

## A STUDY ON THE BEHAVIOR OF DELIVERY MOTORCYCLES IN BANGKOK

Kazushi SANO  
Associate Professor  
Department of Civil and Environmental  
Engineering  
Nagaoka University of Technology  
1603-1 Kamitomioka-Machi, Nagaoka  
Niigata, 940-2188 Japan  
Fax: +81-2-58-47-9650  
E-mail: sano@nagaokaut.ac.jp

Wisinee WISETJINDAWAT  
Graduate Student  
Department of Civil and Environmental  
Engineering  
Nagaoka University of Technology  
1603-1 Kamitomioka-Machi, Nagaoka  
Niigata, 940-2188 Japan  
Fax: +81-2-58-47-9650  
E-mail: wisinee@stn.nagaokaut.ac.jp

Chu Cong MINH  
Graduate Student  
Department of Civil and Environmental  
Engineering  
Nagaoka University of Technology  
1603-1 Kamitomioka-Machi, Nagaoka  
Niigata, 940-2188 Japan  
Fax: +81-2-58-47-9650  
E-mail: ccminh@stn.nagaokaut.ac.jp

Watchara SATTAYAPRASERT  
Lecturer  
Transportation Engineering Program  
Department of Civil Engineering  
Mahanakorn University of Technology  
51 Cheamsamphan Road, Nongjok  
Bangkok, Thailand  
Fax: +66-2988-3666  
E-mail: swatchar@hotmail.com

**Abstract:** The study on motorcycle behavior is important to understand its characteristic and system for ease in policy decisions related to the vehicles. One of the purposes of motorcycle usage is for the delivery of documents or commodities. This study aims to investigate the characteristics and system of delivery motorcycles. Delivery motorcycles are examined from two approaches: interview and traffic surveys. Delivery motorcycle drivers were interviewed about the characteristics of firm, driver, and the movement of vehicle. Traffic survey is another approach to countercheck the results. The survey results imply that the total vehicle kilometer traveled of delivery motorcycles for the entire Bangkok is almost 4.6 million vehicle-kilometers per day. More than 80 percent of delivery motorcycles are used for delivery documents. Among businesses, banks contribute the greatest share of the usage of motorcycles for delivery.

**Key Words:** Motorcycle, Messenger, Developing country.

### 1. INTRODUCTION

Motorcycle is one of the most popular modes in developing countries because of its fast speed, high maneuverability, and low cost. However, tremendous growing of motorcycle uses in Bangkok has deteriorated environment, public safety, and quality of life of people. Bangkok contributes nearly half of the country's GDP, and accounts for over one third of manufacturing enterprises and motor vehicle population (National Statistics Office, 1998). Number of motorcycles is continuously increasing year by year in which the total number of motorcycles registered in Bangkok is 2.37 million vehicles corresponding to 40 percent of the total number of all motor vehicles (Statistics Sub-Division, Department of Land Transport, 2003). Particularly, accidents on motorcycle drivers are increasing not only in number but also in severity. The study on the role of motorcycle is therefore important to understand its characteristics and system in order to assist to policy decision about motorcycle vehicles. Motorcycles are not only used for people travel but also used for delivery documents and commodities. Although trucks are the common modes used for transporting commodities, motorcycles are found more suitable in some cases especially for delivery small-size

commodities or documents in central business district. Surprisingly, the study on delivery motorcycles has never been an interest to researchers even though the number of motorcycles used for this purpose is not negligible.

The objective of this study is (1) to understand the role of motorcycles in business in aspects of its characteristics and system and (2) to estimate the vehicle kilometer of traveled (VKT) of delivery motorcycles. Our focus is mainly on motorcycles that are used for the purpose of delivery commodities, which can be divided into two sub-purposes: for delivery of documents and for delivery of commodities.

The first section of this paper provides the background about the study area and motorcycle roles in business. The next section will discuss the survey and results of two survey approaches. The VKT of delivery motorcycles between two approaches are compared. The last section contains the summary and recommendation on the survey.

## 2. BACKGROUND

### 2.1 Study Area

Bangkok consists of 50 municipal districts which the total area is 1,568.737 sq. km (The Registration Administration Bureau, Department of Local Administration, Ministry of Interior, 2003). The total population of Bangkok in 2003 was 5.84 million corresponding to about 10 percent of the total population of Thailand. Firms from the Yellow-page phone book are classified into eight business types:

- Banks (BK),
- Insurance Companies (IC),
- Post Offices (PO),
- Financial Institutes (FI),
- Logistics Companies (LC),
- Fast Food Shops (FF),
- Other Shops (SH),
- Others Business Types.

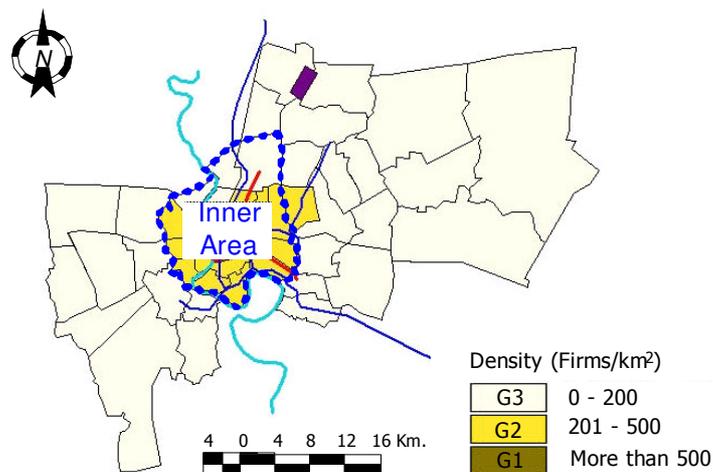


Figure 1. Firm's Density of Bangkok

For business types (1) to (5), we focus only on the delivery of documents whereas, for business type (6) and (7), we consider only the deliver of commodities. The last group (8) is divided into two groups of delivery purposes including delivery documents and delivery commodities. Firm's density by district is shown in Figure 1. We divide the districts into 3 groups according to the density of companies located in each zone. The firm density of zone groups G1, G2, and G3 are arranged in descending order. The districts with the highest firm density include Bangrak, Pranakorn, Pomprabsattrupai and Sumpantawong. These four districts are known as the CBD of Bangkok. Silom road in Bangrak is especially the main business area in where most head offices are located. Yowarat (known as China Town) in Sumpantawong is a very famous place to where many tourist and shoppers are attracted. For ease of comparison between two approaches of the study, Bangkok is divided into two study areas which are the inner area and the entire area. The inner area is the area inside the broken line in Figure1. About 78 thousand and 130 thousand firms are located in the inner area and the entire area of Bangkok respectively.

## **2.2 Motorcycle's Roles in Business**

Motorcycles are used for many different purposes. Generally, motorcycles are used either for people travels or carrying commodities. Motorcycles used for people travels are not considered in this paper. The second purpose that motorcycles are used for carrying commodities is divided into two sub-purposes: delivery of documents and delivery of commodities.

In business, information flows is very important. Data transferring via electronic mean can not be applied all times, the primitive way like using messenger is still necessary. Messengers therefore play an important role in transferring data and documents to customers or to other branches. The advantages of motorcycle, which are fast speed, high maneuverability, and low cost, cause motorcycle is suitable for messenger's job. Motorcycle messengers are used in Banks, Insurance Companies, Financial Institutes, Logistics Companies, Post Offices, and Other offices (such as travel agencies, offices, and some medium-size shops). Messenger's uniform is usually a black or blue jacket which is distinguished from the other motorcycle's drivers. Luggage a messenger carrying is commonly a medium-size bag that can carry up to 10 or 20 kilograms or a box fastened with seat at the back side. Carries are mostly cheques, tickets, and documents that will be delivered to braches, offices, or customer's houses.

Motorcycles are also used in some shops for delivery small-size commodities. Fast food shops and some other shops usually use motorcycles for delivery their products to customer's houses. Especially in Yowarat area, motorcycles is the major mode since streets are very narrow. Customers can not drive to shops and have to park at the parking spaces faraway so that those shops delivery their products right at customer's cars using motorcycles. The special characteristic of this area is that small-size motorcycles (or scooters) are the most popular. Commodities are usually fastened with seat at the back side.

## **3. METHODOLOGY**

This research study delivery motorcycles from two approaches: interview survey and traffic survey. First, the behavior of delivery motorcycle drivers was surveyed by interviewing messengers at companies and workers at shops. Second, traffic volume survey collected the present traffic condition, share of motorcycles from the other traffic, and share of delivery

motorcycle drivers from the other motorcycles. VDO instruments were set up at the selected main roads and intersections in the central business district.

### 3.1 Interview Survey

#### 3.1.1 Survey

218 questionnaires were distributed to 179 motorcycle messengers of 48 companies and 39 workers of 19 shops over the entire Bangkok during December 15, 2003 to December 22, 2003. The sample companies are randomly selected to be the representatives of the other zones which have similar characteristics based on the density of companies in each zone. Figure 2 shows locations of companies and shops where the survey was conducted. The questionnaire consists of three parts: (1) General information of firm, (2) Information of messenger, and (3) Information of vehicle movement. The general information of firm is about location, business type, office type, number of employees, and number of motorcycle drivers. The information about messenger includes type of messenger, working period, and rush hours. The last part is the information of vehicle movement which is distributed to each motorcycle driver to record the detail about delivery route. The information includes delivery frequency, purpose, destinations, departure and arrival time, the number on mileage meter while departing and arriving at stops, and business types of destinations.

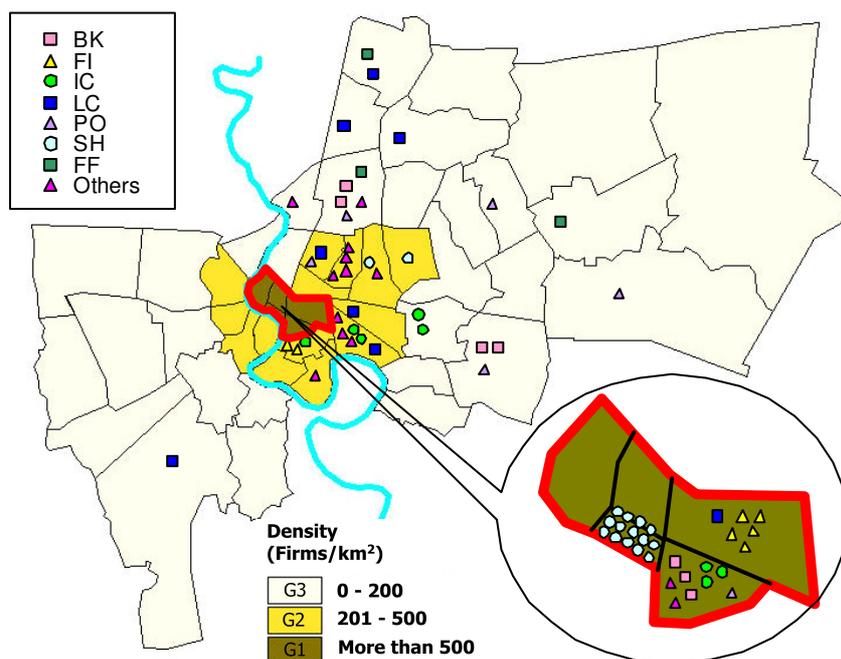


Figure 2. Location of Survey Points

#### 3.1.2 Calculation of Vehicle Kilometer of Traveled

To estimate the total kilometer traveling of motorcycle messengers, the following equation is applied. Firms classified by business types and zones are grouped into three types based on the density of firms in a zone. The average number of tours of a messenger in a day, the average distance of a tour traveling by a messenger in a day, the average number of messengers in a firm, and the number of firms in a zone are obtained from the survey data.

$$\text{Total Kilometer Traveling [km/day]} = \sum_{\text{all } z, \text{all } b} \overline{TO}_{bz} \cdot \overline{D}_{bz} \cdot \overline{N}_{bz} \cdot NC_{bz} \quad (1)$$

where,

$$b \in B = \left\{ \begin{array}{l} BK, FI, IC, PO, LC, FF, \\ SH, \text{ and Others} \end{array} \right\} \quad \text{Set of business types of companies.}$$

$z \in Z = \{Low, Medium, High\}$  Set of zone classification based on the density of firms in a zone.

$\overline{TO}_{bz}$  [tour/day-messenger] Average number of tours per a day for each messenger of a firm business type  $b$  and location zone  $z$ .

$\overline{D}_{bz}$  [km/trip] Average distance traveling by a messenger for each trip of a firm business type  $b$ , and location zone  $z$ .

$\overline{N}_{bz}$  [driver/firm] Average number of messengers in a firm of business type  $b$  and location zone  $z$ .

$NC_{bz}$  [companies] Number of firms which are business type  $b$  and located at zone  $z$ .

### 3.1.3 Results

#### (1) General Characteristics of Firms

Table 1 summarizes the general characteristics of companies and the characteristics of vehicle movement. The number of motorcycle messengers of Bank (BK), Financial Institute (FI), and Insurance Company (IC) is approximately 5 percent of the total employees in a firm. These three business types are very similar in characteristics and purpose of using motorcycle messengers. Post Offices (PO) and Logistics Companies (LC) have more proportion of motorcycle messengers, which are approximately 50 percent of the total employees. This is because these types of businesses mainly deal with delivery. The proportion of motorcycle delivery workers of Fast Food shops (FF) and Shops (SH) are comparable and is about 20 percent of the total employees. In the aspect of messenger ownership, messenger sectors in some large companies are managed by sub-contractors. This system is currently used only in some banks corresponding to approximately 57 percent of all banks in Bangkok.

Based on the above table, total number of motorcycles used in all business types is calculated and equals to 67,654 and 100,558 vehicles for the inner area and the entire area respectively. The shares for each business type for the inner area and the entire area are depicted in Figures 3 and 4. The shares comparing between the inner area and the entire area are indifferent. The proportion of the number of banks is very small; bank however is the main business that used motorcycle messengers. Motorcycles used in financial institutes, insurance companies, and logistics companies are similarly about 5 percent of all business types. These results are reasonable since the number of companies of these business types is small.





















