Exploring The Impact of the 'Free Before 7' Campaign on Reducing Overcrowding on Melbournes Trains

Graham Currie[1*]

[*]*Corresponding Author*

[1*]Graham Currie, Professor, Chair of Public Transport, Institute of Transport Studies, Department of Civil Engineering, Building 60, Monash University, Clayton, Victoria 3800, AUSTRALIA.
Phone: + 61 3 9905 5574, Fax: +61 3 9905 4944, Email: graham.currie@eng.monash.edu

ABSTRACT:

Melbourne rail ridership has grown over 40% in the last 3 years. Peak overcrowding is endemic and limits performance and the economic and environmental benefits which rail provides.

In 2007/early 2008 an 'early bird' free fares before 7:00a.m. program was introduced to encourage peak travellers to travel earlier to reduce critical peak demand. This paper takes an independent view of the performance of the program.

The program cost $Aust 6M p.a. in lost fares and 8-9,000 passengers/weekday use the scheme. Some 23% of these have shifted the time of travel (around 2,000 to 2,600 passengers) by an average of 42 mins. This has reduced demand in the peak by 1.2%-1.5% and is the equivalent of 2.5-5 peak train loads. Demand growth during this period has far outweighed this effect so overloading rose after early bird was introduced. Its affect was to reduce the scale of increased overloading.

Overall the program pays for itself by providing relief equivalent to 2.5 to 5 peak trains. Economic benefits are likely to be higher. When considering alternatives there is no equivalent measure which could be implemented at such a cost so quickly.

(191 words – limit 200)

Keywords: Rail, Fares Policy, Congestion, Overloading

1. INTRODUCTION

Overcrowding of rail services has now become an endemic problem for many major cities throughout the world. In the UK the share of a.m. peak rail services into London which are beyond capacity has increased from 3.7% to 4.8% between 2002 and 2006 (Office of the Rail Regulator 2008). The New York subway, long considered overcrowded, has experienced over 50% ridership growth over the last decade at a quarter of all stations (Center for an Urban Future 2009). Options to address capacity problems are limited since almost all the subway lines above 100% loading are also at maximum track capacity (Neuman 2007).

Similar issues are affecting Australian urban railways. In Sydney, the share of trains above their 135% load factor standard increased from 6% in January 2004 to 16% in July 2008 (Independent Pricing and Regulatory Tribunal 2008, the system target was 5% for 2008). In Melbourne the number of trains breaching peak contract loading standards increased by 500% between 2005 and 2007 (Eddington 2008)[1].

Finding feasible solutions to these issues is a major challenge for authorities. Where track capacity is available new trains commonly cost up to $Aust 20M to purchase and often require a procurement period of up to 5 years. Where track capacity is full, new lines can cost $Billions and over a decade to implement. Since almost all authorities are facing difficult financial pressures cheaper and shorter term solutions are needed.

This paper reviews the performance of a new approach to managing peak overloading of rail services implemented in Melbourne Australia in March 2008. Called the ‘early bird ticket’ the promotion offers rail passengers free travel as long as they complete their journey before 7:00a.m. The aim of the program was to encourage peak rail passengers to shift travel to earlier trains thus relieving overcrowding pressure.

The next section of the paper presents a summary of previous research concerning measures of this kind. This is followed a brief outline of the context for the Melbourne early bird ticket program, a description of the program and how it was implemented. The take up and usage of the ticket are then presented followed by a review of its impacts on peak loading. The paper concludes with an assessment of the program including suggestions for future research.

2. PREVIOUS RESEARCH

The use of ticketing discounts to shift demand from peak periods is not new to either research or practice. Discounted season tickets called ‘early bird’ tickets have been offered by the First Transpeninine Express for trains arriving in Manchester before 7:30 National Rail Enquiries 2009. Another ‘early bird’ ticket has been offered on the overloaded London, Tilbury and Southend Railway for arrivals before 7:00a.m. (Kearns 2000). However in both cases these are discounted rather than free tickets as offered in the Melbourne program. Inter-peak to peak fare differentiation is reasonably common around the world although its implementation to reduce peak loadings is rare Fearnley 2003. One source notes that the Mass Transit Railway in Hong Kong offers rebates to travellers who start their journey before the morning peak (Fearnley 2003)[2].

Research examining the impacts of fare policies on peak loadings was undertaken by the UK’s Strategic Rail Authority largely in response to the overloading challenges in the UK (Whelan and Johnson 2004). This explored increasing peak fares as well as reductions in off peak fares. It found that:

---

[1] More recent unpublished analysis from the Department of Transport suggests this increase may be more of the order of 200%
[2] The author could find no evidence of this fare policy on the MTR web site

- Increasing peak fare 10% reduces peak loading from 130% to 126%. Increasing peak fare 30% reduces peak loading from 130% to 119%
- Discounting off peak fares of 10%-30% only generates small reductions in peak load factors. There are passenger benefits from reduced fares but these are at the cost of operator viability.

The research concluded that "more substantial reductions to train overcrowding can be achieved by increasing fare differentials between peak and off-peak travel" (Whelan and Johnson 2004). It also recommended a combined strategy of increased peak fares and reduced off peak fares which would have a larger effect on ridership shifts and also act to balance operator viability. While these findings support the view that peak/off peak fare differentials should be high, increasing peak fares is likely to be unpopular with riders. Other researchers have questioned the economic case for higher peak fares which might act to encourage car travel on already congested road networks (Fearnley 2003).

Research in London has confirmed the need for large peak/off peak fare differentials to achieve reductions in peak travel (Transport for London 2004). Based on a neutral revenue assumption, modelling estimated that a 3% switch in travel (representing about a years growth) could be achieved by introducing a 40% peak/off peak fare differential however a 100% differential would be needed in the outer zone 3 area. The report concluded that substantial fare changes are required to make even small changes in demand.

In general these findings are supported by US research considering differential peak/off peak fares. Free interpeak fares were offered on largely bus based systems in Denver and Trenton and achieved a reduction in the share of ridership in the peak to 30% from 50% and to 55% from 68% respectively (McCollom and Pratt 2004). Substantially smaller impacts were found for discounted rather than free fares. This research also suggests peak/off peak fare differential is important in achieving demand shifts but also notes that having a large pool of peak passengers who are willing to shift the timing of trips is also important.

Focus groups held in London sought out passengers who might have the flexibility to retiming commuting trips to other time periods (Passenger Focus 2006). Their findings were interesting in relation to the Melbourne 'early bird' trial:

- Some 41% of commuters said they could arrive outside of peak times
- Of these only 6% said they would travel after the peak, the majority said they would prefer to arrive earlier rather than after the a.m. peak.
- The study found that seasonal factors could affect behaviour, with passengers less willing to travel earlier in the dark winter months
- It found that there would be time lag effects whereby time was needed for passengers to adjust their travel behaviour after any fare changes were made.

Many of these findings were confirmed in another UK study exploring rail passenger flexibility to shift travel times (Faber Maunsell 2007). A train user survey established that 56% of passengers had more flexibility to travel earlier rather than later (39%). However 60% of rail users said arrival and return times were linked but that focussing on the a.m. peak would be a more productive area for differential fare pricing. The same study established some user valuations for time displacement using stated preference techniques. They found that:

- Travelling 60 mins earlier is valued at £2.40 while travelling 60 mins later was £12.0. On this basis "significant fare reductions would be required to encourage peak spreading' (Faber Maunsell 2007)
- "It is likely that a simple fare reduction for the shoulder of the peak would be insufficient to overcome the time displacement effect except for those travellers making longer journeys and paying higher fares"
- "Combinations of fare reductions and fare surcharges, matched with crowding benefits, are more likely to be productive in promoting time switching"

- There are strong interactions between fare, time displacement and overcrowding levels – around 9% of passengers had already undertaken some time shifting in the a.m. peak because of crowding
- Around 55% of passengers have some flexibility to shift their travel time dominated by those who could shift this time by around 30 mins (45% had no flexibility)
- Longer distance passengers have greater potential to overcome time displacement penalties while shorter distance travellers need very significant fare benefits to overcome time shifting effects
- Higher income earners have greater flexibility to time shift than lower income travellers. This is related to their ability to use flexitime work opportunities which are less for blue collar workers.

Overall previous research suggests that shifting demand from the peak is possible as long as peak/off peak fare differentials are high. Free off peak travel has more impact than fare discounts. Reducing pre-a.m. peak tickets is likely to have more impact that post peak tickets These are all findings which support the design elements of the Melbourne ‘early bird’ program.

3. MELBOURNE CONTEXT AND ‘EARLY BIRD’ PROGRAM

Melbourne is a city of around 3.6 million people on the southern coast of Australia. The city’s public transport network consists of trains, tram and buses, attracting around 13% of all motorised trips (Department of Treasury and Finance 2007). There are some 450M p.a. boardings on Melbournes public transport system in total and 201m on the metropolitan railway (Department of Transport 2009).

Rail travel in Melbourne is booming. In the 15 years between 1993/4 and 2007/8 rail boardings have doubled in Melbourne with a 43% increase in ridership over the last 5 years (Department of Transport 2009). This has had a significant impact on crowding on trains in the morning peak. Between 2001 and 2007, severe breaches of contract loading standards increased from 4 to 23 per average annual peak with most of these increases occurring in the last 3 years (Eddington 2008) (there were 38 average daily peak load breaches in May 2008[3]).

The ‘early bird’ ticket was firstly introduced on a trial basis on two (Sydenham and Frankston lines) of Melbournes 15 rail lines on 29th October 2007. This was followed by full rollout of the scheme to the whole network on 31st March 2008.

The ‘early bird’ ticket provides free travel to passengers completing their rail journey before 7:00a.m.[4] Use of the scheme requires passengers to obtain a multi-trip early bird ticket allowing 10 trips. These tickets are free but require validation on each trip. In this way usage of the ticket can be monitored. If trains scheduled to arrive before 7:00a.m. actually arrive after this, due to service disruptions, station staff are told to let passengers through ticket barriers using these tickets.

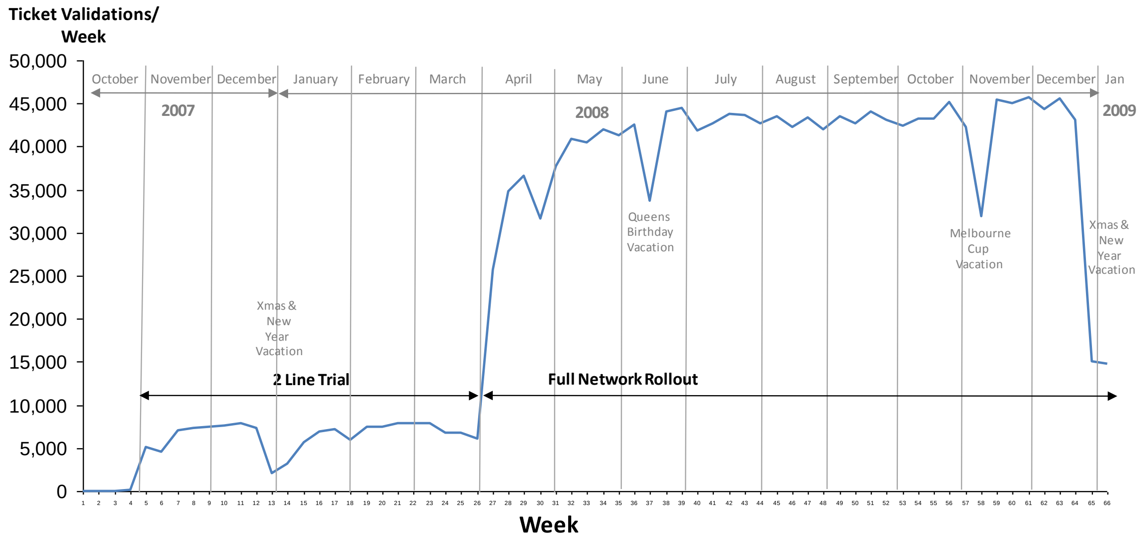
Full details of the performance of the trial are not published. However evidence suggested (Lahey 2008) that 27% of the 1,500 passengers travelling on the trial lines before 7 a.m. had adjusted their travel to make use of the ticket (implying some 405 passengers). Clearly this was enough to encourage the government to make a full rollout of the program. The cost of the program, mainly lost revenue, was estimated at $Aust12M over 2 years or around $Aust 6M p.a.(Department of Transport 2009).

[3] Personal communication with the Victorian Department of Transport
[4] Free travel only applies to rail journeys not bus or tram.

4. EARLY BIRD TICKET USAGE BEHAVIOUR

Figure 1 shows the weekly take up rate of the early bird ticket over the period from first trial to January 2009.

FIGURE 1 : Early Bird Ticket Validation History



Source: Department of Transport, Victoria

These figures suggest that around 7,000 validations a week (or 1,400 a weekday) were made during the trial however there is a slight trend to increasing validations over the trial period. The full roll out of the program increased validations to around 44,000 per week or some 8,800 a weekday. Again there is an increasing trend although this is partly confused by the 'ramp up' in validations at the start of the program and also by seasonal dips in demand at the end of 2008.

In September 2008 a random intercept survey of 901 rail users was undertaken to target travellers making trips finishing before 7:00a.m.. Interviews took place on platforms at selected stations between the start of services in the morning and 7:30 a.m. (Gaymer 2008). The survey found that:

- Some 23% of early bird ticket holders had shifted trips from the peak to pre-peak times.
- The average time shift was 42 minutes with a range of between 5 minutes and 120 minutes.
- In general more longer distance passengers (25%, using zone 1-2 tickets) made a time shift than shorter distance passenger (14%, zone 1 only tickets).
- The remaining 77% of early bird ticket holders had not shifted their time of travel. However 67% had always travelled at this time while another 10% were new travellers. The Department of Transport have suggested that these passengers could be encouraged by the free fare to start using public transport (Gaymer 2008). However, as noted, rail patronage has been rising generally with an increase of 11.8% in 2008 compared to the previous year. Hence much of this growth may be explained by background growth.

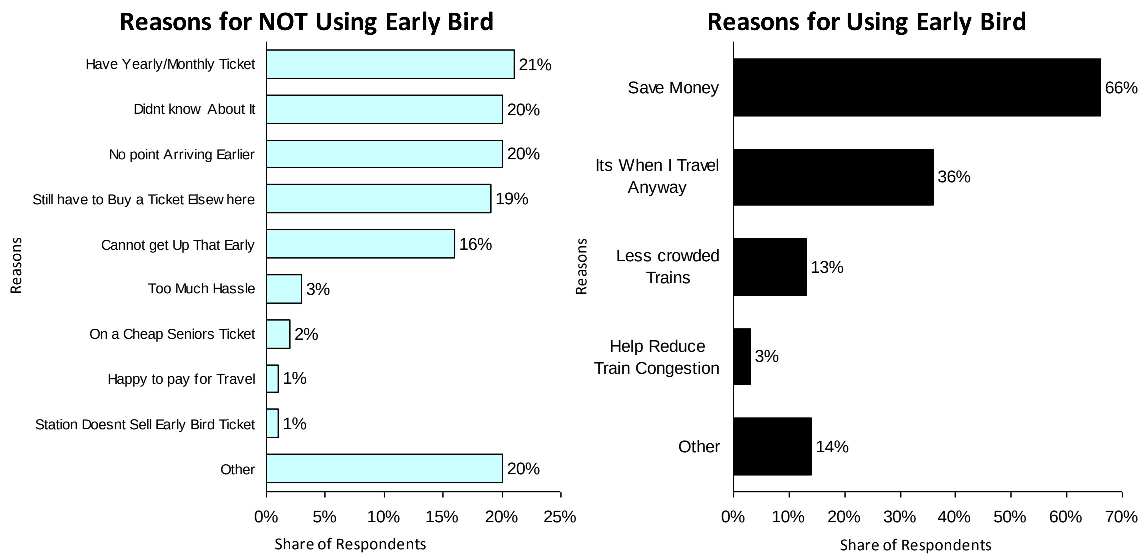
Based on the survey the Department of Transport estimated that 2,000 rail passengers (8,600 early bird validations per weekday factored by 23%) had shifted behaviour from the peak. They also suggested that this was equivalent to 2.5 peak train loads of passenger (using the Melbourne standard of a full train is about 800 passengers per set) (Gaymer 2008). The same source set an upper bound estimate of this effect by suggesting that prior to the program some 5.1% of validations occurred before 7:00a.m. This increased to 5.5% after early bird was implemented. The increase of 0.4% equates to 2,600 passengers or an equivalent of 3.25 peak train loads (again using the 800 passengers per train standard) (Gaymer 2008).

The survey also established some other useful features of those using early bird tickets:

- Some 40% of early bird travellers accessed stations using a car. Station car parks are known to be full for commuters after the peak. Hence earlier access would act to ensure a space is available for early bird passengers. However the 40% share is the same as general station access mode for all peak travellers (42%)[5]. Some 97% of early bird users had not changed their access mode to stations as a result of using tickets.
- Most early bird ticket holders (71%) used the tickets every weekday. Some 20% used it for 3-4 days a week.
- Almost all early bird ticket holders (96.4%) also used public transport to return home later in the day.

Figure 2 illustrates the responses to reasons for using and not using early bird tickets. Saving money dominates reasons for use however a small number (13%) also liked using less crowded trains. A mix of reasons for not using the ticket were given. Only around 36% suggested the time was too early (no point arriving early and cannot get up that early). Some 23% already had tickets (periodicals/seniors tickets) so might use early bird later when they renew their ticket. Access to tickets was highlighted by 20% (having to buy another ticket and station doesn't sell early bird ticket[6]). Some 20% didn't know about the ticket despite a reasonable amount of media coverage and promotion. A high share of 'other' reasons were also given (20%). This included those who had travel paid by employers, those finding it not convenient and those being delayed on the day by unexpected events (sleeping in or bad traffic).

FIGURE 2 : Reasons For Using and Not Using Early Bird Tickets



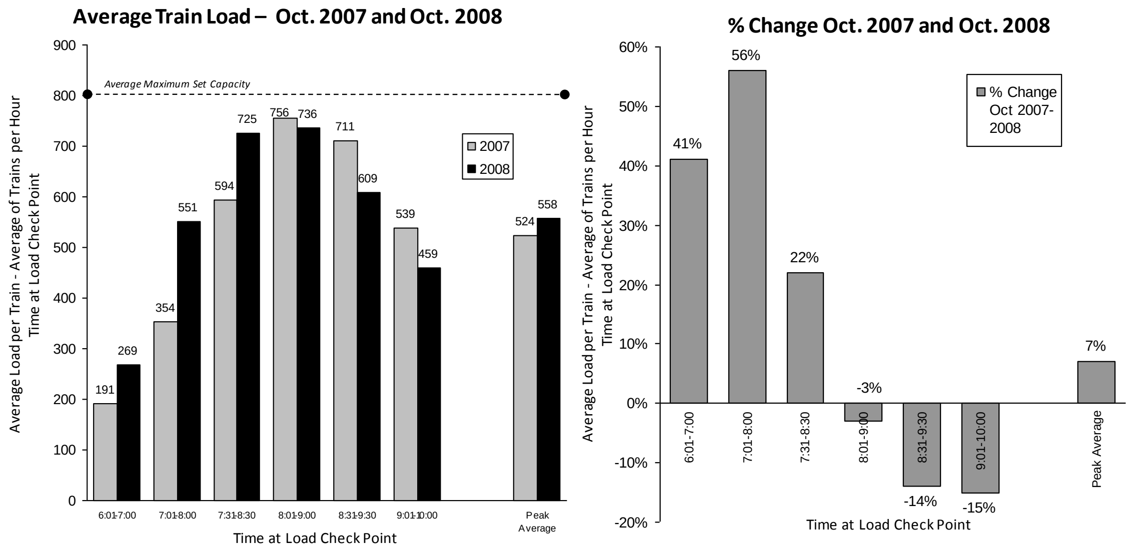
5. PEAK LOADING IMPACTS

Figure 3 illustrates the distribution of average train loadings on the network by rolling hour over the a.m. peak for October 2007 (before early bird) and for October 2008 (after early bird).

[5] Based on an analysis of the Victorian Activity Travel Survey The Transport Research Centre (2001). User Manual Volume 2 Coding Frame: A companion document to the VATS94-VATS99 databases. Melbourne, RMIT University.

[6] Early bird tickets are only sold at stations where staff sell tickets. This represents about 30% of stations.

FIGURE 3 : Change in Average Peak Train Loading – Before and After Early Bird



Note: This is the average total per train of 18 separate train groups weighted by the number of trains by line between 06:00to 10:00
Source: Connex Train Load Standard Survey Oct 2007 and Oct 2008

This analysis shows that train loads before 7:00a.m. have increased after early bird was introduced. The increase is 41% which is higher than, though generally fairly consistent with, the changes suggested by the interview survey (the survey suggested that pre-7:00a.m. ridership had increased by 33% - including a 23% time shift of travellers from the peak and a 10% growth in ridership).

Figure 3 also shows a number of other trends which are harder to explain:

- The 7:00-8:00 loads have increased by 56% which is surprising since we know that a time shift has occurred from this period to pre-7:00a.m. trains. The implication is that there are wider changes in travel patterns occurring and that the early bird program is only a part of this.
- The 7:30-8:30 loads also increase but there are declines in those for the 8:00-9:00, 8:30-9:30 and 9:00 to 10:00 hours. While this could be associated with the early bird program it is by no means clear. The survey suggested that average time shifts for early bird users was 42 minutes. For this to act to reduce train loads after 8:00a.m. a time shift of at least 60 minutes would be needed. A much longer time shift would be needed to explain the higher reductions in peak loads for the train loads after 8:30. While the maximum time shift reported in the early bird user survey was 120mins it is clear this represented only a small share of those making time shifts.

Overall these findings support the view that the early bird ticket has acted to increase ridership before 7:00 a.m. The evidence provides some support for the view that train loads during the peak have been reduced by the early bird program. However the dominant shifts in behaviour seem to be towards earlier peak travel from later peak travel and early bird is unlikely to have been a major influence in this trend. It can be hypothesised that demand shifts may have occurred due to 'cascading' shifts in available capacity. This occurs when early bird tickets act to shift demand from the early peak (07:00 to 08:00) making more seats available at this time. This could potentially cause shifts from the peak of the peak (08:00 to 09:00) to early peak trains because seats are available. While this seems plausible it is only a theory and requires exploration to validate this effect.

6. ASSESSMENT

Two major questions arise in assessing the early bird program; is it effective in reducing peak train loads? And, is it worth the costs associated with it?

Impact on Reducing Train Crowding

The evidence provides fairly conclusive proof that early bird acts to shift demand from the peak to the pre-peak. After its introduction, 23% of those using tickets had time shifted by an average of 42 minutes. These passengers received a free fare for this as did the 67% of other ticket users, most of whom receive a 'windfall gain'. The central question is how much did this act to reduce peak train loads?

Unfortunately no before and after data on changes in overloading of individual peak trains is available to make this assessment. Overloading trends are complicated by ongoing ridership increases and also small increases in train operations in response to this. It is highly likely that the increasing trend in overloading infringements has continued since ridership growth has occurred.

The Department of Transport claims that a shift of between 2,000 and 2,600 passengers has occurred which is equivalent to between 2.5 and 3.23 peak train loads. This is calculated by adopting the threshold loading standard (800 passengers) to the shift in demand. However loads vary considerably during the peak (Figure 3) with peak demand and load breaches occurring in the 8:00 to 9:00a.m. periods.

The average peak load was 524 before early bird. By applying the average load to the shifts in ridership the equivalent of 3.8 to 5.0 average peak train loads of passengers have shifted from the peak (since the a.m. peak includes around 160 trains this is a reduction equivalent to a maximum of about 3% of peak operations). Overall therefore between 2.5 and 5 peak trains have been saved depending on how savings are measured.

Another way of examining this issue is from a demand perspective. Between 2,000 and 2,600 passengers are estimated to have time-shifted from the peak. Inbound a.m. peak ridership is estimated to represent about 170,000 passengers in 2007/87. Hence the early bird program might have reduced this by between 1.2% and 1.5%. This during a period when annual ridership grew by 4%. It is possible that peak ridership may have grown by more this (total peak loadings in Figure 3 increased by 7%)[8]. The implication is that ridership growth will almost certainly have had a much greater effect at increasing peak overloading than early bird has had at reducing it. In effect the program is likely to be reducing the scale of crowding impacts caused by increased ridership rather than reducing crowding overall. This is supported by evidence from the Melbourne Customer Satisfaction Monitor. All customer satisfaction indices for all quarters in 2008 showed a decline in satisfaction with rail passenger comfort and service delivery compared to 2007 (Department of Transport 2008). The problem of overloading appears to have been increasing after early bird was introduced. Nevertheless it has clearly acted to reduce the scale of this problem which is still a laudable objective.

Figure 4 illustrates an analysis of rail peak demand by time period covering the pre peak and a.m. peak. It is a record based on old household travel surveys undertaken between 1994 and 1999 but represents the best available data on the shape of the arrival profile of passengers using trains in the peak[9]. This illustrates that the highest demands are experienced in the hour between 8:00 a.m. and 9:00 a.m. This pattern is consistent with loadings shown in Figure 3. Since the early bird ticket has generated an average time shift of only 42 minutes it is clear that most of the impacts on peak load

---

[7] This is based on 201.2M boardings p.a. and factors of 295 (year to weekday) and 25% (weekday to a.m. inbound). These factors are typical values used by the industry.

[8] Unfortunately little data is available on peak ridership. However previous research has shown strong elasticity evidence that auto fuel price growth have been acting to increase peak rail ridership in Melbourne Currie, G. and J. Phung (2008). "'Understanding Links Between Transit Ridership and Auto Gas Prices: U.S. and Australian Evidence' " Transportation Research Record, Journal of the Transportation Research Board, Washington DC **No. 2063, , 2008**: pp. 133–142..

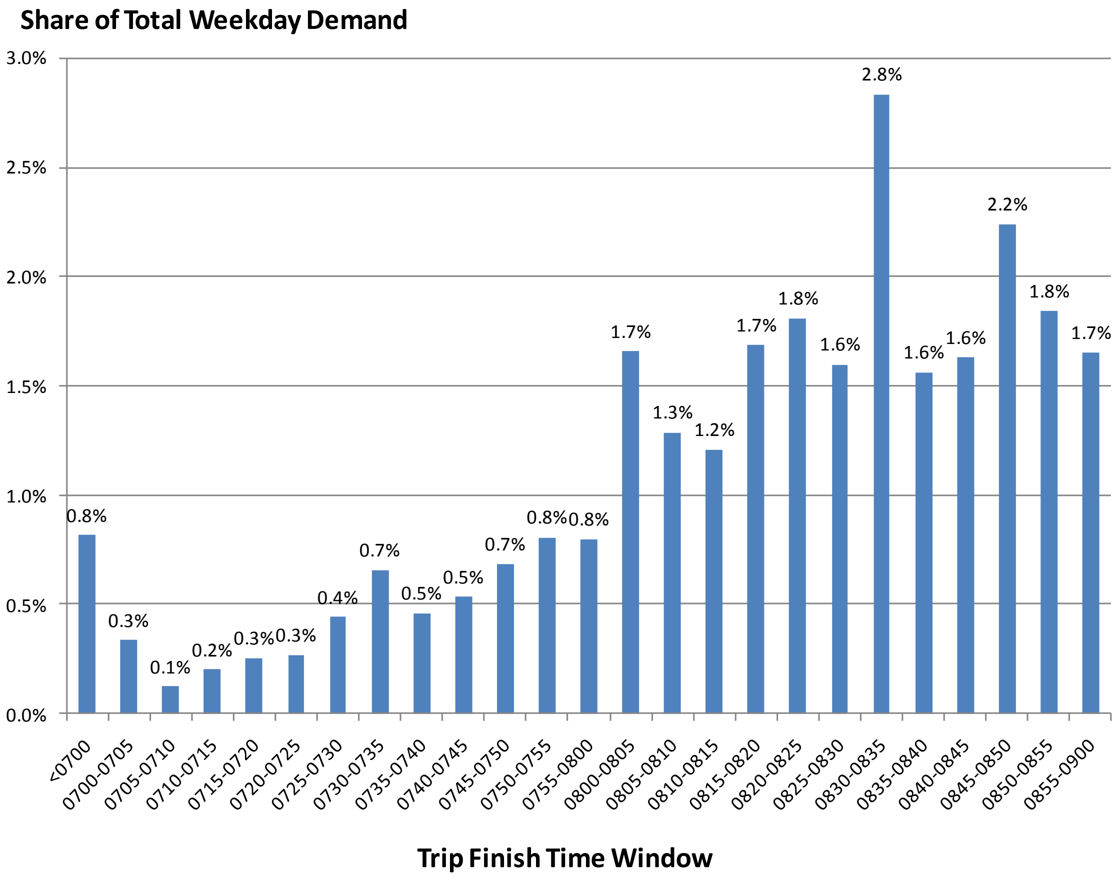
[9] This is based on an analysis of the Victorian Activity Travel Survey (1994 to 1999) The Transport Research Centre (2001). User Manual Volume 2 Coding Frame: A companion document to the VATS94-VATS99 databases. Melbourne, RMIT University.

will not have occurred in this critical period. Nevertheless it is likely to have had some affect and its main impact on the 7-8 period will also have had some impact on peak loadings[10].

In summary we can conclude the following regarding this assessment of the impact of the program on reducing peak overcrowding:

- The early bird program has encouraged between 2,000 and 2,600 passengers to shift from the peak to pre-peak travel. This has reduced demand in the peak by between 1.2% and 1.5% from previous levels and is the equivalent of between 2.5 and 5 peak train loads of passengers or some 1.5% to 3% of total peak trains.
- Demand growth during this period would have far outweighed this effect. Overloading, passenger discomfort and their views on service delivery all declined after early bird was introduced. Early birds affect was to reduce the scale of increased overloading rather than to create a net reduction.
- Overall it is unclear to what degree early bird has acted to reduce overloading problems because in practice rising demand has increased the problem. It is clear that it has more impact in reducing peak travel in the less critical 7-8 peak hour although this may still be beneficial. Its impact in the critical 8-9 peak hour is less but can still be helpful.

FIGURE 4 : Share and Distribution of Weekday Rail Arrivals – Pre-peak and A.M. Peak (Average 1994/1999)



---

[10] Another interesting observation from this analysis is that only 0.8% of all weekday trips arrived before 7:00 in the 1994-199 period. The Department of Transport has suggested that 5.1% of all ticket ticket validations were made before 7:00a.m. before early bird was introduced. The difference is partly explained by the means of measurement i.e. that 5.1% comes at the start of trips and 0.8% is the end of trips. Nevertheless it is possible that an element of this change is due to peak spreading occurring between 1994/99 and 2007.

Is it worth the costs?

Given that the scale of impacts on peak loading is unclear it might also be difficult to assess the value to money aspects of the program. However some clear indications emerge when reviewing the data.

The financial costs of the scheme are the reduced fares which are around $Aust 6M p.a. which has a Present Value (6% Discount Rate) over a standard evaluation period of 30 years of $89M.

The financial benefits are the effect on peak demand which acts to reduce peak train requirements by between 2.5 and 5 peak train loads of ridership. If it is possible to save 2.5-5 peak train trips as a result (or deploy them to address capacity issues) then this is likely to equate to 2.5-5 sets of rollingstock (since each train does only one peak trip). The current capital cost of a new train set is $Aust20M so 5 sets would save the equivalent of $100M in capital investment and 2.5 some $50M. The average annual operating costs of a peak train is at least $1M p.a.[11] Hence operating cost savings are between $2.5M and $5M p.a. Table 1 shows the resulting financial performance of the scheme based on these assumptions.

TABLE 1: Financial Assessment of the Free Before 7 Program

	Net Present Value (Discount rate 6%, 30 years)		**Notes**
	Range of Benefits		
	Low Peak Impact (2.5 peak trains)	**High Peak Impact** (5 peak trains)	
Program Cost			
Foregone Fare Revenue	$89M	$89M	• $6M p.a. in foregone revenue
Program Benefits			
Reduced Annual Operating Costs	-$37M	-$74M	• $1M p.a. reduced operating cost per peak train saved
Capital cost Savings	-$50M	-$100M	• $20M saving per peak train saved
Sub-Total	-87M	-$174M	
Performance			
Net Present Value	-$2M	+85M	
Benefit Cost Ratio	.98	2.0	

Overall the financial assessment suggests the scheme is either just covering its costs or is covering more than twice costs. Net Present Value (Discount rate 6%, 30 years) of the scheme is between -$2M and +$85M.

An economic evaluation of the project, including the wider user benefits is likely to substantially increase the scale of benefits, have a better benefit cost ratio and a higher positive NPV.

Another perspective on the value of the program is its assessment relative to alternative courses of action. In this context no other alternative means of addressing overloading was possible within the time frame available. Where line capacity is available procuring new trains would have taken 3 to 5 years, where it wasn't provision of new lines would take around a decade (if not more).
These results suggest authorities facing these problems have no choice but to consider programs of this kind. Based on the evidence above the Melbourne early bird program appears to make financial as well as economic and operational sense.

---

[11] This is based on unit operating costs identified in Australian Transport Council (2006). National Guidelines for Transport System Management in Australia - 4 Urban Transport, Commonwealth of Australia. and applied to average kms and vehicle hours per set p.a. in Melbourne

7. SUMMARY AND CONCLUSION

Overcrowding of rail services has now become an endemic problem for many major cities throughout the world. Finding feasible solutions to these issues is a major challenge for transit authorities. Where track capacity is available new trains commonly cost up to $Aust 20M to purchase and often require a procurement period of up to 5 years. Where track capacity is full, new lines can cost $Billions and over a decade long to implement. Since almost all authorities are facing difficult financial pressures cheaper and shorter term solutions are needed.

This paper reviews the performance of a new approach to managing peak overloading of rail services implemented in Melbourne Australia in March 2008. Called the 'early bird ticket' the promotion offers rail passengers free travel on rail services as long as they complete their journey before 7:00a.m. The aim of the program is to encourage peak rail passengers to shift travel to earlier trains thus relieving overcrowding pressure on peak trains.

The research has found that the program costs about $6M p.a. in lost fare revenues and around 8-9,000 passengers use the free early bird tickets each weekday. Some 23% of these passengers have shifted the time of their travel out of the peak or around 2,000 to 2,600 passengers each peak. This has reduced demand in the peak by between 1.2% and 1.5% from previous levels and is the equivalent of a maximum of 5 average peak train loads of passengers or some 3% of total peak trains. Demand growth during this period would have far outweighed this effect. Overloading, passenger discomfort and passengers views on service delivery all declined after early bird was introduced. Early birds affect was to reduce the scale of increased overloading rather than to create a net reduction.

Overall it is unclear to what degree early bird has acted to reduce overloading problems because in practice rising demand has increased the problem. It is clear that it has had more impact in reducing peak travel in the less critical 7-8 peak hour although this may still be beneficial. Its impact in the critical 8-9 peak hour is less but can still be helpful.

Analysis suggests the program pays for itself by relief equivalent to between 2.5 and 5 peak train loads. The financial evaluation suggests a benefit cost ratio of between 0.98 and 2.0 while economic benefits are likely to be higher. When considering alternatives there is no equivalent measure which could be implemented at such a modest cost in such a short time frame.

Finally a number of points are worthy of further consideration in assessing the program into the future:

- Previous research suggested that higher demand shift impacts might be expected in the medium and long term rather than the short term (Passenger Focus 2006). It will be worthwhile monitoring this as the program develops. If higher ridership impacts occur in the medium-long term, the projects financial performance, which is already good, is likely to be improved.
- There is clearly much greater scope to isolate the schemes impact on peak overloading by collating peak loading figures before and after the program was implemented. Unfortunately this information was not available for this review (and would require a great deal of interpretation due to increases in ridership).
- If a 7:00 a.m. threshold for an early bird ticket has limited impact on the critical 8-9a.m. ridership then what impact would a 7:30a.m. threshold have? This would be a worthwhile area for further investigation.
- The analysis in Figure 3 shows substantial changes in loading behaviours which cannot be caused by early bird. Their implication are a shift in demand from the critical 8-9a.m. period to the less critical 7-8 a.m. peak. This is a most interesting and fortuitous trend for managing

peak capacity. Understanding why this is happening might be an excellent first step to further encouraging it.

ACKNOWLEDGEMENTS

The author would like to thank Dr Simon Gaymer of the Department of Transport for assistance in compiling data and both Dr Gaymer and Mr Ray Kinnear for commenting on drafts of the paper. The author would also like to thank the Victorian Department of Transport for providing access to data used in this research. The inputs from the papers reviewers were also of value. This research is an independent view from the author and does not necessarily represent the views of other parties. Any omission or errors are the responsibility of the author.

REFERENCES:

Australian Transport Council (2006). National Guidelines for Transport System Management in Australia - 4 Urban Transport, Commonwealth of Australia.

Center for an Urban Future (2009). Transit Overload: A station-by-station examination of subway ridership growth over the past decade. New York by the Numbers - Economic snapshots of the five boroughs. New York, New York, USA. **March 2009 Volume 2 Issue 1**.

Currie, G. and J. Phung (2008). "'Understanding Links Between Transit Ridership and Auto Gas Prices: U.S. and Australian Evidence' " Transportation Research Record, Journal of the Transportation Research Board, Washington DC **No. 2063, , 2008**: pp. 133–142.

Department of Transport (2008). Track Record - Quarterly Performance Bulletin. Melbourne, Australia, Victorian Government.

Department of Transport (2009). Annual Report. Melbourne, Australia, Department of Transport, Victoria.

Department of Treasury and Finance (2007). Victorian State Budget, Service Delivery, Budget Paper No. 3. Melbourne, Australia.

Eddington, R. (2008). Investing in Transport – East West Link Needs Assessment Melbourne, Australia, for the Government of Victoria.

Faber Maunsell (2007). Demand Management techniques - Peak Spreading - Final Report. T. f. L. a. N. R. for Department for Transport. **April 2007**.

Fearnley, N. (2003). Inventive pricing of urban public transport. Oslo, Norway, Institute of Transport Economics. **TOI report 655/2003**.

Gaymer, S. (2008). Early Bird Initiative - Evaluation Assessment. Melbourne, Australia, Department of Transport, Victoria.

Independent Pricing and Regulatory Tribunal (2008). Review of CityRail fares, 2009-2012 - Transport — Final Report. Sydney NSW Australia, Independent Pricing and Regulatory Tribunal of New South Wales. **December 2008**.

Kearns, S. (2000). "Rail Services in London - Creating a Balanced Network." Transition **No. 10**(The Centre for Independent Transport Research in London, January 2000).

Lahey, K. (2008). Early Train Cmmuters to Travel For Free. The Age. Melbourne, Australia.

McCollom, B. E. and R. H. Pratt (2004). Traveler Response to Transportation System Changes Chapter 12—Transit Pricing and Fares. Transit Cooperative Research Program. Washington DC, Transportation Research Board. **TCRP Report 95**.

National Rail Enquiries. (2009). "Season Tickets - First Transpennine Express - Early Bird." from http://www.nationalrail.co.uk/time_fares/season_tickets (last accessed February 2009)

Neuman, W. (2007). Some Subways Found Packed Past Capacity New York Times. New York, New York, USA.

Office of the Rail Regulator (2008). National Rail Trends Yearbook. London UK, Office of the Rail Regulator.
Passenger Focus (2006). Edge of Morning Peak Travel, http://www.eukn.org/eukn/themes/Urban_Policy/Transport_and_infrastructure/Public_transport/Train_services/Edge-of-morning-peak-travel_1032.html (Last accessed June 2009)
The Transport Research Centre (2001). User Manual Volume 2 Coding Frame: A companion document to the VATS94-VATS99 databases. Melbourne, RMIT University.
Transport for London (2004). Spreading the Peak. London, UK. **May 2004**.
Whelan, G. and D. Johnson (2004). "Modelling the impact of alternative fare structures on train overcrowding." International Journal of Transport Management **2 (2004)**: 51-58.