
Centre Line Removal or non-reinstatement: Briefing Note

Adrian Davis, Alan Tapp, Stella Warren.



In 2018 researchers from the University of the West of England undertook a study which asked the question: What is the impact of Centre Line Removal (CLR) or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety? Cycle user perceptions of road danger are significantly a function of driver speed. The sense of danger is substantially increased when speeds driven are above posted 20 and 30mph limits on unsegregated roads. Achieving driver speed limit compliance is, however, very difficult without traffic calming or enforcement. In terms of 20mph speed limits, while there is consistent majority public support in Great Britain (Department for Transport 2012; Tapp et al 2015), driver compliance is more problematic. Moreover, previous UK research has reported that overtaking speeds on 20 and 30mph roads were reduced if there was no centre-line present (Shackel, Parkin, 2014). The literature is not clear as to the causation of lower speeds without centre lines but it may be that cognitive load increases without the certainty of a centre-line so drivers slow in order to gain more time to respond (Murphy, Greene, 2017). Road types are typically village roads and local distributor roads in urban areas which are single carriageway two-way with opposing flows with the centre-line removed or not reinstated.

The research was comprised of two sections. Firstly, an Evidence Review was undertaken. This type of Review provides a summary of the available evidence guided by an assessment of methodological design and robustness of studies found in searches. The Evidence Review highlighted what is known about the impact of a project or intervention, in this case the impact of CLR or non-re-instatement on 20mph and 30mph speed limit roads, and where the gaps in the evidence-based literature lie. The Review was then underpinned by evidence-based practice, ensuring that current best evidenced advice is used to inform the development and delivery of new interventions.

The Review found 11 studies which were considered for inclusion. It is of note that none of the original 11 studies were sufficiently robust (the study design) to enable causality and its direction to be attributed. Most were non-randomised controlled trials, case-control studies, and weaker study designs. The search for studies using robust research criteria largely concluded that there is a deficit of such studies in the international (English language) peer reviewed literature. Two studies met the Inclusion criteria. This is disappointing but perhaps not to be unexpected given the niche aspect of CLR in road safety. The major focus in the international peer reviewed literature and that of the grey literature is on speed limits above 30mph and where attention is given to augmenting of existing

centre lines such as through widening or doubling the line, inclusion of rumble strip materials and edge lines. Both are concerned with higher speeds and the risk of the vehicle moving out of the lane with the risk of serious injury or death due to high impact speeds.

What has been found tends to confirm the view of studies with relatively weak study designs that low speed limit areas of 20 and 30 mph where CLR has occurred may well reduce average speeds driven by approximately 2 mph. In addition, there was also robust evidence that the lateral position of the vehicle, which is closer to the centre of the road, as a result of an edge of carriageway line, is safer than a lateral position that is closer to the edge of the road (Davidse, R., van Driel, C., Goldenbeld, C. 2004). Clearly, further research is needed in order to test this claim sufficiently through robustly designed interventions. This will benefit from studies that only address CLR rather than CLR with other interventions which makes almost impossible the task of attributing effects solely due to CLR. Research by the Transport Research Laboratory has shown that for roads with low average speeds (20-30 mph) there is an average 6% reduction in collisions with each 1mph reduction in average speed (Taylor, M., Lynam, D., Baruya, A. 2000).

Evidence Review recommendations:

- to encourage further studies using research designs likely to reduce bias in ascertaining the road safety value or otherwise of CLR or non-re-instatement and with a particular concern for cycle user safety
- Addressing the knowledge gap in terms of how widely CLR is applied by local authorities across the UK. Some examination as to current practice would assist and in part any research should seek out grey literature, including local authority in-house studies, and, qualitatively, local authority attitudes and perceived barriers and enablers of the use of CLR
- There may be issues pertaining to older drivers and a greater reliance on centre-lines at 20mph and 30mph speed than among younger drivers. However, while this seems plausible there is little research which explores this aspect. Similarly, in the next few years, it may be worth exploring CLR in the context of Autonomous Vehicles and the viability of CLR.

The second section of the project was comprised of an on-line survey distributed to road safety practitioners across Great Britain via RSGB's e-bulletins with three follow-up reminders. The survey specifically asked about local highway authority experiences and views regarding the use of CLR. This resulted in 94 people accessing the survey. Thirty-eight completed surveys were received, mostly from local authorities, providing some details regarding the application or reasons for non-application of CLR. Five of the 38 completed surveys responses came from non-highway authority organisations or individuals – Police and Fire Services, the British Horse Society, a Driving Instructor, and retired local authority staff. Most of the respondents had little direct experience of CLR and this may be due to loss of institutional memory as CLR may have had a higher profile in the 1990s and early 2000s

compared to 2019 given a spate of UK reports published over a decade ago – and occasionally referred to by a few respondents.

After analysis of responses 12 organisations were identified as interview candidates in order to follow up on information supplied in their survey responses. Subsequently 6 survey respondents were interviewed.¹ Of the six responding local authorities, one provided significant detail including pre-post speed data from one scheme. Four of the six authorities were county councils, and the two others were city unitary authorities so there was some variation in the types of 20mph and 30mph roads, notably between villages and cities. Of the six Individual officers 5 were largely in favour of CLR or non-reinstatement and one was ambivalent.

One of the difficulties with CLR reported was a lack of public demand which may be because it is partly counter-intuitive. Local highways officers noted that they could not imagine support from local residents for CLR, as they don't understand the reasons why it might be introduced. Mostly, the general enquiries on road safety tend to be members of the public wanting to add signs and lines rather than to take them away. This lack of understanding could also extend to Councillors. As an officer working for a County Council noted:

“I think some of the Councillors weren't very happy with that idea because it was deemed to only be doing it to save money. Whereas we were trying to explain that actually no, there would be a road safety benefit of squeezing traffic closer together.”

By way of contrast, the Council for the Protection of Rural England was one organisation that was reported to have worked with a County Council to de-clutter the road environment. The local authority has largely been happy to reduce clutter including CLR. One city authority introduced a CLR scheme following discussions with local cycle groups:

“It was conversations with the local cycling groups. It's a measure to try and reduce speeds and to create a bit of uncertainty in drivers who used to drive to the centre line and base their position off that and then could encroach into the cycle lanes.”

The CLR was part of a scheme to promote cycling, reduce speeds on the actual road, create sheltered parking bays, because the whole width of the road was very wide. And it provided a good opportunity to try and do something a bit different. The officer noted:

¹ Names of individuals and their local authorities have been removed with one approved exception.

“I think, certainly in cycle monitoring, there was some increase shown on that. Whether that was down to the actual works, but cycling certainly increased, and we didn’t get an increase in casualties as a result”.

One of the six authorities has a non-replacement policy. In a Scottish local authority this started in 2008 as a management of assets policy, partly due to budgetary considerations, where they wouldn’t replace centre lines apart from at traffic islands or at junctions. In terms of evidence in support of this decision no research was commissioned by the authority although they did look at a report by TRL for Wiltshire Council in 2003 on CLR and reduced road speeds. No evaluation has been done. However, the officer stated that even without the benefit of a formal evaluation, there had not been any detrimental effect on safety and accident rates. In an English local authority in some areas highways colleagues have worked with local communities and have not reinstated the centre line (e.g. after roadworks and road surface has been replaced) in some smaller villages, deliberately as a way of calming traffic. While not being aware of any evaluation the officer noted that “anecdotally, I believe that they have been effective” in that CLR has decreased traffic speed. Most examples where a centre line has been removed are narrow country lanes through villages.

It was clear that one of the problems with CLR or non-reinstatements where implemented is a lack of pre and post intervention for vehicle speeds or even just collating Stats 19 data. We include (page 6) one pre-post vehicle speed evaluation from Hampshire as the only example provided. Consequently, one officer reflected that:

“I think your work could potentially be quite helpful, if there could be found some proper before/after studies and I guess that’s what you’re seeking to find. But I think there’s a gap there in knowledge of just what difference it makes. It could be a very helpful to have an advice note. In days gone by, there have always been ‘traffic advisory leaflets’ issued by the Department for Transport on methods of reducing speeds or improving crossing points, or whatever, on various topics. One on CLR would be quite helpful.”

In another local authority where CLR has been implemented there was more objective evidence. The removal of all centre lines, was however, accompanied by removal of road studs, and signs, as well as lots of carriageway resurfacing. When the local authority monitored the follow-up speeds against pre-intervention: “we found that we’d got drops of between 4-5 mph, which was a very good reduction. So we were very pleased with the results.”

In the same authority, the officer reported that:

“CLR was ... generally in areas where there were reports of higher than desired vehicle speeds and we would often remove sections of centre lines in conjunction with putting edge of

carriageway markings. So you're in effect squeezing traffic a little bit closer together and creating a bit of uncertainty. Generally then we were finding that you might get marginal reductions – maybe 1 or 2 mph – but we didn't generally apply a county-wide policy and say we're always going to remove centre lines. It was just done on a case by case basis."

This case-by-case approach was the norm for the relatively few authorities responding and which had tried CLR or non-reinstatement. But over time a few authorities did adapt given their experience with CLR. As an Officer with considerable experience of CLR noted:

"Our thinking on carriageway lining has changed a little bit because, going back quite a few years, what we've tended to do quite a lot of, was putting in central carriageway hatching because our thinking was it would make it safer if you separate the traffic, so you have this hatched area in the middle. But, as time has gone on, we tend to have moved away from that and have gone with this approach [CLR] of it's better to squeeze traffic together to be more effective."

Survey and interview-based recommendations:

- There is limited knowledge and understanding as to the potential value of CLR or non-reinstatement across local authority representatives responding to the survey. The majority had no experience of CLR.
- There is a lack of pre and post intervention data for both vehicle speeds and casualty data for CLR interventions. Any future CLR interventions should be evaluated both for changes in speed as well as casualty number changes over a minimum of a 3 year period post intervention.
- There is some suggestions that CLR has improved cycle safety as measured by casualty numbers but this needs robust studies to ascertain if this is a real effect and, if so, under what conditions.
- Local data, where it exists, suggests significant average speed reductions of 1-2 mph for CLR. This aligns with the findings from the Evidence Review.

**A32 West Meon – Before and After Vehicle Speeds
85th PERCENTILE (mph)**

Site	Direction	Before Speeds (85th %tile)	After Speeds (85th %tile)	Difference (mph)
West Lodge (Outside 30mph limit)*	Northbound	49.5	47.6	-1.9
Between Red Lion Pub and Station Road	Northbound	34.4	30.5	-3.9
	Southbound	29.3	30.6	1.3
Headon View Junction	Northbound	38.7	35.4	-3.3
	Southbound	39.2	34.8	-4.4

MEAN AVERAGE (mph)

Site	Direction	Before Speeds (Mean Ave)	After Speeds (Mean Ave)	Difference (mph)
West Lodge (Outside 30mph limit)*	Northbound	42.4	40.7	-1.7
Between Red Lion Pub and Station Road	Northbound	28.9	26.9	-2.0
	Southbound	25.1	27.1	2.0
Headon View Junction	Northbound	32	30	-2.0
	Southbound	31.7	29.4	-2.3

* Represents speeds recorded approximately 100m before start of 30mph speed limit / village gateway

References

- Davidse, R., van Driel, C., Goldenbeld, C. 2004. *The effect of altered road markings on speed and lateral position*, Leidschendam: SWOV Institute for Road Safety Research).
- Department for Transport 2012. *British Social Attitudes Survey 2011: Public attitudes towards transport*. London: Department for Transport.
- Murphy, G., Greene, C. 2017. Load theory behind the wheel: Perceptual and cognitive load effects, *Canadian Journal of Experimental Psychology*, 71(3): 191-202.
- Tapp, A., Nancarrow, C., Davis, A. 2015. Exploring support and compliance with 20mph limits in Great Britain. *Transportation Research Part F*. 31:36-53.
- Shackel, S., Parkin, J. 2014. Influence of road markings, lane widths and driver behaviour on proximity and speed of vehicles overtaking cyclists, *Accident Analysis and Prevention*, 73: 100-108.
- Taylor, M., Lynam, D., Baruya, A. 2000. *The effects of drivers' speed on the frequency of road accidents*, Crowthorne: TRL.

We are grateful to the Road Safety Trust for funding this research, to the respondents of our survey and interviews, and to RSGB for distribution of the on-line survey and Briefing Note.

Suggested citation: Davis, A. Tapp, A., Warren, S, 2019. Centre line removal or non-reinstatement. Briefing Note. Bristol Business School: University of the West of England.

Contact Dr Adrian L Davis adrian.davis@uwe.ac.uk