

EFFECT OF THE SCHOOL TRIPS ... A CASE STUDY IN BANGKOK

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INTRODUCTION

Together with her prosperous, lucrative and rich in cultural and natural resources, Bangkok also becomes widely known on her traffic congestion which was often described as being one of the worst in the world. Traffic congestion has become almost a way of life in Bangkok. It is a daily occurrence involving different commuters like students, workers, public officials and ordinary people in the countless hours of time and amount of energy being wasted. Not to mention the ever growing environmental pollution particularly the air qualities which become rapidly deteriorating throughout the city.

Among the many causes of Bangkok's chaotic traffic conditions, one undeniable fact in contributing to these severe congestions is the school trips. School trips syndrome may not sound very familiar to many especially to Westerners, but it is quite apparent in Bangkok. It becomes almost a way of life for some Thai parents to send their children to and fro schools using private cars. In fact, the number of school trips during peak hours represented almost one third of the total trips made in Bangkok [1]. This paper intends to present the effect of school trips in Bangkok. The main aim is to evaluate the traffic conditions through travel time studies during both school days and school holidays.

1. DATA COLLECTION

Travel time data were collected through license plate technique together with corresponding volume counts which were conducted manually. Data of both travel time and volume surveys were collected for before and after phases. Since data had to be collected first at the time when schools were closed for holidays, as such before and after refer in this paper as the school holidays and school days, respectively. Data were collected at three selected locations namely: Samsen Road, Convent Road and Sathon Nua. These locations were chosen because of their severe traffic congestion. Moreover, numbers of well known schools are located along these streets of which most are private schools with a high reputation of wealthy parents. Thus, majority of these

students are sent to and fro schools using private cars. Details of these study sites are presented in Table 1.

Table 1 : Description of the Study Routes

Study Routes	Distance Covered Under the Study	Type of Traffic Movements	Name of School Located Along the Road	Number of Students Enrolled	Educational Level
Sansen Road	500 m.	One-way traffic with contra-flow bus lane in the opposite direction.	Saint Gabriel School	4,742	Primary 1 to Highschool
Sathon Hua Road	1300 m.	One-way Traffic	Bangkok Christian School	4,450	Primary 1 to Highschool
Convent Road	470 m.	One-way traffic during specified peak periods, otherwise two-way traffic. Buses do not operate along this road.	Saint Joseph's Convent School	4,736	Primary 1 to Highschool

Travel time surveys were conducted by the license plate technique with synchronized stopwatches. Observers were stationed at the entrance and at the exit of each study section. Each observer recorded the time and identified the license numbers of each vehicle as it passed the observation point. However, only white and red cars were randomly chosen to represent the traffic in order to get more matched data. The identical license numbers were matched and the travel time, the difference between the two recorded times, were determined. While each travel time survey was conducted, classified traffic counts were also made at the same location. Data were recorded at 15-minute intervals using counter boards. Traffic were classified into two categories as follows:

1. CARS : Including passenger cars, taxis, pickups and vans.

2. BUSES : Including BMTA buses and private minibuses which have the same performance as the BMTA buses. (BMTA is the Bangkok Mass Transit Authority which operates the bus transit system.)

In Bangkok, both heavy and light trucks are restricted to operate in the city streets during the peak periods. As such, traffic volumes counts were classified into only two types as mentioned.

All surveys were conducted during both morning and afternoon periods and coincide with the beginning and ending of classes. The study periods were from 0700 to 0830 hours in the morning and 1430 to 1630 hours in the afternoon on Wednesday and Thursday, 24th and 25th of October 1990 for the before phase. After study was conducted on the same days (Wednesday and Thursday), 21st and 22nd of November 1990.

2. ANALYSIS OF THE DATA

After sorting and matching the identical license plate numbers through the computer package, the average travel time together with the classified volumes were obtained. Then, by using the statistical approach, evaluation was made of the significance of the observed differences between the before and after distribution of cars and buses travel times as well as their volumes.

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3.1. Cars and Buses Travel Time Changes

Table 2 shows the results of cars and buses travel times on the three selected study routes for both morning and afternoon periods. Results clearly indicated that school trips have much effect on the average travel times of the traffic along these streets. All selected study roads showed the increase in travel times for both cars and buses during school days compared to the school holidays periods. Although, the travel time increments appeared to be nominal as the observation distances were rather short, the percentages of changes were quite substantial especially for the Convent Road. Travel times along this particular road during school days increased drastically from about a minute to nearly 19 minutes and 9 minutes in the morning and afternoon, respectively. These resulted to the reduction in corresponding travel speeds of 29.4 kph to only 1.5 kph.

Table 2 : Travel Time Changes Between School Holidays and School Days

Study Section	Type of Vehicle	Direction	Time Period	Average Travel Time (Minutes)		Changes of Average Travel Time			Travel Speed, kph	
				\bar{X}_b	\bar{X}_a	Minutes	Percentage of Changes	Significantly Increased*	School Holidays	School Days
Samsen Road	Car	Inbound	0700 - 0830	0.84	1.85	+1.01	+120.24%	Yes	35.71	16.22
			1430 - 1630	0.69	1.48	+0.79	+114.49%	Yes	43.48	20.27
	Bus	Inbound	0700 - 0830	2.67	3.37	+0.70	+26.22%	Yes	11.24	8.90
			1430 - 1630	1.96	2.24	+0.28	+14.29%	Yes	15.31	13.39
		Outbound	0700 - 0830	1.49	2.79	+1.30	+87.25%	Yes	20.13	10.75
			1430 - 1630	1.38	1.87	+0.49	+35.51%	Yes	21.74	16.04
Sathon Nua Road	Car	Inbound	0700 - 0830	7.52	11.84	+4.32	+57.45%	Yes	10.37	6.59
			1430 - 1630	5.27	7.62	+2.35	+44.59%	Yes	14.80	10.24
	Bus	Inbound	0700 - 0830	9.31	17.05	+7.74	+83.17%	Yes	8.38	4.57
			1430 - 1630	6.64	8.05	+1.41	+21.23%	Yes	11.75	9.69
Convent Road	Car	Inbound	0700 - 0830	0.96	18.53	+17.57	+1830.20%	Yes	29.38	1.52
			1430 - 1630	1.07	8.48	+7.41	+692.52%	Yes	26.36	3.33

Note : \bar{X}_b = Mean travel time during school holidays

\bar{X}_a = Mean travel time during school days

* = Statistical test at 5% - level of significance

It should be noted that buses do not operate along Convent Road, as such buses travel times were not observed on this road. While Samsen and Sathon Nua Roads are one-way traffic streets with the exemption of contra-flow bus lane being employed along Samsen Road. Cars and buses travel times were observed only along the traffic flow direction except

Samsen Road which had the bus travel time observed also along the contra-flow bus lane. Nevertheless, bus travel times along this contra-flow bus lane also indicated the marked increase during the school days as shown in Table 2. Moreover, the increment in travel times of both cars and buses were noticed in all study periods.

Results of the before and after studies which represented school holidays and school days were confirmed through the statistical tests. It revealed that travel time increased significantly during school days at 5 percent level in all three study sites as well for all survey periods.

3.2. Traffic Volume Changes

Perspective of the school trips syndrome in Bangkok becomes more apparent when considering the traffic volume changes during the school days and school holidays. Volume counts were made in front of the two selected schools simultaneously with the travel time studies and within the same time periods. Results of the average hourly volumes during school days and holidays were summarized as shown in Table 3. It becomes obviously clear that car volumes increased during school days, ranging from less than 1% to 46% increased. Samsen Road has been more affected by this school trips syndrome as car volumes raised significantly during school days by 37% and 46% for morning and afternoon periods, respectively. However, slight increments were observed for the Sathon Nua Road especially during the morning peak as only 8 additional cars (0.38%) were noticed during school days. Being one of the major arterials in Bangkok, traffic along Sathon Nua can be expected to be dense most of the year. As such, only slight increased were noticed along this road for both school days and holidays.

It is interesting to note that while increments in car volumes were reported, bus volumes on the other hand, showed an opposite trend. Throughout the observation periods and for both study sites, bus volumes dropped significantly during school days as shown in Table 3. This unusual phenomenon may due to the inability of the buses to pass through severely congested streets caused by the additional vehicles trips during school days. Unfortunately, even though bus lanes have been implemented in Bangkok since 1980, lack of proper enforcement has so far failed to ensure bus priority on the usage of bus lanes. Bus lanes become almost ordinary lanes as all other traffics intruded into the lanes. Perhaps, the Thai Authorities should concentrate on the concept of moving people rather than moving vehicles.

Table 3 : Results of the Classified Volume Counts during School Holidays and School Days

Location	Type of Vehicle	Time Period	Average Volume, vph		Changes of Volume, vph		
			\bar{X}_b	\bar{X}_a	Numbers	Percentage	Significantly Increased*
IN FRONT OF SAINT GABRIEL SCHOOL	Car	Morning	1654	2422	+768	+46.43	Yes
		Afternoon	1022	1397	+375	+36.69	Yes
	Bus	Morning	295	218	-77	-26.10	Yes
		Afternoon	281	257	-24	-8.54	Yes
IN FRONT OF BANGKOK CHRISTIAN SCHOOL	Car	Morning	2387	2396	+8	+0.38	No
		Afternoon	1761	1941	+180	+10.22	Yes
	Bus	Morning	110	40	-70	-63.64	Yes
		Afternoon	82	31	-51	-62.20	Yes

Note : X_b = Average hourly volume during school holidays

\bar{X}_a = Average hourly volume during school days

* = Statistical test at 5% - level of significance

3.3. Parking Duration

The previous sections described the effects of school trips through travel time and volume studies. Though, common characteristics of traffic behavior were noticed in most of the observation sites, Sathon Nua, during the morning peak period, requires further clarification. As travel time increased significantly during school days, car volumes were more or less comparable, of which only 0.38% increment were noted along this street. One of the reasons that contributed to the longer travel time despite the consistency in traffic volumes is the additional delays caused by the parked vehicles in front of the schools. In Bangkok, common scene that can usually be observed in front of any schools is that parents wait for their children to go in and come out from

their respective schools. Noticeably, the number of parking spaces in these schools are normally inadequate. As such, these parents must park along the curb sides, thereby, reduce the potential roadway capacity and adversely affect the traffic flows. An attempt had been made in this study to collect the parking durations in front of these three selected schools. Stopping cars were randomly selected and stopping durations were recorded.

Table 4 illustrates the average parking time of the three selected schools of which 0.42, 0.32 and 0.67 minutes were observed in the morning for Saint Gabriel, Bangkok Christian and Saint Joseph Convent Schools, respectively. While individual parking times ranged from 0.05 to 6.3 minutes during this morning peak period. Although, average parking times were quite low during the morning peak period, the individual parking time still indicated some unreasonable duration. The maximum parking time observed at St. Joseph's Convent School of 6.3 minutes and other 4.05 and 4.07 minutes observed at St. Gabriel's School and Bangkok Christian School respectively, indicated that parents either waited until their children completely walked inside the school or either they accompanied their children to the schools themselves. This latter practice is quite common among many schools as parents are not confident especially on the safety of their children. Nevertheless, this problem should be eliminated. Each school should employ their teachers and/or some appointed persons to fetch students in front of the schools to ensure public confidence to parents. Moreover, those schools which have the higher educational level could request the more mature and senior students to assist at the school entrances.

The seriousness of parking becomes even more pronounced in the afternoon periods, as not only the average parking time increased to 6.78, 5.46 and 4.75 minutes for those mentioned schools, respectively but the maximum individual's parking time also increased to 40.2, 75.75 and 51.82 minutes, respectively. These parking durations clearly indicated that parents were waiting for their children at those mentioned schools. Oftentimes, it can be witnessed among the well known schools in Bangkok that parents were seen waiting for their children inside the schools premises instead of dropping off and picking up their children. However, with the inadequate and limited numbers of parking spaces inside the schools, they have to park illegally along the roadside. This has further intensify the seriousness of the limited road spaces thus enhanced more severe traffic congestion along these streets. This obvious phenomenon becomes more and more serious which requires immediate attention and measures.

Table 4 : Results of Parking Durations Survey

Locations	Time Period	Average Parking Duration (Min.)	Sample Size	Standard Deviation	Minimum Value	Maximum Value
St. Gabriel School	0700 - 0830	0.42	215	0.50	0.05	4.05
	1430 - 1630	6.78	62	8.35	0.15	40.20
Bangkok Christian School	0700 - 0830	0.32	114	0.38	0.08	4.07
	1430 - 1630	5.46	52	12.52	0.10	75.75
St. Joseph's Convent School	0700 - 0830	0.67	103	0.88	0.08	6.30
	1430 - 1630	4.75	60	8.23	0.13	51.82

CONCLUSION AND RECOMMENDATIONS

Effect of school trips in Bangkok is no longer in doubt and requires considerable attention. It is unfortunate to mention that the most obvious and simple solution of providing school bus system has so far been largely ignored and failed in implementing effectively. No regulations or even any incentives to encourage the usage of school buses. As such, only very limited numbers of schools are providing school bus services. According to the statistics provided by the Ministry of Education, there were only 675 school buses providing the services to nearly 1.3 million students in Bangkok in 1988 [2]. Assuming that each school bus can carry 60 students, these amount to 40,500 students equivalent to only 3.1 percent of the total students. In fact, among the three selected schools with a total of nearly 15,000 students, only Saint Joseph's Convent School offers the school bus services. Imagine that if all these students come to schools by private cars, how much more chaotic the traffic in Bangkok would be?

Reasons why schools are reluctant to provide school buses may stem out from the burden of shouldering any responsibilities. Concerned with their schools' reputation that could be easily hampered if any accidents occur. Moreover, it is not financially attractive to cater school bus services as other hindrances also arise from searching potential drivers, allocation of parking spaces within school premises, under-utilization of these buses during school holidays and unattractive fare being regulated by the

Authority. On the other hand, Thai parents still lack the faith to allow their children to patronize school buses. One common reason is that they do not have the confidence toward the safety of school buses. Other reason may due to the unacceptable durations on riding school buses because of circuitous trips.

School buses in Bangkok come in various sizes and different types of vehicles are being used. Though, the 60-seater normal type of buses do exist, the most popular type of vehicles currently being utilized is the van which could be seated up to 15 adult passengers. It is interesting to note that among those schools which cater the school bus services, not all of them are having their own buses neither the drivers were their own employees. Numbers of private operators have been contracted to provide the services to certain schools. Some are initiated by the schools while many are the parents' personal consensus who grouped together and requested for bus services. For the latter case, schools bear no responsibilities for any consequences that may occur to the students. Another form of school bus also becomes more popular but still illegally operated, is that the teachers in each respective school utilize their own vehicles to pick the students along their routes to schools. Whichever system being adopted, it is unfortunate to mention that all these services are totally catered by privates, authorities concerned have so far no intention to provide the school bus services as part of the public welfare program.

This paper highly recommends that school bus system should be considered seriously despite any past failure experiences. Bangkok can no longer tolerate without the implementation of any discouraging measures on the usage of private cars. School bus system could well be one of the possible measures to help relieve the severe congestion caused by the usage of private cars. School trips syndrome should be minimized if not totally eliminated. While in many developed countries, school bus services are usually provided for the public as part of the welfare program. Unfortunately, the Thai Government is yet to consider the school bus system as part of the public welfare program or even to provide any incentives that could encourage more school buses. Moreover, certain outdated regulations on the fare policy should be revised or be totally abolished to provide more competitive and attractive to the operators. On the other hand, all safety aspects must be highly endorsed to their maximum level to ensure public confidence.

REFERENCES

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