



Architectural Phenomena Following Law—Review of Residential Buildings in Hong Kong’s Colonial Era

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Abstract: This is a historical perspective of Hong Kong for the colonial era from 1841 to 1997 CE on the architectural (residential) forms and the legislative control regulating them. The residential typology had evolved from the Tong Lau when Hong Kong was a fishing village at nineteenth century to high-rise structures when Hong Kong became a modern metropolis. The limited land supply at the start of the colony together with Chinese culture and local technology contributed to make the first residential housing prototype as Tong Lau in Hong Kong. How this building typology relates to modern residential development is discussed in this article. Subsequently with gradual increase in population, the high density built environment of Hong Kong evolved. Various forms of legislative control like town planning issues, land matters and building regulations etc could exert influence on the building forms. These are illustrated with examples. Then how forms and features of high-rise residential buildings before 1997, the end of the colonial period, followed the building code is explained. This article is thus a concise summary of how various legislations had affected residential buildings within the colonial era in Hong Kong.

Key words: Buildings Ordinance, lease, legislative control, residential, Tong Lau, colony.

1. Introduction

The making of the modern metropolis of Hong Kong has various contributing factors such as geographical conditions, ever increasing population, economical advancement, building technology and other social factors as well as the intelligence of designers, users and administrators. However, the realization of these factors was through the law in the form of building code and other related legislative control that had directly shaped and modified the building blocks to make the city even up to the present.

The origin of this phenomenon was the British rule that started with the first Opium War¹ when Hong

Kong Island and the harbor were ceded to the British Crown since 1841 (Fig. 1). Subsequently, the British colony was expanded to include Kowloon and the new Territories. Law was made to control buildings with the first legislation written under the Ordinance for the Preservation of Order and Cleanliness within the colony of Hong Kong. This actually was made to deal with local construction and dilapidated buildings. Yet the first ordinance to carry the name of “buildings” was the Ordinance for Buildings and Nuisances² issued in 1856 by the governor, Sir John Bowring [1]. “Nuisances” was the term associated with the ordinance and meant buildings or part(s) of buildings in contravention of the Ordinance, lack of maintenance,

defeated at Yangtze and the Treaty of Nanking was subsequently signed in 1842 with the cessation of Hong Kong Island to Britain. Reference: “First Opium War”, Wikipedia online.

²Reference: The Hong Kong Government Gazette, GN 12 of 1856.

¹The First Opium War was fought between Great Britain and China from 1839 to 1842 after the Chinese official Lin Zexu banned the sale of opium and destroyed 20,000 opium chests from the British merchants in China. However, China was



Fig. 1 City of Victoria-Island of Hong Kong at 1840s.

left in a ruinous situation or any unauthorized encroachment into Crown land³.

The trail of history for the construction of Hong Kong can be found in the building code. For instance, even the design and construction of the opium divans can be seen in the Public Health and Buildings Ordinance of 1903[2]⁴, Part VII Miscellaneous Provisions, Schedule C. (Fig. 2) There were written legal requirements for building materials, lighting, ventilation, drainage, maintenance and removal of sick person. Hence, if someone was found seriously ill in the opium divan, the keeper of the divan should immediately remove that person to the satisfaction of the medical officer of health. This reflects opium was legally accepted by the British Crown in Hong Kong at that time. It was only until 1910 that all opium houses were closed down after the International Opium Conference held at Shanghai, 1909.

Similarly, we shall reveal cases of architectural forms to examine the legislative control behind as evidence of various historical factors at work.

2. High Density started with the Tong Lau

Before 1841 Hong Kong was only a fishing village. The island of Hong Kong posing itself as a hilly terrain was originally lack of substantial flat land thus difficult for the construction of any buildings. The first

form of residential buildings that appeared was the tenement house or the Tong Lau with detail description by H.Y. Lee [3]. Built from late nineteenth century, these were row housing of 3 to 4 stories high and about 4.5m wide with shops at the ground floor and balconies at upper floors built over the pavements. Terraces were formed on the hilly slopes of Hong Kong Island for construction of these buildings (Fig. 3) and later large scale reclamation made more flat land available for building.

The Public Health and Buildings Ordinance, 1903, designated the Tong Lau as “Chinese domestic building”. The legal administrators had devised an easy way to regulate the design and construction of Tong Lau. So this Ordinance stated that a building “of a different character from those previously existing on the same site” or “differs in design or character from those in the immediate neighbourhood”⁵ would be forbidden to be erected.

The Tong Lau as stated by H.Y. Lee [3] had been a major form of habitation until at around 1930s when technology let taller buildings⁶ to be constructed. Subsequently at 1960s many Tong Lau were demolished to make way for development of high-rise buildings. At about the same time, the ordinance⁷ for buildings was modernized by the government [4] with its contents as the basis of the present day ordinance.

2.1 The Mystery of the Party Wall

A tourist in Hong Kong might have come across a lonesome old brick wall (Fig. 4) three to four stories high squeezed in between two tall buildings or a skeleton wall attached to one side of a building if there is no other building adjacent to it. This weird phenomenon is the story of “party wall”, the definition

³Crown land has assumed the meaning that all land in Hong Kong was owned by Great Britain as a colony. Private owners had to enter into a lease with the government to secure right to use the land. Land un-owned and unleased are called Crown land.

⁴ Reference: The Hong Kong Government Gazette, 27th February, 1903, p. 243.

⁵Reference: Design of Buildings, clause 203, The Public Health and Buildings Ordinance, 1903.

⁶Control to allow for taller buildings can be seen at the Buildings Ordinance, 1935.

⁷The Buildings Ordinance of 1955 had laid out the basic format and mechanism for control of development. Building regulations in the form of planning (design and layout), administration and construction were initially established in their modern format in 1956.

OPIMUM DIVANS.

1. Every opium smoking divan shall be adequately lit and ventilated to the satisfaction of the Board and shall be paved with good lime or cement concrete laid down at least six inches thick, and the surface thereof shall be rendered smooth and impervious with asphalt, cement or such other material as the Board may approve of.
2. Every opium smoking divan shall be so drained as to be in accordance with the requirements of the Public Health and Buildings Ordinance and the bye-laws made thereunder, and all inlets to the drains shall be placed outside the building.
3. Every opium smoking divan shall be at all times open to inspection by any officer or member of the Board.
4. The keeper of an opium smoking divan shall not permit his premises to be occupied between the hours of midnight and 5 o'clock a.m. by a greater number of persons than such as will allow for each adult not less than fifty square feet of habitable floor space or superficial area, and five hundred and fifty cubic feet of clear and unobstructed air space unless such opium smoking divan comes within the exemption contained in the second proviso to section 46 of the Public Health and Buildings Ordinance.
5. The keeper of an opium smoking divan shall cause the windows and ventilating openings of his premises to be kept at all times free from obstruction, and shall daily open the windows to such an extent and at such times as may be necessary for the efficient ventilation of the premises unless prevented by inclement weather or by the illness of any person occupying the said premises.
6. The keeper of an opium smoking divan shall cause the internal walls and ceilings of every part of his premises to be thoroughly cleansed and lime-washed during the months of January, April, July and October of each year.
7. The keeper of an opium smoking divan shall at all times keep his premises in a clean and wholesome condition, and shall cause all filth and house refuse or other offensive matter to be removed from his premises daily.
8. The keeper of an opium smoking divan shall, without delay report at the office of the Board, every case of serious illness which shall occur upon his premises, and should such case prove to be of a contagious nature, he shall afford every facility for the removal of the sick person and shall adopt all such precautions as the medical officer of health or other duly authorized officer of the Board shall direct. For the purposes of this bye-law any officer in possession of instructions in writing signed by the secretary or by the medical officer of health shall be deemed to be duly authorized.

Fig. 2 Requirements for the opium divans in the public health and buildings ordinance, 1903.



Fig. 3 Tong Lau at Tai Ping Shan of Hong Kong Island, late nineteenth century.



Fig. 4 Party wall in between two previous Tong Lau (first photo) and skeleton of party wall remaining on side walls of buildings (second photo), Queen's Road East, Wan Chai, Hong Kong.

of which can be found in the 1889 Buildings Ordinance [5]⁸ as “Any wall used or built in order to be used as a separation of any building from any other building, such buildings not being accessible through a common entrance”.

Located between two Tong Laus, the party wall is actually the load bearing wall previously supporting the two Tong Laus and now still exists with later new buildings. The site boundary of the two lots of the Tong Lau lay in the middle of the party wall because it was the same wall that supported these two Tong Laus. Hence, if the party wall is taken down, the floors on either side will collapse. In subsequent re-development of the Tong Lau, the owner to take down the Tong Lau first will have to keep the existing party wall otherwise the adjoining Tong Lau will collapse. However, when the adjoining owner intends to make re-development, he will need to ask for the consent of all owners before he can demolish the party wall. This process will be very time-consuming and might not be practical (people may ask for unrealistic compensation). So the easier choice for the adjoining owner/developer is to maintain the party wall in its original position. This is how this urban phenomenon has been formed as a subtle reminder of the historical Tong Lau typology.

To cater for the ownership and rights of the owners and adjoining owners of the party wall, provisions had been made in the 1935 Buildings Ordinance prepared by the government [6]⁹ and maintained still up to the present¹⁰ as Tong Lau and at least the party walls still exist in the present Buildings Ordinance from the government [7].

2.2 Tong Lau as the Building Block of the Colony

Besides the party wall phenomenon, the *Tong Lau* also contributes as the building block of the city. From a survey map (Fig. 5) of Hong Kong, we can get the impression of the Tong Lau as a basic module of the

urban fabric. This actually demonstrates how the private developers acquire land through assemblage of individual Tong Lau blocks.

The dimensions of the Tong Lau were actually governed by the available building materials, structure and the Buildings Ordinance. The building (Fig. 6) was basically about 4.5 m wide which was the length of the timber joists that were common to span the floor slab which was supported by two parallel load bearing walls. The Ordinance lay down the dimensions of the walls in relation to the height of the wall. For instance, the Buildings Ordinance 1889¹¹, stated in the external and party walls exceeding 50 feet: “When built to any length exceeding fifty feet, clear of any return-wall or cross-wall, the external walls or party walls of all buildings shall be of the thickness of not less than thirteen inches for the upper portion to the extent of fifteen feet and for the remaining or lower portion the thickness shall increase at least four inches in each depth of fifteen feet.”

The depth of the Tong Lau could range from 10 to 15 m and as the building had only front and rear external walls, cross ventilation would be quite important. Hence, there was a requirement in the Ordinance that there should be clear headroom of nine feet (3 m) for the interior space. Even as such, the inherent configuration of the Tong Lau did have potential health and fire safety hazards. That was evident in several occasions when fire or plague broke out, it did spread quite easily and intensively to cause great calamities.

Anyway, the modular-like Tong Lau phenomenon has resulted in a city that is marked with the Tong Lau dimension (Fig. 7). A walk around the historical core of Hong Kong will discover the facades of buildings are in a rough module of the 4.5m dimension. There can be occasionally very small buildings that conform to the size of one single *Tong Lau* which is around 70 square metres. Small parks can also be seen as a left-over undeveloped space from previous Tong Lau.

⁸The Buildings Ordinance, 1889 can be read in the Hong Kong Government Gazette, 4th May, 1889.

⁹Reference: The Hong Kong Government Gazette, April, 12, 1935, pp. 474-482.

¹⁰See the Buildings Ordinance, Second Schedule, online.

¹¹Reference: The Hong Kong Government Gazette, 4th may, 1889, p. 380.



Fig. 5 Survey map of Central District at 1980s.

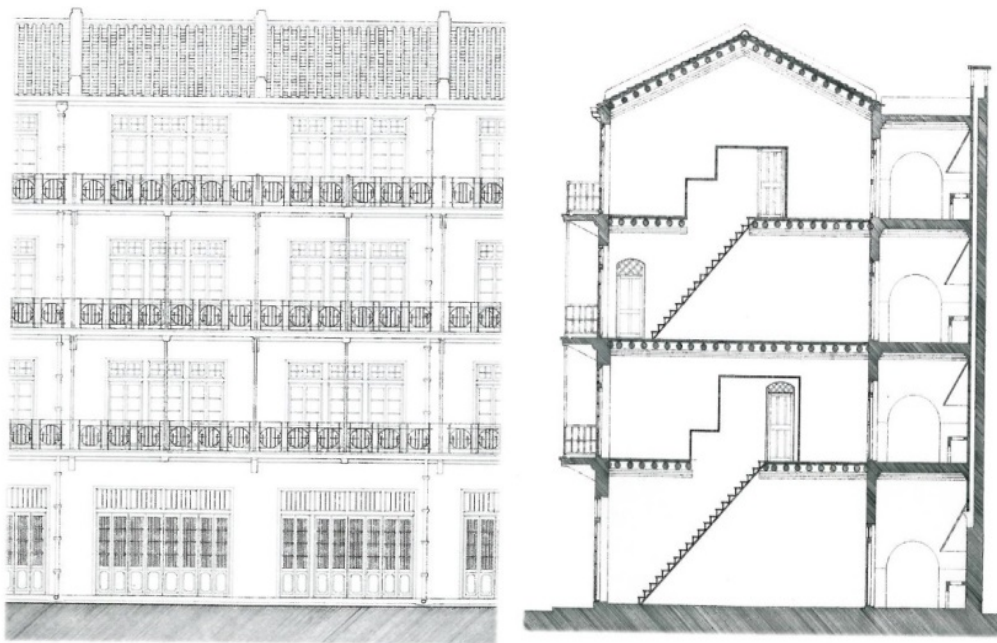


Fig. 6 Measured drawings of the Tong Lau at Wan Chai Road¹², built 1903-1935.

¹²Source: Department of Architecture, University of Hong Kong, 1999, Measured drawings, Volume One, Pace publications, pp. 174-175.



Fig. 7 A street in Hong Kong Central showing the signboards that have marked the spacing of the previous Tong Lau.

2.3 One Hundred Percent Site Coverage and More-the Concrete Jungle

Hong Kong has been remarked as a “concrete jungle” which a clue to its origin might be in the Buildings Ordinance. What the concrete jungle meant is the high density of building mass that one can feel at the street or ground level. The phenomena is the building mass one hundred percent covered up the site to a height of 15 m above ground and only the street with the carriageway part is uncovered. This means that the building occupies the whole site to a height of 15m, leaving no spaces behind for anything. This building mass is called the “podium”.

There is an equivalence of this high density phenomenon with the Tong Lau except for the presence of upper tower for modern residential buildings. The Tong Lau occupied three to four stories to a building height similar to 15 m and covered up the site even to the extent of having verandahs and building mass over the pedestrian pavements. That is more than one hundred per cent site coverage. Hence, the highly dense Tong Lau could well be the origin of the podiums with 100% site coverage¹³.

An examination at the Building (Planning) Regulation no. 20, 20A and the First Schedule (enacted

¹³ Site coverage is defined in the Building (Planning) regulations as the area of the site covered by a building that is erected on it and often expressed as a percentage of the site area.

since 1962¹⁴) reveals permissible site coverage of 100% (Fig. 8) at the podium up to 50 feet (15 m) though these spaces should not be used for residential purposes. The mechanism to create the highly dense building mass is thus found to be embedded in the Ordinance. For older generations of residential buildings, we can even discover the building mass had been carried well over the pedestrian pavements.

In this way, the trend of building development has been constantly on high density. Just before 1997, the end of the colonial period of Hong Kong, the density¹⁵ reached an average of about 6,700 persons per square kilometres and the densest area was 116,000 persons per square kilometres in Monkok as noted by K.S. Pun [8].

3. Architectural Characteristics from Various Legislative Control

Not only local issues but global issues could be traced in the Buildings Ordinance. For instance, when

“FIRST SCHEDULE. [regs. 20 and 20A.]
Percentage site coverages and plot ratios.

Height of building in feet.	Domestic buildings.						Non-domestic buildings.					
	Percentage site coverage.			Plot ratio.			Percentage site coverage.			Plot ratio.		
	Class A site.	Class B site.	Class C site.	Class A site.	Class B site.	Class C site.	Class A site.	Class B site.	Class C site.	Class A site.	Class B site.	Class C site.
Not exceeding 50	66.6	75	80	3.3	3.75	4.0	100	100	100	5	5	5
Over 50 but not exceeding 60	60	67	72	3.6	4.0	4.3	97.5	97.5	97.5	5.8	5.8	5.8
Over 60 but not exceeding 70	56	62	67	3.9	4.3	4.7	95	95	95	6.7	6.7	6.7
Over 70 but not exceeding 80	52	58	63	4.2	4.6	5.0	92	92	92	7.4	7.4	7.4
Over 80 but not exceeding 90	49	55	59	4.4	4.9	5.3	89	90	90	8.0	8.1	8.1
Over 90 but not exceeding 100	46	52	55	4.6	5.2	5.5	85	87	88	8.5	8.7	8.8
Over 100 but not exceeding 120	42	47.5	50	5.0	5.7	6.0	80	82.5	85	9.5	9.9	10.2
Over 120 but not exceeding 140	39	44	47	5.4	6.1	6.5	75	77.5	80	10.5	10.8	11.2
Over 140 but not exceeding 160	37	41	44	5.9	6.5	7.0	69	72.5	75	11.0	11.6	12.0
Over 160 but not exceeding 180	35	39	42	6.3	7.0	7.5	64	67.5	70	11.5	12.1	12.6
Over 180 but not exceeding 200	34	38	41	6.8	7.6	8.0	60	62.5	65	12.2	12.5	13.0
Over 200	33.33	37.5	40	8.0	9.0	10.0	60	62.5	65	15	15	15

Fig. 8 First Schedule in the Building (Planning) Regulations, 1962, to show the permissible site coverage of 100% for the first 15 m height of the building.

¹⁴The First schedule was legally enforced since 1962 as per Supplement No.2, September 21, 1962 in the Hong Kong Government Gazette.

¹⁵High density development in Hong Kong was recorded by K.S. Pun in “High Density Development, Hong Kong-City of Tomorrow”, pp. 12-17.

the United Kingdom joined the European Economic Community in 1973, the metric system of measurements had to be adopted by the United Kingdom in lieu of the previous imperial system. Following the British way, Hong Kong buildings had to go for metrication. The Metrication Ordinance 1976¹⁶ was enacted as an order to come into full operation at the beginning of 1977. So, feet and inches were converted into metres and millimetres. For example, 1 m would replace three feet six inches. Together with the original Chinese system, there had been since three systems of measurement in Hong Kong. However, the imperial system of “square feet” is still the most popular measurement for the real estate market.

This is just an example of urban phenomena created from different laws. However, as stated by W.S. Wong [9], there are three closely related legislative fields¹⁷ that have controlled building development in Hong Kong, namely, town planning issues, land matters and building regulations. Particular cases of interest in the respective fields will be discussed in the followings.

3.1 Tall Buildings Obstructions

An example of planning control to influence architectural forms is illustrated here.

Before the Hong Kong International Airport moved to Lantau in 1998, one would find the Kowloon peninsula to resemble a plateau of buildings which were of the same height allowing adjoining hills to be distinctly seen from the opposite Hong Kong Island (Fig. 9). It seemed that the buildings could not rise to a certain height so they all stopped construction at a certain level. This invisible cut off plane was in fact imposed by the Hong Kong Airport (Control of Obstructions) Ordinance (Fig. 10) which was created to facilitate non-obstruction for air flights and acted as an enormous envelop to cut off tall buildings from the city.

¹⁶Reference: The Government Gazette, L.N. 294 of 1976, L.S. No.2 to Gazette no. 49/1976.

¹⁷The author (2011) discusses the three levels of legislative control in Legislation and Safety of Tall Residential Buildings, High-rise Living in Asian Cities, Springer, pp. 88-91.

The effect on tall buildings and hence the overall form of the city might only be a side effort of this Ordinance.

Kai Tak International Airport began its services in 1925. Located just to the east of Kowloon peninsula and in the midst of the city, control of the surrounding building heights¹⁸ to allow airplanes to have an unobstructed flight on arrival and departure had imposed almost uniform height restriction across the peninsula of Kowloon and other areas of Hong Kong. Hence until the airport moved to Chek Lap Kok in Lantau in 1998, the buildings in these locations were controlled to strict height limitations.

This Ordinance had dictated the heights of buildings in Hong Kong. In some areas where developments still needed to be maximized with a restrictive vertical dimension, the living conditions might lead to overcrowding to result in increased hazards of health and safety. Also within the building, floor heights could also be restricted to result in very clamp spaces. An example of such building illustrated by Bunnag and Patera [10] is the Chungking Mansions¹⁹ (Fig. 11) in Tsim Sha Tsui, Kowloon south. Completed in 1961, this is a building complex with five residential blocks of seventeen stories on a podium which contained a



Fig. 9 Kowloon peninsula with its plateau of buildings at 1989.

¹⁸The building height of Kowloon was generally set to a limit of two hundred feet from the principal datum which was the mean sea level. For areas in close proximity with the airport, the limit of building height was much lower.

¹⁹Professors Bunnag and Patera had studied on the Chungking Mansions stating it had presented a dense community of people and a strong organic pattern of functions. See “Dencity” online : <http://dencity-studio.blogspot.hk/2013/10/chungking-mansions-organic-dystopia.html>.

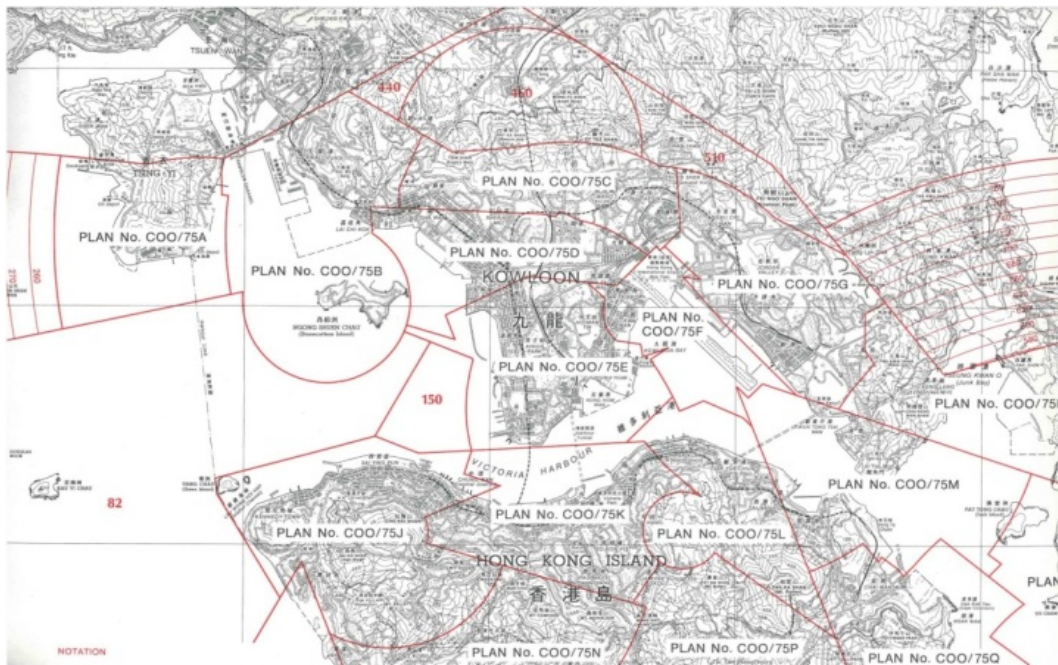


Fig. 10 The master plan for restriction of building height in different districts authorized by the Hong Kong Airport (control of obstructions) ordinance with the location marked “PLAN No.COO/75F” as the runway for the Kai Tak International Airport.



Fig. 11 Chungking mansions in Nathan road as a highly dense mixed use building complex.

variety of uses including low-budget hotels, shops, restaurants and other commercial establishments. As a densely populated building, it is also a gathering place for minor ethnic minorities.

3.2 Floor Plans Converted from Quantities

This is a case of how lease conditions²⁰ affect building form.

²⁰Lease conditions are laid down in a document for the sale of a piece of land for the compliance of the purchaser who will become the landowner.

To meet the demand of lower income class for home ownership, there was a type of residential building that had relatively small units. This building typology became a special habitation between public and private developments and known as the “Private Sector Participation Scheme” (PSPS) which was documented by Yeung and Wong [11]. This program was initiated by the government in 1978²¹.

²¹Reference: Yeung and Wong (2003) Fifty Years of Public Housing in Hong Kong, p. 9.

After successful bidding to obtain the land from auction, the developer-contractor had to build the housing blocks and sell them back to government at a predetermined sum. Hence, the lease between this private developer-contractor and the government formed the contract. It was actually the conditions in the lease that quantifies the building into an almost pre-determined form.

Can quantities be used to specify the floor plans and thus the building form?

Reference can be made to the government [12] lease of Kwai Chung Town Lot No. 486 (a PSPS scheme) that contains lease conditions with limitations of quantities on the residential part of the development specified by the legal administrators:

Number of residential flats in each floor not exceeding 10 (The developer-contractor would just work on the maximum of 10);

Proportion of sizes for different flats based on a saleable area²² from 35 to 55 square metres, (The developer-contractor would build with typical floors and follow the proportions of the flat sizes as allocated);

Not less than 58% shall contain 3 bedrooms (This is another criteria for strict compliance);

Efficiency ratio²³ of each floor not exceeding 86%, (Based on this, the developer-contractor had no other choice but a central core design of typical floor);

Total gross floor area²⁴ for private residential not exceeding 20,540 square metres, (The developer-contractor would comply and maximize to the last square metre);

The residential flats would be purchased by the Hong Kong Housing Authority at the price of HK

\$12,900 per square metre of saleable area (Hence, the common area which would not account to any profit had to be minimized).

The resultant design was the very standard cruciform floor plan with central core surrounded by the residential units. The central core was the centralized provisions of building services and the shared common areas for the residents including elevators, escape staircases, waiting lobbies and building service riser ducts. The residential units would contain all the saleable areas (Fig. 12).

3.3. The Ziggurat-tower: Shadow Setback

An example of the building regulations affecting the physical appearance of building is revealed here.

Tall buildings with an elongated ziggurat²⁵-form can be discovered in Hong Kong. These are residential buildings that setback and terraced upwards with the increase in height. A good example given by Bristow [13] is the Man Wah Sun Chuen²⁶, an eight-block

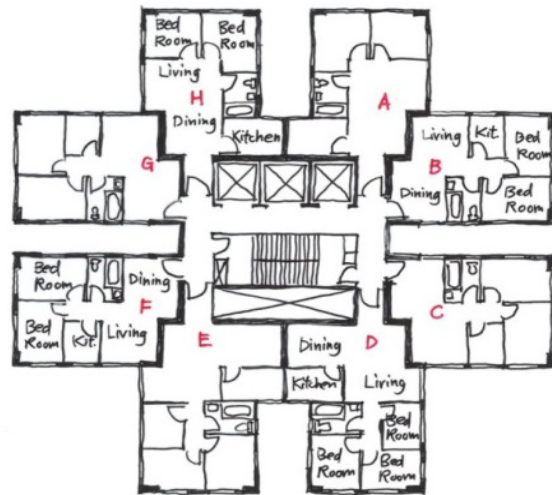


Fig. 12 Typical floor plan of richland gardens²⁷, another PSPS residential development completed in 1985.

²²Saleable area was defined in the lease conditions as “the total area of a unit measured to the external face of the unit’s enclosing walls (including walls adjoining common parts in the building) and to the centre line of the unit’s party walls”.

²³Efficiency ratio was defined as the ratio of saleable area to gross floor area.

²⁴Gross floor area was defined as “the area contained within the external faces of the external walls of any building at each floor level together with the area of each balcony.” Service ducts and refuse rooms were usually exempted from the gross floor area calculation.

²⁵Ziggurats were temples found in the Mesopotamia from ancient times with succeeding receding levels to make terraced step pyramids.

²⁶Bristow commented that the very high density developments like Man Wah Sun Chuen built under the building controls of the 50s formed difficult living environment and made way for subsequent new forms of control. See Bristow’s “Land-use Planning in Hong Kong”, p. 175.

²⁷Completed in 1985 Richland Gardens was an example of the Private Sector Participation Scheme with 22 high-rise towers

complex of residential/commercial complex built from 1964 to 1970 as an early form of private real estate development located at Jordan Road/Ferry Road of Kowloon (Fig. 13). The phenomenon of terraced setback at the top part of the building is common among these eight blocks.

If the sloping profile of the terraced setback is measured, one will discover it is inclined at 76 degrees or ratio of 1:4. This phenomenon can be traced back half a century ago in the Building (Planning) Regulations of 1956, clause 18 which states, “Above the permitted heights of walls fronting on streets the building above these levels shall be set back within an angle of 76 degrees with the horizontal” (Fig. 14).

This example also illustrates the highly dense development at that time with development intensity measured by “volume” or massive bulk of the building (based on 1955 Buildings Ordinance and 1956 building Planning regulations published by government [14]). The setback was taken by the legal administrators in relation to the streets to limit the actual bulk of the building. However, buildings with density of 6,000 persons per acre were common and corner sites reached 10,000 persons per acre. Unpleasant quality of life resulted so subsequently in 1962 this development control through volume was



Fig. 13 Man Wah Sun Chuen, a private housing estate completed at 1964-1970.

(34 stories of residential floors each) and 5984 units. This floor plan contained a central service core surrounded by eight residential units.

DIAGRAMS—The diagrams accompanying the text are purely explanatory and form no part of the enacted regulations.

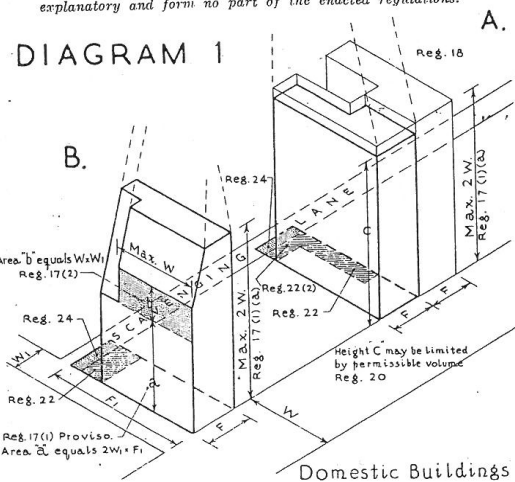


Fig. 14 Diagram to explain setback for residential (domestic) buildings in the building (planning) regulations 1956.

replaced by plot ratio²⁸ or gross floor area.

A similar setback regulation was introduced in 1969 probably by the environmentalist administrator to control the mass of building facing the street. This was called the Street Shadow Area²⁹ in the Building (Planning) Amendment allowing certain amount of sunlight into the street. In this way, the façades of buildings facing the streets were regulated (Fig. 15) and seen as an early form of environmental awareness for the spatial quality in the city. However, the resultant ziggurat-tower was not welcomed by the community so modifications³⁰ were often sought to replace the terraced setback with simple clear cut forms as long as the authorized person³¹-architect could demonstrate there would be no increase in the bulk of development by doing so. This regulatory control was subsequently revoked in 1987.

²⁸Plot ratio is the total gross floor area of building over site area. This is still the mechanism of development control even at present (2014) in Hong Kong Buildings Ordinance.

²⁹The street shadow area control was applied to both domestic (residential) and non-domestic buildings.

³⁰Modification for a clear-cut straight-edge design was through submission of a “notional scheme” to prove there was no advantage in development potential in terms of increase in floor areas for the intended design as compared to the terraced-setback design.

³¹The authorized person is the person responsible to coordinate the building works.



Fig. 15 A high-rise residential building in Wellington Street, Central, showing terraced setback for street shadow calculation.

4. Form Follows Code

After years of development and changes since the start of Hong Kong as a British colony, the residential buildings had evolved a special prototype before the return of the sovereignty of Hong Kong to China in 1997. Advancement in technology, increase in population, fast growth in economy and numerous alterations in the legislation gradually led to the formation of the popular residential floor plan with a cruciform layout and central service core (Fig. 16).

4.1 High Efficiency as the Objective

What was the objective when making the floor plan? It was the making of the optimal saleable floor area to maximize the profit for the real estate investment.

Since the enactment through Building (Planning) Regulations in 1962, the density of development was controlled by the “gross floor area” which was the floor area within the external wall and all the gross floor area (GFA) added together divided by the site area gave the “plot ratio”³², the mechanism to restrict development. There were three kinds of floor areas

³² The control using plot ratio started with the Building (Planning) Regulations of 1962 was based on domestic and non-domestic building classification, the class of site and the building height.

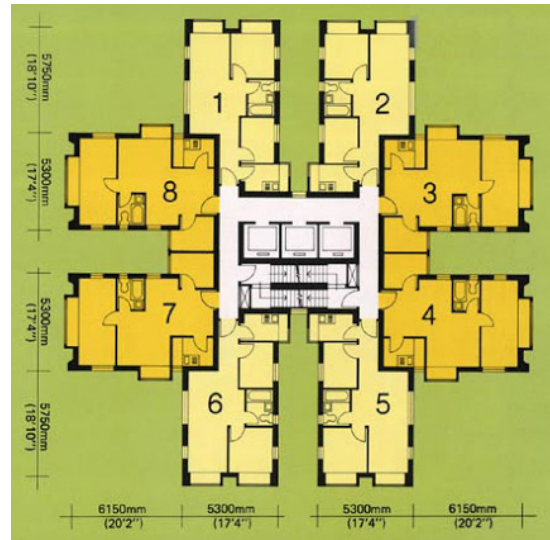


Fig. 16 Typical floor plan of amoy gardens³³, a middle-class private housing development built from 1981 to 1987.

within a residential typical floor, namely, saleable floor area, common area and GFA exempted area³⁴, the first two were accountable for gross floor area and the last one was exempted from gross floor area calculation. The saleable floor area was the floor area within the residential unit; the common area was the shared spaces of lift lobbies, lifts and staircases while the GFA non-accountable floor area was the area occupied by the building service ducts. Hence, the highest profit for the developer was possible by the maximization of the saleable area as well as the minimization of the common area. The resultant best arrangement was the cruciform floor plan with the central service core giving the highest efficiency ratio.

This arrangement is illustrated in the Goldwin Heights (Fig. 17), a high-rise residential tower completed in 1994, with the orientation of the living-dining room to get the best view from the interior. The typical floor plan contains eight flats of saleable area about 80 square metres each surrounding a central service core of lifts and staircases.

³³ Amoy Gardens, comprised of nineteen blocks from 30 to 40 stories, was seriously affected by the 2003 outbreak of SARS with a total of 321 cases in the whole estate.

³⁴ With the expansive market in real estate, developers try to build more and sell more. Hence, what can be exempted from GFA becomes crucial in the design of the residential buildings.

4.2 Health-“Building Re-entrant”

On the periphery of this floor plan, there are four deep recesses into the building which have been termed “building re-entrants” in Hong Kong. This is the location of windows for bathrooms and kitchens plus any other room. The windows³⁵ located here have to satisfy the building regulations for lighting and ventilation, the basic health requirement for proper habitation. Hence, the width of the re-entrant as noted by E. Lau [15] is 2.3 metres minimum³⁶ (Fig. 17). If the re-entrant only serves bathroom windows, its width can be reduced even to 1.5 m.

As the cruciform plan tends to have the minimum periphery so the building re-entrants are necessary to allow the provision of windows which have lower priority for an external view than the basic lighting and ventilation. Though satisfying the basic code requirement, the re-entrants have demonstrated decreased ventilation flow in air movement studies³⁷

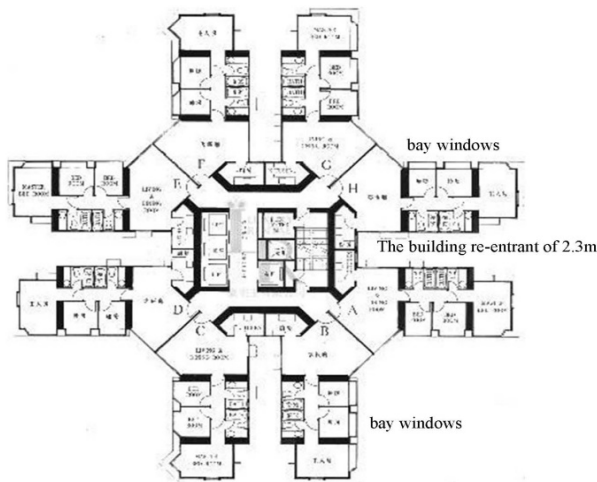


Fig. 17 Typical floor plan of Goldwin Heights, Seymour Road, Hong Kong.

³⁵ To satisfy the lighting and ventilation requirements, “prescribed windows” conforming to certain criteria have to be designed and built.

³⁶ The 2.3 metre dimension is necessary to satisfy the “rectangular horizontal plane”, a device for calculation of the window requirement to allow certain degree of unobstructed space for lighting and ventilation.

³⁷ Reference to Planning and design tools for sustainable housing development for healthy living-effect of building re-entrant on ventilation: Effectiveness in high-rise residential buildings.

due to the narrow width and relatively great depth of the recess.

The re-entrant is also the location of exposed drainage and water supply pipes hanging on the external wall as well as installation of air-handling machines. When there is insufficient maintenance, the micro-environment here with stiff air and humid climate can be unhealthy.

4.3 Safety-“Scissors-Staircases”

The “scissors staircases” is another invention by some ingenious designer for the architectural phenomena in Hong Kong. It is a three-dimensional architectural design with a pair of fire escape staircases (Fig. 18) overlapping with each other. The resultant phenomenon is two staircases occupying only the area of one staircase therefore saving the gross floor area calculated for the typical floor plan. The overlapping staircases resemble a pair of scissors hence the name of “scissors-staircases”. As efficiency is optimized, this form of escape staircase has been widely adopted in Hong Kong buildings.

However, the fire escape for the residential flats has to satisfy travel distance requirements so a linear plan will probably need two separate staircases at a certain distance apart and thus more expenditure on the limited gross floor area. Hence, the scissors staircases are only good for use with the central core floor plan



Fig. 18 Model of the “scissors-staircases”.

and at the same time reinforce the popularity of the cruciform plan with central core.

4.4 “Bay Windows” as Added Value

The “bay windows” (Fig. 16) in Hong Kong are not true bay windows (like those found in Victorian architecture) but projected windows from the external walls. This had been introduced by the Buildings Department³⁸ [16] through Practice Notes to Authorized Persons (PNAP)³⁹ in March 1980 (Fig. 19) as additional feature on the building (Fig. 20).

Soon they became popular with property developers because they were non-accountable for gross floor area. Initially these bay windows could be continuous and constructed for both domestic (residential) and non-domestic buildings with a maximum projection of 750 mm. Then in March 1985 another PNAP override the previous one. It restricted the projection to 500 mm and permitted on residential buildings only (Fig. 21). Soon the bay windows were installed on every room and became the dominating feature on the façade of residential buildings.

However, as observed by E. Lau [17], some users did not like the bay windows because they had reduced the overall efficiency ratio⁴⁰. Others opined that they did not facilitate good usage for the tenants.

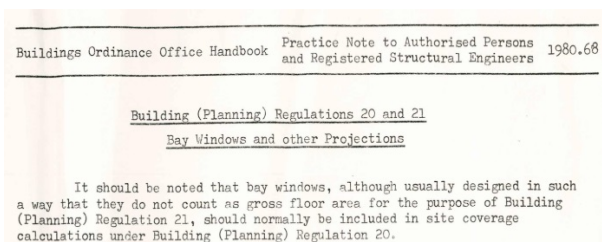


Fig. 19 Practice Note to authorized persons issued by government in 1980.

³⁸The Buildings Department of Hong Kong Government is the authority for making the Buildings Ordinance and its allied regulations.

³⁹ Practice Notes to Authorized Persons and Registered Structural Engineers (PNAP) were issued by the Buildings Department (also called the Buildings Ordinance Office) from time to time for interpretation of the Building regulations (Now PNAP can be found online).

⁴⁰ Reference: Some Interesting Trends of Hong Kong Commodity Housing by Eddie Lau, Building Journal, October 2011, pp. 56-57.



Fig. 20 Continuous bay windows in an office building (Tai Yau Plaza) completed in the 80s.



Fig. 21 “Bay windows” of residential buildings as the facade.

In actual construction, bay windows were relatively difficult parts of the building works and would often attract water leakage problems. Later, environmentalists found these as anti-energy saving devices. Subsequently the exemption of “bay windows” for gross floor area calculation was withdrawn in 2012⁴¹ through another PNAP published by the Buildings Department [14] that allowed a maximum window projection of 100 mm only.

4.5 Reading Building Regulations on the Building Form

As stated by W.S. Wong [18], with the popular cruciform plan and central core of scissors staircases, the external appearances of high-rise residential buildings soon become physical manifestation of

⁴¹The bay window exemption was withdrawn by the Buildings Department in the Practice Note for Authorized Persons, APP-19, 2012.

various building regulations such as the building re-entrants and bay windows. The example of Goldwin Heights (completed in 1994) illustrates various compliance of building regulations on its external wall features (Fig. 22).

5. Conclusion

To regulate residential development within high density and to provide fair opportunities in building projects and impartial judgment in government administration, strict legislative control in various aspects is necessary. As seen throughout the history of the colonial era of Hong Kong, the housing typology had gradually evolved from the low-rise vernacular Tong Lau into the high-rise residential towers by the end of twentieth century. At the same time, the effects of law as recorded in the particular legislative control on certain features of building or the overall appearance of the city are apparent. Hence, freedom for innovative design is rather limited in the high density context of urban Hong Kong.

Yet despite the building code penetrating every aspect of the building, there are still loopholes to be discovered. An interesting example is the on-street newspaper stalls (Fig. 23) erected on the ground floor by the external wall of the building. They give a human scale and lively touch to the streets reminding the traditional Cantonese culture in the past. What is



Fig. 22 Goldwin Heights.



Fig. 23 On-street newspaper stalls in Causeway Bay, Hong Kong.

the legal perspective on these? From the Buildings Department point of view, they are features outside the site boundaries of the building and separate from it structurally. From the administrator of the street, Highways Department, they belong to building furniture not really the original component of the street. Hence, as noted by Y.J. Chong [19], beyond the control of these government departments, these on-street newspaper stalls had survived for years to become part of the Hong Kong street life⁴² and local culture.

The colonial era in Hong Kong had posed a particular limitation to make a particular culture. Because of high density in the general environment and expansive market for real estate, attention to the mutual dependency of building and legislation is essential. Not only the on-street newspaper stalls, from the parts to the whole of the building are all display of the law or unauthorized building works in certain cases. This unity of the law with building features actually come from the mind of the architects, developers and administrators to suit particular circumstances in the course of time.

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⁴²A sense of street is given by the on-street newspaper stalls. Reference : Chong, Y.J., 2008, HKU Postgraduate Thesis: Legend at street corner: on-street news stalls as a character-defining element of Hong Kong street life.

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