Transition of Row Houses at Chitlada State Railway of Thailand Housing Site in Bangkok
- Multipurpose Space such as Taithun (underneath) and Chan (terrace) -

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Abstract
The purpose of this study is to evaluate and analyze the Chitlada State Railway of Thailand (SRT) Housing in Bangkok by examining at the transition of multipurpose space of row houses. Row houses at Chitlada are made of timber and are built on concrete pillars and have multipurpose space such as a Taithun (underneath) and a Chan (terrace) which are often seen in traditional Thai houses. In this paper we have carried out research into the history of these houses and analyzed the present conditions of this outstanding house planning which could be useful for future architectural planning. We found that at the present the Taithun and the Chan have undergone structural modifications that have brought social changes in the way people interact with each other. However these space support the residents' continuous living and indicated the importance of multipurpose space which reflects the Thai way of life.

Keywords: Bangkok ; State Railway of Thailand ; Row House ; Multipurpose Space ; Common Space

1. Introduction
The State Railway of Thailand (SRT) housing is a kind of welfare housing provided by the government to the railway employees, and was developed at almost the same time as the commencement of the railway services in Thailand in 1896*. These SRT housing sites are found throughout the country. In Bangkok, there are 25 locations of SRT housing along the railways (Table 1).

SRT housing plays an important role in the supply of housing to the specific group within the public sector and helps to alleviate the problem of housing shortage for low-income groups*. Besides, the old timber row houses have a unique design and reflect the traditional way of life, which is rare in present day Bangkok. These row houses are built on 2-2.5m high concrete pillars, leaving the area underneath the house (‘Taithun’ in Thai) available for multipurpose uses. The roof has long eaves and appropriate slope. The kitchen is separated from the main building by a terrace (‘Chan’ in Thai). This timber house has a character that reflects its suitability for tropical climates.

Several studies have been done. Suehiro*7 and Kakizaki*4 are looking at the SRT industry from the socioeconomic point of view to explain the development of the railway industry. From an architectural point of view, Pimonsathean*5 selected three SRT housing sites where old timber houses are still existing, in order to appeal to conservation awareness. These researches are useful in understanding the background and history of the SRT housing. The role of house planning with unique space, however, has never been discussed before.

This paper tries to understand the transition of these housing sites and to evaluate the design by looking at the multipurpose space such as Taithun and Chan. Since this is one of the outstanding elements of this housing design it could be used in future Thai house planning and neighboring countries with similar climates.

2. Methods
This study gathered both primary and secondary data. Primary data was collected through a field survey in February and July 2001. Field surveys include interviews with community leaders, elderly people and residents, physical measurement of the housing structure of typical housing units to understand the existing conditions of land use and housing extension. A total of 25 households were interviewed*. Activities within the multipurpose common space was also recorded. Secondary
data was obtained at King Mongkut’s Institute of Technology, Ladkrabang and Siripakorn University.

3. Chitlada SRT Housing Site

3-1 Historical Background

Early SRT houses were built around Hua Lam Phong station but they were demolished when the extension of the station took place. Some of these houses were relocated around the pond in Chitlada. Though a blueprint of the Chitlada site dated 1936 (Fig.1) does not show these houses, according to the interview with elderly residents the detached and duplex houses relocated from Hua Lam Phong were built in the early 1940s.

The area of Chitlada has height restrictions and residential use is regulated due to its proximity to the King’s residence.

Table 1. Outline of 25 SRT housing site in Bangkok

| No. | Name             | No. of units | Having old house | Housing typology found in the site | Remarks          |
|-----|------------------|--------------|------------------|-----------------------------------|------------------|
| 1.  | Wat Danu Khupe   | 40           | Yes              | Single                           | High-rise        |
| 2.  | Chitlada         | 168          |                   |                                  |                  |
| 3.  | Sam San          | 45           |                   |                                  |                  |
| 4.  | Rong Sue         | 62           |                   |                                  |                  |
| 5.  | Kne Khon II      | 69**         |                   |                                  |                  |
| 6.  | Kne Khon III     | 1,997        |                   |                                  |                  |
| 7.  | Leel Si          | 6            |                   |                                  |                  |
| 8.  | Bong Chen        | 14           |                   |                                  |                  |
| 9.  | Don Muang        | 10           |                   |                                  |                  |
| 10. | Nakhon           | 100**        |                   |                                  |                  |
| 11. | Nakhon           | 6            |                   |                                  |                  |
| 12. | Nong Tan         | 5            |                   |                                  |                  |
| 13. | Nakhon           | 4            |                   |                                  |                  |
| 14. | Ban Thong Chiang | 7            |                   |                                  |                  |
| 15. | Kne Kon          | 13           |                   |                                  |                  |
| 16. | Ruee Ta Khupe    | 43           |                   |                                  | New Flats        |
| 17. | Knekon Loeong    | 5            |                   |                                  |                  |
| 18. | Wong Phue Yai    | 2            |                   |                                  |                 ** |
| 19. | Ban Yai           | 2            |                   |                                  |                  |
| 20. | Bang Kitti        | 37           |                   |                                  |                  |
| 21. | Kneon Chom       | 17           |                   |                                  |                  |
| 22. | Kneon Chom       | 17           |                   |                                  |                  |
| 23. | Ban Kitti         | 22           |                   |                                  |                  |
| 24. | Ban Chom Fies    | 1            |                   |                                  |                  |
| 25. | Saen Tham Soi    | 3            |                   |                                  |                  |

Notes: Information based on 1. Field survey, Oct-Dec 1999 and 2. Interview from the SRT staff.

** Comprising 584 units in the estate plus 40 row house units near the station.
*** No house but an accommodation unit within the station building.
**** Date before partial demolition for Siray hospital extension project in December 1999.
Source: Yongchant Pronesatham et al. (2000), p.4.

3-2 Design of Chitlada SRT Housing

In Chitlada there are three types of houses: a) detached house, b) duplex house and c) row houses. All of them were made of timber and built on 2-2.5 meter-high concrete pillars and had Taithun space which was cool and used for multipurpose activities. The difference among the three types are basically the amount of space available. Detached houses were built for higher ranking officials and are spacious while row houses are smaller. Row houses are divided into three sub types such as RH1, RH2 and RH6 (Table 2). Among the three sub types, RH1 was built for the workers of higher position such as train drivers and RH6 was built for the lowest position such as rail maintenance workers. The units of RH1 and RH2 are the same style with different width (RH1: 4m x

Table 2. Outline of Row house in Chitlada

| Type of House | RH1 | RH2 | RH6 |
|---------------|-----|-----|-----|
| Row house     | Row house, separated kitchen | Row house, separated kitchen | Row house, separated kitchen (shared with 7 units) |
| Gr. scalaray grade during 1939-1950 | (train driver, etc) | (clerk, etc) | Rail maintenance workers |
| Year of redrafting stated in the blue prints | 1939, 1953 | 1939, 1953 | 1939 |

Archer: Vodhyakara Vodhyakara N.A.

| Qualified resident | 3rd rank | 4th rank | Rail maintenance workers |
|-------------------|----------|----------|---------------------------|
| Gr. scalaray grade during 1939-1950 | Gr. 80-160 | Gr. 60-120 | |
| Year of redrafting stated in the blue prints | 1939, 1953 | 1939, 1953 | 1939 |

Architect: Vodhyakara Vodhyakara N.A.

| Functional area (sq.m/unit)* | RH1 | RH2 | RH6 |
|-----------------------------|-----|-----|-----|
| Chari (terrace)             | 12.0 | 9.0 | 25.5** |
| Chari (veranda)             | 8.0  | 6.0 | 15.0 |
| Krua (kitchen)              | 9.0  | 6.0 | 4.5-5.0 |
| Non (bed room)              | 16.0 | 12.0 | 6.25-8.75 |
| Non (toilet)                | 4.0  | 4.0 | N.A.*** |
| Total area                  | 49.0 | 37.0 | 102.5-13.75*** |

Notes: Information based on 1. Field survey, Oct-Dec 1999 and 2. Interview from the SRT staff.

* Name of the space from the blue print. The ground space is excluded.
** This is the total area of the common terrace and is shared with seven units.
*** The toilet for RH6 is shared toilet outside quarter.
**** This is excluded common terrace area.
Source: Blueprints of architectural drawings, State Railway of Thailand

Fig. 1. Plan of Chitlada SRT Housing Site
Source: SRT blue print 1936
15m, RH2: 3m x 15m). Both of them have a kitchen, Chan, Chalieng and bedroom*10 (Fig.2). Chan was originally the outside space with long eaves and connecting kitchen and bedroom. Chalieng was next to the bedroom and was a part of the Chan with a 15 cm higher floor level than that of the Chan. A different floor level contributes to ventilation and wind circulation. RH1 and RH2 were designed by the pioneer Thai architect Mom Chao Vodhyakara Varavarn*11. The designer of RH6 is unknown even though the design is similar to RH1 and RH2. The RH6 building is shared among seven people including the worker’s leader (Fig.3). The worker’s leader had an exclusive kitchen and six people shared three kitchens*12. Chan and two Chalieng are multipurpose common spaces and connect to shared kitchens and bedrooms. Chalieng A is surrounded by three units including the leader’s unit. Chalieng B is a more closed space between the two units.

4. Transition of the Chitlada SRT Housing Site

Fig. 4. Existing Conditions at the Chitlada Site

The development of the Chitlada is summarized in Table 3. The existing conditions are shown in Fig.4 and 5. Only a few new row houses have been reconstructed after a fire in 1997. There are quite a number of residents who have worked for the SRT for generations. The atmosphere of the housing site has not changed drastically except in RH6 where extensions and remodeling have been much more frequent*13.

Since 1992, this community has been called ‘Chum Chon Sageo’ as a legal community and has received social services from the Bangkok Metropolitan Administration (BMA) district office*15. Since then, the community has been organized and includes one community leader, two health care volunteers and one sports community volunteer. The office for health care and sports is located inside the community and provides free medicine and sports equipment which is distributed by the BMA (Fig.4). According to the BMA policy such as one public space should include one sport court*, three playgrounds converted to a volleyball court, a football court and a takro court. Every year residents enjoy the big Songklan festival (Thai new year festival in April) and other festivals around these grounds and pond are shared with nonresidents. Contributions for these festivals come partly from the BMA district office.

4-2 Residents’ Profile and Living Conditions

According to the report*10 of three SRT housing sites including Chitlada, the average size of a household is 4.6 per household, which is larger than that of Bangkok (3.1 person /hh in Dec. 1998). The average period of stay in the SRT house is 17.7 years while the longest stay is more than 40 years. Social interaction in the neighborhood is solid, about 76.3% are acquainted with 10 neighbors or more while only 5.9% know only one or two of their neighbors*16. The average household income of the
row house is 23,915 baht/month, which is slightly less than that of the Bangkok region (26,571 baht/month). Only 31% have already prepared their houses after retirement.

Since the SRT housing is a kind of welfare, residents do not have to pay a rent fee except electricity and water. They have had individual meters for electricity and water since 1982. The living conditions in SRT are better than those of other houses in Bangkok.*17.

4-3 Taithun and Chan at RH1 and RH2

The Taithun of RH1 and RH2 are surrounded by bricks and are used as living space or for commercial activities. Modifications and extensions however are not frequently done by residents (Fig.5). There are several reasons be-

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Table 3. Development of Chitlada Housing Site

| Year | Row House (R180) | Chitlada (underneath) | Chan (terraco) | Chalabang (corridor) | Krus (kitchen) |
|------|-----------------|------------------------|----------------|---------------------|----------------|
| 1980s | - | - | - | - | - |
| 1990s | - | - | - | - | - |
| 2000 | - | - | - | - | - |

*17: A reference number that might be specific to the context or source.
hind this phenomena. One reason is that living space upstairs and downstairs is sufficient for a family including an extended family and does not require extra space (No.28: two families of a relative live on the 1st and 2nd floors, No.142: Parents live on downstairs). These buildings are located along the railway and well ordered maintenance is required by the SRT officer.

The roof was made above the Chan nearly 10 years ago after a part of the RH1 building caught fire from an adjacent slum community along the railway. Before that, residents were not satisfied with the outdoor Chan space due to rain water, fallen leaves and insects. They requested that a roof be made at the time when some repairs were taking place.

The Chan was a connecting space and made a separated kitchen room into a private room easy (Fig.6). Although the Chan has physically changed by the roof, this space is used for multipurpose activities such as relaxing and for socializing including inviting monks to comply with their Buddhist beliefs.

4-4 Taithun and Chan at RH6

There was no extension in the underneath until the 1950s. Children ran around and residents played with water in the Songkran Festival (Thai New Year) at Taithun. Some people slept on the lawn surrounding the water taps since it was cool and comfortable. Keeping up with increasing family members, residents started to use the kitchen and the Taithun as bedrooms for their children around the 1960s. The original kitchen was expected to be shared among residents, however from the early days each kitchen tended to be used exclusively by a specific family. Therefore it was easily converted to a private room. Although there is no official rule, the Taithun belongs to the residents who have the right to stay in the units upstairs. The RH6 has undergone extensive changes around the Taithun and outside space (Fig.5). Taithun provided living space for retired people or families who accidentally lost the right to stay (Fig.6).

Chan was an outdoor space but because of environmental reasons such as rain and leaves the residents requested the roof in the 1980s. At that time, there were already some units underneath and were troubled by these climatic inconveniences. The Chan was used for various activities, especially while eating together with neighbors or playing with children; and is nowadays used for utility space such as drying clothes, cooking, storage and playing but not for social activities among neighbors as before (Table 4). Quite a number of daily commodities such as kitchen ware, baskets and clothes are kept on the Chan (Table 5). Since the underneath is blocked and less ventilated, this space is not as comfortable for living as it used to be.

Some residents have sub-rented to outsiders as the location is very convenient being near the city center, hospital, market and railway. There are several renters found in RH6 (Fig.7). We also found several families who own units two or more. However only unit No.88 (the community leader lives here) is a common space partitioned by walls for exclusive use. The Chan does not perform

Fig. 6. Plan of RH1, RH2 and RH6 (2001. July)
the role for active communication in daily life, but is nevertheless important for inviting monks or for holding funeral ceremonies.

Originally the Chan and Chalieng-B were connected but in none of these buildings have this circular passage anymore. Chalieng B is used as a semiprivate space between the surrounding units. Comparing the utilization

![Diagram of Chan and Chalieng-B](image)

**Table 4. Activity at Chan on workday and holiday**

| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|--------|---------|-----------|----------|--------|----------|--------|
| 94     | 98      | 98        | 100      | 94     | 98       | 98     |
| 98     | 98      | 100       | 94       | 98     | 98       | 98     |
| 100    | 94      | 98        | 98       | 100    | 98       | 98     |
| Time   | Time    | Time      | Time     | Time   | Time     | Time   |
| 6:30   | 7:00    | 7:30      | 8:00     | 8:30   | 9:00     | 9:30   |
| 9:00   | 9:30    | 10:30     | 10:00    | 11:00  | 11:30    | 12:00  |
| 12:00  | 12:30   | 13:00     | 13:30    | 14:00  | 14:30    | 15:00  |
| 15:00  | 15:30   | 16:00     | 16:30    | 17:00  | 17:30    | 18:00  |
| 18:00  | 18:30   | 19:00     | 19:30    | 20:00  | 20:30    | 21:00  |

**Table 5. Kind and quantity of commodity in the Chan**

| Commodity | No. of row house |
|-----------|------------------|
| Bicycle   | 7                |
| Child car | 9                |
| Building materials | 10 |
| Fan      | 11               |
| Gas cooker | 12        |
| Countertop | 13    |
| Furniture | 14               |
| Chair, bench | 15     |
| Desk, table | 16    |
| Desk unit | 17               |
| Bed      | 18               |
| Refrigerator | 19         |
| Washing, food stall | 20 |
| Bath, sink | 21          |
| Wash, sink | 22         |
| Laundry, drawer | 23 |
| Mirror | 24               |
| Table    | 25               |
| Chair    | 26               |
| Bed      | 27               |
| Shelves  | 28               |
| Wardrobe | 29               |
| Washing machine | 30   |
| Sleeping bag | 31    |
| Storage | 32               |
| Self-service | 33       |
| Goods | 34               |

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| Desk, table | 16    |
| Desk unit | 17               |
| Bed      | 18               |
| Refrigerator | 19         |
| Washing, food stall | 20 |
| Bath, sink | 21          |
| Wash, sink | 22         |
| Laundry, drawer | 23 |
| Mirror | 24               |
| Table    | 25               |
| Chair    | 26               |
| Bed      | 27               |
| Shelves  | 28               |
| Wardrobe | 29               |
| Washing machine | 30   |
| Sleeping bag | 31    |
| Storage | 32               |
| Self-service | 33       |
| Goods | 34               |
of Chan and Chalieng-A by the degree of commodity placed on these spaces, there are less daily commodities and more furniture placed in the Chalieng than those in the Chan. Chalieng A is used more privately with some purposes (Tables 5 and 6).

4-5 Activity in Common Space
To understand the utilization of different common spaces, we recorded whole day activity at the Chan, court and around the pond on workdays and holidays. The Chan is used by few residents for utility space, work space and passage (Table 4). Contrary to the Chan, there were a number of residents seen at the court. The number of women at the court did not change much between workdays and holidays (Fig. 8). People were cooking, washing, eating, bathing children, relaxing and communicating at the court. There were a lot of water jars, shelves, benches and daily commodities such as kitchen wares and washtubs in the court (Fig. 5). People around the pond area were gathering to relax, play football, fish and talk with neighbors. Quite a large number of men stayed around the pond area in the evening and enjoyed their time after work for relaxing and chatting. Recreation activities such as festivals and relaxing used to be carried out at the Taihun but take place nowadays around the pond area. The Court functions as an extended house space while the pond and surroundings functions as a recreation area.

5 Conclusions
This study has explored the transition of the Chitlada SRT housing site and row houses (Fig. 9) and has reached the following conclusions:
1) The Taihun of row houses which was used for multipurpose activities in the past were converted into private rooms or used for commercial activities. Though the Taihun are sometimes flooded in the rainy season, these space of the RH6 provide a living space for retired persons or families who lost their right to stay in the unit due to accidents. The Taihun has been utilized and modified to accommodate the residents’ needs.
2) At the beginning the open Chan of the row houses were designed to fit the natural and social environments. However, a roof was put over the Chan due to rain water and fallen leaves stuck in the gutters. The Chan changed physically with the incorporation of the roof, functioning as a multipurpose space in most of the row houses. The Chan was a connecting space and divided kitchens into a variety of rooms keeping up with the residents’ needs without major construction requirements.
3) In the RH6 the Chan is a semi-outdoor space and shared with residents although it is not comfortable or actively used for communication as it used to be, because the extension underneath prevents ventilation and disorder results from the increasing number of commodity placed in it. The Chan, however, is still used

### Table 6. Kind and quantity of commodity in Chalieng

| No. of row house | 76 | 80 | 84 | 87 | 92 | 95 | 99 | 101 | 103 | 105 | 107 | 109 | 111 | 113 | 115 |
|------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Furniture        | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Chair, bed      | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Daily commodity | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |

Source: Field survey 2001 July

Fig. 8. Number of people at the open space
for ceremonies such as inviting monks to bring happiness or for funeral ceremonies. In part this arrangement is still suitable for the Thai way of life.

4) The communication activities including daily activities and festivals which used to take place at the Taithun and Chan have shifted to outside spaces such as the nearby court and around the pond area. An increasing number of residents use such spaces. These spaces have become more important in an overcrowded community.

5) It is 60 years ago that the Chitlada SRT housing site was built. Row houses with multipurpose spaces such as the Taithun and Chan have been contributed to a way of life for the residents. This design, created by a leading Thai architect deserves to be looked at with more attention as a way to consider future planning.

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Notes:
*1 Reference 4, p.2. Reference 5 mentioned that SRT was the largest government organization with more than 15,000 employees in the 1930s. SRT housing can be said to be the earliest welfare housing from these references.
*2 Reference 7 outlined the existing urban housing types at all income levels in Bangkok based on housing supply transitions including housing policy and housing developments. The study summarizes 16 housing types provided by 4 sectors and the SRT housing is placed on one of them.
*3 Reference 5
*4 Reference 1
*5 Reference 4
*6 Interviewed households: RH1 (Nos.24, 28), RH2 (No.142), RH4 (78/2), RH6 (Nos.80, 88, 92, 98, 102), New row house (No.90).
*7 Reference 4, p.2
*8 Residents aged 68 and 73 remembered the time of WWII at Chitlada. According to them, Chitlada was almost the same as Fig.4 except for the new row houses in 1942.
*9 RH3, RH4 and RH5 do not exist in Chitlada.
*10 ‘Chan’ is out of one’s area (by dictionary: The Royal Institute 2525). Professor Onsiri Panit at Siripakorn University explained ‘Chan’ as a connecting space and suggested to use ‘terrace’ in English and ‘Chalieng’ as part of house (Ruen) next to the room or corridor and suggested to use ‘veranda’ in English. Professor Veera Inpuntung at Siripakorn University also explained that Chalieng could be accessed from the public space. ‘Chalieng’ and ‘Rabiang’ are similar (by interview : July 2001).
*11 He was one of the grandsons of King Rama IV and received his architectural education at Cambridge. He was one of the five fully qualified architects in Thailand. Reference 2, pp.49-55.
*12 According to the blue print, the workers’ leader had a bigger room and an exclusive kitchen. However, later everyone had an empty unit and their work or rank did not matter.
*13 There are some of SRT housing regulations that prohibit extension or commercial activity, however, these activities are seen in housing sites. Community leaders and residents working for a longer time for SRT tend to get tacit approvals.
*14 Chum Chon is ‘community’ and Sageo means clean water (pond). The community leader attends the district meeting once a month and requests the budget for community activities. The Health care volunteer and sports community volunteer also submit a monthly report which states the number of people who utilize the facility, the kind and quantity of medicine provided, kind of sports equipment utilized and a request for supplement for these.
*15 Reference 4. They surveyed 229 household with 3 SRT housing.
*16 Reference 4 mentioned that about 10% of the households sub-rent to outsiders. These outsiders might have less interaction with neighbors.
*17

| Living conditions (%) | SRT housing sites | Bangkok | Whole country |
|-----------------------|-------------------|---------|---------------|
| Electricity*          | 100.0             | 99.9    | 98.7          |
| Water supply: Inside tap water | 96.3 | 85.1 | 31.5 |
| Drinking water        |                   |         |               |
| Inside tap water      | 86.3              | 63.3    | 18.7          |
| Bottled water         | 8.1               | 25.0    | 15.7          |
| Toilet: Flush and moulded | 95.2 | 94.9 | 95.0 |

Source: "Electricity is from author’s field survey in Chitlada 2001.
SRT housing sites: Prakasanont (2000)/5, Bangkok & Whole country : NSO (1997)"

*18 Through the interview.
*19 Through the interview. Further analysis is required for the evaluation of shared kitchen.
In the 1980s, there was a family check by SRT. This might have resulted from the increase in residents and extension at that time. Since then, resident receive two units if they request.

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