THE SCHOOL-RUN: characteristics and impact on congestion in Larne

Professor Alan R. Woodside, Dr. Banihan Gunay and Mr. Jonathan Seymour

Transport and Road Assessment Centre, University of Ulster

1 Introduction and Statement of The Problem

School travel continues to be one of the most fascinating areas of work as many new initiatives continue to be developed, not only across the United Kingdom, but throughout the world, according to Mr. Graham Riley (2001) the Road Safety Promotion Unit Manager in Leeds City Council. Despite these developments, work by Jones and Bradshaw (2000) has stressed that a "whole series of barriers need to be tackled". Many parents would welcome an opportunity to drop out of the school-run and it is the greatest untapped potential in improving public transport.

In Northern Ireland the public's "love" for the motorcar is particularly strong and the authors predicted that the subsequent effect of the school-run would be exacerbated by this fact. As a result of this hypothesis the effect of the school-run on a single provincial town was selected as a microcosmic sample of the whole province.

The initial problem would appear to be traffic congestion in the vicinity of schools and or the surrounding infrastructure, which in turn leads to time loss, accidents, road rage, unhealthy environment and less fit children. The primary cause of this congestion appeared to be the excessive number of parents "delivering" their children in private cars many of which were single passenger occupancy. Furthermore the time of arrival of pupils and the school start-up times all appeared to be similar across the complete town. Finally the road layout and land use in the precincts of the various schools appeared to be of a permanent nature and not easily modified. Consequently the problem could be clearly defined in terms of "traffic", "time" and "township".

2 Factors Affecting The Magnitude of The Problem

There would appear to be six main factors that affect the choice of mode, and in particular the use of car-borne escorted travel to school. These six main factors are:

- 1. topography/geography,
- 2. weather conditions,
- 3. parents detouring on the way to work,
- 4. stranger danger,
- 5. road safety, and
- 6. socio-economic factors.

These factors all play a part in the 'school run'. However, from the research done in Larne it would appear that the main factor behind the high percentage of pupils being driven to school was socio-economic. 57% of pupils found the car was more comfortable or convenient. However, the socio-economic factor can be subdivided into at least four other constituent parts such as: disposable income & level of car ownership, level and type of education, social status, and time constraints (Figure 1).



Figure 1: Pupils driven to school and their reason.

It is highly probable that the level of disposable income and the number of cars in a household plays an important part in the choice of mode chosen for travel to school. When the pupils who walked to Larne Grammar School were questioned as to why they chose their mode, the majority (45%) claimed that they had no other option. So walking could be construed as the mode of (Hobson's) choice for 'poorer' children (Figure 2).



Figure 2: Pupils who walk to school and their reason.

On comparison of the modal split between the two schools sampled, it is clear that there is a socio-economic differentiation between the percentage of pupils driven to school. The Grammar School had twice the percentage of children driven to school and less than half the percentage walking to school as the comprehensive type Larne High School (Figure 3).



Figure 3: A comparison of the modal split between LHS and LGS

Social status may also play and important part in the adopt of the 'school run'. Walking to school may not be as 'trendy' as being driven to school. What could be construed from this is that pupils in more 'elite' schools are less likely to walk than their working class counterparts.

There is most likely a prestige factor, or one-upmanship element to the problem, as children of richer parents want to the seen in their parents' new cars.

Social status may also affect parental attitudes, as they see the large number of children walking to the comprehensive school and would not want their children to associate, be bullied or intimidated by them. In Northern Ireland and other parts of Great Britain this problem may be exacerbated by sectarian or racist tension.

Social status affects the parents' choice of school for their children. Parents will choose a primary school with the mindset of achieving a place in a certain university. They will be aided in this respect by the league table of school results and the reputations of the various schools available. In Northern Ireland assessment is made in the final year of primary school using the 'Eleven plus' examination and this is the basis for entry to a Grammar school for a secondary level education. In Belfast, parents will drive cross the city to deliver their child to school, and because this is not their nearest school the pupils will not therefore be eligible for free transport.

Time constraints undoubtedly play an important part in the 'school run'. Once parents used to escort their children by foot to school, but now they are deposited outside school before their parents proceed on their busy schedule. For many parents the 'school run' is now becoming part of their daily commutes, where they detour to the school before proceeding to work.

In the case of large families with children of different ages, this means that the parents need to deliver the children to several schools at different locations in the town before 0900. This can increase levels of stress and impatience in drivers and as a result they may disregard traffic and road safety regulations.

3 Traffic Data Analysis

3.1 Traffic flow comparison, all positions

The traffic flow data were collected at three different sites as shown in Figure 4. The aim of the survey was to record traffic flow past the two schools (Larne Grammar School and Larne High School) and on one of the busiest roads in Larne, The Roddens.



Figure 4: Map of the survey points in Larne.

The traffic was recorded in 15 minutes intervals, starting at 0730 and finishing at 0930 on four dates: 19 December 2000 (the pilot survey), 03 January 2001 (all schools off), 04 January 2001 (52% of pupils return to school), and 05 January 2001. The total traffic flows for each date and time are shown in Figure 5.



Figure 5: The total traffic flows for each date and time.

The idea of the school survey was to record the increase in traffic generated by the school term time when compared to holiday periods. The problem arose during the

© Association for European Transport 2001

survey concerning the start of the next term for each school. It was envisaged that all schools would be on holiday on the 03 January 2001. On the 4 January 2001 the Grammar School and some of the other schools would return and by the 05 January all schools would have returned. In the end five of the twelve schools did not return until Monday 8 January 2001. So the data for 'All schools' was based on the pilot survey, 19 December 2000, and the data for the school holiday period was based on the survey conducted on the 03 January 2001.

Figure 6 compares the level of the traffic flow between the 19 December 2000 and 3 January 2001 on various positions and turning movements during the entire rush



hour.

Figure 6: Traffic flow comparison at all positions, 19 December 2000 and 03 January 2001, between 7.30 and 9.30. For the descriptions of the numbers shown on the x-axis, see the appendices at the end of the paper.

If we consider only traffic between 0800 and 0900, the traffic flow levels take the form given in Table 1.

| Positions* | 19 Dec 00 | 03 Jan 01 | Difference |
|------------|-----------|-----------|------------|
| 1-1 | 44 | 5 | 39 |
| 1-2 | 294 | 148 | 146 |
| 1-3 | 82 | 28 | 54 |
| 1-4 | 140 | 46 | 94 |
| 2-1 | 48 | 6 | 42 |
| 2-2 | 324 | 236 | 88 |
| 2-3 | 211 | 91 | 120 |
| 2-4 | 217 | 82 | 135 |
| 3-1 | 43 | 19 | 24 |
| 3-2 | 57 | 27 | 30 |
| 3-3 | 128 | 44 | 84 |
| 3-4 | 160 | 78 | 82 |
| Totals | 1748 | 810 | 938 |

Table 1: Traffic flow levels at various locations during the maximum congested period,8.00-9.00 am, on two dates 19 Dec 00 and 3 Jan 01

* For the descriptions of the numbers, see the appendices at the end of the paper.

Figure 7 is a graph of traffic flows for the 19 December 2000 and the 3 January 2001 with the three positions and 12 turning movements collated. The increase in traffic between the two periods was 1322 vehicles or a 179% increase in flow. Or put another way, at the positions surveyed, the 'school run' composes at least 44% of



morning peak traffic.

Figure 7: Traffic Flow Comparison, all positions, 03 Jan 01 & 19 Dec 00, 0800-0900. For the descriptions of the numbers shown on the x-axis, see the appendices at the end of the paper.

These findings show that there was a significant increase in traffic flow during the school term between the hours of 0800 and 0900. The increase was 938 vehicles, or a 216% increase in flow. In another words, the 'school run' would appear to compose 54% of peak hour traffic at the three positions.

3.2 Traffic Flow Comparison on the LCR & The Roddens, 19 December 2000 and 3 January 2001, 0730-0930

On the sections of road examined in this area there is also an obvious increase in vehicle flow. The increase in vehicle flow is 741 vehicles, or a 194% increase. The 'school run' would appear to compose at least 49% of peak period flow. If the graph is restricted to the period 0800-0900, the flow values are as shown in Table 2.

| | Positions | 03 Jan 01 | 19 Dec | Differenc |
|--------------------------|-----------|-----------|--------|-----------|
| | * | | 00 | е |
| Roddens, | 3-2 | 27 | 57 | 30 |
| downhill/southwards | 3-4 | 78 | 160 | 82 |
| Lewer Coirposette Deed (| 1-2 | 148 | 294 | 146 |
| Lower Carncastie Road / | 1-4 | 46 | 140 | 94 |
| Meetinghouse Street | 2-1 | 6 | 48 | 42 |
| | 2-4 | 82 | 217 | 135 |
| Totals | | 387 | 916 | 529 |

Table 2: Traffic flow comparison, 19 December 2000 and 3 Jan 2001, 8.00-09.00 am

* For the descriptions of the numbers, see the appendices at the end of the paper.

On the sections of road examined between 0800 and 0900, there are significantly higher flows than those that have been shown in the previous tables. The increase in vehicle flow was 529, or a 237 % increase. This means that the 'school run' composes at least 58% of peak hour flow on these stretches of road.

Obviously the 'school run' will compose a greater percentage of traffic near schools and that this will decrease with distance away from schools. Therefore it would be unsatisfactory to claim that the 'school run' composes 58% of peak hour traffic. However, this also begs the question, what locations does the DETR use for the National Travel Survey? Does it simply examine the increase in flow, over the two periods, based on flow along main roads or does it have some other way?

If the two-way flow on the Lower Cairncastle Road is examined in isolation Table 3 and Figure 8 can be drawn.

| • | | | | | |
|---|-----------|-----------|----|-----|------------|
| | Positions | 03 Jan 01 | 19 | Dec | Difference |
| | | | 00 | | |

| Table 3: | Traffic flov | v comparison | on the LCR. | 03 Jan 01 8 | & 19 Dec 00 | 0800-0900 |
|----------|--------------|-------------------|-------------|-------------|-------------|-----------|
| Tuble 0. | In anno not | • ••••••••••••••• | | | | |

1-4

2-1

2-4

Lower Cairncastle Road /

Meetinghouse Street

Totals

* For the descriptions of the numbers, see the appendices at the end of the paper.

46

6

82

134

94

42

135

271

140

48

217

405



Figure 8: Graphical illustration of Table 3. For the descriptions of the numbers shown on the x-axis, see the appendices at the end of the paper.

On the Lower Cairncastle Road, between 0800 & 0900, there is an increase of 271 vehicles or a 302% increase in traffic. This indicates that on the LCR the 'school run' composes at least 67% of peak hour traffic flow. If the down hill (southward) flow past Larne High School is also examined in isolation then Table 4 can be constructed.

| Table 4: Traffic flow comparison or | n The Roddens, (| 03 Jan 01 & 19 D | ec 00, 0800-0900 |
|-------------------------------------|------------------|------------------|------------------|
|-------------------------------------|------------------|------------------|------------------|

| | Positions * | 03 Jan 01 | 19 Dec 00 | Difference |
|-------------|----------------|-----------|-----------|------------|
| The Roddens | 3-2 | 27 | 57 | 30 |
| | 3-4 | 78 | 160 | 82 |
| Totals | | 105 | 217 | 112 |

* For the descriptions of the numbers, see the appendices at the end of the paper.

On The Roddens between 0800 & 0900 there is an increase of 1122 vehicles or a 207% increase in traffic flow. This means that the 'school run' composes at least 53% of the peak hour traffic.

4 Suggestions to Reduce Congestion Outside Schools

As stated earlier, the problem of the 'school run' is exacerbated by the following three factors:

- Congestion due to high levels of traffic on the roads around schools
- Lack of traffic management schemes
- > The scheduled start times of schools and workplaces

If any of these three factors could be altered then the impact of the 'school run could be reduced.

4.1 TRAFFIC - Reducing levels of traffic

To reduce the levels of traffic around schools requires there to be a significant modal shift from the car to other forms of travel. To do this necessitates the development and highlighting of alternatives and measures to persuade parents not to drive their children to school, or not least right to the front gate.

Bus

As the research has already shown that children who live beyond the three mile limit are more likely to use public transport, then the focus of attention is the children who live within the three mile limit but who are too far away from school to comfortable walk. One of the best ways to serve these pupils is by bus transport.

As most of the secondary schools are dispersed throughout a town and are often sited away from the town centre, only arterial town bus services will service them. The potential therefore exists to develop either urban school bus services or to reroute certain morning and evening bus services to stop at the schools.

Walking & Cycling

Schemes have been tried to encourage children to walk and cycle to school such as the 'Walking Bus, and 'Cycle Bus'/'Cycle Train'. However, teenagers may not use such schemes which are perceived as lacking 'streetcred'. Cycle education and training may give pupils and their parents the confidence to allow their children to cycle to school. This could be enhanced nearer schools by dedicated walking routes and cycle paths protected from traffic. The training could be part of an ongoing traffic awareness scheme taught to all children up the school system.

Liftsharing

Liftsharing could be encouraged by the school to reduce the number of vehicles outside schools. The chauffeuring could be organised between parents living in close

proximity to each other or who pass the houses of other children subject to insurance arrangements.

4.2 TIME - Staggered start times

Perhaps the most important factor in determining the magnitude and impact of the 'school run' is the 0900 deadline that constrains most of the working and studying population. If measures could be proposed and adopted that widen the range of start time in schools and workplaces, then the traffic flow level, that peaks at 0850, could be flattened and lengthened. This would mean that if there was not a modal shift from the present modes, the average traffic flow in the morning and evening peak periods would still be lower but last longer.

If this state of staggered start times was adopted then the US model of schooling could be used, where the older students start earlier then the younger. This has two advantages:

- School buses can be more efficiently used, performing several 'runs' in the morning.
- There is an isolation of each academic year from the others at the start and end of their day. This could decrease the possibility of bullying against younger pupils.

4.3 TOWNSHIP - Traffic management schemes

Although the capacity of the roads around secondary level schools may be capable of sustaining the traffic levels the merging of peak levels of traffic outside the school within a 10 minute period leads to gridlock. The road layouts should be improved with the aim of:

- Easing congestion,
- Improving traffic flow and,
- Improving road safety

It may be that parents could be persuaded to drop-off their children further away from school, or to avoid the use of the main roads near the schools.

5 Conclusion

While the factors that affect the choice of mode play an important part in the congestion, it is important to highlight the obsession with the car. The UK may not have the highest levels of car ownership but we are migrating towards the US model: where people drive everywhere and some suburban areas do not even have

footpaths. We must become more European in our approach to travel and even town planning and urban sprawl. There are European countries with higher levels of car ownership but without the high levels of congestion common in the UK. We should use our cars more responsibly and not feel stigmatised by using public transport.

This proposed change of attitudes could be assisted by the government's method of revenue gathering, as instead of a one-yearly VED charge and insurance a 'pay as you go' type scheme could be adopted to hammer home the true cost of motoring. This could be organised in conjunction with road user pricing scheme that could be used as a 'stick' once the 'carrot' of better public transport and alternatives to the car have been developed.

The aim of this scheme should not be to collect money for the treasury but to change public attitudes to other non-car forms of transport. In Denmark, pupils who are driven to school are seen as childish by pupils who walk and cycle to school.

What is important to recognise is that pupils and their parents want a choice of travel modes and they do not want to be forced into accepting something else. However, lifelong habits are developed early in life and so it is important to end the 'car culture' that has gripped most of the UK. Not only does this have long-term implications for traffic congestion, fuel shortages and pollution, but on the long-term health of future generations of adults.

Acknowledgement

The authors would like to thank Mr. Trevor Kidd and Mr. Derek Robinson for their assistance during the traffic surveys of the research.

References

Graham Riley (2001) Changing travel to school behaviour: a local authority perspective. Presented at the conference "Tackling The School Run: New Initiation For The Journey to School",18 June 2001, London.

Jones, P. and Bradshaw, R. (2000) The family and the school run. What would make a real difference? Summary Report, University of Westminster / AA Foundation for Road Safety Research.

Appendices

- 1- Traffic flow observation points 19 December 2000
- 2- Traffic flow observation points 3 January 2001

Traffic Flow Diagrammatic - 19 Dec. 00, 0730-0930



© Association for European Transport 2001

Traffic Flow Diagrammatic - 03 Jan. 01, 0730-0930



© Association for European Transport 2001