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ABSTRACT

150m² - 40m² - 60m³

Pencil Towers are slender pencil-like apartment buildings. They are commonly found in high-density Asian cities such as Hong Kong, Tokyo and Singapore. Focusing on Hong Kong as the context of research, this thesis explored the causes, implications and possibilities of invention in this phenomenon.

Pencil Tower is a hyper-specific typology. Typically, the footprints of these buildings are exceptionally small that each floor of a Pencil Tower consists only of an apartment, an elevator lobby and a pair of scissor stairs. The usable floor area of such apartment ranges from 25m² to 40m². By means of negotiating with various building codes and economic realities, the act of building such slender apartments within any limited building plots in the city becomes very profitable for developers. The typology of Pencil Tower works well along with various external pressures (historical, economical and legal considerations) of the city. This thesis, therefore, understood Pencil Tower typology as a hyper-specific evolution of building type which is only feasible under these context-specific external pressures of Hong Kong.

However, architects are rejected by Pencil Towers. The main concern is that the concept of luxury is non-architectural in Hong Kong. For instance, if an apartment is furnished with high-end bathroom and kitchen furniture, top-rated floor and wall finishing, and an extravagant lighting system, it is called luxury. In an extreme case, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use.

Therefore, the main design ambition of the thesis project is to promote an alternative understanding of “luxury living” in Pencil Tower. More importantly, this thesis tried to re-state architects position in the construction industry of Hong Kong. Eight different apartment units were designed to demonstrate how 40m² luxurious living environments could be architecturally generated. In terms of a design exercise, the key challenge was to maintain feasibility within the harsh limits.

Thesis Supervisor:
Yung Ho Chang
Professor of Architecture
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I would like to also thank Filip Tejchman, my second reader, whose critiques have been supportive and constructive throughout.

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At last, I owe my deepest thanks to my family, for being supportive over the past six years; for believing me in pursuing my academic dream whole-heartedly; and for understanding my nomadic life over the past few years. Thank you very much.

Thanks,
Kian
Jan 2012
"Pencil Tower" refers to the slender pencil-like apartment buildings that are found commonly in Hong Kong. These buildings consist of one apartment with usable floor area as little as 40 square meters at each floor. The load-bearing structure of these towers are reinforced concrete. They are found all over the city, especially in the older parts of city fabric. In most cases, the floor plan takes up the maximum tolerance allowed by the building codes at each specific plot.
I PREFACE | Emerging 40sqm
Data – Architectural documents of Pencil Tower
History – Emergence of Pencil Tower in Hong Kong
History – Evolution of 6 basic typologies
Context - Pencil Tower at Mongkok, Hong Kong
Context – Scale of Manhattan and Mong Kok
Economy – Marketing trend of Pencil Tower
Socio-cultural analysis – Target group and demography
Conclusion - Priority of Constructing Pencil Tower

II INQUIRIES | Obsolete 40sqm
Surplus – Volume
Surplus – Usage
Surplus – Sensation
Rethinking definition of luxury
Delicacy Vs. Extravagant

III DESIGN AGENDA | Saturating 40sqm
Hypothesis – fitting 90 luxury programs into 40sqm
Design agenda - Floor area VS Floor usable area
Design agenda – Implicit VS Explicit way of organization 40sqm

IV DESIGN TACTICS | How to maximize usable area?
800mm module (690mm width)
800mm – as a tool to maximize usable area
Material thickness VS 800mm
Sectional possibility VS 800mm
Planometric possibility VS 800mm

V ELEMENT DESIGN | Rethinking domestic functional elements
800mm shelves
800mm Stairs
800mm window
800mm Scissor Stairs
800mm Loft
800mm Ceiling

VI APARTMENT PROPOSAL | Hyper-luxurious unit
65 m² - Luxurious Window 1.0
85 m² - Luxurious Wall 1.0
90 m² - Luxurious Shelves 1.0
80 m² - Luxurious Balcony 1.0
80 m² - Luxurious Window 2.0
90 m² - Luxurious Stairs 1.0
95 m² - Luxurious Scissor Stairs 2.0
100 m² - Luxurious Ceiling 1.0
Conclusion - Rethinking domestic ways of living

VII CRITICAL URBAN IMPACT
Elevation impacts
Freeing up floor levels
Freeing up floor height

VIII MODEL ARCHIVES

VIII REFERENCE AND BIBLIOGRAPHY
EMERGENCE OF 40m²

PREFACE | Emerging Pencil Tower Typology

Data – Architectural documents of Pencil Tower
History – Emergence of Pencil Tower in Hong Kong
History – Evolution of 6 basic typologies
Context – Pencil Tower at Mongkok, Hong Kong
Context – Scale of Manhattan and Mongkok
Economy – Marketing trend of Pencil Tower
Socio-cultural analysis – Target group and demography
Legislation – Limitation in design
Conclusion – Priority of Constructing Pencil Tower
40m² LUXURY TOWER

This thesis identified an typological phenomenon - Pencil Tower

WHAT IS PENCIL TOWER?

“Pencil Tower” refers to slender pencil-like apartment buildings that are found commonly in Hong Kong. On each floor, these buildings consist of one apartment with usable floor area as little as 40 square meters. The load-bearing structure of these towers are reinforced concrete. This type of building is found all over the city, especially in the older parts of city fabric. In most cases, the floor plan takes up the maximum tolerance allowed by building codes at each specific plot.
Emergence of Pencil Towers is a cultural phenomenon, more importantly, it is an architectural reaction. This phenomenon was an reaction towards the notion of “existenzminimum” in Asia (minimum housing prototype for affordable human habitat) in the early 60s.

MINIMUM LIVING | MAXIMUM EFFICIENCY FLOOR PLAN

[con’d] Under this notion, how to achieve pleasant living environment with the use of minimum amount of instruments and space became an essential consideration while designing apartment units.
As a mathematical challenge, the real estate developers successfully manipulate with minimum dimensions of different domestic functions.

Typically, each floor of Pencil Tower consists of one apartment, an elevator lobby and a pair of scissor stairs. The usable floor area ranges from 25m² to 40m². Negotiating with various building codes and economic realities, it becomes profitable to build these slender apartments within small building plots. Marketed as a contemporary way of living (referred as Affordable Luxury in later Chapter), this building typology provided a new way of living for young middle-income group in Hong Kong.
MONGKOK, HONG KONG

PLOT SIZES: 15m X 10m

Mong Kok, a district in Hong Kong, reflects a typical pattern of city fabric formed during the British Colonial ages. The district is organized by a grid system, within each grid it is further sub-divided into individual plots. Each plot is sized around 15m x 10m.
CAUSE OF EMERGENCE

UNEXPECTED FUTURE DEMAND OF SPACE

As mentioned, this plot size is set by the British Colonial government in the 1910s. It considered the common building types at the time of the early 1900s. These building types are averagely 2-3 storeys high, approximately 4m x 10m in area. They were, therefore, generous building plots at the time of 1900s.

At the early 1900s, it was unexpected that these rural areas like Mong Kok, would become today’s urban city centres. Since the 1950s, there was a huge influx of population from the mainland China into Hong Kong. At the same time, Hong Kong’s light industry has been dramatically expanding. In order to meet the rising demand of space in these urban centres, building taller buildings were necessary in order to meet the market’s demand of space.

EMERGENCE OF 40M² | 2011

MONG KOK, HONG KONG, 2011

EVOLUTION OF SMALL PLOT SIZE
The first generation of building mostly consists of 3-storeys Tong Lau. At that time, each building was occupying half of the footprint at each plot. However, with the expanding population and rapid development in Mongkok, these Tong Laus were replaced by towers with higher spatial capacity. As a result, in the late 1990s, Pencil Towers with over 25 storeys were already a well-established building type in Hong Kong.
COEXISTENCE OF 6 TYPES OF TOWER TYPOLOGY

Building plots at old city fabric are owned by different landlords. The process of development was independent on each other. Therefore, the rate of development could varied a lot within the same area. It resulted a situation that different types of towers with different ages and typologies are coexisting adjacently along one street.
PENCIL TOWER AT MONG KOK

MARKET DISTRIBUTION AND REAL ESTATE VALUES

This study is looking at the area around Shanghai Street and Soy Street at Mong Kok. Looking at these 122 buildings, 11 out of 122 buildings are Pencil Towers, 40 out of 122 buildings are buildings with height of 20 storeys or above.

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**I PREFACE**

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**GENOM**

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**EMERGENCE OF 40M**

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**MONG KOK, HONG KONG, 2011**

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**PENCIL TOWER AT MONG KOK**

**MARKET DISTRIBUTION AND REAL ESTATE VALUES**

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**DATA RESEARCH ON MARKETING VALUE AND LOCATION DISTRIBUTION OF PENCIL TOWER IN MONGKOK, 2011**
AFFORDABLE LUXURY

MIDDLE INCOME GROUP

MARKETING OF PENCIL TOWER

The marketing potential of Pencil Towers is situated in between deluxe private housing and low-income residential housing. Pencil Towers are marketing towards young middle income group. Part of the reason is that this group of people could afford living condition that is better than low-income public housing, but not yet able to purchase at deluxe private estates. The pencil towers, on the other hand, couldn’t provide the generous space that the high-income group demands; as a result, marketing towards these young professional group becomes the best opportunity for developers to maximize their sale revenue.
Every habitable room or a kitchen shall be provided with a clear width of not less than 1050mm and a clear headroom of not less than 2000mm;

Watercloset

Every firefighting and rescue stairway should be enclosed by walls and these walls, the stair lobby, the stairwell or the lift lobby and the machine or pulley room, should be separated from the rest of the building by fire barriers having an FRR of not less than 120/120/120;

Vertical shafts or ducts

Every domestic building, and unless exempted by the Building Authority2 any part of a domestic building which is intended to be separately let for dwelling purposes, shall be provided with kitchen accommodation. [Source: regulation 45(2) of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Lavatories) Regulations Cap. 123 subsidiary legislation]

Natural Ventilation

Every firefighting and rescue stairway should be enclosed by walls and these walls, the stair lobby, the stairwell or the lift lobby and the machine or pulley room, should be separated from the rest of the building by fire barriers having an FRR of not less than 120/120/120;
NATURE OF TYPOLOGY

PENCIL TOWER IS A HYPER-SPECIFIC TYPOLOGY
The nature of pencil tower is hyper-specific. This typology is specific to context which could only be economical valuable at the pre-set context in Hong Kong. It will not be equally profitable to build such building type in Manhattan or other high-dense city. One of the reason is that these areas don’t have the extreme constraint of plot size in the first place.

A "SPECIFICALLY-NORMAL" PHENOMENON
General public in Hong Kong considers pencil-tower as a normal type of housing; while at a global housing context, this typology is considered as radical and unique. For the Hong Kongers, the tower is rational because it fulfills the rules set up by the city’s spatial and economical demands. In a global context, this typology become radical because it has unnecessarily pushed the living condition into extreme limits.
Rethinking the definition of luxury
Delicacy Vs. Extravagant
4.11 BD adopts a general guide of 9m² usable floor area per person in assessing the likely number of persons and population density within a domestic building. This basis of calculation is used to determine the required number of watercloset fittings, lavatory basins, and baths or showers to be provided in domestic buildings.

Building Department, Hong Kong

OBSERVATION

OBSOLETE PENCIL TOWER

Are current pencil-tower units designed to utilize the maximum spatial potential of 40m²?

40m² for 4
Advised by the Building Department, the minimum living area for one person is 9 square-metres. Given that each pencil tower apartment is sized at 40m², theoretically each apartment could fit in at least 4 people, which is a common family size in Hong Kong.

In other words, for a family, the space of these units is more than sufficient.

1 person = 9m² | 31m² in surplus
2 people = 18m² | 22m² in surplus
4 people = 32m² | 8 m² in surplus

The selling trend of these units in Hong Kong reveals that not only young families are interested in these apartments, young singles or couples also makes up a large portion of sales market.
Based on calculation, 32.5% of the floor area is in surplus  
56.25% of floor volume is in surplus

OBSERVATION

OBSELETE PENCIL TOWER

Is the typical pencil tower unit designed to utilize the maximum spatial potential of th 40m²?

40sqm for 4

Advised by the Building Department, the minimum living area for one single person should at least 9 square-metre. Given that each pencil tower apartment sized as 40sqm, theoretically each apartment could fit in at least 4 people - a common small size in Hong Kong. In another word, for a single family, the size of these units are actually more than sufficient.

1 person = 9m² | 31m² in surplus
2 people = 18 m² | 22m² in surplus
4 people = 32 m² | 8 m² in surplus
**OBSERVATION**

**HOW OFTEN IS THE APARTMENT LEFT IDLE?**

Pencil Towers are marketing for middle income group which includes, working family, singles and couples; these population are the active working class at society. To understand the frequency of usage, this simulation study is identifying the frequency of use within a Pencil-Tower Apartment at different duration of time.

**FREQUENCY OF USAGE / ONE WEEK**

- **Totally idle = 30 hrs**
- **Used by external Users = 15 hrs**

In one week, there are 45 hours out of 168 hours that the apartment is not in use.
Based on calculation, 32.5% of the floor area is in surplus. 56.25% of floor volume is in surplus.

In one month, there are 180 hours out of 672 hours that the apartment is not in use. THERE ARE 27% OF TIME, WHICH AN APARTMENT IS NOT IN USED.
IV DESIGN TACTICS: How to maximize usable area?

800mm module (Body width)
800mm – as a tool to maximize usable area
Material thickness VS 800mm
Sectional possibility VS 800mm
800mm...

- 800mm at plan = minimum circulation width
- 800mm at section = Worktop height (desk)
- 800/2 mm = seating height
- 800/4 = stair (max.) riser height
- 800 x 2 = minimum stair-head clearance
  etc...
**4 SIGNIFICANT 800mm STUDYING OF 800mm**

**IDENTIFYING DESIGN MODULES**
- 300mm - good for sectional division (300/300)
- 400mm - seating levels, multiples of working top height
- 600mm - Worktop height

**800mm VS DOMESTIC ACTIVITIES**
**IDENTIFYING VARIOUS DOMESTIC ACTIVITIES WITH 800MM**
- [PATH] = Domestic activities that demand routes or trajectories
- [SEAT/WORK/SLEEP] = Working, seating etc, which involve inhabitant’s participation but stationery
- [STORAGE] = Object-oriented functions
800MM VS MATERIALITY

IDENTIFYING COMMONLY USED INTERIOR MATERIALS

[OPAQUE] Brick Wall, Cement Board, Plywood, Gypsum Board

[TRANSLUCENT] Glass Blocks, Glass Panel, Vinyl Screen

[TRANSPARENT] Glass

[OTHERS] Sound proofing Foam, Corrugated Board

[FINISHING] Ceramic Tiles, Hardwood Finishing

800MM VS MATERIALITY

IDENTIFYING COMMONLY USED INTERIOR MATERIALS

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HOW TO ACHIEVE SECTIONAL VARIATION BY 800mm?

MAIN ACTIVE LEVEL: +0mm - 1400mm headroom
+400mm - 1000mm headroom unreachable
+800mm - 600mm headroom unreachable
Hypothesis – fitting 90 luxury programs into 40sqm
Design inquires - is pencil tower luxury?
Design inquires - architects rejected by pencil towers
Design agenda – Floor area VS Floor usable area
Design agenda – Implicit VS Explicit way of organizing 40sqm
Currently in the real estate market of Hong Kong, there are two major types of luxury private housing, namely the luxury estates and the luxury towers. The first type consists of mega-luxurious-housing complexes built on enormous area near city centres. The other type consists of individual towers built within existing city fabric. In many cases, the first type of housing is targeting towards the high-middle income group while the second type is marketing towards the low-middle income group.

Pencil Tower falls into the category of affordable-luxury towers. There are two very distinct marketing strategies for the two types of private housing. For mega-private complexes, these housing attract higher-income group by providing a vibrant range of mixed-use programs within estate complexes. These programs include shopping mall, offices, cultural centers and well-established transport systems, which are all essential to fulfill the desire of luxury living of higher-income group.

In order to create the impression of luxury living, in many cases, Pencil Tower apartments are equipped with high-end bathroom and kitchen furniture, top-rated floor and wall finishing. Ironically, the spatial design of each apartment is almost neglected to minimize construction cost. After all, the degree of luxury in pencil tower is established mostly by branded objects instead of architectural delicacy.

While marketing strategy of mega-estates is programs-oriented, that of the affordable luxury tower is product-oriented. For affordable luxury housing like Pencil Towers, there is a limitation on the amount of land which developers could purchase at one time. Hence, it is not feasible for developers to construct a mixed-use mega-complex. At the same time, the construction capacity for high-rise building constrained the floor slab area of each floor. Therefore, without a generous apartment size and attractive supporting facilities, in what way could developers of pencil tower market their buildings as luxury housing?

Inquiries

IS PENCIL TOWER A LUXURIOUS?

AFFORDABLE LUXURY | Targeting the middle-income group

Currently in the real estate market of Hong Kong, there are two major types of luxury private housing, namely the luxury estates and the luxury towers. The first type consists of mega-luxurious-housing complexes built on enormous area near city centres. The other type consists of individual towers built within existing city fabric. In many cases, the first type of housing is targeting towards the high-middle income group while the second type is marketing towards the low-middle income group.

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PENCIL TOWERS ARE REJECTING ARCHITECTS

Mentioned earlier, the degree of luxury in pencil tower is established mostly by branded objects instead of architectural delicacy.

Indeed, architects are rejected by Pencil Towers. The main concern is that the concept of luxury is non-architectural in Hong Kong. For instance, if an apartment is furnished with high-end bathroom and kitchen furniture, top-rated floor and wall finishing, and an extravagant lighting system, it is called luxury. In an extreme case, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use.
Undoubtedly, the responsibility of architects in designing towers in Hong Kong is diminishing. At a structural scope, the construction systems of high-rise residential towers are confined to a few typical types based on price and time. For programmatic arrangement, the circulation system is dictated by a pair of scissor stair running through the tower based on spatial efficiency. In a spatial aspect, each floor is standardized in every dimension for the ease of pre-fabrication. Under these circumstances, the importance of architectural design is placed at a very low priority. As a result, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use on façade.

Therefore, the design ambition of this thesis project is to promote an alternative understanding of “luxury living” in Pencil Towers. More importantly, this thesis tried to re-state architects’ position in the construction industry of Hong Kong. Eight different apartment units were designed to demonstrate how 40m² luxurious living environments could be architecturally generated. In terms of a design exercise, the key challenge was to maintain feasibility within the harsh limits.
First of all, one of the major design challenge is how to provide more usable floor area. When designing how 40m² luxurious living environments could be architecturally generated, these solutions should consider how to provide developers with better alternatives without compromising their economic interests. In most cases, the economic value of Hong Kong’s apartment is based on Usable Floor Area¹. Hence, one of the key aspects of design proposals is to provide more Usable floor Area for each apartment in order to maintain the economic feasibility.

The second design challenge is the performance of apartment. While the proposals should spatially densify the apartment, these designs should, at the same time, maintain practicability based on domestic-ergonomic considerations.

¹ Defined by the Building Department in Hong Kong. The usable floor area is defined as the aggregate of the areas of the floor or floors in a storey or building excluding any staircases, public circulation space, lift landings, lobbies, water closets, kitchens, and any space occupied by machinery for any lift, air-conditioning system or similar service provided for the building.
Observation III, TWO IMPORTANT LEVELS

S - SATURATING & GM

- Usable level - level in contact with users (circulation must be provided)
- Headroom clearance level - Determines the ceiling level

**THESIS PARAMETER I**

**BODY : DIMENSION AND PERFORMANCE**

**SECTIONAL DIMENSION:**

[Headroom Clearance Level] - Determines the ceiling level and the volume occupied by its functional performance

[Usable Level] - The level where users perform certain functions comfortably and effectively

**BODY : DIMENSION AND PERFORMANCE**

**SECTIONAL DIMENSION:**

[Headroom Clearance Level] - Determines the ceiling level and the volume occupied by its functional performance

[Usable Level] - The level where users perform certain functions comfortably and effectively
III THESIS INTENTION

SURFACE-DEPENDENT FUNCTIONS

swimming pool

SURFACE-INDEPENDENT FUNCTIONS

bed, beds

THESIS PARAMETER II

TECTONIC OF DOMESTIC FUNCTIONS

[Volume] - functions that require enclosure, either because of environmental condition, privacy or defined sizes.

[Surface] - functions which consist of instructions adhering on vertical surfaces.

[Ground] - Functions that define their own territory of ground, the definition is context specific.

THESIS PARAMETER III

TECTONIC OF DOMESTIC FUNCTIONS

[Explicit Functions] Functions that usually come with definite objects, like oven, stove, hi-fi set etc. These functions are independent with the architecture. They adhere on it.

[Implicit Functions] They are formally flexible functions. These functions work well in various kinds of typologies. These functions could suggest formal operations. It also react to specific need of context.
800 mm OPPORTUNISTIC ELEMENT DESIGN | Rethinking Domestic Furnitures

800mm Shelves
800mm Stairs
800mm Windows
800mm Scissor Stairs
800mm Lofts
800mm Ceilings
This exercise explored various ways in organizing forty 800mm x 800mm boxes within one apartment. This study evaluated how people could inhabit within these configurations.
Rethinking Domestic Elements: Stairs

Area gained:
(to minimize)

Performance:
- Stairs
- Worktops
- Shelves
- Ladders
- Walls

Stairs allow sectional movement, yet the acute volume generated under stairs are difficult to be programmed. This exercise studied various ways in organizing stairs. Then, it also studied how the residue volumes could be utilized effectively.
In Hong Kong, walls are not only designed to partition volumes, they are also embedded with shelves and storage units. This exercise studied different ways to configure these shelving units, so that they could perform as effective facade units for better natural lighting, ventilation and views.
Rethinking Domestic Elements: bunk beds

Spatial Elements:
Volume + Stairs
Area gained: 2.0

Performance:
- Worktop
- Steps
- Compartment
- Rooms
- Shelves

Bunk bed is commonly used to save space for sleeping and working. Similarly, the design of this module is based on the idea of a bunk bed. Three slices of vertical volumes are generated:
Top: (Headroom 883mm)
- Suitable for sleeping
Mid: (Headroom 1080mm)
- Suitable for working and main circulation
Bottom: (Headroom 2000mm)
- Suitable for storage, sitting
In this module, rooms and internal volumes are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment. The maze-like spatial experience is dynamic. The configuration also generates different degree of privacy within an apartment.
In Hong Kong, window bays are often thickened to accommodate services like air-conditioners and plumbings. Similarly, the design of this module is based on converting these window bays into human occupiable space.
FOUR NEW WAYS TO LIVE...

>40 m²

VI. APARTMENT PROPOSAL | Hyper-Luxurious Units

- 60 m² - Luxurious Window 1.0
- 65 m² - Luxurious Wall 1.0
- 75 m² - Luxurious Shelves 1.0
- 80 m² - Luxurious Balcony 1.0
- 85 m² - Luxurious Window 2.0
- 85 m² - Luxurious Stairs 1.0
- 90 m² - Luxurious Scissor Stairs 2.0
- 100 m² - Luxurious Ceiling 1.0

Conclusion - Rethinking domestic ways of living
HYPER-LUXURIOUS APARTMENTS

In the second phase of design project, a series of hyper-luxurious apartment units are invented. A hyper-luxurious unit is designed not only to maintain the economic interest of developers; it should promote an alternate reading of luxurious living in Hong Kong. For instance, how could we maximize outdoor experience in a small unit? How could we enjoy maximum privacy if the apartment is shared among strangers?

This chapter is a documentation of design evolution. The first part of the chapter includes massing studies, which follows with a series of initial schematic drafts.

The second part of the chapter
DESIGN OBJECTIVE  
TOWARDS AN ALTERNATIVE LUXIOUS LIVING

MASSING STUDY

TYPEOLOGY WITHIN APARTMENT

Design process began by identifying various types of massing configurations. Showing in the diagram below, the yellow massing are volume designated for luxurious functions.
When evaluating the design process, I considered the usable surface area of each unit as the first set of elimination parameters. The reason is that, in developers’ perspective, the more usable luxurious area an apartment consists, the more sales revenue it worth. In this case, types that could bring about larger amount of usable (surface) area are continued to develop in the second round.

<table>
<thead>
<tr>
<th>TYPE 0</th>
<th>Typology: Nil</th>
<th>Area increased: -Usable Floor area-</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE A1</td>
<td>Typology: Centralized</td>
<td>Area gained: 20m²</td>
</tr>
<tr>
<td>TYPE A2</td>
<td>Typology: Centralized</td>
<td>Area gained: 20m²</td>
</tr>
<tr>
<td>TYPE B1</td>
<td>Typology: Peripheral</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE B2</td>
<td>Typology: Peripheral</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE B3</td>
<td>Typology: Peripheral</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE C1</td>
<td>Typology: Wall</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE C2</td>
<td>Typology: Wall</td>
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<td>TYPE C3</td>
<td>Typology: Wall</td>
<td>Area gained: 40m²</td>
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<tr>
<td>TYPE D1</td>
<td>Typology: Centralized</td>
<td>Area gained: 20m²</td>
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<td>TYPE D2</td>
<td>Typology: Centralized</td>
<td>Area gained: 20m²</td>
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<td>TYPE D4</td>
<td>Typology: Centralized</td>
<td>Area gained: 20m²</td>
</tr>
<tr>
<td>TYPE C4</td>
<td>Typology: Wall</td>
<td>Area gained: 45m²</td>
</tr>
<tr>
<td>TYPE E1</td>
<td>Typology: Ground</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE G1</td>
<td>Typology: Ground</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE G2</td>
<td>Typology: Ground</td>
<td>Area gained: 50m²</td>
</tr>
<tr>
<td>TYPE F1</td>
<td>Typology: Ground</td>
<td>Area gained: 40m²</td>
</tr>
<tr>
<td>TYPE F2</td>
<td>Typology: Ground</td>
<td>Area gained: 45m²</td>
</tr>
</tbody>
</table>
**TYPE C1**

**50 m²**

**SPLIT HOUSE**

Typology: Centralized
Area gained: 10m²
Balcony area: 5m²

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SPATIALLY GAINED...

- Two separate interior volumes
- Central spine embedded with luxury programs

*Lack of sectional differences*

*Do not suggest clear natural lighting performance*
Core House Type D1

Type: Centralized

Area gained: 20m²
Balcony area: 15m²

Spatially gained...
- Enlarged Balcony
- Eliminated interior partitions
- Sectional variation within apartment
VI DESIGN PROPOSALS

SKIN HOUSE

Typology: Peripheral
Area gained: 35m²
Balcony area: 5m²

SPATIALLY GAINED...
• The interior is maximally remained
• All services could be hidden at the exterior wall
• Luxurious programs could be embedded within the wall
**SHELVES HOUSE**

Typology: Layered

Area gained: 35m²

Balcony area: 10m²

- Numerous semi-private area
- Shelves function as shared community space
- Shelves function as internal partitions
- Shelves function as storage, worktop
- Generous natural lighting within each bay
- Sectional variations along each bay
VI APARTMENT PROPOSAL | Hyper-luxurious unit

- 60 m² - Luxurious Window 1.0
- 65 m² - Luxurious Walls 1.0
- 75 m² - Luxurious Shelves 1.0
- 80 m² - Luxurious Balcony 1.0
- 85 m² - Luxurious Window 2.0
- 90 m² - Luxurious Stairs 1.0
- 100 m² - Luxurious Staircase 1.0

Conclusion - Rethinking domestic ways of living
These balconies push out most domestic programs to the periphery of the apartment, which leave a generous open interior at the center. On one hand, the domestic functions could enjoy all the views, lighting and ventilation; the residual areas in the heart of the house become private and flexible.

**Formal Operation:**
The façade of apartment is thickened. This ring of volume engulfed different domestic programs.

**Type A1**

**80 m²**

**Window House**

Typology: Envelope
Area gained: 40 m²
Balcony area: 40 m²

**Variety of programmatic performances**

- Open Balcony: These balconies are connecting the interior to the exterior volume, all domestic functions could enjoy better views, air and natural lighting.
- Object Balcony: These balconies are specifically designed for different types of domestic furniture function, such as clothes rack for drying laundry.
- Service Balcony: Unobtrusive service components such as air-conditioner, exhaust fans, are fitted in these balconies; they are hidden from sight.
**TYPE 31**

**90 m² SUSPENDING HOUSE**

Typology: Suspending

Area gained: 50 m²

Balcony area: 40 m²

**Formal Operation:**

Taking the idea of suspended ceilings, rooms are suspended from the ceiling at different heights. Whole ground is free up for exterior use.

In this case, owners could enjoy a whole floor of garden/swimming pool or any other outdoor functions.

**OPTION 1: PRIVATE POOL**

**OPTION 2: GARDEN**
**TYPE C1**

**95 m²**

**SCISSOR STAIR HOUSE**

Typology: interlocking

Area gained: 55m²

Balcony area: 20m²

**Formal Operation:**

Each module is developed from the idea of scissor stairs. Each apartment could fit in four modules. Each module works like a pair of scissor stairs which one could enter from the two sides ascending to the volume above and below.

Three slices of vertical volumes are generated:

- **Top:** (Headroom 800mm) - Suitable for sleeping
- **Mid:** (Headroom 1800mm) - Suitable for working and main circulation
- **Bottom:** (Headroom 2200mm) - Suitable for storage, seating

Evolution of module design
VI DESIGN PROPOSALS | 100m²

LOFT HOUSE

Typology: interlocking
Area gained: 60m²
Balcony area: 20m²

Formal Operation:
Rooms and internal volumes are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment. The maze-like spatial experience is dynamic. The configuration also generates different degree of privacy within an apartment.
Typology: Envelope
Area gained: 40 m²
Balcony area: 40 m²

Formal Operation:
The façade of apartment is thickened. This ring of volume engulfed different domestic programs.
**TYPE 31**

**90m²**

**SUSPENDING HOUSE**

Typology: Suspending

Area gained: 50m²

Balcony area: 40m²

**Formal Operation:**

Taking the idea of suspended ceilings, rooms are suspended from the ceiling at different heights. Whole ground is free-up for exterior use.

In this case, owners could enjoy a whole floor of garden/swimming pool or any other outdoor functions.
VI DESIGN PROPOSALS

TYPE C1

95 m²

SCISSOR STAIR HOUSE

Typology: interlocking
Area gained: 55 m²
Balcony area: 20 m²

Formal Operation:
Each module is developed from the idea of scissor stairs. Each apartment could fit in four modules. Each module works like a pair of scissor stairs which one could enter from the two sides ascending to the volumes above and below.

SECTIONS BB SCALE 1:200

SECTIONS AA SCALE 1:100

PLAN 1:100

SCISSOR STAIR HOUSE

95 m²

Typology: interlocking
Area gained: 55 m²
Balcony area: 20 m²
**Type D1**

**100m²**

**Loft House**

**Typology:** Interlocking

**Area gained:** 60m²

**Balcony area:** 20m²

**Formal Operation:**

Rooms and internal volume are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment. The maze-like spatial experience is dynamic, and creates different degree of privacy within an apartment.
VI CRITICAL URBAN IMPACT

Impacts 1: Freeing Up Elevations
Impacts 2: Shifting of Float Levels
Impacts 3: Emergence of New City Image
IMPLICATIONS

SCOPE | TOWER SCALE
This chapter acknowledges the implications of design at a tower-scale. Imagining architects and developers are taking a new mentality in designing each apartment, the design of each Pencil Tower will change. Thus the cityscape will not be comprised of homogeneous units. In this chapter, three prominent impacts are identified – the freeing up of elevations, the shifting of floor levels and the emergence of a new city image.
IMPACT 01: FREE UP ELEVATIONS

MUTUAL BENEFIT BETWEEN FLOORS

Conventionally, the design of every floor is standardized. As a result, the environmental performance, such as natural lighting and ventilation, is not responding to the context around it. Alternatively, designing each unit specifically allows a more context-responsive design. Architects of adjacent floors could work hand-in-hand, thus, this way of co-operation facilitates design proposals that benefit both units. For instance, façade geometry of neighboring units could be compromised, so that both units are enjoying better views, lighting and ventilation performance.
IMPLICATION 2: FLEXIBLE ENTRANCE LEVELS

FREEING UP LIFT LOBBY ENTRANCES

Sections of the conventional Pencil Tower are monotonous. It is common that the landings of egress stairs determine the floor levels of each unit. Then, these levels suggest where elevator is landing accordingly. As a result, lift lobbies and stair entrances confine each apartment at the same floor level.

In fact, where the elevator arrives is not necessary to be where the egress stair lands. By freeing up the lift lobby from the stair, it could allow a generous sectional variation within each apartment. In most of the design proposals, the lift lobbies are raised 800mm above their stair lobbies. Insipid of the fact that 800mm is as subtle as four rises of steps, this move facilitates a dynamic sectional experience within the tower.
In order to maximize the design efficiency and economic value of the residential projects, developers of Hong Kong have created lots of Pencil Towers with little variations. As these buildings are built on small land parcels that are commonly found in the old neighborhood, they often exist in close proximity. The monotonous elevations of the cookie-cutter buildings thus create an expected mundane cityscape.
...THE NEW PENCIL TOWERS WILL HELP SHAPING A MIXED CITYSCAPE THAT ELABORATES THE HETEROGENEOUS QUALITY OF THE CITY.

SECTIONAL SIMULATION OF TWO BLOCKS OF CITY FABRICS

CONCLUSION | AN URBAN VISION

However, with the new design mentality explored, the eight design proposals proved that Pencil Towers with better environmental performances and living pleasures can be achieved. These solutions provide the developers with better alternatives without compromising their economic interests. The city will project an unprecedented image. With the new design direction, not only the residents' presence are individually reflected at each floor, the agglomeration of different design units will create a diverse facade that is unique within the neighbourhood. Finally, the new Pencil Towers will help shaping a mixed cityscape that elaborates the heterogeneous quality of the city.
MODEL ARCHIVES

MODULE TYPE: LOFT HOUSE

SCALE: 1:10
NO. OF MODULES: 4

The total footprint of this model is equal to half of the floor area at one Pencil Tower apartment.
MODEL ARCHIVES

MODULE TYPE: SCISSOR ROOM

SCALE: 1:10

NO. OF MODULES: 4

The total footprint of this model is equal to one-fourth of the floor area at one Pencil Tower apartment.
UNIT VARIATIONS

MODEL ARCHIVES

SCALE: 1:25

Models are built at full apartment size (10m x 4m). Services core, lobby and egress stairs are excluded.
BIBLIOGRAPHY

WORK CITED


