Manila City Bus Operation Characteristics

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Abstract: In February this year, DOTC has carried out surveys of bus operation on the eight bus routes to crosscheck the actual size of bus fleet in Metro Manila. The routs surveyed were three routes passing through EDSA, three routes along radial roads, one coastal route and one loop route in busy downtown area. The survey results exhibited the number of operators and units plying along each bus route, time variation of service frequency and load factor, etc. The report is also intended to delineate the productivity of the operational schemes of these eight routes.

1. Introduction

The operation of public utilities in Metropolitan Manila, such as buses, jeepneys, taxis, FXs (often called MEGA Taxi) and tricycles, has been one of the issues that are most often talked about. The issues include various aspects: driving habits of the drivers, smoke belching, causing traffic jams at the bus stops, ***colorum*** operation (operation without proper license or franchise), etc.

As a government agency that is responsible for the administration of road transport, DOTC in coordination with law enforcing agencies, has been tackling these traffic problems ever since. Some of the recent achievements are computerization of driver's licensing/vehicle registration and the implementation of emission test and the preparation of the motor vehicle inspection system. In order to help the PU operators to upgrade their fleets for the compliance with the emission standards required by the Clean Air Act 1999, DOTC is also making efforts to make financial assistance available to those operators.

Apart from the emission standards and enforcement of traffic rules, DOTC, through its agency the Land Transportation Franchising and Regulatory Board (LTFRB), is the sole authority that issues the franchises of public utilities except for tricycles, of which franchising has been transferred to local governments. LTFRB has issued 190 routes for city bus operation in Metro Manila for about 180 operators. These routes are identified by the origin and destination. Majority of the routes passes EDSA.

While the franchise of bus operators remains unchanged over five years, passenger trip patterns have been changing because of the new development of residential sub-divisions, opening of new shopping malls and introduction of other mode of transportation such as FXs and MRT. Therefore, some of the franchised routes are no longer profitable and the operators have terminated the services. This is especially true for those routes along EDSA,

because the transport capacity along this route has been drastically changed by the operation of the MRT Line 3.

Thus, the rationalization of franchise routes has been required. The Road Transport Planning Division of DOTC has been conducting field surveys to monitor the actual bus fleet plying in major bus routes Metropolitan Manila. The latest survey was conducted in February 2002. This paper presents some operational characteristics of bus operation exhibited by the data obtained through the surveys.

2. Surveys

The roadside surveys were carried out over the period from February 11 to 18, 2002. The survey was conducted for the eight (8) routes listed in **Table –1**. The Table shows the origin, destination, passage, location of survey and the bus direction surveyed. These routes and the survey locations are exhibited in **Fig. – 1.**

Table - 1 Survey Routes

Route Name Survey Date	Origin (Distance)	Destination (Distance)	Route	Survey Location	Survey Direction
(1) Quezon A. Feb. 11 & 12 5:00 – 22:00	SM Fairview (24 km)	Taft, Quiapo Lawton	Don Mariano Marcos Quezon Ave.	Cor, Quezon Ave. & EDSA	West Bound to Lawton
(2) Alabang Feb. 18 0: 00 - 17:00	Novaliches	Alabang (36 km)	Quirino HWY EDSA South Super Hwy	MANTRADE MRT, Maga- llanes Station	West Bound to Alabang
(3) Baclaran Feb. 18 16:00 – 22:00	Malanday Monumento	MIA(32 km) Baclaran	McArthur EDSA	Cor EDSA & South Super Hwy	West Bound to Baclaran
	Novaliches Fairview	Baclaran MIA	Dn Mari. Marcos East Ave, EDSA		
(4) Ayala Feb. 18 10:00 – 16:00	Malanday (28km) Monumento	Philcite	McArthur EDSA, Ayala, Sen.G. Puyat	Cor. EDSA & Ayala	East Bound to Philsite
	Novaliches Fairview	Philcite	Dn Mari. Marcos East Ave, EDSA Ayala, S.G. Puyat		
(5) Buendia- Taft Feb. 15 5:00 – 22:00	Lawton Via Cor. Taft & Sen.G.Puyat	Moonwalk(18km) Pilar Alabang Dasmarinas	S. G. Puyat Roxas Blvd. Coastal Rd. Alabang-Zapote	Cor. Taft & Sen.G.Puyat	West Bound to Roxas Blvd.
(6) Ortigas Feb. 15 5:00 – 22:00	Lawton	Cainta (17 km) Taytay	Rizal Av., C.M. Recto Ram. Magsaysay Aurora , Ortigas,	In Front of Robinson	East Bound To Cainta
(7) Shaw Feb. 13 & 14 5:00 – 16:00	Divisoria	Antipolo (22km)	C.M. Recto Ramon Magsaysay Shaw, Ortigas	San Miguel Ave & Shaw Blvd.	West Bound To Divisoria
(8) Pandacan Feb. 13 & 14 5:00 – 22:00	Pandacan, Palunpong	Quiapo (Loop) (9 km)	Pandacan Paz Guazon UN Ave., Romualdez P. Burgos, Palanca Ayala Blvd. San Marcelino UN Ave., Paz Guazon	Romualdez St.	North Bound To Quiapo

These routes fall into three categories:

1) Routes passing through EDSA [(2) Alabang, (3) Baclaran and (4) Ayala Routes]

2) Radial routes crossing EDSA [(1) Quezon Avenue, (5) Buendia-Taft, (6) Ortigas and (7) Shaw Boulevard], and
3) A loop rout within commercial area in the City of Manila [(8) Pandacan].

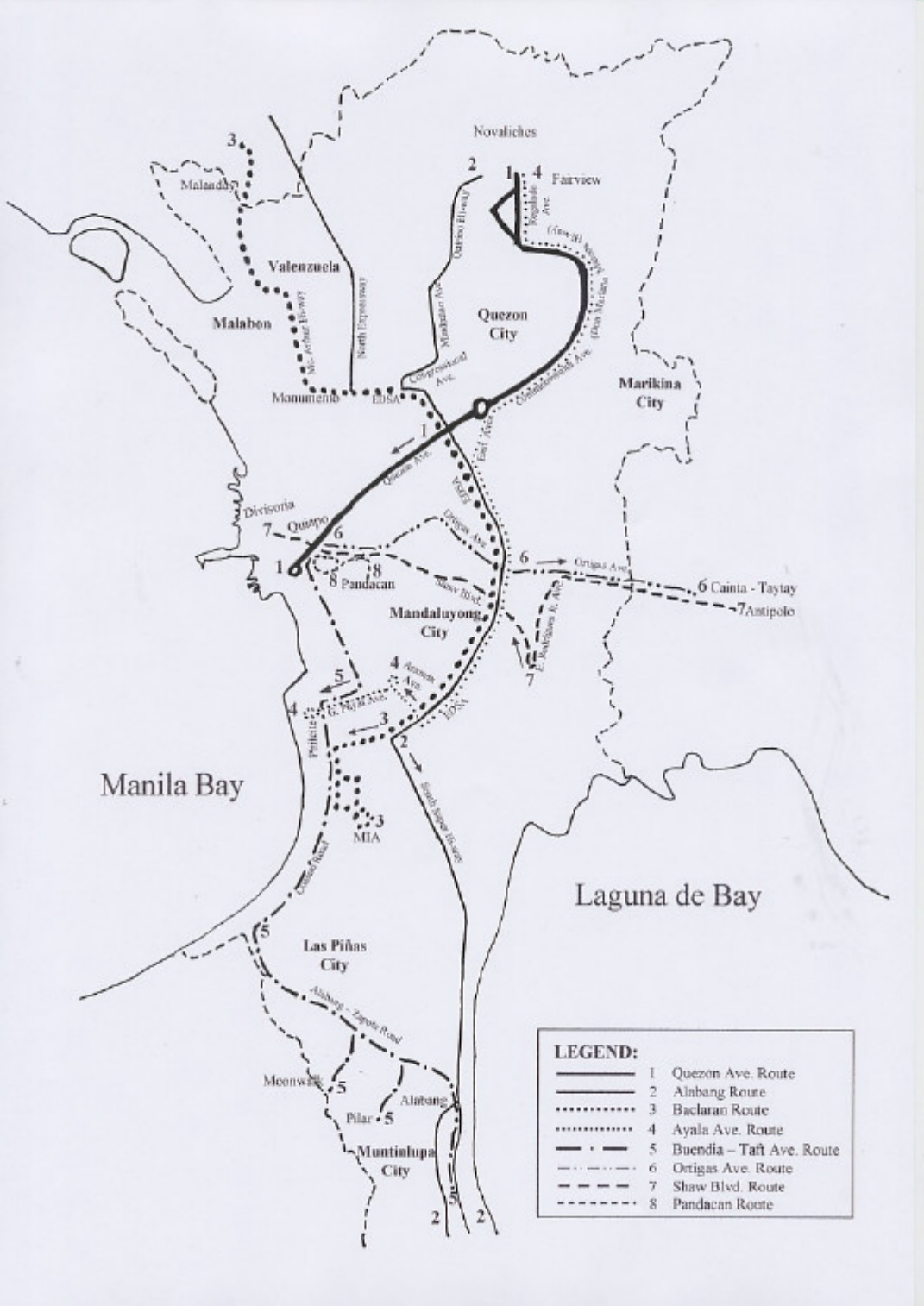

Fig. – 1 Bus Route Map

The surveys were carried out from 5:00 a.m. to 10:00 p.m. in three shifts for the radial routes while the survey durations were limited to four hours for those routes passing

through EDSA. In each shift, six (6) surveyors and two (2) supervisors were employed. The surveyors recorded the following items:

1) Time of the passage,
2) Name of operator,
3) Destination,
4) License number,
5) Type of bus (Air-con, Ordinary and Minibus)
6) Approximate number of passengers on board.

3. Routes and survey locations.

(1) Quezon Avenue route

This route is originated from Fairview (Quezon City, Corner of Quirino Highway and Regalado Avenue) and bound for Lawton (City of Manila, near the LRT Central Station) via Quezon Memorial Circle, Quezon Avenue, España, Quezon Boulevard and Quezon Bridge. . Buses start from various locations along the commonwealth Avenue: SM Fairview, Novaliches, Balara, and Philcoa..

The survey location is at the corner of Quezon Avenue and EDSA. Only those buses bound for Lawton were recorded.

(2) Alabang route

This route consists of several bus routes originated from various locations in Quezon City Valenzuela and Malabon, and bound for various areas along South Super Highway: FTI, Bicutan, Sucat, Alabang, Muntinlupa, Pacita.

The three major Origins are:

i) Novaliches (Quezon City) ; passing through Quiriono Highway, (Tandang Sora Ave.), Mindanao Ave., Congressional Ave., EDSA and South Super Highway.
ii) Malinta and Malanday (Valenzuela); passing through McArthur Highway, Monumento, EDSA and South Super Highway
iii) Letre (Malabon); Passing Gen. San Miguel, Samson Road, Monumento, EDSA and South Super Highway

The survey location is at MANTRADE (MRT Magallanes Station), the corner of EDSA and South Super Highway. Southbound buses are recorded.

(3) Baclaran

The origins of this route are the same as (2) Alabang route, i.e. Quezon City, Valenzuela, and Malabon. There are many buses originated from Monumento (Caloocan City). The destinations are either Baclaran on Roxas Boulevard or Manila International Airport (MIA).

The survey location is at the corner of EDSA and South Super Highway after the Magallanes interchange. Only southbound busses were recorded.

(4) Ayala

The origins of the buses running along this route are the same as above Alabang and Baclaran routes. The route deviates from EDSA at Ayala Avenue. Then the route passes through Ayala, Gil Puyat Ave. (former Buendia Ave.) and ends at the Philcite (CCP

Complex, Reclamation area) after crossing Roxas Boulevard. The buses were recorded at the bus stop on Ayala Avenue across Ayala Center. Buses bound for Philcite were recorded.

(5) Buendia-Taft
The route originates at Lawton, City of Manila and bound for Las Piñas and Alabang Cities. The rout passes through Taft Ave., Gil. Puyat Ave., Roxas Boulevard, Coastal Road and Alabang – Zapotes Road. The destinations of buses are Moonwalk, Pilar and Alabang. The survey location is on the corner of Taft Ave. and Gil J Puyat Ave., where buses turn toward Roxas Boulevard.

(6) Ortigas
The route is originated from Lawton and bound for Cainta and Taytay (Cainta, Province of Rizal) via Quezon Boulevard, C. M. Recto, Ramon Magsaysay, Aurora Boulevard, G. Araneta Ave., N. Domingo, Pinaglabanan, Santoran Road and Ortigas. Ave. The survey location is at the corner of EDSA and Ortigas Ave. (in front of Robinson Galleria). East bound buses going to Cainta were recorded.

(7) Shaw Boulevard
This rout originates from Divisoria (Manila) and bound for Antipolo via C. M. Recto, Ramon Magsaysay, Shaw Boulevard, Pasig Boulevard, E. Rodriguez Ave. and Ortigas Ave. The survey location is one block eastward from the corner of Shaw Boulevard and EDSA. Westbound buses going to Manila were recorded.

(8) Pandacan
This route is a loop starting from Laura Street in Pandacan (Manila) to Quiapo area via Palumpong St., Paz M. Guazon, United Nations (U.N.) Ave., Romualdez, Concepcion, P. Burgos, McArthur Bridge, Quiapo, C. Palanca St., Ayala Boulevard, San Marcerino, U.N. Ave., Paz Guazon, Palumpong and Laura.

The survey location is on Romuardez St. where buses were going toward Quiapo.

4. Results of survey

4.1 General characteristic values

Characteristic values are summarized in **Table – 2**. The table exhibits the following items for each route:

Table – 2 Summary of the survey

Route Name	Number of Operators	Trips	Units	Passenger	Pass./Trip	Pas./U/D	Trip/Unit	Survey hours
(1) Quezon Ave.	27	345	153	13,919	40	82	2.3	17
(2) Alabang	24	305	304	NA	NA	NA	2.4*	7
(3) Baclaran	68	502	477	NA	NA	NA	3.0*	6
(4) Ayala	52	599	476	NA	NA	NA	3.6*	6
(5) Buendia-Taft	12	769	245	22,561	29	92	3.1	17
(6) Ortigas	3	556	169	21,523	37	120	3.2	17
(7) Shaw	1	23	17	771	34	48	1.4	17
(8) Pandacan	1	133	24	6,309	47	263	5.5	17
Total	184	3,227	1,881					

Note * Estimated value on 17 hour basis

1) Number of operators,
2) Total trips recorded over the observation period,
3) Total bus units observed,
4) Total passengers counted at the survey location,
5) Average number of passengers on board at the observation location
6) Total number of passengers per unit per day
7) Average number of trips made by a bus unit, and
8) Survey hours.

Some of the outstanding observations in the table are:

1) Quite many operators are operating along the first five (5) routes, i.e. Quezon, Alabang, Baclaran, Ayala and Buendia-Taft routes, while in the last three routes, i.e. Ortigas, Shaw and Pandacan, only few operates.

2) Except Pandacan Route that is a short loop route, the average number of trips that a bus unit made in a day was day is less than four. For Quezon Ave. and Baclaran routes a bus makes only two round trips.

4.2 Operational characteristics by route

(1) Quezon Avenue Route

a. Operators

There are total 27 operators. With total 153 bus units, the operators provide 345 services over the period 16 hours from 5:00 - 21:00. Of the 27 operators, the operators that provide 20 trips or more are only five. and 55% of the total trips on Feb. 11 were provided by those top five operators. It should be noted that 15 operators provided only occasional and random services.

Table – 3 Quezon Ave. Operators (Feb. 11, 2002)

Service provided in a day	Number of Operators	Number of Trips	Share
20 trips or more	5	190	55.1%
10 to 19	7	91	26.4%
9 or less	15	63	18.6%
Total	27	344	100.0%

Along this route there types of buses are employed: Air Conditioned, Ordinary and Mini buses. The number of units employed and the share in the total trips are as follows

Type of bus	Units deployed	Share in the service
Air Conditioned bus	103	66.7 %,
Ordinary bus;	35	22.0%,
Mini Bus;	14	11.3%

As shown in **Table – 4** , ordinary buses are operated by eight operators: four operate both Air-con and Ordinary buses, while the other four operate ordinary buses only. Mini buses are operated by two operators that also operate air-conditioned buses.

Table – 4 Types of buses deployed

Type of Bus	Number of Operators	Units			
		Air-con	Ordinary	Mini bus	Total
A-C & Ordinary	4	15	15		30
A-C & Mini Bus	2	25		14	39
A-C Only	17	63			63
Ordinary Only	4		20		20
	27	103	35	14	152

b. Passenger traffic and bus operation

The hourly variation of the service frequency, passenger traffic and average number of passengers per bus are shown in **Fig. – 3.** Since those bused going to Manila, commercial and business area, large passenger traffic was observed during the peak hours from 6:00 to 10:00, while fewer traffic was observed from 10:00 and later hours.

Regardless of such variation of passenger traffic, the bus service frequency remains at almost the same level of about 25 services per hour. As a consequence, the buses were full during the morning peak hours, while the passengers per trip gradually decrease in the afternoon. The average number of passengers per trip during off peak hours was about 20 passengers

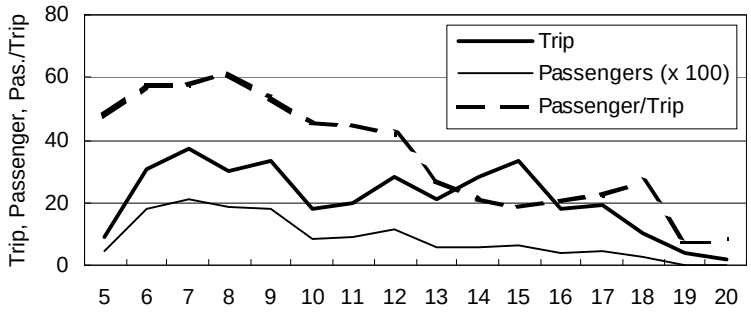

Fig. – 3 Time variation of Trips, Passenger, Passenger/Trip
(Quezon Ave., to Manila, Feb. 11)

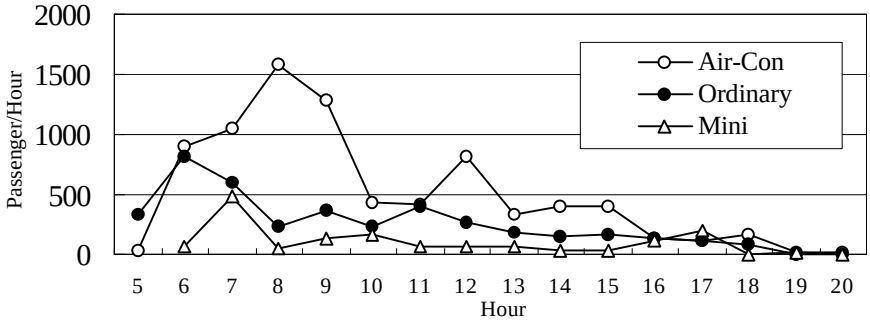

Fig.-4 Passenger Traffic by Type of Bus
(Quezon Ave., to Manila, Feb. 11)

c. Service frequency by operators

Break down of the hourly services by the top five operators and others is exhibited in **Fig. – 7**. The operational scheme of FASTRANS, the biggest operator in this route, is rather constant, while MAFEL tends to provide more services during peak hours. It is also seen

that during the peak hours, especially in the morning, a number of services were provided by middle and smaller scale operators.

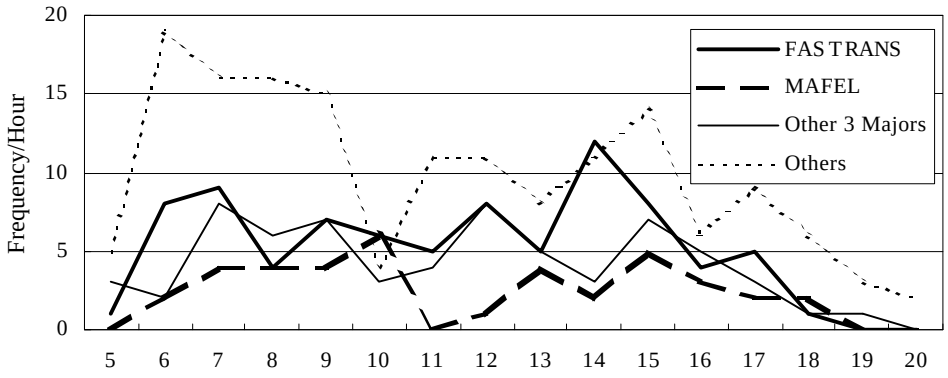

Fig. – 7 Service Frequency by Operators (Quezon Ave, Feb. 11)

Figures - 8 and **9** show the hourly variation of the service frequency for ordinary and mini buses, respectively. It is observed that the operators tend to operate their units during peak hours. This tendency is quite obvious for the mini bus operation.

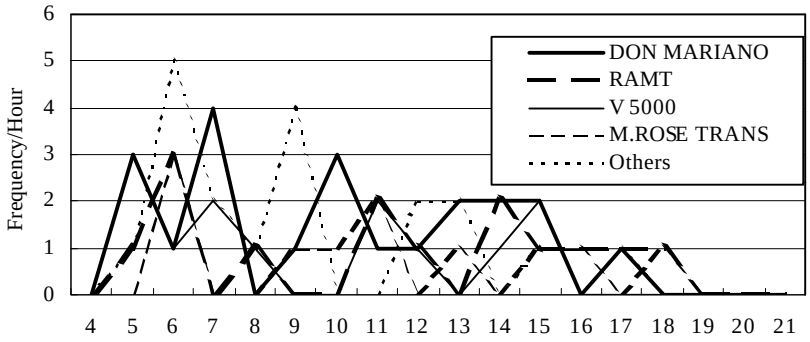

Fig. - 8 Ordinary Bus Frequency (Quezon Ave. Feb. 11)

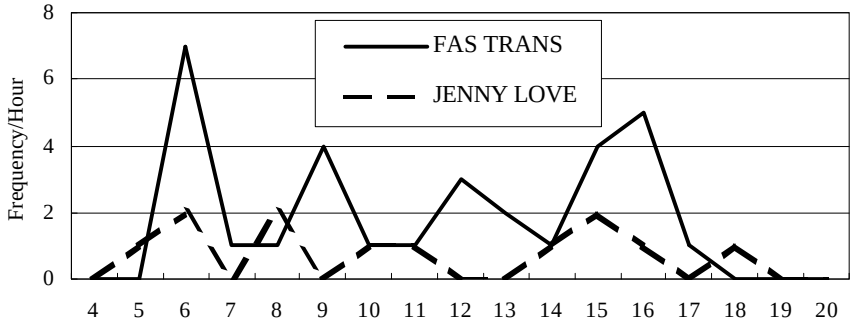

Fig. – 9 Mini Bus Frequency (Quezon Ave. Feb. 11)

d. Productivity of bus units

In order to examine the productivity of a bus unit, the following indices may be useful:

a. How many trips a bus unit can make in a day (Number of trips) ,
b. How many passengers on board during a trip (Number of passenger per trip), and
c. How many passengers a bus unit can carry in a day(Number of passengers per bus unit per day).

These indices are shown in **Table – 5** for different types of buses.

Table - 5 Productivity of bus units

Type of bus	Trip	Unit	Trip/Unit	Passenger/Unit	Passenger/Trip
Air-conditioned	230	104	2.2	82	37
Ordinary	76	35	2.2	112	51
Mini	39	14	2.8	91	33
Total	345	153	2.3	90	40

As shown in **Table – 5**, Air-conditioned buses, on the average, make 2.2 trips a day, while mini buses make 2.8 trips, i.e. 20 % more than the former. The average number of passengers per trip is much larger for ordinary buses than that of air-conditioned buses. It seems that most of the ordinary buses are fully loaded while air-conditioned buses are running with vacant seats. Taking into consideration of the passenger capacity of mini buses, i.e. about 40 passengers, the seat occupancy rate of Mini buses also seems to be quite high.

On the basis of these indices, the productivities of ordinary and mini buses are higher than that of air-conditioned buses. This seems to result from the difference of operational scheme of these types of buses: ordinary and minibus services are concentrated during the peak hours.

Productivities also varies from operator to operator:

Type of operation	Trips/Unit	Passenger/Trip	Passenger/Unit
Air-conditioned bus operators	1.0 to 3.3	13 to 62	13 to 148
Ordinary bus operator	1.0 to 3.0	35 to 60	74 to 156
Mini bus operator	2.6 to 3.3	33	85 to 106

MAFEL, an operator of air-conditioned bus only and the second largest operator on this route achieved 3.3 trips per unit and 36 passengers per trip (118 passengers per unit per day), while the largest operator FASTRASNS in its air-conditioned bus operation, achieved 2.9 times and 32 passengers per trip (91 passengers per unit per day). Thus there obviously exists the difference in the productivity between the two operators. This difference results from the operational schedule of the two operators (see **Fig. – 7.**).

Some of the air-conditioned bus operators that operate only few units, i. e. 1 to 3 units, were able to achieve to carry 50 passengers or more per trip. However, they operate their units only during the peak hours.

(2) Alabang Route

a. Operators

The survey was conducted on February 18, 2002 from 10:00 to 17:00. Since the survey period was limited to seven (7) hours, except for one bus unit, all the bus units passed the survey point only once. Thus, the round trip of this route must have taken 6 hours or longer.

A total of 305 services were provided within the seven hours by 64 operators. The fleet sizes of these operators are as shown in **Table – 6**.

Table – 6 Operators of Alabang Route

Scale of bus fleet	Number of Operators	Subtotal of bus units	Cumulative percentile
20 over	3	98	32.5%
10 - 19	4	50	48.9%
5 - 9	12	76	73.8%
2 - 4	22	56	92.1%
1	24	24	100.0%
Total	65	304	

The top two operators in terms of fleet scale are PASCUAL and JELL, and their fleets are 36 and 34 units, respectively. JMK is the third largest operator that operates 28 units.

The top three and four followers, namely DELA ROSA, ROVAL, GMB and CIGN, cover about 50 % of the services in Alabang Route.

It should be noted that a quarter of the services was provided by 46 small-scale operators having only 4four units or less. In fact there are 24 operators that operate only one unit.

b. Service frequency by operators

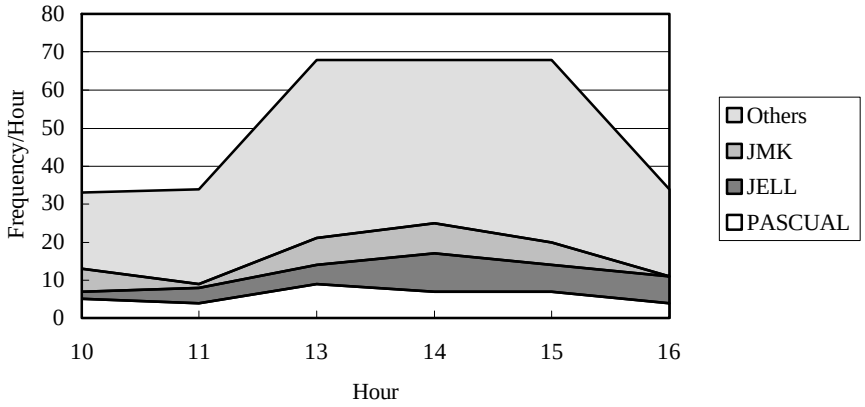

Fig. - 9 Service Frequency (Alabang Route)

The service frequency per hour varies 33 to 68. This wide variation might have resulted from such an operation scheme of many small-scale operators that are deploying their units without regular schedule.

Since the survey was conducted off peak hours, the service frequency during the peak hour is not known.

c. Productivity of bus units

Taking into consideration that a round trip of this route takes longer than six (7) hours, a unit can make only 2.4 round trips or less within 17 hours of daily operation.

(3) Baclaran Route

a. Operators

Over the survey period of 6 hours from 16:00 to 22:00 on February 18, 2002, 68 operators provided 502 services with 477 units. Of the 68 operators, Lucky 7 is the largest operator that provided 52 trips (with 52 bus units), while RRCG, the second largest operator, provided 45 trips with 42 units, i.e. during six hour survey period three units passed the survey location twice.

Including the above mentioned two operators, there are nine operators that are operating fleets of 30 units or more. The total service frequency provided by the 9 operators cover 55% of the total service frequency.

Table – 7 The scale of the operators for Baclaran route

Frequency of service	Operator	Services	Units	Cumulative Percentile
30 over	4	159	154	31.7%
20-29	5	117	106	55.0%
10-19	5	62	66	67.3%
5-9	11	67	65	80.7%
2-4	19	56	55	91.8%
1	24	24	24	96.6%
Unknown		17		100.0%
Total	68	502		

b. Service frequency by operators

Figure – 10 shows time variation of the service frequency for the top four operators, the five major operators next to the top four and other operators. Lucky 7 seems to provide higher frequency between 17:00 and 19:00, while the service frequency provided by other three major operators, i. e. RRCG, CBL, HR Line remain almost the same level.

It is also observed in the figure that other operators tend to provide higher frequency between 17:00 and 19:00.

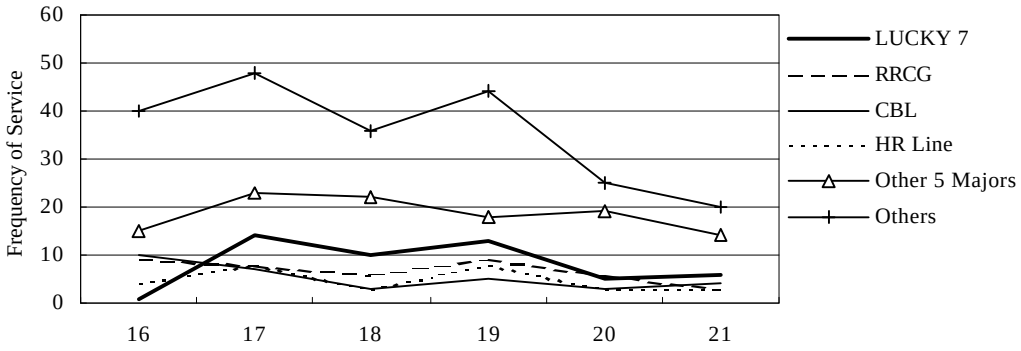

Fig. - 10 Hourly service frequency by operators (Baclaran Route, Feb. 18)

Figure – 11 is drawn to show the cumulative service frequency by all the operators. It should be noted that at around 17:00 the service frequency exceeded 100 per hour: the interval of service is about 30 seconds.

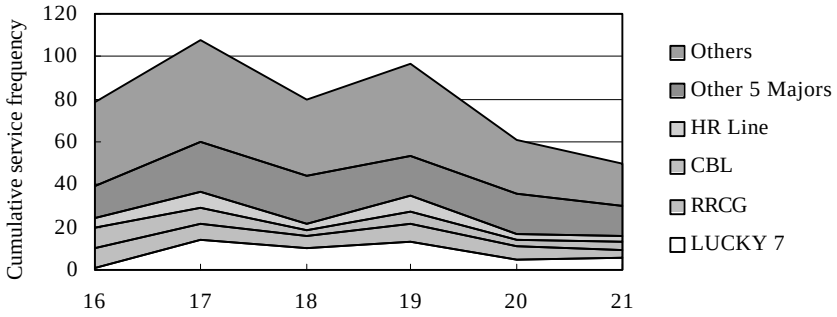

Fig. – 11 Cumulative service frequency (Baclaran Route, Feb. 18)

c. Productivity of bus units

During the 6-hour observation, total 502 buses were recorded. Of the 502 passages of buses, 25 busses (or about 5%) appeared twice. Thus, the round trip along this route seems to take a little longer than 6 hours. In general, those buses completed a round trip within the survey period were one or two units of the major operators. However, it should be noted that one thirds of the LIPAD fleet (7 units out of 21 units employed in the route) completed a round trip within six (6) hours.

(4) Ayala Route

a. Operators

There are 52 operators in this route. A total of 599 services were provided with 478 bus units. The top two operators cover about 25% and the top eight operators cover about 54 % of the services.

Table – 8 Scales of operators (Baclaran Route)

Scale of services	Operators	Trip	Units	Percentile
70 & over	2	154	114	25.7%
30 - 50	2	82	69	39.4%
20 - 23	4	86	75	53.8%
10 - 19	13	182	141	84.1%
5 - 9	8	51	43	92.7%
1 - 4	23	44	36	100.0%
Total	52	599	478	

b. Service frequency by operators

Figure 12 shows the hourly variation of the service. In general, the service frequency remains almost the same level. However, toward the peak hour in the late afternoon, it tends to increase.

c. Productivity of bus units

Though the observation was conducted only for six hours, there observed some difference between the performances of JELL and MALTC, the largest and the second largest operators. JELL provided 82 services by 64 units (1.28 round trips per unit) while MALTC achieved 72 services with its 50 bus units (1.44 round trips per unit).

Thus it can be said that MALTC fleet traveled faster than that of JELL.

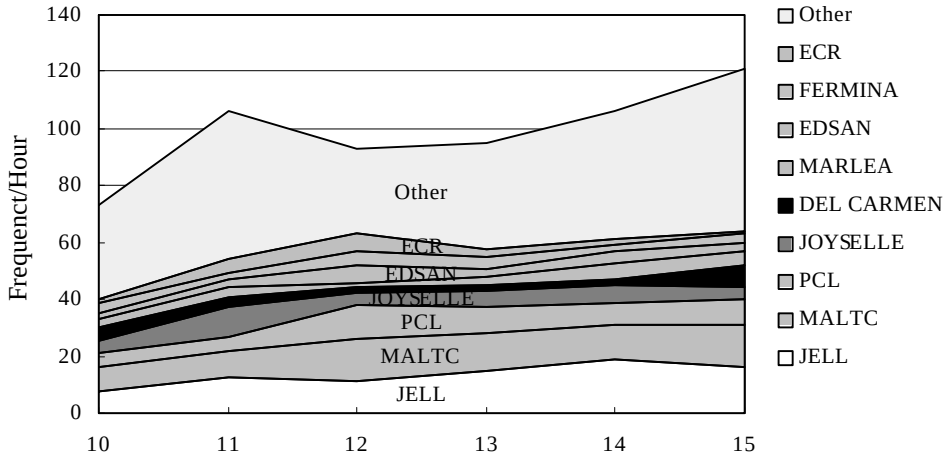

Fig. – 12 Service Frequency (Ayala Route)

(5) Buendia-Taft Route

a. Operators

A total of 769 services were provided by 12 operators with a total of 245 bus units. Of the 12 operators, two operators, namely ATSCI and IGAN, operate air-conditioned, ordinary and mini buses. CBL and another operator operate ordinary bus only. Other eight (8) operators operate air-conditioned bus only.

Figure – 13 shows the fleet of the 12 operators. ATSCI, TAS and ERJON are the top three operators, the service provided by the top three operators covers 82 % of the total services.

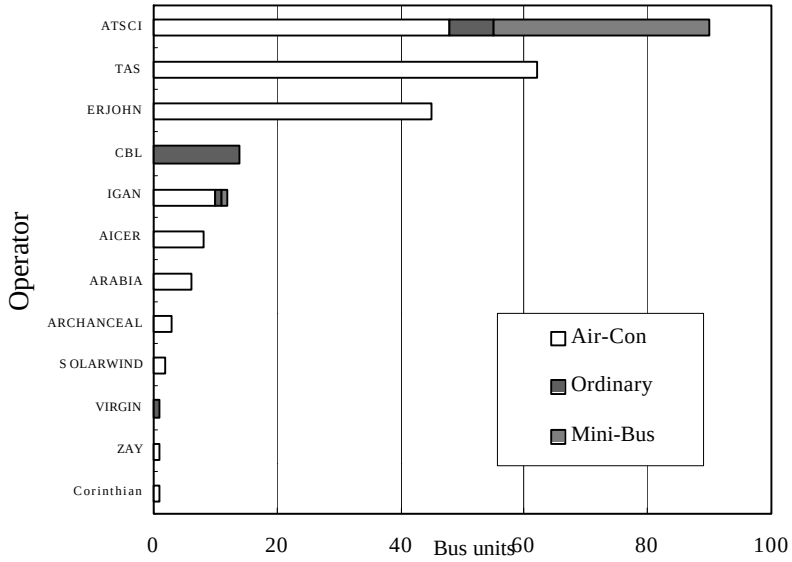

Fig. - 13 Units operated (Buendia-Taft)

Table - 9 Operational characteristics (Buendia – Taft Route)

	Units	Trips	Pass.	Trip/Day	Pass/Unit	Passenger/Trip
Air-Conditioned	186	574	16,927	3.1	91	29
Ordinary	23	63	1,741	2.7	76	28
Mini Bus	36	132	3,893	3.7	108	29
Total	245	769	22,561	3.1	92	29

b. Passenger traffic and bus operation

The time variation of passenger traffic, service frequency and average passengers per bus are drawn in **Figs. - 14, 15** and **16** for Air-conditioned, Ordinary and Mini buses, respectively. Since those buses leaving Pasay for Las Piñas was recorded, the peak hours were between 17:00 to 19:00. It is observed in these figures that the service frequencies of Air-conditioned and Ordinary buses during peak hours are 50% higher than off-peak hours while the frequency of the mini bus service remained almost at the same level.

c. Service frequency by operators

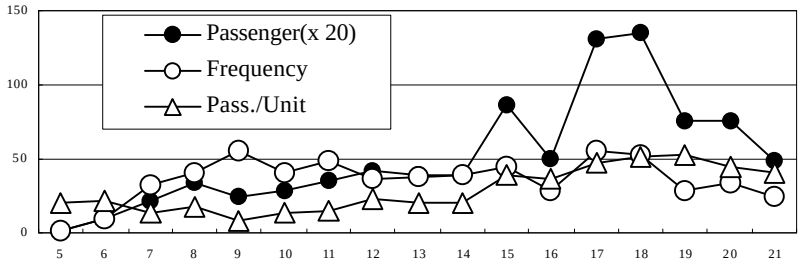

Fig. – 14 Time Variation of Passenger Traffic, Service Frequency and Passenger /Unit
(Buendia-Taft Route, Air-conditioned busses)

The time variation of service frequency of the three major Air-conditioned bus operators is shown in Fig. 17. The frequency is higher during peak hours in the morning and afternoon. It is observed that all the three operators had the intension to operate their fleet during the evening peak hours. In fact, the service frequency sharply decreased at 16:00. This implies that many bus units must have stood by to serve peak hours.

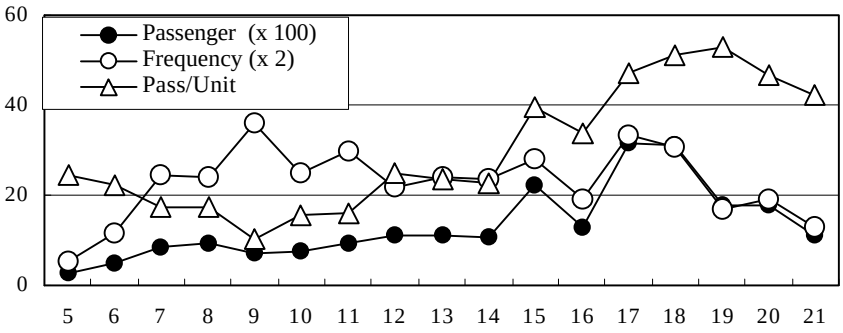

Fig. – 15 Time Variation of Passenger Traffic, Service Frequency and Passenger /Unit
(Buendia-Taft Route, Ordinary Bus)

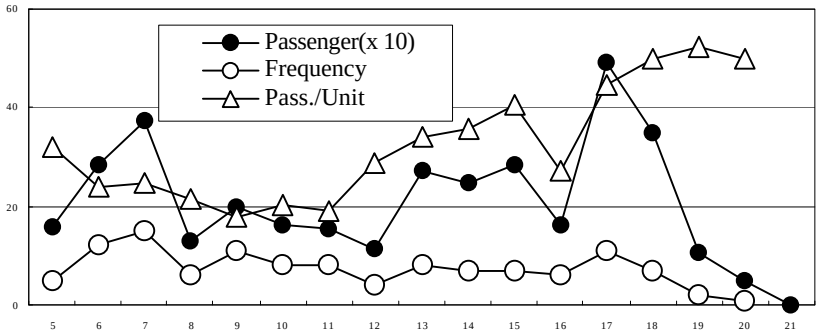

Fig. – 16 Time Variation of Passenger Traffic, Service Frequency and Passenger /Unit
(Buendia-Taft Route, Mini Busses)

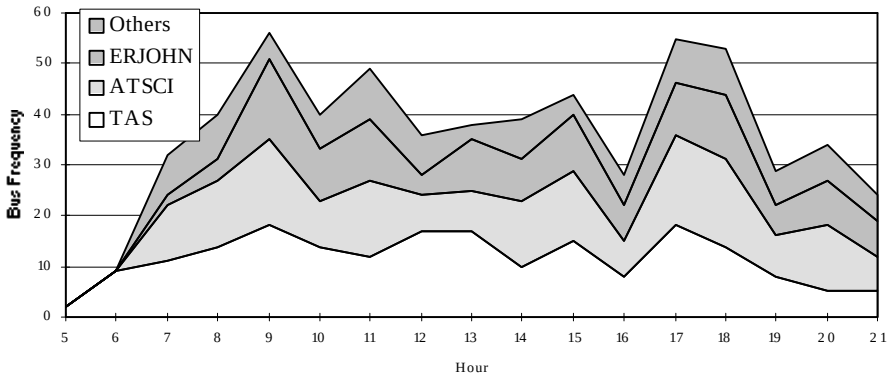

Fig. – 17 Air-conditioned bus service frequency(Buendia-Taft Route, Feb. 15)

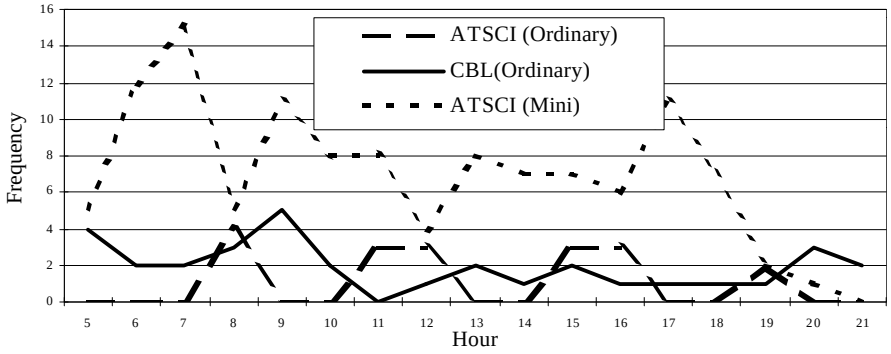

Fig. – 18 Ordinary and Mini Bus service frequency(Buendia-Taft Route, Feb. 15)

d. Productivity of bus units

The number of trips per units is calculated for the major operators (See Table – 11). For air-conditioned buses, TAS and ATSCI achieved 3.2 trips per unit, while ERJOHN made only 2.7 trips. However, the passengers that carried by a unit of the latter were more than that of TAS. For ordinary bus, ATSCI achieved 3.7 trips per unit while CBL made only 2.4, but the latter carried more passengers per trip. It should be noted that ATSCI mini bus made 3.7 trips per unit, which is the highest among all the operators. In addition, the passenger carried by a unit is the largest. Thus, mini bus seems to be most productive in this route.

Table – 10 Operational characteristics of major operators(Buendia-Taft Route)

Type	Operator	Unit	Trip	Passenger	Trip/Unit	Pass./Unit	Pass./Trip
Air-conditioned	TAS	62	197	5,297	3.2	85	27
	ATSCI	48	153	4,756	3.2	99	31
	ERJOHN	45	126	4,228	2.8	94	34
Ordinary	CBL	14	33	1,061	2.4	76	32
	ATSCI	7	26	493	3.7	70	19
Mini Bus	ATSCI	35	128	3,740	3.7	107	29

(6) Ortigas Route

a. Operators

There are three operators in this route. G Liner and PMESI operate both air-conditioned and ordinary buses, while RRCG operate only air-conditioned buses. The total trips made by the three were 556 trips. Of the 556 trips, 430 trips were made by Air-conditioned bus, while

126 trips were made by ordinary bus. The shares in bus fleet, service frequency and the passenger carries, among the three operators, are almost the same ratios: G-Liner takes 65%, RRCG 25% and PMESI 10%.

Table – 11 Operators in Ortigas Route

Type	Operator	Unit	Trip	Pass.	Trip/Unit	Pass/Unit	Pass/Trip
Air-con	G. LINER-AC	78	244	9,276	3.1	119	38
	RRCG-AC	41	141	5,361	3.4	131	38
	PMESI-AC	15	45	1,467	3.0	98	33
Ordinary	G. LINER-Ord.	32	118	4,993	3.7	156	42
	PMESI-Ord.	3	8	426	2.7	142	53
		169	556	21,523			

b. Passenger traffic and bus operation

The passenger traffic is exhibited in **Fig. – 19**. Since eastbound bases are recorded, the peak appears after 16:00 and a peak smaller peak also appears in the morning.

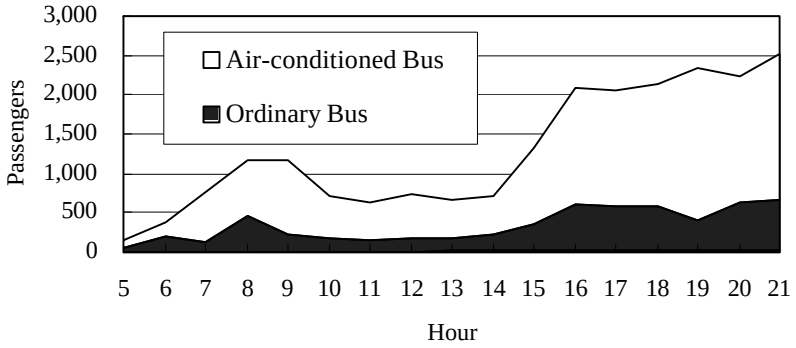

Fig. – 19 Passenger Traffic (Ortigas Ave. Route, Feb. 15)

Time variation of service frequency by operators is shown in **Fig. – 20**. The service frequency of the three operator, both air-conditioned and ordinary buses, randomly fluctuated and it does not seem to be interfaced with the time variation of passenger traffic volume. As a consequence, the number of passenger per unit is high during peak hours while it is law during off peak hours. Approximately, the numbers of passenger per units are:

6:00 – 10:00	35 – 40 passengers/bus
10:00 – 14: 00	20
16:00 – 19:00	65 – 75

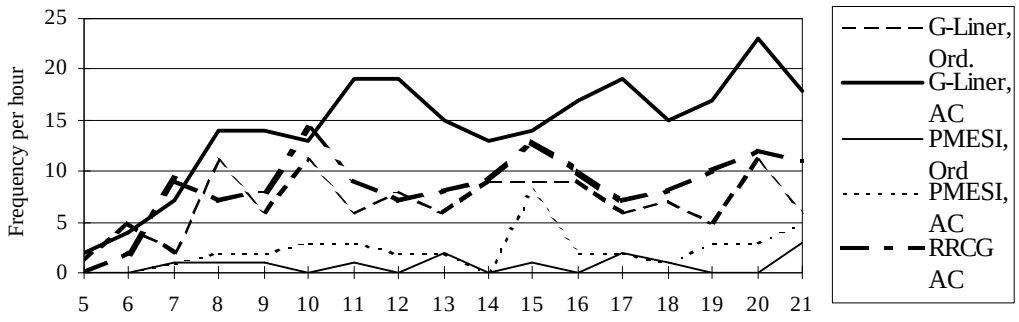

Fig. – 20 Time Variation of Service Frequency (Ortigas Ave.)

c. Productivity of bus units

A notable difference is observed between the passengers carried by air-conditioned and ordinary buses (See **Table – 11**). The number of passenger per air-conditioned bus is 33 – 38, while that of ordinary bus is 42 - 53. This difference might results from the difference in the service frequency and passengers' preference.

Among the three air-conditioned bus operators, RRCG achieved 3.4 trips per unit while other two operators made 3.1 or less. In the ordinary bus operation, the operational scheme of the two operators is quite a contrast. G Liner achieved 3.7 trips per unit while PEMCI made only 2.7. However, the passenger per trip is fewer for the former (43 passengers per trip) while the latter carried 53 passengers per trip. As a consequence, the total passengers carried by a unit turned out to be almost comparative.

(7) Shaw Boulevard Route

a. Operator

This route is a single-operator route: EMBC is the sole operator. On Feb. 13, EMBC provided 23 services (18 services by ordinary and 5 services by Air-conditioned buses), while the service frequency on Feb. 14 was 25: 19 services by Ordinary and 6 services by Air-conditioned buses (see **Table -13**). It should be noted that, over the two-day survey, total 26 bus units were observed.

Table – 12 Number of bus units deployed
(Shaw Blvd. Route, Feb. 13 & 14, EMBC)

	Air-con + Ordinary	Air-con	Ordinary
Total Fleet	26	8	18
Operated 2 days	8	2	6
Operated 1 day only	18	6	12

Of the 26 units, only eight (8) units were observed both days while other 18 units were observed on one day only. This implies that about two thirds of the fleet was idle on either of the two days: or these buses might have been deployed in other direction of the same route during the evening peak hours.

b. Passenger traffic and bus operation

Figure – 21 shows the hourly variation of passengers, service frequency and passenger per trip. The bus operator deployed frequent service during the peak hour in the morning and over the rest of the day, the frequency is two services per hour. Thus, it seems that the operator deploys two buses an hour plus additional services during the peak hours.

c. Productivity of bus units

As shown in **Table – 13**, the average trips made by an ordinary unit were 1.5 while an Air-conditioned unit made only one trip a day. It should be noted that the ordinary buses were loaded more passengers. Once again, it is obviously seen that there is a passengers' preference in choosing types of bus.

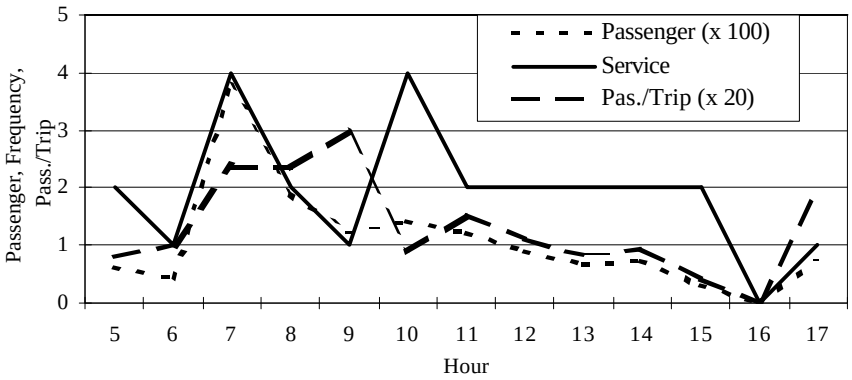

Fig. – 21 Shaw Blvd. Route (Feb. 14)

Table – 13 Operational characteristics (Shaw Blvd. Route Feb. 13)

Type	Service	Unit	Pass.	Trip/Unit	Pass/Trip	Pass/Unit/Day
Ordinary	18	12	663	1.5	37	55
AC	5	5	79	1.0	16	16
Total	23	17	742	1.4	32	44

(8) Pandacan Route

a. Operators

This bus route is also served by the sole operator, Pandacan TSCI. Since this route is relatively short, i.e. only 9 km. A round trip can be made within an hour. Thus, the number of trips made by a unit is quite large. Some of the units served as many as nine trips in a day (See **Table 14**).

Over the two-day survey, a total of 27 units were recorded. Three units were not operated on Feb. 13 while eights units were idle on Feb. 14: more than two thirds of the fleet was deployed on these two days.

b. Passenger traffic and bus operation

Figure – 22 shows the time variation of service frequency (Trip), Passenger carried, and passenger per bus. It is clearly observed that the number of passenger per bus is almost constant value except for the peak hour in the evening. The figure also indicates that the operator deploy more buses during the morning peak hours.

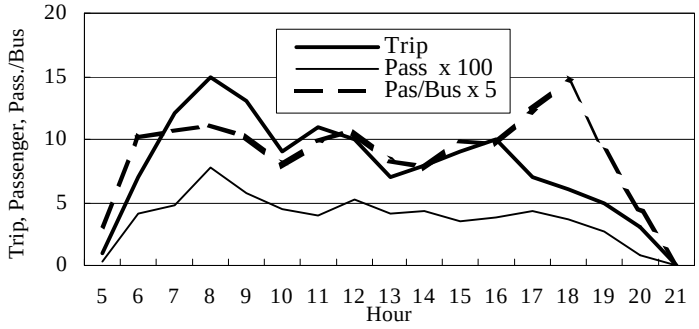

Fig. – 22 Time variation of Trip, Passenger and Passenger/Trip (Pandacan Rout, Feb. 14)

c. Productivity of bus units

Since the total length of route is only 9 km, the average number of trip per unit is much larger than those observed in other routes. In addition, the route is passing through business and commercial area in the City of Manila, all the units were almost fully loaded. Thus, the productivity is assessed to be the highest among the eight survey routs.

Table – 14 Operational characteristics of Pandacan Route

	Bus units Deployed	Total Trips	Average Trip/Unit	Passenger	Average Pass/Trip	Pass/Unit/ Day
February 13, 2002	24	133	5.5	6,418	48	267
February 14, 2002	19	133	7.0	6,309	47	332

5. Findings

Summing up the description of the operational schemes of the eight (8) routes, the following are the outstanding observations:

(1) Number of operators and competition

Quite many operators are competing on the following four routes: 1) Quezon Ave.(27 operators), 2) Alabang (64), 3). Baclaran (68), 4) Ayala routes (52). For each route, there are major operators that are providing hourly services. In general, the top five operators provide more than 50 % of the services. On Buendia-Taft Route, the number of the operators is 12, i.e. much fewer comparing to the above mentioned four routes, top three operators cover 82% of total services.

It is commonly observed in these routes that, while the major operators maintain almost the same number of services throughout the day, other small-scale operators tend to provide their services during the peak hours (see **Figs. – 7 & 17**). Thus, many small-scale operators deploy their units during peak hours only, and the average number of trips made by a unit is rather small, i.e. twice or three times.

On Ortigas Ave. Route, there are only three operators. However, the competition among these three operators seems much severer than on other routes. G-liner, the leading operator, provides itself 20 to 25 services per hour (See **Fig. – 20**): this results in the competition among the units of the same operator.

Shaw Blvd. and Pandacan Routes are the single operator routes: EMBC is the operator on Shaw Blvd. route, while Pandacan TSCI is the operator of Pandacan Loop route. These two operators deploy almost the same number of fleets:26 (EMBC) and 24 (Pandacan TSCI).

However, it is observed quite a contrast between the operational schemes in the two routes. The average number of trips made by EMBC (Shaw Blvd. Route) was only 1.4 while Pandacan TSCI made 5.5 to 7 round trip a day. Such difference might have resulted from the difference in the lengths of the routes: a round trip along Shaw Blvd. Route is 44 km, while Pandacdan Loop Route is only 9 km long. In addition, two third of EMBC's fleet were not deployed, while the Pandacan EMBC operate two thirds of it fleet on the two consecutive days.

It should be noted that the average number of passengers per trip is much larger on Pandacan Loop Route (32 passenger/trip) than Shaw blvd.(48 passenger/trip). Further more,

Pandacan EMBC seems to adjust their service frequency to the traffic more flexibly (see **Fig. – 22**).

(2) Passengers' preference

In many routes, both air-conditioned and ordinary buses are deployed. In some route, mini buses are also employed. In general, the productivity of ordinary and mini buses are higher than air-conditioned buses, because ordinary buses carry more passengers than air-conditioned buses and mini-buses carry as many passenger as air-conditioned buses (see **Tables – 9, 10 & 11**). This shows that even though the service frequencies of ordinary and mini buses are lower than that of air-conditioned buses, when available, passengers tend to wait and ride these two types of buses.

(3) Productivity

For all the eight routes, the passenger traffic has a peak in the morning flowing into urban centers, while another peak appears in the evening moving back to residential areas. Such a time variation of passenger traffic makes the operator difficult to attain higher productivity.

The increase in the number of trips per day does not always result in the improvement in the productivity. As seen in **Table – 11**, the ordinary buses of G-liner served 3.7 trips per day, while ordinary units of PMESI made only 2.7 trips a day. However, the total passenger number carried by a unit per day may remain unchanged. This is because the increase in service frequency during off peak hours does not always contribute revenue increase.

Thus, there are many bus operators and bus units that tend to serve only during the peak hours.

(4) Bus service frequency

Of the eight routes, the three routes, i.e. Alabang, Baclaran and Ayala routes, pass through the portion of EDSA between East Avenue and Ayala Avenue. Summing up the bus units deployed along these three routes, it is estimated that a total of 1,260 units of buses are running this section and, on the average, the service frequency is about 230 units per hour, or about four (4) buses per minute, or every 15 seconds.

Incidentally, the service frequency is 20 to 35 per hour on Quezon Ave. Route, about 50 to 70 per hour on Buendia-Taft Route, and 35 to 50 on Ortigas Ave.

Acknowledgement

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