



EXPERT WITNESS REPORT - GUIDED BUSWAYS

1) INTRODUCTION

This case concerns the question of guided busway safety both in general and with particular reference to the proposals that exist between Cambridge and St Ives. It is examined from a safety point of view and not with regard to the commercial desirability of any of the other options. I have attempted to contrast the different standards of safety required of a "light" railway, of a "heavy" railway and the rules for guided busways.

2) FACTORS FOR CONSIDERATION

- 2.1) I have considered whether the vehicles used on the guided busway will need to be crashworthy. The regulations with regard to introduction of crashworthy vehicles are stringent within railways and in "light" railways and it requires to be established what the situation is for a busway;
- 2.2) Further investigation is required to establish if buses operating on the public highway are "governed" to a 60 mph speed limit. I have considered the effects of 70 mph operation on a limited clearance, single track highway;
- 2.3) I have reviewed the system in Adelaide, Australia which has experienced a number of collisions because it had a variable signalling system and I believe an inadequate control system. If 70 mph operation is envisaged the Adelaide experiences should be considered further against these proposals;
- 2.4) I have reviewed the difficulties surrounding night operation to establish what are the implications for a driver relying solely on the observation of the tail light of the vehicle in front;

- 2.5) I have considered what control is necessary at "passing places", particularly during the hours of darkness or during fog or falling snow. A quick review has been undertaken of the tragic accident on the Grimsby to Immingham tramway during the 1940s at an uncontrolled passing place. An application of the lessons learned needs to be applied to passing places on any proposed high speed busway. (See Recommendations);
- 2.6) I have reviewed the situation at level crossings and points where guided buses leave the busway. Consideration has been given to whether a guided bus can join the busway at intermediate points which create locations of possible conflict and requirement for a signalling system;
- 2.7) A form of control required to prevent other road users getting onto the busway has been recognised;
- 2.8) Consideration has been given to the physiological effects upon bus drivers from switching between ordinary road driving and high speed guided driving on significant lengths of former railway routes;
- 2.9) Consideration has been given to the possible need of more careful selection for Bus Driving on Busways over and above the holding of a PSV Licence; Psychometric testing of trainee train drivers is part of railway safety Group Standards and this needs further review.
- 2.10) A review needs to be undertaken in view of the fact that road drivers control their buses by using brakes and by steering to avoid hazards and thus follow a safe track. There is very restricted scope to steer away from hazards on a single track dedicated roadway and consideration needs to be given how to maintain safety;
- 2.12) As drivers will be driving within the limits of their vision and without guidance other than steering, due allowance must be made to maintain safety by restricting speed wherever vision is limited and consideration should be given to what signs or signalling systems are needed;
- 2.13) I have considered how a bus driver, when on a guided busway and unable to steer out of trouble in the way that is natural for him, will deal with items that come across his path. It will be necessary to fence the guided busway against pedestrians, straying animals, huntsman and dogs etc, but complete protection against trespass is impossible. The less frequent guided bus movements, compared to movements of traffic on public roads, will be likely to invite more rather than less unauthorised access to the busway. The light construction of buses and the inability to steer to minimise danger may mean that 70 mph operation could prove to be an unacceptable hazard. This situation requires further in-depth study.

- 2.14) I have reviewed the question of pedestrians or vehicles that cross or conflict at road junctions with the guided busway and what hazards may be created. Since the busway will probably be given priority at junctions it will need to be reviewed whether experience to date shows that not everybody gives way or stops when they should. A particular hazard is likely to develop akin to that already being experienced at railway level crossings. Road junctions suffer similarly, but there is usually more room for manoeuvre to avoid a collision;
- 2.15) The whole question of speed limits needs to be further reviewed to give a bus driver a reasonable chance of stopping in order to avoid a collision with a trespasser or anyone who fails to give him priority of passage and if a good view ahead cannot be provided for the bus driver then even lower local speed limits may be needed;
- 2.16) A review needs to be undertaken of the attitude of the ordinary road user who will see buses passing on the guideway as widely spaced, isolated events and may not realise how fast they can move. Road drivers may cross over the guideway many times without being stopped and without seeing a bus pass. Some drivers may take a chance that the crossing will be clear, or that they can get across before the guided bus. Risk analysis needs to be applied to this situation;
- 2.17) It may be more difficult for ordinary road traffic drivers to correctly judge the speed of a bus approaching them on a narrow guideway compared to judging speed of traffic approaching them on a road of normal width with better sight lines and background. This needs to be reviewed and further risk analysis applied to it;
- 2.18) I have considered that, on the edge of the Fenland, the weather in the area is prone to Fog.
- 2.19) A review of the need for traffic signal protection of guided busway junctions with ordinary roads should be undertaken in all cases where the bus is allowed to travel faster than the road traffic and whenever the road traffic can be at all heavy;
- 2.20) I have examined examples of Junction Working and considered whether an ordinary road user unfamiliar with guided buses will be at risk to some degree at road junctions with the guided busway. That risk could be minimised by good junction design, a right angled crossing, a clear view of approaching buses subject to an appropriate speed limit and provision of traffic lights, but it cannot be entirely eliminated. The risk will apply to all when the operation commences but there will always remain a reducing minority of unfamiliar users;

2.21) I would wish to review further the situation with Sustrans to see if they have any involvement with this stretch of former railway line. Sustrans policy provides for reinstatement of a railway and maintenance of a less wide path or alternative upon which to cycle. It may well be difficult to apply such an arrangement when a former railway is converted to a guided busway;

2.22) I have considered the HSE statement of 10 December 1998 that rail traffic is 15 times safer than travelling by car and five times safer than travelling by coach. These statistics, given the very differing sets of circumstances that will apply on a high speed busway, need reviewing before any steps can be taken to put the public further at risk. I have considered the opinion of the HSE (The Chief Inspecting Officer of Railways) dated 21 October 1998 as follows:

"When being operated along on a guided busway, the signalling system employed is normally line of sight and the bus driver would be controlling the bus in such a way that the guided bus should be able to stop should a hazard arise. Of course, due to the nature of a guided busway the driver would not be able to drive off the guided route, therefore guided buses do not have to have a dedicated signalling system".

I have considered whether there is sufficient experience of guided busway operations to be able to assess the risks associated with uncontrolled passing places and single track guided busways. I have reviewed this argument with care in an attempt to understand the logic behind the Chief Inspecting Officer's opinion.

2.23) Consideration has been given to the following remarks of Mr SSJ Robertson Chief Inspecting Officer of the HSE

"Guided busways tend to form only part of the route of a guided bus. Invariably, for example, in city centres guided buses would have to use the highway with other road users. For this reason the construction of guided busways would have to conform to the current Road Vehicle Construction & Use Regulations 1996".

I have considered the risks associated with guided bus operation at speed over longer distances and in open country and whether compliance with Light Rail vehicle standards should be required. Experience in Sheffield, Newcastle on Tyne and Manchester should be reviewed. I have not revisited my own notes on the Manchester system for I was part of the authorisation of the railway, tramway, running side by side in the Altrincham area. A review of safety hazards experienced on these systems should be undertaken, and comparisons made with models of proposed busway operation. Such a review of these developing alternatives would benefit any decision making process.

2.24) I have passed in review of the letter of 24 January 1996 by Mr S S J Robertson who was then Chief Inspecting Officer of Railways and I have reviewed the following items with regard to his advice. The wisdom of his advice has not been considered in any order of precedence:

a) A speed limit on unlit stretches, bends, in fog etc might be applied, but the normal road rules on driving on line-of-sight would apply. Hence in fog etc drivers would be expected to reduce speed;

b) Block equipment signalling will not be required if speed is not restricted. Again, line-of-sight rules of driving at such a speed so that the bus can be stopped within sighting distance would apply;

c) A control centre for signalling and communications, breakdown and emergencies is very much a matter for operational convenience;

d) You ask whether a speed limit will be required over occupational crossings and foot rights of way where the guidance system is withdrawn. It is expected that the normal highway rules, regarding visibility displays would be applied. It was not found necessary on earlier trial kerb-guidance systems to reduce speeds at 'gaps' in the guidance caused by road intersections;

e) Signalling will only be required at busway-public highway intersections if it would be required on a comparable highway intersection;

f) Only a very limited amount of training for bus drivers will be required, depending on the exact nature of the system;

g) You also ask whether a supervisory body will be in charge of inspections for safety arrangements of the busway. This is a matter for the approving authority, namely DoT.

- 2.25) I have further reviewed the last paragraphs of Mr Robertson's letter in which he states

"There is no safety case regime for busways but operators would be required to observe the provisions of the management of Health and Safety Regulations 1992. These require that a proper risk assessment of all activities be undertaken and appropriate measures taken to mitigate those risks"

and considered whether this adequately protects the needs of the travelling public.

- 2.26) I have considered the differing costs and the need to fully take account of extra costs generated by safety considerations, should the busway solution be the accepted one.

3. CONCLUSION.

It is my opinion that the adoption of the busway solution to the needs of Cambridge City and the surrounding areas may create safety risks which should be addressed. The examination of this example of Busway schemes has revealed a need for rationalisation of the standards for operation and safety of guided busways and the development of suitable safety requirements which will recognise the risks attendant on their use.

4. RECOMMENDATIONS.

That an independent inquiry be set up to determine the merits of the differing modes of transport available for such schemes as the one proposed for Cambridgeshire. The Inquiry also to review the regulations applicable for such urban transport schemes and whether these need to be strengthened to ensure safe operation of guided busways. Particular reference to be made to the cost and benefits of safety controls set against the cost of accidents and deaths without such developments. These costs, when fully evaluated, to be set against similar cost ratios for Light and Heavy rail operation.

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