DAILY VARIABILITY IN PUBLIC TRANSPORT PATRONAGE

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ABSTRACT

The extent to which public transport services can be matched throughout the day to the level of demand depends on both the degree of accuracy with which the amount of patronage expected in any given time period is known and also the degree to which patronage in any given time period varies from week to week.

This paper analyses the extent to which patronage on buses operated by the State Transport Authority, Adelaide, South Australia, varied from day to day and within particular time periods during the day, over the three month period August to October 1988. It was found that there were definite patterns of usage which are repeated from week to week.

The cost to the State Transport Authority of providing excess capacity to cater for variability in daily patronage was estimated and found to be of the order of $2 million per annum. The closer the service delivery can be made to match the expected daily patronage, the more this cost can be reduced.

Daily variability can be expected to increase in the future due to changes in work patterns. The need for flexibility in provision of services in order to match the variations in patronage may therefore further increase as potential savings become even greater.

INTRODUCTION

In the most general sense, the "level of service" provided by a public transport operator can be defined as the frequency at which vehicles are available to the travelling public. The "level of service" at any time of the day determines the number of people that the system can carry (i.e. the "capacity of the system).

One of the greatest difficulties faced by public transport operators is to provide "just enough" service during each hour of the day to satisfy the needs of the travelling public. Whilst analysis of the day to day variations in patronage might be a statistician's delight, providing for these variations can become an operator s nightmare.

If too few vehicles are in service then overcrowding results and people are even left behind, and if too many vehicles are used they are only partly filled, and costs are higher than necessary.

If exactly the same number of people travelled the same way, at the same time, every day of the week, this problem would not exist. But there are considerable fluctuations in patronage from day to day through the year, and within like time periods from day to day. Consequently, to cater for the maximum expected loading, operators tend to have more vehicles in traffic than is strictly necessary. There may be potential for considerable saving if service provision could be varied to match demand more closely.

There are two factors that are vitally necessary in order to modify services to reduce the margin of over supply. The first of these factors is the availability of reliable and comprehensive daily patronage data, broken down by time periods throughout the day. The second is the ability to adjust the number of vehicles in service from day to day with relative ease and with little (or no) adverse effect on passengers.

The State Transport Authority is in the fortunate position of now having the facilities to address the first of these factors. The adoption of the new Crouzet ticketing system in September 1987 has meant that detailed daily patronage data is now available. For each day of the year, a separate breakdown of patronage by type of ticket used, by route and by time period is now known. All boardings are further subdivided into "first boardings" within the time validity of the ticket and "transfers".

Recent planning initiatives by the State Transport Authority are now addressing the second of these factors and have lead to the re-consideration of "double division" type services. Although not a new concept, and not yet fully explored for its viability, the concept is that a basic timetable is developed to cater for the lowest patronised days. On days when the patronage is expected to be higher, additional vehicles depart from termini at identical times to vehicles on which loads are known to be heaviest. Thus extra vehicles can be added without the need to show differences in public timetables.

So that the relative magnitude of costs derived later in this paper can be appreciated, it should be noted that the State Transport Authority operates a fleet of 699 buses, 21 tramcars and 145 railcars, and has an annual operating cost of approximately $141 million.

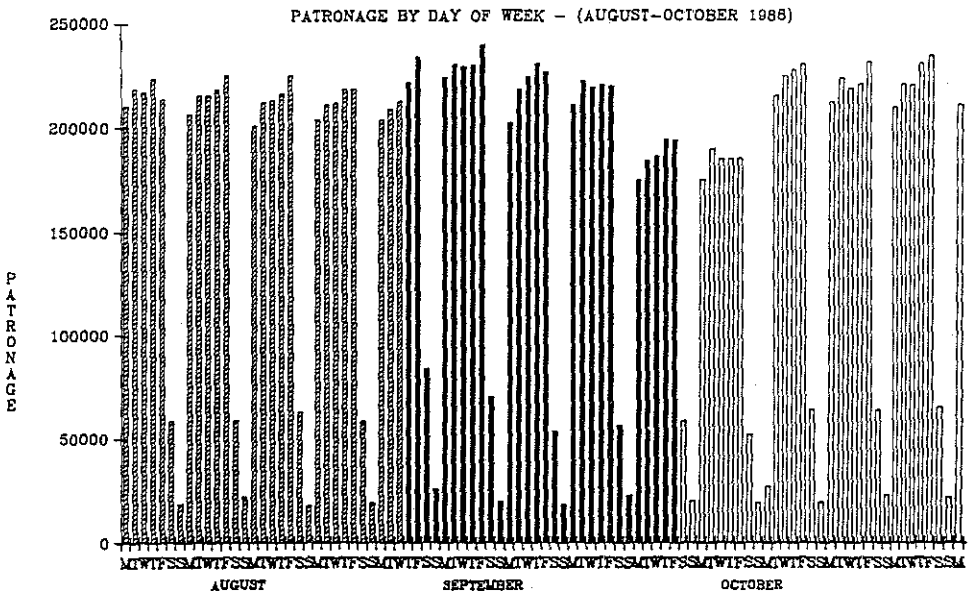
This paper will therefore examine the variability of patronage from day to day and within like time periods from day to day, for the purpose of establishing whether there is both sufficient variation, and sufficient repetition of patterns of usage of services, to warrant the effort being made to adjust levels of service from day to day to match this variation in patronage. The paper also examines the theoretical cost savings that would result if capacity modifications could be made to services. The analysis is based on system-wide data. For changes to be made to levels of service it will be necessary to obtain time of day breakdown of patronage data for individual routes. It is anticipated that this type of data will be obtainable by mid 1989.

The three month period from Monday 1st August 1988 to Friday 28th October 1988 was selected for analysis because it was not affected by external factors such as fare rises, service changes or industrial action. Further, it contains a two-week school holiday period, thus allowing a further series of analyses to be carried out. Ideally, analysis should be carried out over a longer period, such as a full year. The analysis has been restricted to buses only, but could be extended to cover trams and trains.

PATRONAGE VARIABILITY

Total Daily Weekday Patronage

As an overview of the day to day fluctuations of patronage on the STA's buses, total daily weekday patronage for the three month period is shown in Graph No. 1, following. (Actual figures are given in Appendix 1)



GRAPH NO. 1: TOTAL DAILY WEEKDAY PATRONAGE

The repetitive weekly pattern in patronage stands out. Monday patronage is always the lowest and Friday patronage almost always the highest, with Tuesdays, Wednesdays and Thursdays generally fairly similar. The drop in patronage during the two-week school holiday and on the Monday public holiday following the school holiday period can also be seen quite clearly.

Analysis of weekdays in the non-school holiday periods shows that average patronage on each day is as follows:

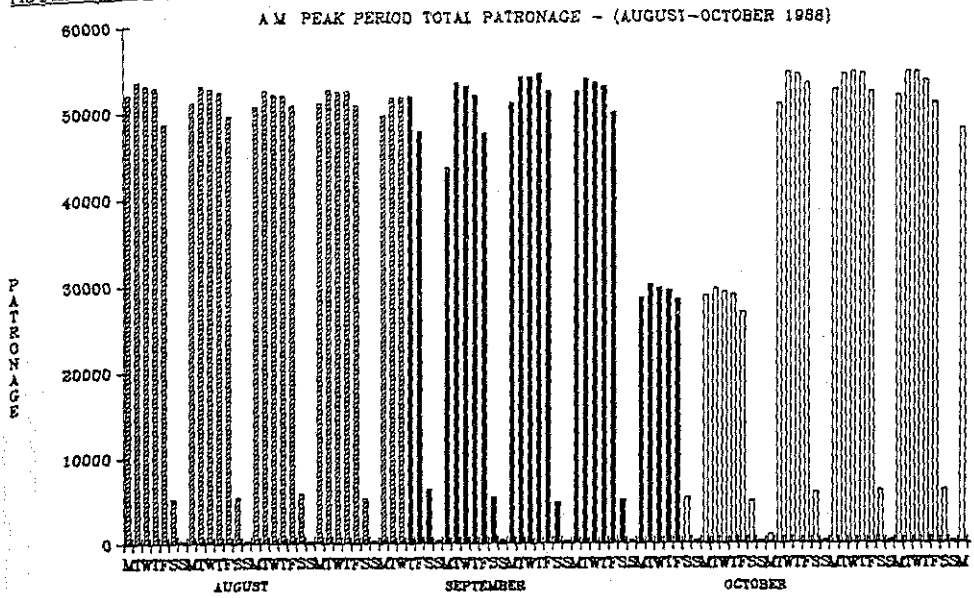
DAY	AVERAGE PATRONAGE	COEFFICIENT OF VARIATION
Monday	209025	3.08
Tuesday	218189	2.85
Wednesday	219073	2.54
Thursday	223762	2.38
Friday	227404	3.44

It can also be seen from the coefficients of variation that variation in patronage is higher on Mondays and Fridays than on Tuesdays, Wednesdays and Thursdays.

The following analyses looks more specifically at firstly the random variability of patronage from week to week within a particular time period and for a particular day of the week, and secondly the systematic variability from day to day within particular time periods.

DAILY VARIABILITY IN PUBLIC TRANSPORT PATRONAGE

Morning Peak Patronage



GRAPH NO. 2: PATRONAGE DURING MORNING PEAK ONLY

As can be seen from Graph No. 2, unlike total daily patronage, morning peak period patronage is consistently higher during the mid-week days Tuesdays, Wednesdays and Thursdays than on Mondays and Fridays. Some potential therefore exists for reduction of services in the morning peak on Mondays and Fridays.

Variations in patronage from week to week within the morning peak period are shown in Graph No. 4 (Appendix No. 2).

Statistical analysis of morning peak patronage produces the following table (Table No. 1) of mean values by day of week, with corresponding standard deviations and coefficients of variation.

TABLE No 1 - ANALYSIS OF MORNING PEAK PATRONAGE AUGUST TO SEPTEMBER 1988

Analysis Variable : BOARDINGS DURING MORNING PEAK (7-9am)

NORMAL WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	11	43672.00	52545.00	50376.45	2578.16	777.35	5.12
TUE	11	50941.00	54596.00	53159.73	1139.71	343.64	2.14
WED	11	51655.00	54566.00	53270.36	1022.74	308.37	1.92
THU	11	51860.00	54481.00	53011.91	1006.03	303.33	1.90
FRI	11	47553.00	53217.00	50383.09	1848.96	557.48	3.67

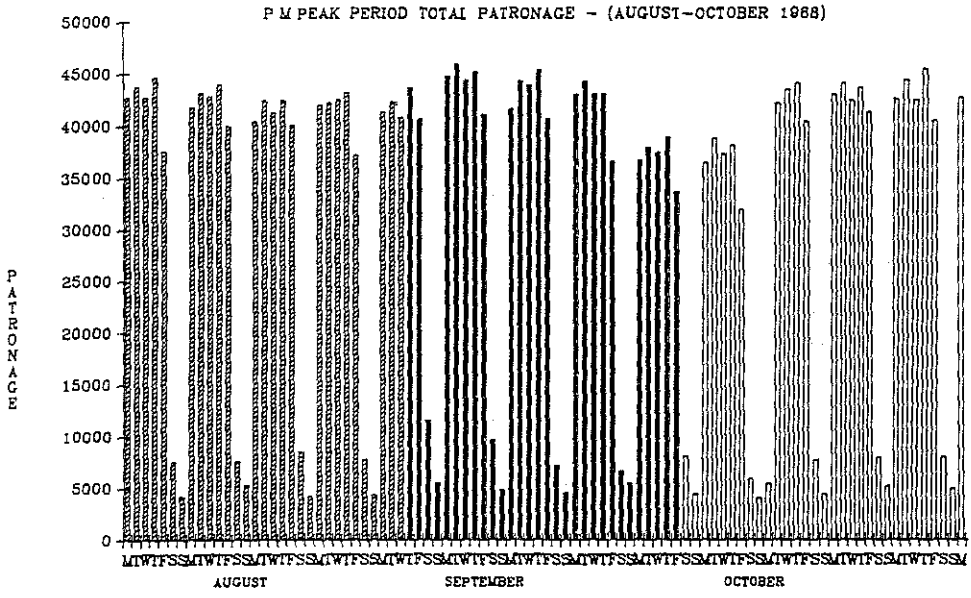
SCHOOL HOLIDAY WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	2	28698.00	28901.00	28799.50	143.54	101.50	0.50
TUE	2	29673.00	30168.00	29920.50	350.02	247.50	1.17
WED	2	29317.00	29751.00	29534.00	306.88	217.00	1.04
THU	2	29000.00	29487.00	29243.50	344.36	243.50	1.18
FRI	2	26942.00	28446.00	27694.00	1063.49	752.00	3.84

As can be seen from Table No. 1, variation is highest on Mondays and Fridays. However, the relatively high average variation on Mondays was due to the unusually low patronage on Monday 5th September (Week 6 of the analysis period).

Afternoon Peak Patronage

Patronage during the afternoon peak period (ie 4pm to 6pm) is shown in Graph No. 3, following.



GRAPH NO. 3: PATRONAGE DURING AFTERNOON PEAK ONLY

As can be seen from Graph No. 3, for afternoon peak patronage, a different pattern emerges again, in which generally Monday to Thursday patronage is relatively similar, but Friday patronage is significantly lower. Variability in afternoon peak patronage is further illustrated in Graph No. 8 (Appendix No. 2).

This is further demonstrated in the following table (Table No. 2), in which the mean patronage during the afternoon peak periods on Fridays is 5-10% lower than other weekdays.

TABLE No 2 - ANALYSIS OF AFTERNOON PEAK PATRONAGE FOR AUGUST TO SEPTEMBER 1988

Analysis Variable : BOARDINGS DURING AFTERNOON PEAK (4-6pm)

NORMAL WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	11	40496.00	44764.00	42388.00	1107.02	333.78	2.61
TUE	11	42157.00	45962.00	43580.09	1207.47	364.07	2.77
WED	11	40838.00	44408.00	42743.73	1043.35	314.58	2.44
THU	11	42426.00	45445.00	44086.91	991.46	298.94	2.25
FRI	11	36610.00	41300.00	39683.55	1662.86	501.37	4.19

TABLE No 2 (cont)

Analysis Variable : BOARDINGS DURING AFTERNOON PEAK (4-6pm)

SCHOOL HOLIDAY WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	2	36502.00	36757.00	36629.50	180.31	127.50	0.49
TUE	2	37974.00	38840.00	38407.00	612.35	433.00	1.59
WED	2	37381.00	37517.00	37449.00	96.17	68.00	0.26
THU	2	38153.00	38994.00	38573.50	594.68	420.50	1.54
FRI	2	32006.00	33729.00	32867.50	1218.34	861.50	3.71

There is therefore some potential to reduce service frequencies during Friday afternoon peak periods, relative to afternoon peak period service frequencies during Mondays to Fridays.

Interpeak Patronage

The interpeak period (ie 9am to 3pm) has been subdivided into two three hour periods, 9am to noon and noon to 3pm. Variations in patronage in these periods from week to week are illustrated in Graphs Nos. 5 and 6 (Appendix No. 2).

Analysis of these two time periods produces the values on the following two tables (Tables Nos. 3 and 4). (The "Normal Week-day" analysis includes the data for Week 6, during which the Royal Show was held in Adelaide).

TABLE No 3 - ANALYSIS OF 9AM TO NOON PATRONAGE FOR AUGUST TO SEPTEMBER 1988

Analysis Variable : BOARDINGS BETWEEN 9AM & NOON

NORMAL WEEK-DAY

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	11	31700.00	47303.00	35928.18	4057.53	1223.39	11.29
TUE	11	35966.00	41996.00	38175.09	1927.05	581.03	5.05
WED	11	35125.00	41318.00	38278.55	1639.92	494.45	4.28
THU	11	36490.00	42083.00	38996.36	1813.62	546.83	4.65
FRI	11	38677.00	46753.00	40992.91	2646.79	798.04	6.46

SCHOOL HOLIDAY WEEK-DAY

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	2	42141.00	43760.00	42950.50	1144.81	809.50	2.67
TUE	2	44810.00	47418.00	46114.00	1844.13	1304.00	4.00
WED	2	45865.00	46622.00	46243.50	535.28	378.50	1.16
THU	2	44363.00	47924.00	46143.50	2518.01	1780.50	5.46
FRI	2	46236.00	48202.00	47219.00	1390.17	983.00	2.94

TABLE No 4 - ANALYSIS OF NOON TO 3PM PATRONAGE FOR AUGUST TO SEPTEMBER 1988

Analysis Variable : BOARDINGS BETWEEN NOON & 3PM

NORMAL WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	11	31070.00	41800.00	33454.36	3010.58	907.72	9.00
TUE	11	33573.00	38191.00	35093.09	1370.39	413.19	3.91
WED	11	33812.00	38094.00	35454.82	1193.94	359.99	3.37
THU	11	33072.00	38137.00	35744.64	1372.30	413.76	3.84
FRI	11	36937.00	45328.00	39793.18	2980.99	898.80	7.49

SCHOOL HOLIDAY WEEK-DAYS

DAY	N Obs	Minimum	Maximum	Mean	Std Dev	Std Error	CV
MON	2	37413.00	38626.00	38019.50	857.72	606.50	2.26
TUE	2	40523.00	41873.00	41198.00	954.59	675.00	2.32
WED	2	40922.00	40947.00	40934.50	17.68	12.50	0.04
THU	2	40104.00	43269.00	41686.50	2237.99	1582.50	5.37
FRI	2	42910.00	44492.00	43701.00	1118.64	791.00	2.56

As can be seen from these tables, a similar pattern of patronage exists for both periods, which, unlike either the morning or afternoon peak periods, resembles that of the total daily patronage in which patronage is consistently lowest on Mondays, fairly constant and similar on Tuesdays to Thursdays, and highest on Fridays.

Again some scope must therefore exist for a lower frequency of service on Mondays at least and possibly on Tuesdays to Thursdays as well.

School Holiday Services

In common with many other operators the State Transport Authority operates the same timetabled services for each day-type throughout the year, except in that some additional services are operated to specific schools during school terms only and some additional services are run during the interpeak period in school holidays.

In the three month period selected, week nos. 9 and 10 were school holidays. Inspection of Graphs Nos. 4 to 8 (Appendix No. 2), and reference to Tables 1 to 4 shown earlier, indicate some interesting characteristics of school holiday patronage.

Firstly, both morning peak and 3pm to 4pm patronage is considerably lower (of the order of 45% lower) during school holidays than during school term periods.

Secondly, both 9am to noon, and noon to 3pm patronage is of the order of 20% higher.

Thirdly, afternoon peak period patronage is only slightly lower (approximately 10%) during school holidays, than during normal school term times.

These findings lead to the following two conclusions:

1) There is scope for provision of a reduction in capacity during school holiday morning and afternoon peak periods, and during the 3 - 4pm period, compared with normal school term weekdays.

2) Since the capacity provided during the 9am to 3pm period is adequate to cater for the school holiday patronage, the capacity could be reduced between 9am and 3pm for all non-school holiday (i.e. school term) weekdays, subject to limitations due to policy on service frequency. A few additional services are run during the interpeak periods on school holidays, but not enough to fully cater for the patronage differences observed.

AVOIDABLE COSTS OF SPARE CAPACITY

Overview

The following analyses are based on the assumption that if the existing level of service in any given time period can cater for the highest patronage experienced on any one day during that time period, then the level of service should be capable of being reduced proportionally to the highest patronage for any other day during the same time period.

It could also be argued that services could be adjusted in accordance with the mean patronage for a particular time period, taking into consideration the variability of the patronage within that time period. For example, if there was a normal distribution of patronage about the mean, in terms of statistical analysis, services during a lower patronised period could be reduced to a level proportional to two standard deviations above the mean, and still cater for 95% of all likely patronage within that time period. However, for simplicity, the following analyses are based on comparisons of maxima.

The avoidable costs of specified changes to levels of services were calculated using data on vehicles in traffic adjusted to reflect the patronage variations derived earlier and unit costs of provision of bus services.

There are four main time periods during which there appears to be sufficient variability in the patronage to warrant investigation of the "avoidable" cost of the surplus capacity. These are:

1) Morning peak (ie 7am to 9am) services;
2) Afternoon peak (ie 4pm to 6pm) services;
3) Weekday interpeak (ie 9am to 3pm) services;
4) School holiday services.

Avoidable Costs During Morning Peak

Patronage during the morning peak periods on Mondays and Fridays was consistently lower than on other days. From Table No. 1 it is seen that the highest patronage occurred on a Tuesday (54,596 boardings), which is 3.9% higher than the maximum Monday patronage (52,545 boardings) and 2.6% higher than the maximum Friday patronage (53,217 boardings).

It is estimated that the full year effect of reductions in service frequency during the morning peak period of 3.9% on Mondays and 2.6% on Fridays would result in cost savings of approx. $80,000 and $50,000 respectively. i.e. the cost to the State Transport Authority of variability of patronage during the morning peak is of the order of $130,000 per year.

Avoidable Costs During Afternoon Peak

Afternoon peak patronage was lower on Fridays than on other days of the week. From Table No. 2 it is calculated that the highest maximum patronage (45,445 boardings) is 10.0% higher than the highest Friday patronage (41,300 boardings).

It is estimated that the full year effect of a 10.0% decrease in afternoon peak service frequency on Fridays would result in a cost saving of approximately $190,000 per year.

Avoidable Cost Savings During Weekday Interpeak Periods

Interpeak patronage was highest on Fridays and lowest on Mondays. The difference in maxima, excluding the Week 6 figure (Royal Show), was approximately 6.8% and 8.4% respectively for the 9am to noon and noon to 3pm periods.

It is estimated that the full year effect of a reduction in service frequency on Mondays of 6.8% in the 9am to noon period and 8.4% in the noon to 3pm period is approximately $110,000 and $40,000 respectively, totalling $150,000 per year.

Avoidable Costs during School Holiday Periods

Both morning peak and 3pm to 4pm patronage is approximately 45% lower during school holidays than during school term periods.

Assuming that a 40% reduction in service frequency could be made during both the morning peak and 3pm to 4pm periods, for the eleven weeks per year of school holidays, cost savings of approximately $530,000 and $190,000 per annum, that is a total of about $720,000 per annum, could be achieved.

As mentioned earlier, there is also grounds to argue that the 9am to 3pm service provision could be reduced for all weekday non-school holiday days. However, reductions in the frequency of services in the interpeak period, where in many cases a minimum level of service is already operating, are harder to achieve, and consequently have not been costed.

Avoidable Costs Summary

Based on the cost savings estimated for the periods examined above only, the total costs to the State Transport Authority of excess capacity necessitated by variability in patronage is of the order of $1.2 million per annum. Analysis could be carried out for various other time periods and days of the week, although the savings are likely to be somewhat less, as the periods selected for analysis were those likely to produce the largest savings. However, it is quite conceivable that another $1 million or so could be saved by extension of this approach to other time periods, for the bus system alone. Further savings could also be made on the train and tram systems.

The many constraints and intricacies of rostering and timetabling, not the least of which is the need to maintain already low frequencies of services, mean that, in practice, changes could not be made to the extent necessary to avoid all these costs. Nevertheless, this analysis highlights the order of magnitude of potential cost savings that could be made if such timetable and roster changes were possible.

CONCLUSIONS

Patronage Variability

Analysis of daily patronage during the three month period selected shows that there are definite patterns of usage of public transport services which are repeated from week to week.

The extent of the variation by day-type varies, with patronage being relatively constant on Tuesdays, Wednesdays and Thursdays from week to week, and greater variations occurring on Mondays and Fridays.

There is also a noticeable variation in patronage from day to day during the week, with the patterns repeating consistently enough to allow a reduction in the level of service during certain time periods on certain days and still provide an adequate level of service for the patronage expected.

Also, patronage during school holiday periods is distinctly different from non-school holiday periods and is of a sufficiently consistent nature to warrant the introduction of separate timetable for school holiday periods only.

Avoidable Costs

For a public transport operator like the State Iransport Authority, with approximately 600 buses in service during the peak periods, the cost of providing excess capacity sufficient to cater for the variations in patronage from day to day is of the order of $2 million per annum. As mentioned earlier, it is not likely that savings to this extent could be made in practice, but the analysis indicates the savings potentially available if changes to timetables to match the expected patronage could be made.

With the increasing popularity of various systems of flexible working hours (eg flexitime), the variability of patronage from day to day will tend to increase even further. The incentive to match service provision to patronage is therefore likely to become even greater in the future.

APPENDIX No 1 (Page 1 of 2)

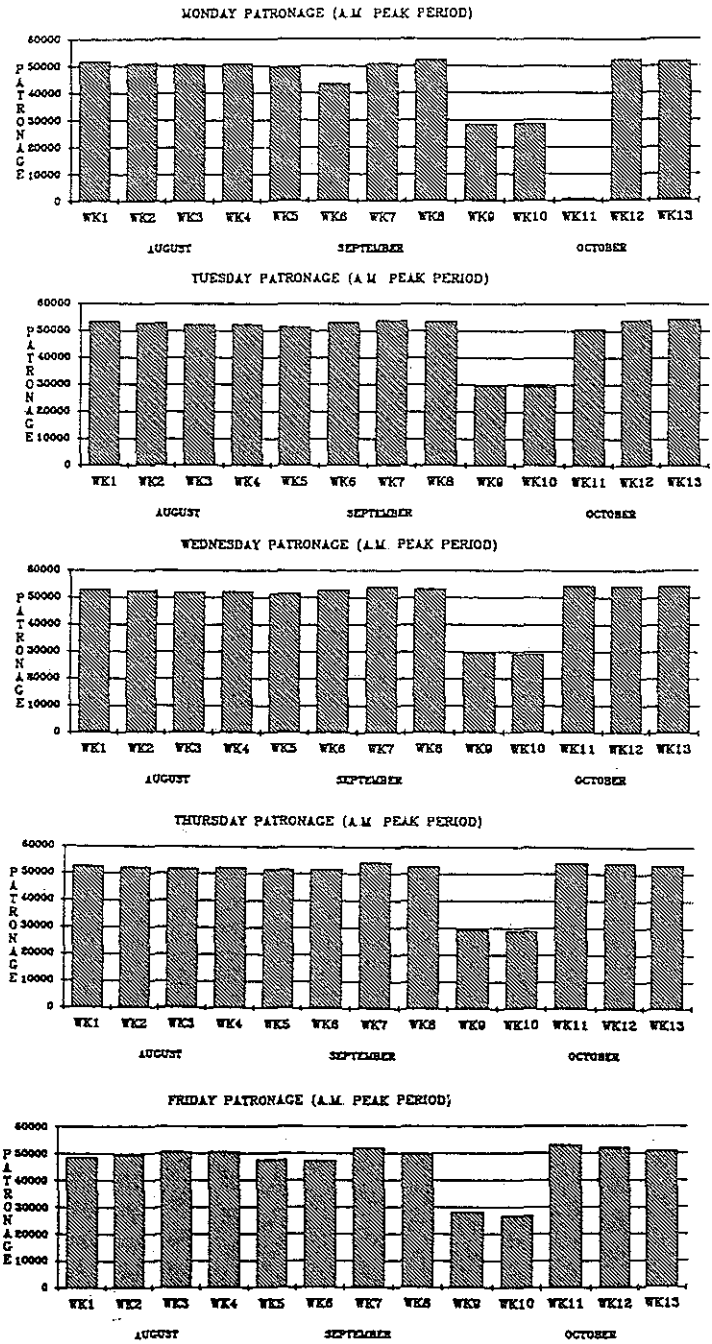
DAY	DATE	MON	DAY-TYPE (*)	NUMBER OF BOARDINGS 7-9am	9am-noon	noon-3pm	3-4pm	4-6pm	Daily Total
MON	01	AUG	NWD	52079	35799	33918	31823	42771	210941
TUE	02	AUG	NWD	53658	37862	35689	32304	43878	219056
WED	03	AUG	NWD	53170	37771	35367	31921	42738	217334
THU	04	AUG	NWD	52895	39382	36265	32106	44690	223898
FRI	05	AUG	NWD	48791	38677	36937	30027	37659	213754
SAT	06	AUG	WE	5295	18968	15474	3061	7593	59004
SUN	07	AUG	WE	387	2855	6606	2011	4295	19108
MON	08	AUG	NWD	51150	34717	33015	31435	41803	206800
TUE	09	AUG	NWD	53108	37262	35138	31538	43209	215588
WED	10	AUG	NWD	52663	36649	35951	31641	42894	215763
THU	11	AUG	NWD	52392	36490	35232	32158	44005	218574
FRI	12	AUG	NWD	49619	39760	39444	32080	40053	225291
SAT	13	AUG	WE	5491	18898	15327	3347	7600	59509
SUN	14	AUG	WE	380	3466	7089	2237	5360	22540
MON	15	AUG	NWD	50691	33677	31538	30814	40496	201242
TUE	16	AUG	NWD	52483	36862	33827	31578	42450	212369
WED	17	AUG	NWD	52106	37892	34513	31771	41307	213397
THU	18	AUG	NWD	51951	37663	34537	32242	42426	216740
FRI	19	AUG	NWD	50837	39042	39263	32740	40140	225299
SAT	20	AUG	WE	5867	19865	16447	3073	8625	63436
SUN	21	AUG	WE	353	2621	6246	1898	4241	18397
MON	22	AUG	NWD	51077	33684	31449	31989	42076	204246
TUE	23	AUG	NWD	52627	35966	33761	32301	42215	211312
WED	24	AUG	NWD	52419	35125	34780	32123	42573	212221
THU	25	AUG	NWD	52469	36779	35406	32370	43277	218702
FRI	26	AUG	NWD	50888	38691	36961	31868	37285	218869
SAT	27	AUG	WE	5422	18868	15078	2989	7868	59076
SUN	28	AUG	WE	372	2753	6576	2114	4412	19462
MON	29	AUG	NWD	49667	34713	32678	32073	41413	203989
TUE	30	AUG	NWD	51681	36153	33573	31699	42371	209347
WED	31	AUG	NWD	51655	37974	35121	32065	40838	212837
THU	01	SEP	NWD	51860	38910	35773	32436	43708	221778
FRI	02	SEP	NWD	47807	44392	42881	30743	40671	234345
SAT	03	SEP	WE	6474	24007	20736	5128	11645	84055
SUN	04	SEP	WE	471	4238	8225	2578	5641	26326
MON	05	SEP	NWD	43672	47303	41800	27448	44764	224585
TUE	06	SEP	NWD	53362	41996	38191	33091	45962	230559
WED	07	SEP	NWD	53001	41318	38094	33137	44408	229495
THU	08	SEP	NWD	51930	42083	38137	31311	45193	230245
FRI	09	SEP	NWD	47553	46753	43908	30821	41136	240174
SAT	10	SEP	WE	5455	19982	17092	4443	9723	70604
SUN	11	SEP	WE	573	3155	6499	1937	4931	20417
MON	12	SEP	NWD	51052	31700	31070	32560	41647	203054
TUE	13	SEP	NWD	54129	36720	34374	32813	44328	218780
WED	14	SEP	NWD	54055	39542	36713	33200	43980	224840
THU	15	SEP	NWD	54481	40557	37262	33418	45375	231010

APPENDIX No 1 (Page 2 of 2)

DAY	DATE	MON	DAY-TYPE (*)	NUMBER OF BOARDINGS 7-9am	9am-noon	noon-3pm	3-4pm	4-6pm	Daily Total
FRI	16	SEP	NWD	52366	40362	37503	32336	40695	226874
SAT	17	SEP	WE	4963	16429	13804	2942	7308	54116
SUN	18	SEP	WE	459	2867	6199	1915	4653	19062
MON	19	SEP	NWD	52360	34702	32973	32587	43049	211002
TUE	20	SEP	NWD	53833	39274	36314	32506	44312	222743
WED	21	SEP	NWD	53342	38597	35500	31803	43037	219615
THU	22	SEP	NWD	52980	38410	35458	31402	43078	220745
FRI	23	SEP	NWD	49944	39220	45328	23984	36610	220175
SAT	24	SEP	WE	5232	18325	14182	3301	6749	56778
SUN	25	SEP	WE	419	3576	7552	2027	5617	23185
MON	26	SEP	SHOL	28698	42141	38626	13423	36757	175332
TUE	27	SEP	SHOL	30168	44810	40523	14767	37974	184643
WED	28	SEP	SHOL	29751	46622	40947	14900	37517	186571
THU	29	SEP	SHOL	29487	47924	43269	15411	38994	194650
FRI	30	SEP	SHOL	28446	48202	44492	15245	33729	194337
SAT	01	OCT	WE	5426	18737	14410	2929	8128	59014
SUN	02	OCT	WE	446	3047	6917	1995	4504	20439
MON	03	OCT	SHOL	28901	43760	37413	13438	36502	175583
TUE	04	OCT	SHOL	29673	47418	41873	15850	38840	190379
WED	05	OCT	SHOL	29317	45865	40922	15119	37381	185266
THU	06	OCT	SHOL	29000	44363	40104	14771	38153	185590
FRI	07	OCT	SHOL	26942	46236	42910	15081	32006	185950
SAT	08	OCT	WE	5065	17484	13129	3012	5971	52372
SUN	09	OCT	WE	431	3154	6844	2031	4122	19812
MON	10	OCT	PHOL	1112	6399	7700	2660	5543	27523
TUE	11	OCT	NWD	50941	40751	35080	30911	42157	215594
WED	12	OCT	NWD	54533	39417	35787	34333	43506	224854
THU	13	OCT	NWD	54279	40425	35213	33641	44067	227874
FRI	14	OCT	NWD	53217	40732	37099	33355	40451	230487
SAT	15	OCT	WE	6088	20655	16340	3467	7833	64501
SUN	16	OCT	WE	460	3069	6644	2055	4484	19988
MON	17	OCT	NWD	52545	35550	32388	33090	43022	212340
TUE	18	OCT	NWD	54339	39125	35788	33039	44075	223737
WED	19	OCT	NWD	54566	37513	33812	32671	42438	218876
THU	20	OCT	NWD	54329	37491	33072	32844	43692	221061
FRI	21	OCT	NWD	52253	40086	38207	33299	41300	231586
SAT	22	OCT	WE	6277	20413	15816	3555	8023	64410
SUN	23	OCT	WE	492	3226	7980	2188	5274	23557
MON	24	OCT	NWD	51851	35810	31973	32311	42573	209848
TUE	25	OCT	NWD	54596	37955	34289	32643	44424	221000
WED	26	OCT	NWD	54464	39266	34365	32381	42462	220568
THU	27	OCT	NWD	53565	40770	36836	33008	45445	230756
FRI	28	OCT	NWD	50939	43207	40194	32263	40519	234590
SAT	29	OCT	WE	6375	21106	16248	3894	8080	65879
SUN	30	OCT	WE	419	2886	6850	2378	5061	22173
MON	31	OCT	NWD	47997	37555	35196	30446	42654	211232

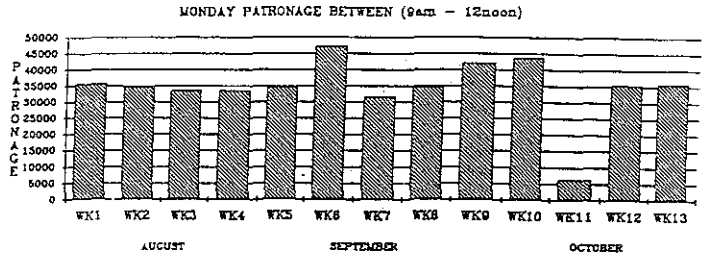
(*) NWD = Normal Week Day
WE = Week End
SHOL= School Holiday
PHOL= Public Holiday

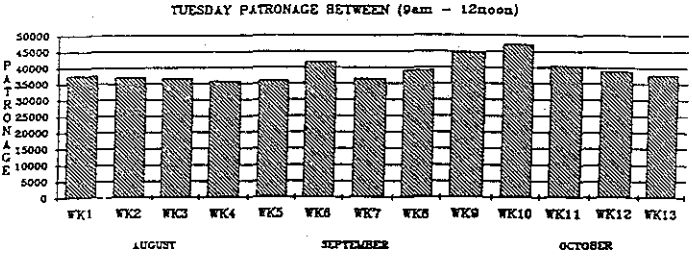
APPENDIX NO. 2 (Page 1 of 5)

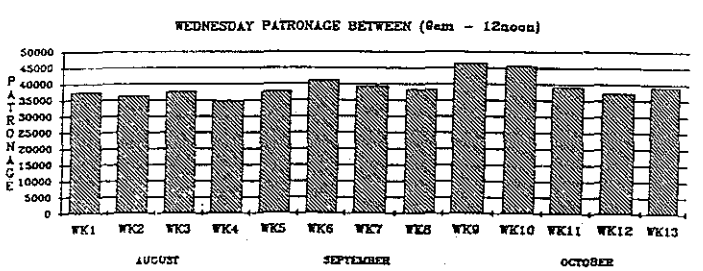


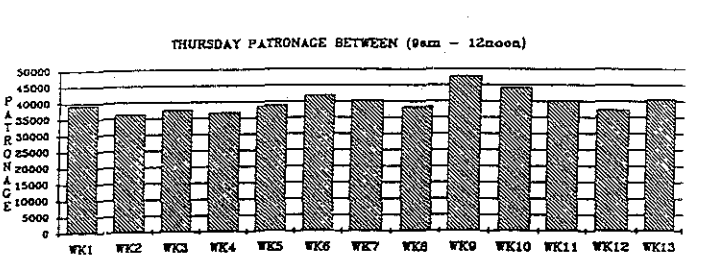
GRAPH NO. 4: MORNING PEAK PATRONAGE

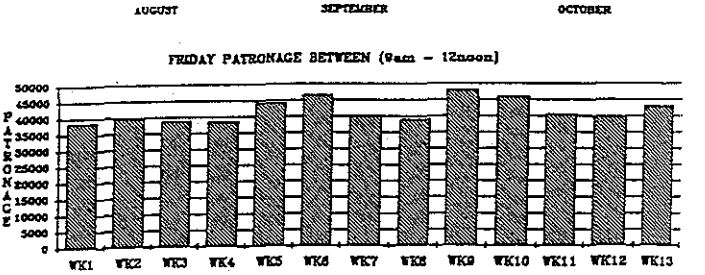
APPENDIX NO. 2 (Page 2 of 5)





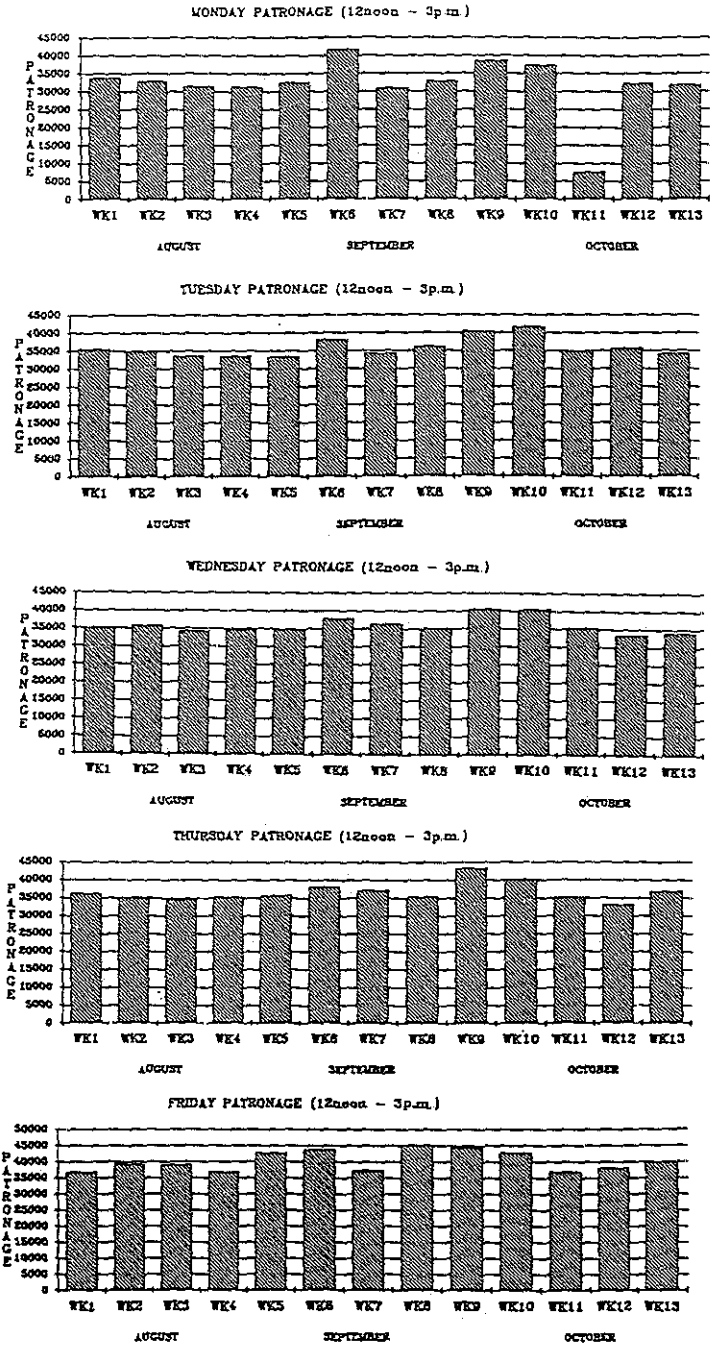






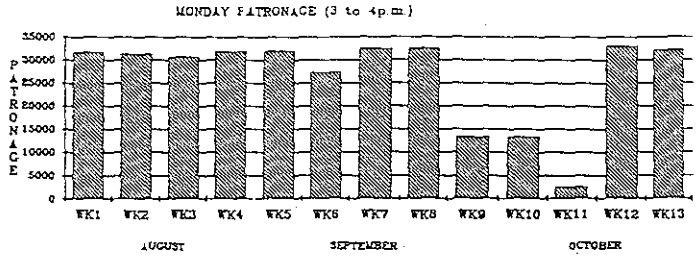
GRAPH NO. 5: MORNING INTERPEAK PATRONAGE

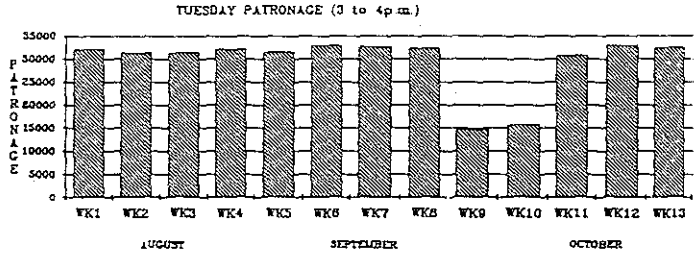
APPENDIX NO. 2 (Page 3 of 5)

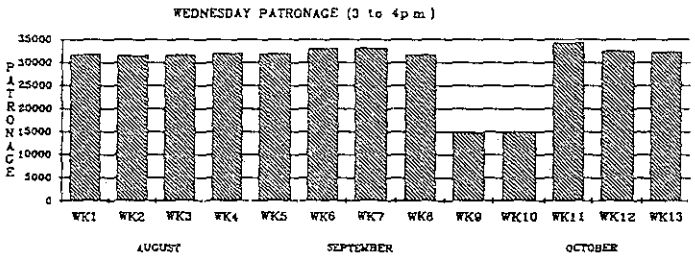


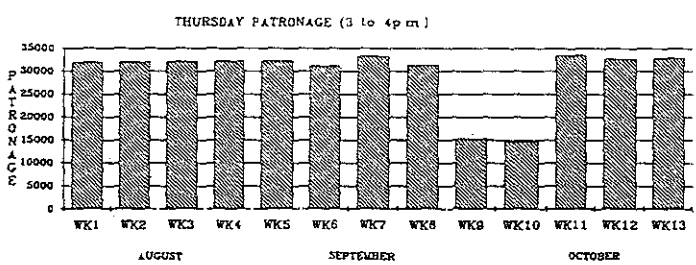
GRAPH NO. 6: AFTERNOON INTERPEAK PATRONAGE

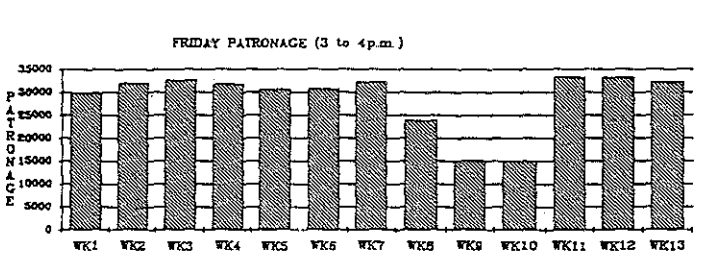
APPENDIX NO. 2 (Page 4 of 5)







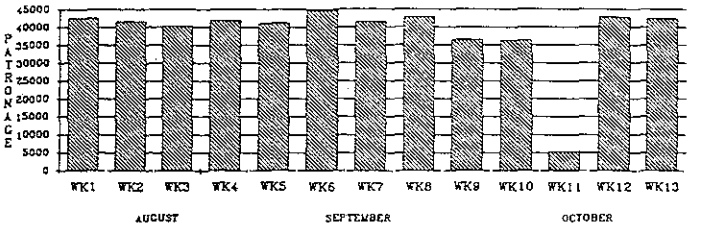




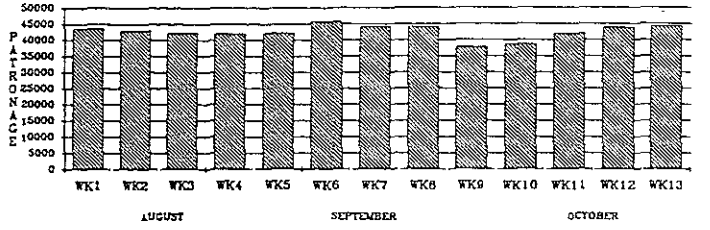
GRAPH NO. 7: 3PM TO 4PM PATRONAGE

APPENDIX NO. 2 (Page 5 of 5)

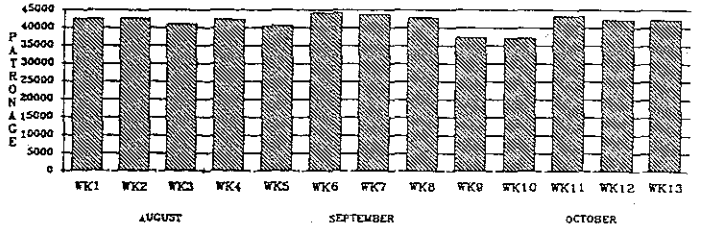
MONDAY PATRONAGE (P M PEAK PERIOD)



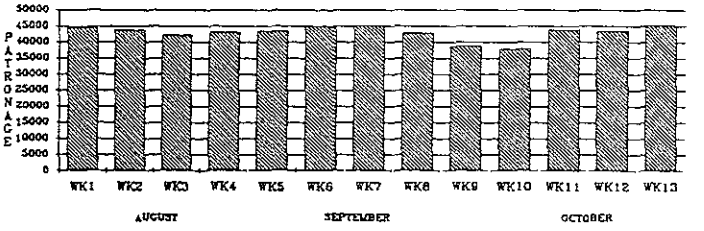
TUESDAY PATRONAGE (P M PEAK PERIOD)



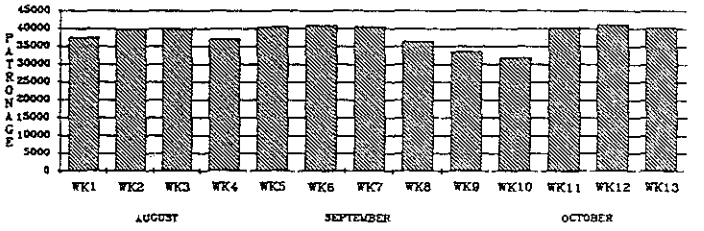
WEDNESDAY PATRONAGE (P M PEAK PERIOD)



THURSDAY PATRONAGE (P M PEAK PERIOD)



FRIDAY PATRONAGE (P M PEAK PERIOD)



GRAPH NO. 8: AFTERNOON PEAK PATRONAGE