<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>Adaptive Reuse of Industrial Building for Affordable Housing in Hong Kong</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Author(s)</strong></td>
<td>Kee, TYC</td>
</tr>
<tr>
<td><strong>Citation</strong></td>
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</tbody>
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Adaptive Reuse of Industrial Buildings – Transformation into Quality Housing

Tris KEE
Assistant Professor
Department of Architecture
The University of Hong Kong
Due to limited land supply and other reasons, there is shortage in HK housing.
In terms of:  
1. Supply   
2. Affordability   
3. Income inequality

...many Chinese do not mind working almost half of their lives just to pay off the bank loans. Owning a house in China is not just for residential purposes. It is now considered a marriage prerequisite and shows one’s financial capability. Other than that, it reflects on the unrealistic urgency of young people agonized by material desire and the shaky housing system in China.

As Li Daokui, professor at Tsinghua University and a member of the Chinese central bank’s monetary policy committee, says, “It is more than [just] a bubble problem,” Li says. “When prices go up, many people, especially young people become very anxious. It is a social problem.”


How Unaffordable Is Hong Kong Housing?


explores the problem of subdivided flats in Hong Kong as the government pledges it will address public anger over record house prices and reassess land policy. J.P. Morgan has helpfully crunched the numbers in a note, “Unaffordable housing,” to show just how unaffordable housing has become for the general public and why the government’s cooling policies have been ineffective.

Writes JPM:

A 1,300 sq ft apartment in the Belcher’s (upscale private complex in Hong Kong’s Western district) is equivalent to 11.6 times an income of HK$100,000 per month. Even wealthy households cannot pay for property from income.

HK housing crisis is becoming a problem for all classes of citizens
A Survey was carried out by HK Govt on private domesticComposite buildings aged 25+ in HK in 2013 Jan-Apr.

Fragmented ownership, lack of monitoring by the building management, relatively large floor area and relatively low rental value before subdivision – a higher chance of finding domestic premises in these old buildings being subdivided into two or more units.
Housing crisis in Hong Kong

Survey on Subdivided Units

The Long Term Housing Strategy Steering Committee (SC) commissioned an independent research institution, to conduct a survey on SDUs during the three-month period from 31 January to 30 April 2013.

objective - to estimate the number of SDUs and to gather information on the profile of the tenants

<table>
<thead>
<tr>
<th></th>
<th>Estimated number of persons living in SDU</th>
<th>Number of persons (C&amp;SD 2012)</th>
<th>Percentage of persons living in SDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong Island</td>
<td>37 800</td>
<td>1 260 100</td>
<td>3.0%</td>
</tr>
<tr>
<td>Kowloon</td>
<td>81 600</td>
<td>2 121 100</td>
<td>3.8%</td>
</tr>
<tr>
<td>New Territories East</td>
<td>6 400</td>
<td>1 672 000</td>
<td>0.4%</td>
</tr>
<tr>
<td>New Territories West</td>
<td>45 500</td>
<td>2 012 300</td>
<td>2.3%</td>
</tr>
<tr>
<td>Total</td>
<td>171 300</td>
<td>7 065 500</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Number of private domestic units aged 25 and above</th>
<th>Estimated percentage of quarters with SDU</th>
<th>Estimated number of quarters with SDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong Island</td>
<td>229 700</td>
<td>2.0%</td>
<td>4 500</td>
</tr>
<tr>
<td>Kowloon</td>
<td>239 400</td>
<td>3.9%</td>
<td>9 300</td>
</tr>
<tr>
<td>New Territories East</td>
<td>53 600</td>
<td>2.1%</td>
<td>1 100</td>
</tr>
<tr>
<td>New Territories West</td>
<td>94 000</td>
<td>4.1%</td>
<td>3 900</td>
</tr>
<tr>
<td>Total</td>
<td>616 700</td>
<td>3.0%</td>
<td>18 800</td>
</tr>
</tbody>
</table>

Number of people living in subdivided units (SDU) in 2013 - **171,300**
Number of SDUs in HK – **66,900**
Each quarter is divided into **3.6 units on average**
Housing crisis in Hong Kong

Table 31: Area of SDU reported by households living in SDU (%)

<table>
<thead>
<tr>
<th>Area of SDU</th>
<th>Below 70 sq. ft.</th>
<th>70-139 sq. ft.</th>
<th>140-209 sq. ft.</th>
<th>210-279 sq. ft.</th>
<th>280 sq. ft. or above</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.8%</td>
<td>55.4%</td>
<td>22.0%</td>
<td>10.5%</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Table 40: The views of households living in SDU on problems of SDU/buildings (%)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Serious</th>
<th>Average</th>
<th>Not serious</th>
<th>Do not have this problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water seepage</td>
<td>12.7%</td>
<td>9.2%</td>
<td>32.3%</td>
<td>45.8%</td>
</tr>
<tr>
<td>Concrete cracking</td>
<td>11.3%</td>
<td>7.7%</td>
<td>32.5%</td>
<td>48.5%</td>
</tr>
<tr>
<td>Messy electrical wiring</td>
<td>6.0%</td>
<td>26.5%</td>
<td>16.6%</td>
<td>50.9%</td>
</tr>
<tr>
<td>Exposed reinforcement</td>
<td>9.1%</td>
<td>6.2%</td>
<td>31.9%</td>
<td>52.8%</td>
</tr>
</tbody>
</table>

Table 39: The views of households living in SDU on the conditions of SDU (%)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Very dissatisfied</th>
<th>Dissatisfied</th>
<th>Average</th>
<th>Satisfied</th>
<th>Very satisfied</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Conditions in SDU</td>
<td>5.9%</td>
<td>8.5%</td>
<td>57.6%</td>
<td>27.8%</td>
<td>0.2%</td>
<td>—</td>
</tr>
<tr>
<td>Ventilation in the SDU</td>
<td>4.3%</td>
<td>18.7%</td>
<td>24.0%</td>
<td>51.0%</td>
<td>2.0%</td>
<td>—</td>
</tr>
<tr>
<td>Extent of congestion in the SDU</td>
<td>17.2%</td>
<td>30.0%</td>
<td>17.1%</td>
<td>35.5%</td>
<td>0.2%</td>
<td>—</td>
</tr>
</tbody>
</table>
Housing crisis in Hong Kong

### Allocation of HA PRH Flats

<table>
<thead>
<tr>
<th></th>
<th>2001/02</th>
<th>2006/07</th>
<th>2011/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>65</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>By Rehousing Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting List</td>
<td>42</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Clearance</td>
<td>1</td>
<td>^</td>
<td>^</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>10</td>
<td>2</td>
<td>^</td>
</tr>
<tr>
<td>Redevelopment &amp; Major Repairs</td>
<td>12</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Other Categories</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Less than 500

### Waiting List

<table>
<thead>
<tr>
<th></th>
<th>2001/02</th>
<th>2006/07</th>
<th>2011/12</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Live Applicants</td>
<td>86</td>
<td>107</td>
<td>189</td>
</tr>
</tbody>
</table>

The average waiting time for the general Waiting List applicants to be allocated with HA PRH flats in the year 2011/12 was 2.6 years. The monthly income limit and asset limit for a 4-person household were HK$20,710 and HK$418,000 for 2012/13 respectively.

Number of people waiting for HA Public Rental Housing in 2012 – **189,000**

Average waiting time – **2.6y**

Number of people allocate to HA Public Rental Housing in same period – **31,000**

Hong Kong’s 1.2 million poorest live in “Cage Homes”
Housing Reform

Home Ownership Scheme (HOS)
Public Rental Housing (PRH)
Rent Allowance for Elderly Scheme
Home Assistance Loan Scheme
Tenants Purchase Scheme
HK Housing Authority

- Since 1954, HA built over 700,000 public rental housing flats in 156 estates
- From 2010-2015, HA will provide about 75,000 flats
- The annual production of 15,000 new flats
- Over 2 Mil of HK people live in HA housing

(source: Planning, Design, and Delivery of Quality Public Housing in the New Millennium HK Housing Authority 2010)
Solutions?

housing supply through construction.....
but it takes time, resources, planning

Land supply?
Increasing construction fee?
Redevelopment?
Adaptive Reuse in Hong Kong

Explore possibility / feasibility of converting existing factory buildings into quality housing
Are there any other Immediate Solutions?

**Adaptive Reuse** be an alternative?

**Definition of Adaptive Reuse**活化建築 ...

...the process of reusing an old site or building for a purpose other than which it was built or designed for.

Adaptive reuse - a key factor in land conservation

-a compromise between historic preservation and demolition.

1. Environmental consideration
2. Maintain social cultural heritage
3. Gives new life to old buildings

Disadvantages:
1. Structural integrity
2. Not up to current building standards
3. Might contain toxic materials like asbestos

Source: http://en.wikipedia.org/wiki/Adaptive_reuse
Case Study

- **District of Kwun Tong**
500 Survey conducted
Sept 2012 – March 2013
Study area:
Kwun Tong:
One-forth of industrial buildings in non-industrial zones in Hong Kong are located in Kwun Tong

More than 40% of industrial buildings are less than 30 years old. It would be a waste for all of them to be pulled down and redeveloped

Survey findings – Vacancy Rate

Vacancy increased in ALL industrial buildings in recent years

Planning Department's Report on Area Assessments 2009 of Industrial Land in the Territory

only about 39% of industrial premises in OU(B) zone were still engaged in industrial and related uses.

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>全港</td>
<td>7.1%</td>
<td>6.3%</td>
<td>6.0%</td>
<td>5.7%</td>
<td>5.9%</td>
<td>8.4%</td>
</tr>
<tr>
<td>九龍區</td>
<td>6.6%</td>
<td>5.4%</td>
<td>5.6%</td>
<td>6.0%</td>
<td>6.4%</td>
<td>9.1%</td>
</tr>
<tr>
<td>觀塘</td>
<td>8.6%</td>
<td>6.6%</td>
<td>7.0%</td>
<td>7.6%</td>
<td>8.3%</td>
<td>12.0%</td>
</tr>
<tr>
<td>九龍灣</td>
<td>4.1%</td>
<td>3.7%</td>
<td>3.1%</td>
<td>3.2%</td>
<td>2.3%</td>
<td>4.1%</td>
</tr>
</tbody>
</table>

Demand for Manufacturing Floor Spaces and Stock of Industrial Premises

Source: Planning Department, Census and Statistics Department & Rating and Valuation Department
Kowloon Flour Mills = one of the very few flour mills still in operation in Hong Kong.

The Kowloon Flour Mills operates since 1 Feb 1966.

Key elements for heritage conservation
Most people surveyed came to Kwun Tong to work.

Approximately 30% of the interviewees came to Kwun Tong to join leisure activities.

This suggests industrial units in the area are used in many different ways.
Many interviewees are for industrial building revitalization.

Suggestions include offices, shopping centers and studios for creative industries.

Public housing is another favorite option among the interviewees.

A point to note is that though only a small number of people (3%) reported to take part in cultural activities in Kwun Tong, a large proportion of them (51%) believe we should develop creative industries in the area. This shows the public expectation to turn Kwun Tong into a cultural hub in Kowloon east.

Q: How Kwun Tong should be developed in the future? (can choose more than one answer)
More than 80% of our interviewees support the idea to allow altering the inner structure of industrial buildings so that they can be used in a different way.

We believe the Government should loosen the current regulations on changing the inner structure of industrial buildings and provide financial support to encourage revitalization.

But we believe the Government should not loosen the height restraints and regulations on plot ratio blindly. Or the newly-built high buildings may block the view to ridge line in the area and adversely affect the air circulation in the town center.

Q: Do you support the idea to demolish industrial buildings and build higher buildings on the sites?

Q: Do you support the idea to alter the inner structure of industrial buildings so that they can adapt to new use?
The research finds that most people believe air pollution (326 people), traffic congestion (318 people) and narrow pedestrian paths (305 people) are the most needed to solve problems in the Kwun Tong district.

A number of interviewees (272 people) expressed the view that there are not enough green areas and leisure facilities in the district.

We suggest the government making it a part of contract for developers to leave more spaces for pedestrians and add green areas in new revitalization projects in the future.
Qualitative Method - Interviews with stakeholders

- Strike a balance between residence and commerce
- Policies are confusing
- Official organizations should take part in the buyout
- Allow conversion of building by floor

- The government should allow application for change of building use
- Allow the owner to pay premium after the project is successful
- Provision of low interest loan by government

- Kwun Tong is convenient
- The area is well developed and I can find everything I want here
- Many designers set up studios in Kwun Tong, there is a brand effect
- I don’t want Kwun Tong to be wholly commercial

- Kwun Tong industrial area is part of Hong Kong history
- Roads are too narrow for too many people; water and electric supply is in 50-60s standard
- There is multiple ownership. A facilitator is needed to help the transition
- There are legal constrains on revitalization
- When some owners make money in revitalization, others follow
- Like “EKEO”, start with small projects first
- Take care of the traffic

Owner of an industrial building
Owner of an industrial building
Studio atelier j-ar, person in charge
Architect
Possibility of loft living

Vacant industrial buildings can be turned into affordable and pleasant residence and studios.
SWOT Analysis

**Strengths**
- Connectivity
- Fragmented Property

**Opportunities**
- Rise of housing needs
- Existing framework

**Weaknesses**
- Connectivity
- Fragmented Property

**Threats**
- Connectivity
- Fragmented Property
Precedents of international example of Adaptive Reuse
Critical considerations – both Micro and Macro

Micro scale
Hardware
1. Upgrade to current fire regulations
2. Provisions of barrier free access
3. Lighting and ventilation
4. Buildings Ordinance requirements
5. Sanitary fitment provisions
6. Drainage
7. Refuge Floor requirements

Macro scale
Software
1. Upgrade to a livable neighborhood
2. Provisions of recreational facilities
3. Parks and green spaces
4. Public amenities
5. Urban planning perspectives
6. Livable environment
7. Social sustainability
Adaptive Reuse of Industrial Buildings – Transformation into Quality Housing

活化工廈 – 提供優質住屋

Thank you!

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The University of Hong Kong