

# CURRENT SITUATION OF PARK & RIDE RAPID TRANSIT IN BANGKOK

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## 1. Introduction

Park & Ride (P&R) is essential measure which is car driver shift to rail based system in urban area in the residential of Bangkok. From early 90s, the rail based system have been operating Bangkok Mass Transit System (BTS: Sky train) and Mass Rapid Transit (MRT: subway), these rail based system officially opened in 1999 and 2004 respectively. However, both system mainly operated in business district only, this is very difficult to accommodate commuting purpose. Even several P&R facilities opened in the Lat Phrao station etc., Recently Thai government start to construct new rail based system namely Purple line which will connect to Bang Yai area. Blue line connected to Thonburi side, Red line or airport link bound to eastside of Bangkok. Those lines will connect to residential area of outskirts of Bangkok. Thus, Thai government expect to have many commuters will shift from passenger vehicle to those rail based system. To promote rail based system more, Thai government had better plan building many P&R system open on newly opened station.

In this study, first, we would like to confirm current situation of P&R system in Bangkok. And then, we would like to show the characteristic of P&R user demand with some results of questionnaire surveys.

## 2. Current Situation of P&R

### (1) Park & Ride Locations

Currently, there are 9 P&R areas (2 parking buildings and 7 ground-level parking lots), located at 8 stations along the route of MRT Chaloem Ratchamongkhon Line as shown Figure 1 and Table 1. Total of parking lot is around 3,565 spaces. P&R's Chatuchuck Park station is ground-space which the data has not been collect. These P&R facilities are operated by Mass Rapid Transit Authority of Thailand (MRTA). And as the future plan, the government had a policy of developing the rapid transit network. The Bang Yai – Bang Sue section (Purple Line) is one of the new network of rapid transit which has 23 kilometers as a total length. There are 16 stations including 4 P&R facility and present construct site as shown in Figure 2.



Figure 1 P&R Locations<sup>1)</sup>

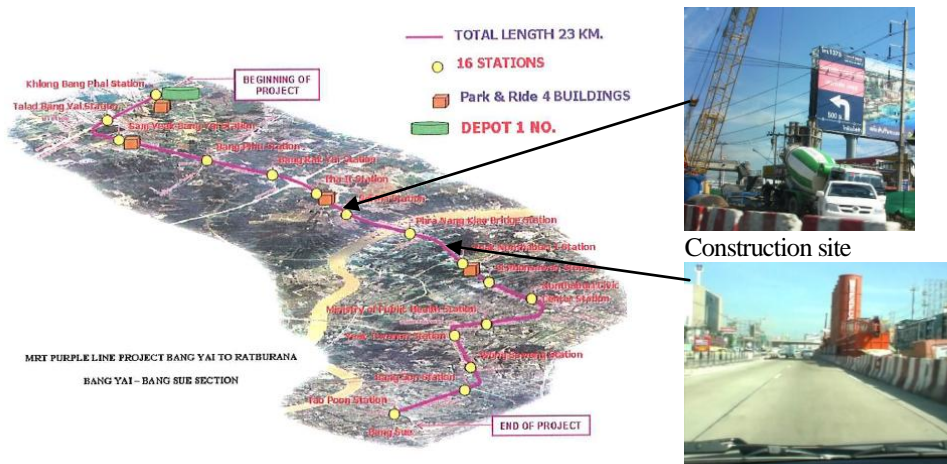
Table 1 P&R Facilities

| P&R Facilities                                      | Car Park Spaces(Spaces) |
|---|-------------------------|
| 9-storey P&R building, Lat Phrao St.                | 2,500                   |
| Parking lot, Ratchadaphisek St.                     | 70                      |
| Parking lot, Huai Khwang St.                        | 80                      |
| Parking lot, Thailand Cultural Centre St.           | 35                      |
| 3-storey P&R building, Thailand Cultural Centre St. | 200                     |
| Parking lot, Phetchaburi St.                        | 90                      |
| Parking lot, Sukhumvit St.                          | 50                      |
| Parking lot, Sam Yan St.                            | 40                      |
| Ground space , Chatujauk Park St.                   | about 500               |

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(2) Operations Parking Facilities (MRTA Park & Ride System)

MRTA has started revenue P&R service since August 13, 2004. MRTA engages a private firm to manage parking service and collect parking fees, and also engages other firms for related services such as security, cleaning, and maintenance services. MRTA uses automatic car park system with security car access and dependable collection of parking fees. This system can automatically calculate parking fees and record car license number, entry/exit time and parking fee data to make useful reports for related applications. The parking charge for MRT passenger is 10 baht per 2 hours. The ordinary vehicle parking charge is 30 baht per hour (except Petchaburi Station and Sukhumvit Station, ordinary parking charge is 40 baht per hour) and 1,000 baht per month at P&R building (excluding 300 baht of smart card deposit, will be returned if the customer quits monthly parking and returns the completely usable smart card). MRT passenger has to bring a smart card for discount recording by presenting the smart card on the auto-stamp device within paid area of the destination station. The smart card cannot be recorded for discount at the station leaving car. Figure 3 illustrates the numbers of users who use P&R (not included data's Chatuchuck Park station) and compare with capacity (around 3,565 spaces) which cannot support at this time so that the P&R facility should be more rapidly constructed.

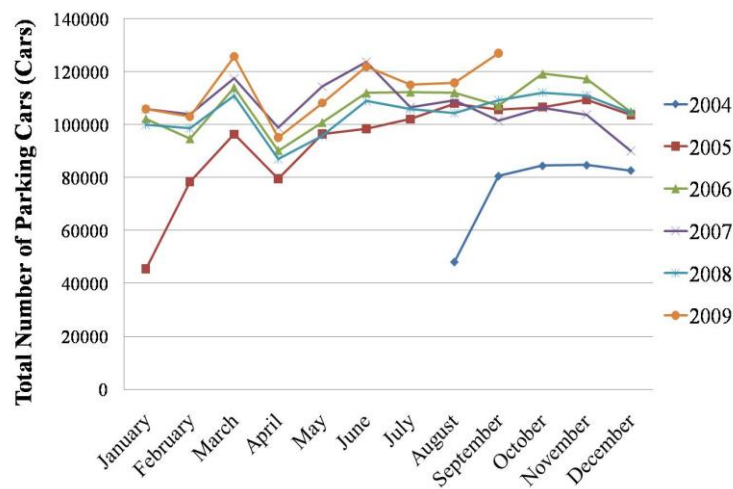


Figure 3 Numbers of P&R users from 2004 to 2009

Source; Mass Rapid Transit Authority of Thailand

3. Questionnaire Survey for P&R system

(1) Outline of Questionnaire Survey

We conducted questionnaire survey to make P&R users' behavior clear. The questionnaire for P&R users conducted on MRT Chaloem Ratchamongkhon Line in the Blue line at three stations that are Lat Phrao station, Thailand Cultural Centre station and Chatuchuck Park station. Here, each station has P&R facilities. First, Lat Phrao Station has 9-storey P&R building including 2,500

spaces for car parking. Second, Thailand Cultural Centre Station has 3-storey P&R building with 200 spaces. That station has more a parking area with 35 spaces. And then thirdly, Chatuchuck Park station has plain parking including 1,300 spaces.

The objective of this questionnaire is to observe the commuters' decision factor. The questionnaire was consisted by origin and destination, age, income, travel behavior, occupation etc. for grasping characteristic of P&R users. We distributed 99 sets and valid answers were 66 sets. And then, we try to conduct the SP questionnaire survey in the case of opened Purple line.

(2) Results of Survey

The Figure 4 shows the results from the 66 sets questionnaire. The most P&R users can be classified as a company employee because that uses on weekday and the period to come in the P&R at 7:00-9:00 for avoiding traffic jam in rush-hours. As shown in Figure 3, in each station, it is found that P&R users who use five times a week were using MRT more than five times a week. Occupation of passengers are as shown in Figure 4. Company employee is the most occupied users and the second is self-owned business, public officer and student. It can be considered that P&R was used for commuter trip. In the weekend, it can be observed that the student sometime uses P&R when their parent vehicle is free to commute to the district. A few users use P&R but not to use MRT service due to work around station. This reason will be that their company does not have the lot parking support themselves or other parking has the high parking fee. Regarding the share of transportation mode in egress trips is shown in figure5. Most of user choice bike or walk partially choice taxi. Therefore, it can be considered that destination of P&R users is located around a station.

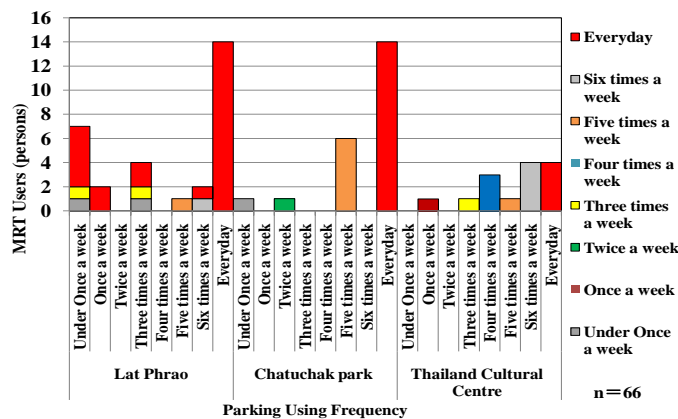


Figure 3 Frequency of Passengers

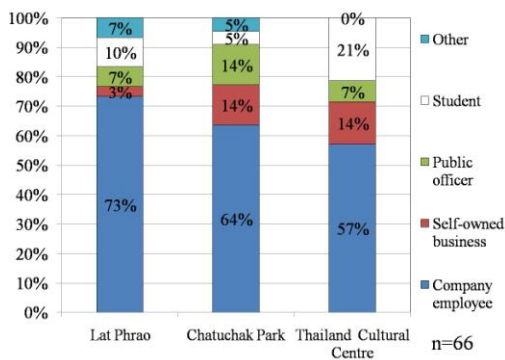


Figure 4 Occupation of passengers

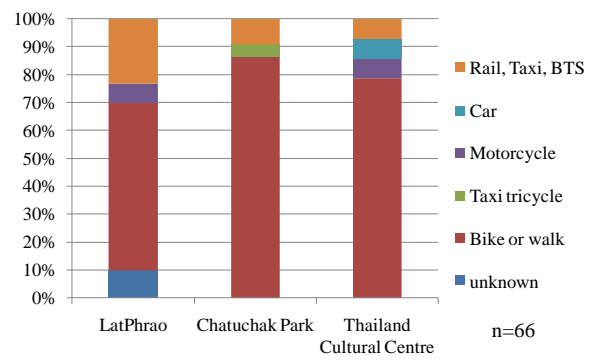


Figure 5 Egress of P&R users

(3) Analysis of P&R users intention

The SP questionnaire was conducted by comparison between the subway and the other transportation modes and between the present route and P&R route assuming that shorter travel time by paying P&R parking fee. The SP questionnaire was conducted with 4 pattern combinations for parameter estimation as shown in Figure 6. We use 720 samples for analysis which are to be equal to P&R route and present route samples. The result is shown in Table 2. The coincidence condition is satisfied and t-value is enough high.

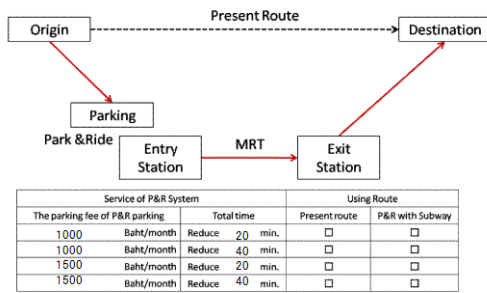


Figure 6 Example of Questionnaire Content

Table 2 Parameter Estimation of P&R

|                                   | Variable          | Parameter  | t-value     |
|-----------------------------------|-------------------|------------|-------------|
| Common Variable                   | Reduction time    | 5.33E-02   | 6.52        |
|                                   | Parking fee       | -8.59E-04  | -2.23       |
| P&R Fixed Variable                | Driver's licence  | -4.31.E-01 | -1.88       |
|                                   | Car ownership     | 2.92.E-01  | 1.35        |
|                                   | House income      | 1.24.E-01  | 2.18        |
|                                   | Individual income | -4.39.E-03 | -0.09       |
| Determination Coefficient         |                   |            | 0.20        |
| Revised Determination Coefficient |                   |            | 0.19        |
| Prediction Rate                   |                   |            | 0.69        |
| Sample Number                     |                   |            | 720 samples |

#### 4. Conclusion

This paper mentioned current situation of P&R measures with rapid transit system in Bangkok with some questionnaire survey result. As the result of this paper, most of P&R users are consisted with company employees and students for commuting trip. And P&R is succeeded when destination can be in walking sphere in egress trip. As the future issue, more detailed survey should be conducted for accuracy enhancement.

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