

Contribution to cycle safety of centre line removal on 20 mph and 30 mph speed limit roads

State of the Art: local highway authority officer's knowledge and practices

Work Package 2 & Final Report

**Adrian Davis, Alan Tapp, Stella Warren
Bristol Business School, Faculty of Business & Law**



**University of the
West of England**



June 2019

What is the impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety?

1 Introduction

This report is Work Package 2 of a two Work Page study addressing Centre Line Removal (CLR) or non-re-instatement. The aims and objectives are to improve road safety, principally through improved cycle safety. The objective was originally to develop an easy to use decision and design protocol spreadsheet (a process) for highway practitioners to quickly determine whether particular sections of carriageway would be suitable for CLR or non-re-instatement when the road is due to be re-surfaced as part of routine highway maintenance. The development of the decision and design protocol spreadsheet was abandoned as a result of the findings of Work Package 1 – that there was insufficient evidence from which to develop this spreadsheet-based tool. Revision of Work Package 2 resulted in its replacement by a GB-wide survey of road safety practitioners. The rationale for this change was to be able to seek additional information through qualitative research from practitioners. This revised Work Page was conducted in late autumn 2018 and then follow-up interviews with a sample of those respondents in early 2019 in order to gather rich data.

The rationale for the study is that non-compliance with low speed limits (30 and 20mph) remains a challenge to cycle user safety in England. In a time of financial austerity, it is particularly important to maximize the effectiveness of interventions that are proven. Evidence prior to this study supports the conclusion that CLR or non-re-instatement on certain local roads which often provide direct and time efficient routes for cycle users could bring greater compliance with posted limits and hence improved safety. This project overall has sought to draw together the 'state of the art' as to CLR to test current knowledge and how this can improve objective cycle safety and perceptions. This has been achieved through a robust Evidence Review of peer reviewed and grey literature followed by the survey work and semi-structured interviews. The outcome of this project is, we suggest, of national interest and benefit for those engaged in both sustainable transport and in safe systems road safety.

The conclusions to Work Package 1

The search for studies using robust research criteria through an Evidence Review, 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 sourced focuses on speed limits above 30mph and where the focus was the augmenting of existing centre lines such as through widening or duelling 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.

Impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety

- 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 2mph.
- Further research is needed in order to test this claim sufficiently through robustly designed interventions. This will need to be studies that only address CRL rather than CLR with other interventions in order to attribute any road safety changes due to CLR.
- Autonomous Vehicles (AVs) and centre-lines was largely noticeable through its absence from the literature. There has been a suggestion that without lines the AV may be unable to locate their position sufficiently and so risk compromising safety. This lack of evidence may well change in the next few years due to a much stronger focus on AVs.

Recommendations from Work Page 1 were:

- 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
- To address the knowledge gap in terms of how widely CLR is applied by local highway authorities across the UK. Some examination as to current practice would assist and in part any research should seek out grey literature, including local highway authority in-house studies, and, qualitatively, local authority highway attitudes and perceived barriers and enablers of the use of CLR
- To note that 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. Similar, in the next few years, it may be worth exploring CLR in the context of AVs and the viability of CLR.

2 Work Package 2

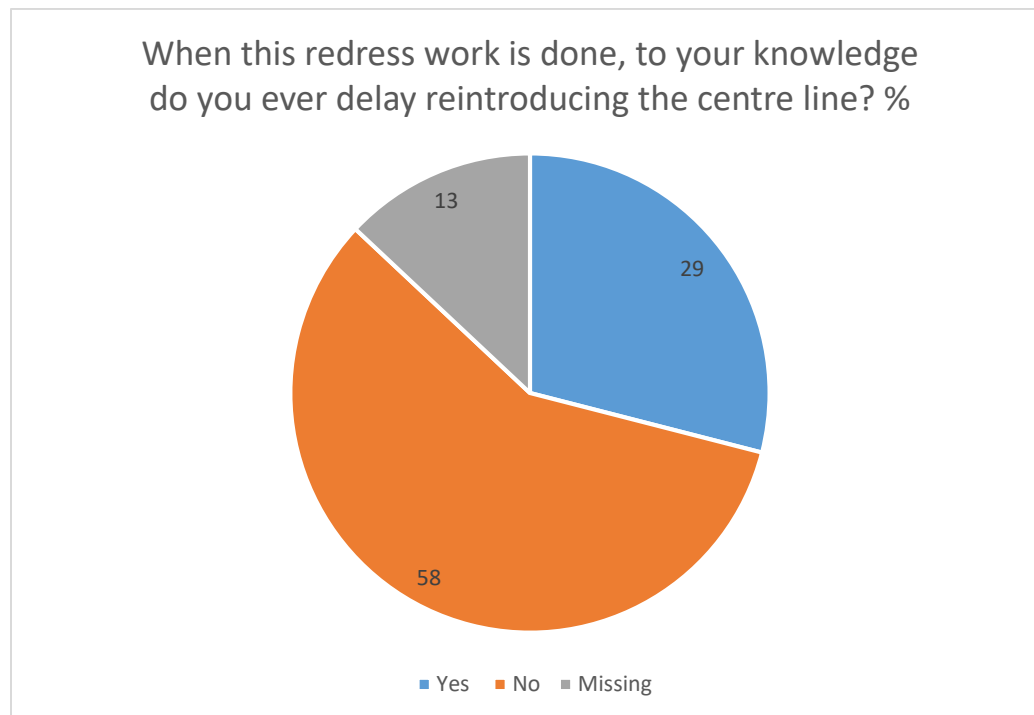
Online-survey

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 highway 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 highway 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.

Survey responses provided some information about the extent of engagement with CLR or non-reinstatement (from the self-selecting sample of 38 who responded). This included information which suggests that a few of the local highway authorities (n=9) do not automatically reinstate the centre line after a road surface has been redressed (Figure 1).

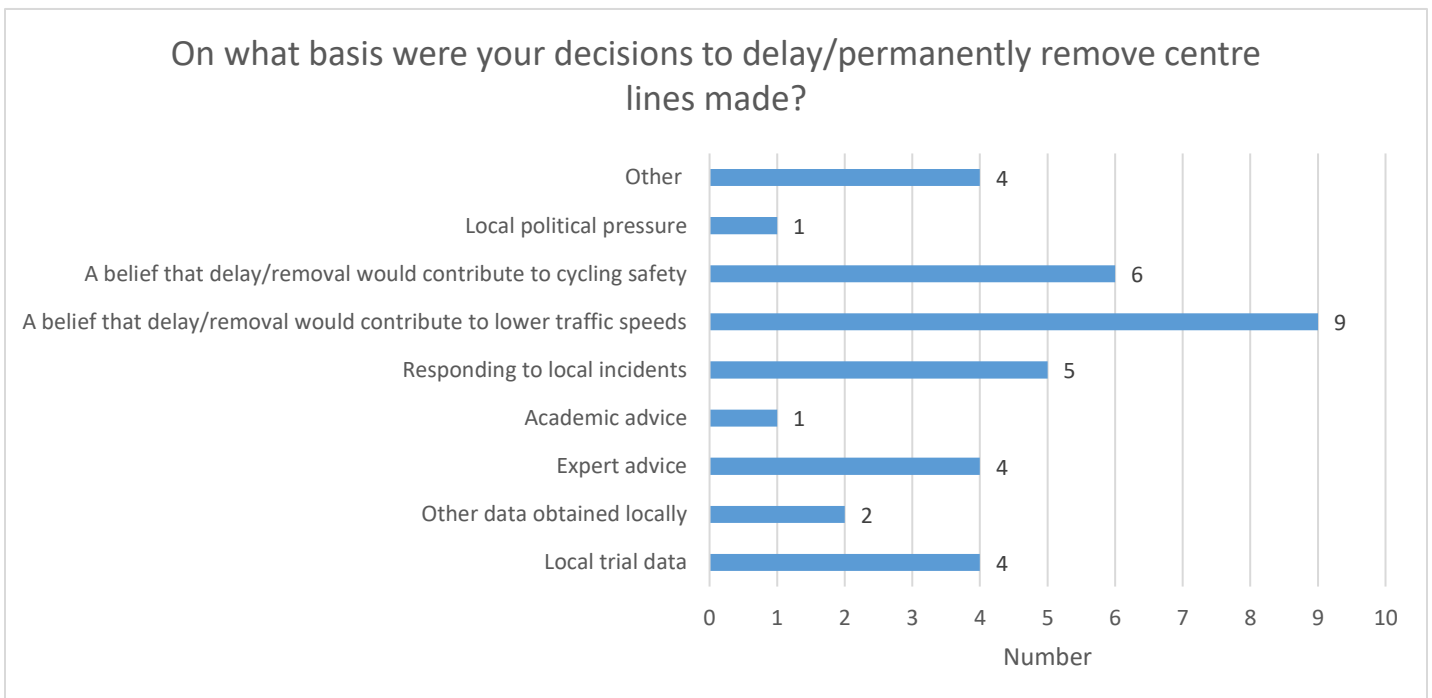
Figure 1: Is there ever a delay in reintroducing centre lines after a road has been redressed?



Impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety

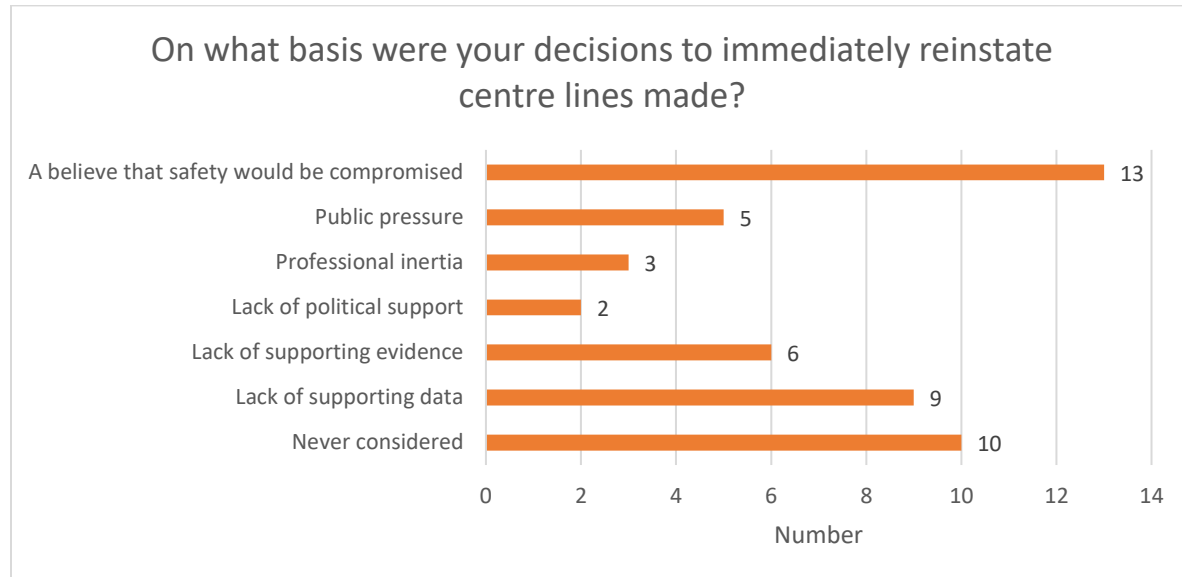
In terms of the reasons for a delay the following responses (Figure 2) suggest that a belief that delay or permanent removal would contribute to lower speeds was the single most selected reason while cycle safety was the next most selected. Given that the evidence base has been limited to a few studies, including those rejected as insufficiently robust for the Evidence Review, it seems that local authority highway officers may have resorted more to a general feeling – a belief – that CLR or non-reinstatement have some safety benefits.

Figure 2: The basis for decisions to delay/permanently remove centre lines



In contrast, decisions to immediately reinstate centre lines after a road surface redressing also fall to a belief that safety would be compromised, and this is supported by claims for lack of supporting data and evidence (Figure 3). Interestingly from this small total number of responses, 10 of the 38 had never considered non-reinstatement.

Figure 3: The basis for decisions to immediately reinstate centre lines



Lastly, arising from the on-line survey, 8 respondents did state that their authority had evaluated the effects of delaying/removing centre lines.

Semi-structure interviews

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 replied to the request for an interview.¹ Of the six responding local highway authorities, one provided significant detail including pre-post speed data from one scheme.² Four of the six local highway authorities were County Council employees, and the two others were City Unitary authority employees, 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 reported difficulties with CLR was a lack of public demand which may be because it is partly counter-intuitive. Local highway 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 signs and lines in rather than to take them away. This lack of understanding could also extend to Councillors. As an officer working for a County Council noted:

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

² See Appendix A for Before and After data from 1 scheme.

Impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety

“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 organization 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 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:

“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 highway colleagues have worked with 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 5) 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

Impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety

leaflets' issues 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 highway 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 highway 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 highway 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."

3 Conclusions

Arising from the online survey and interviews we conclude the following:

- There is limited knowledge and understanding of the potential value of CLR or non-reinstatement across local highway 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 date for CLR interventions.
- There is some suggestion 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.

Additional conclusions arising from Work Packages 1 and 2:

- There is limited evidence available to local highway officers as to the potential impacts of CLR or non-reinstatement
- There may be attrition of institutional memory as officers working on CLR during the 1990s and early 2000s when there were more studies which included CLR or non-reinstatement leave/retire.
- With the caveat of small survey response numbers, there appears to be some interest in distribution of the survey results across local highway authorities
- The survey and interviews provide more evidence that further and more robust research, included pre-post and comparator sites, is needed in developing greater confidence in the findings.
- On the basis of the Evidence Review, and limited pre-post data provided by local highway authority officers, we conclude that evidence does suggest that there is an average speed reductions of 1-2 mph for CLR/non-reinstatements.

Recommendations

- In terms of further research, there is a need for further studies of CLR and non-reinstatement with at least three year pre and post intervention data where no other interventions have been implemented in order to assess further any changes in reported collisions as well as changes in speeds. Clear descriptions of road type, volume, and other variables such as set back from the carriageway of dwellings, on-street parking, and any cycle infrastructure provision should also be reported. There may also be value in gathering cycle users' views as to their perceived safety with and without CLR on distributor and other roads suitable for CLR. These studies should be focused on roads with posted 30mph and 20mph speed limits.
- The claim that CLR has led to increases in cycling but not to increases in reported collisions needs further examination. This could be through a study that specifically addresses cycle use on road sections which have CLR or non-reinstatement compared with similar roads type with 30mph and 20mph speed limits.
- More generally, CLR and non-reinstatements on 30mph and 20mph speed limit roads is an under researched area. There is evidence that it achieves a reduction in speed which equates to a significant reduction in the number of collisions and potentially injuries with a considerable financial cost (let alone suffering) to the economy and public funds. It is therefore an intervention that remains ripe for further study.

Impact of centre line removal or non-re-instatement on 20mph and 30mph speed limit roads as a contributor to cycle safety

Appendix A

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

We are grateful to the Road Safety Trust for funding this research and to the respondents of our survey and interviews.

Suggested citation: Davis, A. Tapp, A., Warren, S, 2019. Contribution to cycle safety of centre line removal on 20 mph and 30 mph speed limit roads. State of the Art: local highway authority officer's knowledge and practices. Work Package 2. Bristol Business School: University of the West of England.