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REPORTS OF MEETINGS

A REVIEW OF THE GREATER MANCHESTER METROLINK

David Gane, Director, Oscar Faber TPA

Eighteen members and visitors heard David Gane describe the results of a before and after study of the Greater Manchester Metrolink system. Mr Gane was standing in for the advertised speaker, Brian Vaughan, who had been called abroad at short notice.

Metrolink opened in autumn 1992 and runs from Bury to Altrincham with a branch to Piccadilly station. Planning started in the early 1980's for the first UK train system with extensive street running to be opened since the first World War. Most of the route in both corridors is on former BR tracks and it was expected that all traffic on the routes would immediately transfer to Metrolink. The majority of the £120m plus costs came from central government through a s56 grant. [There is a schematic of the Metrolink layout on page 8 of this article.]

The Department of Transport commissioned two studies to monitor the effect of the opening of Metrolink. One of these, on land use changes, is being carried out by Salford University but is not expected to find many changes in the space of only two years. The other, carried out by Oscar Faber TPA, on the impact of the system on travel habits, was the subject of Mr Gane's talk.

The study concentrated on the accuracy of the forecasts, the reasons for differences between forecasts and actual results, reductions in road traffic congestion and, finally, lessons to be learned for future projects.

The study began in spring 1991 when the first "before" surveys were undertaken. "After" surveys were carried out in spring 1993 and autumn 1994, by which time patronage on Metrolink had stabilised. Both stated and revealed preference surveys were undertaken, as well as counts of passengers and of road vehicles. A panel of 1,200 households in the Altrincham and Bury corridors formed much of the interview data. If a particular household moved house during the period of the study its successor in the same house was incorporated into the panel.

Results of Surveys

Table 1 presents the modal share for journeys to Central Manchester prior to the opening of Metrolink. Rail's modal share is comparatively high with that of buses being low.

Table 1: Pre-Metrolink modal shares for movements to Central Manchester (%)

From	Bus	Rail	Car
Bury	6	28	66
Radcliffe	14	33	53
Whitefield	13	21	66
Altrincham/Timperley	2	44	54
Sale/Brooklands	10	52	38

Patronage on Metrolink itself rose quickly to some 15,000 passengers per day by November 1992, and had stabilised at about 19,500 passengers per day by May 1994. Table 2 summarises the main categories of trips by Metrolink and compares this with the original estimates. Whilst the total number of trips is about 4% higher than forecast, individual categories vary much more. Between 1993 and 1994 Metrolink patronage in the Altrincham corridor grew by 30%, compared with only 10% in the Bury corridor.

Table 2: Composition of annual Metrolink patronage (millions)

From	Forecast	Actual (1994)
Bury corridor	5.37	4.78
Altrincham corridor	5.90	5.70
City centre only	0.28	1.00
Sunday services	0.59	0.50
Other trips (concessionary/free)	-	0.70
Overall total	**12.14**	**12.68**

Table 3 gives a breakdown of passengers by ticket sales. The great majority of tickets are sold from machines with period passes only accounting for 8% of passengers.

Table 3: Metrolink patronage estimates in May 1993 and May 1994

Patronage source	Average weekly patronage	
	May 1993	May 1994
Machine ticket sales:		
Monday-Saturday	152,272	182,744
Sunday	9,925	9,484
Metrolink period passes	11,767	20,361
Sub-total	**173,964**	**212,589**
Additional sources:		
Rail ticket to city centre	12,370	15,224
Free school pass	3,650	5,620
Free concessionary pass	4,250	6,648
Free ride/under 5's	6,690	9,082
Other	1,825	2,444
Sub-total	**28,785**	**39,018**
Total passengers per week	**202,749**	**251,607**
Total passengers per annum	**10,218.549**	**12,680,992**

Tables 4 and 5 show the previous mode of those trips now using Metrolink in the Bury and Altrincham corridors respectively. However, it was not possible to distinguish between induced trips and those previously using rail, because of the long period of closure of the rail lines to Altrincham and Bury.

In the Bury corridor (table 4), 10-12% of peak trips to Central Manchester transferred from car, 27-31% from bus and the remainder from rail. In the off-peak rather more transferred from car (16-17%) and slightly fewer from rail. These proportions are fairly similar to the forecasts, but show a rather higher than expected diversion from buses within the corridor outside Central Manchester. Such trips account for about 28% of all Metrolink trips in the Bury corridor.

In the Altrincham corridor (table 5), rather more trips have transferred from car to Metrolink and rather fewer from buses, reflecting the lower initial share of the market held by buses prior to the opening of Metrolink. However for non-central area trips in the off-peak, Metrolink has gained nearly half its patronage from buses, as occurred in the Bury corridor.

Table 4: Sources of Metrolink patronage in the Bury corridor (%)		
Movement/mode	**Peak**	**Off-peak**
Between Central Manchester and:		
(i) Bury/Radcliffe/Whitefield		
Car	12.1	17.5
Bus	26.6	27.8
Rail/induced trips	61.3	54.7
(ii) Besses/Prestwich/Heaton Park		
Car	10.4	16.2
Bus	28.2	25.2
Rail/induced trips	61.4	58.6
(iii) Bowker Vale/Crumpsall/Woodlands Road		
Car	11.1	15.1
Bus	31.5	28.8
Rail/induced trips	57.4	56.1
Within corridor trips:		
Car	8.2	7.1
Bus	23.0	43.1
Rail/induced trips	68.8	50.2

Table 5: Sources of Metrolink patronage in the Altrincham corridor (%)		
Movement/mode	**Peak**	**Off-peak**
Between Central Manchester and:		
(i) Altrincham/North Road/Timperley		
Car	19.9	14.3
Bus	21.6	11.3
Rail/induced trips	58.5	74.4
(ii) Brooklands/Sale/Dane Road		
Car	15.0	14.4
Bus	14.0	22.3
Rail/induced trips	71.0	63.3
(iii) Stretford/Old Trafford/Trafford Bar		
Car	15.9	6.4
Bus	29.8	39.1
Rail/induced trips	54.3	54.5
Within corridor trips:		
Car	8.2	8.6
Bus	23.1	41.7
Rail/induced trips	68.7	49.7

Effect of Metrolink on the Highway Network

Table 6 shows the consultant's estimates of the number of cars removed from certain main roads in the Bury corridor during the peak hour as a result of drivers switching to Metrolink. They represent between 2% and 8% of the inbound traffic on the roads identified, with up to 3.6% in the outbound direction.

Table 6: Metrolink impact on road traffic - Bury corridor - AM peak hour				
Location	**Cars removed**		**% reduction**	
	Inbound	**Outbound**	**Inbound**	**Outbound**
Outer area				
A665	65	15	8.4	3.4
A56	22	24	2.3	3.6
Inner area				
M66	61	11	3.1	1.6
A665	30	5	2.5	0.8
A56	30	5	1.7	0.5
Central area				
A56	20	4	2.9	0.5
A576	75	12	3.7	1.4
A665	68	2	3.4	0.3

Table 7 gives similar data for the average off-peak hour in the Bury corridor where the reductions are under 3%.

In the Altrincham corridor (table 8), the proportion of inbound peak traffic diverted is higher: up to 10% of traffic on the central section of the A56. However, in the off-peak the diversion is less than 2%.

Table 7: Metrolink impact on road traffic - Bury corridor - average off-peak hour		
Location	**Cars removed (two way)**	**% reduction**
Outer area		
A665	28	2.5
A56	21	1.3
Inner area		
M66	31	1.4
A665	14	1.0
A56	23	1.8
Central area		
A56	34	1.8
A576	46	2.7
A665	23	1.3

Table 8: Metrolink impact on road traffic - Altrincham corridor - AM peak hour				
Location	**Cars removed**		**% reduction**	
	Inbound	**Outbound**	**Inbound**	**Outbound**
Outer area				
A56	94	21	5.5	2.1
A560	90	24	7.3	2.6
Inner area				
A56	177	43	7.4	2.7
A5103	123	23	3.2	1.1
Central area				
A56	177	60	10.1	5.0
A5103	123	23	6.6	2.6

Looking at the complete central are cordon, there was an estimated reduction of 1.9% in the total number of cars entering the central area following the opening of Metrolink. The corresponding figure for the off-peak is 0.7%.

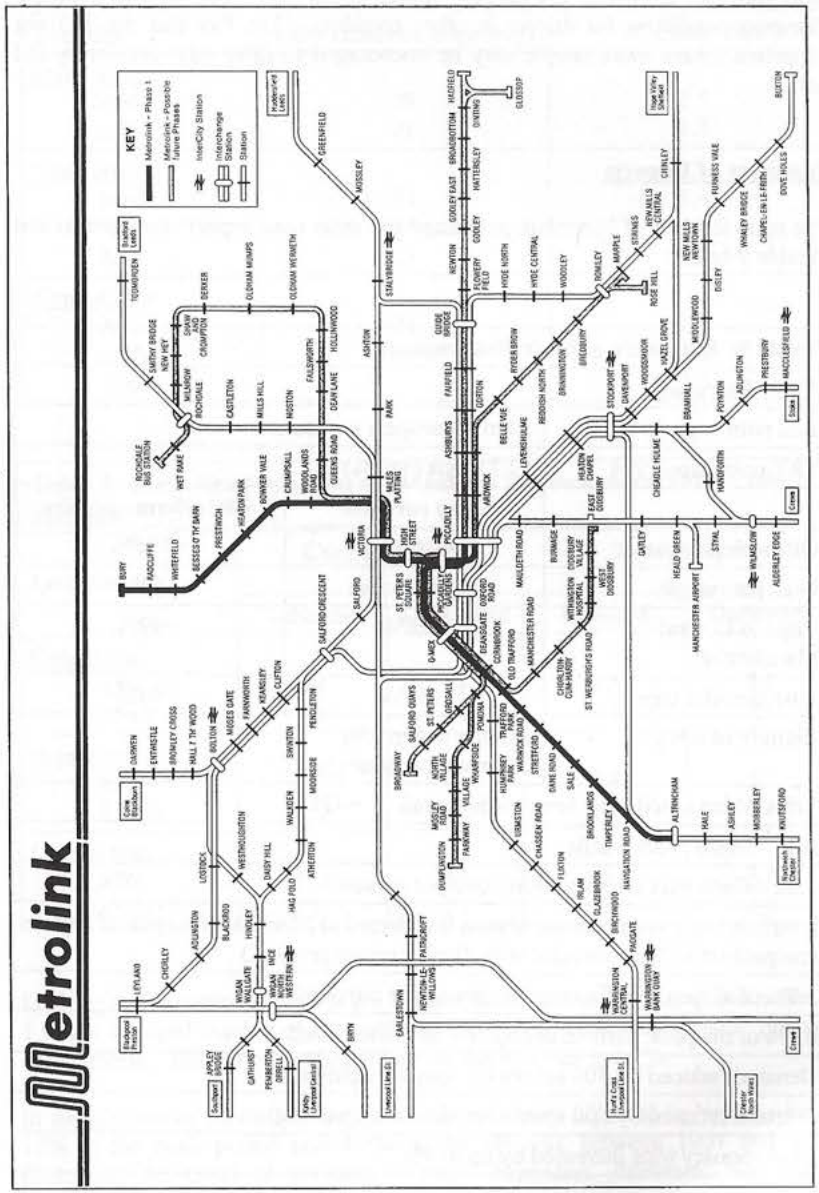
In the absence of Metrolink, traffic would have been expected to increase by 5-10% in the peak period and 4-5% in the off-peak between 1991 and 1994 (following the trend of previous years). Metrolink, therefore, has had a significant turnaround on traffic growth.

The reduction of car trips destined for the central area has meant some 700 long-term and 500 short-term car parking spaces could have been removed without changing conditions for drivers in other corridors. The fact that this has not happened means more people may be encouraged to drive who previously did not.

Summary of Impacts

The main features of Metrolink patronage and main road impacts are summarised in table 9 below:

Table 9: Summary of Metrolink impacts		
(i) Patronage		
Rail patronage 1991	7.6m passengers per annum	
LRT patronage 1994	12.7 mppa (+67%)	
	Bury corridor	**Altrincham corridor**
Off-peak patronage:	+100%	+166%
Peak patronage:	slight decline	+63%
Trips to Central Manchester:	+28%	+49%
Intra corridor trips	+56%	+46%
Entirely new trips:	1 mppa within City 0.5 mppa on Sundays	
Trips which could have been made by rail +47%		
(ii) Main road traffic		
1.32 million cars removed from road per annum		
3 million bus passengers per annum transferred to Metrolink (in spite of intense competition in Bury corridor with direct express services)		
1.9% of all peak traffic entering city centre removed		
0.7% of off-peak traffic entering city centre removed		
Demand reduced by 700 spaces for long-stay parking		
Demand reduced by 500 spaces for short-stay parking		
Discretionary trips increased by up to 9%		



Model Variation

The second part of OFTPA's study was to use the survey data to validate the models used to estimate Metrolink patronage. However, before doing this it is necessary to consider two other issues:

(i) Changes in assumptions made in the forecasts

Several assumptions have in fact turned out to be incorrect. One is that all former rail passengers in the Bury and Altrincham corridors would transfer to Metrolink. In fact, this has not happened, probably because of the much longer than expected closure of both lines (8 months in the case of the Bury line and 7 months for the Altrincham line).

Secondly, it was assumed that Metrolink fares would be similar in real terms to those of the former rail routes. In fact, fares on the Bury line are higher than before and those on the Altrincham line are lower.

Thirdly, it was assumed that there would be no competing bus services. Because of changes in ownership of bus operators since the original proposal for Metrolink, bus operation is much less constrained than it was. Greater Manchester Buses decided to continue operation of the "temporary" replacement service between Manchester and Bury.

Finally, the frequency of service operated on Metrolink is higher than originally assumed. It was to have been six per hour all day, supplemented by a further six per hour at peak times. Now the timetable is ten per hour all day.

(ii) The specification of the models

The forecasting procedure actually used two separate models with stated preference data, one for transfer from bus and a second for transfer from car. The assumption about transfer from rail meant that no modelling was done on this aspect, and neither was concessionary travel modelled. OFTPA derived a new model for car/tramlink transfer, using revealed preference data.

Overall Metrolink patronage is 4.3% higher that forecast (table 2), but this was largely because concessionary travel was not forecast at all. Travel in the Bury corridor is 11% lower than forecast, largely because of bus competition, but City Centre patronage is three times more than expected.

Re-running the original model with the hindsight of events gives results much closer to what actually happened with, for example, forecast trips to and from Central Manchester being within 5% of the actual.

On the other hand, forecasting of non-central area trips is not improved; in particular, trips with a destination within in Bury and Altrincham are underestimated by 40% to 100%. It appears that a model calibrated on central Manchester data does not reproduce what happens elsewhere in the corridors satisfactorily.

Conclusions

The main conclusions to be drawn from the study are:

(a) Metrolink is perceived as a superior form of travel to the previous heavy rail.

(b) Transfer from bus and car is less significant than from heavy rail.

(c) Metrolink has been particularly successful in the off-peak period and for central area trips.

(d) It is unwise to use models outside the area for which they have been calibrated.

(e) It is desirable to apply sensitivity tests on as many input assumptions as possible.

Discussion

Ian Gilliver (WS Atkins) asked whether the speaker could elaborate on the extent of non-user benefits of Metrolink, and whether the road space vacated by drivers transferring was subsequently filled by other vehicles. The speaker replied that the method used made it impossible to determine whether there has been a subsequent shift of road traffic between corridors, but he doubts that Metrolink creates a genuine effect of removing a certain amount of road traffic.

Andrew Spencer (Independent consultant) asked whether the models used were based on a fixed trip matrix and, if so, whether a competitive type of model would be preferable. The answer was that although the models did have a fixed matrix, they can reproduce the current situation fairly satisfactorily, and a completely different type of model is not required.

Jo Martin (Cambridgeshire) asked a more general question about why people think that light rail is preferable to heavy rail. Mr Gane thought that the reasons are mainly the higher frequency and better reliability. Although some car drivers thought that Metrolink stops are too frequent and that it does not have sufficient priority over other traffic.

Roland Niblett (Colin Buchanan) followed up this answer by asking whether better access to Manchester city centre is also important. The speaker thought this was probably the case.

The speaker had earlier referred to stated preference "games", and Jonathan Rees (Accent Marketing & Research) asked whether the fares used in these games represented the actual fares in force. The answer is that they lie well within the range of fares in the questions and were also related to the individual type of correspondent.

Peter White (University of Westminster) commented that the modelling of demand for the Hong Kong metro, like that for Metrolink, failed to forecast central area trips properly.

In answer to a question from Ian Gilliver, Mr Gane said that the zoning system was based on Greater Manchester's existing zoning system which was drawn up such that each zone was centred on a Metrolink station, with a maximum walking distance of ten minutes. The average population in each zone was about 6,000

Finally, Peter Collins (London Transport) noted that the overall forecasts are very close to the actual and wondered whether more sophisticated models would be worthwhile. He asked about the competing express buses to Bury. Mr Gane said that these buses have definitely captured some of the former rail traffic because even though the buses are slower, they are also cheaper. However, Metrolink's own peak fares were initially set too high and had to be reduced slightly.

Report by Roland Niblett, Colin Buchanan and Partners

FREIGHT TRANSPORT: ENVIRONMENTAL IMPACT OF SUPPLY CHAIN RE-DESIGN

Professor James Cooper, Cranfield Centre for Logistics and Transportation

Professor James Cooper based his paper on the results of a two-year study carried out at Cranfield University and supported by the ESRC. The presentation concentrated on an assessment of the link between supply chain re-design by companies and the trend toward goods being carried longer distances.

In the UK, average length of haul for goods has doubled during the last 30 years, a trend also found in other European countries. The change in the length of haul is not uniform for all types of goods. For example, the length of haul for food, drink and tobacco has increased considerably over time, while that for crude minerals has remained constant.

Two key factors contribute to supply chain re-design and to the increase in length of haul:

Development of Focused Factories

The move toward focused production - factories specialising in particular product lines - has tended to increase the distance between production locations and markets. This continuing trend has significantly contributed to increased length of haul for goods, and tends to create more environmental pollution by transport. There has also been a pronounced trend to concentrate stockholding into a smaller number of warehouses at a European level. In general, centralisation of stockholding will lead to an increase in transport movements.

Changing Demands of the Market Place

A key factor in the geographical extension of supply chains is the quest for better quality and a wider variety of goods. Buyers today are seeking products from further afield, and are prepared to pay the increased costs of delivery. It is similar in the case of variety: consumers want more choice and company buyers are prepared to source the right kinds of products from distant locations. Within consumer markets, the search for variety and quality has implications for fresh produce distribution and what were once considered exotic fruits and vegetables are now available throughout the year. In the industrial sector, the search for quality can lead to longer distance movements as manufacturers seek out firms with specialist skills.

Transport prices have fallen in real terms over the past four decades. If prices were to be increased (recommended by the Royal Commission on Environmental Pollution) it is interesting to consider the implications for supply chains. Research at Cranfield suggests that the impact of transport price increases will vary significantly according to which industry sector is considered. For instance, although it could become less attractive to transport agricultural products over long distances, components for the computer industry will be largely unaffected.

However, significant price increases would in general lead to some further consideration of the scope to develop more localised supply chains and this in turn could reduce the choice and variety to which consumers have become accustomed.

Some elements of logistics strategy already contribute to the reduction in environmental impacts through reduced transport needs (for example, working with supply chain partners to reduce empty running). In future the challenge for business would seem to be to seek ways to retain the current benefits of supply chain performance while aiming to reduce the environmental impact of its transport requirements. This may mean switching from road to more environmentally-acceptable modes of transport such as combined transport. The research at Cranfield has contributed to understanding the supply chain dynamics which create additional transport demand, highlighting the difficulties in achieving environmentally-friendly supply chains capable of delivering the kinds of goods we have come to expect as part of everyday life.

Discussion

Peter White (University of Westminster) opened the discussion by asking how significant environmentally-based taxes would be in changing the costs of operating transport fleets. JC replied by saying that transport costs are generally seen as low in comparison to other benefits achieved through supply chain re-organisation. Some research by Alan Mackinnon of Heriot Watt University suggested that transport costs could double due to supply chain changes.

Stuart Cole (University of North London) suggested that just two distribution locations, at either end of the Channel Tunnel, are required. JC indicated that political considerations are also very important in location decisions. For example, OSRAM being owned by a German parent company wishes to enjoy German tax relief. Phillips on the other hand are Dutch and would be sensitive to job losses in the Netherlands, if these were imposed as a result of facilities being located elsewhere.

Don Box asked if efficiency of transport is a crucial issue and should emphasis be placed on efficiency rather than cost. JC stated that countries tend to develop

certain types of niche markets with, for example, Scotland and Ireland attracting companies because of their educated workforce, despite being peripheral to mainland Europe.

Don Box also enquired whether, if traffic congestion increased astronomically, this would have a big impact on transport costs. JC thought that the impact would be primarily on companies new to their markets, while more established firms would experience a lesser impact.

Ian Gilliver (WS Atkins) asked what opportunities existed for using rail to move freight. JC said that, generally speaking, intermodal traffic requires operators to develop their market and service customers.

Speaking personally, a Eurotunnel employee suggested that rail operators do not have much control over service reliability which means that it is difficult for such operators to compete for traffic. Competition, therefore, represents a dilemma for freight operators since they may be marketing services, the reliability of which they cannot guarantee. JC thought that the fragmentation of the national railway into infrastructure and train operating units may mean investment in, for example, search and trace systems not being made. However, the spur of competition may bring some advantages to rail operators and their customers.

Compiled by Michael Browne (University of Westminster), based on the report from which Jim gave his talk, and Martin Lawrence (Oscar Faber).

It is the Group's usual practice to produce a meeting report that has been checked by the speaker. Sadly, Jim Cooper was diagnosed as having cancer a few weeks after giving this talk. Treatment was unsuccessful, and he died in August 1996. Having known Jim over twenty years first, as a student, and then as a colleague at the (then) Polytechnic of Central London, before his appointment to Cranfield in January 1992, I would like to express sympathy and condolences to his family and colleagues on behalf of the Transport Economists' Group. An obituary appeared in the January 1997 issue of *'Transport Reviews'*.

Peter White, Chairman

THE COMPETITIVE ROLE OF SECONDARY AIRPORTS IN MAJOR CONURBATIONS

Nigel Dennis, Transport Studies Group, University of Westminster

A number of Europe's major conurbations are served by several airports with, in most case, one developing as the dominant airport and others fulfilling more specialised roles. The growth of secondary airports was due to the increasing congestion occurring at the primary airport. This study defined secondary airports within 70 km of the major airport and with some scheduled services. The secondary airports studied are given in table 1 below:

Table 1: Secondary airports and relationship with major airport

Secondary airport	Passengers (thousands)	Distance to	Major airport	Passengers (thousands)
Belfast City	846	20 km	Belfast Int.	2,180
Edinburgh	2,709	70 km	Glasgow	5,014
Prestwick	10	40 km	Glasgow	5,014
Teesside	318	60 km	Newcastle	2,076
Liverpool	460	40 km	Manchester	12,832
East Midlands	1,372	50 km	Birmingham	4,032
Antwerp	n/a	30 km	Brussels	10,032
Rotterdam	315	40 km	Amsterdam	20,770
Cologne	3,775	60 km	Düsseldorf	12,992
Dortmund	300	50 km	Düsseldorf	12,992
Berlin Tempelhof	1,100	10 km	Berlin Tegel	7,100
Milan Malpensa	3,559	50 km	Milan Linate	9,469
Bergamo	336	40 km	Milan Linate	9,469
Florence	497	70 km	Pisa	1,002
Stockholm Bromma	474	40 km	Stockholm Arlanda	12,466

Generally, secondary airports have much lower total passenger flows and passengers per flight than the primary airport, although there are a few exceptions on the second measure.

The Role of Secondary Airports

Secondary airports perform roles such as:

- Overspill from primary airport (e.g. Milan Malpensa, Cologne/Bonn) where most secondary airports have spare capacity.

- Domestic services (e.g. Belfast City, Stockholm Bromma) where secondary airports can exploit its time saving function.
- Cross-water services (e.g. Liverpool, Rotterdam, Antwerp) where these airports have a specialised role.
- Charters or low cost services (e.g. Prestwick) at airports further from population centres, therefore not attracting both business and leisure traffic.

It is likely that secondary airports could be operated as an outlying terminal of the main airport. For example, there are proposals for Redhill as Gatwick East, Northolt as Heathrow North (although runways conflict with those at Heathrow) and Liverpool as Manchester's third terminal. Möchengladbach is being marketed as the new regional airport for Düsseldorf, advertising the advantages of unlimited slots and favourable user charges, and linked to Düsseldorf airport by air and bus shuttle.

Impact of Secondary Airports on Passenger Demand

Generation of new demand may occur as well as spreading demand For example, Belfast City provides a role for new carriers with routes to Jersey and Europe.

Hub links have become important in the United States as part of the new competitive strategy since deregulation. Los Angeles area traffic has grown rapidly at secondary airports, providing additional links to other hubs. Table 2 indicates the growth in traffic 1978 to 1993.

Table 2: Passenger traffic at Los Angeles Area Airports, 1978 & 1993

millions

	1978	1993	% growth
Los Angeles	33.0	47.8	45
International	2.0	6.2	210
Ontario	2.4	6.1	154
Orange County	n/a	4.3	-
Burbank	n/a	0.7	-
Long Beach			

Similar hub links from secondary airports exist in Europe as shown in table 3.

Table 3: Examples of hub links from secondary airports in Europe

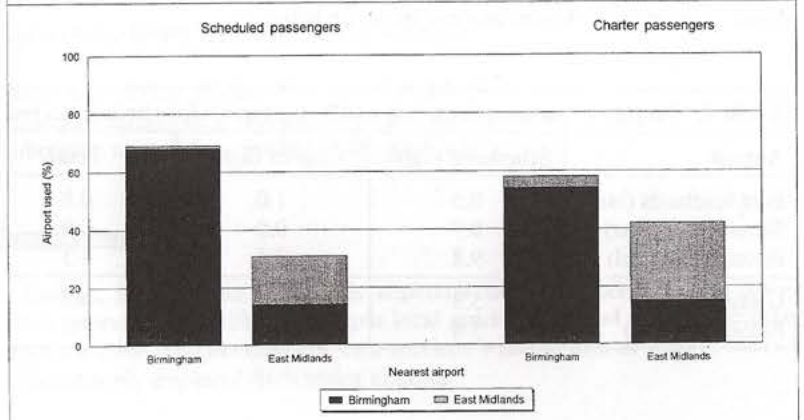
Secondary airport	Hub Link	Airline
Cologne/Bonn	Frankfurt London Heathrow Paris Charles de Gaulle Vienna	Lufthansa British Airways Air France Austrian
Antwerp	Amsterdam London Gatwick	KLM British Airways

Surface Access and Catchment Areas

The catchment areas for secondary airports differ from primary airports for scheduled and charter passengers. Two examples were presented: for the Midlands (Birmingham and East Midlands airports) and for the Scottish Lowlands (Glasgow and Edinburgh airports). (Note the remainder of passengers up to 100% travel to other airports in the UK).

Midlands (figure 1): People whose nearest airport is Birmingham, use that airport almost exclusively for both scheduled and charter flights, with a very small proportion using East Midlands. Very few people nearer the major airport use East Midlands (secondary airport). East Midlands seems to be more competitive for charter flights.

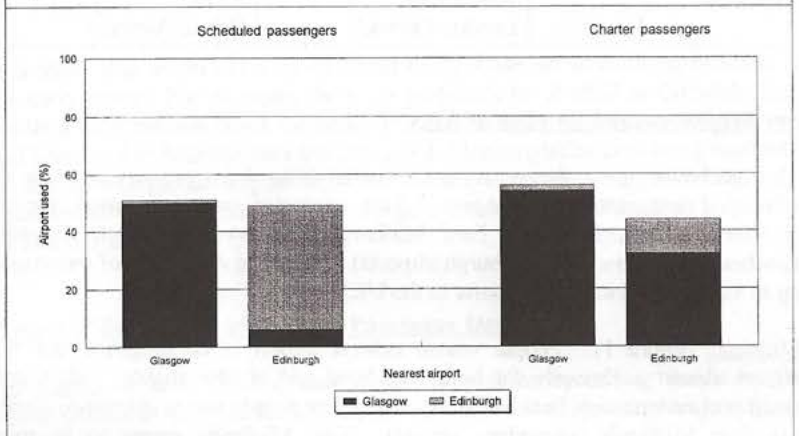
Figure 1: Use of Birmingham and East Midlands Airports



Compiled from CAA 1990 Airports Survey data supplied by SH&E

Scottish Lowlands (figure 2): A similar analysis was done for Glasgow (primary) and Edinburgh (secondary) showing that Glasgow dominated the Glasgow catchment area and had the largest share of charter passengers in the Edinburgh catchment area. Scheduled passengers in the Edinburgh catchment area mostly use Edinburgh airport.

Figure 2: Use of Glasgow and Edinburgh Airports



Compiled from CAA 1990 Airports Survey data supplied by SH&E

Public transport access

Although secondary airports may have good locational advantage, these benefits are often eroded by poorer public transport access. Table 4 shows the public transport mode share for two secondary airports compared to their primary airport, indicating the higher mode share at the latter.

Table 4: Percent of passengers using public transport for surface access

Airport	Scheduled flights	Charter flights	Total
East Midlands (bus)	0.5	1.0	0.8
Birmingham (bus)	0.9	0.9	0.9
Birmingham (rail)	9.8	2.5	6.3
Glasgow (bus)	5.3	3.5	4.8
Edinburgh (bus)	5.4	4.9	5.3

Airport Charges

Secondary airports tend to have lower charges than primary airports, thereby stimulating demand, although there are some notable exceptions as indicated by table 5.

Table 5: Comparison of airport charges (for turn-around of a BAe 146 with 50 passengers)

Secondary airport	Total charges (£)	Major Airport	Total charges (£)
Edinburgh	819	Glasgow	830
Prestwick	760	Glasgow	830
East Midlands	1,069	Birmingham	960
Antwerp	393	Brussels	744
Cologne/Bonn	1,070	Düsseldorf	1,080
Berlin Tempelhof	1,110	Berlin Tegel	1,110
Stockholm Bromma	740	Stockholm Arlanda	660

Environmental Issues

The issues associated with secondary airports give varying environmental impacts. For example, small regional aircraft usually create less noise but they carry fewer passengers with, potentially, more aircraft being used. Added to this, successful secondary airports are usually located much closer to urban areas than the major airport.

Typical noise levels 150 metres above ground are:

Old jet aircraft (e.g. Boeing 727)	105 dB(A)
Modern jet aircraft (e.g. Boeing 757)	90 dB(A)
Turbo-prop aircraft (e.g. Fokker F50)	80 dB(A)

Future Prospects

In Europe, links to hub airports is important to allow access to world-wide networks and will be able to underpin local services. Added to this, secondary airports are likely to develop low cost services with the charter market likely to be increasingly displaced from major airports.

There are many small airports near major cities in Europe that could play a greater part in meeting the demand for air travel. Operations could be expanded in two ways, led by airlines:

(i) Through more links to major international hubs, giving access to wider networks, increasing passenger choice and provide competition to direct services from the major airport. This would particularly benefit passengers in the immediate vicinity of the secondary airports.

(ii) Offer low cost services that can attract demand from a wider catchment area by competing on price.

To facilitate an increase in services, airport charges need to be competitive in relation to major airports, particularly for small aircraft. Charges at secondary airports in Europe are often among the highest in the world.

Surface access needs to be improved and public transport links, although relatively unimportant at present, are likely to offer an increased advantage to major airports in the future. The best solution for secondary airports is to tap into an existing rail or bus corridor as they cannot justify dedicated high frequency connections themselves.

The environmental aspects of developing additional airport facilities may also raise concern but the use of quiet turbo-prop and small jet aircraft can help offset this, as can the ability to reduce surface journeys. Although a greater use of secondary airports will inevitably lead to the noise and pollution that air transport creates being more widely spread, so will be the economic benefits that better access to air services can bring.

TEG NEWS

NOTICE OF ANNUAL GENERAL MEETING

To be held on 19 February 1997
at 5:30 pm
Transport Studies Group
University of Westminster
35 Marylebone Road, London NW1 5LS

MEETINGS PROGRAMME 1997

All meetings are held at 5.30 for 6pm in University of Westminster, 35 Marylebone Road, London NW1 5LS. The building is on the south side of Marylebone Road, close to Baker Street Underground Station. Visitors to the building should sign in at the entrance on Marylebone Road.

15 January	**Transport to the Millennium Exhibition.** Roland Niblett, Colin Buchanan & Partners
19 February	**Economic Implications of Parking Policy.** Mark Vallely, Transport Studies Group, University of Westminster
19 March	**DBFO Road Schemes.** David Clements, W S Atkins
16 April	**The Future of Rail Freight.** Julie Clarke, Director, Railfreight Distribution.

MEMBERS LIST NOVEMBER 1996 - ERRATA & ADDENDUM

My sincere apologies for the errors that have found their way into or been perpetuated in the most recent Members List. I fear that I have yet to find a foolproof method of incorporating amendments to this list, but please continue to report these as they affect you as individuals and use the Membership Renewal form to confirm any changes which have occurred during the past year. My greatest embarrassment is that my new 'phone number has not been recorded!

The amended entries are:

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The Group congratulates Prof. Richard Allsop on being awarded the OBE for services to road safety and traffic management in the New Year's Honours.

Don Box
January, 1997

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