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Where are B-Doubles Taking Us? – A Review of Heavy Truck Safety in NSW

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Abstract

Double-trailer vehicles were introduced into the outer regions of New South Wales in about 1988 on a trial basis. In the early 1990s, the area available to them was progressively extended to cover all main roads in N. S. W. One of the stated reasons for their introduction was that they were safer than carrying the same loads on semi-trailers. This paper investigates to what extent that presumption was justified.

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INTRODUCTION

Road vehicle mass limits world-wide have generally grown since 1980, and size limits have also been increased. Australia and N.S.W. are no exception. Following the Review of Road Load Limits conducted for the National Association of Australian State Road Authorities ("NAASRA") in the 1980s, it was decided in about 1988 to permit double-trailer vehicles in the remoter western areas of New South Wales. These vehicles differ from road trains in several ways and are called "B-doubles". The most obvious difference is that trailers on road trains have their own front axles; the semi-trailers on B-doubles have only one axle system, with the front of each B-double semi-trailer being supported by the turntable of the vehicle in front. Evidence presented at the time suggested that using B-doubles was considerably safer than carrying the same load on a larger number of conventional semi-trailer trucks.

The purpose of this paper is to investigate whether and if so to what extent the presumption of greater safety on B-doubles under special regulation, compared with carrying the same load on ordinary semi-trailer trucks, can be sustained.

STATE OF THE ART

Total yearly road deaths in Australia peaked in 1970 at 3798 fatalities (FORS 1997). There has been a considerable decline since then; the annual total was below 3000 in the mid 1980s and below 2000 in the mid 1990s (op. cit.). However, this desirable pattern was not mirrored in accidents involving heavy trucks. Oluwoye (1990) shows a noticeable jump in both rigid and articulated truck fatalities occurring in 1986. The higher levels were sustained in 1987 and 1988. Closer examination of some aspects of these trends can be found in Sweatman et al (1990, page 42). Especially after 1989, when there were several widely-publicised major accidents in NSW which involved multiple fatalities, including smashes involving overnight interstate passenger coaches, there was considerable pressure of public opinion that the safety of heavy vehicles should be improved. The introduction of a new type of heavy truck was an opportunity to review standards of vehicle construction and operation, and driver training and accreditation.

In April 1990, the NSW Parliament's Joint Standing Committee on Road Safety ("Staysafe") published its report (Staysafe 1990) which investigated whether B-doubles ought to be permitted in the eastern parts of NSW. The eastern region of the State includes the coastal areas where the great majority of NSW's population and traffic are centred around the Sydney-Newcastle-Wollongong conglomeration. The Staysafe report was enthusiastic about the safety implications of widening the use of B-doubles. It took the viewpoint that raising the load limit per vehicle could lead to a reduction in trucks on the road, and implied that one result would be fewer accidents. It also argued that high standards could and should be enforced for these vehicles, with consequent gains in safety.

The standards included a minimum engine power of 400kW. This, it was argued, would benefit safety by permitting trucks to climb faster, thereby reducing reckless overtaking by frustrated car drivers on long hills. The standards also prescribed a quite different type of coupling between the semi-trailers and between the front semi-trailer and the prime mover from that of road trains. Known as a "fifth wheel" coupling, its construction and reduced rotational freedom was supposed to make jack-knifing less likely, reducing accidents where crashed vehicles blocked many lanes of a road with attendant risk of involving many vehicles in collisions. The reduced rotational freedom also was supposed to prevent units of the B-double from rolling individually, greatly reducing rollover accidents. The fifth wheel was also supposed to reduce the risk of accidents caused by a trailer uncoupling. Another safety factor in the standards was a speed limit on the vehicle. Further, B-doubles were to be required to carry vehicle monitors and to be subject to a stringent regime of driver training and accreditation. Also, B-doubles were required to have spray suppression equipment on their wheels and to have anti-lock braking systems. And they were to be prohibited from urban main roads during and in the direction of peak traffic flow. Standards also prescribed that each of the two semi-trailers on a B-double was to be somewhat shorter than the single trailer on a conventional semi-trailer, reducing the width of the swept path on moderate curves, and accordingly reducing the risk of side-swiping accidents involving passing vehicles.

Staysafe was optimistic that the combined effect of the above measures would be a worthwhile improvement in safety. It felt that any loss in safety caused by the extra length of B-doubles would be more than compensated for by the fact that the number of large trucks on the road would be reduced. The expected reduction in the number of trucks was due to the ability of B-doubles to carry more freight per truck, reducing the number of trucks needed for the same freight task. Moreover, B-doubles would generally be on roads with few intersections, so there should be no loss of safety due to trucks taking more time to clear intersections. And they would generally be on multi-laned roads, minimising any adverse effect their greater size might have on traffic congestion by being difficult to overtake.

Staysafe expressed concern about the need for enforcement of safety measures and expressed particular concern about the lack of regard shown by some local officials for enforcement of safety standards in their areas. It noted laxity in enforcement of standards observed with other types of vehicle and re-iterated that standards would have to be enforced rigorously for B-doubles. Street and Chow (1997) discuss how safety and other regulations can be enforced, pointing out that roadside inspections are costly to both the inspectors and the vehicles inspected, and that many offenders escape roadside inspections.

Staysafe specifically considered the issue of whether B-doubles ought to be allowed into Sydney, as opposed to being required to uncouple on the city outskirts and operate in urban areas only as semi-trailers or transfer their loads to still smaller vehicles. Evidence was taken (op. cit. pp 13-14) that this restriction could destroy the economic advantage of using B-doubles; this evidence is not questioned by Staysafe. Hensher and Battellino

(1990) discusses the economic pressures on truck drivers; it seems clear that society is not prepared to pay much more for transport than it pays now.

Staysafe addressed the question of B-double safety (pp. 5-7), and pointed out that the very limited experience then available was not enough for "a definitive measure of the safety of B-doubles". However, it cited a 1989 RTA statistic showing an average of one casualty crash for every 2 million kilometres of travel by ordinary articulated trucks in NSW and a history of only one casualty crash in about 20 millions kilometres of B-double travel (page 5). Staysafe observed (page 7) that the high level of safety reported for B-doubles might merely indicate what could be achieved when the industry took extreme care. The safety question was addressed again two years later by the RTA (RTA 1992), which reported a safety survey conducted by the B-Double Operators Group that suggested B-doubles had "a safety record 9-10 times better than other heavy articulated vehicles."

Given that B-doubles have been operating for about 7 years, one might hope that enough data would now be available for an assessment of B-double safety. Unfortunately, such does not appear to be the case. American guidelines (Transportation Research Board, 1990) show clearly just how difficult it can be to aggregate statistics prepared under different jurisdictions. The TRB report went on to propose data collection standards for measuring road safety in the United States. The present author was advised that obtaining Australia-wide data in a form suitable for investigating B-double safety would be very difficult. Accordingly, it was decided to limit the present study to New South Wales.

DATA ANALYSIS AND DISCUSSION

Details of all reported accidents in NSW for the five calendar years 1993-1997 and involving a casualty or requiring a vehicle to be towed away and involving a B-double or a road train were obtained from the NSW Roads and Traffic Authority. They showed:

Year	Fatalities	Accidents	Casualty Accidents*
1993	2	17	8
1994	-	15	4
1995	1	11	3
1996	6	26	14
1997	11	69	34

*Statistics in the last column were not reported as such in the RTA statistics but were obtained from the RTA's detailed reports

Numbers of B-doubles registered in NSW in the years 1997-1998 were also obtained from the NSW RTA:

At end of:	B-doubles registered in NSW
Dec. 1996	295
Jun. 1997	458
Dec. 1997	606
Jun. 1998	712
Dec. 1998	809

The only full calendar year for which accident figures and registration figures are both available is 1997. The average number of vehicles registered was approximately 460, assuming uniform growth throughout the year. The number of casualty accidents was 34. Taking the estimate in (Staysafe 1990 p. 6), the average distance travelled per B-double per year is 200 000 km. Thus, observing 34 casualty accidents for 460 B-doubles corresponds to one casualty accident per 2.7 million km driven. This figure is only slightly less than one casualty accident per 2 million km stated in 1989 as being typical of ordinary articulated trucks in NSW (Staysafe 1990 p. 5). Turning to the 1997 statistics for articulated vehicle accidents, there were 519 casualty accidents reported in NSW and there were then 13,700 articulated vehicles registered. At 200,000 km per vehicle per year, that corresponds to 1 casualty accident per 5.2 million km driven. Even making allowance for the crudeness of calculation, the assertion that B-doubles are much safer than ordinary semi-trailers must now be suspect.

EPILOGUE

Conducting a proper study into the relative safety of different types of truck would be a major undertaking. One would need to account for the different types of journey which the different types of truck generally make. For example, it is quite possible that B-doubles generally travel on less accident-prone roads than do ordinary semi-trailers, and that this factor alone could account for much of any safety advantage that B-doubles appear to have. The whole issue is slewed by the fact that the majority of personal damage in accidents involving large trucks tends to be to road users other than the occupants of those trucks – see Rechnitzer (1993). And one would have to account scrupulously for freight shifting from rail to B-doubles; there is no question that rail carriage is much safer than all forms of transport by road.

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