The Parliament of the Commonwealth of Australia

BICYCLE HELMET SAFETY

Final Report on the Motorcycle and Bicycle Helmet Safety Inquiry

Report of the House of Representatives
Standing Committee on Transport Safety

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Terms of Reference

On 27 February 1985, the Committee was appointed by *Resolution of the House of Representatives to inquire into and* report on:

(a) the most effective means in terms of cost and efficiency of achieving greater transport safety in Australia
(b) the main causes of air, sea, rail and road transport accidents in Australia
(c) the particular aspects to which those concerned with transport safety could most advantageously direct their efforts
(d) the economic cost to the community of transport related accidents in Australia, remedial measures and equity considerations in the burden of cost
(e) those sections of the community most affected by transport related accidents, and
(f) occupational health and safety issues in the transport sector.

The Committee, on 28 February 1985, resolved to continue the Inquiry commenced in the previous Parliament into:

(a) motorcycle and bicycle helmet safety; and
(b) the enforcement of helmet safety standards by the Standards Association of Australia and the Trade Practices Commission.

The previous Road Safety Committee has already examined and reported on the enforcement of the motorcycle helmet standard.

Membership of the Committee

Chairperson	Mrs E.E. Darling, MP
Deputy Chairman	Mr B.J. Goodluck, MP
Members	Mr A.J.G. Downer, MP
	Mr R.N.J. Gorman, MP
	Mr C. Hollis, MP
	Mr A.H. Lamb, MP
	Mr P.J. McGauran, MP
	Mr J.B. Mildren, MP
Secretary to the Committee	Mr A.J. Kelly

Mr McGauran replaced Mr T.A. Fischer, M.P., who resigned from the Committee on 18 September 1985.

Abbreviations

ATAC	Australian Transport Advisory Council
DSIR	Department of Scientific and Industrial Research (N.Z.)
FORS	Federal Office of Road Safety
GBP	Geelong Bikeplan
NH&MRC	National Health and Medical Research Council
RTA	Road Traffic Authority (Victoria)
SAA	Standards Association of Australia

CONTENTS

		Page
	Terms of Reference	iii
	Members of the Committee	iii
	Abbreviations	iv
	Recommendations	vii
1.	INTRODUCTION	1
	. History of the Committee	1
	. Background to the Inquiry	1
	- The 1978 *Report on Motorcycle and Bicycle Safety*	1
	- Current Inquiry	2
	- Bicycle helmet aspects	3
	. The Committee's Terms of Reference	3
2.	THE EFFECTIVENESS OF BICYCLE HELMETS	5
	. Bicycle accident research	5
	. The over-representation of children in statistics	6
	. Helmet safety performance	7
	. The Dorsch Study on helmet effectiveness	9
	. The current helmet market	10
3.	BICYCLE HELMET SAFETY	13
	. Helmet usage rates	13
	. Attempts to raise usage rates	15
	- Media campaigns	15
	- School based helmet promotions	17
	- Helmet rebate schemes	19
	. Future role for Government	20
	Broad approach to bicycle safety	21
	- Cyclist education	21
	- Motorist awareness schemes	22
	- Enforcement of current laws	23
4.	THE BICYCLE HELMET STANDARD	25
	. Moves towards a separate bicycle helmet standard	26
	. Changes to the Standard	26
	- Helmet ventilation	26
	- Ventilation vs penetration resistance	27
	- Helmet retention systems	28
	- Helmet mass	29
	. Material of manufacture	31
	. Helmet conspicuity	32
	. Consumer information	32

5. THE COST OF BICYCLE HELMET WEARING 35

. The cost of helmet testing 35
. Helmets on the Australian market 37
. The cost-benefit of universal helmet usage 38
. A Role for Government 39

6. A MANDATORY STANDARD AND COMPULSORY HELMET USE 41

. A mandatory standard 42
. Obstacles to mandatory helmet usage 44
- Historically low helmet usage rates 44
- Lack of enforcement of existing cycle laws 44
- Economic cost 45
- Storage of helmets 46
- The social freedom of cycling 47
. Compulsory helmet use 47

APPENDIXES

1. List of Witnesses 51
2. One Possible Cost-Benefit Calculation of Universal Helmet Use 57
3. Cost to Australian Manufacturers of SAA Certification 59
4. Scripts of Victorian Government Helmet Advertisements 63

Recommendations

The Committee recommends that:

1. (a) the Minister for Transport, through the Federal Office of Road Safety take steps to publicise widely helmet bulk-purchasing programs and to coordinate a national program by encouraging schools, manufacturers and retailers to work closely together to ensure all Australian schools have the opportunity to participate; and

   (b) the Minister for Education facilitate the operation of school-based bulk purchase schemes for bicycle helmets in the Australian Capital Territory along the lines of the Victorian scheme.

   (Paragraph 58)

2. the Ministers for Education and Transport seek the cooperation of their State and Territory counterparts to encourage all schools to introduce the 'compulsory' wearing of helmets by children cycling to and from school.

   (Paragraph 65)

3. the Minister for Transport seek the cooperation of the States and Territories through the Australian Transport Advisory Council to;

   (a) develop effective programs to promote bicycle helmet usage, utilising where possible effective material already developed; and

   (b) provide suitable funding for the development of these programs and materials.

   (Paragraph 71)

4. the Minister for Transport and the Special Minister of State in conjunction with their State counterparts;

   (a) investigate more effective enforcement techniques to ensure cyclists, particularly children, follow the traffic code; and

   (b) introduce a more innovative cycling traffic code.

   (Paragraph 85)

5. the Minister for Transport have undertaken an examination of the physiology of head temperatures under Australian climatic conditions and the amount of cooling required.

   (Paragraph 101)

6. in cooperation with State road safety authorities and the SAA, the Minister for Transport fund the research and development of an effective and reliable test of the ventilation capabilities of bicycle helmets for the purposes of Standard setting.

(Paragraph 101)

7. that the Minister for Transport commission research to allow the Standard AS2063.2 to be revised setting maximum helmet weights for children of various cycling age groups and for adults, consistent with the protective provisions of the Standard.

(Paragraph 115)

8. the Minister for Transport ask the Standards Association of Australia to consider the feasibility of making the colour provisions of AS2063 mandatory during its current review of the Standard, and that it further consider the benefits of reflective material in the same context.

(Paragraph 121)

9. the Federal Office of Road Safety establish the costs and benefits of universal approved bicycle helmet usage and publish the results of such research at the earliest opportunity.

(Paragraph 141)

10. the Minister for Transport encourage the manufacture of approved bicycle helmets in smaller shell sizes for children by reimbursing manufacturers for successful type-testing and routine-testing of small helmets for the first 50,000 helmets per manufacturer.

(Paragraph 144)

11. (a) the Attorney General declare AS2063.2 as a Product Safety Standard under the Trade Practices Act as soon as practicable following the finalisation of the long-term revision of the Standard.

(b) until the Product Safety Standard above can be declared, the Attorney-General declare unsafe those bicycle helmets which do not meet the impact energy attenuation requirements of the current AS2063.1.

(c) bona fide toy helmets be permanently labelled that the helmet is a toy only and should not be used for safety purposes.

(Paragraph 159)

12. the Minister for Transport seek the cooperation of the States and Territories through ATAC to:

(a) develop effective bicycle helmet promotion campaigns, with the objective of achieving universal bicycle helmet wearing,

(b) regularly monitor helmet usage,

(c) review the benefits of bicycle helmet wearing, twelve months after the mandatory bicycle helmet standard is introduced, and unless there are persuasive arguments to the contrary introduce compulsory wearing of helmets by cyclists on roads and other public places, and

(d) provide an exemption, if required, to (c) above for riders in organised road cycling races.

(Paragraph 190)

CHAPTER ONE

INTRODUCTION

History of the Committee

1. The House of Representatives Standing Committee on Transport Safety was first appointed at the beginning of the 34th Parliament on 27 February 1985. It replaces the Road Safety Committee of previous Parliaments.

2. On its appointment the Transport Safety Committee resolved to continue the two Inquiries of the Standing Committee on Road Safety unfinished at the end of the 33rd Parliament. These were the Motorcycle and Bicycle Helmet Safety Inquiry and the Passenger Coach Safety Inquiry.

Background to the Inquiry

The 1978 Report on Motorcycle and Bicycle Safety

3. In May 1978 the House of Representatives Road Safety Committee reported on an Inquiry into Motorcycle and Bicycle Safety. Motorcycle and bicycle helmet safety was covered briefly in that Report and the Committee made a number of recommendations which were relevant to the current Inquiry.

4. Principal among the recommendations on motorcycle helmets was that the motorcycle helmet committee of the Standards Association of Australia (SAA) review Australian Standard 1698 as soon as possible and that the review process include the views of user, importing and manufacturing groups.[1] The Committee also recommended that the Commonwealth Department of Transport introduce a system of post-accident analysis of motorcyclists' helmets and that the compliance to AS1698 of available helmets be monitored by a government sponsored independent testing agency and that the results be widely disseminated.[2]

5. Recommendations in the 1978 Report concerning bicycle helmets were: that cyclists be advised of the safety benefits of protective helmets, and that the possibility of requiring cyclists to wear helmets be kept under review.[3] The former of these two recommendations was accepted by the Government and the Government's response in November 1978 stated that the necessary preliminary action had already been taken. In May 1985 the

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1. Motorcycle and Bicycle Safety, Report of the House of Representatives Standing Committee on Road Safety, AGPS, 1978, p.69.

2. 1978 Report, paragraph 185.

3. 1978 Report, paragraph 209.

Federal Government launched a campaign featuring Molly Meldrum of the ABC Countdown program to promote bicycle safety helmet wearing. With regard to reviewing the possibility of mandatory helmet wearing, the Government's response in 1978 was that further investigation was still required. Both of these recommendations concern key issues in the current Inquiry and will be discussed at greater length in Chapters Three and Six respectively.

Current Inquiry

6. The current Inquiry into Motorcycle and Bicycle Helmet Safety was commenced by the Standing Committee on Road Safety in May 1984. That Committee announced the Inquiry following a preliminary hearing of allegations that a number of motorcycle helmets on the Australian market were in contravention of the mandatory Australian standard. That Committee believed that these allegations were of a serious enough nature to warrant an Inquiry into motorcycle and bicycle helmet safety and the enforcement of helmet safety standards by the SAA and the Trade Practices Commission.

7. In June 1984, the Road Safety Committee reported on the motorcycle helmet aspect of the current Inquiry. In this Interim Report the Committee found evidence that the SAA had not adequately observed the requirements of the published Standard in its certification of helmets and in their routine testing. The Committee concluded that the problems were associated with the interpretation of the standard by the SAA, the lack of clear lines of authorisation in these interpretations and failures in the licensing test procedures. As this Standard was called up in the mandatory product safety standard declared under the Trade Practices Act, this meant that the mandatory standard was also not being fully observed. The Standard AS1698 was first made mandatory in November 1978.

8. The Committee repeated the recommendation of the 1978 Report that compliance of helmets available in the marketplace to Australian Standard 1698 be monitored by a Government sponsored independent testing agency and that the results be widely disseminated.[4] The Committee found that despite the Government's favourable response to recommendations of the 1978 Report, these recommendations had not been fully implemented.[5] The Interim Report noted that if these recommendations had been fully implemented there may not have been any need for the latest Inquiry into motorcycle helmet safety.[6] The Government responded to the Interim Report on Motorcycle and Bicycle Helmet Safety in October 1984 accepting all of the recommendations.

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4. Paragraph 38.

5. Paragraph 37.

6. Paragraph 37.

9. The Interim Report also recommended the formation of a task force to review the SAA's certification and testing procedures for helmets as well as the administrative procedures of SAA Committee AU/12 which is responsible for the formulation of the SAA motorcycle helmet standard.[7] The Committee understands that this task force has been established and has already completed its review with the full cooperation of the SAA. The Committee commends the Government on its swift action on such an important recommendation.

Bicycle helmet aspects

10. The Road Safety Committee held the first public hearing specifically on bicycle helmets on 3 October 1984 in Canberra. On the dissolution of the Parliament on 11 October 1984 the Committee was also dissolved without being able to complete this aspect of the Inquiry. The Transport Safety Committee has held hearings on this Inquiry in Canberra, Melbourne, Perth, Adelaide, Darwin, Newcastle and Sydney.

The Committee's Terms of Reference

11. As this is the first report of the Transport Safety Committee the Committee makes several brief observations concerning the much broader terms of reference compared to those of the Road Safety Committees. The Transport Safety Committee's Terms of Reference give it the opportunity to inquire into the safety of air, sea, rail and road transport in Australia. The Committee is charged with examining the main causes of accidents in each of these transport sectors and in this regard the Committee has recently announced an Inquiry into Sports Aviation Safety.

12. Table 1 is a comparison of deaths and injuries in the four sectors of Australian transport. It must be stressed that the statistics for the various categories are not strictly comparable for statistical purposes but they do provide some basis for comparison of death and injuries between the modes. Although the comparison is somewhat rough the relative enormity of the road toll is immediately obvious. The Committee believes that it's major concern will continue to be the enormous tragedy of Australia's road toll.

13. Road accidents killed 52,243 Australians in the fifteen year period ending 31 December 1983. The annual road toll figure has fallen over recent years but the Transport Safety Committee will continue to address road safety problems and make recommendations in an attempt to ensure that this figure falls even further.

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7. Paragraph 56.

TABLE 1

FATALITIES AND INJURIES IN AUSTRALIAN TRANSPORT
1978-1979

Road Traffic	- Persons killed	3,272(a)
- Persons injured	32,054	
.Tram and Bus Services(1)	- Persons killed	27
- Persons injured	1,885(b)	
Government Railways(2)	- Persons killed	58(c)
- Persons injured	1,687	
Air Transport(3)	- Persons killed	42
- Persons injured	37	
Shipping and small boats	- Persons killed	146(d)

(1) Figures fully included in road traffic statistics.
(2) Casualty figures for Non-Government Railways are not collected in Australia.
(3) Does not include sports aviation casualties other than gliding.
(a) 1980 Calendar Year.
(b) Excludes New South Wales.
(c) 1979 Calendar Year. Source: Ann Halford, Cause of Death Section (ABS).
(d) 1978 Calendar Year. Source: Water Transport Accidents: Australia (unpublished ABS 1985).

Note: This table is for rough comparison purposes only and should not be used for any other purpose.

CHAPTER TWO

THE EFFECTIVENESS OF BICYCLE HELMETS

14. The wearing of helmets by motorcycle riders has been a part of safe motorcycling for some time now and Australia has lead the way in making motorcycle helmet standards and the wearing of approved helmets mandatory. Throughout the Inquiry the Committee has heard of growing support for the wearing of bicycle helmets by cyclists. The effectiveness of helmets in reducing head injuries in crashes has been confirmed by recent studies and the growing number of cyclists wearing helmets attests to their popularity and the public's desire for safer cycling.

Bicycle accident research

15. Research in Australia and overseas over the last 20 years has continued to highlight the extremely high incidence of head injuries amongst cyclists involved in accidents. The first study of this phenomenon was undertaken in Australia and showed that of 181 bicycle fatalities in Brisbane from 1935 to 1964, 80 per cent showed brain damage, with 71 per cent having associated skull fractures.[1]

16. Subsequent studies have confirmed figures of this order with a recent study of bicycle fatalities for children under 15 years in Queensland indicating that 77 per cent died of head injuries, 13 per cent of multiple trauma which did not include head injuries and 10 per cent of spinal fractures involving the neck.[2] Other research has shown that head injuries occur in approximately 80 per cent of fatalities. Coroner's records in South Australia suggest that 50-65 percent of cyclist deaths are solely due to head injuries and in many cases the impact was so severe that a helmet would not have saved the rider.[3] It must be stressed that even the best helmet cannot prevent all injuries or all fatalities. In many instances the injuries suffered are so severe that the rider cannot survive whether wearing a helmet or not.

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1. Tonge et al (1964), Fatal Traffic Accidents in Brisbane From 1935 to 1964, Medical Journal of Australia, 2, pp.811-820, quoted in Mathieson, J.G., 'Bicycle Safety in Australia: A comprehensive review,' Proceedings of the National Road Safety Symposium, Canberra, 1984.

2. Nixon, J.W., Clacher, R. and Pearn J.H., (1983), 'Children and Pedal Cycle Accidents on the Road,' Australian College of Paediatrics Meeting, Surfers Paradise, May, quoted in Evidence, p.631.

3. Evidence, pp.507, 878.

17. A study based on head injuries treated in the Royal Childrens Hospital in Brisbane between 1956-1978 pointed out that any further improvement in mortality rates in childhood head injuries lies in "prevention or increased protection rather than in increased sophistication of surgical techniques".[4]

18. Detailed study of Coroner's Reports indicates that, as well as head injuries, cyclists are highly likely to sustain thoracic and abdominal injuries. This is due to their vulnerability and the nature of bicycle accidents.

The over-representation of children in the statistics

19. The Committee is concerned by the extremely high over-representation of children in bicycle accident casualty statistics. The authors of the Brisbane study previously cited estimated that the bicycle accident rate for children aged 5-14 years is 53.86 per 100,000. The significance of this figure is realised when compared with the accident rate for the total population which is only 9.89 per 100,000. The authors also calculated that the accident rate for boys is 7.1 times that for girls.[5]

20. A study of bicycle related injuries at the Redcliffe Hospital in Brisbane in 1984 found of the 166 injury cases over a nine month period, 154 (or 92.6 per cent) were sixteen years of age and under. Of these 74 per cent were males and 77.1 per cent occurred on the road.[6] Furthermore, a recent study of Western Australian hospital morbidity data indicated that cyclists under 20 years of age have approximately three times the injury rate of cyclists in the over 20 years age group.[7]

21. In evidence, the Federal Office of Road Safety summarised these statistics by estimating that 70 per cent of all bicycle casualties involve children aged seven to seventeen years of age.[8] Children in this age group made up only 18.4 per cent of the population in 1984.

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4. Exhibit 14. 'Head Injuries in Childhood', Yelland J. in Pearn J.(ed) "Accidents to Children: their incidence and causes," CAPFA, 1983, p.147.

5. Nixon et al (1983), quoted in Evidence p.632.

6. Armson, C.J., and Pollard, C.W., 'Bicycle Injuries on the Redcliffe Peninsula', unpub, 1984, quoted in Evidence, p.632.

7. Lugg, M.M. (1982) Hospital Morbidity Statistics, Pedal Cycle Accidents 1971-1980, W.A. Department of Public Health, quoted in Mathieson, J.G., (1984).

8. Evidence, p.506.

22. The dramatic over-representation of young cyclists is even more disturbing when it is remembered that many injuries go unreported. A recent study published in the Medical Journal of Australia noted that "relatively few bicycle accidents are reported"[9] and school surveys related to the Geelong Bikeplan Study in Victoria found that only 1 in 30 bicycle injuries were reported by children. In Western Australia only 1 in 5 of all bicycle accidents requiring hospitalisation was reported.[10] Research in the United States has indicated that the bicycle crash rate (per million kilometres) on off-road bicycle paths is more than twice that on major arterial roads.[11] Many accidents in Australia particularly those off-road, remain unreported since only those bicycle accidents involving a motor vehicle are required to be reported.[12] Cyclist deaths are fully reported and 25 percent of these occur off-road.[13]

23. The Committee heard that this under-reporting has led to a lack of comprehensive data on accident rates. The development of the most cost-effective bicycle safety countermeasures is hindered because authorities are often unable to isolate the true causes of many accidents.[14] The Committee believes that bicycle injuries, particularly those involving hospitalisation, should be fully reported if future countermeasures are to be adequately assessed and their effectiveness maximised.

Helmet safety performance

24. While there are insufficient data available to facilitate the development of the most effective bicycle safety programs, it is clear that good quality hard-shell helmets significantly reduce the risk to cyclists of head injuries and their seriousness in an accident.

25. Severe head injuries through accidents are the result of high energy levels being absorbed by the head and neck. Effective bicycle helmets should, like any other effective helmet, protect the head from abrasion, reduce the risk of skull fracture or penetration and dissipate as much energy as possible to minimise the deceleration forces on the brain. Damage to the brain can result from rapid deceleration or rotation of the brain within an intact skull. Only a helmet with a hard outer shell and an effective energy-attenuating inner liner can provide this kind of protection in the event of an accident.

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9. McDermott, F.T., and Klug, G.L., 'Comparison of head and other injuries in Melbourne pedal and motorcycle casualties,' *Medical Journal of Australia, Vol. 143, 1985, p232.*

10. Lugg, M.M. (1982), p.5, Evidence, p.870.

11. Mathieson, J.G. (1984), p.11.

12. Evidence, p.506.

13. Evidence, p.506.

14. Evidence, p.506.

26. The strength of the shell is able to protect the head from abrasion and penetration while the liner, by crushing and thereby destroying itself, minimizes the energy absorbed by the head when the cyclist hits the roadway or another object such as a lamp-post or motor vehicle. In a substantial accident involving impact to the head, a helmet and/or the helmet liner is likely to be permanently damaged in terms of its effectiveness and may need to be replaced. This damage is not always obvious and wearers need to be made aware of the helmet's reduced effectiveness. A similar situation applies to seatbelts after serious accidents.

27. Apart from the energy-attenuating properties of a helmet it requires several secondary features to fulfill an effective protective role. It requires an adequate retention system, not only in terms of strength but also in its ability to keep the helmet firmly in place during an accident. The helmet needs to be well ventilated, otherwise it may not be used and there will be a tendency to remove it in hot weather or during extended or strenuous riding. Evidence was given that this was particularly a problem with children, although cycling enthusiasts and riders in the tropics have similar problems. The head is a major heat-transfer area in body cooling and this needs to be taken into account in helmet design.

28. The traditional hair-net style racing helmet has been available for many years. However it provides relatively little energy absorbing material and its 'ribs' do little to protect the rider from abrasion or penetration injuries. Helmets providing high quality protection have become available only relatively recently.

29. Following the success of a standard for hard shell helmets for motorcyclists a similar improvement was sought for pedal cyclists and the SAA developed a standard for a lightweight protective recreational helmet. This Standard, AS2063, was published in 1977. However it was not until four years after the Standard had been published that there was a helmet on the market which was fully approved and certified to AS2063. In subsequent years a further four helmets have been approved. There is a wide variety of hard shell helmets available on the market offering varying degrees of protection. While some offer a high level of protection others offer very little protection. To enable consumers to purchase helmets with demonstrated protective properties, road safety authorities have recommended those helmets licensed to carry the SAA mark.

30. From 1981 onwards, consumers have been offered a growing range of SAA approved helmets to choose from. Despite this, two helmets that have been approved have met with criticism from cycling groups and government authorities. The Star and Rampar helmets are the same helmet except for different colours and markings. While satisfying the requirements of AS2063, the Star and Rampar helmets have been criticised for being extremely

heavy, lacking in any ventilation and being easily removable from many peoples' head while the straps are firmly fastened. The weight of the helmet is within the range recommended under the Standard. The distributor of the helmet has pointed out that the weight and lack of ventilation are obvious to a purchaser.

31. The SAA has moved quickly to overcome those identified shortcomings. It has proposed a short-term remedy by putting out for comment draft revisions to the Standard, requiring ventilation and more comprehensive retention performance testing. The SAA has gone a long way to rectifying the retention system problem by requiring helmets to be tested for pivotal or rotational stability on a headform that corresponds closely to the shape of a human head. The new draft of AS2063 currently under review includes a 'chin' on the test head form. The testing of pivotal or rotational stability was not recognized as being critical until the Star/Rampar debate. To date, testing of the retention system has simply tested the physical strength of the strap system under load. The SAA has developed a number of research projects to develop longer-term improvement to the Standard. Other areas where the Standard is being changed will be discussed in Chapter Four.

32. Any manufacturer may make a helmet and sell it as a bicycle helmet regardless of its protective properties. One witness stated that a manufacturer could call a flowerpot a bicycle helmet and sell it in Australia as such.[15] The only restriction is that they cannot claim that it is either approved by SAA or that it meets the performance requirements of AS2063. The ease with which grossly inadequate helmets can be sold as safety helmets greatly concerns the Committee. Many of the inadequate helmets are of good appearance.

The Dorsch Study on helmet effectiveness

33. One of the most significant studies yet conducted into the effectiveness of bicycle helmets has recently been completed in Adelaide. The study[16] was commenced in 1983 to evaluate the effectiveness of bicycle helmets in real crashes. Members of South Australian cycling clubs were surveyed and information was collected about their most recent crash. Data were supplied by 197 cyclists who had sustained a blow to the head or helmet and the frequency and severity of head injuries was determined.

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15. Evidence, p.999.

16. Dorsch, M.M., Woodward, A.J. and Sommers, R.L. 'Do Bicycle Safety Helmets Reduce Severity of Head Injury in Real Crashes?' NH&MRC Road Accident Research Unit and University of Adelaide, 1984.

34. The results are important in that they show that riders who had been using a helmet at the time of their crash experienced fewer and less severe head injuries than those who did not use helmets. An analysis of these data and other data collected previously, indicated that those cyclists wearing a good helmet (defined as a hard outer shell with a stiff liner covering most of the inner shell) were 19 times less likely to die as the result of head injuries sustained in a crash than those not wearing a helmet. Riders who wear hair-net helmets were estimated to experience an eight-fold reduction in risk of head injury death relative to unhelmeted riders. The Dorsch study was the first to attempt to evaluate the effectiveness of helmets in real-life crashes. Since its publication it has received almost universal acceptance by bicycle groups who have been working for many years to have bicycle helmets widely accepted on the basis of their effectiveness in reducing head injuries.

35. The Committee believes, as did the previous Committee during the motorcycle helmet part of this Inquiry, that wearing any helmet is far better than wearing no helmet at all. Nevertheless the Dorsch study shows that hard shell helmets with high-quality energy absorbent inner liners dramatically reduce head injuries. Perhaps the only exception to this would be helmets designed to be worn by infant cycle passengers. Helmets for this user group have been developed that do not have a hard outer shell because of the need for helmets to be of extremely light weight.

36. A study by McDermott and Klug[17] of cyclist and motorcyclist casualties at four major Melbourne hospitals showed that pedal cyclists sustained more frequent and severe head injuries than motorcyclists (who universally wear high quality helmets). Cyclist fatality rates were almost twice those of motorcyclists and death rates from head injury alone was more than twice that of motorcyclists.

The current helmet market

37. Evidence indicates that the bicycle helmet market in Australia has grown steadily in recent years. This is largely due to promotional campaigns. Chapter Three examines the reasons for this growth. The result of this growth is that the consumer is faced with a bewildering choice of "safety" helmets in any bicycle shop or department store. The Committee was unable to establish the full extent of the range of helmets available in Australia however during hearings the Committee saw a number of helmets of extremely poor quality which afforded little or no protection to the head. The poor quality of these helmets was beyond question and the Committee was appalled that such helmets could be purchased in good faith by consumers erroneously believing that their new helmet would protect them in an accident. Many helmets lack a firm but crushable inner liner covering most of the shell. Others lack a suitable hard outer shell.

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17. McDermott and Klug (1985), p.232.

38. To be effective bicycle helmets must:

(a) spread impact forces to reduce the risk of skull fracture or penetration from high localised loads,

(b) absorb as much energy as possible to reduce the deceleration forces on the brain, and

(c) cover the head and protect it from abrasion.[18]

If the shell cannot withstand the impact of a cyclist falling to the ground or if the shell and liner cannot absorb high levels of energy, then the helmet is inadequate as a safety helmet.

39. In 1977 it was believed that certification to the Standard would provide the necessary consumer information required to make a correct choice of helmet. However, because the Standard is non-mandatory consumers are still faced with a wide choice including both approved and non-approved helmets. Given the doubts raised over some SAA approved helmets, the Standard has not provided the consumer certainty that was hoped of it. Consumers still rely on a variety of sources of advice (e.g. shop assistants, cycling magazines, cycling clubs or friends) in their choice of a safe helmet whether the helmet has the AS mark of approval or not. This situation is likely to continue.

40. Recent education campaigns and media attention have gone some of the way in giving buyers a clearer idea of which helmets are suited to their needs. However the current confusion of consumers faced with a plethora of helmets of varying quality and price could be lessened by useful and informative education material for the purchaser, the retailer and the user of any helmet. The Committee believes that stronger action is necessary to ensure unsafe helmets are removed from the market. This will be dealt with further in Chapter 6.

41. Raising community awareness of the benefits of cycle helmets and providing better information to consumers will be dealt with further in the next two chapters.

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18. Evidence, p.1032.

CHAPTER THREE

BICYCLE HELMET SAFETY

Helmet usage rates

42. In the general community, helmet wearing rates vary widely but generally appear to be extremely low. Figures in the order of 2-5 per cent are generally accepted by researchers. The Federal Office of Road Safety estimates that the highest estimate for overall usage, across Australia, would be less than ten per cent.[1] The Committee heard evidence that recent helmet campaigns have raised usage rates dramatically (See Table 2). The Committee also heard that the helmet usage rate amongst adult commuters in Canberra and Melbourne was as high as 50 per cent.[2] Several witnesses have claimed that this rate is higher than anywhere else in the world.[3] No other countries appear to have such high usage rates.

43. The Victorian Government in summarising wearing rates amongst metropolitan school children in Victoria in 1983 estimated that 4.6 per cent of primary school children and 1.6 per cent of secondary school children wear some kind of helmet. Research subsequent to this has indicated that wearing rates have increased to 38.6 per cent and 14 per cent respectively. However these wearing rates are by no means uniform and it appears that some schools have near-zero wearing rates while in others helmet wearing is almost universal.[4]

44. Table 2 gives the most up-to-date usage rates for Victorian cyclists. Victoria may have much higher helmet wearing rates than other States and the Committee cautions against interpolating these figures across other States. Nonetheless the Committee believes that this Table is helpful in showing how far one part of Australia has come in accepting bicycle helmets as an important road safety measure.

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1. Evidence, p.524.

2. Evidence, p.881.

3. Evidence, p.690, 771.

4. Torpey, S.E., '1984 School Bicycle Helmet Usage Survey,' RTA, Victoria, 1984, p.(i).

Table 2 Bicycle Helmet Usage in Victoria 1983-1985

A. Helmet Usage by School Type: Metropolitan Melbourne

	No. Cyclists			No. with Helmets			Usage Rate(%)		
	1983	1984	1985	1983	1984	1985			
Primary	681	687	536	31	91	207	4.6	13.3	38.6
Secondary	1774	681	741	29	35	104	1.6	5.1	14.0

B. Commuter Helmet Usage: Metropolitan Melbourne

No. Cyclists			No. with Helmets			Usage Rate(%)		
1983	1984	1985	1983	1984	1985	1983	1984	1985
502	360	421	131	121	177	26.1	33.6	42.0

C. Commuter Helmet Usage: Non-Metropolitan Victoria, 1985

	No. Cyclists	No. with Helmets	Usage Rate(%)
Primary	1836	560	30.5
Secondary	2205	118	5.4
Adults	457	43	9.4

Source: 'Bicycle Helmets Save Lives', RTA, Victoria, 1985, p15-16

45. An understanding of the usage rates of bicycle helmet wearing is essential if effective programs are to be developed to educate and encourage cyclists to wear helmets. Education and publicity programs need to be carefully targetted to ensure that particular bicycle user groups are reached to increase their use of helmets. Peer group pressure amongst older children is a major obstacle to widespread helmet use. The Committee heard of instances where children who wear helmets have been called 'sissy' or 'egghead' by their friends. This negative pressure is occurring at ages where peer group pressure to conform is strongest. Peer group pressure may be turned to advantage if

sufficient numbers can be persuaded to wear helmets and there is pressure on others to follow. Overcoming this reluctance to helmet usage by children and young teenagers should be a major objective of education and publicity campaigns. The Victorian Government has directed their education campaigns predominantly to the parents of primary school children. It is of great concern to the Committee that the highest risk group of cyclists, the under 17 year olds, has the lowest usage rates.[1]

46. Historically bicycle helmet usage rates have been extremely variable. Those riders who might best be described as cycling enthusiasts, who are members of cycling clubs or who regularly commute by bicycle have high usage rates. User groups such as racers have traditionally had high rates because of encouragement from within racing clubs but this has been of the hair-net style of helmet. Racing riders have shown a strong resistance to the wearing of high-protection hard-shell helmets despite the much higher protection provided.

47. While some older children are reluctant to wear safety helmets one group of children, BMX riders in club activities, not only universally wear helmets but also wear protective knee and elbow pads. The wearing of protective helmets is compulsory for these club-sponsored off-road activities. Despite the rough conditions under which BMX participants ride, head injuries are reported to be low. BMX helmets tend to be heavier and protect a greater area of the head than do normal cycling helmets and are more like motorcycle helmets.

Attempts to raise usage rates

48. Australians have seen a number of programs in recent years encouraging the wearing of bicycle helmets. These programs have ranged from low-key school or community based bulk purchasing schemes that operate on a local or regional basis to the high profile multi-media campaigns using well known Australians as role models.

(i) Media campaigns

49. In recent years road safety authorities have begun using media campaigns to promote road safety programs effectively. Television campaigns encouraging motorists not to drive after drinking have become well known and the random breath testing programs in many States were preceded and supported by massive media coverage.

50. Following the approval of two bicycle helmets to AS2063 in 1981/82 the Road Traffic Authority (RTA) of Victoria has undertaken a series of media promotions beginning in December 1982. The RTA also commissioned market research to understand better the attitudes of cyclists to helmet wearing campaigns. As a result of this research a media campaign was developed and

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5. Evidence, p.1036

launched in March 1984 targetted at parents of young cyclists. The first part of the campaign, the 'Egghead', depicted an egg being smashed by a hammer and showed the fragility of a child's skull and the need for adequate protection. The second part, called 'Hindsight' depicted a child's growth over the years and was designed to trigger a parent's fear about their child's safety on the roads. The scripts for these advertisements are at Appendix 4.

51. Educational material was distributed to helmet retailers, cycle clubs, schools, doctors and the media. Newspapers ran a number of articles on helmet safety.[6]

At the time that general media campaigns were being conducted to increase helmet usage and school based promotions were commencing, supporting news items and photos were being carried in the press. This photo from the front pages of The Age shows pupils of Kingswood Primary School in Melbourne. (Photo courtesy of The Age)

52. In May 1985 the Federal Office of Road Safety launched its nationwide helmet promotion campaign using Ian "Molly" Meldrum to publicise the need for children to wear helmets. The campaign is designed to break down the impression in children's and teenager's minds that it is 'sissy' to wear a helmet. Posters featuring Molly Meldrum and promoting helmet use have been distributed to all Australian schools. The campaign also includes well known Australian pop groups doing short advertisements on radio advocating helmet use.

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6. Evidence, p.1040-1041.

53. The Federal Office of Road Safety has recently produced swing tickets featuring Molly Meldrum and giving helmet purchase advice. These are to be hung on new bikes to encourage the purchase of a helmet with a bike purchase. The Committee suggests these labels could be produced by manufacturers.

54. In its Report on Road Safety Generally in 1984 the previous Road Safety Committee noted that education materials were often inappropriate for particular target groups and that such materials were often used in situations to which they were unsuited. The Committee also found that much of the advertising targetted at the bulk of the population who are urban Australians was irrelevant to audiences in outback or remote areas. The Road Safety Committee urged authorities to design effective education campaigns with clear target audiences in mind.[7]

55. During the current Inquiry the Transport Safety Committee has again been faced with the problem of advertising campaigns that are designed for national distribution but were found to be inappropriate for outback audiences. This appears to have been the case in the Molly Meldrum bicycle helmet campaign. Many outback and Northern Territory children either do not receive television in their area or did not recognise or identify with the role model. Nevertheless the Committee believes that this campaign has been well received by urban audiences and that the involvement in future campaigns by popular and well known role models will go a long way in reducing peer group pressure against helmets.

(ii) School based helmet promotions

56. The first Government sponsored scheme designed to raise usage rates was a Victorian trial bulk-purchase scheme in 1982. In this trial, conducted by the Victorian Department of Education and the Road Traffic Authority of Victoria, parents were given the opportunity of purchasing helmets through the child's school at a reduced cost. Over 1,000 helmets were sold in this way and the trial clearly indicated a significant helmet market which could be tapped through bulk-purchase schemes. Refinements have been made to the scheme, which is now community based, with advice being given by the RTA where required.[8]

57. In early 1983 the Victorian Department of Education distributed a poster to all Victorian schools aimed at parents urging them to purchase helmets for their children. Following additional market research, promotional material aimed at the mothers of primary school children was prepared and distributed.

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7. Report on Road Safety Generally. Report of the House of Representatives Standing Committee on Road Safety, AGPS, October 1984, paragraphs 50, 92.

8. Evidence, p.1038.

58. Recently schools in other States have been involved in small scale helmet promotion programs. The most common of these continues to be the bulk-purchasing scheme and one witness suggested that such schemes would be quite common in South Australia by 1986.[9] The Committee applauds such schemes and recommends that:

(a) the Minister for Transport, through the Federal Office of Road Safety take steps to publicise widely helmet bulk-purchasing programs and to coordinate a national program by encouraging schools, manufacturers and retailers to work closely together to ensure all Australian schools have the opportunity to participate; and

(b) the Minister for Education facilitate the operation of school-based bulk purchase schemes for bicycle helmets in the Australian Capital Territory along the lines of the Victorian scheme.

59. Following the success of helmet purchasing schemes there were moves in Victoria to conduct trial schemes making helmet wearing by school students compulsory. While there is no legal basis to such requirements, voluntary compliance has been very high.

60. In August 1984 fourteen schools in Victoria had a compulsory helmet rule operating although there may now be several more. At most schools the rule took the form of - "a student may not ride to or from school unless wearing a bicycle helmet". At one school the rule stated that a "child may not bring a bicycle into the school grounds unless he or she is wearing a helmet," which appears to avoid the issue of whether a school can govern the conduct of children outside the school grounds. Parents have enthusiastically supported the scheme.[10] Ten of the schools specified that the helmet be SAA approved.

61. In a 1984 review of schools with compulsory helmet rules, the Road Traffic Authority of Victoria found few, if any, problems in implementing the compulsory helmet rule. All but one of the schools had a bulk purchase scheme of approved helmets operating in conjunction with the rule. This combination had the effect that helmet costs were reduced, helmet usage was dramatically increased, while at the same time ensuring that approved helmets were purchased.

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9. Evidence, p.914.

10. Evidence, p.1057.

62. The early success of Victorian compulsory wearing to school schemes has lead to schools in other Australian States taking up the program. Such schemes have generally lead to higher wearing rates even if the initial response is a fall in the number of children cycling to school.[11]

63. Legal concerns have been raised by some schools in Victoria. One school had received legal advice that if a compulsory helmet rule was introduced and a child, disobeying the rule, was injured then the school could be legally responsible. On the basis of this advice, one school had withdrawn the official status of its rule and helmet use is now 'encouraged' rather than 'enforced'.

64. There is some doubt as to whether helmets are worn by the same children in recreational riding outside of the journey to and from school. Notwithstanding these doubts, the Committee believes that compulsory wearing to and from school is an important and effective way of increasing helmet usage.

65. The Committee recommends that:

the Ministers for Education and Transport seek the cooperation of their State and Territory counterparts to encourage all schools to introduce the 'compulsory' wearing of helmets by children cycling to and from school.

(iii) Helmet rebate schemes

66. Two of the most important schemes to the wider community thus far have been the Victorian helmet rebate schemes of 1984 and 1985. Following a media campaign aimed at making school children and their parents more aware of bicycle helmets, the Victorian Government through the Road Traffic Authority of Victoria introduced a scheme whereby purchasers of SAA approved helmets could receive a cash rebate on the retail price of a new helmet.

67. The response to the first rebate scheme in the Christmas buying season of 11-29 December 1984 was overwhelming and a record 38,000 helmets were sold.[12] This was five to ten times the normal December sales level. As the two Australian-made helmets were the only SAA approved helmets at the time, they were the only helmets to qualify for the rebate in the original scheme. The following year the rebate scheme was reintroduced however, now there were six SAA approved helmets on the market

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11. Hawthorne, G., 'Compulsory helmet use - the case for', Freewheeling, No.30, 1985, p.37, and Evidence, p.1038.

12. Evidence, p.1038.

and all were included. Despite the fact that the rebate was cut from ten dollars to five dollars the second scheme was again taken up by consumers. Numerous problems, not the least being complaints about the ventilation, heavy weight and poor retention system of the Star/Rampar helmet, resulted in the scheme being prematurely suspended in March 1985, but not before 5,000 claims were received.[13]

68. The public responded dramatically to the two Victorian rebate schemes and there are now 43,000 cyclists wearing approved helmets as a result of the schemes.

Future role for Government

69. In its 1978 Report on Motorcycle and Bicycle Safety the House of Representatives Standing Committee on Road Safety recommended that cyclists be advised of the safety benefits of protective helmets by publicity or other suitable means.[14] The Committee believes that much more can be done to convince cyclists that helmet wearing, like seatbelt wearing in cars, is essential. From a situation just a few years ago of a very small minority of cyclists wearing helmets and a great deal of reluctance by cyclists to their wearing, usage rates amongst commuter cyclists, for example, have risen to 40 per cent in some cities. The range of promotional campaigns undertaken by the Victorian Road Traffic Authority has shown that helmet usage can be increased dramatically. Some of these campaigns such as bulk-purchase schemes and compulsory wearing to school involve minimal government expenditure. The helmet rebate schemes, while more expensive, accurately targetted the cycling community and succeeded in getting large numbers of cyclists to buy approved helmets. Earlier media campaigns and dissemination of information on the clear safety advantages of helmets has prepared the way for later campaigns.

70. While much progress has been made in some States, much more can be done by way of well-researched programs to increase helmet usage rates amongst cyclists. This is particularly necessary to increase usage by the highest risk group, the under 17 year olds, amongst whom is some of the strongest resistance to helmet wearing.

71. The Committee recommends that:

the Minister for Transport seek the cooperation of the States and Territories through the Australian Transport Advisory Council to;

(a) develop effective programs to promote bicycle helmet usage, utilising where possible effective material already developed; and

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13. Evidence, p.1039.

14. Motorcycle and Bicycle Safety Report, 1978, paragraph 289.

(b) provide suitable funding for the development of these programs and materials.

72. The cost benefits of helmet use will be discussed further in Chapter Five.

Broad approach to bicycle safety

73. The wearing of effective bicycle helmets is only one aspect of cycling safety and needs to be considered in context. At the same time that the Standard was being developed for bicycle helmets the Geelong Bikeplan (GBP), November 1977, was pioneering the development in Australia of integrated bicycle use policies for urban communities. The GBP proposed to achieve its twin goals of increased bicycle safety and increased bicycle use by a program based on the "4 E's." These four programs were:

- engineering - to provide a safer road environment through physical improvement
- enforcement - to improve the road behaviour of drivers and cyclists
- education - to train cyclists to ride more safely
- encouragement - to promote awareness of improved facilities, safety, education and enforcement programs and the benefits of cycling.[15]

74. These four E's have been the basis of many Australian bicycle programs in recent years. Bicycle safety and in particular cycle helmet safety are best viewed and planned for within this context. The Committee wishes to focus principally on the education, enforcement and encouragement aspects as these are the most relevant to the wearing of bicycle helmets.

(i) Cyclist education

75. The education of safe cycling should begin in the early years of primary school and continue throughout life. The very successful Bike-Ed program that has been operating in Victorian schools since 1980 and has also been adopted in some other States is an example of how such bicycle safety education should work. Bike-Ed using specially trained teachers has its major influence from ages 8 or 9 onwards when children's first school cycling contact occurs. Children are taught all aspects of bicycle safety including safe riding skills, the traffic code and bicycle maintenance. Bike-Ed and programs like it have had a significant influence on making helmets a natural part of cycling for many young Australians. As 25 per cent of bicycle fatalities occur off-road the emphasis on rider competence in Bike-Ed type programs is most welcome.

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15. Geelong Bikeplan Study Report, Victorian State Government November 1977, p.(iii).

76. Some cycling education is also taking place in road safety centres around Australia. Centres are often run by road safety agencies in cooperation with local police in capital cities and regional centres. Usually operating during school holidays, they teach bicycle safety and road skills in an off-road environment. Many of these centres have begun using bicycle helmets during classes and this further reinforces in young cyclists minds the importance of wearing a helmet while riding. At the same time many parents learn from their children of the need for bicycle helmets. Recently a road safety education centre in the ACT awarded bicycle helmets as prizes in their bicycle safety competition. These community-based helmet promotions are another useful way of encouraging helmet use.

(ii) Motorist awareness schemes

77. Evidence suggests that cyclists are frequently not seen by drivers in motor vehicle - bicycle collisions. It has been estimated that over one-half of these collisions could be caused by the failure of the driver to see the cyclist or by the driver misjudging the bicycle's speed. This conspicuity problem is of course far worse at dawn, dusk or at night or in wet conditions.[16] The Federal Office of Road Safety estimates that the majority of deaths occur in the twilight hours between 3pm and 7pm.[17]

78. The Geelong Bikeplan Study estimated that the severity of bicycle crashes increased under poor light conditions, at night or during rain.[18] More recent research in New South Wales showed that of 197 deaths in New South Wales in the period 1976-1983, 25 per cent occurred at night, dawn or dusk.[19]

79. Some cycling groups, like their motorcycling counterparts, argue that motorists have the primary responsibility for seeing and avoiding cyclists. They argue that campaigns to raise motorist awareness should have greater priority than those to raise cyclist conspicuity. The Committee believes that both types of programs are essential. A motorist awareness campaign was recently conducted by the Traffic Authority of NSW. The problem of motorist awareness is exacerbated by the fact that many accidents involving children are caused by cyclist error. Research for the Geelong Bikeplan Study in 1977 indicated that children are legally at fault in 70 per cent of their bicycle road crashes. In the case of adult cyclists the position is reversed and the motorist is at fault in approximately 60 per cent of accidents.[20]

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16. Mathieson, J.G. (1984), p.13.

17. Evidence, p.506.

18. Geelong Bikeplan Study Report, p.24.

19. Mathieson, J.G. (1984), p.13.

20. Geelong Bikeplan Study Report, p.22.

80. The Committee heard that helmets can dramatically increase the conspicuity of cyclists in the road environment. Light-coloured helmets to assist the conspicuity of riders is believed to be much more important for cyclists than for motorcyclists. The question of helmet conspicuity will be discussed further in Chapter Four.

81. Improving cyclist conspicuity is needed in addition to driver awareness. Cyclists must also be educated and encouraged to wear effective reflective outer garments such as vests, rain capes and helmets to improve conspicuity. Bikes must have efficient lights and reflectors if used at or after dusk and these must be in good working order.

(iii) Enforcement of current laws

82. Several witnesses have stressed the need for existing traffic laws relating to bicycling to be more strictly enforced. One submission stated that any increased enforcement of road rules on all cyclists would be for their own protection and that before any legislation requiring mandatory helmet wearing was introduced, existing bicycle laws should be more rigourously enforced.[21] The Committee heard that police are often reluctant or unable to enforce road rules adequately and systematically due to insufficient resources or lack of appropriate procedures.

83. Police are also reluctant to apprehend children or adolescents breaching the traffic code as this may develop a negative attitude on the part of the young to the police. Apprehending young offenders may also involve accompanying the child to talk to parents. This is considered both time consuming and difficult. There is a need for appropriate policing methods to be developed and for resources to be provided to ensure that these essential safety rules are enforced. There is little point in introducing legislation requiring helmet wearing without the necessary enforcement to make it effective.[22]

84. The Committee believes that enforcement of existing cycle laws is essential if bicycle fatalities are to be reduced. Enforcement bodies should actively investigate more effective ways of ensuring that cyclists follow the traffic code, with a view to introducing an innovative code designed specifically for cyclists.

85. *The Committee recommends that:*

the Minister for Transport and the Special Minister of State in conjunction with their State counterparts;

(a) investigate more effective enforcement techniques to ensure cyclists, particularly children, follow the traffic code; and

(b) introduce a more innovative cycling traffic code.

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21. Evidence, p.565.

22. Evidence, p.664.

CHAPTER FOUR

THE BICYCLE HELMET STANDARD

86. The Standards Association of Australia is Australia's national standards organization. It is established under Royal Charter and has 1400 separate committees involved in the preparation of standards, whose members represent all major technological disciplines and community interests. These committees prepare Australian standards and include representatives of government, industry organisations and user groups.

87. Australian Standard 2063 "Lightweight protective helmets (for use in pedal cycling, horse riding and other activities requiring similar protection)" is prepared by SAA Committee CS/14. A number of the helmets already approved to the Standard are specifically for horse riders. The aim of the Committee is to allow, within the Standard, the development of helmets which provide a reasonable degree of protection to the wearer's head, as well as being well-ventilated and light in weight.[1]

88. The Committee is made up of representatives of 22 separate organizations covering government, medicine, industry, consumer groups and five sports groups. It is this Committee that prepared the first draft of AS2063 in 1977 and the revised edition of 1982. A Sub-committee set up to develop a separate cycle helmet standard prepared the draft standard recently available for comment. The closing date for comment was 15 October 1985.

89. It has always been intended that AS2063 would be a multi-purpose lightweight helmet standard covering the needs of a variety of recreational activities requiring differing special performance requirements. It therefore concentrated on specifying basic performance requirements in relation to shock attenuation, penetration resistance, retention system strength and peripheral vision clearance. The SAA states that any special requirements for specific sporting activities can be added as separate parts of AS2063 as the need arises.[2]

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1. Evidence, p.531.

2. Evidence, p.531.

Moves towards a separate bicycle helmet standard

90. In recent years cyclist groups, manufacturers and consumers have called for a separate standard for bicycle helmets. They argue that cyclists, with their high rate of physical activity even at low speeds, require helmets with special performance capabilities. The requirements of the current Standard with regard to ventilation, retention systems and helmet mass have come under particular criticism. It should be pointed out that these deficiencies concerned the provisions of the Standard and not necessarily all helmets approved to the Standard.

91. The Committee was advised by the Standards Association of Australia that a separate standard for bicycle helmets was being prepared. In March 1985 the SAA put a lead time of approximately two years on its development. The SAA has advised the Committee that a sub-committee of CS/14 will be carrying out a complete re-evaluation of the necessary performance requirements for bicycle helmets as part of the longer-term review of the separate bicycle helmet standard.

Changes to the Standard

(i) **Helmet ventilation**

92. The provision of effective ventilation is a major issue in helmet design. Some 40 per cent of body heat is lost from the head and shoulders such that temperature build-up under the helmet, even after moderate exercise, can lead to heat exhaustion if effective ventilation is not available.[3] More detail is needed on the heat loss from that area of the head covered by a helmet.

93. AS2063 does not contain any provision requiring helmet ventilation. Clause 4.4 ('Ventilation Openings') of the Standard states that a helmet may have:

> Any number of ventilation openings, provided that the projected area normal to the headform surface does not exceed 400 mm^2 for the largest of such openings. It shall not be possible to pass a rod 20 mm in diameter through any of the openings.[4]

94. Critics of this aspect of the Standard point out that, although it limits maximum ventilation opening size, it does not require any minimum ventilation. The Standard therefore allows helmets without any ventilation at all to be approved.

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3. Evidence, p.879A.

4. Exhibit 1, SAA, p.5.

95. The previously mentioned Star/Rampar helmet appears to fit into this category. The helmet has no ventilation openings and when fitted correctly, the helmet lining "seals" the head and prevents air reaching the forehead or scalp. That such a helmet should have received approval under AS2063 indicates the need for a change to the Standard. The distributor has claimed that the lack of ventilation is obvious to any purchaser. However given the relative novelty of helmet-wearing this may not be so obvious to all purchasers.

96. The SAA has advised that changes to the ventilation requirements of the Standard are already being considered by Sub-committee CS/14/2. The Draft Australian Standard of 1 September 1985 states that the new ventilation requirement was included at the request of cycling organisations. The new draft ventilation requirements states simply that "helmets for pedal cyclists shall incorporate a means of effecting heat transfer from the head. This may be by ventilation openings or by flow-through airways."

97. The Committee has heard that research needs to be undertaken into the physiological requirements for head cooling and that an airflow ventilation test be devised to measure the required cooling effect.[5] The Committee understands that an Australian helmet manufacturer has designed and built testing equipment which provides information on helmet ventilation and heat build-up in a helmet under different cycling speeds and at a variety of ambient temperatures. However the Standards Association told the Committee that a lack of research prevents the SAA from setting minimum ventilation requirements in the changes to the Standard at this stage.

(ii) **Ventilation vs penetration resistance**

98. Increasing helmet ventilation has the potential to compromise the ability of the helmet to resist impact penetration or entry of sharp or narrow objects. The Standard is currently designed to limit the entry of narrow objects through shell openings by limiting the maximum size of shell openings. Helmets which have very large openings and are therefore extremely well ventilated do not meet the requirements of the Standard in this respect. The Committee saw the Bell Vl-Pro helmet and heard of its popularity amongst cyclists despite it not holding SAA approval.

99. Research indicates that such penetration head injuries are extremely rare among cyclists. One United States study of 286 cyclist fatalities in Florida showed that only one died of a penetrating head wound.[6] Similar research in South Australia, albeit on a limited scale, showed no evidence of penetrating head

5. Evidence, p. 879A.

6. Evidence, p.919.

wounds in bicycle fatalities.[7] In Victoria McDermott and Klug indicated such injuries amongst cyclists hospitalised were rare. Such research would support submissions from a number of cycle groups that the penetration resistance requirement of the Standard could be relaxed to allow helmets providing more effective ventilation for Australian conditions to be approved under AS2063. Many cyclists are willing to forego penetration resistance for a helmet that is well ventilated. Evidence in the Northern Territory stressed the need for good ventilation in the tropics.

100. The Committee believes that helmet manufacturers need to be researching new designs that provide greater effective ventilation. Such ventilation can be effected by means of air scoops and helmet shell designs that avoid the need for excessively large holes in the hard shell thereby ensuring that adequate ventilation is provided without unduly compromising the helmet's overall energy absorption capacity. Given the evidence on the very low incidence of injuries from skull penetration by long thin objects, the Committee believes some relaxation of the maximum allowable opening sizes is justified. If this encourages those experiencing high head heat levels to wear helmets then it will be particularly worthwhile.

101. The Committee notes the lack of data on the physiology of head heat and cooling as well as the lack of any quantifiable test of helmet ventilation. Both these needs should be addressed as quickly as possible. The Committee therefore recommends that:

- **the Minister for Transport have undertaken an examination of the physiology of head temperatures under Australian climatic conditions and the amount of cooling required; and**

- **in cooperation with State road safety authorities and the SAA, the Minister for Transport fund the research and development of an effective and reliable test of the ventilation capabilities of bicycle helmets for the purposes of Standard setting.**

(iii) Helmet retention systems

102. The question of helmet retention systems has been another major area of concern about AS2063. The SAA approval of the Star/Rampar helmet was a major catalyst in this debate. As has been mentioned in Chapter Three the inclusion of these helmets in the Victorian Government's 1985 helmet rebate scheme was one reason why this scheme was stopped prematurely. Critics of the helmet say that the location of the helmet strap anchorages enables it to be removed with little effort while the chin strap is still firmly fastened to the head. Not only could a helmet be dislodged in an accident, but the helmet can slip

7. Evidence, p.919.

forward over the eyes due to movement while riding and cause an accident. It has been argued that this only occurs when helmets are incorrectly fitted. The Committee believes that changes being made to the Standard will ensure that retention systems are more effectively tested.

103. Previously, the AS2063 test assesed only the tensile strength of a helmet's retention system to ensure that the straps do not separate from the helmet under pressure. There has been no requirement or test to ensure that the helmet cannot be removed from the head by applying rotational force to the back or front of the helmet while the helmet is secured on the head.

104. The Standards Association has recently released a draft standard enabling helmets to be tested on a headform with a 'chin' to determine under test conditions whether the helmet moves when a force is applied to the front or rear of the helmet. The Committee believes this test requirement will greatly improve the Standard and ensure that helmets have adequate retention systems.

(iv) **Helmet mass**

105. During the Inquiry the Committee heard from numerous witnesses that the weight of bicycle helmets was a major issue in helmet design. AS2063 states that as helmets complying with the standard are for use in recreational and sporting activities, the bulk and mass of the helmet can be important safety factors affecting the comfort and movement of the wearer.[8]

106. The Standard AS2063 recommends that manufacturers keep the mass of their helmets within the range of 600 g - 1500 g. The maximum helmet mass for each headform size is as follows.

Headform size (for testing purposes)	Recommended maximum Helmet mass
A	600 g
B	900 g
C	1200 g
D	1500 g

107. The Standard states that headform sizes A and B are suitable for children and that the mass of helmets in these sizes should be as low as possible. Currently there is no helmet conforming to headform 'A' available in Australia.

108. A range of helmets that not only fit children but are also of a light enough weight is an urgent need in Australia. Children and infants should be wearing bicycle helmets at the earliest possible age and parents are being frustrated by the lack of a range of acceptable helmets.[9]

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8. Appendix B, AS2063, Part 1.

9. Evidence, p.573.

109. One survey of bicycle helmets available in Australia was conducted by the cycling magazine Freewheeling. The table[10] below gives some comparative weights of approved and non-approved helmets available in Australia. Helmets currently approved to AS2063 weigh between 450g (Guardian) and 834g (Star/Rampar). These weights are indicative only as different sizes have different weights, e.g. the Star and Rampar are the same helmet.

TABLE 3

L'ill Bell Shell	252	OGK Touring	464
Sorelli Sport	283	Brancale SP 4	470
Brancale Sport	303	Bell Tourlite	551
Brancale Giro	305	*Daylyte Pedla	522
Bell V-1 Pro	391	*Rosebank Stackhat	555
Skid Lid Touring	431	H A Keirin	604
OGK CH 202	441	*Gemray 323	636
MSR	446	*Star KC 100	805
*Guardian	450	*Rampar KC 100	834
Bell Biker II	454		

Note: *SAA approved helmet

110. Witnesses believe many of these helmets to be excessively heavy for children. The Committee understands that helmets light enough to avoid neck strain in young children are not being manufactured because of the extremely small market and the high cost of developing equipment for helmet manufacture. Currently some helmets for adult heads are altered by means of padding to fit smaller heads and while this obviates the need for manufacturers to develop moulding equipment for small helmets the weight of the helmets is not sufficiently reduced.

111. The SAA states that more research is needed to establish maximum weights for each headform size and the Committee agrees that such research is necessary. Research should also examine the contributory effect of helmet mass on head and neck injuries in infants and children. The Committee firmly believes that efforts by road safety authorities to encourage helmet use will be frustrated if a range of suitable helmets is unavailable for children. More needs to be done to ensure that this vital group of road users is adequately protected.

112. The only helmet which has been specifically designed for very young children is the Bell "L'ill Bell Shell". These children are too young to ride bikes but are carried as passengers. This helmet has no outer shell but is made completely of the same expanded polystyrene material that other helmets use for the liner. The lack of a hard shell precludes the helmet from complying with AS2063. The lack of a hard outer shell

10. Freewheeling magazine, May/June 1985, p.26.

significantly reduces the helmet's mass for very young children and infants and although penetration resistance is reduced the helmet provides excellent energy absorbtion protection.[11] Because the helmet only weighs 252 grams, these very young children should be able to wear the helmet with comfort.

113. The Committee believes that there is scope for the development of a separate standard for infant helmets given their different requirements. However this group is numerically very small and priority should be given to ensuring the availability of a suitable range of quality hard-shell helmets for older children. This latter group is numerically much more important and is the highest risk group.

114. With regard to the mass of adult size bicycle helmets, a number of witnesses have called for the Standards Association to set a maximum weight for all helmets and one witness suggested that 500 grams may be realistic. The Committee is unable to assess whether imposing such a limit is realistic given the need for helmets to provide adequate impact protection in crashes.

115. The Committee recommends:

that the Minister for Transport commission research to allow the Standard AS2063.2 to be revised setting maximum helmet weights for children of various cycling age groups and for adults, consistent with the protective provisions of the Standard.

Material of manufacture

116. Appendix A of AS2063 notes that the characteristics of the materials used in the manufacture of protective helmets should be known not to undergo "appreciable alteration under the influence of ageing, sunlight, extremes of temperature and rain."

117. This proviso on the material used in the manufacture of helmets is however, only advisory and it is not mandatory that approved helmets demonstrate the chemical inertness of their shell or liner materials. There has been some questioning of one material used in a number of helmets but the evidence is insufficient for the Committee to determine the suitability of the material. The Committee believes that the characteristics of the materials used in helmet manufacture be established by the manufacturer prior to use in production to ensure their suitability, and that SAA call for satisfactory evidence on resistance to degradation where any doubt is raised.

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11. Evidence, p.941.

Helmet conspicuity

118. Chapter Two of this Report examined the issue of bicycle conspicuity and noted that in at least fifty per cent of accidents involving a motor vehicle, drivers claimed not to have seen the cyclist. Cyclists generally present a very narrow profile to motor vehicle users in traffic and a helmet can increase a cyclist's visibility dramatically.[12]

119. Prior to 1984, the motorcycle helmet standard made it mandatory that not more than 50 per cent of the helmet be black in colour and noted that the exterior surface of the helmet should be of a colour, or colour combination, that is conspicuous in daylight. In its 1984 revision of this Standard the SAA stated that the requirements for conspicuity had raised strong criticism from many helmet users and that a significant number of helmets are modified after sale by painting. The SAA amended the Standard by deleting this requirement in November 1984 and the amendment to the mandatory standard was gazetted on 22 January 1985.

120. The bicycle helmet Standard does not include any such mandatory conspicuity provision. The Standard only recommends that helmets for pedal cyclists be manufactured in colours within the yellow to orange spectrum. One cycling organisation called for a revision of the Standard to require that helmets be in the white to orange colour spectrum.[13] The same organisation believed that helmets should have reflective material attached to increase conspicuity.[14] Motorcycles and their riders have a larger visual profile than cyclists. The Committee believes that light-coloured helmets to assist the conspicuity of cyclists is more important for cyclists than for motorcyclists.

121. The Committee therefore recommends that:

the Minister for Transport ask the Standards Association of Australia to consider the feasibility of making the colour provisions of AS2063 mandatory during its current review of the Standard, and that it further consider the benefits of reflective material in the same context.

Consumer information

122. AS2063 includes a provision for marking the bicycle helmet and the helmet packaging with consumer information. It also includes a requirement that the manufacturer provide an informative brochure or label with each helmet sold. This brochure has to include certain information related to helmet use, helmet wearing and fitting guidelines, and the need for a helmet to be destroyed in the event of an accident.

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12. Evidence, p.562.

13. Evidence, p.570.

14. Evidence, p.560.

123. Given the difficulties experienced with some approved helmets rotating or pivoting on the head it would appear that helmet packaging and labelling (Section 8(c) of the main Standard) should be more strongly worded to ensure that helmets are of the correct fit. Like shoes, helmets need to fit the individual. The Committee recognises that gift purchases, supermarket purchases and parents buying children's helmets allowing room for the child's growth can militate against a perfect fit. Stronger wording might reduce the incidence of ill-fitting helmets.

124. There is a real need for helmet owners, particularly with the growth of 'non-enthusiast' helmet wearing, to be better informed on the need to have helmets checked after a moderately serious accident. Given the expense of helmets, the Committee applauds those helmet manufacturers and importers who offer a helmet inspection and replacement service should the helmet be involved in an accident. The Committee would wish to encourage all helmet manufacturers and importers to set up similar schemes for their customers through the point of sale.

CHAPTER FIVE

THE COST OF BICYCLE HELMET WEARING

125. The cost of quality bicycle helmets is an important issue in the Inquiry. Consumers are looking for helmets which provide adequate protection at a reasonable price. The cost of helmets is a disincentive to many in buying and using a helmet. Market research carried out for the Road Traffic Authority of Victoria confirms that the price of a helmet is a real barrier for many parents seeking to protect their children adequately from head injuries in the event of an accident.[1]

126. If helmet usage rates are to be increased then such barriers must be reduced without compromising the high level of protection offered by approved helmets. Some helmets recommended by bicycle shops can cost as high as $70-80 and parents are often caught between the desire to see their children protected and the need to purchase a reasonably priced helmet regardless of its effectiveness. This is exacerbated by the need to buy larger helmets as children grow and the need to buy a separate helmet for each child. The Committee heard evidence that parents often need to go to the bottom end of the market in an attempt to purchase reasonably priced helmets for their children.[2]

127. Evidence suggests that Australia now has the highest per capita usage of helmets in the world.[3] While this situation is heartening the desirable goal is universal wearing of helmets. The Committee believes that with the increase in the size of the helmet market which is currently occurring, manufacturing costs can be kept low due to economies of scale.

The cost of helmet testing

128. Evidence was given that the requirement that a manufacturer comply with the SAA's scheme of supervision and control imposes additional costs that are not borne by manufacturers of non-complying helmets.

129. The Committee heard conflicting evidence during the course of the Inquiry regarding the cost to the manufacturer of having a helmet tested to the requirements of AS2063. Manufacturers must pay an application fee and an annual licensing

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1. 'Bicycle Helmets Save Lives', RTA, Victoria, 1985, p.7.

2. Evidence, p.719.

3. Evidence, p.771.

fee. The costing of certification supplied by SAA is in Appendix 4. Testing costs comprise those associated with the type-testing of a helmet prior to approval by SAA, together with the costs of routine testing of each batch. A manufacturer must have evidence from an SAA approved independent testing authority that its helmet reaches the requirements of the Standard, prior to the helmet being granted approval by the SAA. Currently the SAA has approved the laboratories of Technisearch Ltd in Melbourne (a private company owned by Royal Melbourne Institute of Technology) and those of the Department of Scientific and Industrial Research (DSIR) in New Zealand (The New Zealand equivalent of CSIRO).[4] At present, Japanese and Taiwanese helmets are being type-tested at Technisearch. Australian helmets are also type-tested at Technisearch as well as being sent to DSIR in New Zealand.[5]

130. Some manufacturers believe that testing costs place an unfair burden on those who wish to have their helmets approved.[6] The initial cost of type-testing is approximately $800 plus the cost of the set of four sample helmets (approximately $100). Each different shell size needs to be tested separately. An engineering evaluation of smaller size helmets than the one being type-tested is $340 per set of four plus the cost of the helmets. In early production stages batch routine-testing proceeds at a rate of four helmets per four hundred produced. Each series of tests costs $550 in addition to the cost of the sample helmets. After ten successive batches are passed, helmets are tested at the rate of four per one thousand.

131. One witness claimed that if the original cost of type testing and earlier more expensive routine testing is taken into account along with additional administrative costs and licence fees, the result, per helmet produced, is approximately $2.50 at the manufacturing level or $5 to $6 at retail levels.[7] However, the SAA has estimated that if a manufacturer were to produce 30,000 helmets per annum its additional costs per unit would be $1.04 in the first year ($1.14 if from Europe or USA) and $0.84 in subsequent years ($0.87 if from Europe or USA). SAA have said that these costs are maximum costs. Some additional costs can be incurred by the manufacturer as each batch is quarantined by the SAA until testing is completed.[8]

132. The Committee believes the SAA costing to be more accurate. The SAA cost calculations are set out in Appendix 4. The Committee notes that SAA approved helmets are available through chain stores or through bulk-purchase schemes at around the $30.00 mark. The component of retail prices due to the costs of certification is greatly affected by the retail mark-up rate.

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4. Evidence, p.990.

5. Evidence, p.977.

6. Evidence, p.709.

7. Evidence, p.743.

8. Evidence, p.744.

133. While the retail price flow-on of testing costs is of some concern, the Committee believes that such costs are unavoidable if the primary performance characteristics of the helmet are to be guaranteed to the purchaser. All manufacturers should bear the cost of testing a product for safety. It is no-one's right to market a below-standard product. The Committee notes that SAA approved helmets are far from the most expensive helmets on the market.

Helmets on the Australian market

134. In October 1985 there were at least 19 hard-shell bicycle helmets on the Australian market. There are also a number of other sporting helmets which might be worn by cyclists. In addition the Committee saw a number of very cheap helmets that could only be described as ineffective toys. Only two of the cycling helmets are manufactured in Australia and both are SAA approved. Consumers are faced with helmets costing from $30 up to $89. These prices often fluctuate due to changes in exchange rates. The Committee heard that it was possible to purchase a helmet through discount stores at a much lower price than the recommended retail price. A growing number of school children and their parents are able to purchase their helmets through school and community bulk-purchasing schemes. Evidence suggests that such schemes can reduce the retail price by up to two-thirds.[9]

135. In the survey referred to earlier, conducted by Freewheeling magazine, the following early 1985 retail prices were quoted:[10]

TABLE 4

Comparative price Table

*Gemray 323	$30.00	H A Keirin	$49.00
OGK CH 202	$30.00	Brancale SP4	$52.00
Sorelli Sport	$30.00	Brancale Sport	$54.00
*Rampar KC 100	$37.00	L'ill Bell Shell	$59.00
*Rosebank Stackhat	$40.00	Skid Lid Touring	$69.00
OGK Touring	$40.00	Bell Biker II	$79.00
Brancale Giro	$40.00	Bell Vl Pro	$79.00
*Guardian	$45.00	MSR	$80.00
*Star KC 100	$45.00	Bell Tourlite	$89.00
*Daylyte Pedla	$45.00		

Note: * SAA approved helmet

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9. 'Bicycle Helmets Save Lives,' p.5.

10. 'Bicycle helmets - which one will you wear? Freewheeling, No. 30, 1985, p.26.

136. The Committee believes that for approved helmets to be accepted by the public they must be seen to be competitively priced vis-a-vis non-approved helmets. The above table shows that currently approved helmets are priced competitively.

The cost-benefit of universal helmet usage

137. The Federal Office of Road Safety has estimated that the total cost of road crashes to the community is approximately $3 billion per year. The cost to the community of a road fatality is $265,000 with every injury averaging $7,000. Furthermore the loss of earnings from all types of road crashes was estimated to be $820 million in 1983 (or 31 per cent of total community cost).[11] These costs are predominantly for motor vehicle crashes. Costs for bicycle crashes would be lower as vehicle damage costs are lower. However serious bicycle crashes, including those involving serious head injuries, can involve very high costs.

138. These sobering statistics raise the question of the cost-benefit to the community of universal or compulsory helmet use. The cost-benefit debate has intensified as research data have shown that 33 per cent of reported cycling injuries involve head injuries and that head injuries cause 80 per cent of fatalities.[12] While not all fatalities or injuries will be prevented by helmet wearing it is clearly the case that they will be very substantially reduced.

139. Many researchers believe that universal helmet usage could lead to a 75 per cent reduction in cyclist deaths and have used this figure to estimate substantial cost benefit savings.[13] However this claim is refuted as being over-optimistic since many fatalities from head injuries would not have been survivable whether a helmet was worn or not.[14] Nonetheless the Committee believes that cost-benefit assessment is necessary in estimating the benefits to the community of universal helmet use. The cost-benefit calculations are dependent on a number of variables and it must be noted that compulsory helmet use may not provide an overall saving if the cost of helmets rises.

140. Several attempts have been made at estimating the cost-benefit ratio for universal helmet wearing. One such estimate by the Newcastle Cycleways Movement is shown in Appendix 2. In using the word 'universal' the Committee means wearing a helmet whenever a bicycle is being ridden, as protection is needed at all such times. However for establishing costs and

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11. 'The Cost of Road Crashes', FORS, Canberra, 1984.

12. 'Bicycle Helmets Save Lives', p.(i).

13. Evidence, pp.885, 902.

14. Evidence, p.903.

benefits of compulsory wearing, calculations should only include helmet wearing in public places as the Committee believes this is the practical limit in enforceable legislation. The South Australian Government warned that the cost of enforcement should be included in the costing.[15]

141. Despite the demonstrated capacity of hard-shell helmets to reduce the severity of head injuries in an accident, the Committee found very little research had been conducted into the cost benefit to the community of universal bicycle helmet usage. The need for sound research is clear. The Committee therefore recommends that:

> **the Federal Office of Road Safety establish the costs and benefits of universal approved bicycle helmet usage and publish the results of such research at the earliest opportunity.**

A role for Government

142. The Committee is reluctant to recommend Government intervention in the marketplace to reduce the cost of approved helmets. The Committee believes that if all helmets were to meet the SAA standard and all cyclists were to wear helmets then economies of scale would minimise manufacturing costs. The market is currently competitive and in an increasing market that competition should continue. Consumers on the whole are looking for lower cost helmets and it has been shown that SAA approved helmets can be made available at lower prices. There is some inequality in the market in that SAA approved helmets bear an additional cost in their certification. This cost is partly compensated for by consumer preference for a proven product. This inequality would be removed by a mandatory standard for cycle helmets.

143. As a short-term measure only, the Committee believes some incentive could be offered to manufacturers to produce smaller size helmet shells for children. The Commonwealth could reimburse manufacturers for successful type-testing and routine-testing of smaller helmets for the first 50,000 helmets per manufacturer. Manufacturers who have already produced children's shell sizes should not be disadvantaged. Such a scheme should not cost government a great deal but offer a real incentive in a competitive market and provide a range of helmets to that group most in need of helmets.

144. The Committee recommends that:

> **the Minister for Transport encourage the manufacture of approved bicycle helmets in smaller shell sizes for children by reimbursing manufacturers for successful type-testing and routine-testing of small helmets for the first 50,000 helmets per manufacturer.**

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15. Evidence, p.903.

145. There is clearly an important and direct role for governments to play in promoting helmet use thereby reducing the financial cost to the community and the personal pain and suffering of cyclist head injuries.

CHAPTER SIX

A MANDATORY STANDARD AND COMPULSORY HELMET USE

146. The question of making helmet wearing mandatory has been raised on a number of occasions. The previous Road Safety Committee in its 1978 *Report on Motorcycle and Bicycle Safety* recommended that the possibility of requiring cyclists to wear helmets be kept under review.[1]

147. Helmet wearing has increased dramatically for one high exposure group, that is commuter cyclists. However the highest risk group of cyclists, cyclists under 17 years of age has the lowest helmet wearing rate. The older segment of this group is highly resistant to helmet wearing, and peer group pressure militates heavily against increased usage.

148. Before mandatory helmet use can be considered a number of factors need to be examined. Some authorities believe that before helmet use can be made compulsory, voluntary wearing rates must be sufficiently high. The Committee does not believe that this is necessarily true for all areas of Australia. However, it is perhaps important that some States are well advanced in achieving high voluntary wearing rates, before mandatory wearing could be successfully introduced across Australia. To be successful, compulsory safety measures such as seat belts and motorcycle helmets must have a self-evident advantage and be largely self-enforcing.

149. The Victorian Government lists the prerequisites to mandatory wearing legislation as "a specific bicycle helmet standard, a sufficient range of styles and sizes in approved helmets, a reduction in overall price levels and a significant increase in wearing rates."[2]

150. Since 1982 the Victorian Branch of the Australian Medical Association has had a policy that 'the wearing of protective helmets by pedal cyclists should be compulsory everywhere.'[3] The most recent of many calls for mandatory helmet legislation came in the Medical Journal of Australia from two members of the Royal Australasian College of Surgeons following a study which showed cyclists suffering more numerous and more serious head injuries than motorcyclists due to all motorcyclists wearing approved helmets. They stated that with

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1. Paragraph 289.

2. Evidence, p.1036.

3. Quoted in Hawthorne, G. (1985), p.35.

recently heightened community awareness of the need for cyclist head protection, the wider range of approved safety helmets now available and consistently high adult wearing rates, a climate has been created whereby the introduction of legislation requiring compulsory helmet use by cyclists is now feasible.[1]

151. Following the identification of deficiencies in AS2063 as it relates to cyclists' helmets, the SAA has agreed to develop a separate standard for cycle helmets, AS2063.2, based on AS2063 but with short-term amendments to provide for some form of ventilation and an improved retention system.

152. The SAA is also undertaking a longer-term revision of the bicycle helmet standard and research projects to underpin those revisions are currently being planned. The Committee believes that one of the preconditions for helmet wearing being made compulsory is that every helmet on the market must meet an acceptable and effective product safety standard.

153. It must be said that Australia is in the forefront in the development of a bicycle helmet standard offering a high level of protection. We have had only four years of helmets being certified to that Standard. The recognition of some deficiencies and prompt action to overcome them only serves to strengthen the Standard. A number of manufacturers have shown they are willing to manufacture to the Standard and these manufacturers have generally indicated a willingness to meet the revised standard with new models where required. The Committee believes that the revised Standard will be one of the highest, if not the highest, in the world and that helmets meeting that Standard should be attractive to overseas markets. The revised Standard should provide an opportunity for local manufacturers to increase exports.

A mandatory standard

154. Following the publication of the original standard for lightweight recreational helmets in 1977, several manufacturers have been able to produce helmets capable of meeting the requirements of the Standard. Some of these are available at reduced and thus competitive prices. Many other helmets on the Australian market however fall far short of the protective requirements of the Standard and it is these helmets that greatly concern the Committee. Evidence was given that some helmets which do not carry SAA approval are recommended by some retailers as being "better" helmets than those which are approved.

155. The Committee strongly believes that making the revised separate Standard mandatory will, over time, ensure that helmets which are grossly inadequate as safety helmets are removed from the market. The experience with motorcycle helmets after AS2063 was made mandatory in the 1970s has shown that this procedure can be quite effective. The Committee believes that a mandatory standard is required quite independently of it being a prerequisite for the mandatory wearing of helmets.

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4. McDermott, F.T. and Klugg, G.L. (1985), p.234.

156. While some deficiencies have been identified with the existing standard and are being actively rectified, some of the attacks on the present standard have been counter-productive in bicycle helmet safety terms. The Victorian Government observed:

> Publicity of these criticisms of particular helmets were unfortunately taken by some members of the public as suggesting that bicycle helmets were intrinsically dangerous and that they should not be used. This has damaged helmet credibility and slowed the increase in helmet wearing rate.[5]

157. The Committee would like to see a mandatory standard in place to ensure unsafe helmets are removed from the market. However, the long-term review of the separate cycle helmet standard being undertaken by the SAA may involve some substantial changes to the Standard. Therefore the Committee does not believe that the Standard should be made mandatory until the long-term review of AS2063.2 is complete.

158. The Department of Home Affairs and Environment, then the Department responsible for introducing mandatory standards, stated that it has been the practice to allow at least 12 months from the initial time of announcement to the implementation of a mandatory standard. This allows time for industry to meet the standard or to voice any objections if it considers the standard restrictive. The time involved in awaiting the longer-term revision and the necessary period of grace allowed for manufacturers to meet the revised standard would delay the elimination of unsafe helmets for far too long. The Committee is deeply concerned that some of these helmets are of good appearance, are not cheap in price but provide a very low level of head protection.

159. The Attorney-General's Department is now responsible for introducing mandatory product safety standards and the prohibition of unsafe goods. The Committee therefore recommends that:

(a) **the Attorney General declare AS2063.2 as a Product Safety Standard under the Trade Practices Act as soon as practicable following the finalisation of the long-term revision of the Standard.**

(b) **until the Product Safety Standard above can be declared, the Attorney-General declare unsafe those bicycle helmets which do not meet the impact energy attenuation requirements of the current AS2063.1.**

(c) **bona fide toy helmets be permanently labelled that the helmet is a toy only and should not be used for safety purposes.**

Children's floating toys have a similar requirement to the last recommendation.

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5. Evidence, pp.1033-4.

Obstacles to mandatory helmet usage

160. Apart from the need for an acceptable and effective separate bicycle helmet standard to be published and made mandatory, the Committee believes there are a number of other major obstacles to mandatory helmet usage at this stage.

(i) Historically low helmet usage rates

161. As mentioned earlier, for mandatory helmet wearing to be successful the benefits of wearing must be publicised and accepted by users. Good quality helmets are still relatively new and have therefore started from a very low usage rate. Recent media and education campaigns have seen the rate of helmet usage grow dramatically in some parts of Australia. Chapter Three examined usage rates in more detail. This increase has been more pronounced in the southern capitals of Melbourne, Adelaide and Canberra where usage rates are now estimated at greater than 40 per cent for adult urban commuters. It is believed that these are the highest per capita rates in the world. However, the Committee has heard evidence that usage rates vary markedly within cities as well as between cities, between age groups and between different socio-economic groups.[6] Although usage rates may be high in some areas or for some user groups, these rates cannot be interpolated across other user groups or areas.

162. The Committee heard evidence that changing community attitudes requires a substantial investment in well designed promotional and educational material. The introduction of random breath testing and the legislation requiring compulsory seatbelt wearing both demonstrated this fact.[7] One witness believed that similar high-profile selective promotion of bicycle helmets will lead to other, equally important, cycle safety measures being played-down or ignored.[8] While the Committee believes that bicycle helmet safety has to be seen in the wider context of bicycle safety, effective campaigns to raise helmet usage will need to be specifically designed and targetted. The Committee wishes to make it perfectly clear that primary cycling safety programs are the first line of defence in improving cycling safety and that helmets are a very effective secondary safety measure. The allocation of limited campaign funding must be seen in this context.

(ii) Lack of enforcement of existing cycle laws

163. In its 1978 Report on Motorcycle and Bicycle Safety, the Road Safety Committee found that police often did not accord high priority to the enforcement of bicycle laws and that many bicycle accidents were caused by a breach of existing road rules by cyclists and motorists. The Road Safety Committee recommended that stricter enforcement of road rules applying to cyclists be implemented.[9]

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6. Evidence, p.510.

7. Evidence, p.512.

8. Evidence, p.663.

9. Paragraph 258.

164. The Committee received evidence that any laws requiring cyclists to wear helmets will be rendered ineffective while existing laws related to bicycle safety are inadequately enforced. Many cyclists believe that since there is minimal enforcement of current laws due to limited police resources and inappropriate policing methods, there is little chance of helmet legislation being enforced as well.[10] This is particularly so in the case of children. Police have difficulty identifying the offender and are naturally reluctant to enforce road rules because of this.[11] Procedures requiring the interviewing or warning of children to be in the presence of a parent or guardian are also seen as time consuming. Enforcement should not be seen solely in terms of prosecutions or meeting a quota.

165. Research has shown that children are legally at fault in 70 per cent of their bicycle road crashes involving motor vehicles, whereas motorists are at fault in 60 per cent of crashes involving adult cyclists.[12] The enforcement of the law is important to child cycle safety.

166. The difficulty of enforcement where children are involved is seen as one of the biggest obstacles to mandatory helmet wearing. However, like bicycle lights, reflectors and brakes, the wearing of helmets is a necessary safety measure. The Committee believes that the difficulties involved in enforcing such life saving measures are worth tackling. The Committee has recommended in Chapter 3 that an innovative bicycle traffic code and means of enforcement be developed. It is this group of cyclists that is at the greatest risk.

167. Many believe that should effective enforcement of current legislation be adopted, there would be an almost immediate and significant increase in cyclist safety as a result.[13] As with seat belt and motorcycle helmet wearing the Committee believes that greater enforcement should be undertaken of safety related road rules affecting cyclists. However education of road users, both cyclists and motorists, of the hazards involved and correct behaviour is equally important.

(iii) Economic cost

168. The question of economic cost has been examined in Chapter Five. The Committee believes that the cost of helmets is significant, particularly in relation to the cost of bicycles. It is also aware that this cost is heaviest on families where several children need to be protected and the burden is greatest on low-income families. Children will require bigger helmets as they grow older. Many believe that the cost of helmets is a

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10. Evidence, pp. 565, 663.

11. Evidence, p.672.

12. GBP (1977), p.22.

13. Evidence, p.663.

powerful obstacle to making helmet wearing compulsory for children.[14] While sympathising with this view the Committee believes the alternative costs must also be considered and that these are much greater in the event of an accident. Helmet cost needs to be seen as an integral part of the cost of cycling as are tyres or brakes. Nonetheless the cost effectiveness of helmet use is greatest when the cost of helmets is kept low. Governments, schools, importers, manufacturers and retailers all have an important role to play in minimising the unit cost of helmets.

169. Not all cyclists are school children or adult urban commuters. Many are recreational cyclists who ride for the pleasure and the exercise. Surveys have shown that between 20 and 25 per cent of Australians own and use bicycles and two-thirds of these ride at least once per week.[15] Some believe that recreational cyclists would be severely disadvantaged should helmet use be made compulsory. Many ride for very short distances and may even hire their cycles. The Committee does not find this argument persuasive. Many motorcycle riders ride for recreation and wear helmets. The need for protection of recreational riders is just as great as for any other cyclists, possibly even greater. If these riders ride for either pleasure or their health then a helmet is a necessity, given that head injuries provide neither.

(iv) **Storage of helmets**

170. Evidence has suggested that the lack of secure storage of bicycle helmets could lead to a reduction in cycling should helmet wearing be made compulsory.[16] However, research by the Road Traffic Authority of Victoria in its review of schools where helmet wearing by students is compulsory, found few if any storage problems. Prior to the compulsory helmet rule being introduced two of the schools believed that it could have been a problem but in practice there were no difficulties.[17]

171. The Committee believes that just as motorcycle riders secure their helmets to their motorcycles when not in use, so cyclists, who chain-up their cycles at their destination, will be able to secure their helmets. This is not, however, an excuse for doing nothing. The Committee heard evidence that Australia is very poorly serviced with secure areas for cycle and helmet storage. One witness believed that because the bicycle is not regarded as a valid form of transportation, much of the progress being made is of a piecemeal nature resulting in poor building design and further problems as cycle use grows.[18]

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14. Evidence, p.665.

15. Mathieson, Dr J.G. (1984), p.1.

16. Evidence, p.666.

17. 'A Review of Schools with compulsory bicycle helmet wearing rule', Road Traffic Authority of Victoria, 1984, p.3.

18. Evidence, p.845.

172. The Committee believes that some publicity should be given to the need for the provision of secure helmet storage areas together with bicycle racks in public and private buildings.

(vi) **The social freedom of cycling**

173. The Committee acknowledges that the area of personal freedom is one that needs sensitive consideration involving as it does people's feelings and attitudes. It is in this area that educational and promotional campaigns will have the greatest impact but over the longest period of time. People should be encouraged to see helmet use not as an infringement of their freedom but as an opportunity to increase the pleasure of their cycling by dramatically raising its safety.

174. Cycling is attractive to some riders because of its relative freedom from restriction. Head injuries are the very antithesis of this freedom. The freedoms alleged to be breached by compulsory helmet use are somewhat nebulous. The avoidable injuries suffered in accidents without a helmet being worn are readily defined restrictions on freedom. In addition many of the avoidable costs incurred are borne by other members of the community.

175. Attitudinal changes come slowly. Helmets that are comfortable, light in weight and well ventilated will greatly enhance the users enjoyment and more such helmets need to be manufactured if 'non-cycle enthusiast' helmet usage rates are to increase.

Compulsory helmet use

176. On safety grounds there is an overwhelming need for cyclists to wear effective and comfortable bicycle helmets. There can be no doubt that high quality, hard shell helmets do reduce the severity of head and face injuries in accidents and can save lives.

177. In 1978 the Road Safety Committee recommended that the possibility of making helmet wearing compulsory should be kept under review. The Committee believes that the Australian community is much closer to accepting compulsory bicycle helmet use than it was in 1978. A number of the prerequisites for universal use are being fulfilled. There is a growing acceptance of the necessity of helmet use. Usage rates in many areas have risen substantially in recent years and are continuing to rise. A number of schools are introducing compulsory wearing when cycling to and from school and various schemes have made approved helmets available at a modest price.

178. Australia was a world leader in the introduction of the compulsory wearing of seat belts and motorcycle helmets. The study of Professors McDermott and Klug showing the more numerous

and serious head injuries of cyclists compared with motorcyclists shows the large benefits which are potentially available through universal wearing by cyclists. Universal wearing is the objective and compulsory wearing has been shown, through experience with seat belts and motorcycle helmets, to be an effective way to achieve this.

179. Little is heard in Australia these days that compulsory seat belt and motorcycle helmet wearing is an infringement of civil rights. In the United States where some states have repealed compulsory motorcycle helmet wearing laws on civil rights grounds, a bizarre experiment has taken place with greatly increased deaths and injuries resulting. One State, Louisiana, has subsequently reintroduced its law. With universal use of these life saving and injury reducing devices, most Australians know people whose lives are known to have been saved by their use in crashes. There is now a growing number of cyclists whose lives have been saved or injuries avoided or reduced by a quality cycle helmet.

180. These other compulsory measures were not introduced without some reluctance and teething troubles. Both were introduced after extensive education campaigns concerning their benefits and a high voluntary usage rate had been achieved. Even where voluntary wearing rates were not high, their self-evident advantages meant they were readily accepted by the whole community when made mandatory.

181. The Committee believes that cycle helmets will considerably reduce the occurrence and severity of head injuries to cyclists. Most importantly protection will be extended to those most at risk, children and young teenagers, who are doubly at risk given their reluctance, through peer-group pressure, to wear helmets.

182. The Committee believes that people's interest in preserving their health and well-being, especially when many cyclists ride for health reasons, together with the self-evident protection offered by good helmets will allow voluntary usage rates to grow considerably with well designed promotion campaigns.

183. As with motorcycle safety, motorist awareness campaigns and wider safety education campaigns must be the primary cycle safety focus. However when things go wrong, there is an unacceptably high risk of head injuries, with the dreadful consequences of death, or permanent incapacity. These injuries are largely avoidable with proper head protection. The cost, while appearing to be large in a comparatively low cost activity, is very minor when compared to the alternative cost of head injuries. Even the best riders have accidents and, for their cost, helmets provide good insurance cover.

184. The Federal Government and all State and Territory Governments that provided evidence to the Committee have agreed that there is an urgent need to increase substantially voluntary bicycle helmet wearing rates. They also agree that children are the group at greatest risk. All Governments indicated that, at present, helmet wearing rates are not sufficiently high to permit the successful introduction of mandatory wearing legislation. Several Governments indicated that mandatory wearing of helmets is their objective.[19] South Australia drew attention to the cost of enforcement of mandatory wearing. It pointed out that without a reasonable level of voluntary use, the legislation would be impossible to police and would fall into disrepute.

185. The Federal Office of Road Safety and the South Australian Government, referred to the difficulties of enforcement and the economic costs to families of mandatory wearing.[20] The costs of helmets may be prohibitive for low income families and pensioners, some of whom are dependent on this form of transport.[21] Rebate, bulk-purchase and other schemes to minimise the cost of helmets are important tools in minimising the regressive effects of universal helmet usage.[22]

186. The evidence leads the Committee to believe that the successful introduction of mandatory wearing is more likely with adult cyclists who already have comparatively high wearing rates. Enforcement is more practical with this group and economic factors are more favourable.

187. Nevertheless, as stated earlier, the Committee believes that bicycle helmets are a highly effective safety measure for children who constitute the group most at risk. Therefore, overcoming the difficulties involved in enforcing this life saving measure for children is a task well worth tackling.

188. The Committee agrees with the proposal of the Victorian Government that mandatory wearing of approved bicycle helmets is a desirable objective. Community wearing rates are not yet sufficiently high and are very uneven. The bicycle helmet standard is currently being reviewed and the Committee has recommended that it be made mandatory. Concurrent with this, programs to increase community understanding of the benefits of helmets and to increase the wearing of helmets should be undertaken. During this time the cost-benefit analysis of compulsory helmet wearing recommended earlier would become available.

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19. Evidence, pp. 816, 963-4.

20. Evidence, pp.519-20, 881.

21. Evidence, p.881.

22. Evidence, p.881.

189. Usage rates should be regularly monitored to assist in program development and assess community readiness for universal wearing legislation. Given the differences that currently exist this may have to be on a state by state basis.

190. The Committee recommends that:

the Minister for Transport seek the cooperation of the States and Territories through ATAC to:

(a) **develop effective bicycle helmet promotion campaigns, with the objective of achieving universal bicycle helmet wearing,**

(b) **regularly monitor helmet usage,**

(c) **review the benefits of bicycle helmet wearing, twelve months after the mandatory bicycle helmet standard is introduced, and unless there are persuasive arguments to the contrary introduce compulsory wearing of helmets by cyclists on roads and other public places, and**

(d) **provide an exemption, if required, to (c) above for riders in organised road cycling races**

19 November 1985

E. F. Darling
Chairperson

APPENDIX 1

LIST OF WITNESSES

List of witnesses including date of appearance before the Motorcycle and Bicycle Helmet Safety Inquiry. Those witnesses who appeared in connection with the motorcycle helmet aspect only are marked with an asterisk.

ADAMS, R.B.*	Quality Assurance and Certification, Standards Association of Australia, North Sydney, NSW (23 May 1984), pp.31-107.
ANDERSON, G.J.*	Product Engineer, BMW Australia Ltd, Springvale, VIC (23 May 1984), pp.235-274.
ANDREWS, J.T.*	Parts Marketing Manager, BMW Australia Ltd, Springvale, VIC (23 May 1984), pp.235-274.
ARTHURSON, Dr. R.M.	Acting Manager, Traffic Accident Research Unit, Traffic Authority of New South Wales, Rosebery, NSW (2 Sep 1985), pp.935-967.
BICKELL, C.M.*	Executive Officer, Standards Association of Australia, North Sydney, NSW (23 May 1984), pp.31-107.
BOUGHTON, C.J.	Acting Assistant Secretary, Road User Branch, Federal Office of Road Safety, Department of Transport, Canberra, ACT (3 Oct 1984), pp.504-525.
BUDD, R.A.*	Assistant Secretary, Special Projects, Federal Office of Road Safety, Department of Transport, Canberra, ACT (23 May 1984), pp.199-234.
BURT, R.M.*	Group Manager, Quality Assurance and Certification, Standards Association of Australia, North Sydney, NSW (23 May 1984), pp.31-107.
CHAPMAN, P.	Technical and Research Consultant, Rosebank Products Pty Ltd, Dandenong, VIC (4 June and 15 Nov 1985), pp.692-731.
COIN, Dr. C.D.A.	Partner, Biketech, Rankin Park, NSW (2 Sep 1985), pp.923-932.

CRAN-CROMBIE, J.*	Member, Australian Helmet Manufacturers and Importers Association, Lakemba, NSW (23 May 1984), pp.296-312.
DORSCH, Dr. M.M.	13 Langham Terrace, Unley, S.A. (26 June 1985), pp.853-927.
GIBSON, T.J.	Senior Research Officer, National Health and Medical Research Council Road Accident Research Unit, University of Adelaide, S.A. (26 June 1985), pp.928-948.
GRAY, H.R.	Director, Administration and Approvals, Standards Association of Australia, North Sydney, NSW (23 May and 3 Oct 1984, and 2 Sep and 15 Nov 1985), pp.31-107, 526-556, 968-1004.
GRIFFITHS, M.*	Acting Principal Research Scientist, Engineering and Medical Section, Traffic Accident Research Unit, Traffic Authority of New South Wales, Rosebery, NSW (4 April and 30 May 1984), pp.24-27, 333-344.
HALLION, J.V.	Manager, Policy and Research Branch, Division of Road Safety, South Australian Department of Transport, Adelaide, S.A. (26 June 1985), pp.853-927.
HAND, I.B.	Member, CS/14 Committee of SAA and Engineering Manager, Safe-n-Sound Pty Ltd, Lonsdale, S.A. (15 Nov 1985)
also appeared as	Member, Australian Manufacturers of Safety and Protective Helmets Council. (15 Nov 1985).
HAMLYN, E.J.*	Officer-in-Charge, Consumer Projects Information, Trade Practices Commission, Sydney, NSW (23 May and 30 May 1984), pp.108-176, 345-368.
HARDING, M.J.	Chairman, WA Bicycle Policy Committee, Perth, WA (25 June 1985), pp.815-850.
HARITOS, S.*	Spokesman, Australian Helmet Manufacturers and Importers Association, Lakemba, NSW (23 May 1984), pp.296-312.
HAWTHORNE, G.E.	Curriculum Program Officer, Traffic Safety Education, Education Department of Victoria, Carlton, VIC (18 Oct 1985), pp.1027-1079.

HEWITT, J.V.	Director of Land Transport and Registrar of Motor Vehicles, Department of Transport and Works, Darwin, N.T. (29 July 1985), pp.853A-874A.
HOLLOWAY, M.K.*	Member, AU/12 Committee, Standards Association of Australia, and Member, Australian Motorcycle Council, Canberra, ACT (23 May 1984), pp.313-330.
JOHNSON, G.W.*	Assistant Secretary, Products, Policy and Standards Branch, Department of Home Affairs and Environment, Canberra, ACT (23 May 1984), pp.177-198.
LEES, I.J.	Director, Division of Road Safety, South Australian Department of Transport, Adelaide, S.A. (26 June 1985), pp.853-927.
LESCHEN, R.A.	Executive Director, Australian Manufacturers of Safety and Protective Helmets Council, The Plastics Institute of Australia, St Kilda West, VIC (4 June and 15 Nov 1985), pp.760-812.
MARKS, J.B.	Director, Marquip Australia Pty Ltd, Melbourne, VIC (15 Nov 1985).
MARTIN, D.M.	Education Officer, Bicycle Institute of New South Wales, Sydney, NSW (3 Oct 1984), pp.557-592.
also appeared as	Coordinator, State Bicycle Committee, Ministry of Transport, Sydney, NSW (2 Sep 1985), pp.935-967.
MATHIESON, Dr. J.G.	Secretary, Newcastle Cycleways Movement, New Lambton, NSW (2 Sep 1985), pp.877-922.
MATICH, F.A.*	Chairman, Matich (Australia) Pty Ltd, Roseville, NSW (4 April and 30 May 1984), pp.3-23, 369-478.
MILLAR, D.J.	Member, CS/14 Committee, Standards Association of Australia, and Representative, Australian Federalion of Consumer Organisations, Barton, ACT (2 Sep 1985), pp.1005-1024.
MILNE, P.W.	Manager, Educational Programs, Road Traffic Authority, Hawthorn, VIC, (18 Oct 1985), pp.1027-1079.

MULLER, M.*	Director, Brisk Sales Pty Ltd, and Advance Traders Pty Ltd, Buranda, QLD (23 May 1984), pp.275-295.
McDERMOTT, Prof. F.T.	Chairman, Victorian Road Trauma Committee, and Deputy Chairman, National Road Trauma Committee, Royal Australasian College of Surgeons; and Associate Professor of Surgery, Monash University and Department of Surgery, Alfred Hospital, Melbourne, VIC (18 Oct 1985), pp.1080-1104.
McLEAN, Dr. A.J.	Director, National Health and Medical Research Council Road Accident Research Unit, University of Adelaide, S.A. (26 June 1985), pp.928-948.
NAGEL, C.M.	Executive Director, Guardian Safe-n-Sound, Lonsdale, S.A. (4 June 1985), pp.732-759.
also appeared as	Member, Australian Manufacturers of Safety and Protective Helmets Council. (4 June 1985), pp.760-812.
NORTH, C.M.	Acting Assistant Secretary, Policy Development Branch, Federal Office of Road Safety, Department of Transport, Canberra, ACT (3 Oct 1984), pp.504-525.
PANG, Dr. H.	75 Parkhill Street, Pearce, ACT (2 Sep 1985), pp.1005-1024.
PATE, W.R.	Legal Officer, Standards Association of Australia, North Sydney, NSW (23 May, 30 May and 3 Oct 1984 and 2 Sept and 15 Nov 1985), pp.31-107, 479-501, 526-556, 968-1004.
PRIMROSE, J.	Supervising Project Officer, Trade Practices Commission, Belconnen, ACT (3 Oct 1984), pp.593-608.
RANN, D.C.*	Engineer, Federal Office of Road Safety, Department of Transport, Canberra, ACT (23 May 1984), pp.199-234.
RODSTED, G.	Consultant, Rosebank Products Pty Ltd, 13/12 Dandenong, VIC (4 June and 15 Nov 1985), pp.692-731.
also appeared as	Member, Australian Manufacturers of Safety and Protective Helmets Council, (4 June and 15 Nov 1985), pp.760-812.

ROSE, J.	Managing Director, Rosebank Products Pty Ltd, Dandenong, VIC (4 June and 15 Nov 1985), pp.692-731.
also appeared as	Member, Australian Manufacturers of Safety and Protective Helmets Council, (4 June and 15 Nov 1985), pp.760-812.
SARRAILHE, S.R.*	Experimental Officer, Aeronautical Research Laboratories, Department of Defence and Committee Member, Standards Association of Australia, (23 May 1984), pp.31-107.
SEARLES, I.	Acting Supervising Project Officer, Trade Practices Commission, Belconnen, ACT (23 May, 30 May and 3 Oct 1984), pp.108-176, 345-368, 593-608.
SHEPHERD, S.R.	Executive Member, Bicycle Institute of Victoria, Melbourne, VIC (4 June 1985), pp.659-691.
SLATTER, W.B.	Chairman, Road Safety Council of the Northern Territory, Darwin, N.T. (29 July 1985), pp.853A-874A.
SMITH, R.J.*	First Assistant Commissioner, Consumer Protection Division, Trade Practices Commission, Belconnen, ACT (23 May and 30 May 1984), pp.108-176, 345-368.
STOLZ, P.	Chief Executive Officer, Child Accident Prevention Foundation of Australia, Melbourne, VIC (4 June 1985), pp.627-658.
TOUGH, P.F.	Director, Products Safety Section, Department of Home Affairs and Environment, Canberra, ACT (23 May and 3 Oct 1984), pp.177-198, 609-623.
WIGAN, Dr M.R.*	Chairman, Committee AU/12, Standards Association of Australia, North Sydney, NSW (23 May 1984), pp.31-107.
WIGGINS, S.G.*	Committee Member, Federation of Australian Motorcyclists, and Member, Group of Australian Motorcycle Council, Parramatta, NSW (23 May 1984), pp.313-330.
WILLIAMS, M.J.	Mechanical Engineer/Ergonomist, Technisearch Ltd, Collingwood, VIC, (15 Nov 1985).
WOOD, H.T.	Section Head, Research and Investigations Branch, Road Traffic Authority, Hawthorn, VIC, (18 Oct 1985), pp.1027-1079.

APPENDIX 2

ONE POSSIBLE COST-BENEFIT CALCULATION OF UNIVERSAL HELMET USE[1]

The calculation is for New South Wales only.

A. Cost of Helmets

Number of NSW cyclists	1 000 000
Cost per helmet	$40
Average helmet life	5 years

Annual cost imposition of compulsory use of bicycle helmets in NSW is therefore:

$$\frac{1\,000\,000 \times \$40}{5} = \$8 \text{ million per year}$$

B. Cost of Accidents

(i) Average number of fatalities	25 per year
Value of a life	$200 000

Present value of future income, calculated at 40 years of $20 000 per year, discounted at 10%

% deaths due to head injuries	90%
% head injury lives saved by helmets	75%

Annual savings of bicycle fatalities with helmet use:

25 x 0.9 x 0.75 x $200 000[2] = $3.4 million[2]

(ii) Average number of non-fatal accidents (reported)	1 000
Unreported serious accidents (est.)	2 000[2]
% head injuries	40%[2]
% injuries saved by helmets	100%[2]
Estimated cost per accident	$1 000[2]

Annual savings for non-fatal accidents due to helmet use:

3000 x 0.4 x 1 x $1 000[2] = $1.2 million[2]

(iii) Estimated Total Savings due to helmet use:

(i) + (ii) = $4.6 million[2] per year

C. Benefit-to-Cost

On the basis of the conservative cost estimates, the total savings are of the same order of magnitude but less than the cost imposition of compulsory helmet use. This situation would be reversed if helmets were available at $20 each which may be possible for a large market.

Conclusion:

Economically, the balance is close but compulsory helmet use may not provide an overall community benefit unless helmets become cheaper or the cost of accidents becomes greater. On an individual basis helmet purchase is very good insurance because the cost is small compared to the potential loss.

D. Revised Cost-Benefit of Universal Helmet Use[3]

The cost-benefit of helmet use has been calculated both for NSW (Mathieson 1984a) and Victoria (Social Development Committee 1984). In both cases only fatalities and reported injuries were used in the analyses and the Dorsch et al (1984) study of helmet effectiveness was not then available. Recalculating for NSW on the basis of 25 fatalities per annum, at a loss of $300,000 per fatality (SDC 1984), with 75% saved by helmet use; and 1000 reported and 4000 unreported hospitalisation crashes at a conservative $5000 cost each (higher costs are given by the SDC 1984); and assuming that 45% involved head injury and that 90% of these would not occur with helmet use, the annual community loss due to cyclist head injuries in NSW is thus $20 million. For helmets costing $40 each, with a life of 5 years for 1 million NSW cyclists, the annual cost of helmet provision is $8 million. The annual benefit-to-cost ratio is therefore at least 2.5 to 1, making the promotion of universal helmet use a very attractive community program.

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1. Source: "CYC-ED OUT". Newsletter of the Newcastle Cycleways Movement, April-May 1984, Evidence pp.884-5.

2. See revision below, provided by the Newcastle Cycleways Movement.

3. Source: Evidence, p.888.

APPENDIX 3

COST TO AUSTRALIAN MANUFACTURERS OF SAA CERTIFICATION

(This costing was supplied by the Standards Association of Australia in its supplementary submission of 11 November 1985)

FIXED COSTS

Before Licence granted

Application fee[1]	$ 600
Type testing[2] (at Technisearch)	$ 800
Value of helmets used in testing[3]	$ 75
	$1,475

After Licence granted

Annual Licence fee[4]	$ 700
	$2,175

VARIABLE COSTS

Production test fees (per batch)[5]	$ 688
Value of helmets used in testing[6]	$ 60 per batch
Cost of Standards Mark labels	$ 0.07 each

Footnotes

1. Includes costs of pre-Licence factory assessment.

2. Assumes applicant submitting one size of helmet only for certification. If other sizes were also to be certified, the full type test is only carried out on the largest size and smaller sizes are subjected to an Engineering Evaluation (at an additional cost of $340).

3. 4 helmets are used in type testing. In addition, 1 helmet is retained by SAA as a Reference Sample. Assumes wholesale value to manufacturer of 5 helmets at $15 per helmet. Add $15 for each smaller size submitted for Engineering Evaluation.

4. Used to finance costs of routine audit inspections of factory in conjunction with royalties on Standards Mark labels.

5. Under SAA's Scheme a manufacturer initially is required to have 4 helmets out of each batch of 400 tested. After 10 successive batches pass, the testing frequency is reduced to 4 in every 1000 helmets manufactured. Fees quoted are as per Technisearch standard fees.

6. Value per batch 4 x $15 (see 3. above).

The extra amount SAA certification adds to the price of each helmet depends upon the number of helmets produced. Manufacturers who are able to sell larger quantities than their competitors are able to spread the fixed costs, which results in a lower unit cost of certification. Also, unit costs in the first year are greater than in subsequent years as the pre-Licence costs ($1,475) do not apply in subsequent years. For example, if a manufacturer were to produce 30,000 Standards Marked helmets per annum its additional costs per unit would be $1.04 in the first year and $0.84 in subsequent years, calculated as follows:

1st year

Fixed costs		$ 2,175
Variable costs	- Production test fees 10 batches of 400 + 26 batches of 1000 (36 x $688)	$24,768
	- Value of helmets used in testing (36 batches x $60)	$ 2,160
	- Cost of Standards Mark labels (30,000 x $0.07)	$ 2,100
		$31,203
Unit cost = $31,203/30,000 =		$1.04 per helmet

Subsequent years

Fixed costs (Annual fee only)		$ 700
Variable costs	- Production test fees 30 batches of 1000 (30 x $688)	$20,640
	- Value of helmets used in testing (30 batches x $60)	$ 1,800
	- Costs of Standards Mark labels (30,000 x $0.07)	$ 2,100
		$25,240
Unit cost = $25,240/30,000 =		$0.84 per helmet

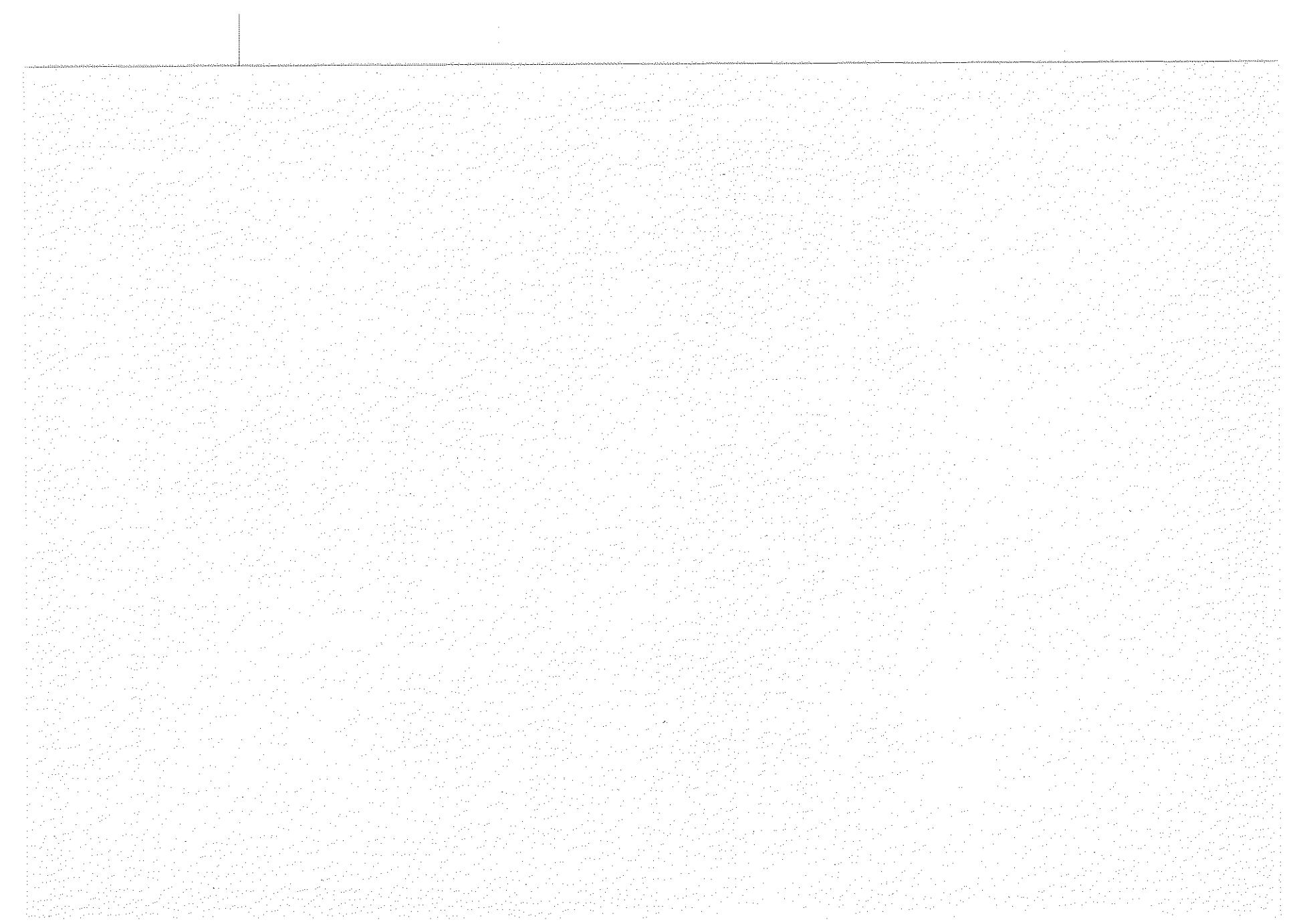
If a manufacturer were to produce 100,000 Standards Marked helmets per annum its additional costs per unit after the first year would be calculated as follows:

Fixed costs (Annual fee only)			$ 700
Variable costs	-	Production test fees 100 batches of 1000 (100 x $688)	$68,800
	-	Value of helmets used in testing (100 batches x $60)	$ 6,000
	-	Cost of Standards Mark labels (100,000 x $0.07)	$ 7,000
			$82,500
Unit cost = $82,500/100,000 =			$0.82 per helmet

The unit costs for overseas licensees would be slightly higher, as the Application fees are $1,700 for Asian licensees and $2,200 for European and USA licensees, and the Annual fees are $1,500 and $1,800 respectively.

When examining the "costs" to manufacturers of SAA certification, it is not valid to ignore the tangible benefits of operating an effective quality control system. The objective of implementing a quality control system is to achieve an overall reduction in manufacturing costs by aiming for goods to be produced "right first time", thereby eliminating rejects and waste. Responsible manufacturers should be doing some production testing anyway, regardless of whether they have opted to operate under SAA's scheme and, therefore, it could be argued that the figures given above overstate the true net cost of certification.

We have calculated that SAA receives no more than 5 cents per helmet which is used towards the cost of undertaking audit visits (including travel costs, accommodation of inspectors, reports and other administrative expenses).



APPENDIX 4

SCRIPTS OF VICTORIAN GOVERNMENT
HELMET ADVERTISEMENTS

TV Copy - Egghead

VIDEO	AUDIO
In this spot a solitary egg cup is dissolved into a frame, then an egg is dissolved into the egg cup. Next scene is a hammer hitting the egg - egg shatters over table top.	SFX: Strange, discordant, metallic sounds V.O. Every year in Victoria over 1200 bike riders are killed or injured on our roads.
Dissolves back to egg cup and egg, bicycle helmet dissolves in over the top of the egg.	Too many of them are children.
Hammer once again tries to shatter the egg through the helmet but with no success.	And too many of our children are killed or permanently damaged through head injuries that could have been avoided if we had used our heads and put theirs in a Safety Standards Approved helmet.
Dissolve to a range of helmets:	So please before your child takes a bike on the street use your head and save your kids'.
SUPER: RTA Logo.	Get them in a helmet that carries this sign.
SUPER: Use your head, get them in a helmet.	
S.A.A. Logo rolls across screen.	

TV Copy - Hindsight

VIDEO	AUDIO
This spot consists of a series of slow pull outs from scenes of a small child's life, from baby to now, poignant. Little happy snaps.	SFX: Street noise/sound of ambulance. Behind this is simple classical music that swells as spot progresses.
	V.O. FATHER (pensive) Seems like only yesterday Danny was a baby. but he grew up to be really independent. and it just had to be a bike for his birthday, nothing else would do. Took to it like a duck to water.
Photograph tears across boys face:	
Live action: Boy on bike in a helmet smiles.	Just couldn't get him to wear a helmet though. Didn't seem that important anyway I mean he was only riding up and down the street.
Dissolve to a range of helmets: SUPER: RTA Logo SUPER: Use your head, get them in a helmet. S.A.A. logo rolls across screen.	Not important that is, until today. God, he looked so helpless lying there, but they think he'll be OK. But I know if I'd used my head, I could have saved his. Use your head and save your kid's. Put them in a helmet that carries this sign.