ABSTRACT

FAT FACADE : VERTICAL PUBLIC SPACE

by

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This thesis proposes that the facade of a building, typically seen as a boundary, can become volumetric and inhabited with program. Shanghai's library, currently a sprawling, horizontal megaform, is reconfigured as a thin vertical envelope that attaches to the facade of an existing building. The inner, existing tower uses the efficiency of stacked floor plates for office and book storage, while the facade becomes a cultural interface with the city, bringing porosity and collectivity to the high-rise. The new nested tower typology invigorates Shanghai's crowded city center with an institution that lacks space on the ground plane, while providing a layer of climate control for the tower through a programmed, structural façade. Two latent byproducts of capitalism, skyscrapers and skin systems, are exploited to produce a typology for a high visibility, but low-footprint, institution for the city.
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PREFACE

This thesis is both a culmination of, and a step along the way, in a lineage of thinking that has developed over my time at Rice in relation to the tower and the facade, their relationships to capitalism, and their roles in the city. *My project for Neyran Turan's Islands and Voids studio, “Down-rise,” took the stance that towers can be invisible from afar, capitalizing on the dropping topography at the edge of the city in order to embed inverted towers in the ground, the only facades being internalized. My project for Troy Schaum's Megaform and the Swarm studio, “Skin Deep,” turned to the building envelope (both in terms of overall massing and skin system) as a place for innovation that can guide an architectural intervention as a whole.* With my thesis, I attempted to re-envision the highrise typology by amplifying the role of the facade as a thickened interface between city and institution.

Architectural figures who influenced my exploration of the facade include Corbusier with his Maison Domino, which minimized the role of the facade (this project's antithesis), Piano and Rogers' Centre Pompidou, an important precedent for the dream of walking on a facade, and Alejan-
dro Zaera Polo's recent writings on the envelope. Architectural figures who influenced my explorations of the tower include Corbusier with his horizontal "groundscrapers" and vertical cities; Greg Lynn with his thesis, Stranded Sears Tower, which delaminated the bundled tube structure of the existing tower and reconfigured it horizontally; and more contemporary work by Rem Koolhaas' firm OMA, Joshua Prince Ramus' firm REX, and Bjarke Ingels' firm BIG, which have all begun to explore reconfigurations of the typical tower/podium scheme to benefit the public and the city as a whole.
vertical institution
tower typography
remix
resurfacing as
city growth

ARCHITECTURAL RESEARCH AND DESIGN PROPOSAL
1. RESURFACING AS CITY GROWTH

China expects 12 million people to move from rural to urban locations by the year 2020. This thesis explores a mode of vertical urban growth that expands out from towers to open up new opportunities for city life in dense Asian cities.

Shanghai is a rapidly growing city of skyscrapers, resulting in an abundance of vertical surfaces but a lack of open space.

This thesis proposes that the city can densify vertically by folding the ground plane upward.
Currently the developed grid iron prevents growth.
Existing tower is isolated from city fabric.

City fabric envelops existing tower.
The city itself as facade.
The existing building envelope provides new surfaces for cultural amenities.
New program gains elevated views while shading the existing tower.
REWORKING THE TOWER TYPOLOGY

The high-rise, in all of its shapes and forms, arose as a formal solution for density, but remains a highly constrained architectural intervention. The high-rise is constrained by several key issues: structural loads, circulation, light, and access to greenspace.

This thesis is predicated on the idea that the facade, though often underutilized and dismissed architecturally in the past as a purely decorative surface, is best positioned to accommodate innovation in the tower typology. A "fattened" facade is introduced to Shanghai as a programmed, structural sleeve that wraps a generic tower core. Working within the constraints of the existing high-rise, the reworked tower typology densifies the city without occupying new sites by invigorating urban centers with cultural programs that lack the necessary space on the ground plane.
A sky lobby above the existing tower holds double height exhibit spaces and supports a protective rainscreen. The south facing curtain wall, currently a solar oven, is transformed into a solar playground of varying light and temperature conditions.

Axonometric diagrams of new skin and program (blue, turquoise, and pink) and existing tower (black).
Diagram showing how much intermediate space (and potentially occupiable space) is added to the tower between new and old skins in relationship to existing floor plate.

100% TOWER  127% TOWER  155% TOWER
Axonometric diagrams illustrating how much potential square footage the tower gains in total.
VERTICAL INSTITUTION

The strategy of accommodating program vertically involves interlacing collective programs with the constraints of an existing high-rise. The starting point is a generic tower, built based on a formula of efficiency through stacked floor plates. The skyscraper typology has developed as vertically striated space around a load-bearing core. This thesis encrusts one such generic tower with a new architectural typology, a cultural and climatic skin. The outer layer offers a new prototype for an institution: reinterpreting the public library as a sleeve of collective programs that cantilever over the city: gardens, reading rooms, auditorium, and exhibition.

Nesting dolls as a model for the vertical reorganization of an institution as a concentric tower.
The typical office tower is composed of repetitive programs that directly lead to repetitive form. A library is composed of varied programs, which, in this thesis, present themselves as a variety of forms on the outside of the existing tower. The splicing of double height book voids into the existing tower sets up a regular gridiron that allows these voids to cantilever out from the tower over the city.
In the existing central library, cultural amenities are hidden inside the podium, and books are inaccessible in two towers. The proposed library as tower pulls the public up around the entire archive, making cultural amenities visible on the exterior.
A gradient of light from interior to exterior allows programs to receive varying degrees of light, protecting books on the interior, providing filtered, even light to reading rooms, and creating sunny terraces on the exterior.
Books are used as a counterweight for the cantilevered library programs.
Axonometric diagram of one double height book vault.
DESIGN DETAILS AND RENDERINGS
SELECTED FLOOR PLANS
SITE PLAN WITH SHADOWS OVERLAID

SITE SECTION LOOKING NORTH
SECTION CUT THROUGH TOWER
CORE LOOKING EAST

FLOOR PLAN DIAGRAMS SHOWING
OFFICE SPACE IN WHITE, NEW PROGRAM IN DARK
PINK, AND NEW ENVELOPED SPACE IN LIGHT PINK
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APPENDIX

APPENDIX 1: INITIAL THESIS RESEARCH

At cities around the world density, they build up with many more exterior vertical surfaces than horizontal.

Between 1992 and 1997, over 2,500 high rises were built in Shanghai alone, of which 1,000 rise to over 20 floors.

High rises in China are often torn down after 20-30 years, generating a huge amount of waste upon demolishing.

What if the facades of existing high rises were seen as dormant tabula rasas? Buildings as commodities gain a longer life.

The horizontal public realm can extend upwards.

By creating a feedback loop next to an existing facade.

China has been building skyscrapers since the 1980s.

Any number of public programs could be placed on a facade.

Creating a new father city.
by resurfacing one tower
drawing the public realm upwards begs the question of how can the public realm coexist in an environment of commercial architecture?

the institution of the public library provides a programmatic vehicle for extending the public realm onto a facade

the library provides program malleable enough to be placed on a facade

existing office tower
existing central library

circulation by elevator

natural light

public annex

The existing central library gains a public annex in the form of a sleeve that wraps around an existing building.

existing office tower

new facade

podium resurfaced

bowl for pedestrian access

Circulation cores

Entry points

Site plan
LEFT: TYPICAL FLOOR PLANS
RIGHT: DIAGRAM OF EVERY FLOOR, SHOWING EXISTING TOWER IN WHITE, NEW PROGRAMMED SPACE IN DARK PINK, AND NEW ENVELOPED SPACE IN LIGHT PINK
SECTIONAL DIAGRAMS THROUGH EAST, NORTH, WEST, AND SOUTH FACADES

SECTIONAL PROGRAM DIAGRAM LOOKING SOUTH
Program occupies the space between a new outer skin of operable glass and louvers, and the existing inner skin of curtain wall.
NIGHT ELEVATIONS: WEST, NORTH, EAST, SOUTH