



### London Road Safety Unit: Safety Research Report No. 2 Review of 20 mph Zones in London Boroughs

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#### Abstract

London, with 13.5 accidents per 1,000 registered vehicles per year, is the least safe region of Great Britain. It is considerably less safe than other built up regions such as Greater Manchester (9.4) and the West Midlands (7.8) and lags behind the GB average of 8.2 (2000 data).

The Mayor has set targets to reduce the number of killed and seriously injured (KSI) road casualties by 40% and slight casualties by 10% by 2010 compared with the 1994-98 average. In October 2002, to investigate the effectiveness of measures that might help achieve this target, the London Road Safety Unit commissioned TRL Ltd to review the effectiveness of 20 mph zones in London.

In 2002 in Greater London, 36,813 road casualties (89% of the total) occurred on roads with a 30 mph speed limit. The 20 mph zones studied have almost exclusively been implemented on unclassified roads that previously had a 30 mph limit and, prior to the

introduction of the 20 mph zone, the number of accidents per km per year was, on average, more than twice that of other unclassified roads.

The research carried out by TRL shows that 20 mph zones are an effective way to reduce the frequency and severity of injury accidents mainly through reducing traffic speeds. The number of killed and seriously injured casualties was shown to have reduced by around 57% and the frequency of injury accidents by around 42%.

#### Objectives

- To quantify the impact of 20 mph zones on the number and severity of injury accidents and their associated casualties in London.
- To identify which road user groups benefit most from 20 mph zones.
- To identify which characteristics of 20 mph zones are most effective.
- To generate a comparator for how new schemes in London might be expected to perform and how schemes in London compare with those in other locations.



## Introduction

Previous work has shown the positive impact of 20 mph zones through reducing numbers of accidents and the number and severity of casualties. A 1996 TRL study for the DfT of two hundred such zones around the country showed that;

- Speeds were reduced by 9 mph
- Traffic flows were reduced by 27%
- Injury accidents (all severities) were reduced by 61%
- Fatal and serious accidents (KSIs) were reduced by 70%

More recent data from the City of Hull (where 120 zones covering 191km, or 26%, of the city's roads are subject to 20 mph speed restrictions) showed that in 20 mph zones;

- Injury accidents decrease by 56%
- KSI accidents decrease by 90%
- Pedestrian casualties decrease by 54%
- Child casualties decrease by 64%
- Child pedestrian casualties decrease by 74%

The current study has used a similar methodology to that used by TRL in the study undertaken for the DfT looking into the effectiveness of 20 mph zones. This allows a comparison of the changes in accident frequency for the London

schemes against 20 mph zones in other areas.

Data provided by the London Boroughs shows that the number of 20 mph zones being installed annually has increased from about five per year prior to 1999 to over thirty per year by 2002, with a total of about 137 installed zones by 2002. Detailed information was received for 115 of these, of which 40 (35%) were purely residential, 70 (61%) contained schools and 5 (4%) were town/city centre or mainly commercial zones. Seventy-eight had been in place long enough for at least a year of 'after' accident data to be available for analysis. 'Before' periods of five years were used and the average length of the 'After' periods available was three years. 20 mph zones have been implemented on around 391 km of borough roads and this analysis includes 253 km of these.

Previous work has shown that average speeds in 20 mph zones are likely to reduce by around 1 mph if signs alone are used to indicate the presence of a zone – hence there is a need for other measures to encourage self enforcement. The main traffic calming measures used within the zones studied were road humps, entrance gateways (figure 1), raised junctions (figure 2) and speed cushions.



Fig. 1



Fig. 2

## Casualties

The impact on casualties due to the introduction of 20 mph zones in London can be summarised as follows;

- Allowing for background changes in KSI casualty frequencies, the installation of 20 mph zones has reduced the frequency of road user casualties within the zones by about 45% and reduced the frequency of fatal or serious (KSI) casualties by about 57%.
- There were statistically significant reductions in the KSI casualty frequency for most classes of road user within the 20 mph zones.
  - The KSI casualty frequency for children also fell significantly -- by 60%.
  - The severity ratio (the ratio of KSI casualties to all casualties) fell from 0.16 to 0.12 following zone installation – indicating a reduced severity.
  - The average annual reduction in fatal and serious (KSI) casualties per 20 mph zone suggests an annual saving of about 66 KSI casualties across all of London’s current 20 mph zones. Using DfT figures this is equivalent to a current annual saving of at least £8.8 million, at 2001 prices.

**Table 1: Before and after - Casualties per year per site by road user class**

Road user class	All casualties per year per site			KSI casualties per year per site		
	Before <sup>1</sup>	After <sup>2</sup>	% Reduction	Before <sup>1</sup>	After <sup>2</sup>	% Reduction
All casualties	4.96	2.66	46%	0.79	0.32	60%
Pedestrians	1.37	0.83	40%	0.32	0.16	50%
Child pedestrians	0.75	0.39	48%	0.19	0.07	61%
Pedal cyclist	0.64	0.43	33%	0.10	0.05	50%
Child pedal cyclist <sup>3</sup>	0.25	0.10	59%	0.04	0.02	60%
P2Ws <sup>4</sup>	0.53	0.32	41%	0.14	0.05	68%
Car occupants	2.23	0.95	57%	0.21	0.05	77%
Child car occupants <sup>5</sup>	0.19	0.09	51%	0.01	0.00	47%

1. Before has been measured over 4,680 site-months

2. After period measured over 2,930 site-months

3. Small sample size means that KSI data for child pedal cyclists is not statistically significant

4. P2W = Powered Two Wheelers (includes scooters, mopeds and motorcycles)

5. Small sample size means that data for child car occupants is not statistically significant

## Injury accidents

The impact on injury accidents due to the introduction of 20 mph zones in London can be summarised as follows;

- The introduction of 20 mph zones in London has reduced the frequency of injury accidents within the zones by about 42% and reduced the frequency of accidents involving fatal or serious injury (KSI) by about 53%. Both of these reductions allow for the background frequency of injury accidents declining over the period.
- The average ratio of KSI accidents to all injury accidents fell from 0.17 to 0.13 following zone installation.
- Over the 'before' period, the numbers of accidents per km per year on 20 mph zone roads were, on average, more than twice those on other unclassified roads in London.

Concerns that accidents may be migrating away from the 20 mph zones and into the surrounding area

(as vehicles may choose to use different routes) were addressed by the study and shown to be unfounded.

## Traffic speeds and flows

From the more limited data available on traffic flows and speeds, the impact of the introduction of 20 mph zones can be summarised as follows;

- Mean traffic speeds after installation, measured from twenty-two zones, were about 17 mph.
- Measurements of before and after speeds suggest an average reduction of about 9 mph through the installation of 20 mph zones. Previous research has shown that each 1 mph reduction in speed can be expected to reduce the frequency of injury accidents by around 5%.
- Traffic flows, measured in eleven zones, have reduced by an average of about 15%.

**Table 2: Before and after - Accidents per year by road type<sup>1</sup>**

Road type	All accidents per year per km			KSI accidents per year per km		
	Before <sup>2</sup>	After <sup>3</sup>	% Reduction	Before <sup>2</sup>	After <sup>3</sup>	% Reduction
All unclassified roads <sup>4</sup>	0.58	0.56	4%	0.09	0.08	12%
20 mph Zones	1.31	0.74	43%	0.22	0.10	56%
Non-20 mph Zones	0.56	0.55	1%	0.09	0.08	9%

1. This data does not allow for background declines over the period
2. Before period measured over 5 years
3. After period measured over 3 years
4. Before period September 1992 to October 1997, after period November 1998 to October 2001

## Conclusions

The results of this study are extremely encouraging, showing that large accident and casualty reductions can be made through the increased use of self enforcing 20 mph zones on unclassified borough roads in London. These accident and casualty reductions appear to largely result from speed reductions associated with self enforcing 20 mph zones.

In recent years 20 mph zones have been implemented in increasing numbers by the London Boroughs. If this trend continues, the casualty reductions measured by this study are likely to be observed in any newly implemented zones, as well as persisting in those currently in place.

## Potential

There are around 13,000 km of borough roads in London and in 2002 there were 177 fatal, 3,839 serious and 25,428 slight casualties on these roads which represents 71% of all casualties on London's roads.

It is likely that 20 mph zones would be suitable for implementation over the majority of the borough road network

and, if installed, would have the potential to make large casualty savings. For example, if 60% of the borough road network were treated and the results of this study replicated, the KSI number for the treated network could be expected to fall from 2,410 to around 1,040. This would equate to an annual saving of around £248m. An additional reduction in the slight casualties may deliver savings of around £65m.

The cost of installing 20 mph zones on 60%, or around 8,000 km, of the borough road network has been very roughly estimated at £230m.

## Selected references

1. Webster, DC and Mackie, AM (1996). Review of traffic calming schemes in 20 mph zones. TRL Report 215. Transport Research Laboratory, Crowthorne.
2. National Statistics / DTLR (2001). Road Accidents Great Britain: 2000 The Casualty Report.
3. DfT (2001). Highways Economics Note No. 1 2001
4. Brightwell (2003). Hull reaps road safety rewards from slowing the city's traffic. Local Transport Today, 5/03.