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TOVA: SPAIN'S FIRST 3D PRINTED BUILDING

Posted on October 7, 2025 by Dima Fadel

Categories: expanding design practices, Formats, IAAC, Low Density, Project, Technology and fabrication, Topics, Valldaura Labs

Tags: 3D printing, Advanced Architecture, Affordable Housing, Circular design, Climate Adaptation, community architecture, computational design, Digital fabrication, Digital paradigm, Ecological design, Local materials, Robotic Construction, sustainable design

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To address the pressing issues of climate change and the global housing crisis by exploring innovative, sustainable construction methods that can be implemented anywhere in the world. Developing a rapid construction technique that utilises local earth and 3D printing technology, allowing for customizable and adaptable housing solutions that minimise environmental impact.

A sustainable construction prototype developed by IAAC's 3D Printing Architecture (3DPA) postgraduate program, focusing on innovation in building practices. The key output of the TOVA project is the successful construction of Spain's first 3D printed building using local earth, completed in just seven weeks with zero waste and a near-zero carbon footprint.

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TOVA incorporates a variety of sustainable features, such as walls designed with air cavities for insulation and a compact, expandable structure to maximise outdoor living space. The construction process generates zero waste and utilises a unique mixture of local materials to ensure environmental sustainability.

The project emphasises the importance of local sourcing, drastically reducing carbon emissions associated with traditional construction methods, which are responsible for a significant percentage of global CO2 emissions. TOVA serves as a model for how 3D printing can transform construction, offering rapid, customizable, and environmentally friendly housing solutions.

The project was executed using a Crane WASP 3D printer, which allowed for precise and efficient construction. The building design was tailored to the local climate, ensuring longevity and resilience.

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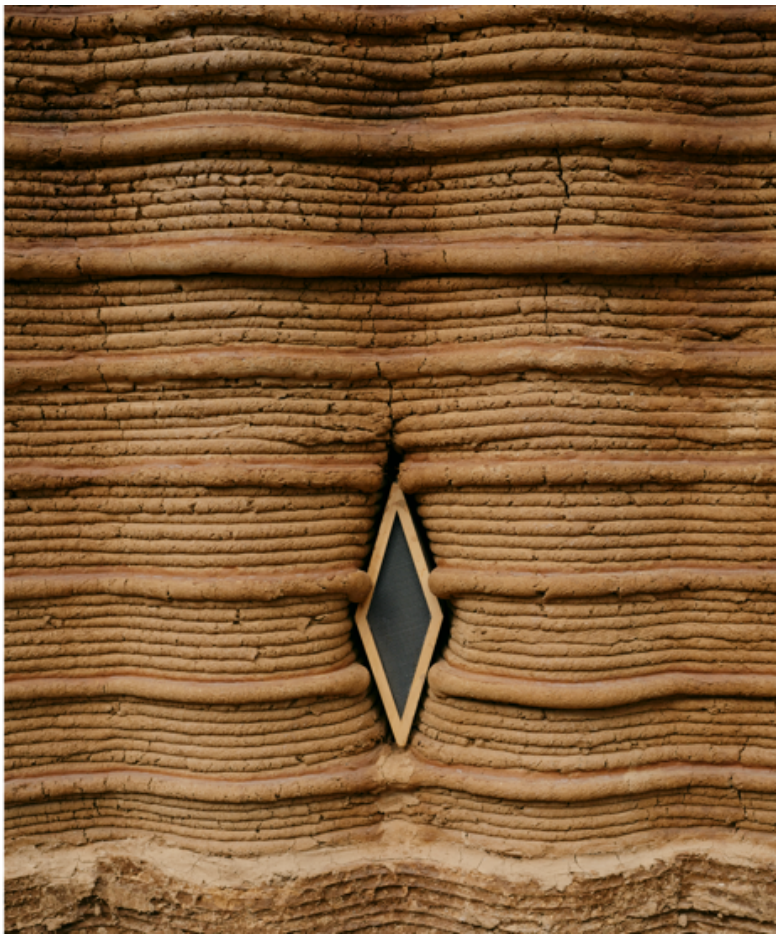
The construction methodology emphasises minimal waste production and adaptability, making it suitable for various applications, from homes to public spaces.



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Who is it for?

Architects and Builders: Professionals interested in sustainable construction techniques and innovative design solutions.

Policy Makers and NGOs: Organisations looking for scalable solutions to address housing shortages and environmental concerns.

Communities: Local populations in need of affordable, sustainable housing options in response to climate change and migration challenges.

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