

# A road too far

*Anne Batchelor*

## **Anne Batchelor's evidence to the public inquiry into the proposed Birmingham Northern Relief Road**

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I wish to object against the proposed official route of the Birmingham Northern Relief Road on personal and environmental grounds, and the proposed further holistic impact from the increased volume of traffic on ourselves, our cottage and garden, and our immediate environment at Curdworth.

We live in a 350-year-old period cottage with oak beams which was my family home where I grew up. Both my husband and I love it and do not want to leave. We have a big garden full of trees, an orchard, flower beds etc., and to us, our beloved little cottage and garden is a perfect place to live.

I taught locally at the village school for 17 years and our home is perfectly situated for us, just on the edge of an attractive village, but within walking distance of the community where we are involved in village life. We are quiet-living, professional people who work very hard and enjoy living and relaxing in this secluded and attractive spot. We garden, mostly organically, and spend a considerable amount of time at home enjoying the outdoor country life.

From January 1984 to October 1985, through no fault of ours, our personal lives were involved in great trauma. We endured many aspects of emotional, physical and social stress and at times our home life became intolerable. Our home was battered by noise vibration, both inside and outside. We endured weeks of mud outside our gateway, breathed dust that made us ill, lost sleep, couldn't get any peace, felt isolated, and lived in a constant battlefield of intense activity of concentrated construction work.

The summer of 1984 was a beautiful one and we had to remain indoors, with windows shut and at times we couldn't tolerate any of the rooms in our house. Later (September 1985) we had problems with flooding in the house. There was a stage when no one could get in to see

us and even one day, after a six mile detour, the postman failed to deliver the letters. Finally, we had to agree for our post to be delivered to the school. For several weeks the dustmen refused to call because of the state of the access, and on at least two occasions I arrived up to three hours late for work because I couldn't get out of my road. There were many occasions when we couldn't get the car home.

You cannot go through the experiences we did without learning from it and being changed by it. It is a period of our lives we will never forget and has left its personal scars, even today, reflecting on that time, and it is the reason I am here today.

The reason for our 18 months of misery was the building of the M42 on our eastern boundary, next to our house, with a major site office thoughtlessly planned opposite our home.

In October 1983 following a request from ourselves, the resident engineer spelt out the implications for the cottage – and for us. Land was to be taken under compulsory purchase and we felt there was no way we could continue to enjoy Croft Cottage.

In January 1984, after requesting a meeting with Department of Transport (DoT) officials, two officials came out so that we could find out more information. The work was due to start in May. There was to be no noise or visual screening for us, no safety barriers and if a vehicle lost control or caught fire, our only protection was the post and rail fencing that was to be erected in place of our trees and hedges. The noise levels would be in the red shading – over 76 decibels. The only thing was for us to sell to the Department at their price. The officials' attitude was uncaring, unhelpful and very heavy handed, and my husband asked the officials to leave. We were devastated, but they went away laughing. We had arranged a dinner party that night and although our guests arrived, I was unable to cook the dinner. I cried for three days and three nights and didn't believe that a department, acting on behalf of our country, could be so rotten.

We took advice and appealed to the Minister, Mrs Chalker, for some noise screening and hoped that we could somehow live through this proposed nightmare situation. We also requested the district valuer to give us a selling price. When it came through in April, as the final offer, it was such a low offer that we felt everything that we had worked for was being taken away from us and we couldn't even purchase a semi-detached house in the village for the money offered. We felt we were left with no choice but to stay and try and fight for the sound screening. In the First Public Inquiry Inspector's report 16.4.11.5 Mr Kavanagh describes our decision to stay as "brave", but it was more of a "Hobson's choice" situation if we were not to be financially ruined.

The Minister was kind and allowed us some screening and gave an undertaking for provision to be made for some earth mounding on the property itself. We did get more earth mounding by later negotiation. In addition, she gave us a year's grace for the DoT to purchase after the road opened, but that written undertaking was not honoured by the incoming Minister, Peter Bottomley.

In May, work began and that was the worst time in our lives so far, for my husband and myself. We were entitled to a certain amount of secondary glazing but that took another three months before it was installed. We were engulfed with a major site, involving a new bridge, which took 18 months to build, site toilets, strategically placed opposite our front door, and later we had a concrete batching plant and stone crusher. At one stage during a massive movement of soil there were eight different movements of slow lorries up and down the lane, outside our home.

On day three, the attitude of the engineering youngsters was provocative. At 8.00 a.m. surveyors were all around my car, parked outside the gate of my house, with rulers and theodolites, etc. The youngsters didn't speak or smile (in a community where everyone stops for a chat). By the end of the day, massive pumps had been left on outside the house, left on all night (this was an area of natural springs). A security guard visited every hour and woke us up with his parked diesel engine running outside the cottage and we had hardly any sleep for three weeks.

Originally, we were told that strict times and noise levels had to be adhered to, but these tended to be ignored and often deliveries would take place by sub-contractors etc. during the night. Machinery would be started up at 5.30 a.m. and go on till late. We questioned the senior resident engineer about the noise levels and noise monitoring and he told us that the law did not necessarily apply to us

because of our position relative to the site and said, "I told you it would be hell".

Work continued to increase around us and areas were being opened up on five sides of us – all around us and overhead. My husband was a police officer on shift work and sleep was very difficult. There was nowhere in the house where we could be free of noise. Our kitchen was flooded over a period of time and our spring in the garden that fed our watercress beds stopped and no effort was made to reinstate it.

That summer of 1984 was a wonderful summer weather-wise, and the dust made us ill but when the rain came the mud drove us mad. The road was frequently thick with mud and we couldn't keep the house, our clothing or our cars reasonable. Our access was frequently denied to us, we couldn't get in, get out, go to work, get home or entertain at home. Tradespeople could be diverted for several miles and still fail to get through. Nobody could get to see me on my birthday and there were times I couldn't even get through, even on foot, to feed the puppy at lunchtime.

My car got hit by a tarmac machine and the door was damaged and wouldn't close. The foreman said eight men had witnessed the incident and I had opened the door on to the machine, but luckily for me a local councillor had witnessed the incident from the bridge and their attitude changed.

The constant vibration of the machines shook the inner walls and made our big wall clock shake. Cracks appeared in the cottage walls and the flooding in the kitchen hadn't been sorted out. We felt that we had had 18 months of personal bombardment.

We were unlucky on our site that we had a site agent who was very ruthless and didn't care about us at all. He obviously had a big organization to run, targets to meet and if he were ahead of contract, the company profited well. The work was completed eight months ahead of schedule. The resident engineer on site was pleasant but appeared to be inexperienced. We found the top manager of the contractors at Water Orton very helpful but it was all confrontational management. We learned to question, to fight, to complain and get angry, to threaten with the press, to talk and negotiate in order to get treated "properly" and basically we did survive. When the secondary glazing was installed, we did get our sleep, but the whole experience left us battle scarred and very traumatized.

I am a deputy teacher and a professional, and I refused to allow my personal difficulties to compromise my work,

apart from the times I couldn't get through, but the whole business took its toll. I lost two stones in weight in the 18 months. My hair fell out in clumps and my hairdresser diagnosed alopecia, a stress-related disorder.

Towards the end I wrote to Mrs Chalker, Minister of State, with a view to the Department using my journal as a training file to improve the lives of people like us, living under a motorway scheme. She came to my school, saw the award-winning project we had done relating to the motorway and talked to me about the difficulties we had had. She asked why I hadn't contacted her earlier, listened courteously to suggestions and took notes. From that time on we had no further problems.

The road opened in December 1986 and we got on with the business of living again. However, by the following September we were in trouble again. We had endured all that, then we heard that the Birmingham Northern Relief Road was coming through the cottage.

We went to the first public inquiry and then much later we learned that the new road would all be the other side to us and the cottage would stay. This sounded wonderful, but, as we found out more, we believe that this will work out worse for us than the original idea.

We understand that we have no automatic right to sell to the Highways Agency. My husband and myself feel we could not go through that trauma again. The thought of those earth movers arriving again makes me feel physically sick. We are older now, know that we came psychologically near the edge last time and have an idea what would be involved.

A representative for the Highways Agency has told us that it will be nothing like as bad as last time, but we know there will be disturbance – it's obvious. The noisy intrusion from the M42 is just tolerable and we work in the outside environment of our house when we know the road will be quieter. The increased volume of the Birmingham Northern Relief Road will make that impossible. Therefore, very painfully, we are having to face the prospect of leaving our beloved Croft Cottage and also our lovely village.

We are very unlikely to sell the house at its proper competitive market value ourselves and we understand that the present system requires the house being put up for sale and advertised for a period of five months at a cost of around £1,000 to ourselves for agent's fees and advertising, after which time we can apply to the Highways Agency for discretionary purchase. After all we have been through, to have people walking through

our home as a paper exercise, when we are still under great stress on the uncertainty of our whole future, will only add to the psychological strain.

We are now in our fifties and have lived with this blight for 15 years and know that the Highways Agency etc. has all the cards and we are very concerned for our future wellbeing if this road is permitted to go through. To purchase a similar property in a different village would involve a competitive market and with our experience with the District Valuer, we cannot see the money matching so we anticipate losing out heavily.

### **Environmental impact studies**

I have examined the Highways Agency's work on the environmental impact study and believe the environmental directive has been breached.

I believe a balanced study should have taken into account the impact on local people, people like us who have suffered so already. That does not seem to have taken place. To have to make the kind of sacrifices we have once in a lifetime is hard enough, but no one should have this happen to them twice. We've had our share. Also I feel the study should have considered the impact on the villagers. This does not appear to have been done.

I wish to cross-examine the Highways Agency, or whoever is involved, about this and find out, when planning routes, what considerations are taken into account regarding the stresses that ordinary people like us are put under in these circumstances.

I also know, as an individual living by a busy motorway, about the impact of the last road. Now I get noise, pollution, dirt. I get an accumulation of black, oily substances on my window frames, patio table, bird bath etc., if left unwiped for a couple of weeks, which didn't happen pre-motorway. I never get a simple cold now, nor my husband, it always develops into a chest cold and I've never smoked so it isn't that. The roads around my village are always crowded. On certain days, at morning's rush hour, it can take me up to 30 minutes to get around Dunton Island to begin my journey to work and this is pre-construction. I believe our countryside and our villages are Britain's little gems, and if they are invaded by road development, then we have lost something very special. I haven't yet seen any evidence of environmental impact regarding these matters.

I am a keen environmentalist myself, and our garden and its surroundings are very rich in wild life. I saw what happened to the countryside when the M42 was put

through and now that this area appears to be recovering we are about to destroy it again. I watched sadly as beautiful rare orchids were destroyed from the ancient peat bogs next to the cottage and the old oaks were felled. If the Birmingham Northern Relief Road is built, I assume the process of destruction will continue. What will happen to the new young trees including the expensive, slow-growing oaks now ten years old? Will they be destroyed when the bridge comes down?

I am also very concerned, if we have to stay, about the cottage and the vibrations from the destruction of the bridge (will explosives be used?). Our cottage is well over 350 years old and has no foundations in the old part and has suffered cracking before from road construction and it isn't very pleasant worrying whether you will have anything left to live in at the end of the day.

Finally, we ask the inspector to please consider our plight and that consideration be given for the re-routeing/

rejection of the proposed Birmingham Northern Relief Road so that we do not have to suffer any more from further motorway building.

Also that in practice, the Highways Agency, consulting engineers and main contractors, and people who will profit from the road, consider the human rights and comfort of people like ourselves when planning and constructing a motorway, for I believe the mark of a civilized country is the way the mighty and powerful care morally, or not, about the rights of the weak.

In public statements we have been told that no alternative exists to alleviate our circumstances. I have to ask why not? If this infrastructure is so vital to the wellbeing of the development of this country and will harness considerable financial reward for some, why can't more humane procedures and support be given to people like us – innocents caught up in this nightmare situation?

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Anne Batchelor is a member of the public who gave evidence to the public inquiry into the Birmingham Northern Relief Road in the UK in September 1995.

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# Land use impact costs of transportation

Todd Litman

**Describes a framework for incorporating land use impacts into transportation planning and policy decisions**

## Introduction

There is growing concern about the total costs of transportation. Transportation professionals and the general public desire a vocabulary for discussing these costs, and tools for incorporating them into decision making. Of special concern are environmental and social externalities. The fields of geography, urban economics, land use planning, landscape design, and environmental studies are acutely aware of the impacts transportation can have on land uses, but this information is seldom incorporated into transportation planning and policy making. Transportation professionals have little guidance for evaluating such impact, leading to inappropriate planning decisions and conflicts with politicians and the general public.

This article suggests that a general category of *land use impact costs* should be used for evaluating transportation decisions. It examines how transportation decisions impact land use and how land use impact costs can be evaluated. It describes a framework for incorporating land use impacts into transportation planning and policy decisions.

## Transportation as a cause of land use changes

Transportation decisions impose direct and indirect land use impacts. Direct impacts result from land used for transport facilities, including paths, roads, parking and terminals. Indirect costs include the overall effects that transportation has on development patterns.

### Direct impacts

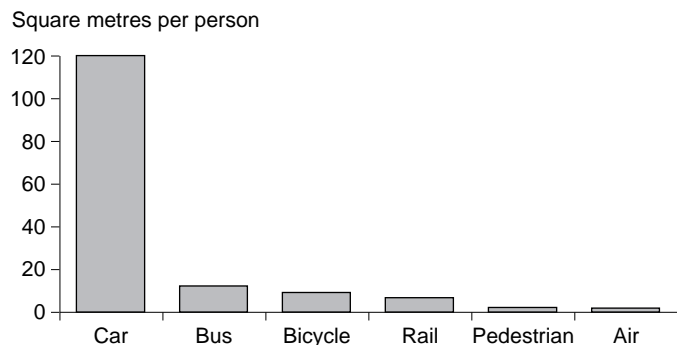
The land required per passenger varies significantly by mode, as illustrated in Figure 1. Walking cities typically devote less than 10 per cent of land to transport, while automobile-oriented cities devote 30-50 per cent for roads and off-street parking (Renner, 1988, p. 46).

Urban economists have long recognized that increased driving requires more land for roads and parking, leaving less land available for other purposes (Gabszewicz *et al.*, 1986). This is not considered a problem if land outside the urban area is assumed to have no significant value because urban expansion compensates for this loss. But, since urban expansion imposes external costs, as discussed later, this is a false assumption.

### Indirect impacts

Transportation decisions greatly affect development patterns (Hanson, 1986). Automobile use encourages urban sprawl by increasing the portion of urban land needed for roads and parking, by degrading the urban environment, and by accommodating low density development at the urban periphery. Many of the complaints people express about urban environments are actually problems resulting from increased automobile ownership and use: traffic congestion and noise, parking problems, unfriendly neighbourhoods, and few areas left for children to play (Appleyard, 1981). As a result of these impacts, individuals face increased incentive to flee cities for suburban and semi-rural (exurban) residences. Low density suburban and exurban development creates automobile-dependent land use patterns that further increase these negative impacts. This self-reinforcing driving/sprawl cycle continues until other forces, such as travel time, vehicle costs, and congestion become limiting factors.

The tendency of automobile transportation to result in low density land use is widely acknowledged. One popular transportation engineering text states, "Although there are other factors that play a role [in urban sprawl], reliance on the automobile has been most significant..." (Edwards, 1982, p. 401). Newman and Kenworthy (1989) found strong negative relationships between private vehicle use and nearly all measures of urban density and provision of automobile facilities (parking and road capacity). Hanson (1992, p. 60) points out, "A motorized means of personal travel is necessarily the dominant transportation technology for serving highly dispersed trip origins and destinations".

**Figure 1.** Road space by mode

Note: Automobiles require much more road space per passenger than other travel modes

Source: Banister and Button (1993, p. 184, based on Teufel, 1989)

It could be argued that sprawl can be prevented through zoning laws and should not be considered a transportation impact. The proper conceptual measure of indirect impacts is the “with and without” test: the difference in development which would occur “with and without” a transportation project or policy (van Kooten, 1993, p. 86). In practice, land use management techniques are seldom completely effective (Knaap and Nelson, 1992). Even with the best land use management system in place, transportation improvements have residual impacts that should be considered transportation costs.

### Land use impact costs

This section explores various costs imposed by the land use impacts described above. These costs tend to increase when greenspace becomes scarce and valuable, and if more people are affected. This explains why concerns over loss of greenspace and sprawl are increasing as less land is left undeveloped and populations grow.

### Market costs

Automobile use imposes direct market costs by increasing the land required for roads and parking facilities. Some authors argue that since roads often increase adjacent real estate values, roadway land provides a positive rather than negative social value (Quinet, 1994, p. 55). It is true that *access* increases land value, but this ignores differences in the amount of land required by different modes, as illustrated earlier. Modes such as driving, which require more land, should be charged this incremental cost.

Roadway land is often treated incorrectly as a “sunk” cost. Lee (1992) points out, “Land in highway right-of-way has alternative uses, and this value is included in published figures only when the purchase of new land is a part of current expenditures. Normally, any long-lived business investment is expected to earn a rate of return at

least equal to the interest rate on borrowed funds.” He estimates the land value forgone to be worth about \$75 billion annually in the USA (Lee, 1995, p. 11). Off-street parking in the USA is estimated to be worth \$64 to \$132 billion per year (Office of Technology Assessment, 1994, p. 106).

### Market costs of low density development

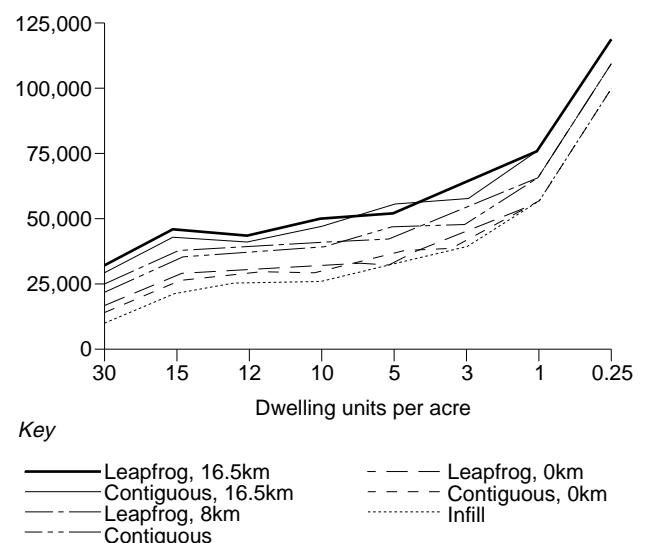
Low density development patterns require significantly higher unit costs for utilities, roads, schools, and emergency services, as indicated in Table I and Figure 2. Rural residents traditionally accepted lower levels of public services, including private water and sewer, and unpaved roads. Sprawl encourages new residents with higher expectations to move to exurban areas. Municipal governments then face pressure to provide urban services to low density sites despite high unit costs. Some

**Table I.** Per unit annual costs by residential density

	Rural sprawl	Rural cluster	Medium density	High density
Units/acre	1:5	1:1	2.67:1	4.5:1
Schools (\$)	4,526	4,478	3,252	3,204
Roads (\$)	154	77	53	36
Utilities (\$)	992	497	364	336
Totals (\$)	5,672	5,052	3,669	3,576

Note: Per household service costs increase owing to sprawl. These are mostly external costs

Source: Smythe (1986)



Note: This illustrates increased capital costs for lower density/non-contiguous development

Source: Frank (1989, p.40)

communities use impact fees to internalize a portion of these costs, but in practice these seldom reflect full marginal costs (City of Lancaster, 1994).

The division of land between residential and commercial activities in suburban areas is inefficient:

Because the home and the workplace are entirely separated from each other, often by a long auto trip, suburban living has grown to mean a complete, well-serviced, self-contained residential or bedroom community and a complete, well-serviced place of work such as an office park. In a sense we are building two communities where we used to have one, known as a town or city. Two communities cost more than one; there is not only the duplication of infrastructure but also of services, institutions and retail, not to mention parking and garaging large numbers of cars in both places (Kelbaugh, 1992, p. 17).

#### **Environmental and aesthetic costs**

Some land use impacts such as loss of wetlands, impacts on historical sites, and threats to endangered species have received considerable attention, and occasionally affect transportation decisions. But it is inappropriate to address each of these as a unique case. Doing so implies that only a few types of land use impacts are significant. For example, it implies that building a road imposes no environmental costs if it avoids wetlands and old growth forest, even if it degrades second growth forest or farmland. A better approach is to develop a general model for assessing the value of any type of land.

Sprawled land use patterns increase the amount of land developed per capita, which reduces the land left as greenspace (biologically active land such as farms, forest, and wetlands) near urban centres. Greenspace provides a variety of external benefits, including wildlife habitat, improved air and water quality, biological diversity, and social benefits of agricultural production (Brabec, 1992). These benefits exist in addition to benefits to the land owner, and are not reflected in the land's market value because they are enjoyed by society as a whole (Knaap and Nelson, 1992). Some result from the direct contribution that an ecological system makes towards the value of market goods, such as the role of stream environments towards fishery production, or the replacement cost of providing fresh water to a community if an aquifer is contaminated. Other values are reflected in the tendency of greenspace to increase adjacent real estate values, the benefits of recreation and tourism activities, and in existence, option, and bequest values (Hanley and Spash, 1993).

Ecological damage from roads and traffic is well documented (Federal Railroad Administration, 1993; Miller and Moffet, 1993; Weissman and Corbett, 1992; Works Consultancy, 1993). Impacts include the loss, isolation, and disturbance of wildlife habitat, increased

paved surfaces, clearing for road buffers, damage to unique physical features, road kills, and injuries. Roley (1993, p. 35) states:

The net effect on wildlife of automobile-dependent urban sprawl is the fragmentation of habitat and the isolation of these fragments and their wildlife populations from one another. The gravest threat to the survival of wildlife in developed areas around the world is the reduction of both habitat and mobility of wildlife. The automobile, in other words, has become the greatest predator of wildlife.

There is considerable support for reducing sprawl in order to preserve greenspace and reduce environmental degradation (Roundtable on the Environment, 1994). Various valuation techniques can be used to estimate the overall external environmental value of different land use categories and specific sites (Hanley and Spash, 1993; Jansson, *et al.*, 1994; Kopp and Smith, 1993), and the cost of their degradation. Table II shows one evaluation of the relative environmental benefits provided by selected land uses.

Roads and traffic also reduce natural environmental beauty and cause urban blight (Hoyle and Knowles, 1992, pp. 54-7). Aesthetic evaluations show roads becoming less attractive as their size and traffic volumes increase (Huddart, 1978). Segal (1981) estimates that a 0.75 mile stretch of Boston's Fitzgerald Expressway reduced downtown property values by as much as \$600 million in current dollars by blocking waterfront views, averaging about \$2 per vehicle trip over the Expressway. This is an extreme case, but indicates that aesthetic degradation from roads probably costs billions of dollars a year in reduced property values and non-market losses.

#### *Framework for quantifying environmental and aesthetic costs*

As mentioned earlier, there are a number of techniques which can be used to estimate the relative and absolute value of an area of land, including external environmental benefits. These can be used to calculate the environmental costs of specific transportation activities, such as the paving of a field, an increase in traffic over a rural highway, or sprawled development patterns. Table III illustrates one proposed generic cost structure.

*Example.* A road project requires paving 20 hectares of farmland and 10 acres of second growth forest, will lead to development on 10 hectares of second growth forest, and will cause noise and pollution impacts to 5 hectares of wetland, 20 hectares of second growth forest and 30 hectares of farmland. Total environmental costs are summarized in Table IV.

#### **Neighbourhood and community degradation**

Increased driving, mobility and urban sprawl tend to degrade the quality of residential neighbourhoods,

**Table II.** *External environmental benefits of selected land use categories*

	Air quality	Water quality	Ecologic <sup>a</sup>	Flood control	Recreation <sup>b</sup>	Aesthetic	Cultural <sup>c</sup>	Economic <sup>d</sup>
Wetlands	High	High	High	High	High	High	High	High
Pristine wildlands	High	High	High	Varies	High	High	High	Varies <sup>e</sup>
Urban greenspace	High	High	Medium	Medium	High	High	High	Varies <sup>e</sup>
Growth forest	High	High	Medium	High	High	Varies	Medium	Medium
Farmland	Medium	Medium	Low	Medium	Low	Varies	Medium	Varies
Pasture range	Low	Medium	Low	Low	Low	Varies	Medium	Low
Mixed urban	Low	Low	Low	Low	Varies	Varies	Varies	High
Highway buffer	Low	High <sup>f</sup>	Low	Low	Low	Low	Low	Low
Pavement	None	None	None	None	None	None	None	None <sup>g</sup>

Notes:

<sup>a</sup> Ecologic benefits include wildlife habitat, species preservation and support for ecological systems

<sup>b</sup> Recreation includes hunting, fishing, wildlife viewing, hiking, horse riding, bicycling, etc.

<sup>c</sup> Cultural benefits include preservation of culturally significant sites, harvesting traditional resources, and support for traditional activities

<sup>d</sup> External economic environmental benefits are economic benefits to people who do not own the land. This includes economic benefits from tourism, harvesting wild plants, fish and animals, and agriculture

<sup>e</sup> The economic value of wetlands, forests and urban greenspace is reflected in tourism and recreational expenditures, increased adjacent property values, water resources' quality and availability, and fisheries

<sup>f</sup> British Columbia's progressive highway buffer management practices (minimal herbicide use, natural swale development) optimize water quality benefits. Benefits may be lower in other jurisdictions

<sup>g</sup>Highways provide economic benefits, but no environmental benefits

Source: Bein *et al.* (1995)

**Table III.** *External environmental costs of road development (\$/hectare)*

Land use categories	Wetlands	Pristine wildland/ urban greenspace	Second growth	Pasture/ farmland	Settlement/ buffer	Pavement
Wetlands	0	- 20,000	- 40,000	- 60,000	- 80,000	- 100,000
Pristine wildland/ urban greenspace	20,000	0	- 20,000	- 40,000	- 60,000	- 80,000
Second growth forest	40,000	20,000	0	- 20,000	- 40,000	- 60,000
Pasture/farmland	60,000	40,000	20,000	0	- 20,000	- 40,000
Settlement/buffer	80,000	60,000	40,000	20,000	0	- 20,000
Pavement	100,000	80,000	60,000	40,000	20,000	0

Note: How to use this table. For each hectare of land converted from its current use (left column) to another use, the dollar amount in the intersection cell indicates the change in external environmental benefits. Indirect road impacts (traffic noise, visual intrusion, introduced species) can be assumed to impose half the cost of conversion to settlement/buffer

Source: Bein *et al.* (1995)

disperse and centralize many of the activities that support community cohesion (local schools, stores, and other services), and discourage pedestrian and bicycle travel, thereby reducing neighbourhood interaction (Isin and Tomalty, 1993). Appleyard (1981) found that increased traffic has significant negative impacts on both individual and community behaviour. As traffic increases on a street, residents' ability to use their own homes becomes con-

strained, interest in their neighbourhood decreases, and local social activities decline. This, he found, was especially hard on disadvantaged people who have fewer travel and housing choices. Untermann and Moudon (1989) state:

A deeper issue than the functional problems caused by road widening and traffic buildup is the loss of sense of community in many districts. Sense of community traditionally

**Table IV.** *External environmental costs calculation example*

Land use impact	Hectares	Cost per hectare (from Table III) (\$)	Half cost for indirect impacts	Totals (\$)
Farmland to pavement	20	40,000	–	800,000
Second growth forest to pavement	10	60,000	–	600,000
Second growth forest to settlement	10	40,000	–	400,000
Wetland noise and pollution impacts	5	80,000	× 0.5	200,000
Second growth noise and pollution impacts	20	40,000	× 0.5	400,000
Farmland noise and pollution impacts	30	20,000	× 0.5	300,000
Total	95		–	2,700,000

*Note:* This table shows calculations of the loss of external environmental (losses to society) benefits from a new or significantly improved road. These are generic estimates; costs may be much higher for land that has special environmental or social value

evolves through easy foot access – people meet and talk on foot which helps them develop contacts, friendships, trust, and commitment to their community. When everyone is in cars there can be no social contact between neighbours, and social contact is essential to developing commitment to neighbourhood (Untermann and Moudon, 1989, p. 3).

An automobile-oriented land use pattern and road system disperses common destinations beyond walking and cycling range and causes the decline of neighbourhood services such as corner stores (Engwicht, 1993). Traffic makes walking and bicycling unpleasant and hazardous, degrades the public realm (public spaces where people naturally interact), all of which reduce community cohesiveness and neighbourhood social interaction (Appleyard, 1981; Kunstler, 1993). Streets become devoid of pedestrian traffic and public attention, increasing crime risk (Jacobs, 1961).

#### **Increased future transportation costs**

Lower densities increase automobile dependency and mileage, resulting in higher travel costs (Kelly, 1994). A study of costs associated with different land use patterns in New Jersey concluded that a development plan which centralizes a greater portion of future growth would require 83 per cent fewer new lane miles than continued sprawl which results in a greater amount of generated traffic (Rutgers University Center for Urban Policy Research, 1992, p. 179). A study comparing 1976 to 1990 Milwaukee area travel costs for 2,700 and 4,400 average people per square mile found that user transport costs increased 10 per cent for the lower density option. Motor vehicle use also imposes external costs, so total incremental costs of low density, automobile dependent land use is much higher. Table V illustrates the additional costs associated with low density land use, applying Holtzclaw's model (1994) for automobile ownership and

**Table V.** *Annual household auto costs under four densities*

Units/acre	1:5	1:1	2.67:1	4.5:1
Auto/household	3.4	2.3	1.77	1.6
Vehicle miles travelled/household	28,822	18,603	15,100	13,233
Auto ownership costs (\$2,600/year)	\$8,840	\$5,980	\$4,602	\$4,160
Auto operating costs (\$0.134/mile)	\$3,862	\$2,493	\$2,023	\$1,773
External costs (\$0.10/mile)	\$2,882	\$1,860	\$1,510	\$1,323
Total costs	\$15,584	\$10,333+	\$8,135+	\$7,256+
Incremental cost of reduced density	\$5,251	\$2,201	\$879	n/a
Average of incremental costs		$(\$5,251 + \$2,201 + \$879) \div 3 = \$2,777$		
Average incremental cost per household		$\$2,777 \times 0.5 = \$1,389$		
Average cost per vehicle mile		$\$1,389/15,100 = 0.092$		

*Note:* This table shows estimate of increased automobile costs associated with lower density land use. (Vehicle ownership and annual mileage data from National Personal Transportation Survey, 1992, pp. 12, 18. Cost values from Litman, 1995a)

use with respect to density, assuming that sprawl causes 50 per cent of all households to choose a residence one step lower density in Table II.

### Equity impacts

Transportation equity can be evaluated by three criteria: horizontal equity, vertical equity with respect to income, and vertical equity with respect to need or ability (Litman, 1995a). Equity implications of motor vehicle land use impacts are explored below.

#### Horizontal equity

The existence of significant external costs, especially costs that are imposed by drivers on non-drivers, indicates horizontal inequity. Drivers benefit from increased capacity of local roads and parking facilities while non-drivers bear an almost equal share of the financial costs and a greater share of non-market costs such as pollution exposure and accident risk. City residents enjoy few of the benefits of sprawl but bear a share of costs, including increased public service expenses, traffic impacts on neighbourhoods, loss of greenspace and other types of environmental degradation.

#### Vertical equity with respect to income

Wider roads, increased parking and sprawl benefit lower income drivers by providing relatively high levels of mobility and the ability to access lower priced suburban housing. However, the poor also pay a portion of the external costs of driving and sprawl. Those who cannot afford to drive are much worse off because they cannot access many destinations, including schools and colleges, employment sites, and social activities. A recent Lincoln Institute of Land Policy newsletter article (1994, p. 2) describes the impacts of sprawl on the poor:

Land use patterns that put a premium on mobility actually disadvantage some segments of the population. Furthermore, a major cause of this poverty, in the opinion of many scholars and policymakers, is the gap between where these poor people live in central cities and where job growth is taking place in the suburbs. This transportation gap can be all but unbridgeable for low-wage workers who do not own cars, especially when public transit, where it exists, usually focuses on downtown and is often useless for conveying people to widely dispersed, suburban employment sites.

#### Vertical equity with respect to need and ability

Non-drivers (including people who are physically and socially disadvantaged, children and seniors) are much worse off from wider roads and sprawl because they cannot easily access suburban and exurban destinations, which include schools and colleges, employment and social activities. Wider roads, increased traffic speeds and volumes, and abundant parking around commercial buildings create barriers and hazards to pedestrian and bicycle travel (1000 Friends of Oregon, 1993).

The roadway system is the most valuable publicly owned asset in most communities, and the most important component of the public realm. Dedicating it primarily to one use, motor vehicle traffic, benefits those who drive most, while imposing disbenefits on non-drivers. In practice this means that wealthier drivers and suburban residents often benefit at the expense of vulnerable urban populations, which is clearly unfair and regressive. Although automobile transportation and sprawl provide a variety of benefits, some of which are enjoyed by lower income households and even non-drivers, overall these costs are inequitable. Everybody bears a share of these costs, including city residents, non-drivers and the poor.

### External benefits of sprawl?

Some commentators argue that low density land use provides external benefits, but none have been demonstrated (Isin and Tomalty, 1993). Although you benefit by moving to a nice country home within easy commuting distance of the city, your benefits degrade if other families do the same. The benefits of sprawl are almost entirely internalized, so the best test of whether sprawl provides net benefits would be to charge users for all external costs and see if beneficiaries are willing to pay. There is no reason for society to subsidize these benefits.

A Transportation Research Board report, *Beneficial Effects Associated with Freeway Construction* (Gamble and Davinroy, 1978) argues that urban highways provide external environmental and social benefits. Few of these proposed but unsubstantiated benefits seem reasonable based on current knowledge, and some seem outright silly. Here are typical quotations from that report:

[Aesthetics]: The freeway can provide open space, reduce or replace displeasing land uses, enhance visual quality through design standards and controls, reduce headlight glare, and reduce noise. [and] Regarding the visual quality of the highway and highway structures, freeways may create a sculptural form of art in their own right. Some authors note that the undulating ribbons of pavement possessing both internal and external harmony are a basic tool of spatial expression.

[Wildlife]: Freeway rights-of-way may be beneficial to wildlife in both rural and urban environments...

[Wetlands]: The intersection of an aquifer by a highway cut may interrupt the natural flow of groundwater and thus may draw down an aquifer, improving the characteristics of the land immediately adjacent to the highway.

[Vegetation]: Roadside rights-of-way can be among the last places where native plants can grow.

[Neighbourhood benefits]: Highways, if they are concentrated along the boundary of the neighborhood, can promote neighborhood stability. [and] Old housing of low quality occupied by poor people often serves as a reason for the destruction of that housing for freeway rights of way.

[Social benefits]: Highways can increase the frequency of contact among individuals ... [and] Good highways facilitate church attendance.

[Recreation]: Freeways cutting across, through, under, and around the cities afford an excellent opportunity for innovations in recreation planning and design.

### Summary of transportation land use costs

Roads and driving cause land use impacts which impose environmental, aesthetic, social, municipal, and transport costs. Land use impacts of transportation are significant, and probably impose total external costs comparable to air pollution. Current automobile-oriented land use patterns offer benefits, but these are primarily enjoyed by drivers and land owners, while costs are borne by society as a whole. Society must account for these externalities to avoid land use changes which result in negative net benefits.

These impacts are inequitable since many costs are not borne by the people who benefit, and because people who benefit least from increased automobile use and sprawl include those who are economically, physically and socially disadvantaged.

If motor vehicle use was reduced, less land would be needed for roads and parking, and more urban sprawl could be avoided. This could benefit society by preserving greenspace, improving aesthetics, increasing neighbourhood and community interaction, reducing municipal costs, and increasing transportation diversity by better accommodating walking, bicycling and transit service. Reduced automobile use and higher development densities do not guarantee all of these benefits, rather they allow them to be achieved in conjunction with good land use planning.

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# Transport policy: a critical role for strategic environmental assessment

*William R. Sheate*

**Calls for a fundamental shift in the way in which transport policy is formulated and implemented**

## Introduction

The international agreements signed at Rio de Janeiro in 1992 brought a degree of optimism to many environmentalists that perhaps governments were willing at last to bite the bullet and take some real and significant action to combat the environmental threats hanging over the world. However, there is a reluctance and an inertia on behalf of governments to put in place real mechanisms for facilitating change. The rhetoric of sustainability is too often seen to be subservient to other priorities, such as economic growth and deregulation.

Environmental impact assessment (EIA) has moved on from its earliest days. It is no longer just about reconciling the environment with economic growth (achieving a balance). The context for decision making is now that of sustainable development which places the environment centre stage. While EIA continues to present information to decision makers, those same decision makers can no longer simply ignore that information. Contrary to popular redefinition by governments, sustainable development implies that if economic development would unduly compromise the environment, the environment should win through (Sheate, 1994).

Debates over environmental, social and economic sustainability do not mean that one necessarily has to be compromised over the others. EIA provides a mechanism for identifying ways forward which maximize sustainability for all three factors, allowing decision makers to choose the options which are most sustainable in the widest sense. There is, however, an environmental and social imperative behind the concept of sustainable development. That was the purpose of the Rio Earth Summit: to find ways of protecting the Earth from the predicted ravages of economic development. We should not forget that it is the consequences of unbridled development which have brought us to this new age of international agreement on environmental protection.

It is, then, the concept of sustainable development that now provides a new opportunity for EIA to make a real impact on decision making. EIA in turn offers probably the best mechanism for incorporating sustainability into the decision-making process. How will that work in the transport context? It is useful to examine some specific – and currently unsustainable – transport policy issues, cascading, in this case, from the most strategic to the most local:

- the Trans-European Network for Transport;
- motorway charging;
- airports;
- new roads.

All are topical issues of debate in the UK and the European Union (EU).

## Trans-European Network

The Trans-European Networks for Transport (TEN) – covering road, rail, air and water – are an essential part of the EU's Common Transport Policy. In April 1994, following pressure from non-governmental organizations (NGOs) and Member States, the Commission, in a proposal for a European Parliament and Council Decision on the development of the TEN, recognized the need for a strategic environmental assessment (SEA) to ensure the EU was meeting its own obligations under the Maastricht Treaty (Commission of the European Communities, 1994). The TEN has as its main objective to “ensure the sustainable and safe mobility of persons and goods within the area without internal frontiers under the best possible social conditions while contributing to the attainment of the Community's environmental objectives”.

The TEN is fundamentally linked to the completion of the Single Market and includes plans for some ECU 1,000-1,500 billion-worth of infrastructure building between 1990 and 2010. New roads alone would add a further 15,000km of road surface across Europe. While the decision to carry out an SEA on the TEN was welcome, the objectives with which the European Commission began to explore the SEA were essentially flawed since the decision to establish the TEN had already been made.

The first concern, then, was that the SEA, if and when it happens, will occur too late in the decision-making process, after the decision to establish the TEN has been taken, instead of the SEA influencing the decision over whether the TEN should be established in the first place: environmental safeguards have therefore failed to keep pace with the Single Market. The objective for the SEA suggested by the European Commission “to provide a forecast on the overall environmental impact of the TEN when fully completed” clearly assumed the TEN would be completed or established as planned. The second objective, “to provide a basis and criteria for the revision of the TEN with a view to their environmental improvements” indicates that the SEA is being seen primarily as a means of identifying mitigation measures to what was a fundamentally economic decision to establish the TEN, rather than as a way of avoiding environmental impact in the first place. This runs counter to the principle of SEA which, by applying EIA principles at the earliest stages, enables real, sustainable choices to be made between alternative options and so avoid impacts, not merely mitigate them. This approach is, therefore, inconsistent with the principles of sustainable development, and indeed with the EU’s own Fifth Environmental Action Programme.

An SEA should be set within the overall context of sustainable development and should, therefore, consider issues such as need (as opposed to demand) and environmental capacity. The development of the TEN should not breach environmental capacity constraints (e.g. wildlife and landscape sensitive areas), should help in reducing atmospheric emissions (and meeting EU targets), and should reduce the need to travel rather than stimulate additional journeys or unsustainable freight movements (Böge, 1995). It is important that SEA is carried out for all the TEN networks (road, rail, air and water) together in order to maximize the sustainability of the final total TEN. For most criteria, e.g. atmospheric emissions or energy consumption, the rail network is likely to be more sustainable than air or road and may, for certain journeys, provide direct competition. The overall TEN should seek to shift transport from less sustainable modes such as road and air to more sustainable modes such as rail and water. This is not possible if each TEN is assessed in isolation.

An SEA at the macro-strategic level of the TEN clearly requires strategic data available at EU and Member State levels. Very localized data are unlikely to be appropriate since such detail would make the SEA totally unwieldy and create too much overlap with lower level SEA/EIA (at least it would if a tiered EIA/SEA system existed in the EU and all Member States). EU-wide data will be most useful in the form of GIS mapping information for ecological, landscape, cultural, archaeological, water catchments, severance, noise etc. sensitivity, including areas designated under EU legislation and at member

state/regional level (see also BirdLife International, 1995). However, this data is unlikely to be available in the same form, if at all, in all member states and this represents a very real difficulty in carrying out such an assessment (a clear role here for the European Environment Agency). Other information will be required on air and water quality, health implications, as will the modelling of the direct impacts of designating TENs, e.g. road traffic generation caused simply by designation and through new roads and upgrading. The longer-term implications for secondary development and other impacts (e.g. servicing of areas from afar) brought about by improved access by TENs will also be important (e.g. through member state land use plans and consultations) as will the use and sources of natural resources, e.g. aggregates.

Traffic forecasts are notoriously unreliable and any SEA which operates under the principles of sustainable development should recognize both environmental capacity constraints and the importance of demand management. In the UK traffic forecasting methodology is currently under revision (not least because it does not yet take account of induced traffic). Despite this, it is still central to the economic justification of road schemes, including improvements to Trans-European Road Network (TERN) routes. The advantage of an SEA is that it should provide the opportunity to look at real alternatives, including managing demand, rather than simply mitigating impacts caused by attempting to meet forecast demand (Sheate, 1992). However, it will also be necessary to consider parallel policies as counter or mitigation measures alongside alternatives so that the best mix of options can be identified, e.g. the use of the pricing mechanism, such as a carbon tax, traffic management and calming policies etc., to counter induced traffic through e.g. TERN designation and road improvements.

### **Public participation**

From a practical point of view, data needs to be broken down and/or gathered at the Member State level, not least to facilitate public participation, which should be central to any SEA methodology. Many of the concerns over the TENs have arisen as a result of the lack of public involvement in the decision to designate the TENs, and especially the TERN, at the EU and member state level. For example, there is huge controversy over the A303 trunk road in South West England which has proposals to upgrade the remaining 40 per cent of the road to dual carriageway standard. Much of the road passes through Areas of Outstanding Natural Beauty and includes Stonehenge, a World Heritage Site. Many fear, probably rightly, that the TERN designation will make these upgradings more likely to happen than otherwise, even if UK TERN schemes are unlikely to attract huge levels of EU funding. The UK Government, in setting its own priorities for road building, will presumably take account of the fact that it has itself designated the TERN routes.

While it may be difficult – though not impossible – to elicit effective public participation at the EU level, it is quite practical and essential to do so at member state level. It is, after all, the member states which identify the routes in the first place. Any SEA, if it is to be credible, must make adequate provision for public and NGO participation, first at the EU level in the scoping of the SEA and then in the identification and assessment stages at member state level, not just when the SEA has been completed.

The Commission (DG VII, Transport) is still struggling with working out how to go about the SEA. A hearing of experts was held in Brussels in June 1994 which, perhaps not surprisingly, failed to establish a practical methodology for carrying out the SEA. One reason, arguably, was that the Commission's objectives were somewhat different to those of many others, for instance over whether the SEA should cover operation of the network, not just the infrastructure impacts (a feeling shared by many experts at the meeting though not the Commission). There was concern, too, as to how the findings of the SEA would actually influence the nature and extent of the TEN. The Commission's prevailing view, that much of the network is already in place, fails to recognize the so far unassessed impact of designating even existing routes as part of a strategic network, e.g. on traffic flows and type of traffic, let alone upgrading them.

### Motorway charging

Proposals issued in 1993 by the UK Government for charging for motorway use (Department of Transport, 1993a) illustrate well the need for proper assessment of the environmental implications of policy initiatives. Although the Government addressed some of the potential environmental impacts, notably the likely diversion of traffic from motorways to the rest of the road network, there was no systematic assessment of the range of possible impacts, for instance in accordance with the Government's own guidelines for policy formulation laid down in *Policy Appraisal and the Environment: A Guide for Government Departments* (Department of the Environment, 1991). One would have hoped to see a separate chapter of a consultation paper devoted to this crucial issue, not least to provide evidence that the procedures in *Policy Appraisal and the Environment* are in fact being applied to the formulation of government policy.

Unfortunately, neither were the implications for other policies addressed. Indeed one of the key criticisms is the way in which the proposals came forward in isolation from an overall and objectives-led strategic transport policy. The fact that these proposals came forward in the absence of a strategic and environmentally sustainable transport policy is also somewhat ironic given the commitment in the UK Government's consultation paper in

1993 on the National Sustainability Strategy to the definition of "the components and objectives for a sustainable transport policy, looking to both the short and long term". Furthermore, the emphasis within the motorway charging proposals on speeding up the Roads Programme failed to recognize the wider environmental consequences which would result and the further distortion to competition it might cause between road and rail.

### Charging for road use

The principle of using price as one mechanism for managing demand for resources, be they water, energy or road space, is an accepted one by most environmentalists. The crucial questions to be asked must always be what the objectives of the initiative are meant to be, the form that the charging mechanism will take, how it relates to other relevant policies, and its likely impact on the environment. A charging mechanism is unlikely in itself ever to be the only way in which demand can be managed; it would normally need to be seen as part of a much wider package to manage a resource in a more environmentally sustainable way.

An original objective of the proposals was explicitly to raise revenue (around £700 million a year) to extend the motorway widening programme and to encourage further involvement of the private sector. The proposals did not therefore come forward primarily to manage demand for road space. However, even if such a policy were in place, charging for motorway use alone would be unlikely to deliver environmental benefits. Rather, it is likely that it would more rapidly bring about further environmental damage.

The Government implied in its consultation paper that charging for urban roads has no connection with that for inter-urban roads, illustrating again the lack of any strategic framework for the Government's transport policy. Road pricing (or congestion charging) in urban areas may play a role in managing traffic where it is part of a strategic transport policy. Such road pricing on a geographical, self-contained basis, i.e. where there is no "free" road alternative, may be effective in managing demand and helping, in conjunction with other demand management tools and improvements in public transport, to shift passengers from cars to alternative modes. The intention would be to moderate demand by taking traffic off unsuitable roads. Motorway charging alone, however, is more likely to lead to an increase in traffic on unsuitable roads as a result of diversion by motorists seeking to avoid paying tolls, whether through physical toll collection, permit or electronic charging.

### Diversion

The Government recognized that even at relatively low charges (e.g. 1.5 pence per mile) there is likely to be a shift of some 10 per cent of traffic from motorways to the rest of the road network in peak periods, and this could be higher in off-peak periods. This is not an insignificant

shift in traffic, particularly if it is transferring to inappropriate and often already congested roads. It could also be seen as justification for upgrading the rest of the road network as a result of increasing demand brought about partly by diversion from motorways.

Charging for road-based transport should be about the application of the polluter pays principle. The proposals for motorway charging did not conform to this principle; instead they were fundamentally about whether people were willing to pay to use motorways. The option of permit charging was a particularly active illustration of this where, having purchased a permit, the motorist would have every incentive to use the motorway network as much as possible. The permit would therefore be a licence to pollute freely, in complete contradiction to the polluter pays principle.

Legitimate concern by environmental groups over the implications for the rest of the road network were further enhanced by the Government's suggestion that charging might have been extended beyond the motorway network to other trunk roads which offer a level of service approaching motorway standard. This could amount to motorway designation by default and ultimately lead to the justification of further upgradings as consequence.

Unless the diversion effect described above can be contained by charging on all parts of the road network, charging on one part will simply lead to the displacement of traffic to other parts. A more appropriate way of implementing the polluter pays principle and of managing demand for road-based travel and hence for road space would be to increase the marginal cost of all road-based travel, in particular by taxing fuel (e.g. with a carbon/energy tax). The phased increases of 5 per cent above inflation per year in fuel taxes announced by the UK Government in 1993 were a step in the right direction, although these are unlikely to fulfil their potential without being part of a wider package of measures. The failure to adequately consider alternatives to the motorway charging proposals exemplifies policy formulation which occurs outside sustainable development objectives. The extent to which the Government had addressed issues of diversion from the motorway network was an illustration of a bolt-on appraisal of irreversible impacts (having decided the policy for other reasons) rather than the proper inclusion of strategic environmental assessment into policy formulation.

In March 1995, following much political controversy and concern over diversion of traffic on to rural roads, and amid a gradual government U-turn on transport policy, the UK Government quietly announced it was abandoning specific proposals to introduce its favoured option of electronic motorway tolling and, instead, would consider ideas for charging for the whole of the road network,

including congestion charging for cities (Wolmar, 1995). Contrary to the original consultation paper, the Government, it seemed, was at last recognizing that financial instruments need to be part of a wider strategy, not isolated initiatives in the way that motorway tolling was originally presented. An SEA of the proposals should, of course, have foreseen this.

Unfortunately, only a month later (10 April 1995), the Government also abandoned urban congestion charging as being politically unacceptable (a questionable assertion in itself). Political expediency had clearly taken precedent over the Government having available to it as many options as possible for dealing with the transport problems it faces. What had started with an apparent step towards a more integrated approach was now exposed as yet another series of isolated policy decisions.

## Airports

The impact of airports on the environment and on communities has increased dramatically over the last 30 years as air travel has grown rapidly, causing loss of open countryside, wildlife habitats, homes and bringing atmospheric pollution and perpetual noise intrusion to surrounding communities. Beyond the direct effects of airports are the consequential impacts derived from additional development, warehousing and transport infrastructure. Decisions on airport policy can cut across other land use and environmental objectives and need to be effectively integrated with these at all levels of decision making.

Current EU policy on air transport promotes free competition among airlines and airports in an attempt to meet forecast demand for air travel ("open skies"). In the UK, this is perpetuated in the 1993 *Runway Capacity to Serve the South East* (RUCATSE) report (Department of Transport, 1993b) (and the Government's response to it: see quote following) which forecast for the UK an increase from 106 million passengers per year in 1992 to between 183 and 280 million passengers per year in 2010. The Government's policy, established in the 1985 White Paper on airports, and that of the EU (Commission of the European Communities, 1992) leaves the market to decide where capacity is needed and therefore fails both to maximize the use of existing airport resources and to recognize the importance of environmental capacity constraints. Consequently, it is environmentally unsustainable. The 1985 UK policy of providing capacity as near to demand as possible has not been delivered and has failed to be effective: nearly a third of all passengers using airports in south east England have neither their origin nor destination in the south east.

Dr Brian Mawhinney, Secretary of State for Transport, to the House of Commons, giving the UK Government's response to the report of the study group RUCATSE on runway capacity in South East England (2 February 1995) is quoted below:

*The Government is firmly committed to enabling the development of additional airport capacity where this makes economic, social and environmental sense. The economic benefits to business and industry are clear, as are the advantages of greater opportunities for leisure travel. The quality of airports in the South East provides the UK and London with a vital competitive advantage and makes the UK a world centre for commerce and tourism.*

The Government wishes to ensure that *capacity can be made available in response to future demand*, but in such a way that recognises and takes *reasonable* account of the environmental impacts, including the impacts of increased air traffic associated with additional runway capacity...

...The Government has concluded that RUCATSE's analysis shows a strong case for additional runway capacity in the South East; but that more work is needed to inform decisions on any proposals which operators may bring forward for that additional capacity.

Our airports operate on a commercial basis and it is for the operators to bring forward proposals for development, where they see a business case, and take them through the planning processes. In doing so, they need to take account of the overall framework of the Government's airports policy, which indicates the factors that would weigh in Government decisions on such proposals. It has been suggested that the Government should seek to reintroduce traffic distribution rules in order to direct air traffic to use specific airports; *the Government has considered this option and concluded that it does not wish to seek to influence the pattern of demand for commercial passenger services by the re-introduction of these rules.*

Three important new considerations have emerged since the group reported; these require more work. First, an independent study of runway capacity at Heathrow, sponsored by the National Air Traffic Services, BAA plc and the airlines, has produced a report suggesting that there is greater scope for increasing the utilisation of the existing runways at Heathrow than was previously envisaged. Before reaching any decisions, I am asking the CAA (Civil Aviation Authority), in consultation with BAA and others, to examine further the gains that might be achieved and the environmental impact involved in making better use of the existing infrastructure at Heathrow. Second, I am clear that BAA should not consider the options studied in RUCATSE for a third runway at Heathrow or for a second runway at Gatwick. However, it has been suggested that there may be better, less environmentally damaging, runway options than those considered by RUCATSE. I am therefore asking BAA to examine whether there might be less damaging options for development, such as a close parallel runway at Gatwick... Third, it has become clear that the issue of surface access to airports in the South East, and particularly the scope for improved public transport links to, and between, the airports need further examination. I note that BAA have initiated a study and I will be commissioning further work on this...

*We will continue to address the global impacts of air travel through work at the international level, to meet the goals of sustainable development; but these impacts are of very limited relevance to decisions on capacity at UK airports. I expect the further work I have commissioned to take between two and three years (Department of Transport, 1995 [emphasis added]).*

One must question whether the demand forecasts used by governments and airlines are a valid basis for decisions over the need for or the location of additional airport and runway capacity; to start with they are based on questionable assumptions. Previous forecasts have consistently overestimated long-term demand. Central to such criticism is that the three key variables of airport capacity, passenger demand and aircraft characteristics are not independent. This makes forecasting notoriously difficult. Given past trends the suggestion that growth in air travel will continue to increase at the rates suggested must be questioned. Much of the most significant growth in air travel has, arguably, already taken place. Given the serious environmental consequences of accommodating further large scale increases in air traffic and airport-related development, a more questioning approach should be adopted in airports policy.

Even if the forecasts represented a realistic picture of the future, why should that demand be met? To do so would run counter to the principles of sustainable development, central to which is the recognition of environmental capacity and the principle of demand management, and increasingly is no longer accepted as a valid approach in other sectors, e.g. road traffic. Why should the airline industry be exempt from the principles of sustainable development or demand management? Central to decisions over whether new airport capacity is needed should be proper consideration of the environmental implications of additional airport development (especially in terms of road traffic and consequential development pressures) and the implications of alternatives such as improved rail services within the UK and the rest of Europe. The Channel Tunnel is just one element of this equation. Such services increasingly provide direct and significant competition to domestic and short-haul European flights: highly significant in the context of the Trans-European Network above.

Governments clearly need to address the issue of runway capacity, and airport development in general, as part of an overall national transport policy, set within the context of sustainable development, which addresses all modes and maximizes the use of existing airport resources before new capacity is provided which will fuel further demand. The UK Government's view that global impacts of air travel have very limited relevance to decisions on capacity at UK airports (see the Government's response to the RUCATSE report quoted earlier) begs the question: how do you address global impacts if not through capacity constraints and demand management? Through

technical fixes which are likely to be outstripped by demand (and have been seen to be ineffective in the road transport sector)? The incorporation of strategic environmental assessment in the formulation of overall transport policy and in airport policy is crucial in order to present sustainable options, for example in a Green Paper on transport policy, for public debate.

### New road building

Defining the parameters of a development project inevitably results in difficulties in deciding what constitutes a project as opposed to a programme or plan. A project may comprise a number of smaller sub-projects and a programme may comprise a series of projects. A plan may identify future projects or programmes or it may be a “masterplan” covering a number of projects which are to be built or developed simultaneously or separately over a period of time. The fact that it is difficult to define precisely where the boundaries between these definitions should lie is itself an illustration of the value of a tiered approach to EIA which ensures that impacts on the environment are assessed at all the appropriate opportunities and at the degree of detail appropriate to the level of decision making.

Until recently, EIA has been applied largely to project level decision making, i.e. decisions about whether to go ahead with individual discrete development projects. In most cases it is not too difficult to recognize an individual project proposal, e.g. a factory, an oil terminal, an airport runway, a reservoir proposal, a housing development. However, there are cases where a development proposal comprises several discrete sub-projects. In the absence of any level of (SEA) it is appropriate and arguably legitimate to say that the overall proposal is a “project” made up of associated, ancillary or subsidiary projects. Where a tiered system of SEA is established, however, this semantic distinction is rendered unnecessary since such a proposal would be caught at the programme level. This problem of definition is particularly acute when it comes to linear developments such as road building, especially when related schemes come forward over a long period of time. Road building in the UK, and other EU member states, illustrates the limitations of the EC Directive on EIA (85/337/EEC) applying so far only to projects.

In September 1991 a complaint was registered by the Council for the Protection of Rural England (CPRE) – an environmental NGO – with the European Commission against the UK Secretary of State for Transport concerning the implementation of the EC Directive on Environmental Impact Assessment (85/337/EEC) with respect to road proposals (Council for the Protection of Rural England, 1991). The complaint argued that UK implementation of EIA for roads fails to comply with the

requirements of the EIA Directive; in particular, that the Departmental guidance on EIA was inadequate, out of date, and failed to incorporate fundamental requirements of the EIA Directive. The key concerns were:

- The inadequacy and limitations of the Department of Transport’s (DoT’s) EIA guidelines (especially the *Manual of Environmental Assessment*).
- The inadequate definition of “project” which results in the splitting of proposed routes into small sections for consent and assessment purposes, without a full assessment of the whole proposal. Linked to this is the failure to require proper assessment of indirect, secondary and other effects, as required under article 3 and Annex III of the Directive.

While many other complaints have been made to the European Commission over individual road schemes, this was an important complaint because it was not individual project specific; rather it was a generic complaint over the principle of poor application. It was therefore, potentially more far reaching and more difficult for the UK Government to dismiss.

While the EIA Directive provides member states with a degree of discretion regarding the information which is relevant to a given consent procedure and to the specific characteristics of a particular project or type of project, the complaint argued that the Secretary of State for Transport had failed to exercise appropriately this discretion in the case of road proposals and that it was impossible to meet the objectives of the Directive of assessing all direct and indirect effects if a project was split into small sections.

The European Commission investigated the complaint since the procedures and guidance followed by member states in implementing the Directive are as important as the relevant legislation, to the extent that even if the legislation appears to comply with the Directive, i.e. there has been correct transposition, in practice the member state may be in breach of its requirements, i.e. there is poor application. There followed correspondence between the Commission and the UK Government over several years.

The UK Department of Transport published its revised *Manual of Environmental Assessment* in July 1993. However, this new guide – Volume 11 of the *Design Manual for Roads and Bridges* – although bringing some welcome improvements to the assessment of detailed aspects of the environment when a road scheme is proposed still failed to address the wider and more fundamental issues, namely the splitting of road projects into small schemes and its lack of attention to avoidance of impacts rather than mitigation. A similar case from Germany (Case C-396/92: brought by Bund Naturschutz and others) was referred to the European Court of Justice

by the Bavarian Higher Regional Administrative Court. The UK Government made an intervention in the case arguing that the separation of road schemes into small sections does comply with the EIA Directive.

The question which came before the European Court was:

Is the concept of project in Articles 1, 3 and 4 of, and Annex I (7) to, the Directive to be understood as meaning, in its application to motorways and express roads, that the environmental impact

- (a) is to be assessed solely for the section of a road link for which development consent has been sought, or
- (b) in addition to the area covered by that section, for the road link as a whole?

Unfortunately, the European Court, in July 1994, avoided addressing this specific question and failed to clarify how the definition of project under the Directive should be interpreted. The Commission has subsequently closed the file on the complaint outlined above on the questionable basis that the DoT's new *Manual of Environmental Assessment* meets the concerns raised (it does not). However, the Commission opened a new file following subsequent evidence provided by CPRE concerning adjacent upgradings of the M4 motorway in South East England (see Appendix).

The same issue was also addressed in an application for judicial review by Surrey County Council in December 1993 over the UK Government's proposed widening of the M25 motorway beyond dual four lanes by the addition of three-lane link roads (collector-distributors) alongside. Mr Justice MacPhearson, although rejecting application for judicial review on the grounds that, as no environmental statement (ES) then existed, the application was premature, said that the Government should require EIA for the whole project, not simply individual sections (*R v. Secretary of State for Transport ex parte Surrey County Council*, High Court, 24 November 1993). Following massive public and political controversy (as well as the publication of the Royal Commission on Environmental Pollution's report on Transport and the Environment, and the Department of Transport's own Standing Advisory Committee on Trunk Road Assessment (SACTRA) report on induced traffic, both in 1994), the Government finally abandoned its link road proposals on 3 April 1995. However, it proposed instead widening to five and six lanes in each direction on the busiest stretches, defeating at a single stroke the logic of abandoning the link roads: that they would generate additional traffic and fail to solve the problems of congestion. The difference between adding three-lane link roads and six lanes in each direction is precisely one lane in each direction! Hardly a major U-turn in government transport policy. However, the Government also announced at the same time that it would look at the

opportunities for improved rail and public transport connections, which does represent a significant shift, i.e. to a more integrated approach than hitherto. But extra widening of the existing dual four lanes will only further distort competition with existing or new public transport provision. The logic has yet to sink in.

The issue of project definition is critical. Unless it is resolved, road and other infrastructure EIAs in the UK and across the EU will continue to fail to address some of the potentially most significant impacts flowing from such developments. The EIA Directive will have singularly failed in its prime objective: that all direct and indirect effects of a project will have been assessed prior to consent being given.

Although the EIA Directive is currently undergoing review, the European Commission has so far chosen not to propose any clarification to the definition of "project", though is coming under pressure to do so from the European Parliament. The Commission could usefully take this opportunity to clarify that a project means the overall project including associated or related developments, not simply the smallest component into which the project can be broken down. It should be remembered that the whole *raison d'être* behind the Directive is that

...effects on the environment [should be taken] into account at the earliest possible stage in all the technical planning and decision-making processes...[Preamble to Directive 85/337/EEC].

This admirable sentiment cannot be achieved if EIA is applied only at the latest stage, i.e. individual schemes of a larger road project or upgrading of an entire route (Sheate, 1995).

## Conclusion

Transport policy – where it exists formally and strategically at all – is frequently unsustainable because the environment has rarely featured as a primary objective in the past. Only a fundamental shift in transport policy formulation which incorporates the environment and sustainable development into the objectives of transport policy will bring about a real change in the impact transport has on the environment. The economic motor which has driven transport policy for so long (even though a questionable basis in itself) is no longer appropriate in the context of sustainable development. Yet it still predominates. The view of governments is still to "take account of" the environment, not to make it a central objective.

Only a systematic assessment of environmental impacts prior to the adoption of a policy or policy change will enable a sensible choice of options to be made. In many cases the rhetoric is already there, but not the action. SEA

– as part of objectives-led policy formulation – is the logical answer, but few politicians yet seem willing to bite the bullet.

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### Appendix: case study – M4 Motorway upgrading, south east England

A complaint to the European Commission in Brussels, made by the Council for the Protection of Rural England (CPRE) on 6 September 1991, outlined a number of concerns about implementation in the UK for road scheme EIA, of which the assessment of the indirect effects of road projects was but one. The Department of Transport's new *Manual of Environmental Assessment* published in 1993, while bringing some

improvements, did nothing to resolve the key concern that the current approach adopted by the Department of Transport results in the splitting of projects into small sections for consent and assessment purposes, which prevents a full assessment of the overall environmental impact.

In detailed supplementary evidence sent to the Commission on 12 October 1992 a number of examples were provided of where strategic routes were upgraded on a piecemeal basis and why it was believed this contravened the requirements of the EC Directive 85/337/EEC. Further evidence was provided on 7 September 1994 of adjacent road "schemes" which are being promoted separately, although they form part of a major upgrading of the M4 motorway through the county of Berkshire. The M4 at junction 4b adjoins the M25 London Orbital Motorway which is also being upgraded in a piecemeal way. The M4 schemes, travelling west from the M25 and London, include:

- (1) the addition of adjacent three-lane link roads along each side of the motorway from junction 5 to junction 8/9 and widening from dual four lane to dual five lane between junctions 4b-5;
- (2) a separate scheme from junction 8/9 to junction 10 to widen the M4 to dual four lane from junctions 10-12;
- (3) another scheme to widen the M4 to dual four lane from junctions 12-15.

The first two (mentioned in (1)) are seen by the Department of Transport as high priority (Priority 1) schemes, the third is Priority 2, and the fourth is of longer-term priority. However, all are included in the Roads Programme and are adjoining proposals, which will result in a major upgrading of the motorway from the M25, throughout the entire length of the M4 in Berkshire to junction 15 in Wiltshire: a total length of around 100km. Yet each is being promoted separately. Individual assessment of each scheme fails, it is argued, to comply with the requirements of the EIA Directive that all direct and indirect effects should be identified and assessed. All these schemes are components of one project – the upgrading of the M4 motorway – and should be subject to one environmental impact assessment, not four separate assessments.

The non-technical summary (for J 8/9-10) and public consultation document (for J 4b-8/9) covering the first two of these schemes from the M25 to junction 10, illustrate clearly the problems. *Neither make reference to the other scheme even though they adjoin one another.* Issues such as traffic flows and many other direct and indirect environmental impacts will not stop at the boundaries of the individual schemes. This approach also means that adequate consideration of alternatives, both routes and options, is prevented.

CPRE requested that the original complaint file be re-opened and that the commission take action against the UK Government over the poor application of EC Directive 85/337/EEC with respect to trunk roads and motorways. *The Commission instead opened a new complaint file following CPRE's representation which is now under investigation.*

# Transport for the visually impaired: a look at urban Britain

*Tamsyn Parry*

**Draws on personal experience to highlight the transport problems visually impaired people encounter**

## Background

There is much inequality of transport provision in Britain for the disabled and other vulnerable sections of the community. I am myself disabled and will use my experiences of being partially sighted. My disability ensures that I am unable to drive a motor car, and am therefore dependent on buses, trains, cycling and walking. For these modes of transport, provision is least developed and in some areas declining rather than developing. Problems experienced by visually impaired people, whether partially sighted or blind, are common to many other sections of the community who may be, or perceive themselves to be, vulnerable. These would include ethnic minority groups, the old or young, and physically disabled people using wheelchairs.

Although the difficulties faced by disabled people are similar around the world, I will only compare the provision of facilities of urban Britain with those of urban western Europe, where in many countries transport planning has catered for the needs of disabled people. Having been fortunate enough to visit India, I recognize that the facilities for disabled people in urban Britain are substantially greater than those of many developing countries.

Section IV of the European Charter of Pedestrian Rights of 1988, quoted in Tolley (1993) states that:

The disabled have the right to specify measures to maximise their independent mobility, including adjustments in public areas, transport systems and public transport (guidelines, warning signs, acoustic signals, accessible buses, trams and trains).

In urban Britain the deregulation of the buses in all areas except London in 1986, the proposed privatization of the railways in the near future, a lack of safe cycle routes, a poor street environment in many of our towns and cities,

and the dominance of the private motor car in transport planning, imply that the provision of facilities for the visually impaired person has much potential.

In this article I will examine what I perceive to be the current situation, in terms of transport provision for the visually impaired, and will then briefly examine positive ways of providing for the visually impaired. I will use examples of present and hoped for practice based on experience in the West Midlands.

## The current situation in urban Britain

### *Public transport*

The deregulation of the bus industry in 1986 was intended to increase competition among bus operators, and therefore increase the efficiency of services and reduce their cost to the consumer. Experience has shown that patronage in metropolitan areas, which had been on the increase prior to deregulation, has steadily fallen after deregulation. Pickup (1992) notes that this is related to a rise in fares and an unpredictability of bus services. Services change frequently while operators crowd profitable routes, with several buses arriving together, rather than a more frequent service over time. Profitability in the industry has been low, leading to many mergers and take-overs. This has produced several large national bus operators with regional and local monopolies. Service provision to those, such as the visually impaired, who depend on the buses has seen little, if any, improvement since deregulation. Monopolies have allowed costs of travel to increase while service provision has not necessarily improved alongside price increases. Confusion of timetables is more likely where many operators compete against each other.

There are several other consequences of bus deregulation. Operators have few resources with which to renew ageing bus fleets. Old buses have little provision for the visually impaired in terms of painted lines and adequate hand rails. They are also less comfortable and in some cases in poor condition. Unclean buses make it difficult to see where you are through the windows, while on-bus information in the form of digital displays is minimal. Older buses also have several steps on to them, which are at times difficult when accompanied with a guide dog, or if they are simply not seen. For the visually impaired, obtaining large print bus timetables can also be difficult. Many timetables are printed in small lettering in bus shelters and often obscured by dirty glass or plastic covers. Leaflets are available but few in large print. There is an opportunity to raise awareness that timetable information is available from special telephone services run by local authorities and bus operators. Bus services in provincial towns and less so in cities can be concentrated between 8.00 a.m. and 6.00 p.m., with considerably less provision at other times. At these times getting connecting buses from or to trains can be difficult with long waits at one or more stages of a journey.

### **Rail transport**

I have always found railways in Britain to be amenable to those with visual impairments. Most rail timetables are printed in clear large print and platform signs and directions are printed in large black letters on a white background. Rail staff are very helpful when giving assistance and there are several telephone enquiry centres which enable a journey to be planned beforehand. Municipal stations also have travel centres where platform numbers and detailed travel information can be obtained. Other information at rail stations is less clear. Television monitors on platforms are invariably too high, unclear, or masked by bright sunlight. At principal stations the huge electronic information boards above platform entrances are almost impossible to read for anyone who is visually impaired.

The ease of interchanges between buses and trains is difficult in many places, with long distances between rail and bus stations, and a lack of direction boards illustrating routes and distances between rail and bus stations. Braille information points at rail and bus stations are very rare, as are manned information services in smaller stations. Under privatization such services may become even rarer as they are likely to be considered a financial cost rather than a social benefit.

### **Town centres**

In Britain, as opposed to several European countries, planning consent has been given for many out of town developments, including supermarkets, cinemas, fast-food outlets, and an expanding range of retail outlets from electrical goods to clothes and DIY. These are often reasonably accessible only by private motor car, with

token bus services available. Cycle paths to them, which would pose little problem to someone with limited sight, and able to cycle, are almost non-existent. As a result of the success of such suburban retail parks many functions previously available in town centres are now being replaced with warehouse outlets in retail parks. As shopping facilities become more dispersed in town centres, walking from one shop to another can in some towns and cities be as challenging as finding your way to a suburban retail park without a car.

At present many towns and cities in Britain suffer from an overdose of the motor car. Motorists can use town centres as a through-route, can park very close to shops and need only spend a short time as a pedestrian. Roads are made wide enough to accommodate more traffic at the expense of narrower pavements and prolific pelican crossings make the pedestrians wait for inordinate lengths of time, breathing in health damaging exhaust emissions, while traffic storms past. To a large extent roads in a town centre are treated as if they are roads on any other part of the road network. Traffic flows are maintained through control of traffic lights and pedestrian crossings, while to the pedestrian the roads act as rivers of metal, rarely stopping. To any pedestrian the pollution from standing and moving traffic is tangible, with the noise and lack of safety caused by fast moving vehicles travelling alongside congested pavements adding to the discomfort. It is worth mentioning that in many towns and cities the number of people crossing a street, excluding those walking along its pavements, is in excess of the number of vehicles using the street as a thoroughfare.

For the visually impaired person, traffic causes several difficulties. Whereas other pedestrians may have the ability to cross in between designated pedestrian crossings, this is often difficult for someone with visual impairment, as distances between vehicles are difficult to judge, and valuable time is wasted seeking out a pelican crossing and then waiting to use it. In older towns narrow pavements with poorly maintained surfaces are a problem, with many obstructions like advertising boards or signs giving directions to motorists. With congested pavements it is often easier to walk along the roadside getting out of the way of cars or buses when necessary (I am lucky enough to be able to see most vehicles approaching me!).

In many towns and cities central streets have been pedestrianized. Although many are a success for the pedestrian, in older more environmentally sensitive areas, streets have been paved with rough cobbles (granite sets) or designs that have a mixture of smooth and rough surfaces. If you are blind, changes in surface materials or small steps from pavements to the central part of a road can be disconcerting and sometimes cause difficulty. Being partially sighted I am often caught out by such

surfaces, but to me the enhancement of the street is compensation. For many streets which are paved and pedestrianized, either completely or partially, street furniture can also cause difficulties. Randomly positioned seats, trees, litter bins and bollards might not be seen, or passage can be cramped (especially for those in wheelchairs) when negotiating the street furniture. People and street furniture combine to make an obstacle course for the blind and partially sighted, and collisions with other pedestrians are more common in these areas.

### Future changes and developments

After many years of neglect the pedestrian in the British urban environment has been recognized as a mode of transport. Provision is made in terms of making the street more environmentally friendly towards the pedestrian with paving and traffic management. This is very good news for those who are blind and partially sighted. There are also several other developments which are positive for the future.

#### Public transport

While deregulation of the bus industry might bring about improvements in the long term; there is also potential in the short term. Many towns and cities in Britain operate park and ride services which enable motorists to get a bus from a suburban location into the town or city centre. This reduces traffic levels in towns and city centres, and reduces congestion and pollution. These services are frequently far better than existing bus services to residential areas in towns, and equal to the existing services in cities. These services are reliable, with extra buses operating at peak times. In several park and ride sites contracts ensure that new buses are used with facilities for the disabled. Low floor, as now used by the Meole park and ride in Shrewsbury since March 1995, are convenient for wheelchair users and for the blind and partially sighted, as there are no steps to negotiate or fall over when entering the bus from the pavement. Steps inside the bus at the rear have special lights inset into them as a warning, and handrails are brightly coloured and well located. As these buses become older and as existing bus fleets are gradually replaced, new low floor buses may operate on normal bus routes and not just park and ride facilities. The West Midlands first low floor bus is at Shrewsbury. Plate 1 shows one of Shrewsbury's four low floor buses.

#### Rail transport

It is hoped with the gradual privatization of the rail industry that the rights of disabled passengers for continued provision will not be eroded. Disabled rail cards are accepted as necessary by the regulator, although I fear personally that other provision may be gradually eroded as cost-cutting to make way for profits becomes more obvious to passengers. Perhaps it is an

**Plate 1.** *One of Shrewsbury's four low floor buses*



ill-informed scepticism that travel information services are also likely to be cut.

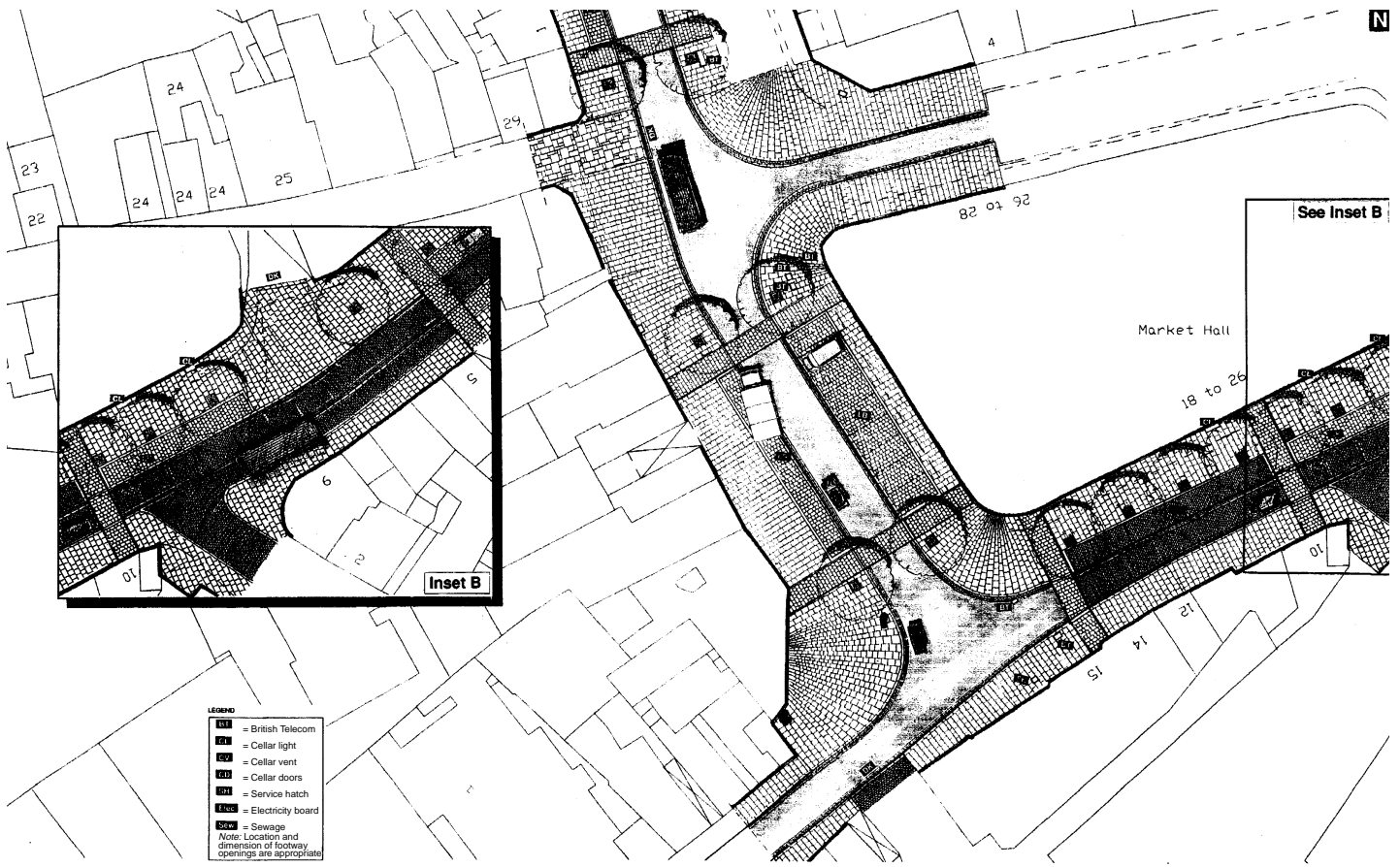
#### Town centres

As an illustration of improvements to town centres I will use two examples of current and hoped for practice. The first is in Birmingham, where pedestrian facilities in the city centre have been vastly improved in recent years. Pleasant squares have been developed with several of the central streets being paved in imaginative ways. Buses can still use Corporation Street although the pavements have been widened considerably. New Street has been paved completely with street furniture in the middle of the street, out of the way of pedestrian movements. Paving patterns and contrasting colours separate the areas of street furniture from walkways.

Other work is currently being considered in Shrewsbury, a small medieval town set inside a loop of the River Severn, 60 miles west of Birmingham. At present vehicles are unrestricted on the main street which passes through the town, although most through-traffic has been diverted on to a new bypass opened in 1993. Traffic in the town centre causes much difficulty for visually impaired pedestrians, as controlled crossings are very infrequent, and traffic almost continuous. Pollution is tangible and the intrusion of motor vehicles in central narrow streets is not acceptable to many. Plans are in progress to pave the main street, with York stone and granite paviers, and to possibly restrict traffic as well. Figure 1 illustrates the proposed street layout in the plans, from one section of High Street, and is at an early stage of planning. As a resident of Shrewsbury I am hopeful that conditions for pedestrians in general, and for the visually impaired in particular, will be much improved.

While we are very fortunate in Britain to have the facilities which already exist for the visually impaired, there is much that can be done to improve conditions, particularly in town and city centres. The provision of

**Figure 1.** Illustration of proposed street layout in High Street, Shrewsbury



low floor buses will assist users of the buses, although improvement to services and routes offered are unlikely to be apparent in the short term. It is hoped that rail privatization will ensure that existing good standards can be maintained. With the progression in town and city centres to ban through traffic, streets are being given back to those who are unable to drive. However, if out of town retail developments had taken place on a smaller scale, then many more traders in towns and cities would be happier at the prospect of reducing traffic flows, as many are now concerned that trade, hit by the recession,

will decrease further if traffic volumes are reduced. I personally do not agree with this viewpoint.

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# Parental attitudes to children's journeys to school

Mary Sissons Joshi and Morag MacLean

Looks at how parental attitudes influence children's travel behaviour

## Introduction

The growth in accompanied travel to school has been one of the most pronounced changes in travel behaviour over the last 20 years. Hillman *et al.* (1990) have noted how the proportion of seven-eight year old children who travel independently to school in England has declined from 80 per cent in 1971 to 9 per cent in 1990.

The phenomenon of accompanied travel to school, particularly by car, has major ramifications. The journey to school is a major source of traffic at peak hours and adds to congestion, accidents and pollution. For example, in Greater London, school journeys account for approximately 9 per cent of vehicle mileage from 7 a.m. to 10 a.m. (Greater London Council, 1981). Such journeys also cost parents time (Gershuny, 1993) and deprive children of the opportunity for regular exercise (Armstrong, 1993). An important assertion in Hillman *et al.*'s (1990) work is that contemporary parents have in some sense become alienated from a "natural" tendency to allow young children freedom and independence. Hillman *et al.* also surmise that reductions in children's opportunities for independent travel may have hidden costs to the children themselves in terms of damage to their social, emotional and cognitive development.

It is important to understand the reasons parents give for accompanying their children to school. Hillman *et al.* (1990) report that parents of junior school children in England place prime importance on traffic danger. However, close inspection of Hillman *et al.*'s work reveals a number of problems with respect to their elicitation of parental reasoning about the journey to school. Specifically, in Hillman *et al.*'s questionnaire, parents were permitted to endorse only one reason for not allowing their children to go to school unaccompanied and, furthermore, as Solomon (1993) notes, all the response options given were negative – such as traffic

danger and molestation. The response categories, therefore, did not allow parents to express any positive reasons they might have for accompanying children to school – such as enjoying the child's company or welcoming the opportunity to have contact with the child's school.

A full understanding of parental views on the journey to school is required if policy makers wish to encourage parents to behave differently. The implication of Hillman *et al.*'s finding is that, since traffic danger is of prime significance to parents, improvements in traffic calming, safe routes to school etc. would result in a decrease in parental accompaniment. However, if parental reasoning is more multifaceted than Hillman *et al.*'s data acknowledges, a single policy measure focusing only on traffic is unlikely to affect parental behaviour.

The current study aimed to discover more about parental preferences and how these influence children's travel behaviour.

## Method

Pilot work focused on the development of a user-appropriate questionnaire. Three group discussions were held to generate reasons for accompanying children to and from school. Each group was composed of five parents of school-age children who spent a 45-minute session on the above topic. These sessions generated 15 reasons for accompanying a child to and/or from school, and a further two reasons for accompanying a child home. Such group discussions ensure that the wording of the reasons reflects everyday rather than researcher usage. Hillman *et al.*'s "traffic danger" was expressed by parents as "child not yet able to cross roads", and "fear of assault or molestation by adult" as "stranger danger". Individual parents expressed multiple reasons for their own pattern of accompaniment and for this reason we designed a questionnaire which would allow a parent to select as many or as few reasons as they wished, and to indicate which among their reasons was the most important reason for accompanying their child.

In order to target parents of young children, 19 interviewers were sent to school gates and shopping areas and instructed to approach adults on a random basis. During the week commencing 10 May 1993, the interviewers gathered data from 378 parents who had one or more children aged 7-11 years. If a parent had more than one child aged 7-11, they were asked to answer the questionnaire in terms of the younger of their children. The questionnaire focused on current mode of transport, pattern of accompaniment as well as reasons for accompaniment.

Fifteen per cent of the sample were interviewed outside school gates, and the remaining 85 per cent were interviewed in shopping areas. Ninety-five per cent of the interviews were conducted in Oxford City and Oxfordshire, and 5 per cent were conducted in a village ten miles from Oxford city, two miles over the Buckinghamshire border). Of the children, 66 per cent attended schools in Oxford City and 30 per cent attended schools in Oxfordshire, and 4 per cent attended schools in Buckinghamshire. Of the parents, 50 per cent had professional or white-collar occupations, 40 per cent had blue-collar occupations, and 10 per cent gave insufficient information on occupation.

Questionnaires were completed with respect to 176 boys and 202 girls, who had an average age of eight years seven months (SD = 16 months). The respondents were predominantly female (83 per cent mothers, 17 per cent fathers), with a mean age of 37 years four months (SD = five years seven months). The mean home-school distance was 2.1 miles (range 100 yards to 31 miles, with 60 per cent living within one mile of the school).

## Results

### *Patterns of accompaniment*

The children in the sample who go to school alone number 13.4 per cent, 18.6 per cent go with another child, and 68 per cent are accompanied to school by an adult (and among these children, 78 per cent are accompanied by their mother; 13 per cent by their father, and the remainder by an adult such as another child's parent or a childminder). As Table I indicates, of those children who travel to school alone, 54 per cent walk, 24 per cent cycle, and 22 per cent use public transport (predominantly bus). Of those children who travel to school with other children, 63.8 per cent walk, 14.5 per cent cycle, and 21.7 per cent use public transport. Of those children who are accompanied to school by an adult, 35.2 per cent walk, 3.2 per cent cycle, 5.9 per cent use public transport, and 55.7 per cent go by car.

Of the sample 14.6 per cent go home from school alone, 21.4 per cent with another child, and 64 per cent are

**Table I.** *Pattern of accompaniment by mode of travel to and from school*

	Alone	With other children	With an adult	N
To school (per cent)				
N	50	69	253	372
Walk	54.0	63.8	35.2	160
Cycle	24.0	14.5	3.2	30
Bus	22.0	21.7	5.9	41
Car	–	–	55.7	141
Per cent of total	13.4	18.6	68.0	
From school (per cent)				
N	54	79	236	369
Walk	55.6	69.6	36.0	170
Cycle	22.2	12.7	3.0	29
Bus	22.2	17.7	5.5	39
Car	–	–	55.5	131
Per cent of total	14.6	21.4	64.0	

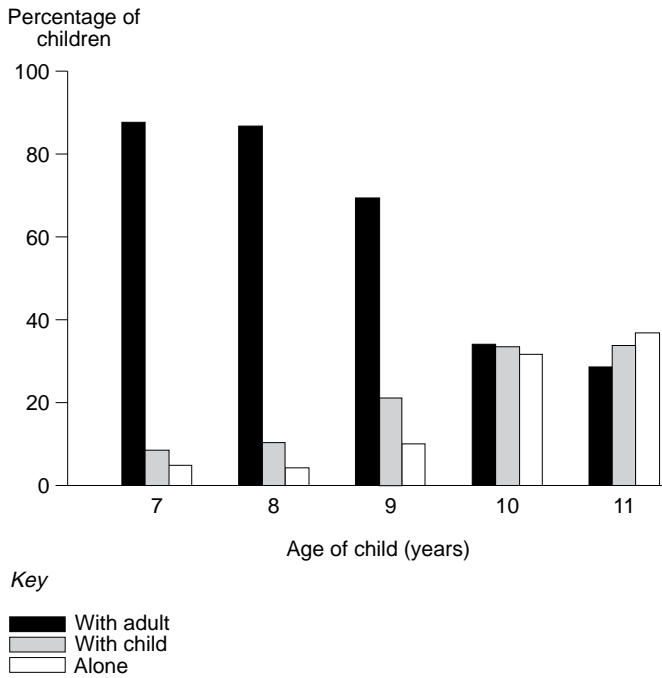
*Note:* The totals of 372 and 369 vary from the total sample of 378 owing to incomplete data

accompanied from school by an adult (and among these children, 75 per cent are accompanied by their mother; 8 per cent by their father; and 17 per cent by another adult). Of those children who travel home alone, 55.6 per cent walk, 22.2 per cent cycle, and 22.2 per cent use public transport. Of those children who travel home with other children, 69.6 per cent walk, 12.7 per cent cycle, and 17.7 per cent use public transport. Of those children who are accompanied home by an adult, 36 per cent walk, 3 per cent cycle, 5.5 per cent use public transport, and 55.5 per cent travel by car.

Children accompanied to school by an adult, but travelling home alone, number 3.8 per cent, 1.9 per cent of children go to school alone but return with an adult, and 5.8 per cent of children are accompanied by an adult on one journey and by another child on the other journey. However, for 88.5 per cent of children the pattern of accompaniment to and from school does not vary. Among these 330 children, 13.6 per cent go to and from school alone; 18.2 per cent are accompanied by other children; and 68.2 per cent are accompanied by an adult.

Distance from home to school is not related to accompaniment ( $F = 1.62$ ,  $df\ 2,327$ , ns), and patterns of accompaniment for children attending schools in village and towns do not vary ( $\chi^2 = 1.93$ ,  $df\ 2$ , ns). While there are no differences in accompaniment for boys and girls ( $\chi^2 = 4.50$ ,  $df\ 2$ , ns), increasing age is strongly associated

**Figure 1.** Children's journeys to and from school by age and accompaniment



with unaccompanied travel ( $\chi^2 = 82.70$ ,  $df\ 8$ ,  $p < 0.001$ ). As Figure 1 shows, 87 per cent of seven year olds, 86 per cent of eight year olds and 69 per cent of nine year olds are accompanied by an adult. At the ages of ten and 11, a third of the children are accompanied by an adult, a third travel alone and a third with other children (mostly of the same age).

The mean age at which the respondents themselves travelled to school without an adult was eight years four months ( $SD = 26$  months), but was not related to their own children's pattern of accompaniment. The 35 per cent of parents who did go to school without an adult at seven years or less were no more likely than other parents to permit their child to travel unaccompanied ( $\chi^2 = 1.63$ ,  $df\ 2$ , ns). The mean age at which parents whose children are currently accompanied to school by an adult expect their children to travel without an adult was ten years five months ( $SD = 20$  months), and did not relate to the age at which the parent travelled without an adult ( $r = 0.11$ ,  $N = 210$ , ns).

**Reasons for accompaniment**

In listing reasons for accompanying their children, parents give, on average, 3.2 reasons for taking their children to school and 3.3 reasons for accompanying them home. Table II presents the breakdown of reasons which parents give for accompanying their children to and from school. Across the sample the only reason which is endorsed by more than 50 per cent of parents is

**Table II.** Percentage of parents citing reasons for accompanying children to and from school

Reasons	To school			From school		
	All ages	7-9 years	10-11 years	All ages	7-9 years	10-11 years
Stranger danger	57.7	61.9	31.4	58.1	62.3	31.3
Child not yet able to cross roads	46.2	50.9	17.1	45.8	49.5	21.9
School too far away	35.6	33.0	51.4	33.9	29.9	59.4
Parent enjoys taking child to/from school	31.6			28.8	31.4	12.5
Allows contact with other parents	26.9			28.8		
Going that way anyway	23.7	19.7	48.6	11.4		
Allows contact with teachers	22.5			28.0		
Child might dilly-dally on the way	13.4			10.6		
Lack of suitable public transport	13.0			13.1		
Child does not want to go without an adult	11.5			7.6		
Just habit	10.3			7.2		
Child might lose way	9.5			10.2		
To keep them out of mischief	6.7			5.9		
It is the done thing	5.9			5.5		
Bullying	2.0			1.7		
Ensure child brings books home (journey home only)	-			8.9		
School insists children are met (journey home only)	-			11.4		

*Note:* Percentages of parents of younger and older children citing a reason given for significant age effects only

“stranger danger”. This is endorsed equally with respect to boys and girls. However, four of the reasons for taking a child to school show age differences such that “stranger danger” and “child not yet able to cross roads” are more important for the parents of children aged 7-9 ( $\chi^2 = 11.43$ ,  $df\ 1$ ,  $p < 0.001$ ;  $\chi^2 = 15.10$   $df\ 1$ ,  $p < 0.001$ ), but “school too far away” and “adult going that way anyway” are more important for the parents of children aged 10-11 ( $\chi^2 = 4.29$ ,  $df\ 1$ ,  $p < 0.05$ ;  $\chi^2 = 12.18$ ,  $df\ 1$ ,  $p < 0.01$ ). For the return journey, “stranger danger”, “child

not yet able to cross roads" and "parent enjoys picking up child from school" are more important for the parents of 7-9 year-old children ( $\chi^2 = 10.85$ ,  $df\ 1$ ,  $p < 0.001$ ;  $\chi^2 = 9.06$ ,  $df\ 1$ ,  $p < 0.01$ ;  $\chi^2 = 5.51$ ,  $df\ 1$ ,  $p < 0.05$ ), but "school too far away" is more important for the parents of 10-11 year old children ( $\chi^2 = 10.13$ ,  $df\ 1$ ,  $p < 0.01$ ).

Hillman *et al.*'s (1990) data suggest that for school journeys parents have a clear rank order of "traffic danger" followed by "fear of molestation" and "unreliability". In contrast our data show "stranger danger" to be more important than "child not yet able to cross roads". "Stranger danger" is the most frequently cited item (at 58 per cent) for accompanying children to and from school. It is of equal importance to the parents of boys and girls, and of particular importance to the parents of children aged seven-nine. In contrast, "child not yet able to cross roads" is cited by only 46 per cent of parents.

Fourteen per cent of Hillman *et al.*'s sample cite "school too far away" and this item is cited by 34 per cent of our sample, and indeed by 55 per cent of the parents of 10-11 year old children. In neither survey is it entirely clear what parents mean when they endorse this item. In our Oxfordshire/Buckinghamshire sample, children generally move schools at 11+ years of age. However, in the Oxford city sample, 7-9 year-old children live on average 1.9 miles ( $SD = 2.45$ ) from school and, since the majority of children move school at nine+, the ten-11 year olds live on average 2.53 miles ( $SD = 3.56$ ) from school. But as we have already shown above, since large numbers of parents accompany on foot, distance from school does not relate to whether or not children are accompanied, and this absence of relationship holds for younger and older children. Among accompanied 7-9 year-olds, 73 per cent live within two miles of school, and even among accompanied 10-11 year olds, 46 per cent live within two miles of school. Furthermore, some parents who accompany their children to school on foot or cycle nevertheless state that the school is too far for the child to go alone thus emphasizing the fact that pure distance is not the issue. For a parent who is anxious about "stranger danger", the difference between a distance of one and two miles is immaterial, since any journey "out of sight" may be too far.

Among those parents who accompany their 10-11 year old children to school, 49 per cent state that they are "going that way anyway". This reason probably features more strongly for the accompanying parents of older rather than younger children as a result of mothers' re-entry to the labour force: the chance of a mother being in paid employment rises monotonically with the age of her youngest child (Joshi, 1990). For the 13 per cent of all

parents who accompany a child to school, "going that way anyway" is stated as their most important reason. This runs counter to Gershuny's (1993) comment that accompaniment on the journey to school imposes an unnecessary cost on parents in terms of time. It is possible, furthermore, that our survey even underestimates the extent to which child accompaniment forms part of a composite journey as the phrasing "going that way anyway" may not have been endorsed, for example, by parents making a car journey but not primarily in "that" direction.

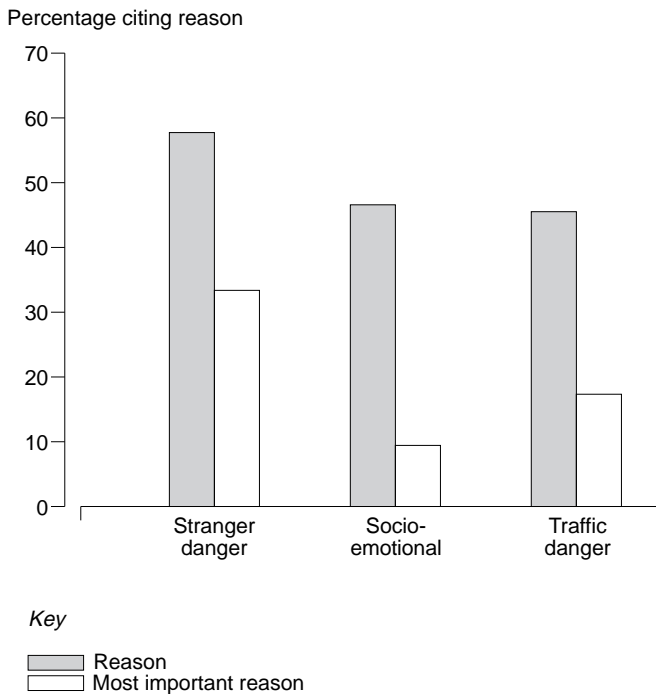
In criticism of Hillman *et al.*'s (1990) survey, it can be noted that key questions were phrased in such a way as to suggest to parents that they ought to "allow" their children to travel independently. Indeed, parents of children who went to school alone or in the company of other children were not asked whether in fact they would like to accompany their children to school. In our survey, 48 per cent of the parents of the young children who go to school either alone or with other children stated that they would like to go to and/or pick up their child from school, mostly citing work commitments as the impediment. Hillman *et al.*'s respondents were not able to indicate any positive reasons for accompanying their children. In our survey "parent enjoys picking up child from school" was endorsed by 29 per cent of the parents who accompany, and particularly by the parents of the seven-nine year olds. Such a result reveals the importance of designing a questionnaire which incorporates reasons generated by parents in pilot work and enables parents to express a variety of reasons for their behaviour.

Our questionnaire listed 15-17 possible reasons for accompanying children but some of these reasons can be grouped together under broader headings. We have retained "stranger danger", "child not yet able to cross roads", "school too far away", and "school insists that children are met" as single items. Four categories have been formed from the remaining items:

- (1) *Socio-emotional*. Parent enjoys taking /picking up child to/from school, allows contact with teachers, allows contact with other parents, and child does not want to go without adult.
- (2) *Monitoring*. Child might lose way, child might dilly-dally on the way, to keep them out of mischief, to ensure that child brings school-work/books home, bullying.
- (3) *Convenience*. Adult going that way anyway, lack of suitable public transport.
- (4) *Habit*. Just habit, it is the done thing.

As Figure 2 shows, for the journey to and from school, the single item "stranger danger" is still the most

**Figure 2.** Reasons and most important reasons for accompanying a child to/from school



frequently endorsed reason, cited by 58 per cent of accompanying parents as discussed earlier, and the most important reason for 33 per cent of such parents. However socio-emotional reasons for accompanying children are now as frequently cited as "child not yet able to cross roads". Forty-seven per cent of parents cite at least one socio-emotional reason but such a reason is the most important only for 9 per cent of parents. Forty-six per cent of parents cite "child not yet able to cross roads" and it is the most important reason for 17 per cent of such parents.

Eighty-three per cent of the respondents were female, and as we have already indicated, it is predominantly mothers among adults who do the accompanying. It is beyond the scope of this survey to assess how families arrive at decisions about who accompanies children but we are able to compare the reasons for accompanying offered by mothers and fathers. The endorsement of reasons by mothers and fathers did not differ except on two items relating to the journey to school. Fathers were slightly more likely to express concerns about the child's ability to cross roads ( $\chi^2 = 3.84$ ,  $df 1$ ,  $p < 0.05$ ), and fathers were also more likely to cite parental enjoyment as a reason for accompaniment ( $\chi^2 = 4.40$ ,  $df 1$ ,  $p < 0.05$ ). With respect to the latter item, it must be added that the father is evidently commenting on the mother's enjoyment not his own as in all of these cases it is the mother who accompanies the child to school.

Although the main focus of this paper has been on levels of accompaniment, mode of transport *per se* is also of interest. For example, Hillman *et al.*'s (1990) report that, in 1990, 67.8 per cent of English junior school children walk, 0.6 per cent cycle, 2.8 per cent bus, and 28.8 per cent are driven home by car (Hillman *et al.*, 1990, Table 49, p. 163). Our Oxfordshire figures suggest 45.2 per cent walk, 7.7 per cent cycle, 11.4 per cent bus, and 35.7 per cent are driven home by car. While it is gratifying to see relatively high rates of cycling in our sample, the figures do suggest an increasing reliance on the car as a mode of transport for children's journeys to school. In comparing our figures with Hillman *et al.*'s, it is important to establish whether the two samples are comparable with respect to car ownership.

Hillman *et al.*'s sample encompasses respondents from areas such as Islington with a low rate of car ownership and West Oxfordshire with a high rate of car ownership. Our Oxford city and fringe area can most appropriately be compared to Hillman *et al.*'s Nottingham area as the 1991 Census reports a similar rate of car ownership in the two areas (62.5 per cent of households in Oxford and 65.7 per cent of households in Nottingham). Thus it is possible to contrast school journeys between 1990 and 1993 in approximately comparable areas. Table III suggests that the percentage of children walking home from school has dropped from 70 per cent in 1990 to 42 per cent in 1993.

**Table III.** Mode of transport to/from school 1990/1993 comparison. Percentage of children using each mode of transport

Mode of travel	Hillman <i>et al.</i> (1990)	Junior school children Current study (1993)	Hillman <i>et al.</i> (1990) Nottingham only	Current study (1993) Oxford city only
	All children	All children		
<i>To school</i>				
Walk	65	42	71	39
Cycle	1	8	0	8
Bus	3	11	2	10
Car	31	39	27	43
<i>From school</i>				
Walk	68	45	70	42
Cycle	1	8	0	8
Bus	3	11	2	10
Car	28	36	28	40
<i>N</i>	522	378	107	246

Source: Hillman *et al.* (1990), Table 49, p. 163

## Discussion

Our data suggest that “stranger danger” is the most important reason determining pattern of accompaniment on the school journey for the parents of seven-nine year old children. This is in contrast to Hillman *et al.* (1990) who emphasize “traffic danger”. Also nearly half of the sample mention socio-emotional reasons for accompanying the child such as allowing contact with other parents. The importance of such reasons should not be underestimated in the light of epidemiological studies which strongly relate social isolation to depression in the mothers of young children (Brown and Harris, 1978; Evason, 1980).

In addressing discrepancies between ours and Hillman *et al.*'s data, we draw attention to a number of methodological differences. As already discussed above, Hillman *et al.* permitted parents to endorse only one reason, whereas we permitted a multiplicity of replies in addition to asking parents to nominate their single most important reason. As Figure 1 and Table II show, “stranger danger” is the most commonly listed reason in both of these categories. It is in fact possible that Hillman *et al.* underestimated the importance of “stranger danger” since some of their sample may have meant “stranger danger” when they endorsed the ambiguously worded item “child unreliable or too young”. Of parents of seven year olds in Hillman *et al.*'s survey, 29 per cent nominated this reason for not allowing their child to come home from school alone (Hillman *et al.*, 1990, Table 10, p. 136) but it is not clear whether the parents meant that the child was, for example, too young to cope with traffic danger, stranger danger, or any other temptation or hazard on the way home.

Some might argue that “stranger danger” would figure disproportionately in parents' minds following the abduction and murder of James Bulger in February 1993. However, it must be pointed out that one or more children are abducted every year in Great Britain, and indeed *The Times Index* for 1990, in the year of Hillman *et al.*'s survey, lists the abduction and murder of five children under the age of 12, one of whom was murdered by another child. In terms of absolute risk, the risk of child abduction and/or murder is, of course, very low indeed. However, as psychologists have repeatedly demonstrated, the perception of risk is not always related to the *reality* of risk (McKenna, 1988; Slovic *et al.*, 1987). For example, people overestimate the risk of rare and potentially catastrophic events (such as being struck by lightning or being involved in a plane crash) and underestimate common risks (such as accidents in the home or smoking-related diseases). In addition parents may well place a higher premium on avoiding one kind of disaster (e.g. death of their child via

abduction) over another (e.g. death of their child via road accident).

Hillman *et al.*'s (1990) study of parental attitudes was more broad-ranging than ours, since they were also interested in non-school journeys and more general issues. In our study we examine why parents accompany their children to and from school, not why such accompaniment occurs by one mode of transport rather than another. The determinants of transport behaviour are complex and their full investigation was beyond the scope of our study. Hillman (1993) also notes that “the erosion of children's freedom to travel independently means that they have far fewer opportunities to do things on their own – all essential elements in the process of growing up” (p. 16). He suspects that the loss of such freedom could be “adversely affecting children's emotional and social development” (p. 16).

Such a proposition requires empirical investigation, although given the complexity of the relationship between specific experience and social/cognitive development (Matthews, 1992), the task will be a complex one. That aside, the importance of the school journey cannot be underestimated as it accounts for almost half of children's journeys (Hillman *et al.*, 1990). Furthermore, because of its frequency and regularity, the school journey is certain to play a very important role in determining a child's attitudes to transport options in later life. An over-reliance on the car in childhood probably sets bad habits for life.

Road accidents are the main cause of accidental death for schoolchildren in the UK and, among these, pedestrian accidents accounted for 194 child deaths (in the 1-14 year old age group) in England and Wales in 1991 (The Office of Population Censuses and Surveys, 1993). Rosenbaum (1993) notes that “the Government acknowledges the rate per 100,000 population of child pedestrians on our roads is one of the worst in Europe” (p. 25). The UK fatality for child pedestrians is 31 per cent higher than the EC average (Department of Transport, 1993). But if policy makers wish to promote children's independence and reduce the use of the car on the journey to school, imaginative measures will need to be devised to assure parents of their children's safety.

In our survey parents on average cite 3.2 reasons for accompanying their children to school, and “stranger danger” is the most frequently cited reason, and ranked as the most important reason. While our data suggest that stranger danger is the key reason determining parents' decisions, traffic danger is also important and measures are required which will satisfy parents on both fronts. In North America the school bus is commonplace,

but although such a solution reduces the number of parental car journeys, it does not provide the children with opportunity for exercise.

In our sample, 18.6 per cent of children go and 21.4 per cent of children come home from school (mostly on foot) without an adult but with other children and it is probable that parents regard groups of children as less at risk from stranger danger than the lone child. Hillman *et al.*'s data suggest that parents are particularly anxious about journeys after dark, and since the school journey mostly occurs in daylight, it is a journey which perhaps has some potential for change. The school journey is also amenable to shared solutions since within a community it is focused on only a few destinations. The opportunity for companionable journeys relates partly to the availability of other children (siblings, neighbours etc.) but it would be possible for schools to take a more active role in promoting and arranging such journeys.

Japan's child pedestrian death rate of 1.5 per 100,000 population aged 0-14 is similar to the UK's rate of 1.6 per 100,000 (Organization for Economic Co-operation and Development, 1992), and yet in Japan, schools do not permit children beyond the age of six to travel to school with an adult (Hendry, 1991). It is the convention for children in the country and the city to walk to school in small neighbourhood groups (Hendry, 1987).

The Japanese solution relates to cultural attitudes which explicitly promote children's independence and their identification with their peer group and neighbourhood (Hendry, 1986, 1987; Peak, 1991). This social arrangement is combined with an extensive network of safe-routes to school and the provision of yellow flags at zebra crossings which children wave as they cross the road to warn drivers of their presence. This practice empowers children in the road environment and is likely to reduce parental anxiety about their children's vulnerability at traffic crossing points. In child-busy areas in Japan, the road signs depict a child jumping out, and the words on the sign are "Watch out for children jumping out". In this way the signs explicitly exhort drivers to recognize that children act impulsively and encourage drivers to slow down in anticipation of an event rather than wait for the event to happen.

Howarth (1988) has shown that drivers in England do not vary their behaviour in relation to child pedestrians and he suggests that drivers are affected by the knowledge that the chance of an incident is so rare as to render caution "unnecessary". From the point of view of the individual driver the chance of an accident is low, but from the point of view of child pedestrians and society, the cost of such accidents is high and therefore one of the

objectives of *The Health of the Nation* is to reduce child accidents by at least 33 per cent by 2005 (Department of Health, 1992).

Drivers can be *encouraged* to adopt lower/safer speeds through a raised consciousness about child safety, the recognition of the impulsive nature of child behaviour, and a harsher system of deterrents. Drivers can be *forced* to adopt lower/safer speeds through traffic calming measures which will radically reduce the amount and severity of accident injury and undoubtedly improve the safety of vulnerable users (pedestrians, cyclists, the young and the old). However, such policies will have little impact on children's journeys to school if parents are as concerned, or even more concerned, with stranger danger than traffic danger.

It is our conclusion that Hillman *et al.*'s (1990) characterization of parental reasons for accompanying children on the school journey is incomplete. An over-emphasis on traffic danger runs the risk of minimizing the other components of parental anxiety.

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#### Appendix: glossary

- SD Standard deviation
- $F$  F value (statistical tabulation of the ratio of two variances).
- $\chi^2$  Chi-square statistic.
- df Degrees of freedom.
- ns Not significant statistically at a given level of significance.
- $p$  Probability or level of significance, e.g.  $p < 0.001$  describes a probability of less than 1 in 1,000 that the finding of significance could have occurred by chance.
- $r$  Correlation coefficient.
- $N$  Sample size.

# Rejoinder to parental attitudes to children's journeys to school

## by Mary Sissons Joshi and Morag MacLean

Mayer Hillman

### A reply to Joshi and MacLean's article

A major justification for Joshi and MacLean undertaking the study reported above is their claim that the 1990 study by Adams, Whitelegg and myself (Hillman *et al.*, 1990) employed a carelessly-worded questionnaire which produced misleading findings and that this has serious consequences in terms of interpreting the reasons given by parents for restricting their children's independence.

Their reservations about the validity of the conclusions of our study stem from their observation that the parents in our survey were asked only for the *main* reason for the restrictions rather than being provided with the opportunity to cite multiple reasons. In their view, this explains why they found that "stranger danger" is a more common reason than our finding that "fear of a road accident" is more common.

In an attempt to justify their judgement, they contrast the pattern of school journeys in their survey area in Oxford City and Oxfordshire in 1993 with ours by abstracting data from one of our 1990 survey areas, namely Nottingham, which the 1991 Census shows to have had a similar rate of car ownership to their survey area.

What they seem to overlook is the fact that the differences in our findings on this issue are more likely to be accounted for by several important factors other than that parents in our survey were limited to providing only the *main* reason for imposing restrictions.

First, we do not know how representative the Joshi and MacLean sample was as most of the parents interviewed

were found in shopping areas, possibly biasing the response whereas, in our survey, we had a 96 per cent response rate from the parents of the children in our schools. Further grounds for concern about the representativeness of their sample is that they recorded 49 per cent of the ten and 11 year-olds being accompanied to school as the parent was "going that way anyway" whereas, in the case of the seven to nine year-olds, this held true for only 20 per cent of the respondent parents. Something odd is evident here.

Second, the scope of the questionnaire in their survey was far less comprehensive in coverage than in ours which allowed, for instance, for analyses of key influences, such as household car ownership and licence-holding, surprisingly omitted from their questionnaire.

Third, they critically overlook the fact that their area is far from comparable with ours from the viewpoint of the key factor of distance to school. In their survey area, 60 per cent of the children lived within one mile of school whereas 95 per cent of the children we questioned lived within one kilometre of school! This obviously goes some way towards explaining why our survey recorded 71 per cent walking to school whereas theirs recorded only 46 per cent. It is salutary to note too that even the comparison of areas is somewhat dubious as, in our survey, the distance from home to school was carefully calculated from detailed Ordnance Survey maps whereas, in their survey, the distance was estimated by the respondent. These points could well explain why Joshi and MacLean found no relationship between distance from school and the level of accompaniment whereas, in our surveys, we found it to be *strongly* related, with for instance 41 per cent travelling alone where the school was within half a kilometre of the child's home, but only 10 per

cent where the school was more than two kilometres away.

Fourth, greater concern was expressed by the Joshi and MacLean respondents on the subject of “stranger danger” with younger children, whereas we found concern on this subject to be inversely related to age – more often cited with older children – a finding which we thought likely to be because of fear of sexual molestation existing in parental minds where their children were more sexually mature. This was borne out in our analysis by gender which showed this concern cited more frequently by parents of girls. Yet, remarkably, Joshi and MacLean found no gender differences.

Fifth, Joshi and MacLean suggest that concern on the subject of “stranger danger” was as prevalent during our survey period as during theirs. In support of this contention, they went to the trouble of finding out from *The Times Index* that five children under the age of 12 were abducted and murdered in 1990, the year of our surveys. However, our surveys were carried out early in 1990. In fact, such concerns have been heightened considerably in recent years because of the exaggerated

attention paid by the media to these rare and emotionally sensitive incidents, such as the James Bulger abduction in a crowded shopping mall which happened after our surveys were completed. Moreover, the organization Kidscape has been very active since the beginning of 1993 in promoting perceptions among caring parents that the outside environment contains potential child molesters – its slogan to encourage children to be wary of strangers approaching them, that is *anyone* unknown to the child, has been to “yell, run and tell”!

The only realistic conclusion which one can draw from the above is that the Joshi and MacLean area was somewhat atypical and that the differences in their findings regarding parental reasons for restricting children compared with those that we recorded stem from several critical factors such as the more common fear of child molestation and abduction rather than our request that parents cite only the main reason for the restriction.

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# Urban space and logistics: on the road to sustainability?

Markus Hesse

Considers the transportation of urban goods

## Urban space and logistics – a framework for sustainability

Arguing with the necessity for more sustainability in the urban and regional environment, there is actually no need for further explanations. Basically, there are five fundamental goals in sustainable development as recently formulated by environmental planners in the UK (see Blowers, 1993):

- (1) *resource conservation* to ensure the supply of natural resources for present and future generations;
- (2) *built development* to ensure that the development and use of the built environment respects and is in harmony with the natural environment;
- (3) *environmental quality* to prevent or reduce processes which degrade or pollute the environment, to protect the regenerative capacity of ecosystems, and to prevent developments which are detrimental to human health or that diminish the quality of life;
- (4) *social equality* to prevent any development which increases the gap between rich and poor and to encourage development that reduces social inequality;
- (5) *political participation* to change values, attitudes and behaviour by encouraging increased participation in political decision making and in initiating environmental improvements at all levels from the local community upwards.

The transportation sector – and in particular freight transport – is an important field for local sustainability strategies, since it causes severe environmental, social and economic problems in towns and regions, such as air pollution, noise emissions, infrastructure and land use demand – much more than its average share of motorized trips in urban transport may indicate. There is a rising conflict between functional requirements of freight

movement and commercial traffic and the significance of the city as a residential and recreational habitat.

In this context, the basic objectives for strategies of “greening” logistics are: improving freight traffic efficiency (from the economic perspective); improving freight traffic acceptability (from the social perspective); and improving freight traffic sustainability (from the environmental perspective).

## Planning approaches for freight traffic policy

Compared to passenger traffic, freight transport planning is nevertheless much more difficult to steer. Since it would not be successful to set up comprehensive but inadequate planning rules and strategies, investigating realistic strategies means considering the following:

- From the urban planning point of view, many subsystems of logistics are undergoing a process of “fragmentation”, corresponding to the structural change: the number of delivery activities and frequencies, the number of involved companies and the specific logics of each urban distribution channel limit a comprehensive planning strategy.
- An important problem is also derived from the functional and physical “distance” between the location of the enterprises and the location of the environmental damage, caused by their logistical structures. When the stock in shops is reduced and the orders function in short terms, or when more large trucks are operating because of their cost advantages, those decisions are made far away from the frequented area. The question is whether and how the logistical chains can be influenced “backwards” from that location.
- Accessibility provided by transport and logistic facilities is becoming a major factor in evaluating potential production locations and thus is a central parameter in regional business development. Economic as environmental problems of business-related-traffic are locally handled in a very sensitive matter. The reason is that every

authority is interested in maximizing the economic vitality and the enterprise's conditions, so there may be a certain willingness to accept external effects of transport.

- The planning knowledge in freight traffic is not very advanced; the existing data sources are more or less directed only towards long-distance transport. In most European cities there is a poor knowledge of local freight transport, as there is much less experience in managing it.

As difficult as this "operating arena" of freight and commercial transport may appear, it is obviously necessary to develop planning and communication strategies to integrate freight transport into the local and regional planning process – step by step. This is an ambitious task and requires a clear understanding of the real structures and the desired future. First of all, the relevant structures, volumes and problems of commercial transport should be elaborated, related to the conditions of space and time, the diverse participants and their problems. This is an important prerequisite for any practical measure.

### Changing structures of commercial transport – a case study

The following results are valid for the tri-city region Remscheid-Solingen-Wuppertal (North Rhine Westphalia, Germany), but they may be representative of other German or European cities of that size. The population consists of more than 670,000 inhabitants, and the urban area is characterized by high density and specific topographic bottlenecks for transportation. Economically, the region has an old industrialized structure, dominated by export-oriented industries (textiles, machine tools, paper, electronics, divers automobile-components etc.); there is also a long tradition in servicing small firms by professional forwarders and transporters.

The research is based on transportation analyses, statistical surveys and nearly 700 inquiries into retail, industry and transport economy. From that perspective, freight transport in urban areas is characterized as follows (Hesse, 1994):

- The average share of commercial traffic is estimated at nearly 30 per cent of all daily motorized trips in town. Twenty per cent of these account for the service functions, most of them done by passenger cars, 10 per cent account for trucks and delivery lorries, dependent on the different land-use patterns.
- Nearly 60 per cent of the lorries belong to the 7.5 tons maximum weight category, the others are above; only a small percentage consists of heavy-vehicle traffic (28 tons, 44 tons total), which occurs

not only in industrial areas, but is also related to the food-store delivery into residential areas.

- A significant part of the city delivery is related to retailers (textiles, food, pharmacies, book-stores, flowers etc.; especially warehouses and super-markets) and to the industry (each nearly 30 per cent), further trips stem from construction, waste management and others.
- The average daily delivery volume is very differentiated: while small retailers are going to be served only twice to five times a day (e.g. small textile stores), food stores tend to be delivered 15 to 25 times a day, dependent on the size and the diversity of the goods supply. Supermarkets and warehouses are the most frequented retail locations with more than 40-50 lorry trips a day.
- The real transport function is served by forwarders and transporters (nearly 30 per cent), shippers (more than 30 per cent), retailers themselves and specialized logistic firms. Most of the relevant logistical dispositions stem from either the shippers or the receivers, not from the forwarders and transporters.
- The time-scale of the delivery function tends to be spread out over the whole day, with peak periods in the later morning and early afternoon. More and more goods are going to be distributed in the early morning (fresh food, newspapers) or during the night (car components); national and international long-distance transport is operated in many cases during the night time.
- Most of the participating firms expect an increase in delivery frequency over the next few years (52 per cent of those questioned), because of more short-term-demand-oriented goods supply by shippers and distribution chains.

### Conclusions

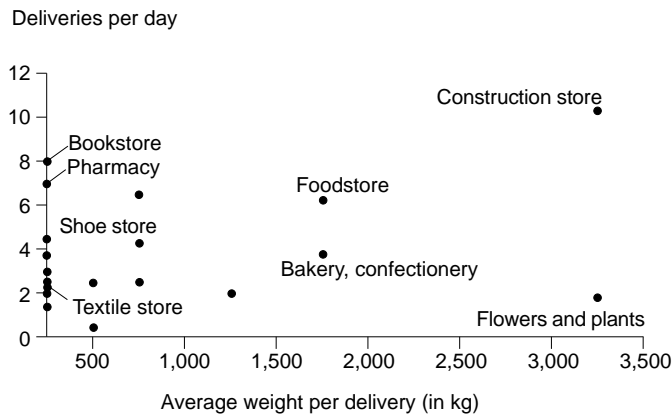
According to the structural change within a rationalized supply and demand of logistic services, the future estimations for freight traffic are characterized by a growing diversity of products and distribution channels, increasing distances and vehicle miles travelled, and a growth in the volume of transported goods in total (see Figures 1-5).

### Freight transport and the urban environment

There are several problems for the environment, urban construction and social interests, derived from commercial transport, and in particular freight traffic. The underlying impact processes can be explained as follows:

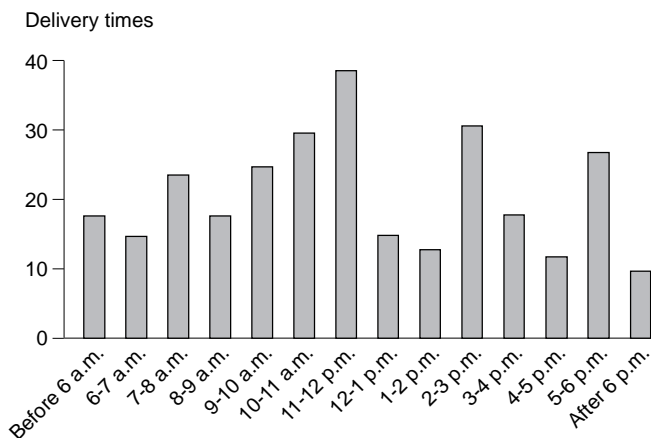
- (1) The increase in the intensity of daily or weekly delivery, following the interest of firms in reducing

**Figure 1.** Transport frequency and volume



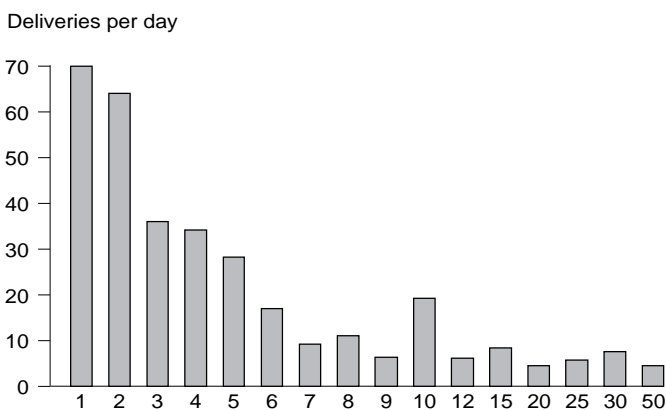
Source: IÖW 1993

**Figure 2.** Commercial transport in central city areas



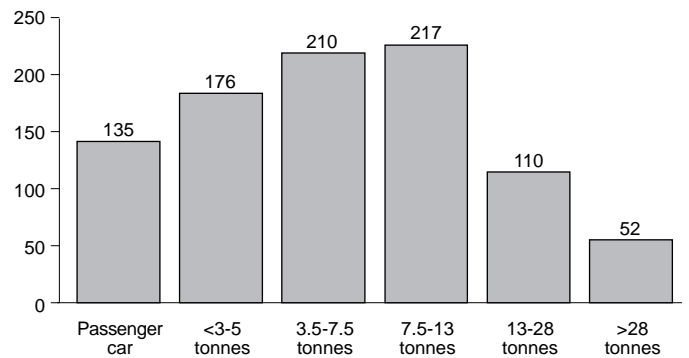
Source: IÖW 1993

**Figure 3.** Commercial transport in central city areas



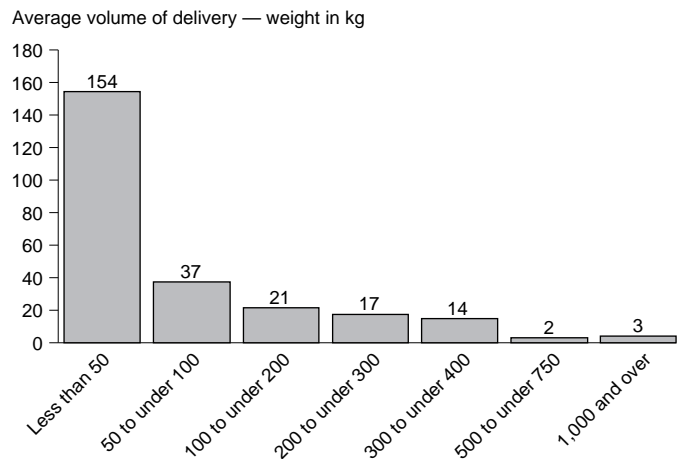
Source: IÖW 1993

**Figure 4.** Type of vehicle, delivery traffic (1993)



Source: IÖW 1993

**Figure 5.** Average delivery volume (1993)



Source: IÖW 1993

stock in shop and establishing a short-term-oriented demand for goods; this occurs in the industry, e.g. by increasing the share of “just-in-time” production, and in the retail business also (see Bromley and Thomas, 1993).

- (2) An increasing volume of larger and heavier lorries, because of the cost advantages of high-volume-traffic. The bigger and heavier the lorries are, the more intensive will be the damage on the road infrastructure.
- (3) There is an increasing demand for space because of the reduction of stock in shop and the functional setting up of logistical services (forwarders, integrators). New functions along the logistical chains require in many cases new locations for certain enterprises such as subcontractors, integrators etc. (Hesse, 1993).

Following the growth of the vehicle miles travelled, the growing average share of road transport on the total freight; and the growth of heavy-vehicle traffic, energy

consumption, noise disturbances and exhaust emissions are increasing. For example, freight transport accounts for 40-50 per cent of all total urban transport's emission of nitrogen oxide. Also of importance – and largely underestimated – are the material and financial implications for public infrastructure maintenance, derived from heavy-vehicle transport.

Politicians, enterprises and local administrations were not aware of those problems for a long time. But public concern about freight transport problems has increased with the process of deregulation and liberalization of the transport economy in the European Single Market, which has been a primary driving force in transport growth over the last few years. Also, companies themselves are interested in new solutions since congestion arises and leads to time and money losses. The basic question is: could there be a common interest of the economy and the environment to make freight transport more efficient and less expensive?

### **Business and planning – a communication problem**

Integration of urban planning, urban design, business operations and transportation activity must give due consideration to the complex structures which make up the city, the need to supply the city with goods and the overall traffic volume. Seen as a central task in this regard is the provision of an arena for communication and co-operation among the various operatives in this field. Relations between city planning authorities and the business community are, however, strained within the region being studied:

- New demands on urban design are in conflict with traditional and modern demands in terms of (transportation) infrastructures as seen from the commercial user's point of view.
- There is dissonance between urban planning and commercial traffic in the context of the specific development dynamics of the transportation sector and, in particular, the growth dynamics of freight movements. The transportation sector is becoming a central driving force in urban development.
- The complex problem of urban planning and business traffic is also characterized by under-developed capabilities on the part of operatives to reach agreement and to act out conflicts. There is virtually no exchange of ideas and information between these two action levels; each side presumably knows relatively little about the motives, problems and constraints of the other side.
- Finally, the political decision-making situation is contributing to ever greater dissonance. Both

groups of operatives, private and public, move within a society in which a political decision-making process – characterized by political bodies regulating public order and arbitrating conflicts – is being replaced to an increasing extent by the articulation of special interests (especially by representatives or lobbyists appointed for this purpose).

The research project has executed a "Freight Traffic Round Table" to promote discussion and to provide a venue in which the appropriate conflict management techniques could be implemented. The intention was to spark willingness to exchange opinions, to lend transparency to each participant's interests, and to explore the leeway available for formulating solutions which promise to find consensus. Over two-and-a-half years, 30-40 representatives of companies, city authorities and research came together twice a year to have an exchange of problems, instruments and experiences related to their daily business, moderated by the research project and accompanied by the chamber of commerce.

This very concrete and detailed exchange led not only to a better understanding of each other's position, but made a more flexible, efficient impact and concept assessment possible. Although no final solution was reached by the participants (and a city-logistics experiment failed because of lack of interest and participation of retailer firms), the round table helped to set up a joint goal system for the region's future freight transport policy. Some of the strategies explained in the next section will be executed in a joint action by private and public participants over the coming years.

### **Policy strategies and opportunities**

A successful strategy for freight transport policy depends first on the ability to find a local and regional consensus between the relevant operators along the logistical chains at the federal, state, regional and local level. The purpose of participants should be to search for a "principle of territory", through closing the gap between the causes and damages of logistic usages and through increasing certain qualifications and implementing ability of city and regional authorities to deal with logistics in urban space.

There are several measures and instruments available to participants in terms of transportation planning and management, legal ordinances (regulation policy), technology and fiscal strategies. The following points offer an overview (source, Institut für ökologische Wirtschaftsforschung, 1993):

(1) *Measures of road and rail management and transport planning:*

- integration of goods movement into transport planning policies;
- specified truck management within the road network (telematics);
- delivery infrastructure in public space (roads, parking lots, delivery lots, pedestrian zones);
- delivery ordinances for industry and retail sites;
- improvement of the rail transport system.

(2) *Measures of time management:*

- enforcement and management of time windows for delivery;
- enforcement of speed limits for trucks;
- organization of heavy-vehicle traffic outside peak hours and periods;

(3) *Terminals and infrastructure:*

- site planning for freight terminals;
- site planning for logistic subcentres;
- telematic infrastructure for terminal networks;
- integrated supply of rail infrastructure.

(4) *Land use planning:*

- location planning for industrial and commercial sites;
- location planning for logistic firm sites;
- mixed use site planning.

(5) *Local/regional fiscal strategies:*

- road pricing;
- local “feebates”.

(6) *Construction management:*

- organization of construction management outside peak hours and periods;
- local material supply stocks for construction companies and building projects;
- infrastructure supply and improvements for big construction projects.

(7) *Vehicle technology and fleet improvements:* submission of advantages for low-noise- and low-emission vehicles in public space.(8) *Dangerous goods movement:*

- definition of road networks allowed for the transport of dangerous goods;
- definition of restrictions for the transport of dangerous goods.

(9) *Community and company co-operation:*

- development of a local and regional “Freight Transport Information Network”;
- enforcing co-operation by round table talks.

(10) *Deregulation of logistic enterprises:* support of freight transport co-operatives.(11) *Public-passenger transit:*

- development of goods movement supply in public transit systems;
- use of underground infrastructure for freight traffic.

(12) *Local energy supply policy:*

- support of natural gas and District Heating infrastructure;
- reduction of coal and gasoline delivery.

**Road and rail improvements**

Road and rail infrastructure management could provide some better conditions for freight transport. Designing specific time and space options and regulations (e.g. loading zones) helps rationalize the truck operations and minimizes the duration of stops, which can be economically and environmentally positive. Here the entire impact of certain measures should be taken into consideration: from the environmental perspective, it is not desirable to widen the infrastructure or to support day and night delivery in towns.

Designing a specific routing ordinance for maximum-loaded trucks or dangerous goods offers chances to reduce the damage caused by heavy vehicle traffic. Another opportunity is to integrate the railway systems into the long-distance network of big industries or retailers, e.g. hub-and-spoke-logistics; several warehouse companies are using railway infrastructure for their distribution concepts.

**Land use planning**

Land use and location planning decisions are very important for freight transport management especially in consideration of the restricted opportunities for managing existing usages. If new business projects are being planned, such as shopping centres, retail stores etc., urban planning should develop delivery ordinances and step-by-step co-operation concepts alongside transporters and customers or developers, to minimize the increasing amount of delivery activities in sensitive areas. Both require interactive communication between public and private participants.

Practical measures are given to support low-emission vehicles and lorries with capsuled engines (low noise emissions). Because of the higher expense of rail transportation (in many cases rail transport is also less capable and convenient) compared to environmentally friendly lorries, rail transportation solutions are not very popular from the firm’s point of view. As a result of this, it is necessary for public authorities to offer incentives to those firms which voluntarily operate with more

sustainable systems (adequate time windows, open access to central business district (CBD), co-operations etc.).

### **Communication and co-operation, "City-Logistics"**

Further strategies are directly based on organizational innovations between several firms to improve distribution efficiency and to establish highly organized logistical chains within the city. Shippers, transporters and customers should come together, not only to develop efficient paths of organization within each distribution channel, but also to make synergies between different participants possible. This kind of public and private interaction requires detailed knowledge of the specific operating conditions of each participant, and it also needs self-confident individuals, not only within the firms but also in the public arena.

A current example of successful co-operation strategies is the so-called "City Logistics" system. This means the shift in the delivery from a product-related distribution to a space- or customer-related distribution. Seen as a close co-operation between several forwarders, these models are already operating in practice. They are primarily directed towards problem spaces (CBD) and special "problem customers". Space-oriented models are currently practised in Freiburg, Germany (four co-operations with 12 forwarders), Kassel, Germany (one transporter with CBD-freight-flows of ten forwarders) and Ulm, Germany (joint disposition for two companies). "Problem customers" such as hypermarkets, or logistical locations of the big retailers are operating in Bremen, Germany (nine forwarders), Cologne, Germany (four forwarders), also in Stuttgart, Berlin and Frankfurt (all Germany). From Switzerland we recently know of three pilots of City Logistics: Zürich-Oerlike, Biel and Basel. A current state of the art report on City Logistics estimates the number of City Logistic discussions in Germany at around 60, and projects in operation at around 20 (Syntonics AG, 1995).

The potential of City Logistics is to achieve more efficiency in the delivery process, especially by reduced operating time for the trucks in the CBD; reduced vehicle miles travelled (VMT); and less heavy vehicle traffic in sensitive areas. That makes a hopeful combination of economic and ecological incentives come true. The most recent German pilots of City Logistics are located in Freiburg and Kassel. In Freiburg it was possible to reduce the monthly number of truck operations from 440 to 295 (by 33 per cent), the number of the trucks within the pedestrian zone was reduced from 352 to 171 (by 51 per cent). The operating time of the trucks was reduced on average by 48 per cent from 612 hours to 317 hours (Thoma, 1994). The Kassel pilot showed a reduction of VMT related to the CBD by nearly 40 per cent and a

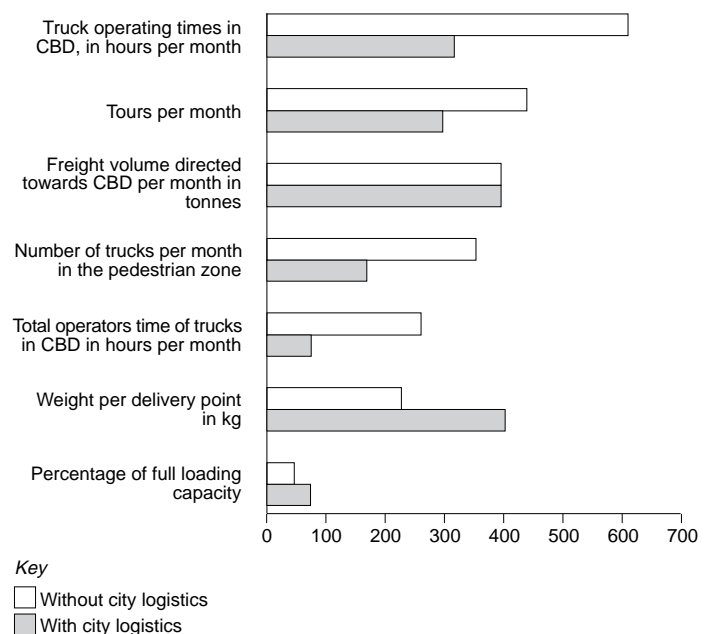
reduced VMT by nearly 70 per cent; the number of the delivering trucks decreased by 11 per cent (Strauss, 1995). Since this is very impressive, it is necessary to consider that, at the moment, City Logistics are valid only for a certain part of the central city's commercial traffic and these are also only responsible for a certain part of the CBD-related delivery. The amount of that part of the delivery is estimated at approximately 31-36 per cent of all delivery operations and nearly 30 per cent of the weight of the goods. Nevertheless, the first results of the pilots in Germany and Switzerland offer some hopeful strategies for making urban goods movement more acceptable, if these initial steps can be transformed to other elements of the entire delivery process to integrate them into a comprehensive urban logistic system (see Figure 6).

### **Telematics**

Looking at the current ranking of potential instruments and measures, telecommunication seems to be very popular as a hopeful strategy for managing transport and material flows. But it is still unknown whether telematics could help us to improve the efficiency of road transport by increasing the load average: in free market competition there exists no "transparent" lorry.

However, much know-how and resources are directed towards the road system, we would still need to consider the participation of modern railway systems in the enforcement of telematic innovations: to improve rail efficiency, to increase its capacity and to gain a higher market share in the distribution economy. This will be necessary without any doubt.

**Figure 6.** *City Logistics: the Freiburg case*



Source: Staudte (1994)

### Future requirements

There are several opportunities to make urban goods distribution more acceptable but the future task in freight transport policy will not be to make growing transport demand as efficient as possible. In terms of sustainability (see Daly and Cobb, 1989), the real task consists of:

- Minimizing the general and specific transport demand of the producing-consuming-waste-management chain; here we need new instruments to estimate the transport demand of new production concepts or locations, by a life-cycle assessment of logistics.
- Avoiding additional transport and limiting transport growth, e.g. by supporting “compact city” strategies and new industrial districts, which could lead to more “proximity” in production and consumption and less division of labour in space.
- Finally, every regional and local strategy requires a framework of nationally and internationally negotiated and thus accepted pricing policy. The basic aim is: “getting the prices right”, for supporting a less material-intensive structural change, with more services and less energy and material consumption in the economy.

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