BUILDING BYTES **: 3D printed bricks for architecture**

www.buildingbytes.info

Project Synopsis:

Combining a traditional building material (ceramics) with a new fabrication technique (3d printing) to re-think the fabrication an ancient building component (bricks), Building Bytes demonstrates how 3D printers will become portable, inexpensive brick factories for large-scale construction.

What the innovation is and why it is innovative

Building Bytes is the first project to demonstrate how desktop 3D printers have the power to change architecture. Rather than constructing an expensive, custom printer, Building Bytes uses a standard desktop 3D printer, a technology that is quickly becoming available to designers worldwide, to fabricate bricks for architecture.

The only modification needed to existing machines is a customized extrusion system (printing head) that was developed to accommodate any liquid material, such as ceramics or concrete. This simple system allows designers and fabricators to source local building materials that are both available and familiar to local builders.

Building Bytes also offers designers and architects far more opportunity for ingenious design than a standard extruded brick. Printed bricks can have complex exterior surfaces, permitting interlocking or curvature of the final structure, while their internal structure can be engineered to significantly lower their weight or increase their strength at stress points for a particular build.

Where and when it originated, has been used, and is expected to be used in the future

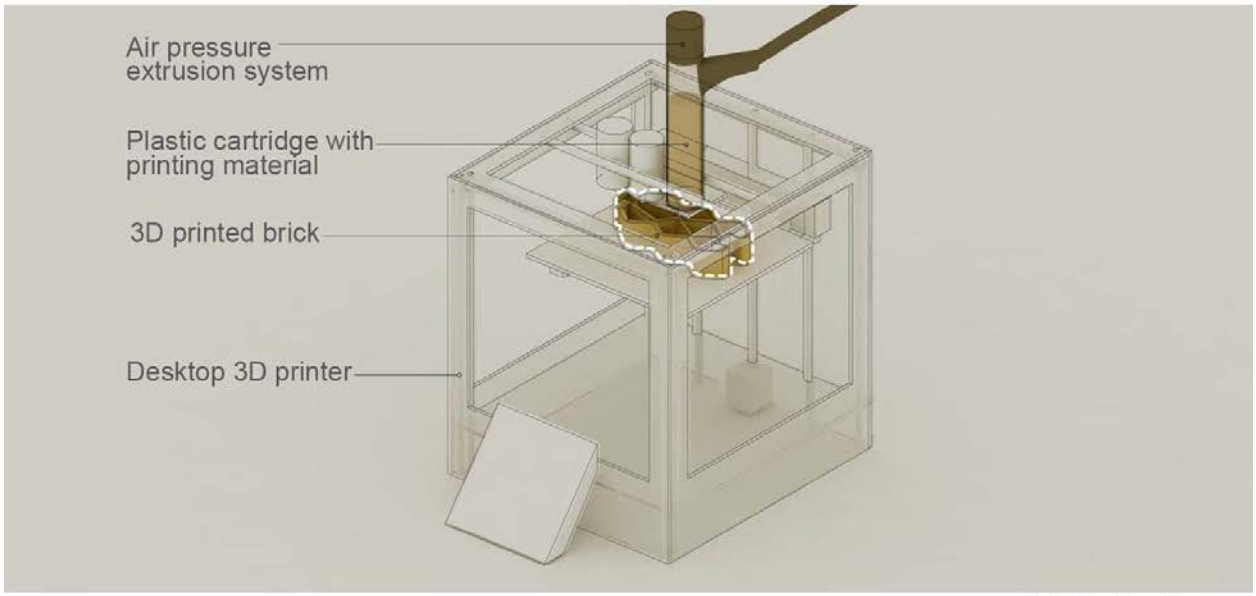
The bricks were developed initially during a 8-week residency at the European Ceramic Workcentre in the Netherlands. Four brick types were developed to test and demonstrate the potential of this fabrication system and its full scale applications in interior and exterior architecture. New forms and materials are currently being developed and tested, with the hope of having structural testing done next year. The aim is to see these accessible 3D printers being used on building sites throughout the world.

What it changed or replaced

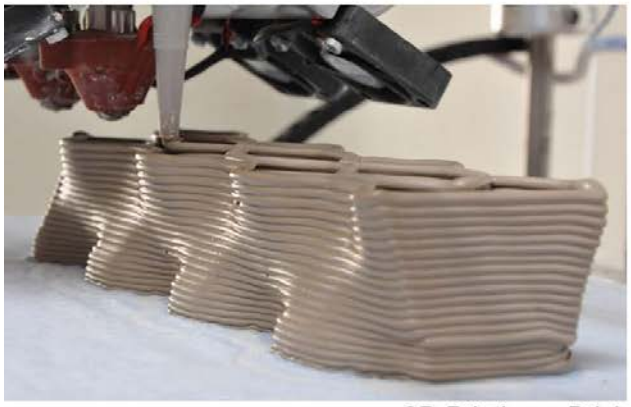
Bricks are an ancient building component and their fabrication has seen several innovations throughout history. The fabrication, however, has consistently relied on moulds or simple profiles which were produced on brick extrusion machines. Building Bytes explores the new design and material possibilities offered by the use of 3D printers for the fabrication of bricks.

If the nomination is for an innovative project, specifically identify each of its innovations.

1. Fabrication System: Using 3D printing to fabricate bricks for architecture
2. Material: Created a custom printing system for the 3D printer to print with ceramics.
3. Design: New design possibilities for bricks –complexity and multiple functions can easily be incorporated
4. Design Process: Using parametric design software to develop each brick design. Both the overall form and the individual bricks were designed using parametric software (Grasshopper) that allows quick visualization of various design options, while also providing specific information about each brick such as the cost, printing time, and position within the full scale assembly.

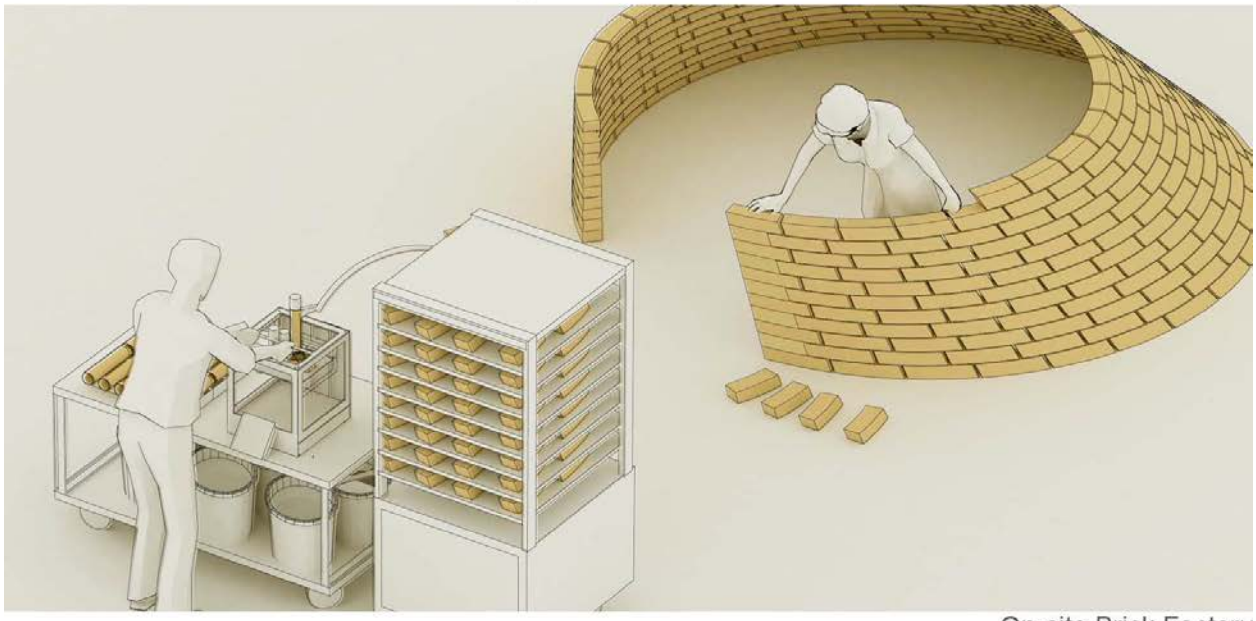


Fabrication System



3D Printing a Brick

3D Printed Brick



On-site Brick Factory