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CENTRE LINE REMOVAL TRIAL

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Introduction

Since the first centre lines were painted on a hazardous corner near Birmingham in 1921, they have gradually become a standard feature on almost all main roads in the UK regardless of the alignment or accident potential. Most traffic engineers prescribe them by default without questioning the necessity. This study seeks to challenge this assumption by investigating the effect of not reinstating central markings on main roads in London following resurfacing works. Removing centre lines on an existing surface was not considered due to the scarring and damage to the surface caused by removal.

Guidance and Legislation

The DfT guidance document for road markings – Chapter 5 of the Traffic Signs Manual – has a section dedicated to centre lines detailing the different types and dimensions of lines. The document does not state that they must be used, but recommends omitting them when the carriageway is rural and less than 5.5 metres. This implies that they should be used in all other situations, however:

The Mayor of London’s “*Better Streets*” Policy, released in 2009, contains a number of suggested interventions to improve streets in London. One of these is to declutter, where highway authorities are challenged to:

*“justify each piece of equipment and obstruction with a presumption that it should be removed unless there is a clear case for retention. Look particularly carefully at the need for signs, posts, guard rails, bollards and **road markings**.”*

Manual for Streets 2 specifically references centre lines as follows:

“MfS1 notes that the use of centre lines is not an absolute requirement and included reference to the reductions in speed that result by omitting centreline markings on carriageways. This has been done successfully on busy routes as well as in village settings. Removing centrelines can be done easily when carriageways are resurfaced, with an immediate saving in capital and ongoing maintenance costs”

The Highway Act 1835 makes it a legal requirement for drivers to keep to the left, and this is reinforced in the Highway Code. The provision or non-provision of a centre line in no way affects this.

Case Studies

A study conducted by Wiltshire County Council between in 2003 found that not reinstating the centre lines on a resurfacing sites led to a reduction in injury collisions and traffic speeds. This built on referenced research by TRL which concluded that there are safety benefits to be gained by removing centre lines in 30 mph zones.

Maintenance and Cost

There is an immediate (although relatively small) cost saving through not reinstating centre lines and hatching, and a longer term maintenance saving through not needing to regularly refresh the markings. There can be significant disruption and traffic delays associated with regular maintenance of the markings, which can require temporary traffic lights, lane or road closures.

TfL Trials

TfL reviewed the markings along three routes scheduled for resurfacing. Each site was on the Transport for London Road Network (TLRN), and had a speed limit of 30 mph. The review resulted in the centre lines and/or central hatching not being reinstated following the resurfacing.

Before and after speed surveys were carried out at each site during dry conditions and off-peak to monitor the effect on speed of removing the central markings. All results were tested at the 95% confidence level and found to be a significant change. At one site (Wickham Road), a section of centre lines/hatching was retained as a control site to monitor the effect of resurfacing alone on vehicle speeds.

The individual sites and further details on the individual results are discussed below.

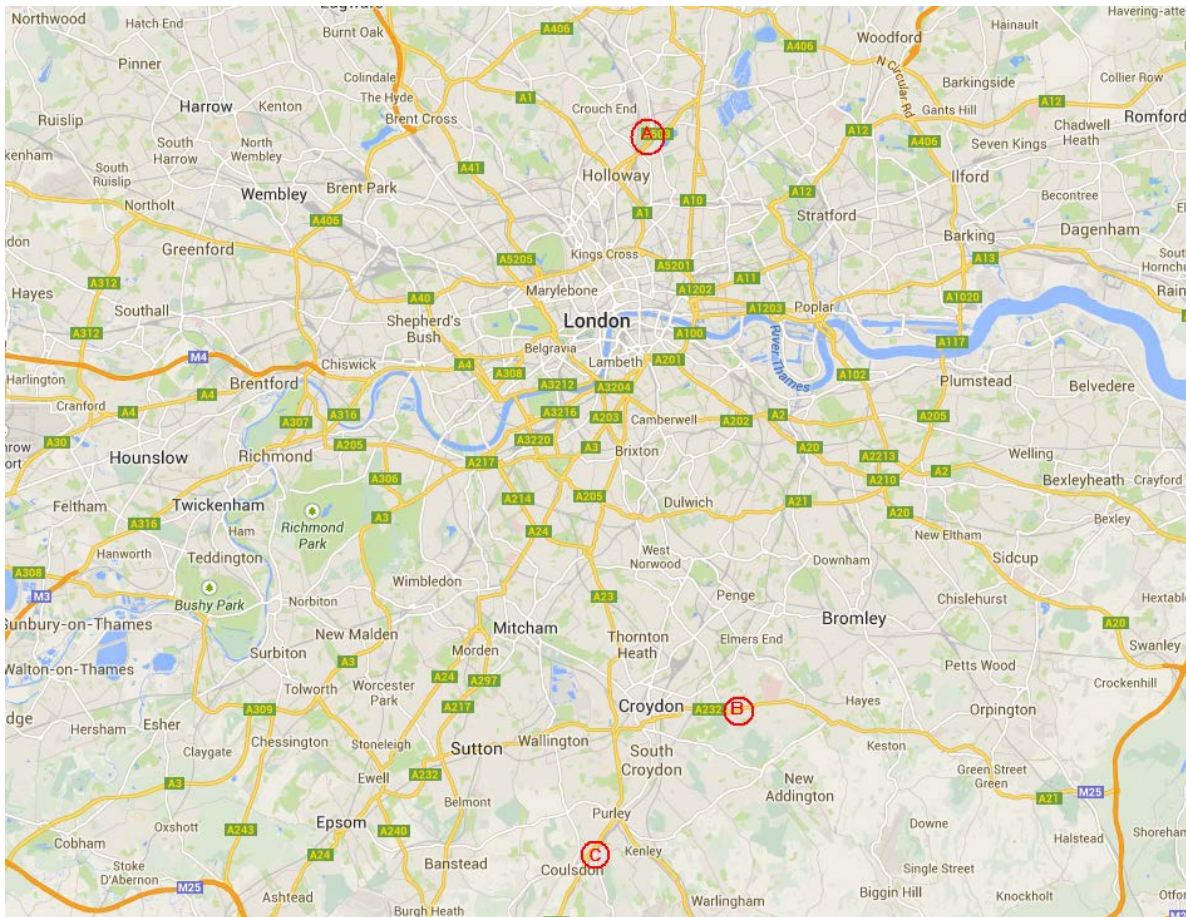


Figure 1 – Location Plan showing sites A (Seven Sisters Rd), B (Wickham Rd), and C (Brighton Rd)

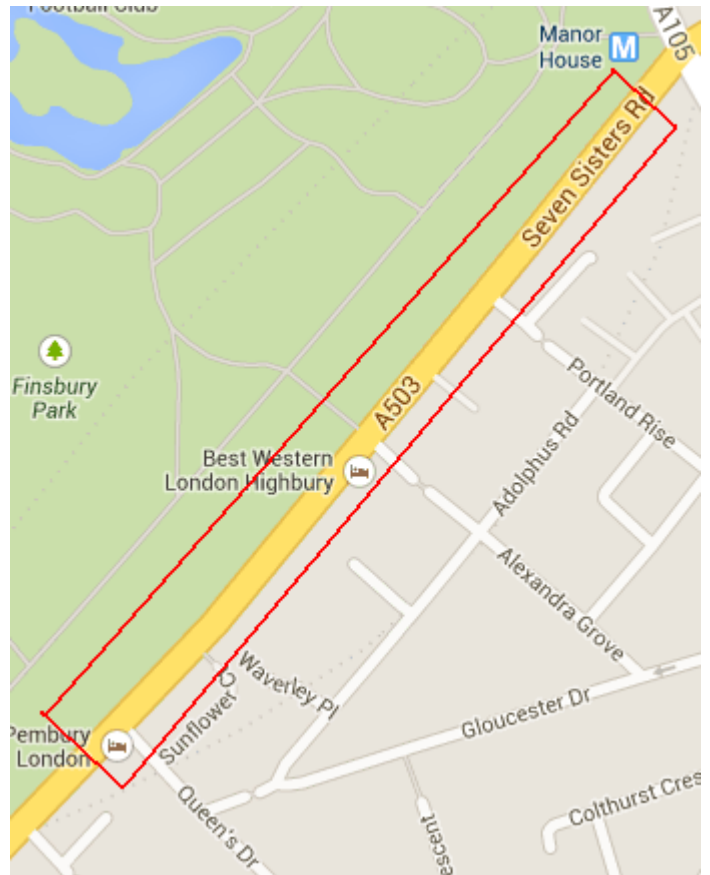
Site A - A503 Seven Sisters Road, Haringey

Seven Sisters Road has an AADF of 21,000 (DfT, 2013). It has two lanes in each direction, the nearside lanes being 3 metre bus lanes. The centre line was not reinstated along a 650m section leaving 6 metres for two way traffic between the bus lanes. There were a total of 36 collisions (5 serious, 31 slight) in this section in the 36 months to November 2013.

Before



Location



After



Average Speed	Before (mph)	After (mph)	Difference (mph)
Northbound	31.4	29.0	-2.5
Southbound	32.4	28.3	-4.1

Site B - Wickham Road, Croydon

This section of Wickham Road carries an AADF of 19,500 (DfT, 2013), and has one lane in each direction with cycle lanes either side. Centre lines and hatching were not reinstated for a 300 metre section. The existing cycle lanes were also widened from 1.1 m to 1.5 m leaving 6 metres for two way traffic. There were a total of 3 slight collisions within this section in the 36 months to March 2014

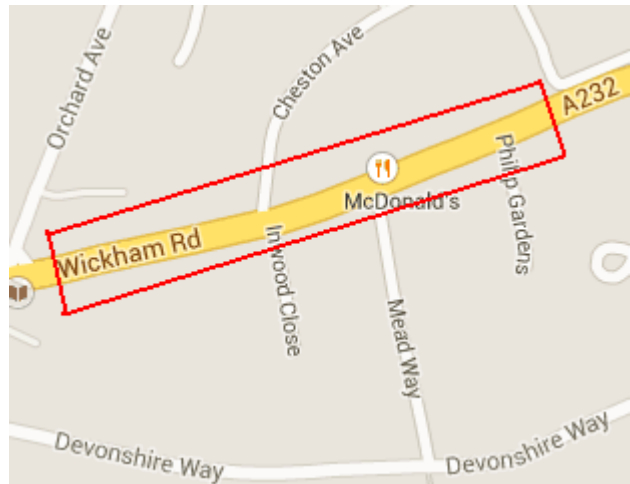
Before



After



Location



Average Speed	Before (mph)	After (mph)	Difference (mph)
Eastbound	34.2	31.3	-2.9
Westbound	31.3	28.3	-3.0

Site C - A23 Brighton Road, Croydon

Brighton Road is the busiest of the three trial sites, with an AADF of 24,300 in 2013 (DfT). Central hatching was not reinstated along two sections totalling 600m. In addition the existing 1.1 metre cycle lanes were widened to 1.5 metres to leave an average carriageway width of 6.5 metres. There were a total of 24 collisions (5 serious, 19 slight) in this section in the 36 months to November 2013.

Before



After



Location



Average Speed	Before (mph)	After (mph)	Difference (mph)
Northbound	30.0	28.9	-1.1
Southbound	29.2	28.3	-0.9*

*Indicates not a statistically significant change at 95% confidence interval, but is a statistically significant change at 90% confidence interval

Control Site

Depending on the condition of the road prior to resurfacing, it is logical to assume that as drivers feel more confident that their vehicle will not be damaged by irregularities in the surface, speeds would increase following resurfacing. This view is supported by a TRL study – [“The effect on traffic speeds of resurfacing a road”](#) (Cooper, Jordan, & Young, 1980) which showed the average traffic speeds increased when a new surface was provided.

To measure this, a different section of Wickham Road was chosen to be a control site, with centre lines and hatching retained to determine if there is a change in vehicle speeds purely caused by the new surfacing with all other conditions remaining the same. The map below shows the location where the central markings were removed (in black) and where they were retained (in red).



The analysis of the results showed that there was a statistically significant (at 95% confidence level) increase in speeds as a result of resurfacing, with an average increase of 4.5 mph. This implies that the absolute reduction in speeds achieved by removing the centre lines is higher than what was physically measured. Allowing for this correction, the below reductions in vehicle speeds were estimated to have been achieved at each of the sites.

		Corrected change in average speed (mph)
Seven Sisters Road	N/bound	- 7.0
	S/bound	- 8.6
Wickham Road	E/bound	- 7.4
	W/bound	- 7.5
Brighton Road	N/bound	- 5.6
	S/bound	- 5.4



Why are speeds higher with centre lines?

Getting into the 'minds' of drivers is not easy. A theory is that centre lines and hatching can provide a psychological sense of confidence to drivers that no vehicles will encroach on 'their' side of the road. There can also be a tendency for some drivers to position their vehicles close to a white line regardless of the traffic conditions, believing it is their 'right' to be in this position. Centre line removal introduces an element of uncertainty which is reflected in lower speeds.

Although not identifiable in the data, it was noted on site that speeds of individual vehicles appeared to be particularly lower when they were passing other vehicles travelling in the opposite direction. This supports the theory that uncertainty and additional cautiousness is responsible for the speed reduction.

Why reduce speeds?

TRL report PPR 580 "[Infrastructure and Cyclists safety](#)" commissioned for the Department of Transport states:

"Of all interventions to increase cycle safety, the greatest benefits come from reducing motor vehicle speeds"

It is well publicised and intuitive that greater impact speeds result in more serious injuries, particularly to pedestrians. *Ashton and Mackay (1979)* and *G. A. Davis (2001)* both found the relationship to be approximately logarithmic, with accident severity increasing sharply with increases in speed above 30 mph.

TRL report 421 "[The effect of drivers' speed on the frequency of road accidents](#)" concludes that higher speeds are associated with more accidents, and that an approximate 5% reduction in accident frequency can be expected per 1mph reduction in average speed.

Collision Monitoring

The sites have been entered into the Traffic Accident Data System (TADS) and will be monitored for any trends after 3 years of data has been obtained. It should be noted that the improved skid resistance of the new surface, along with any other changes that may take place in the coming 3 years may also have an impact on the number of collisions. Therefore, as with all traffic schemes, it may not be possible to completely isolate the impacts of the roadmarking changes on future accidents.



Conclusion

The data recorded in this study and subsequent analysis shows that there was a statistically significant reduction in vehicle speeds as a result of removing central markings on the carriageway.

It is important to note that not all roads would be suitable for removing central markings, particularly where the markings highlight a particular hazard. If the technique is being considered, careful analysis of the site will be required to determine if it is appropriate.

Further Information

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