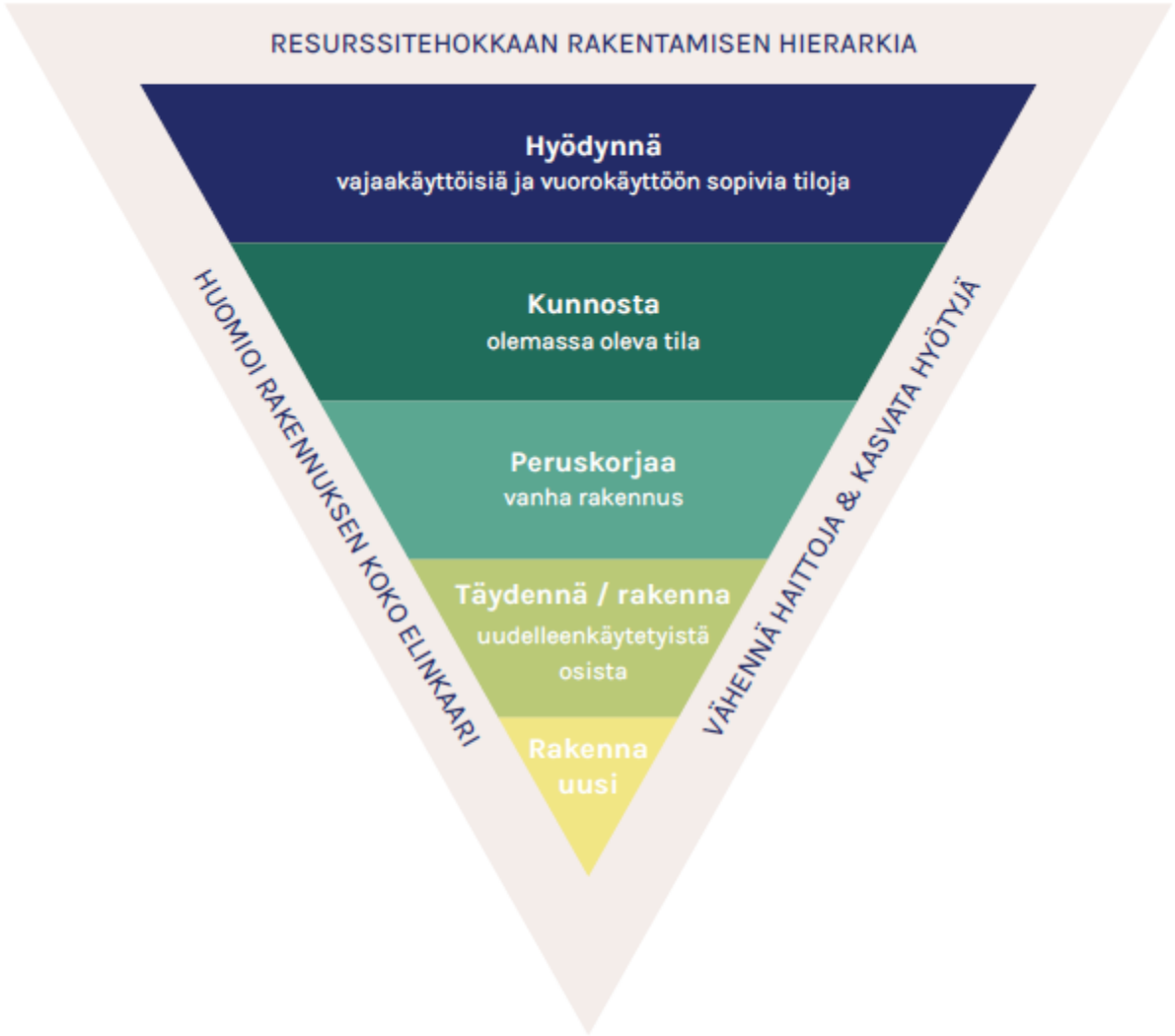

**Kuvio 10** Pääasiallinen runkomateriaali toimitila- ja tuotantoraken-nuksissa (Hytönen & Seppänen 2009, 325).



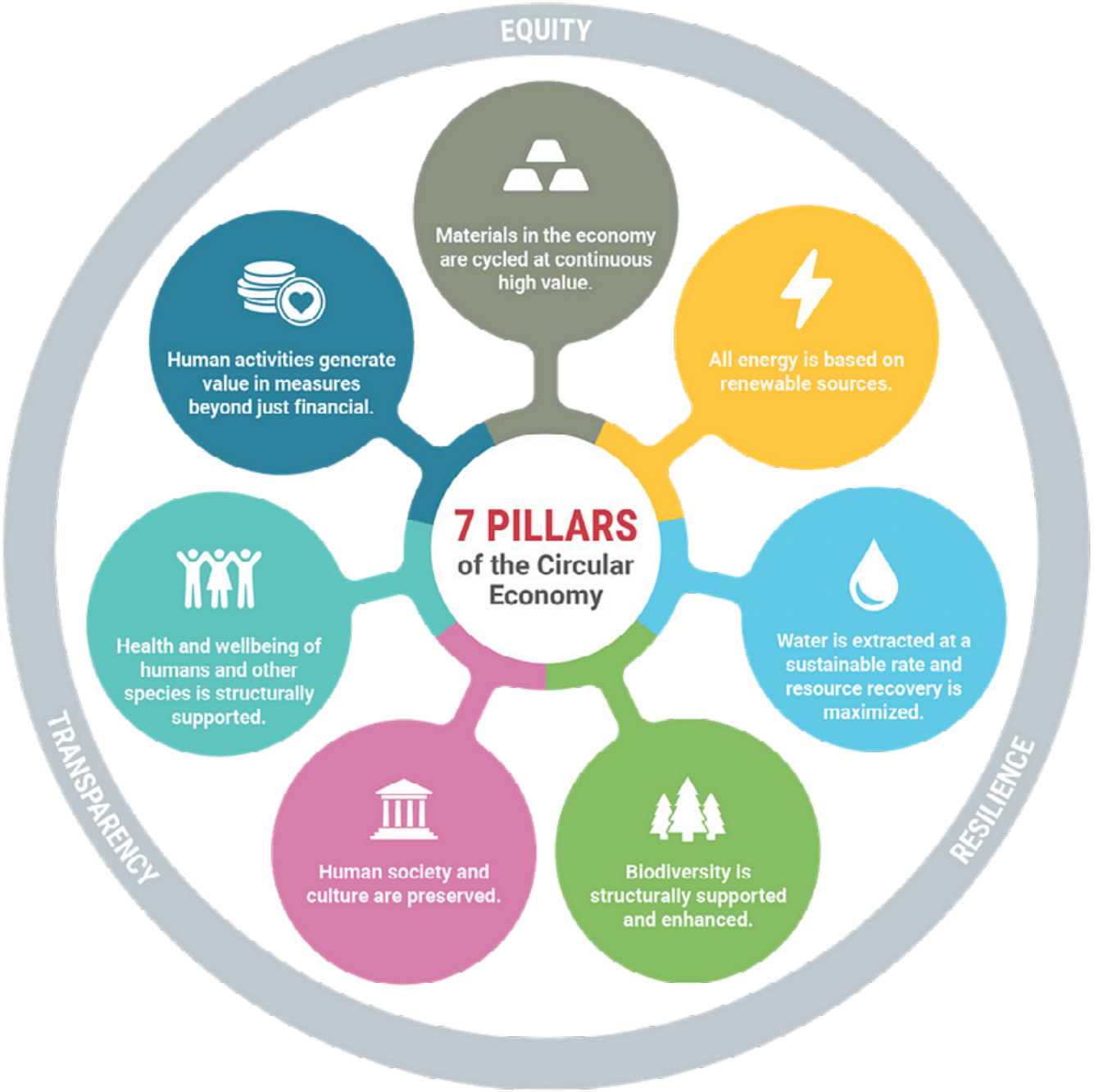

**Kuvio 9** Pääasiallinen runkomateriaali Suomen asuinkerrostaloissa (Hytönen & Seppänen 2009, 325).

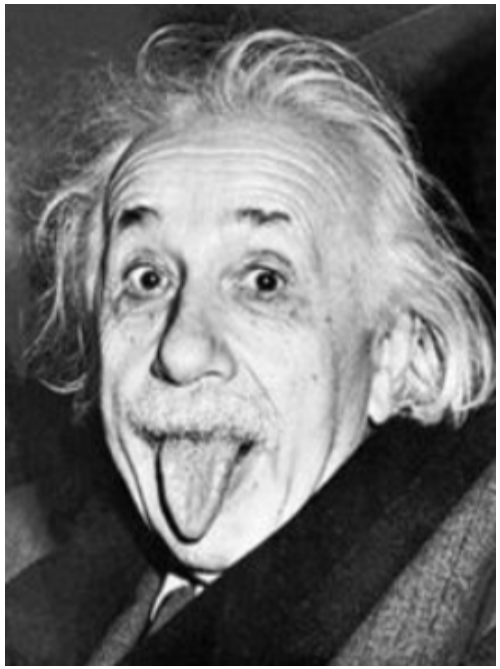


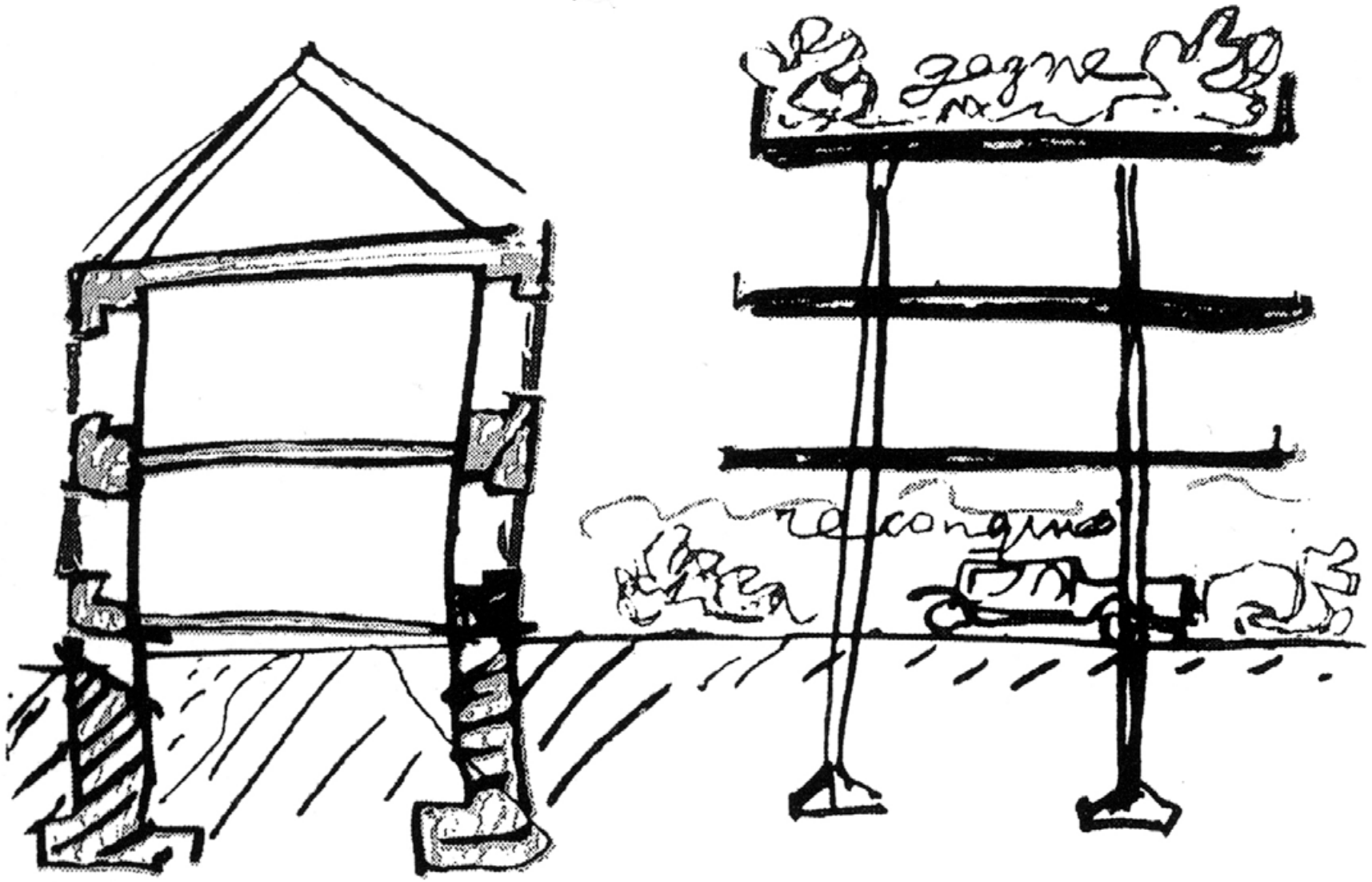

**Kuvio 26** Rakennuksen hierarkkiset kokonaisuudet koostuvat eri tehtävää ajavista rakenteellisista osakokonaisuuksista (Brandt 1994, 13).




**Kuva 7** Uudisrakentaminen uudelleenkäytetyillä rakennusosilla (Järvelä 2021) suhteessa resurssitehokkaan rakentamisen hierarkiaan (Häkkinen & Kuittinen 2020, 179).


EQUITY
Materials in the economy are cycled at continuous high value.
All energy is based on renewable sources.
Water is extracted at a sustainable rate and resource recovery is maximized.
Biodiversity is structurally supported and enhanced.
Human society and culture are preserved.
Health and wellbeing of humans and other species is structurally supported.
Human activities generate value in measures beyond just financial.
7 PILLARS
of the Circular Economy
TRANSPARENCY
RESILIENCE

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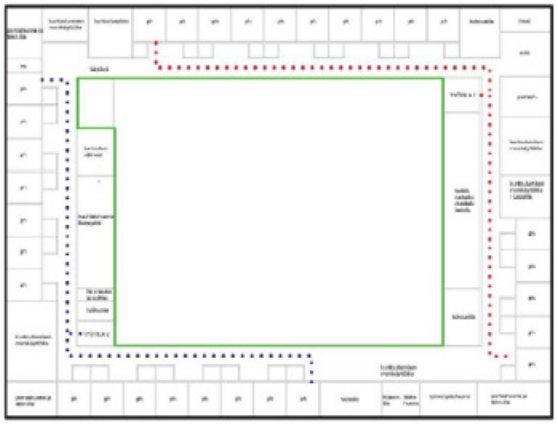
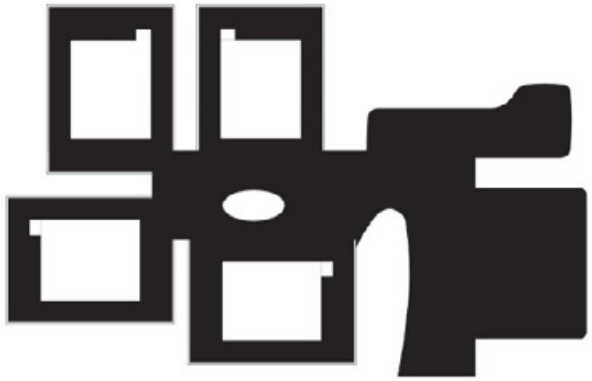
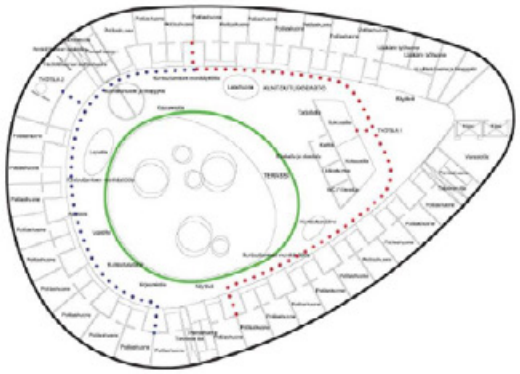


Hyötyala 1454m2
Bruttoala 2330m2
Käytävän pinta-ala 620m2
Maksimi etäisyys työtila 1 - potilashuone 51,9m
Maksimi etäisyys työtila 2 - potilashuone 39,8m
Vaipan pituus 251,2m
Vaipan pituus 177,9m





Bruttoala 2150.8m2
Hyötyala 1453m2
Käytävän pinta-ala 440m2
Maksimi etäisyys työtila 1 - potilashuone 39,2m
Maksimi etäisyys työtila 2 - potilashuone 37,5m
Vaipan pituus 190,8m
Vaipan pituus79,5m

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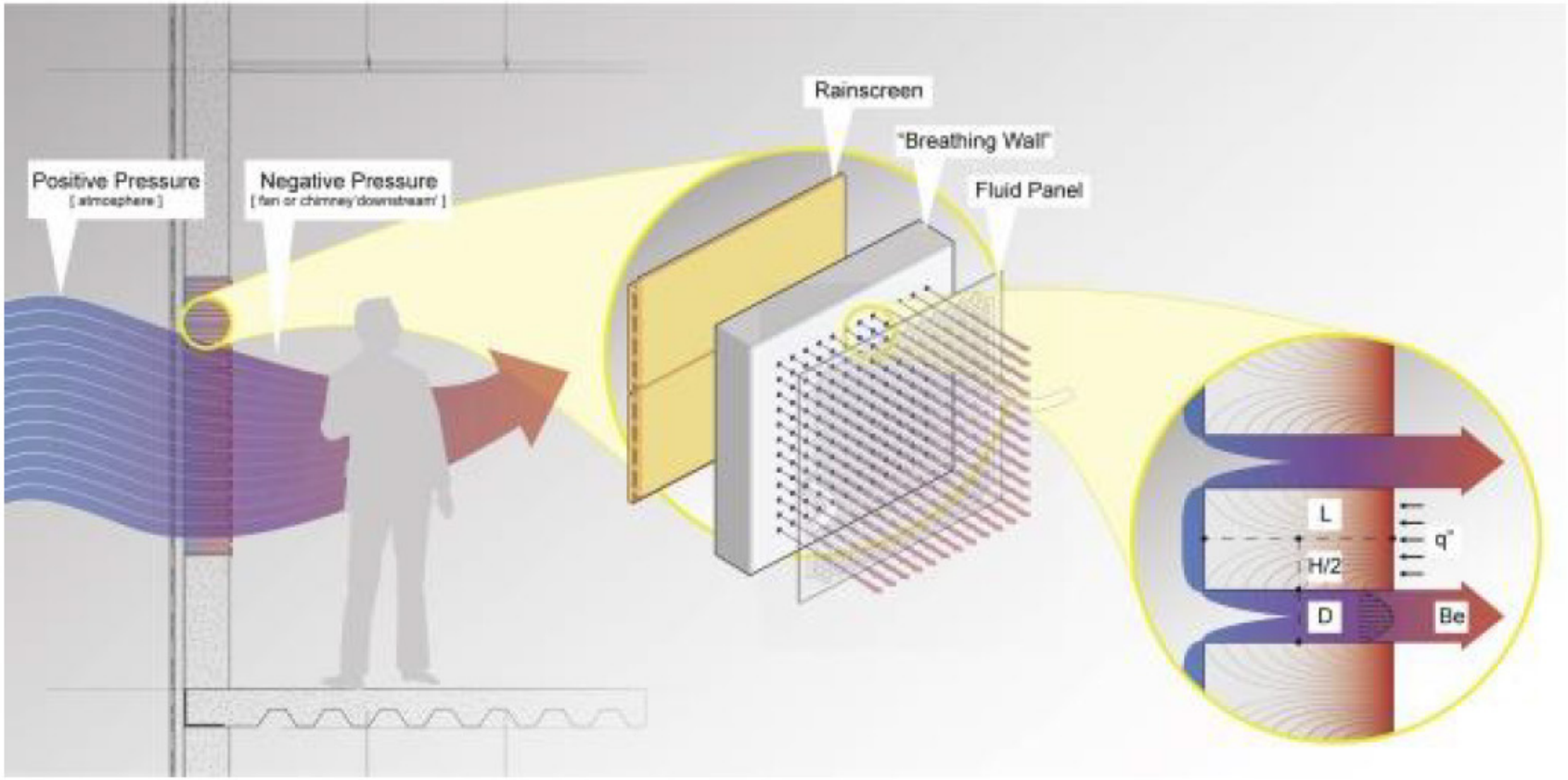
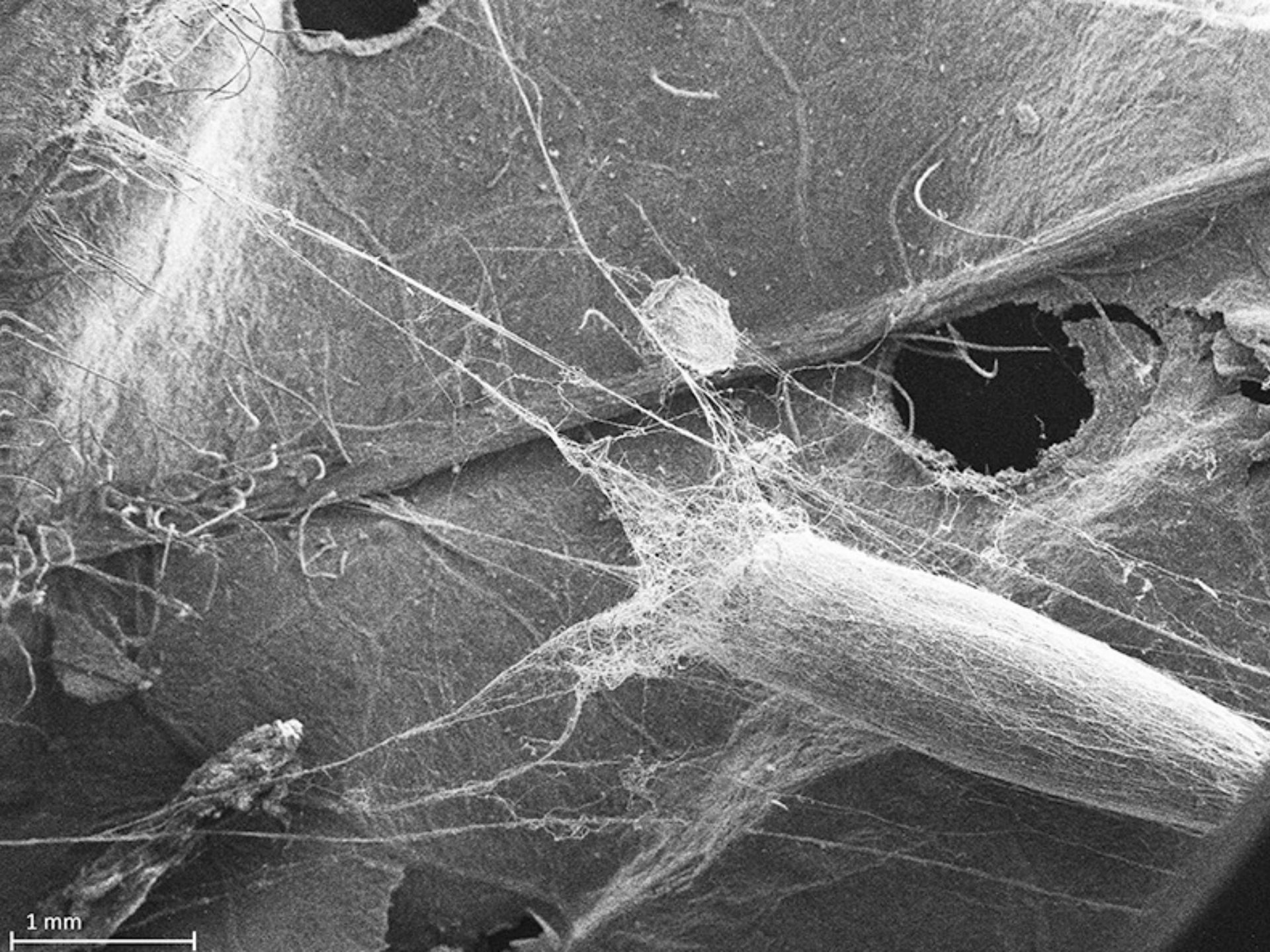



Salman Craig, Jonathan Grinham : Breathing walls: The design of porous materials for heat exchange and decentralized ventilation , 2017

Apple HQ, Foster and Partners, Salman Craig,:  Breathing walls: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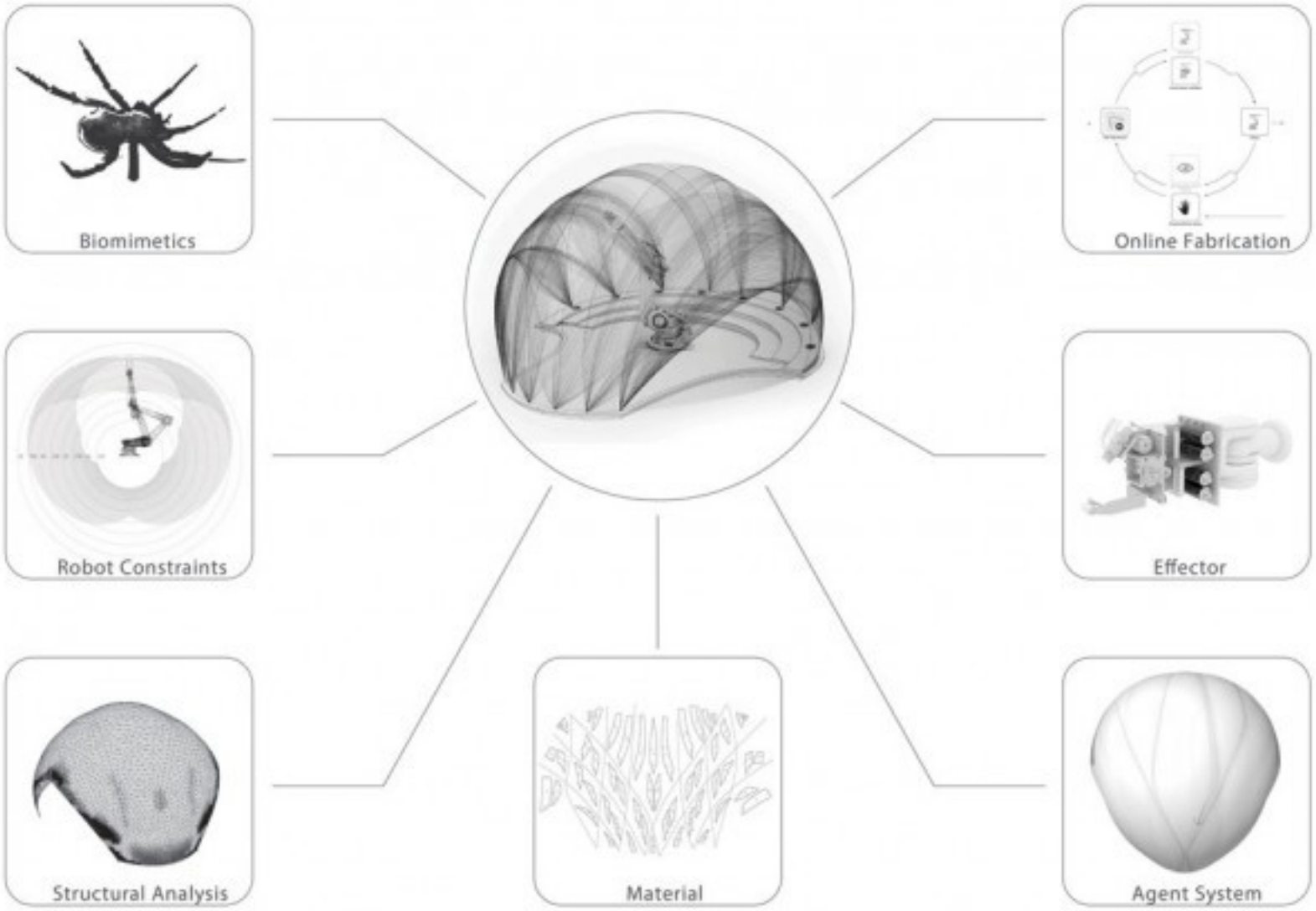
ICD-ITKE Water spider Pavillion – University of Stuttgart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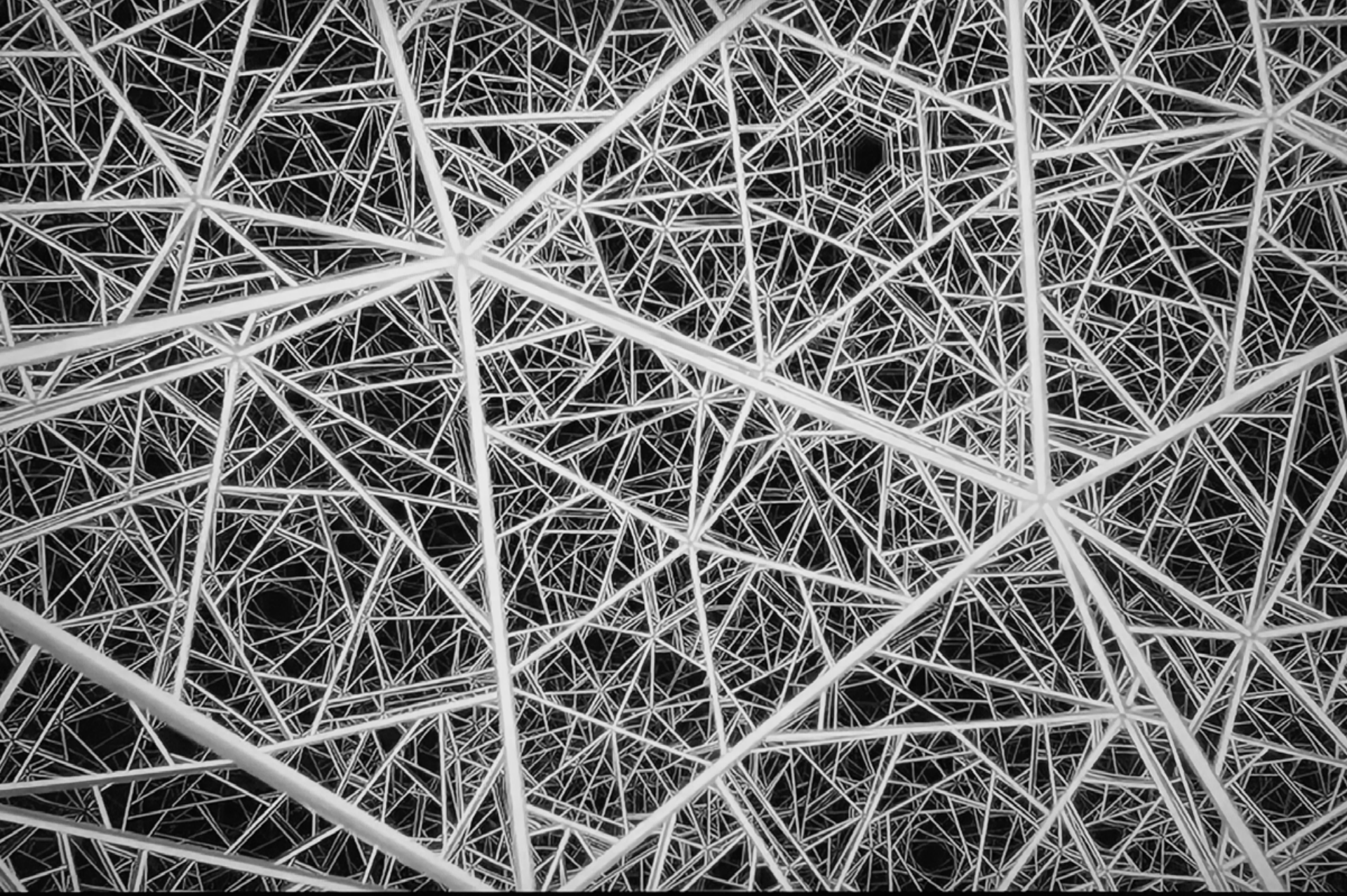
Online Fabrication
Robot Constraints
Effector
Structural Analysis
Material
Agent System



KETTERYYS

NOPEUS

CHAMOSON, SAVIOZ FABRIZZI

CHAMOSON, SAVIOZ FABRIZZI

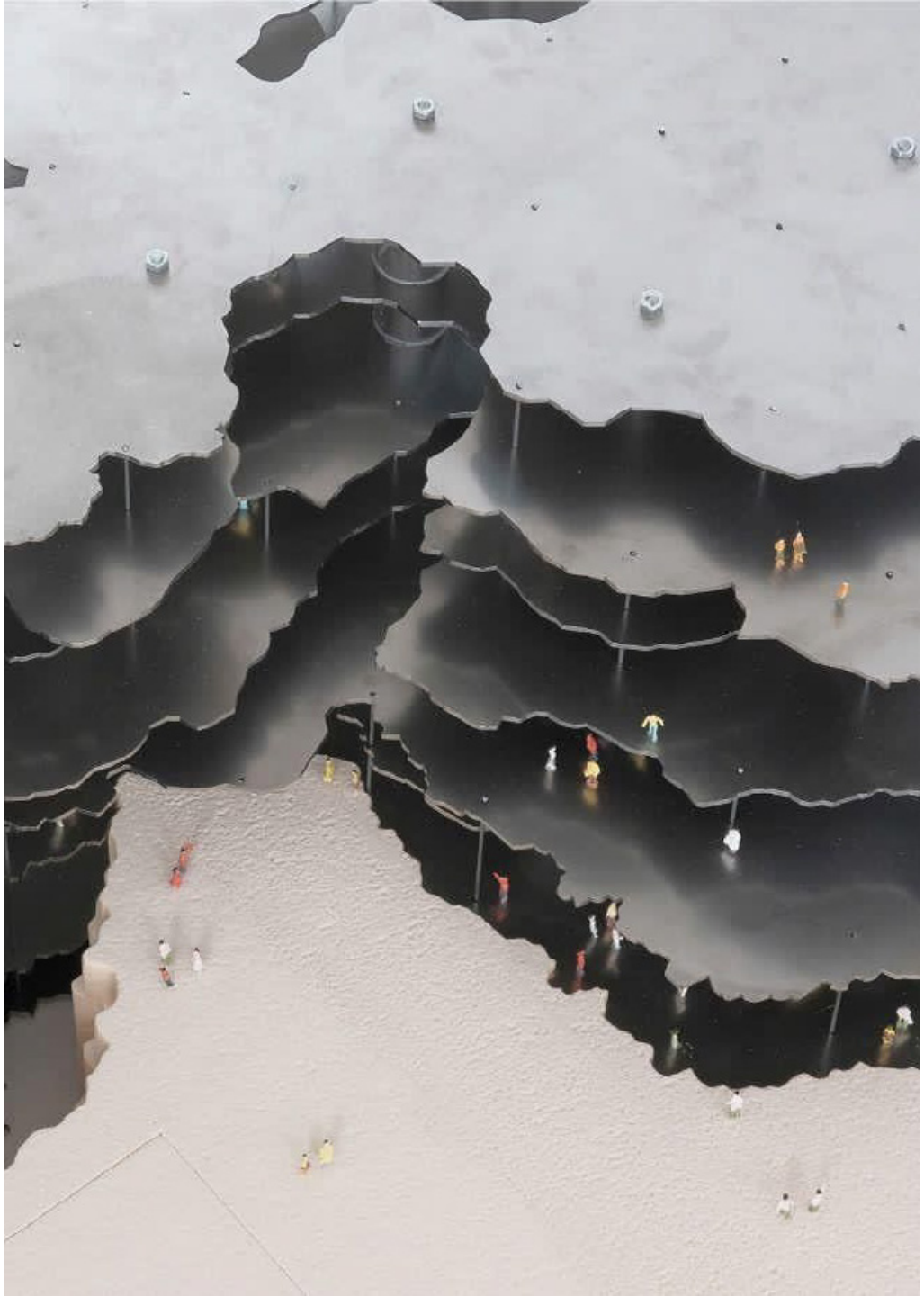
HOUSE RAUCH

HOUSE RAUCH

GEMINI SILO HOUSING, MVDRV

GEMINI SILO HOUSING, MVDRV

# MONINAISUUS



# Sports and Cultural Facilities, Reversible Public Car Park, and Shops

*Marseille, France 2019–*

スポーツ文化施設、転用可公共駐車場、店舗
フランス、マルセイユ 2019〜

Collage-building, machine-building, block-building – this new building for Marseille's flea market can boast all these names. It is a structure that will be seen from afar and mark the entrance to Marseille. It must reflect the image of a modern metropolis, its complexity and its richness. It must take advantage of the energy of the place.
It draws its strength from the simplicity and rigor of its apparent construction techniques, while leaving itself open to the scalability of the inserted programs. To soak up the energy of the place to better reorient it is to combine strength and flexibility architecturally and to succeed in reconciling these 2 characteristics, which are not opposed in such a context. It takes strength to insert oneself into this hectic but stimulating urbanity, and in this landscape reshaped by the flow of the roads within it. Flexibility is needed to show oneself worthy of this place, one marked by the hybridity of uses and practices. This requirement is fortunate. The new block is home to 4 programs – retail, car, sports, and leisure. Even if each program has its own rhythm of operation, it is possible to play on tangents or certain connections that make this coexistence of dynamics visible and stimulate the energy that is so particular to the building.
In a skillful game, the project highlights and withdraws elements. The straight external ramp of the car parks, which runs continuously, serves 4 parking levels and uses a large slant to regulate the main façade of the building. Here the scenography also reflects the scale of the car, as viewed from inside a vehicle.

# JOHDONMUKAISUUS


PERI
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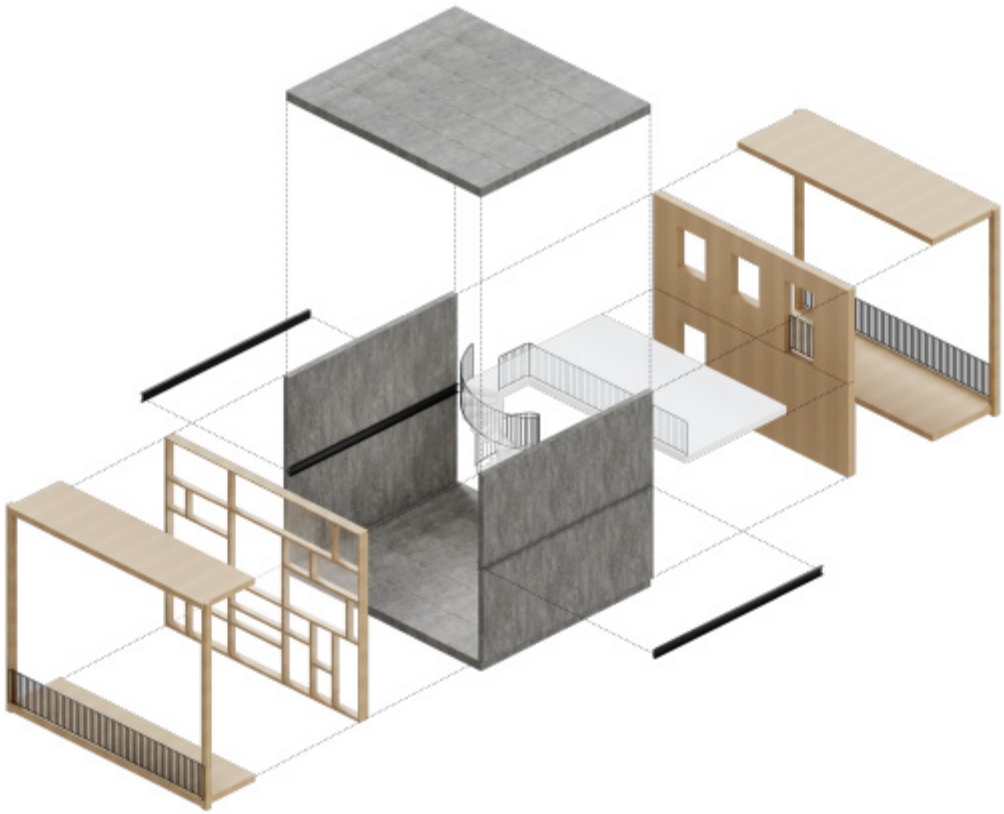
ØRESTAD TOWN HOUSES, LENDAGER GROUP

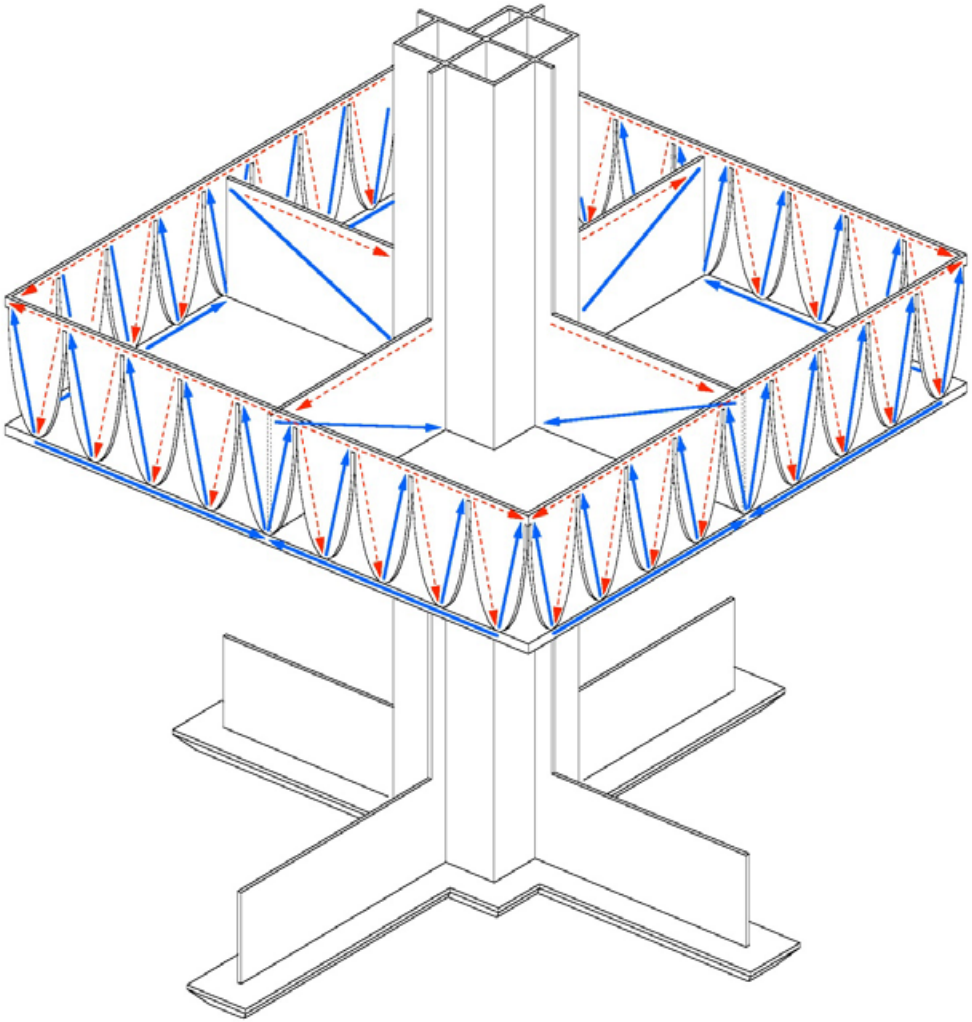

Carlsberg



**Kuva 25** Konseptuaalinen ehdotus 1970-luvun asuinkerrostalon ehjänä purettujen BES-elementtien uudelleenkiinnityksestä mekaanisin liitoksin (Kemppainen, Nieminen & Järvelä 2021).

# NÄKYVYYS

# TÄSMÄLLISYYS



STRUCTURAL SCHEME / 1 : 400

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Christian Keretz – Single wall house, Zurich, 2013

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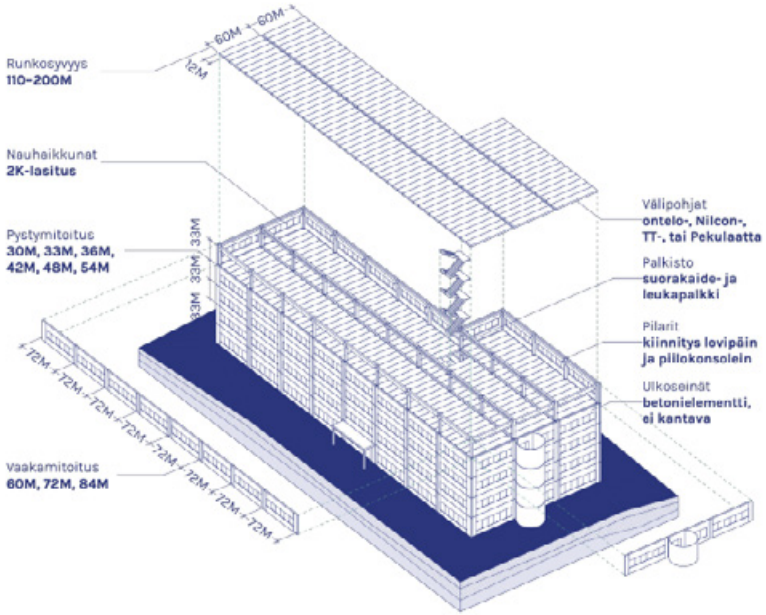
Christian Keretz – Single wall house, Zurich, 2013

YKSINKERTAISESTI IKUISTA?




**Kuva 28** Esimerkki 1960–1980-lukujen toimistotalosta (Järvelä 2021).

**Kuva 29** Kierrätetyn kerrostalon runkorakenne (Järvelä 2021).

**Kuva 39** Näkymä neliöstä (Järvelä 2021).