From concrete waste to walls

An investigation of reclamation and digital technologies for new load-bearing structures

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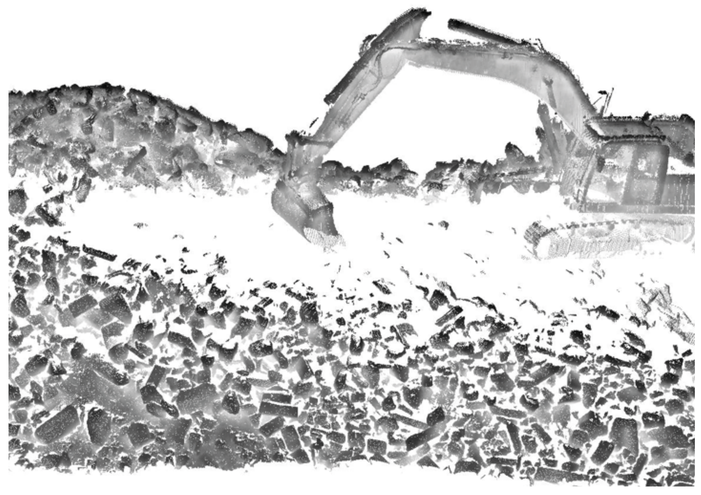
Our research explores opportunities in using unaltered concrete rubbles from demolition for the digital construction of structural walls. Through research by iterative making, we identify relevant upcycling processes and design strategies and explore new tectonics specific to reclaimed concrete rubbles with non-standard variable geometries. This iterative research proposes accessible and scalable digital processes to overcome the challenges inherent to this untapped construction material. A full-scale prototypes was built next door as a first step in developping such constructive logic. Reach out for a visit!
Video of the fabrication process:

sxl.epfl.ch/digital-upcycling

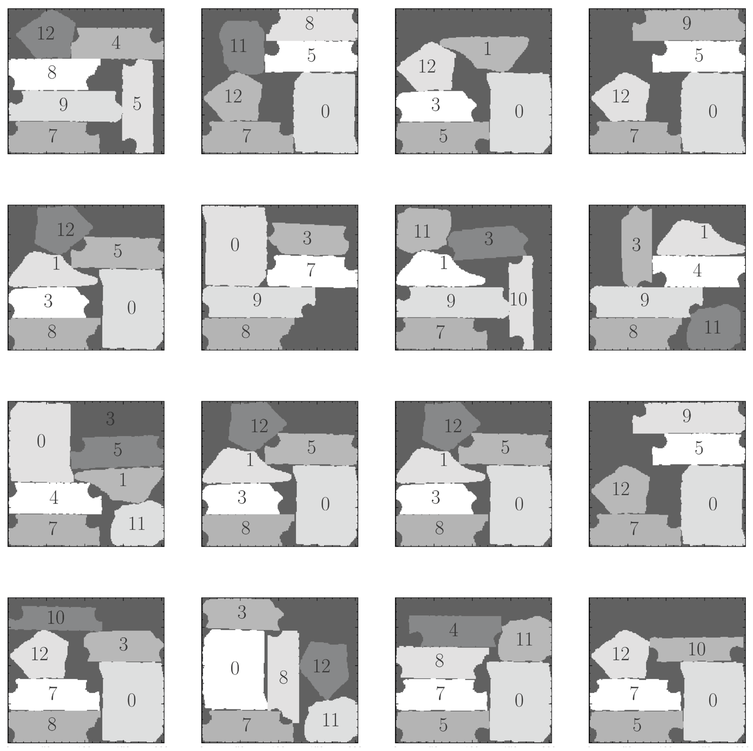
Expected boundary detection from RGB images of concrete rubble piles



Scanning full-scale rubbles with LiDAR for stock analysis

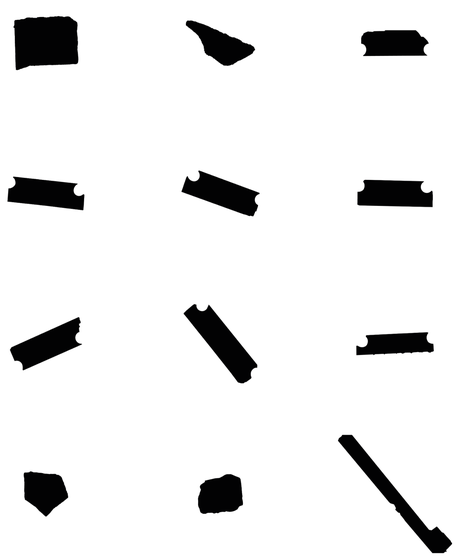
Tools and processes involved in the end of life of reinforced concrete

Built full-scale prototype (visible next door) hinting at new challenges to be addressed to embrace such constructive logic.

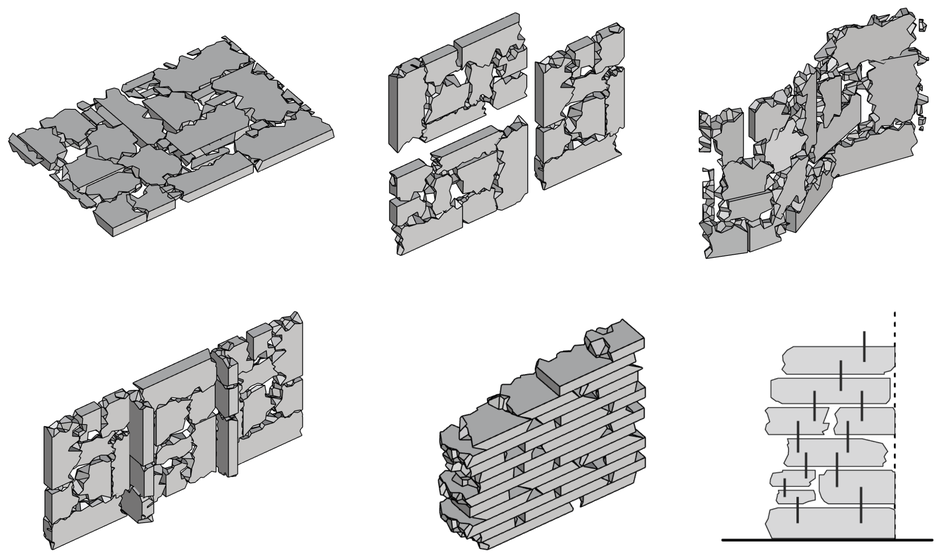


Solutions of the packing algorithm developped by EESD, EPFL, applied to large concrete rubbles for a single leaf wall

Concrete drill mounted on a 7 axis industrial arm, able to drill through concrete (rubbles) at full-scale



Bitmap of the scanned rubbles from top-down images generated by LabView and Grasshopper



Additional geometric arrangement options for wall stability and section of connection strategy