Campaign for Better Transport

# Report on demonstration of longer semi-trailers and risks to vulnerable road users

## Introduction

In January 2012, the Government launched trials of longer semi-trailers. These trials allowed a number of operators to use trailers of 15.65 metres, 2.05 metres longer than the current standard. This brings total vehicle length with cabs to 18.55 metres, rather than the standard 16.5 metres in length. Some semi-trailers of 14.6 metres were also allowed.

These trials, which are set to last for up to 10 years, followed research and consultation by the Department for Transport in 2011. This research claimed that these trailers would be no more dangerous than existing articulated semi-trailers. This claim has been contested by groups representing local government, cyclists and others, with particular concerns being raised about the impact on vulnerable road users and damage to street furniture in heavily built-up areas.

On 27 June 2013 the DfT arranged a demonstration of these longer trailers at Millbrook Proving Ground to allow those concerned to see one of the vehicles in use and to examine the likely practical effects of allowing such vehicles on UK roads. This report outlines the response to the demonstration of the organisations represented and possible solutions to the concerns raised.

## Millbrook Proving Ground demonstration

The demonstration was attended by a wide range of stakeholders.

- Jim Chisholm (Cambridge Cycling Campaign)
- Martin Sachs (Honorary Secretary, Technical Advisers Group Transport Committee)
- Haibat Abro (Transport Engineer, Lambeth Council)
- Philippa Edmunds (Freight on Rail Manager, Campaign for Better Transport)
- Andrew Colski (Freight Policy Branch, DfT)
- Simon Surtees-Goodall (Freight, Operator Licensing and Road Worthiness Division, DfT)
- Nic Fasci (Vehicle Certification Agency, DfT)

A range of tests were carried out on the trailer to show its performance when turning. A detailed account is attached as an annex.

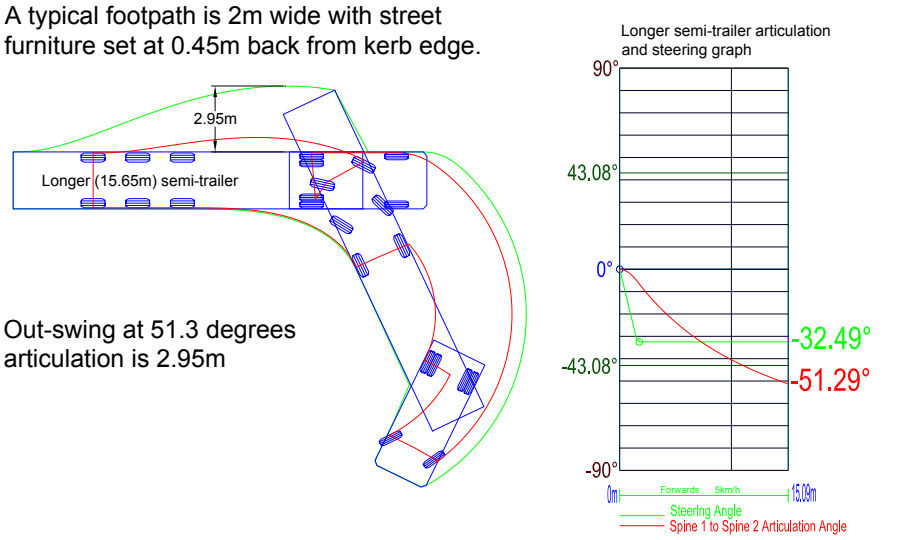
## Issues

The demonstration provided clear evidence of a number of issues with the longer trailers. These are:

- Increase in the rear out-swing of the trailer
- Increased susceptibility to cross winds
- Increased blind spots

The Government's own research, prior to the trials, accepted that the longer trailers would have increased tail swings and susceptibility to cross winds and would not match the turning performance of existing 13.6m metre trailers[1]. The demonstration of the 15.65 metre trailer showed that the rear out-swing of the longer trailer doubles to well over  two metres when tight turns are made. Crucially, the out-swing of such turns will occur in the area that is 'blind' to the driver even with updated mirror arrangements.

This diagram shows an AutoTrack simulation of an 18.55 metre combination showing out-swing of 15.65 metre semi-trailer:




AutoTrack simulation of 18.55m long articulated lorry out-swing



## Implications

### Road junctions and loading bays

Longer semi-trailers are unlikely to present problems on the strategic network, as managed by the Highways Agency, if vehicles are correctly loaded. However, virtually all trips need to access local authority managed networks and third party depots and it is here that they will cause problems. As a result of the extra tail swing, many recently designed junctions on local roads in both urban and rural areas cannot accommodate these longer semi-trailers without them entering 'wrong' lanes or mounting the footway or traffic islands. There are already problems accommodating existing 13.6 metre trailers on urban networks[2] - these longer trailers will have even more problems and this makes their use in practice difficult to countenance on local roads. In urban areas particularly, longer vehicles are more likely to get stuck half way through a manoeuvre and have trouble negotiating ramps. They may also be too big for many loading bays. Increased numbers of cases are being reported where such vehicles are getting totally stuck, especially where the streetscape has been modified to reduce vehicle speeds and provide a safer environment for vulnerable users.

There is another factor that adds to this issue. So as to take the distributed load, the command steered or self-steering axles need to be far further back with 15.65m trailers than on a 13.6 m one, hence the wheel tracking is more likely to mount the kerb, causing additional damage to footways and it is possible that the whole truck will get stuck on corners where there is street furniture such as bell bollards.

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[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3820/report.pdf
[2] See for example photos at www.haibat.com/trucks

Under such circumstances in addition to the risk to human life, damage to street furniture, footways, roadside buildings or parked vehicles is most likely, often with unrecoverable loss to local authorities or innocent third parties. In practice, local authorities, vehicle owners and frontagers will suffer increasing damage, in some cases, as a result of the extra space taken by these longer vehicles. The DfT report included no analysis of the additional costs to local authorities as a result of these impacts, which will have to be borne by the taxpayer, or indeed other parties.

### Road safety

As noted above, the DfT's research in 2011 stated that longer trailers would have increased tail swings and susceptibility to cross winds. However the research assumed that neither the 15.65 metre semi-trailer nor the 14.6 metre version would be any more dangerous than existing HGVs per mile driven. On the basis that the longer trailer will occupy more road space, this analysis is questionable. The Impact Assessment issued with the consultation assumed that 85 per cent of collisions involving HGVs are unaffected by length[3]. Furthermore, in relation to fatal crashes within 20 metres of a junction (one of the largest categories) 99 per cent of collisions were assumed to be outside the scope of the report[4]. Without these exclusions, the longer lorries could be calculated using DfT figures to cause an additional 6 fatalities per annum and increase overall accident rates between 4-8 per cent. Given the issues with wider tail swings and blind spots identified above, the concerns expressed about safety, especially of cyclists and pedestrians, were in our view underlined by the demonstration.

This added length also brings a conflict between dangerous tail swings and stability at high speeds. There are unanswered questions about this; the ideal positioning of axles for weight distribution is not the ideal one to promote stability and avoid "snaking" (rear amplification) at higher speeds. If axles are positioned at the back of the vehicle there is less snaking but there is less manoeuvrability. There are complex interactions between load distribution, axle type and positioning which is different from standard 13.6 metre trailers. Depending on the resolution of this conflict, there may be further implications for the impact and manoeuvrability of longer semi-trailers on local roads and in urban areas.

## Solutions

We can see two types of solution: applying the best available technology and limiting longer semi-trailers to a network of permitted routes.

### Best technology

The DfT consultation that came out in Spring 2011 promised new "active steer technology" which was supposed to give the longer trailers the same turning performance as existing trailers[5]. This was quoted as 18 months away from release. However, this steering technology is still not released and it is unclear whether it would perform better than existing steering technology.

There is also the important principle of comparing like with like, accepted for EU studies. This means that it is wrong to compare a new trailer with additional safety and manoeuvrability features with a lower standard

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[3] Table 20, page 60 of: http://www.trl.co.uk/online_store/reports_publications/trl_reports/cat_traffic_and_transport_planning/report_the_likely_effects_of_permitting_longer_semi-trailers_in_the_uk:_vehicle_specification_performance_and_safety:_final_report.htm

[4] Ibid table 19

[5] The DfT research states that the 2.05 metre trailers could meet existing turning standards with either two self-steer axles or a command steer axle steering technology ref DfT consultation Page 7 para 23.

trailer type which is currently in use. The highest standards of trailer technology available should be implemented as soon as possible on current 16.5 metre HGVs. Then performance of the better technology on longer semi-trailers could be fairly compared to that on these higher standard 16.5 metre vehicles.

**A System of Permitted Urban routes**

The current unregulated system relies on 'self-policing' by the operators, i.e. that operators will take effective measures to ensure that their vehicles are not used in unsafe or inaccessible locations. Such self-policing can hardly be expected to be effective in this environment. Minor incidents of damage to parked cars, footways, street furniture and buildings, are likely to go unreported or even unnoticed by the driver of a fully laden vehicle. It was noted that the rear corner of the test 15.65 metre trailer bore evidence that it had hit something.

We therefore believe that longer semi-trailers should be restricted to a limited network of routes on local authority roads that have been assessed for their suitability to carry such traffic. Other European countries such as the Netherlands and Germany have effective measures to prevent HGVs using unsuitable roads and streets and we believe that this should be applied here to these vehicles. We envisage that a limited number of routes would be designated having been identified by operators and would be rigorously assessed by appropriate modelling software to ensure that an 18.55 metre HGV could be accommodated within the traffic lane. Existing technology could overcome some access issues, by using 'Sat-Nav' to create a set of Local Authority 'permitted' roads, for different classes of HGV, rather than permitting the operator to make any decision, or relying on local authority created TROs banning long vehicles on specific routes.

By introducing defined local authority permitted urban routes, longer semi-trailers can be safely accommodated avoiding more damage to pavements, street furniture and parked cars, not to mention reducing the danger to pedestrians, cyclists and occupants of fronting buildings. It is recognised that there would be some cost involved in the introduction of a permitted route regime. It is right that these costs should be fully met by the operators, who have much to gain through the introduction of longer lorries to the highway network.

There is of course an alternative approach – to adapt urban junctions to cater for these longer trailers. However in this case they would become less safe for other road users, especially cyclists and pedestrians, and this runs against the current moves towards new designs for streets and 20 mph limits which give priority to pedestrians and cyclists.

## Conclusion

Overall we conclude that the safety, road damage and congestion effects of longer trailers were not fully addressed in the DfT research before the trials commenced. The flawed assumption was made that longer semi-trailers would be no more dangerous than existing HGVs per mile driven. While the Government admitted that the longer trailer would increase tail swings and susceptibility to cross winds, and would not meet the performance of existing 13.6 metre trailers, it omitted to state that they also have larger blind spots.

The demonstration of the longer semi-trailers that we observed at Millbrook shows that they are unsuitable for general use in urban areas and on local roads and will increase the risk of death or serious injury to cyclists and pedestrians and damage to street furniture. The rear out-swing of the longer trailer was significantly greater than that of existing 13.6 metre trailers. This will be particularly dangerous for all other road users who may get hit, as it will not be obvious to them how the back of the lorry will swing out into another lane. It is unreasonable to expect other drivers, as well as those on foot or bicycles, to anticipate

that the out-swing of such trailers could be well over two metres under normal road conditions, especially as motor vehicles could be trapped in a queue of stationary vehicles alongside such a trailer in the middle of a sharp turn.

We therefore recommend that the longer semi-trailers be restricted to a network of designated local authority routes agreed by the local authority and the operator and that have been assessed for their suitability to carry such vehicles. We also want to see the promised active steering technology introduced as a matter of urgency and, once proved, made mandatory on longer semi-trailers.

## Annex: Expert opinion on the Millbrook demonstration

**Jim Chisholm**
**Sustainable Transport Campaigner and pioneering researcher who developed the computer simulation program TRACK (the basis for AutoTrack) for vehicle swept path analysis**

**Millbrook 27th June 2013**
This demonstration, although not a full scientific test, was designed to investigate the failing of the existing Construction and Use Regulations (1986) (C&U) to cover the dangers of off-tracking.

A full scientific test would need a combination of runs of a computer model such as 'AutoTrack' (Savoy Computing), using typical urban junction layouts, with verification by limited practical tests. In the demo the path of the rear outside corner was marked using water from a garden pressure sprayer with an attached lance. Measured accuracy was improved by tapping a cane vertically to the rear corner with the end around 50mm from ground surface. This enabled a safe working environment and resulted in a temporary path some 50mm wide marked on the dry asphalt surface.

Firstly, a demonstration of the concentric circle test was carried out, and then the drive through a 90 degree turn was observed. The results were commensurate with those expected for a combination specifically engineered to pass the C&U test. At the end of the 90 degree arc for the tractor unit in the drive through test, it was observed that only about half of the maximum steering lock of the tractor unit had been applied The outswing in this test was within the limits set in C&U regulations. This type of turn is clearly not typical of those made in depots or on urban streets, although they are what would be expected on the strategic highway network.

Secondly, a 90 degree turn where full lock was applied in the straight-ahead position was executed. The out-swing for the rear corner after the 90 degree turn was around 1.8m. If the tractor unit had continued further on maximum lock this outswing would have increased further to over two metres. Because of the geometry it was possible to estimate how much outswing would occur with a typical current 13.6m trailer, and this would be nearly 1 metre less. Such turns are often necessary in an urban environment, such as at traffic light controlled junctions or major-minor 'T' junctions. (Because of the constraints of the C&U regulations the 'effective' wheel base of 13.6m trailers and the longer 15.65m trailers are very similar at around 8.0m.)

At no point in this turn was the angle of articulation greater than that in the concentric circle test, and hence should be well within the design limits of the command steering of the rear axles.

A sharper turn could have been modelled, and such turns are not uncommon on urban networks, but it was felt that under the conditions it would not be good to exceed the design parameters of the command steer. It should also be clear that such vehicles need to be prohibited from areas where such sharp turns would be required, especially where limits to command or self-steer would be exceeded.

Such turns occur when an articulated combination has to turn into an entrance or side road of limited width. Such a double 'hooked' turn involves the tractor unit turning to the left possibly into a adjacent lane before making a sharp right turn through well over 90 degrees before reversing the lock to bring the combination into a straight line in the shortest possible distance.

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Philippa Edmunds
Campaign for Better Transport

Campaign for Better Transport's vision is a country where communities have affordable transport that improves quality of life and protects the environment. Achieving our vision requires substantial changes to UK transport policy which we aim to achieve by providing well-researched, practical solutions that gain support from both decision-makers and the public.

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