

Fabri(cate) Lilong Housing: 3D-Printing Mat-Urbanism

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Abstract

This project investigates the Li-long, a local housing typology in Shanghai and a threatened form of mat-urbanism which has the potential to provide an alternate urban model to the proliferation of high-rise housing towers across China. The Li-Long is redesigned at both the typological scale and the urban scales to explore the architectural opportunities of concrete 3D-printing. Working with building components in layered assemblies, it leverages the customization potential to synthesize programmatic, spatial, and structural considerations. In 3d printed structure, common architectural motifs and building components have to be re-thought to fit the logic of layered construction. The design utilizes the archaic strategy of corbelling to create window and entry openings. Similarly, concrete density can be manipulated for structural optimization. The Smart

Poche Wall explores various poche strategies in vertical wall assemblies for housing clusters, such as calibrating density for party wall between units, altering in thickness for core circulation, and attenuating for thin glazing transition.

At the cluster scale, a wedge-shaped plan module produces various scales of intimate and open courtyard spaces when aggregated. The proposed design can achieve a FAR of 3.0 that is comparable to the residential tower complex common in urban fringes. The project re-configures the Lilong's spine organization into a weaving network of semi-public alleys and courtyards for the public and private social activities. Through its proposed construction methods and spatial design, this project aims to address the social and technological dimensions that have often been eradicated by a large residential tower complex.

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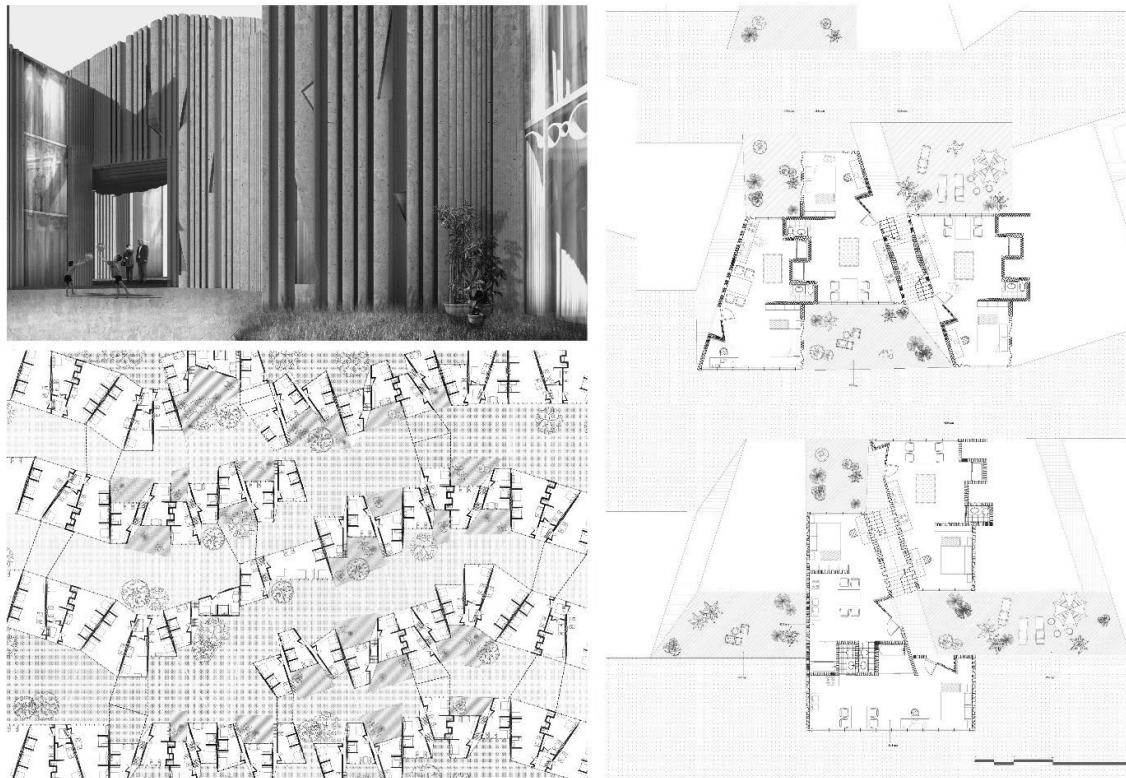


Figure 1. Design of Lilong unit cluster variations and block aggregation. Leslie Lok.

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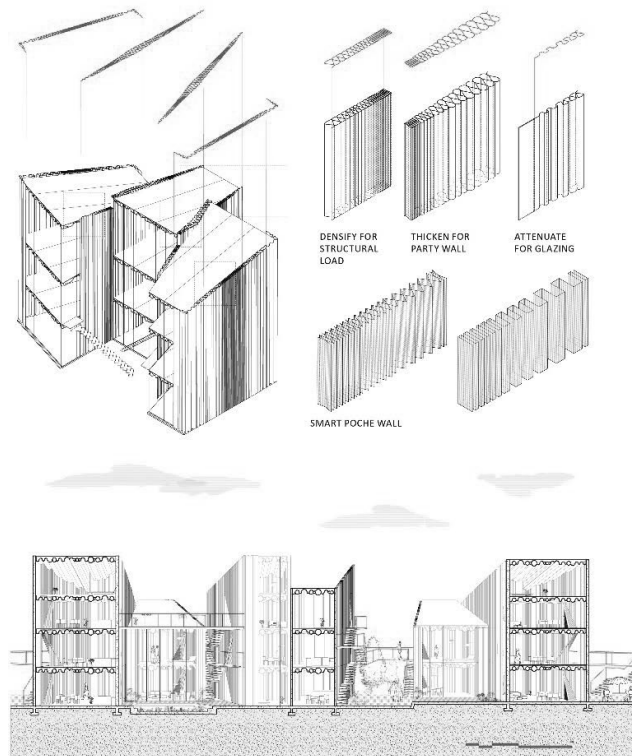


Figure 2. Smart Poche Wall variations (top left), Cluster section (bottom left), Smart Poche Wall full-scale 3D printed concrete prototype (right). Leslie Lok.

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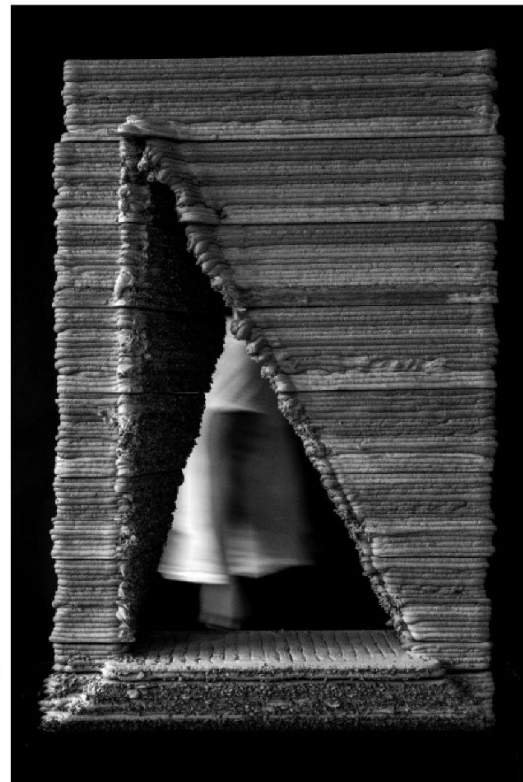
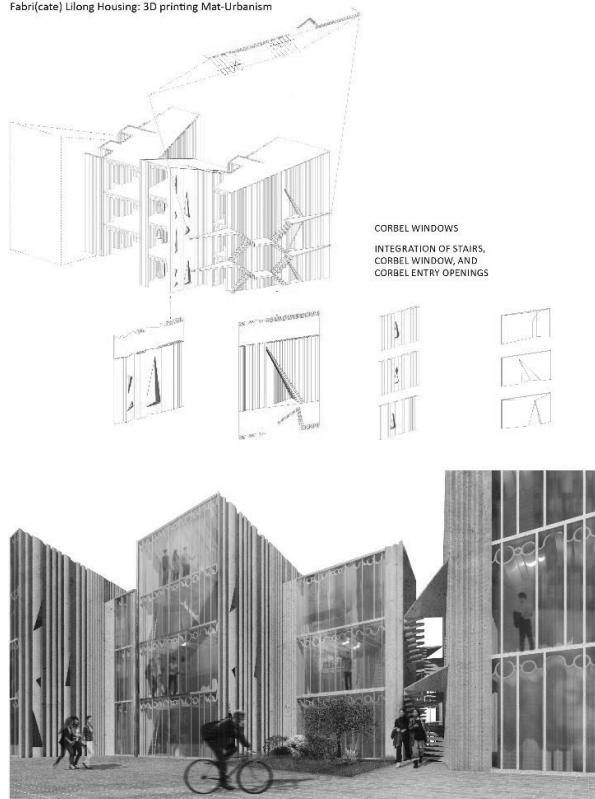


Figure 3. Corbel window and entrance openings studies (top left), Perspective from public alley (bottom left), Corbel Window full-scale 3D printed concrete prototype (right). Leslie Lok.