CHAPTER 4

BICYCLE SAFETY

Introduction

210. As with motorcycles a bicycle offers little protection to a cyclist in a collision and evidence on bicycle safety has therefore mainly concerned accident avoidance, or the primary safety aspects of the bicycle safety problem.

211. Bicycles are currently not approved to any standard and are not subject to registration or insurance as are other road vehicles. Cyclists are not licensed and traffic laws relating to bicycle use appear to be rarely enforced. It is also evident that there is a need to make cyclists clearly visible to other road users and for a definitive assessment of cyclist training requirements. While there has been considerable discussion on measures to improve bicycle safety few have been implemented.

212. Assessment of appropriate measures is often hampered by a lack of statistical information regarding the causes of bicycle accidents. In some cases information on the effectiveness of such measures, where implemented, has been lacking. In the case of other measures considerable administrative costs and legal difficulties are involved. There appears also to be a low level of cyclist acceptance of some of the proposed measures.

Bicycle Primary Safety

- Bicycle Design and Standards

213. The safety of the cyclist depends to a large extent upon the general roadworthiness of the bicycle. Failure of bicycle components can cause accidents. The most important aspects include the condition and effectiveness of brakes, tyres and lights and condition of the frame, particularly front wheel forks and front and rear wheel dropouts. Other important items

are wheel rims, spokes and the condition of nuts and bolts holding the wheels, seat, bearings and handlebars. A number of these areas of bicycle design have been and remain a source of concern to those interested in bicycle safety.

214. The Australian Transport Advisory Council (ATAC) is a co-ordinating and advisory committee at Ministerial level comprising Commonwealth and State transport representatives. Suggested 'on-road' requirements for bicycles endorsed by ATAC are incorporated in Draft Regulations[1] 3001-3008 and are intended for use by the States and Territories as a model for uniform on-road requirements. These Regulations, shown at Appendix 15, specify basic requirements for bicycle braking, dimensions, reflectors and lighting. However, the specifications are not detailed and the extent to which individual States and Territories have adopted similar requirements is not known.

215. In 1976 the SAA issued Australian Standard 1927 (AS 1927) on Pedal Bicycles. This was the first Australian Standard on bicycles. It was prepared at the request of Australian Consumers' Association and the New South Wales Consumer Affairs Council following the failure of a large number of imported bicycles with faulty brazing of joints of tubular components.

216. Australian Standard 1927 uses as a basis draft regulations on bicycle safety issued by the Consumer Product Safety Commission (CPSC) of the United States. Australian Standard 1927 provides for road testing of a bicycle to ensure stable handling, turning and steering characteristics and that there is no loosening or misalignment of seat, handlebars, controls or reflectors in normal use. It provides safety requirements for bicycle construction and equipment including braking and steering systems, strength of frame and forks, projections

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1 Draft Regulations Defining Vehicle Construction, Equipment and Performance Standards for Road Vehicles.

which could be hazardous in an accident, minimum ground and toe clearances, positive action clamping devices, minimum insertion marks for handlebar and seat assemblies, protective guards for chains and derailleurs and recommended tyre pressures. It also requires that each bicycle be supplied with an instruction manual on safe usage and maintenance.

217. While a number of imported bicycles comply with the CPSC regulations, imported and locally manufactured or assembled bicycles are not produced to meet the requirements of AS 1927. Reasons given for failure to comply with the Australian Standard include economic considerations and the fact that the standard is currently under revision by SAA.

218. Evidence indicates that the low levels of returns over recent years have caused local manufacture of bicycles to cease in favour of local assembly. The majority of components are imported. A competitive market and the low returns available have allowed little opportunity to those wishing to comply to AS 1927 to incur the extra expense associated with voluntary compliance.

219. Local assemblers submitted that compliance to AS 1927 should be mandatory in order to exclude low quality bicycles from the Australian market. One organisation claimed that 'unless there is legislation importers will continue to import bikes into this country that meet the lowest possible standard'.[1] While the cost of testing and compliance would increase the cost of the cheaper models of bicycle on the Australian market, if the Standard was made mandatory, there would be little effect on the better models as many of these are already tested in accordance with the similar CPSC standard which is compulsory for compliance in the United States market.

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1 Evidence, p. 754.

220. The Consumer Standards Advisory Committee of SAA also considers that AS 1927 should be mandatory and has asked the Commonwealth Department of Business and Consumer Affairs to consider the matter with a view to prescribing it under Section 62 of the Trade Practices Act.[1] The current revision of the standard by SAA is being undertaken in the context of this request. Manufacturers have pointed out that the standard would prohibit the sale of 'high-riser' bicycles having 'sissy bars' higher than 125 mm above the seat surface, and also prohibit the pseudo motorcross cycle or any other bicycle which, because of its design, could not meet the requirements for 'projections' in the standard. It has been claimed that there is no factual evidence that sissy bars were a real hazard and that projections on the pseudo motorcross bicycle were of a design that would not cause injury. The SAA points out that similar points have been raised overseas with the International Standards Organisation where it was agreed that any new designs using new materials or methods of construction or assembly would be regarded as complying with the ISO draft standard provided they were approved by a representative of a recognised authority as providing an equivalent degree of safety and durability. This provision is under consideration by SAA.

221. At present there is no impediment to the import, or sale, of bicycles which do not incorporate what can best be described as good engineering practice in the interests of safety. Manufacturers and assemblers of bicycles have responsibilities to consumers in the areas of bicycle design and strength, handling, quality of materials and workmanship and provision of instructions

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1 Section 62 prohibits the supply of unsafe goods in respect of which a notice has been published by the Minister declaring them to be an unsafe good. Companies or persons in breach of this Section of the Trade Practices Act are liable to criminal prosecution as well as injunction, damages and ancillary orders by the court.

for the maintenance and safe operation of the bicycle. If the specifications and safety of bicycles are to be improved, all suppliers should be required to comply with AS 1927. The Committee therefore recommends that:

> . *consideration be given to requiring imported bicycles to meet the requirements of Australian Standard 1927, Pedal Bicycles, as revised, and to having compliance to the standard required under Section 62 of the Trade Practices Act.*

222. A number of bicycle suppliers intend to have their bicycles comply with the revised standard when completed. Australia Post advised that to meet safety criteria it intended that future bicycle orders will be made to specifications incorporating AS 1927.

223. Evidence was also received on aspects of improved bicycle design which should be included in the standard. The Bicycle Institute of Victoria stated that there was an urgent need for better bicycle lights and that bicycle lighting was not covered by a standard.

224. The Institute also claimed that the standard should require 2 braking systems and give attention to the problem of wet weather braking performance. Other witnesses also referred to the problem of wet weather braking performance. The Committee considers that braking ability has an important bearing on the safety of cyclists and recommends that:

> *the Standards Association of Australia give serious consideration to amending Australian Standard 1927 to require two braking systems on bicycles and to provide for appropriate levels of wet weather braking performance.*

The Committee is pleased to note that the ISO is considering preparation of standards on wet weather braking.

225. Other aspects of bicycle design and equipment with safety implications were also examined. Aluminium bicycle rims, which are more expensive but not as sturdy as the normally used steel plated rims, seem to have better braking performance under wet weather conditions and centre pull brakes are more effective than side pull brakes. It was claimed that these design improvements because of their cost could only be supplied as standard equipment on the more expensive bicycles, but were available as options on less expensive bicycles.

226. Concern was expressed about the unsafe nature of children's Dragster or Hi Rise handlebar type bicycles. These bicycles feature high handlebars, short wheel-bases and small wheels with the seat often positioned over the back wheel which makes them highly manoeuvrable at low speed but otherwise unsafe and difficult to control. The unsafe nature of these types of bicycle is reflected in United Kingdom accident studies which found a disproportionate number of serious accidents with head injuries, broken bones, etc., involving these types of bicycles.[1] The Committee recommends that:

. *the Standards Association of Australia immediately review Australian Standard 1927 with a view to including requirements to control unsafe features of Dragster or Hi Rise handlebar bicycles.*

- Bicycle Visibility

227. One aspect closely related to design is the inconspicuity of cyclists. Bicycle-car accidents comprise about 85% of reported bicycle accidents and it would appear that because of the size, shape and narrow profile of a bicycle other road users frequently either do not see or misjudge the position or speed of a bicycle. Also the majority of accidents involving cyclists occur at night,

1 Evidence, p. 208.

dusk or dawn, a fact which also suggests that cyclists are not always seen. This problem of providing safety through having a bicycle readily seen by other road users is therefore of considerable significance.

228. A number of ways in which to make bicycles more readily seen were suggested. These included the use of retro-reflective and fluorescent materials on safety helmets, clothing and bicycle frames, reflectorised tyres, reflectors, lights, safety flags mounted on vertical rods, bright clothing and accessories.

(a) Lights

229. The range of lights available for bicycles was claimed to be totally inadequate. Available systems based on either a battery or a dynamo have various disadvantages for cyclists. The wattage output of bicycle lights was claimed to be only 1-2% of that of a motorcar headlamp. At most, such lighting serves to warn motorists of a nearby bicycle, but provides little illumination for cyclists. Battery operated lights are not suitable for long continuous use as the stage is often reached where insufficient light is being produced. Similarly, generator lighting systems have a significant deficiency in that they are inoperative while the bicycle is stopped and only reach peak efficiency when the bicycle is moving reasonably fast. Cyclists are required to stop at traffic lights and other intersections and would therefore be without lights if they used a dynamo for vehicle lighting. The fact that such lighting is totally inadequate is reflected in bicycle accident statistics which show that 60% of bicycle accidents occur at night, dusk or dawn and that 37% of accidents occurring at this time occur to bicycles with lights not on.

230. There is an urgent need for improved lights for bicycles which should be subject to a standard. The Committee is pleased to note that the ISO is considering the preparation of a standard in this area and recommends that:

. *the Standards Association of Australia prepare an appropriate Australian Standard for bicycle lighting.*

The question as to whether manufacturers should be required to provide lighting on bicycles to an appropriate official standard could not be considered until the standard has been created.

231. Some cyclists who are not safety conscious ride at night or in poor visibility conditions without the prescribed lighting. The Committee considers that in the cyclists' own interests the various State and Territory laws prescribing effective bicycle lighting including taillights need to be enforced.

(b) Reflectors

232. Most bicycles involved in accidents between dusk and dawn are struck from the side or rear. Australian Standard 1927 requires[1] bicycles to be fitted with a rear red reflector and yellow side reflectors mounted on the spokes of each wheel. The standard has been recently revised and it is intended to also require a clear reflector to be mounted to the front and the use of pedal reflectors. The circular movement of the spoke reflectors viewed from the side and the up and down movement of pedal reflectors when viewed from the rear are considered ideal means of attracting the attention of motorists.

233. The reflector standard presently being drafted specifies higher photometric requirements than those of reflectors in current use and the angles from which the reflective properties are measured is increased to 50° left and right. These reflectors, in conjunction with a light mounted on a bicycle between dusk and dawn as required by traffic regulations, will make the bicycle visible to motorists through 360°.

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1 Reflectors required in AS 1927 are specified in a separate standard on Reflectors for Pedal Cycles (in the course of preparation).

234. The use of reflectors on bicycles is one of the most significant means of increasing the conspicuity of cyclists at night and their use is highly desirable. As these reflectors are a requirement in AS 1927, implementation of the recommendations in paragraph 221 would ensure their use on all new bicycles. The Committee notes that CPSC regulations in the United States now require reflection at all angles (360°) on bicycles.

(c) Reflectorised Tyres

235. Reflectorised tyres have also been suggested as a suitable means of avoiding the large proportion of two-wheeled vehicle accidents involved in angle collisions at night. Reflective tyres appear as two circles of light amongst the competing visual clutter of other lights and thereby enable a cyclist to be more quickly and easily detected and recognised. A comparative assessment provided by 3M Australia Pty Ltd of various qualities of the reflective tyre, prismatic reflectors and lights is shown in Table 14.

TABLE 14

COMPARISON OF SYSTEMS

REQUIREMENT	REFLECTIVE TYRE	PRISMATIC REFLECTOR	LIGHTS
Detection	Good	Excellent	Excellent
Recognition	Excellent	Poor	Poor
Breakability	Unbreakable	Breakable	Breakable
Scratch Resistant	Excellent	Poor	Excellent
Permanence	Non Removable	Removable	Removable
Wet Performance	Adequate	Adequate	Excellent
Design Effect	Favourable	Questionable	Questionable

Source: Evidence, p. 1184.

236. The reflective tyre provides a more effective device than point sources of light, such as prismatic reflectors or lights. While prismatic reflectors of good quality are per unit surface stronger in reflectivity[1] than the reflective sheeting on tyres their area is smaller and their total brightness is not much higher than that of reflectorised tyres for bicycles. Also in darkness while prismatic reflectors appear as brilliant dots they do not enable rapid identification of the obstacle ahead. When there is closure between an observer and the bicycle, reflective side wall tyres are an aid to correct identification of bicycle movement.

237. Reflective tyres are not included in AS 1927. The SAA reported that reflective tyres were considered when drafting the standard but wide angle side reflectors and pedal reflectors were preferred. Pedal reflectors attract attention from the front and rear and the side reflectors from the side whereas reflective tyres increase the bicycle's visibility only from the side.

238. The Committee, while unable to make a scientific assessment as to which of these devices is the most effective in increasing the detectability of a bicycle, does have a preference for the prismatic reflectors. These devices are available on the Australian market, however, and the Committee recommends that:

. *cyclists should be made aware of the benefits of reflectorised tyres so that they can make their own assessment on their merits as an additional item of safety equipment.*

(d) Fluorescent and Reflective Materials, Bright Clothing and Accessories

239. The use of fluorescent materials or bright clothing and other 'eye-catching' accessories were suggested as means to increase the conspicuity of cyclists particularly in the day-

1 That is, their specific co-efficient of luminous intensity measure in candellas/lux/square metre is higher.

light hours. Fluorescent orange safety flags mounted on vertical rods of about 1.5 metres are particularly eye-catching especially for bicycling in multi-lane traffic. Such flags are known to increase the room left by drivers overtaking bicycles. It was also suggested that fluorescent reflectorised orange would be an appropriate colour to apply to bicycle frames, crash hats and vests or windbreakers.

240. Evidence indicates that while such products are available on the Australian market and are fairly widely used amongst competitive cyclists they are often not specifically designed for cyclists' needs and are sometimes difficult to obtain. However, the high cost and limited availability of such safety accessories for cyclists were unfortunately restricting wider use.

241. In some cases cyclists do not accept the need to equip themselves with such safety accessories. Cyclists should be made aware of their need to be seen and should be encouraged to wear and equip their bicycles with appropriate safety accessories.

- Bicycle Registration

242. Many cyclists submitted that bicycles should be registered as an aid to ensuring that bicycles are in a safe condition, to assist police in enforcing bicycle laws, and to help control thefts.

243. Other advantages of compulsory bicycle registration would include the provision of meaningful statistical information on bicycles, a possible check not only of the roadworthiness of the bicycle but also the cyclist, and the generation of funds to assist in the provision of bicycle facilities. An example of funding is found in South Australia where a $1.00 levy, applied to all vehicle driver licences issued, is used to finance the Road Safety Council of South Australia's operations, i.e., publicity, instruction, etc.

244. The registration systems suggested ranged from requirements similar to those for motor vehicles, to a cruder scheme operated through schools whereby a headmaster has the power to refuse a child permission to ride a bicycle to school unless it corresponds to certain basic standards of roadworthiness. Such a system could be an integral part of getting children to behave more safely on their bicycles.

245. There are, however, a number of problems associated with proposals for bicycle registration. Cyclists pointed out that while a small registration fee would be acceptable to adult cyclists there are problems is requiring a fee from children who ride bicycles. There are also problems of policing a registration scheme based on school supervision as such a scheme would have no legal basis and would require the voluntary support of the children and their parents. Cyclists claimed that registration fees should be small and certainly less than those applicable to motor vehicles in order not to discourage bicycle riding. While the fee should be small it was suggested that bicycle registration may bring with it the respect of other road users and recognition of cyclists' rights on the road.

246. State registering authorities do not favour the proposal as they consider that the costs of administering a registration system would greatly outweigh the benefits. Authorities in New South Wales, Queensland and South Australia have considered the proposal many times and rejected it. Victoria currently has the proposal under consideration as part of work being undertaken in the development of a bicycle plan for the Geelong Region. In Western Australia registration of bicycles was discontinued in 1956 as it was not viable.

247. The Committee considers that the proposal for bicycle registration should be the subject of further study and recommends that:

- *a study be undertaken by the Commonwealth Department of Transport to assess the advantages and disadvantages of compulsory registration of bicycles in Australia.*

- In Use Aspects

248. This Report has earlier referred to the fact that failure of bicycle components can cause accidents. Equally important is the need to ensure that bicycles are adequately maintained. Wear on safety related items such as tyres, brake pads, and cables, etc., can lead to a rapid deterioration of bicycle safety with a corresponding increase in the possibility of an accident.

249. Many bicycles in use are defective from a safety point of view. However, no quantitative evidence was received to indicate that such defects are a significant causal factor in accidents. This is partly a reflection of the general lack of detailed accident data relating to bicycles.

250. Police, cyclist and local community service organisations have made various efforts to operate bicycle inspection days or workshops for school children in order to inspect bicycles and provide some training. These efforts are highly commended and deserve further community support. Such efforts, unless maintained on a continuing basis cannot, however, more than partially fulfil the need for regular maintenance checks. The Committee therefore recommends that:

. *the benefits of roadworthiness checks on bicycles be also considered in the study on compulsory bicycle registration recommended by the Committee.*

Cyclist Primary Safety

- Cyclist Training

251. More cyclist training was frequently proposed as a means of increasing the level of bicycle safety particularly among children who form the majority of those killed and injured in bicycle accidents. The aim of the measure is to develop at the beginning the right attitude and procedures in young cyclists so that they may survive to develop the necessary skills and

experience. Therefore it was often suggested that inexperience, lack of knowledge of road rules and unsatisfactory riding practices are major factors in bicycle accidents and that young cyclists should be given some form of training in traffic rules and in riding techniques.

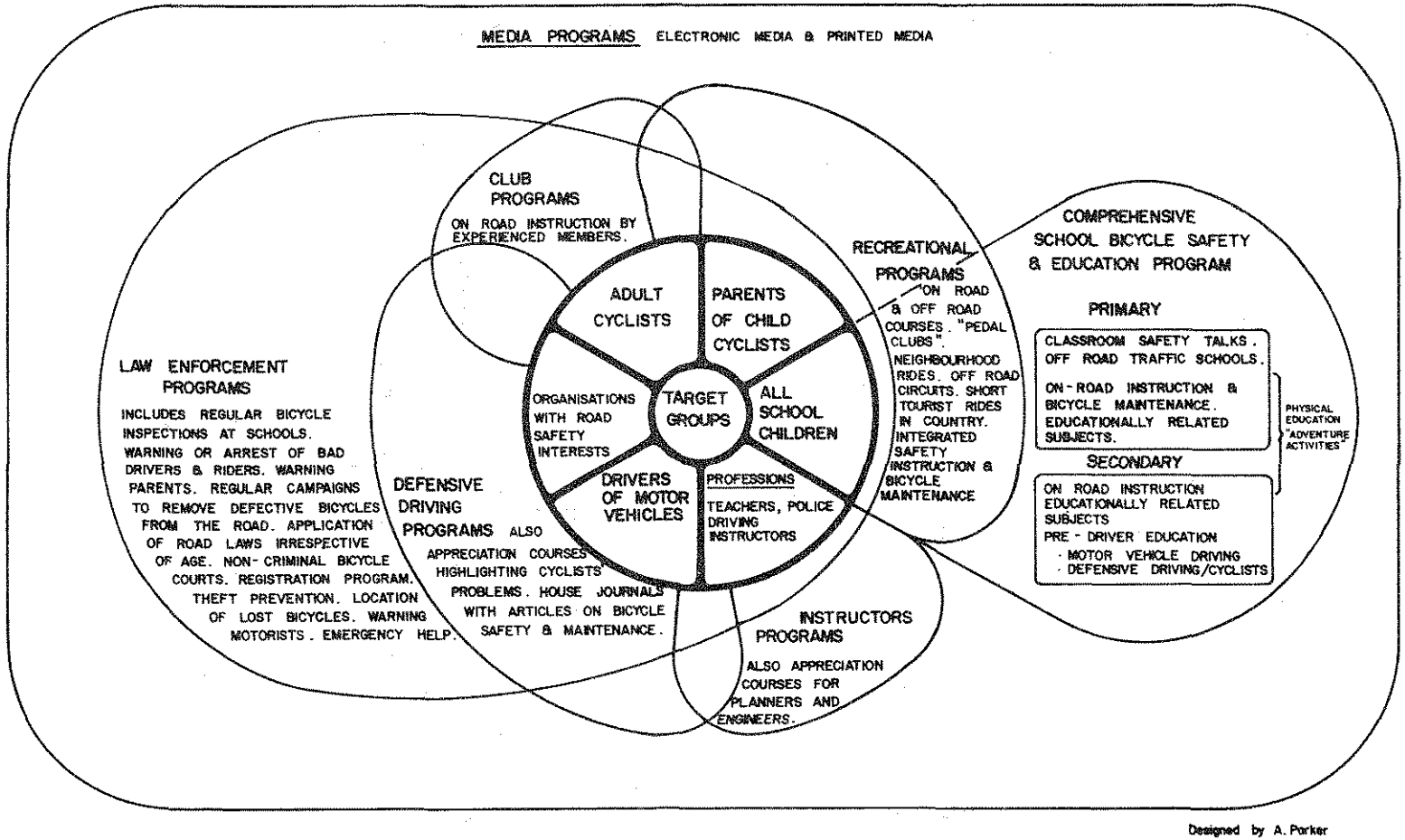
252. There are a number of such courses which, while performing a valuable function, frequently operate under severe disadvantages. As with motorcyclists, training schemes for cyclists have been fragmented, frequently operate with restricted staffing and funding, and cover only a small proportion of the total number of users. In a number of cases these training schemes receive generous support in the form of bicycles from bicycle suppliers.

253. While accepting that proposals for training of cyclists have considerable validity as a means of addressing the problem in common with the wider area of driver training there appears to be no conclusive evidence that such schemes reduce the number of accidents. The Committee therefore considers that there is an urgent need to assess the effectiveness of such cyclist training schemes.

254. The Road Safety and Traffic Authority of Victoria as part of the Geelong Bikeplan will be evaluating the proposed safety education program to be implemented in Geelong. The safety education program to be conducted in both primary and secondary schools will cover riding skill, maintenance, road rules and intersection techniques as a basic program. The program which has involved the Education Department in Victoria in the preparation and development of the course will receive a trial in Geelong schools in 1978 and may be proposed for widespread adoption in Victorian schools in 1980. The relationship of this program for school children to other safety and education programs directed to other target groups is shown in Figure 7.

FIGURE 7

BICYCLE SAFETY AND EDUCATION - RELATIONSHIP BETWEEN PROGRAMS AND TARGET GROUPS



255. The Committee recommends that:

. *further research be undertaken examining the feasibility of developing a training curriculum suitable for use as a cyclist training guide throughout Australia.*

- Legislation and Enforcement

256. There are practical and legal difficulties in enforcing observance of traffic legislation on children riding bicycles.

257. This legislation generally relates to requirements about lighting, reflectors, dimensional limits, brakes and a warning device. Bicycle lights are required only when a bicycle is ridden on a road between sunset and sunrise. Evidence indicates that when school inspections of bicycles have been conducted there is a low level of compliance with requirements. Adherence to standards would possibly require regular inspections by a body with appropriate authority and an effective means of enforcement.

258. Enforcement of such standards often falls to the police who do not accord high priority to enforcement of legislation on bicycles. This is no doubt a reflection of the difficulties entailed in enforcement. Young cyclists often behave as though traffic laws do not apply to them and while police may give stern warnings to young cyclists and their parents there is a reluctance to initiate legal proceedings in such cases (see paragraph 256). There are clearly questions involved of the degree of responsibility and culpability which can be attached to young cyclists for their actions and a clear realisation that imposing penalties associated with the breach of regulations is not the appropriate means in the case of children to achieve the desired road behaviour pattern. Notwithstanding these difficulties many bicycle accidents are caused by a breach of

existing road rules by cyclists and/or motorists. The Committee therefore recommends that:

. *stricter enforcement of road rules applying to cyclists be implemented.*

259. The Australian Capital Territory is the only area in Australia where bicycles can be legally ridden on footpaths. State authorities, however, often permit and sometimes encourage young children to ride on footpaths for safety reasons even though it may be illegal. In some countries where riding on footpaths is allowed there is a maximum age for cyclists using the footpath.

260. One submission claimed that there should be a minimum age for riding a bicycle on the road. This would seem to be a reasonable suggestion which should be considered by appropriate authorities. The Committee notes in relation to this proposal that it was concluded in a report for the European Council of Ministers of Transport that the Danish rule of 6 years as a minimum age for solo riding on streets be adopted.[1] A similar minimum age requirement in Australia, it has been estimated, would affect about 3% of total cyclist accidents.

- Rider Licensing

261. While bicycle riders are not required to be licensed they are required to obey traffic laws. State licensing authorities do not, however, see cyclist licensing to be justifiable. New South Wales has considered the proposal on a number of occasions and concluded that any advantages gained by the introduction of such a scheme would not justify the heavy administrative costs involved. The fact that most cyclists are school children would create additional enforcement problems. In New South Wales it is not possible to take legal action against children under 8 years of age and there are difficulties associated with taking action against children under 14 years of age.

1 In Camera evidence, p. 23.

262. Several cyclists favouring cyclist licensing suggested that a less formal licensing scheme could be implemented through the schools. Such a system is an integral part of pre-driver education designed to foster an overall improvement through cyclists achieving a certain level of riding proficiency and a greater understanding and respect for traffic laws. Other witnesses, however, were uncertain of the benefits to be obtained from the system.

263. The Committee was informed of a primary school in Geelong, Victoria, where as part of a safety education program a bicycle licensing system was introduced to test cyclists' knowledge, ability and the condition of their bicycles. The scheme is being further developed and has been well supported by parents, teachers and children.[1]

264. Licensing of cyclists involving tests of competency is a matter to be considered in association with bicycle registration. The Committee therefore recommends that:

- *consideration be given to whether registration procedures should include tests for cyclist competency and licensing in the study recommended by the Committee on compulsory bicycle registration.*

- Publicity

265. Evidence contained a number of proposals for campaigns aimed at educating motorists to become more aware of cyclists on the road. Opening car doors without looking to see if cyclists are passing by and closely overtaking cyclists at high speed are ways in which motorists, largely unconsciously, endanger cyclists. An education campaign conducted through television, the press and posters in public places, it was suggested, should be directed at motorists to heighten their awareness and tolerance of other road users.

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1 Evidence, p. 1224.

266. It was also suggested that a publicity campaign should be aimed at cyclists regarding their need to choose appropriate safety equipment both in order to protect themselves and in order to be visible to motorists.

267. There is an increasing number of cyclists using roadways and publicity campaigns have an important role to play in raising the level of bicycle safety. However, publicity campaigns may be ineffective and therefore need to be evaluated. Wherever possible, specific forms of road user behaviour which lead to accidents and specific target populations need to be identified. For example, a common and hazardous behaviour of young cyclists is to suddenly swerve into the path of a vehicle travelling in the same direction. Similarly, older cyclists appear to pay insufficient attention to their conspicuity at night and assume that drivers of other vehicles can see them. These two target behaviours and populations may well be suitable for well designed publicity. Other potentially fruitful areas for publicity should be identified in the in-depth accident studies which are in progress in Sydney, Adelaide and Melbourne.

268. The Committee recommends that:

. *the Publicity Advisory Committee on Education and Road Safety consider the need for appropriate publicity campaigns on bicycle safety.*

Road and Environment Factors

269. The major source of cycling accidents involving casualties is the collision between a motor vehicle and a bicycle which share the same roadway. Considerable evidence was directed to various ways to separate bicycles from the normal flow of vehicular traffic. The effective separation of two types of vehicle with very different speeds and masses is widely regarded as absolutely necessary to ensure bicycle safety.

270. There are three general types of bikeways - bicycle routes, bicycle lanes and bicycle paths. The cheapest and simplest form of bicycle planning is to provide bicycle routes which consist of a series of existing streets posted at intervals with a special bike route sign. Bicycle routes employ those streets which carry a lower volume of traffic.

271. Bicycle lanes, on the other hand, consist of a marked traffic lane on city streets for the exclusive use of cyclists. Bicycle lanes reduce the likelihood of accidents as many of the causes of collisions are minimised, particularly those involving rear end collisions and sideswiping by passing vehicles. They present somewhat of a paradox however. If a street is wide enough to include a designated bicycle lane, which does not interfere with motor vehicles, the marking of the lane is unnecessary. A marked lane reduces cyclists' and motorists' flexibility to use the total street for turning and other manoeuvres while, on the other hand, there will be no room for a bike lane which would be desirable in cases where cyclists use a heavily trafficked street with narrow traffic lanes and hazardous conditions.

272. The safest and the optimum type of bikeway is the bicycle path which consists of a special path built for the exclusive use of cyclists (and sometimes pedestrians) on a right-of-way independent of the public street system. The bicycle path has enjoyed considerable success particularly with novice and recreational cyclists who are apprehensive when sharing the road with motor vehicles. Unfortunately any significant development of bicycle paths even as a long term measure is unlikely because of cost and the limited availability of rights-of-way particularly in the urban regions. Also bicycle paths may not correspond with desired travel patterns. The wide dispersion of cyclists' origins and destinations means that bicycle trips will also utilise the existing streets.

Bicycle paths will be unable to duplicate the road system and the capacity of bicycle paths to solve the bicycle safety problem is therefore limited.

273. Cyclists' needs should wherever possible be incorporated in appropriate town planning measures. When this is not appropriate, however, other measures for bicycle safety need to be adopted.

274. Mention has already been made of cyclists' use of footpaths (see paragraph 259). Although use of footpath by cyclists is prohibited in all States it is not enforced. Only in the Australian Capital Territory is the use of footpaths by cyclists legal.

275. The Committee considers that these matters should be subject to detailed examination as the measures of safety advantages to be achieved by various types of bikeways and footpath usage is to some extent unresolved. It therefore recommends that:

. *the safety value of the various types of bicycle ways including the use of footpaths be investigated under Australian conditions by the Commonwealth Department of Transport.*

The Committee notes that regulations associated with use of footpaths and bicycle ways by cyclists are under consideration by ATAC's Advisory Committee on Road User Performance and Traffic Codes.

276. If the bicycle is to be more fully integrated into the traffic stream attention needs to be given to the road system from the cylists' view point. The real needs of cyclists in this area were assessed as part of the Geelong Bikeplan Study. This study has found that the main needs of cyclists relate to improved safety, a better riding environment, improved bicycle

security and better end-of-trip facilities. The physical improvements and facilities for cyclists under these headings as summarised by the Geelong Bikeplan's Study Team Leader are shown at Appendix 16.

277. A further measure under study in the Geelong Bikeplan Study aimed particularly to assist in the integration, in residential streets, of bicycles with other road users is the 40 km/h speed limit trial area. The area selected for the trial involves 14 square kilometres in the Shire of Corio. During the 12 months period selected for the trial, vehicle and bicycle traffic within the area will be monitored. The trial was commenced in July 1977 and until monitoring information has been assessed it will not be possible to determine whether it has been successful. Local residents' reaction to the trial has been most favourable.

278. With the boom in bicycle usage greater interest is being shown in the provision of special facilities for bicycle travel. Bicycle ways as a solution to the bicycle safety problem have been widely recognised by various authorities both in Australia and overseas. Municipal councils in Australia are giving increasing attention to the possible introduction of bike ways within their areas of responsibility. It is highly desirable that such efforts be co-ordinated and directed at achieving the highest possible standards of facilities for cyclists. There should also be a source of advice to these bodies able to recommend practices appropriate to Australian conditions. The Geelong Bikeplan Study Group may well be an appropriate group for such advice. The Committee notes that Road Safety Guidelines for Town Planning which are currently being finalised within the Commonwealth Department of Transport contain recommended practices for the provision of bicycle facilities in both new and existing areas.

Cyclist Secondary Safety

279. It is commonly held that the cyclist is so exposed and unprotected that little can be done to prevent severe injuries resulting from collisions at even moderate speeds. Consequently, with the exception of crash helmets very little research appears to have been done in this area and few countermeasures were suggested.

280. Bicycles are designed with emphasis on strength and minimal weight and there appears to be little scope to provide crash injury protection for cyclists through the design of bicycles able to absorb impact forces more gently.

281. One submission suggested that most of the injuries to a cyclist are inflicted by the striking vehicle and that consideration should be given to the injury potential of the exterior of motor vehicles. In the same way as measures have been taken to ensure that objects inside the passenger compartment of a motor vehicle are unlikely to inflict injury, greater consideration needs to be given to the exterior design of such vehicles in order to reduce the human suffering and disability resulting from collisions with less protected road users.

282. The only other suggestion relating to bicycle design was that stoppers should be fitted to the ends of handlebars. In the event of accidents the exposed ends of handlebars can cause injuries to cyclists. A number of reports of this occurrence have been noted over the years by the Accident Squad of the Australian Capital Territory Police.

283. The most significant form of cyclist protection in the event of an accident is for cyclists to wear protective clothing, particularly crash helmets. The nature of the physical exercise limits the acceptance by many cyclists of protective clothing such as helmets, elbow and knee guards, mittens and capes.

Presently few cyclists wear helmets or other protective clothing. The reticence of cyclists in this area may be overcome by suitable publicity and improved design.

284. A high proportion of cyclists belonging to cycle clubs wear safety helmets and the Cyclists Union of Australia stipulates acceptable helmets that must be worn in official competitive cycle racing events. The majority of serious injuries to cyclists occurs to the head, and head injuries are a major cause of death.

285. In response to the risk of head injuries for cyclists the SAA was asked to prepare a standard for a protective helmet. This standard released in August 1977 is titled AS 2063, General Purpose Protective Helmets (For Use in Pedal Cycling, Horse Riding and Other Activities Requiring Similar Protection).

286. In drafting AS 2063 the SAA considered that the degree of protection to be specified could not realistically be as great as that provided for in AS 1698 (Vehicle Users Helmets) although the impact forces experienced in accidents might be similar. The levels of performance for shock absorption and penetration were therefore reduced to offer the maximum protection possible bearing in mind that the bulk and mass of the helmet should not affect the balance, comfort and movement of the wearer. When dropped from a height of 1500 mm on to a flat anvil the headform acceleration must not exceed 400 g peak which is the level set in AS 1698 for drops from 1340 mm on to a hemispherical anvil and 1830 mm onto a flat anvil. The level of protection therefore compares favourably with that of helmets complying with AS 1698.

287. The SAA stated that no helmets are yet approved to this new standard. Several manufacturers have expressed interest in submitting helmets for independent testing and inquiries have also been received from importers.

288. Cyclists had different opinions on whether they should be required to wear protective helmets. While some favour compulsory wearing of helmets, others favoured only a policy of encouraging the wearing of helmets. The SAA considers that helmets should not be made compulsory until a pedal cycle helmet with an efficiently designed ventilation system has been tested and found to comply to AS 2063 or until helmets meeting the standard have been found practical from a weight point of view. Furthermore, it could be unreasonable to require helmets to be worn in some parts of Australia where summer temperatures would make it extremely uncomfortable for cyclists to wear a helmet even with a ventilation system because of the high temperature resulting from the intensity of the exercise.

289. In view of the frequency of head injury in seriously injured cyclists there is a real need for cyclists to wear protective helmets made to an appropriate minimum standard but because of the practical difficulties outlined in the previous paragraph the Committee for the time being is unwilling to recommend at this stage that their use be compulsory. It is not known whether any State has plans to call up this standard by regulation or legislation as a requirement of cyclists. The Committee therefore recommends that:

- *cyclists be advised of the safety benefits of protective helmets by publicity or other suitable means;*

and

- *the possibility of requiring cyclists to wear helmets be kept under review.*

CHAPTER 5

MOPEDS

290. The moped is defined in Australia as a motorcycle with a propelling engine having a piston displacement not exceeding 50 cc and a maximum speed not exceeding 60 km/h, and which is also capable of being propelled as a pedal cycle.[1] As a motorcycle, mopeds are subject to the same riding, signalling and braking equipment requirements and are required to be registered. Riders of mopeds are also required to undertake driving tests and to conform to licensing and insurance requirements.

291. These requirements of mopeds and their riders are in marked contrast to those in many other countries where the moped is classified as being comparable to a bicycle. Registration and licensing is frequently not required in these countries and the minimum age for driving a moped is most often lower than that for driving either a motorcycle or motor car. There is, however, a degree of diversity in the legal requirements concerning mopeds from one country to another and in respect of the United States, different requirements between States. These requirements in respect of mopeds are shown at Appendix 17.

292. Very low numbers of mopeds have been marketed in Australia. It was suggested that the high cost of motorcycle registration and insurance together with a lack of legislation encouraging the ownership and use of mopeds as a cheap form of transport have been significant contributory factors to the absence of a viable moped market in Australia. This contrasts with many European countries where mopeds outnumber motorcycles (see Figure 8). In these countries the moped has appealed to the consumer by way of its economy, efficiency, ease of operation and ownership and there has been a long tradition of moped usage by all sections of the population eligible to use them.

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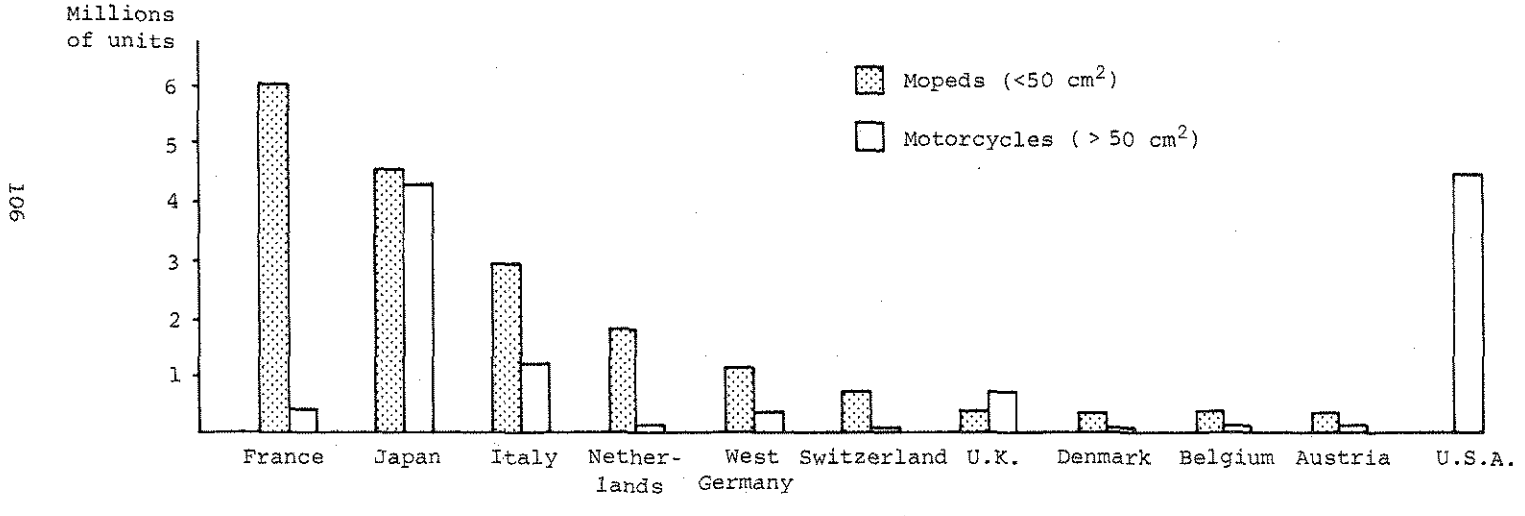
1 Draft Regulations Defining Vehicle Construction, Equipment and Performance Standards For Road Vehicles, Australian Transport Advisory Council.

FIGURE 8

MOPEDS AND MOTORCYCLES ON THE ROAD BY COUNTRY - 1973



	France	Japan	Italy	Nether-lands	West Germany	Switzerland	U.K.	Denmark	Belgium	Austria	U.S.A.
Number of mopeds 1000 inhabitants	114	43	50	134	18	107	8	87	44	62	-

Source: C. Thomas, J-Y. Foret-Bruno, G. Faverjon, C. Henry, C. Tarriere, C. Got, A. Patel, 'Safety of Mopeds. Accident Survey and Rider Injuries', Proceedings of the IIId International Conference on Impact Trauma, Berlin, Germany, 7, 8, 9 September 1977, IRCOBI Secretariate, University of Medecine (pub.), p. 68.

293. In recent years many States of the United States have changed their definition of mopeds. Until 1975, 45 of the 50 States treated mopeds as motorcycles and required them to be insured and licensed. Intense lobbying by the Motorized Bicycle Association led 18 key States in 1976 to change their legal definition of mopeds to that of motorized bicycles. The majority of States now define mopeds as motorized bicycles. Sales of mopeds have increased dramatically following this change. In 1974 moped sales in the United States were about 25,000. In 1977 moped sales had grown to 250,000 per year, with an estimated target figure of 600,000 units per year.

294. In both Europe and the United States moped use is encouraged as a means of transport that reduces traffic congestion in the larger cities and allows people in outer suburbs to commute without relying on cars or public transport. Many local authorities encourage the use of two-wheeled vehicles by allowing free parking in city centres.

295. The growth in moped numbers in most Westernised countries may also be due in part to the increase in fuel costs following the substantial world oil price rises in 1973. The full impact of these price rises has not yet been reflected in Australian petrol prices and a change in economic factors such as registration, insurance and fuel charges could lead to an increase in the popularity of mopeds in Australia.

296. Several witnesses suggested that Australian legislation should be amended to encourage wider use of mopeds. At present a moped is classified as a motorcycle (see paragraph 290). At this early stage of their introduction into Australia the Committee supports the retention of existing State legislation concerning mopeds. The question of more widespread moped usage in Australia raises important safety issues which will require careful consideration by relevant authorities. The level of accident involvement for this category of vehicle in the

Australian context is unknown as few mopeds are registered for use, while mopeds in other countries operate under various conditions, and levels of accident involvement experienced in such countries may or may not be realised in Australia.

297. As the age distribution of those using mopeds overseas tends to parallel that of the general population, in comparison to the specialised young male adult characteristics of the motorcycle market in Australia, it is important to establish whether the safety characteristics of Australian motorcycle riders could be favourably effected by the introduction of mopeds made available at a lower licensing age. The following discussion of overseas moped and other two-wheeled vehicle accident experience indicates that mopeds are a safer form of transport than motorcycles and that rider experience and hence the level of motorcycle safety may be enhanced by more widespread use of mopeds.

298. Table 15 indicates that the severity of accidents for mopeds, in terms of number killed per 100 injured, is less than that for bicycles in all countries shown.

299. Expressed on a different basis, a 1971 study by the European Conference of Ministers of Transport found a death rate, expressed as fatalities per 100,000 vehicles, of 8 for bicycles, 51 for mopeds and 171 for motorcycles.[1]

300. Table 16 shows the relative risk of motorcycle, moped and car drivers in a recent study conducted in Western Germany. The table indicates that the risk of injury per 1,000 registered vehicles for motorcyclists is more than four times that for moped riders. Table 16 also includes estimates of risk when allowance for exposure to accidents (in terms of distances travelled) is made. On this basis motorcyclists have an injury risk three times higher than moped riders.

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1 K.F. Licht, 'The Mopeds are Coming', *Traffic Safety*, United States National Safety Council, April 1977, p. 15.

TABLE 15

SEVERITY OF ACCIDENTS (LETHALITY RATIO)
BY CATEGORY OF VEHICLE, 1971

(Number of killed per 100 injured)

	Bicycles not Motor-Assisted	Mopeds	Light Motorcycles and Other Motorcycles	Total
Germany	4.2	3.2	3	3.6
Belgium	4	2	2.9	2.9
Denmark	5.1	4.2	3.1	4.3
France	6.2	4	4.9	4.4
Ireland	16.3	-	-	-
Luxembourg	-	-	-	-
Norway	6.2	5.1	4.5	5.2
Netherlands	5.9	2.3	5.3	3.3
Portugal	6.6	5.3	5.1	5.5
United Kingdom	7.9	4.5	5	5.7
Switzerland	5.3	3.7	4.3	4.3
Total	5.1	3.5	4.0	4.0

Source: European Conference of Ministers of Transport, 1974 Annual Report, p. 102.

TABLE 16

RELATIVE RISK OF MOTORCYCLE, MOPED AND CAR DRIVERS

Category of Vehicle		Registered Vehicles (July, 1974)	Persons Injured			Risk Injured (a) + (b) + (c) per 1000 Registered Vehicles	Mileage		Risk	
			Fatally (a)	Seriously (b)	Slightly (c)		Average per Reg. Vehicles in 10^3 km	Total in 10^6 km	Injured (b) + (c) per 10^3 km	Fatalities per 10^6 km
Moped	No	1,537,212	733	9,905	18,575	19	1.5*	2.3	0.012	0.3
	%	78	43.5	42.7	46.0					
Motor-Cycle	No	432,661	951	13,260	21,756	83	2.2	0.985	0.035	0.9
	%	22	56.5	57.3	54.0					
Total Motor-ised Two Wheeler	No	1,969,873	1,684	23,165	40,331	33	1.87	3.285	0.010	0.5
	%	100	100	100	100					
Car		17,341,265	6,616	69,599	192,375	15	13.5	234.1	0.001	0.03

* Estimate

Source: K. Langwieder, 'Collision Characteristics and Injuries to Motorcyclists and Moped Drivers', *Twenty-first Stapp Car Crash Conference*, 1977, p. 265.

301. This study also found that in collisions with the lateral front area of cars, motorcyclists are often thrown over the struck car by their higher actual speed, as opposed to moped riders who by virtue of their lower speed more often impact directly on the struck car and thereby undergo a change in trajectory. Where there is a significant change of trajectory caused by direct impact on the other involved car, the actual speed of the two-wheeler was found to be of subordinate importance. With equivalent trajectory, riders of motorcycles and mopeds were found to be exposed to similar injury risks. Impact on the struck car increased the risk of fatal injuries four-fold, and in the case of serious and critical injuries one and a half-fold.[1]

302. Wearing safety helmets is obligatory for motorcyclists in many countries, but moped riders are still largely excluded from these regulations. As the risk of injury appears to be the same it is questionable whether different protective criteria should be applied, particularly regarding the use of helmets.

303. Other studies such as one conducted in Japan[2] have indicated, however, that mopeds have accident characteristics more closely resembling those of bicycles and that it may therefore be inappropriate to consider mopeds with motorcycles. The similarity between mopeds and bicycles in this study was found particularly in respect of the occurrence of certain types of accidents, i.e., railroad crossing collisions, side swipes and side collisions; the location of rider's injury; and the pattern of accident occurrence according to time of day.

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1 K. Langwieder, 'Collision Characteristics and Injuries to Motorcyclists and Moped Drivers', *Twenty-first Stapp Car Crash Conference*, 1977, p. 285.

2 Honda Driving Safety Promotion Center, *Analysis of 2-Wheeled Vehicle Accidents.*

304. Other evidence referred to studies conducted by the Ministry of Transport in the United Kingdom where it was found that, while the overall accident rate for motorcycles is seven times greater than for mopeds, if riders had one full year on a moped their chances of having an accident on a motorcycle would be reduced by 80%.

305. The Committee has already indicated that it would not expect overseas experience with mopeds to be necessarily duplicated in Australia and therefore sees a need, if mopeds are to be encouraged on a wider scale, to introduce them on an experimental and controlled basis, possibly in a single State or Territory, with a view to evaluating their public acceptance, accident characteristics and involvement.

306. Overseas experience suggests that if moped usage is to increase in Australia some of the restrictions in existing legislation covering their use may need to be eased. The Committee can see considerable advantage if the minimum age for access to a moped were lower than that applicable to a motorcycle (see paragraph 304). In this case young inexperienced riders would be encouraged to initially use the comparatively safer low engine capacity machine and gain riding experience over a wider period before being eligible for a motorcycle licence. The Committee therefore recommends that:

. *the minimum age for granting a licence for moped riding be one year less than that for a motorcycle licence.*

307. It is important for an evaluative study to be conducted on any pilot scheme introducing mopeds. The Committee would wish to avoid the situation which has apparently developed in some States in the United States where the collection of accident data on mopeds for evaluation has been made difficult by defining a moped as a motorised bicycle, a category which was not covered on police accident investigation forms.

308. While the moped appears to be an attractive proposition there are potential problems posed by the sudden influx of young mopedalists into the traffic stream. Particular areas of concern are in relation to the low speed of mopeds, the need for helmets, and the need for training.

309. The Committee has previously recommended that the requirement for motorcycles with pillion passengers to travel at a lower speed than other traffic be re-examined (see paragraph 155) Evidence received indicated that deviations from the speed of the surrounding traffic can cause conflict and produce accidents. The Committee is concerned that mopeds may similarly disrupt traffic flow because of their inability to accelerate with and keep up with other vehicles.

310. While overseas studies disclose that the moped rider is less likely to be involved in an accident, in the event of a collision the risks of injury to moped riders and motorcyclists are similar. These studies also suggest that because of the lower speed of the moped the rider in some cases may be more seriously injured. Moped riders overseas, however, are frequently not required to wear crash helmets. This is not the case in Australia, however, as moped riders along with motorcycle riders are required to wear crash helmets. The Committee strongly recommends that:

. *the requirement that moped riders wear crash helmets should be retained.*

311. If the minimum age for eligibility to ride a moped is reduced as previously recommended in paragraph 306 there is a concomitant responsibility on the part of relevant authorities to ensure that appropriate training courses are completed by those riding mopeds. The Committee considers it unacceptable to allow young riders, with little knowledge of the rules of the road and probably totally inexperienced in the operation of a powered vehicle in traffic, access to mopeds without appropriate training.

May 1978

R.C. Katter
Chairman

LIST OF WITNESSES

ADDIS, J.F.	Honorary Treasurer, Federation of Australian Motorcyclists (South Australian Branch), Adelaide.
ALLMAN, D.G.	Assistant to Managing Director, LNC Industries Ltd, Sydney.
ANDERSEN, T.P.	Deputy Commissioner for Transport, Queensland Department of Transport.
ARAKAWA, S.	Assistant General Manager, Honda Australia Pty Ltd, Melbourne.
ARMOUR, G.M.	9 Darke Street, Torrens, Canberra.
BARLING, R.J.W.	Director, Road Regulations and Safety, Department of Transport, Melbourne.
BEECH, R.G.	Club Coach, Northern Suburbs Amateur Cycling Club, Wheeler Heights, New South Wales.
BIRD, G.I.	Plastic Surgeon, Melbourne.
BOULTON, J.B.	Executive Director, National Safety Council of Western Australia Inc.
BRENNAN, H.	Sergeant First Class of Police and Officer-in-Charge of the Highway Patrol, Maroubra Police Station, New South Wales Police Department.
BRUSH, Professor A.H.	Bicycle Institute of Victoria.
BURT, R.M.	Manager, Quality Assurance and Certification, Standards Association of Australia, North Sydney.
CHAMPION, P.A.	Research Officer, Tasmanian Transport Commission, Hobart.
COGHLAN, M.F.	President, Four Owners Club of Victoria, Fairfield.
COLLINGS, N.S.	President, Pedal Power A.C.T. Inc., Canberra.
COLVILL, M.C.	Former Safety Education Convenor, Pedal Power A.C.T. Inc., Canberra.
COPPIN, R.S.	Chief of Research, Californian Department of Motor Vehicles, United States of America.

CRAINE, D.	Chairman, Motorcycle Division, Western Australian Automobile Chamber of Commerce Inc., Perth.
CROMPTON, M:W.	Secretary, Pedal Power A.C.T. Inc., Canberra.
CROWLE, W.A.	Publicity Officer, Pedal Power A.C.T. Inc., Canberra.
COURT, R.J.	Chief Executive Officer, Road Traffic Authority, Western Australia.
DAN, Dr N.G.	Honorary Secretary, Neurosurgical Society of Australasia, New South Wales.
DAWES, V.R.	Public Relations Officer, Australian Automobile Association, Canberra.
DOOLEY, B.J.	Deputy Chairman, Road Trauma Committee, Royal Australasian College of Surgeons, Victoria.
DUFF, M.R.	Acting Manager, National Fleet Operations Department, Australia Post, Victoria.
DUNNE, F.J.	Marketing Manager, Traffic Control Products Division, 3M Australia Pty Ltd, New South Wales.
EARL, R.D.	Secretary, Four Owners Club of Victoria, Korumburra.
EGAN, F.G.	Superintendent, Northern Territory Police Force.
ELL, G.F.	Secretary, Committee AU/12 Motor Cyclists Helmets, Standards Association of Australia, North Sydney.
EVANS, R.D.	Vice-Chairman, Federation of Australian Motorcyclists (South Australian Branch), Adelaide.
FAGAN, M.A.H.F.P.	President, BMW Motor Cycle Club of Victoria, Sunshine.
FERRARI, R.M.	Chairman, Advisory Committee on Safety in Vehicle Design, Department of Transport, Melbourne.
FINCH, H.J.	Senior School Safety Officer, Road Safety Division, National Safety Council of Western Australia Inc.

GARNER, Dr. L.	Lecturer in Optometry, Queensland Institute of Technology and member of Australian Optometrical Association Committee on Visual Factors in Transportation.
GASTON, R.J.L.	Chairman, Federation of Australian Motorcyclists (South Australian Branch), Adelaide.
GEE, R.V.	Sergeant Second Class, Traffic Branch, Queensland Police Department.
GEHLING, W.J.	Member, Executive Committee, The Cyclist Protection Association of South Australia Inc.
GODDARD, G.E.	Field Officer, Queensland Road Safety Council.
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GORMAN, J.M.	'Meilman', Euston, New South Wales.
GOULTER, R.J.	New South Wales delegate, Auto Cycle Council of Australia, Maitland, New South Wales.
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HALL, M.S.	Quality Assurance and Product Test Engineer, Cyclops Industries Pty Ltd, Leichhardt, New South Wales.
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HAMILTON-SMITH, N.	Field Officer, Queensland Road Safety Council.
HARITOS, S.	Managing Director of Mathews Haritos Pty Ltd, New South Wales.
HENDER, E.W.	Chairman, The Road Safety Council of South Australia, South Australian Department of Transport.
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HURNALL, D.D.	Director of Engineering and Development, Geelong Regional Commission, Victorian Department of Youth, Sport and Recreation.
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LEJINS, Z.	Bicycle Workshop, Youth Involvement Program, 1976/77, Canberra.
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McGRATH, R.T.	Membership Secretary, Federation of Australian Motorcyclists (Victorian Branch), Melbourne.
McKENZIE, R.H.	Bicycle Workshop, Youth Involvement Program, 1976/77, Canberra.
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MILLS, A.J.	Inspector of Police, Traffic Division, Australian Capital Territory Police Department.
MILNE, P.W.	Principal Research Officer, Road Safety Branch, Department of Transport, Melbourne.
MUNRO, K.W.	Executive Assistant to the Chairman, Philips Industries Holdings Ltd, North Sydney.
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OHLRICH, Dr J.G.	Chairman, Australian College of Ophthalmologists, Brisbane.
OLLE, G.D.	President, Federation of Australian Motorcyclists (Victorian Branch), Melbourne.
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POWELL, A.D.	Brigadier, Director-General, Personnel Plans, Army Department, Department of Defence, Canberra.
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ROBINSON, Dr P.R.	Queensland Director of Orthopaedics, Royal Brisbane Hospital.
ROOM, D.H.	Member, Motor Scooter and Cycle Association of Victoria, Fitzroy.
RYAN, M.	Acting First Assistant Secretary, Land Transport Policy Division, Department of Transport, Canberra.
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SATOH, H.	Chairman, Planning Sub-Committee, Motorcycle Division, Japan Automobile Manufacturers Association.
SERLS, E.H.	Spokesman for Land and Recreation, Western Australian Motor Cycling Association (Inc.).
SHEPHERD, S.R.	Committee Member, Bicycle Institute of Victoria.

SMITH, D.I.	Officer-in-Charge, Research and Statistics Division, Road Traffic Authority, Western Australia.
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WAWN, G.V.	Group General Manager, 3M Australia Pty Ltd, New South Wales.
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YOUNG, J.D.B.	Technical Director, Federal Chamber of Automotive Industries, Canberra.

EXHIBITS AND SUBMISSIONS

(a) Exhibits

The following is an Index of Exhibits:

EXHIBIT NO.

1. Australian Capital Territory Police Department

   Photographs showing Motorcycle Fairings, Bicycle Reflectors, Bicycle Handlebars, Bicycle Helmet, Vest and Flag.

2. Pedal Power A.C.T. Inc.

   . Appendices to the Submission:

   - Appendix I - 'First Report on Bicycle Facilities for Canberra', 9 June 1975.
   - Appendix II - 'Bikeway Planning Guide', March 1975.
   - Appendix III - 'Critique of the Dickson-City Bike Path'.

   . Correspondence dated 14 February 1977 and 3 May 1977, to the Minister for the Australian Capital Territory.

   . Correspondence dated 30 May 1977 and 8 June 1977 from the Minister for the Australian Capital Territory.

   . Correspondence dated 20 April 1977 to the Australian Capital Territory Police.

   . Correspondence dated 25 May 1977 from the Commissioner, Australian Capital Territory Police.

   . Statement by Mr D.C. Forster, 2 Jindivik Place, Scullin, Australian Capital Territory, accident victim of cycle-car collision.

   . Paper entitled, 'Teaching the Proper Use of Bicycle Paths', by J. Forester, from *Proceedings of the Fourth National Seminar on Planning Design and Implementation of Bicycle and Pedestrian Facilities*, 4-6 December 1977, New Orleans, Louisiana.

   . Thirteen pages of press clippings.

3. Mr M.J. Williams

   . Appendices 1 to 3 of paper entitled, *Improvement of Frontal Conspicuity of Motorcycles*, M. Williams and E.R. Hoffmann, Department of Mechanical Engineering, University of Melbourne, December 1976.

   - Appendix 1 - 'Summary of Signal Detection Theory'.
   - Appendix 2 - 'R.O.C. Curves for all Subjects in Experiments 3 and 4'.
   - Appendix 3 - 'Experimental Equipment - The Motorcycle'.

EXHIBIT NO.

. *The Influence of Motorcycle Visibility on Traffic Accidents*, M.J. Williams, University of Melbourne, February 1977.

4. Philips Industries Holdings Ltd

. Appendices 2-4 Confidential.

. Appendix 5 Part of an Article written to commemorate the Silver Jubilee of Bruce Small and Associates, 1945.

5. Bicycle Institute of Victoria

. *Bicycle Facilities for Australian Capital Cities*, W.H. Pattinson, Australian Transport Research Forum, 24-25 May 1977, Melbourne.

. *Safe Cycling, A Defensive Strategy for the Large Cities with Proposals for Melbourne*, A.A. Parker.

. *Safe Cycling and the Melbourne Bikeway Plan*, A.A. Parker, in Polis A Planning Forum Volume 4 No. 1, March 1977.

. *Cycling Transportation Engineering*, John Forester, First Edition.

. *Bicycling in Tennessee, A State Plan for Bicycle Facilities and Programs*, prepared for Tennessee Departments of Conservation and Transportation by Barton-Aschman Associates, Inc., Minneapolis/54. Paul, Minnesota, February 1975.

. Australian Accident Figures - An Overview.

. *Electric Bike*, David Scott.

. *Cycling Safety*, A.A. Parker.

. Philadelphia Bicycle Coalition, *Bike for a Better City*.

. *Sprocket Man*, Urban Bikeway Design Collaborative, Massachessetts.

. Correspondence from Professor A.H. Brush to Mr B. Dixon, dated 5 April 1977.

6. Australian Optometrical Association

. 'Operators of Private Cars'.

. 'Research into Visual Aspects of Road Safety'.

7. LNC Industries Limited

. *Ride and Really Live, A Guide to Safer and More Enjoyable Motorcycle Riding*, by Pedr Davis and Mike McCarthy.

. Article 'Ride For Life' by Brian Cowan.

. A summary report: 'Analysis of Motorcycle Accident Reports and Statistics'. Publication by the Motorcycle Safety Foundation, Maryland, USA, 1974.

EXHIBIT NO.

. Chapter 7 'Safety Instruction' from *Safety Concepts and Instruction*, by A.L. Thygerson, Prentice Hall.

8. Frank Matich Pty Ltd

. *Higher Performance from High Technology*, J.G. Sundahl, August 1976.

. Publications entitled 'Bell Helmets' and 'Schedule on Helmet Standards'.

9. Standards Association of Australia

. Appendix A - Description of SAA.

. Appendix B - AS 1698-1974 Protective Helmets for Vehicle Users.

. Appendix C - Protective Helmets for Motorcyclists - Committee Members.

. Appendix D - Consumer Standards Advisory Committee - Committee Members.

. Appendix E - SAA Scheme of Supervision and Control Applicable to Protective Helmets for Vehicle Users - AS 1698.

. Appendix F - AS 1609-1974 Automotive Eye Protection.

. Appendix G - AS 1927-1976 Pedal Cycles.

. Appendix H - Pedal Cycles - Committee Members.

. Appendix J - Confidential.

. Appendix K - Safety Helmets for Sport and Recreation - Committee Members.

10. Department of Motor Transport, New South Wales

. *Motorcycle Helmets and Facial Injuries*, R.G. Vaughan.

. *Rules for Authorised Inspection Stations*, Department of Motor Transport, New South Wales, 1975.

. *Motorcycle Crashes: A Level Two Study*, R.G. Vaughan, K. Pettigrew and J. Lukin.

11. Cyclops Industries Pty Ltd

. Raleigh Cycle Owner's Handbook, *Care for your Cycle*.

12. Department of Defence

. Photographs of their training course.

13. 3M Australia Pty Ltd

. *Bicycle Wheel Reflectorization as an Aid to Detection and Recognition*, A. Burg and S. Hulbert.

. *A Visible Bicycle*, by F. Stoovelaar and R.E. Groot.

. Recommendations for Protective Helmet Reflectorization.

. Draft Australian Standard for Pedal Bicycle Reflectors.

. International Standards Organisation's document dated January 1977 on International Standards for Bicycles.

14. Department of Youth, Sport and Recreation, Victoria

. *The Melbourne Bikeway Plan*, July 1976.

. *Guidelines for the Design and Construction of Bicycle Tracks*, August 1976.

. Geelong Bikeplan Seminar, September 1977:

- Over-view of the Geelong Bikeplan.
- Survey Results.
- Development of the Physical Improvement Strategy and Action Plans.
- Economic Viability of the Geelong Bikeplan.
- Planning for Cyclists' Real Needs.
- Safety Education and Enforcement.
- Implementation Projects and Construction.

15. Federation of Australian Motorcyclists (Tasmanian Branch)

. *Motorcycle Training - Standards for Survival*, S. Munro, Road and Motor Vehicle Traffic Safety, Ministry of Transport, Ottawa, Canada.

. *The Development of a National Motorcycle Training Program*, S. Munro, Road and Motor Vehicle Traffic Safety, Ministry of Transport, Ottawa, Canada.

. 'Horns', *Two Wheels*, September 1976, pp. 24-28.

16. Queensland Department of Transport

. The Queensland Traffic Code.

. Form entitled, *Application for Registration of a Recreation Vehicle, Motor Vehicles Control Act 1975.*

. Local Government Bulletin, Issued by the Department of Local Government, Brisbane, Subject: *Motor Vehicles Control Act 1975.*

. News Release from Hon. K.W. Hooper, M.L.A., Minister for Transport entitled, *Traffic Advisory Committee Recommends Graded Licences for Motorcyclists.*

. *The Safe Cycling Course*, Queensland Road Safety Council.

EXHIBIT NO.

17. Frank Matich Pty Ltd

. *Motor Cycle Helmets and Facial Injuries*, R.G. Vaughan, Medical Journal of Australia, 1:125-127, 1977.

. *Higher Performance from Higher Technology*, Jim Sundahl, Manager Manufacturing Standards, Bell Helmets Inc., August 1976.

18. Road Safety Council of South Australia

. Cycle Safety Pamphlets.

. Motorcycle Instruction - Student Numbers, 1975-77.

. Motorcycle Circuit.

. Millicent Children's Road Safety Centre.

. Junior Circuit.

. Suggested Layout Children's Road Safety Training Area.

19. Federation of Australian Motorcyclists (South Australian Branch)

. 'Lights Out! ', *Road Rider Magazine*, April 1974.

20. Western Australian Motor Cycling Association (Inc.)

. RAC/ACU Training Scheme.

(b) Submissions

The Committee has authorised publication of the following submissions and letters received as evidence:

Submission by Mr D. Treble, 221 The Trongate, Granville, New South Wales, dated 27 September 1976.

Submission by Mr J.H. Lemon, 'Oak Bluff', Deviot, Tasmania, dated 25 September 1976.

Submission by Mr S. Algie, 2-16th Street, Horne Hill, Queensland, dated 22 September 1976.

Submission by Acting Professor G.A. Ryan, Department of Social and Preventative Medicine, Monash Medical School, Alfred Hospital, Prahan, Victoria, dated 23 September 1976.

Submission by Mr R.E. Johnston, 17 Caringa Street, Pascoe Vale, Victoria, received 27 September 1976.

Submission by Mr J.W. Sansom, 12 Vasey Grove, Mitcham, Victoria, received 27 September 1976.

Submission by Mr R. Fox, 108 Essex Street, Epping, New South Wales, dated 18 September 1976.

Submission by Mr R.F. Phyall, 2230 Pacific Highway, Upper Mount Gravatt, Brisbane, Queensland, dated 2 September 1976.

Submission by Mr D.W. Duncan, Social Worker, Wistaria Community Centre, 2 Central Avenue, Westmead, New South Wales, dated 14 September 1976.

Submission by Mr C.J. Garard, Unit 19 'Wyuna', The Esplanade, Burleigh Heads, Queensland, dated 20 September 1976.

Submission by Ms A. Parry, 82 Eucalupt Street, Bellara, Bribie Island, Queensland, dated 21 September 1976.

Submission by Mr J.W. Ward, 30 Russell Street, Cleveland, Queensland, dated 20 September 1976.

Submission by Canberra Amateur Cycling Club, dated 20 September 1976.

Submission by Mr K. Davies, Senior, 16 Pettit Street, Crib Point, Victoria, received 21 September 1976.

Submission by Ms M. Corich, Panorama Technical College, 621 Goodwood Road, Panorama, received 15 September 1976.

Submission by Mr J.E. Thew, 15/7 Clifton Crescent, Mount Lawley, Western Australia, dated 18 September 1976.

Submission by Mr R.J. Butler, P.O. Box 1445, South Wagga Wagga, New South Wales, received 21 September 1976.

Submission by Armidale Motor Cycle Club, Box 39, Post Office, Armidale, New South Wales, dated 18 September 1976.

Submission by Mr D. Brown, 6/29 River Road, Wollstonecraft, New South Wales, dated 15 September 1976.

Submission by Mr L.G. Nichols, Centre Cycle Shop, Post Office Box 38, Alice Springs, Northern Territory, received 16 September 1976.

Submission by Mr W.C. Miller, 48 Burgess Street, Kogarah, New South Wales, received 16 September 1976.

Submission by Mr J. Huffman, 7/22 Murphy Street, South Yarra, Victoria, dated 14 September 1976.

Submission by Mr W.J. Griffiths, 273 Hoxton Park Road, Cartwright, New South Wales, dated 11 September 1976.

Submission by Mr S. Sanford, 19 Fairlight Crescent, Fairlight, New South Wales, received 15 September 1976.

Submission by Mrs C. Hyde, 19/40 Spofforth Street, Cremorne, New South Wales, dated 14 September 1976.

Submission by T. Puffield, Charles Street, North Perth, Western Australia, received 15 September 1976.

Submission by Mr M.J. Marchant, 97 Barkly Street, Sale, Victoria, dated 11 September 1976.

Submission by Mr G.E. Millington, 128 Sandy Bay Road, Sandy Bay, Tasmania, dated 11 September 1976.

Submission by Reverend D.A. Jones, 91 West Terrace, Adelaide, South Australia, dated 13 September 1976.

Submission by Mr J. Clark, 45 North Liverpool Road, Mount Pritchard, New South Wales, dated 20 September 1976.

Submission by Mr H. Johnson, Lot 49 Vores Road, Petrie, Queensland, dated 15 September 1976.

Submission by Mr R. Kenna, R.M.B. 769 Edenhope, Victoria, dated 16 September 1976.

Submission by Mr W.A. Shepherd, 69 Croydondale Drive, Mooroolbark, Victoria, dated 17 September 1976.

Submission by Mr H.E. Waring, The Southern Electric Authority of Queensland, Post Office Box 403, Brisbane, Queensland, dated 17 September 1976.

Submission by Ms C. Mann, 52 Brae Street, Cooparoo, Queensland, dated 15 September 1976.

Submission by Dual-Control Motorcycles Pty Ltd, Longueville, New South Wales, received 20 September 1976.

Submission by Mr H. Knoff, 4 Gum Court, Kingston, Queensland, dated 16 September 1976.

Submission by Mr G.C. Spencer, 101 Main Street, Osborne Park, Western Australia, dated 13 September 1976.

Submission by Mrs N. Lever, 125 Hawthorn Grove, Mildura, Victoria, received 17 September 1976.

Submission by Mr M.J. Coles, 3 Second Avenue, Moonah West, Tasmania, dated 14 September 1976.

Submission by Mr M. Leigh, Lot 2, Yarraview Road, Yarra Glen, Melbourne, dated 11 September 1976.

Submission by Mr V. Hirsinger, 204/16 Hinsman Street, South Perth, Western Australia, dated 13 September 1976.

Submission by Mr K.G. Thorpe, Post Office Box 152, Chinchilla, Queensland, dated 13 September 1976.

Submission by Mr J. Sporry, 9 Laming Road, Deer Park, Victoria, received 15 September 1976.

Submission by Mr P. Leahy, 18 Coonara Avenue, Mount Eliza, Victoria, dated 12 September 1976.

Submission by Mr R.V. Alcock, 110 Alanvale Road, Newnham, Launceston, Tasmania, dated 13 September 1976.

Submission by Mr B. Austin, 59 Greenwood Road, Kellyville, New South Wales, dated 12 September 1976.

Submission by Mr T. Fisher, 79 Planet Street, Carlisle, Western Australia, dated 12 September 1976.

Submission by Mr T. Lane-Mullins 13 Norton Street, Ashfield, New South Wales, dated 13 September 1976.

Submission by Mr G. Gaudry, 8 Westward Avenue, Shalvey, New South Wales, dated 12 September 1976.

Submission by Mrs M. Gray, 14 Jacaranda Court, Woodridge, Queensland, dated 11 September 1976.

Submission by Mr J. Ferris, 18 Lyons Street, Williamstown, Victoria, received 15 September 1976.

Submission by Mr W. Andersen, 13 Ross Street, North Curl Curl, New South Wales, dated 12 September 1976.

Submission by Mr S. Coldrich, 92 Turner Street, Blacktown, New South Wales, dated 12 September 1976.

Submission by Mr R.H. Frogley, 972 Nepean Highway, Moorabbin, Victoria, dated 11 September 1976.

Submission by Ms P. Rusden, c/- Reserve Bank, Perth, Western Australia, received 14 September 1976.

Submission by Mr J.J. Dainer, Stipendiary Magistrate, Law Courts of the Australian Capital Territory, dated 22 November 1976.

Submission by Mr B. Pearl, Shire Secretary, Shire of Deakin, Tongala, Victoria, dated 17 November 1976.

Submission by Mr L.A. Bowen, 137 Young Road, Lamberton, New South Wales, dated 5 November 1976.

Submission by Ms M.L. Crisp, Unit 4, 25 Park Avenue, Toowong, Queensland, dated 28 October 1976.

Submission by Mr W. Dolensky, 15 Minchington Road, Elizabeth North, South Australia, dated 28 October 1976.

Submission by Mr K.V. Moffett, 21 First Avenue, Sefton Park, South Australia, dated 28 October 1976.

Submission by Mr C. Sim, 2/106 Hereford Street, Glebe, New South Wales, dated 11 October 1976.

Submission by Mr E.H. Wilkinson, 41 Catalpa Crescent, Turramurra, New South Wales, dated 15 October 1976.

Submission by Mr J.R. Gardner, 3 Ramu Grove, Ashburton, Victoria, dated 18 October 1976.

Submission by Mr F.H. Tucker, Engineer, Snowy Mountains Engineering Corporation, Cooma, New South Wales, dated 18 October 1976.

Submission by Mr R.M. Parkes, Secretary-Manager, Victorian State Council, Confederation of Australian Motor Sport, Post Office Box 441, Camberwell, Victoria, dated 13 October 1976.

Submission by Mr B. Peter, Burling and Simmons Pty Ltd, 150 Parramatta Road, Auburn, New South Wales, received 22 October 1976.

Submission by Mr A.R. Nuttgens, 522 Marine Parade, Labrador, Queensland, dated 11 October 1976.

Submission by Mr D.W. Stone, 49 Seaville Avenue, Scarborough, Queensland, dated 14 October 1976.

Submissions by Dr D. Gilmorgan, 155 Jackson Estate, Crible Island Road, Brisbane, Queensland, received 18 October 1976.

Submission by Mr R. Langman, 53 Roslyn Avenue, Kingston Beach, Tasmania, dated 14 October 1976.

Submission by Ms L. Stitzinger, 10/62 William Street, North Sydney, New South Wales, dated 11 October 1976.

Submission by Mr R.M. Stitzinger, 10/62 William Street, North Sydney, New South Wales, dated 3 October 1976.

Submission by Mr B. Kimmings, 59 Piddington Street, Watson, Australian Capital Territory, received 7 October 1976.

Submission by Mr C. Larque, Post Office Box 70, Manuka, Australian Capital Territory, dated 23 September 1976.

Submission by Mr A.L. Young, Officer, Victoria, dated 4 October 1976.

Submission by Mr G.M. Minus, 48 Henieu Terrace, Greenslopes, Queensland, received 6 October 1976.

Submission by Mrs S. Cox, c/- Morts Dock Ward, Balmain Hospital, Booth Street, Balmain, New South Wales, received 5 October 1976.

Submission by Mr R.A. Coram, 6 Kiandra Place, Heckenberg, New South Wales, dated 29 September 1976.

Submission by Mr K. Jordan, 15 Darley Road, Randwick, New South Wales, dated 30 September 1976.

Submission by Miss D.J. Thompson, Post Office Box 756, Townsville, Queensland, dated 1 October 1976.

Submission by Mr M.J. Rollins, Department of Agriculture, Post Office Box 189, New Norfolk, Tasmania, dated 24 September 1976.

Submission by Mr J. Cook, Ms N. Lane and Ms J. Finnegan, 31 Da Costa, Prospect, South Australia, dated 23 September 1976.

Submission by Mr T.W. Pitman, 1st Avenue, Dodges Ferry, Tasmania, dated 28 September 1976.

Submission by Mr T. Halton, Lot 1, Rotherwood Road, Razorback via Picton, New South Wales, received 29 September 1976.

Submission by Mr F.C.O. Sticher, 17 Albert Street, Glebe, New South Wales, dated 27 September 1976.

Submission by Mr M.W. Paterson, 38 Badimara Street, Waramanga, Australian Capital Territory, dated 28 September 1976.

Submission by Mr J.W. Owen, Faculty of Education, Monash University, Clayton, Victoria, dated 24 September 1976.

Submission by Bicycle Traders Association of South Australia Incorporated, dated 17 December 1976.

Submission by Dr J.P. Brown, Department of Dentistry, University of Queensland, dated 16 December 1976.

Submission by Mr D.J. Philips, 94 Cascade Road, South Hobart, Tasmania, dated 11 December 1976.

Submission by Mr D. Owen, 223 Union Street, West Brunswick, Victoria, dated 13 December 1976.

Submission by Mr G. Price, 1/37 Chantry Street, Goulburn, New South Wales, dated 23 November 1976.

Submission by Mr D. Gittoes, Tewantin, Queensland, dated 25 January 1977.

Submission by Veteran Vintage and Classic Motorcycle Club of the Australian Capital Territory, dated 13 January 1977.

Submission by Dulwich Hill Bicycle Club, New South Wales, dated 10 January 1977.

Submission by New South Wales Police Department, received 10 January 1977.

Submission by Mr J.A. Marks, 65 Warragamba Avenue, Duffy, Australian Capital Territory, dated 21 December 1976.

Submission by Mr R.B. Bullivant, 60 Baker Street, Merrylands, New South Wales, received 11 February 1977.

Submission by Mr P. Le Grand, Post Office Box 14, Binalong, New South Wales, received 11 October 1977.

Submission by Mr R. Davies, 38 Queen Street, Goodra, Queensland, dated 11 August 1977.

Submission by Mrs R. Fookes, 4 Morrice Street, Caulfield, Victoria, dated 2 August 1977.

Submission by Mr I.H. Wright, 43 Wells Street, Redfern, New South Wales, dated 18 July 1977.

Submission by Mr J. Andrews, Secretary, Friends of the Earth, 51 Nicholson Street, Carlton, Victoria, received 22 June 1977.

Submission by Mr L. Whelan, 10 Wellesley Place, Nowra, New South Wales, dated 11 June 1977.

Submission by Mr P.R. King, 55 Welsford Street, Shepparton, Victoria, received 15 July 1977.

Letter from Bicycle Institute of Victoria, dated 1 August 1977.

Letter from Motorcycle Safety Foundation, 6755 Elkridge Landing Road, Linthicum, Maryland, United States of America, dated 29 April 1977.

Letters from 3M Australia Pty Ltd, dated 3 August 1977 and 12 August 1977 and attached documents:

(a) Pages 4147, 4950 and 4952, United States Federal Volume 41, No. 19 January 28, 1976, detailing the CPSC regulations concerning bicycles.

(b) Part 571.108, pages 35522 to 35530, United States Federal Regulation Volume 41, No. 164, August 23, 1976.

(c) Senate Bill No. 343, West Virginia legislature, for the purpose of imposing stricter lamp requirements for bicycles, page 2 section (b).

(d) Press Release by 3M dated 25 April 1977, on 'New Glowall Tyres Make Motorcycles Easier to Recognise at Night'.

(e) 'Prevention of the Two-Wheeled Vehicle Accidents in the Darkness' by IFSPO, March 1977.

(f) 'Motorcycle Helmet Reflectorization Fact Sheet', concerning motorcycle helmet reflectorisation studies and proposals in the United States.

(g) 'State Laws Regarding Motorcycle Helmets', 1 March 1976, details US States requiring reflectorised material on protective helmets.

(h) 'Recommendations on Conspicuity from WG 1', ISO/TC 94/SC1 Protective Helmets, issued July 1977 for international review.

Copy of a Map showing Proposed Route for Trial Cycleway along Anzac Parade submitted by the council of the City of Sydney, 25 July 1977.

Letter from New South Wales Police Department, dated 29 August 1977.

Press Release by the Road Traffic Authority (Western Australia) concerning Dr R.W. Kirkham's report to the Road Traffic Authority dated 18 May 1977.

Press Release by Mr R.J. Court, Chief Executive Officer of the Road Traffic Authority (Western Australia), concerning Dr R.W. Kirkham's report to the Road Traffic Authority dated 18 May 1977.

Letters from Commonwealth Department of Transport, dated 1 July 1977, 8 August 1977, 26 August 1977 and 16 September 1977.

Letter from Commonwealth Department of Defence, dated 20 September 1977.

Letter from Australian Capital Territory Police, dated 6 July 1977.

Letter from Australia Post, dated 5 August 1977.

Letter from LNC Industries Limited (New South Wales), dated 4 August 1977.

Letter from Cyclops Industries Pty Ltd (New South Wales), dated 25 August 1977.

Letter from Milledge Yamaha Pty Ltd (Victoria), dated 14 July 1977.

Letter from Philips Industries Holdings Ltd (New South Wales), dated 5 July 1977.

Letter from Federal Chamber of Automotive Industries (Australian Capital Territory), dated 3 August 1977.

Letter from Australian Automobile Association (Australian Capital Territory), dated 12 July 1977.

Letter from Motorcycle Club of Canberra (Australian Capital Territory), dated 5 July 1977.

Submission by Victorian Council of Pedal Clubs, dated 6 June 1977.

Letter from Dr Yeo (New South Wales), dated 26 July 1977.

Submission by Dr N.V. Sweeney, Plastic Surgeon, (New South Wales), dated 19 August 1977.

Letter from Mr M. Douglas, Editor, Revs International Motorcycle New Magazine (New South Wales), dated 11 October 1977.

Letters from Standards Association of Australia, dated 21 October 1977 and 11 November 1977.

Letters from Mr T.E. Holmes, General Manager, Annand and Thompson Pty Ltd, dated 7 November 1977 and 11 November 1977.

Letter from Queensland Department of Transport, dated 29 November 1977.

Letter from Commissioner of Police, Northern Territory Police Force, Darwin, dated 9 January 1978.

Letter from Dr Snively, Snell Memorial Foundation, United States of America, received on 23 January 1978.

Submission by Royal Australian College of Ophthalmologists, received 14 March 1978.

Letter from Dr J.D. Yeo, Director of the Spinal Unit, Royal North Shore Hospital, Sydney, dated 10 April 1978.

Submission Mr M.E. Hutchinson, 19 Watkins Road, Dalkeith, Western Australia, dated 27 April 1978.

Submission by Mrs S. Hutchinson, 19 Watkins Road, Dalkeith, Western Australia, dated 27 April 1978.

Letter from Motorcycle Division, Western Australian Chamber of Commerce Inc., dated 4 May 1978.

Letter from Mr J.B. Boulton, Executive Director, National Safety Council of Western Australia Inc., dated 11 May 1978.

APPENDIX 3

MOTORCYCLES ON REGISTER AT 31 DECEMBER
AUSTRALIA, 1960 - 1975
('000)

1960	99.5
1961	90.1
1962	82.6
1963	74.7
1964	69.5
1965	67.3
1966	68.9
1967	80.2
1968	96.7
1969	113.7
1970	136.5
1971	164.8
1972	193.4
1973	235.5
1974	274.5
1975	287.1
1976(p)	291.6

(p) Preliminary

Source: ABS Motor Vehicle Registrations, Table 21, 1966-77, and preceding years, and Year Book of Australia, 1975-76, p. 394.

TABLE 1

SUMMARY OF SEX AND AGE CHARACTERISTICS OF MOTORCYCLISTS

Source, Year/s	Males	Age	
Australia, 1975 (riders killed)[1].	98%	Under 21 yrs 56%	Under 30 yrs 90%
Victoria, 1974 (riders killed and injured)[1]. (rider and passenger casualties)[1].	94%	Under 26 yrs 82%	
		Males under 26 yrs 75%	
New South Wales, 1975 (riders killed)[2].	98%[3]	Under 25 yrs 81%	
Western Australia, 1973 (rider licence holders)[1].	84%	Under 26 yrs 68%	
Western Australia, 1970-75 (riders killed)[4].		Under 21 yrs 46.3%	Under 30 yrs 86.0%
(riders injured)[4].		43.3%	77.9%
Tasmania, 1974-1975 (rider casualties)[5]	96%	Under 21 yrs 75%	Under 31 yrs 95%

1. Evidence, p. 225
2. Evidence, p. 1095
3. Riders killed at controls
4. Submission by the Road Traffic Authority, Western Australia dated January, 1977
5. Evidence, p. 1297. 'Not stated' cases were excluded.

TABLE 2

ACCIDENT INVOLVEMENT AND RIDER AGE
SOUTH AUSTRALIA 1973

Age	Usual Riders of Accident Motorcycles No.	%	Usual Riders of Non-Accident Motorcycles No.	%	Accident Probability
16	16	2	25	3	7.6
17	59	9	58	6	11.5
18	94	15	83	9	12.7
19	110	17	81	9	14.8
20	83	13	68	7	13.5
21	52	8	64	7	9.4
22	41	6	44	5	10.7
23	26	4	54	6	5.8
24	26	4	39	4	7.9
25	16	2	25	3	7.6
26	14	2	36	4	4.7
27	13	2	41	4	3.9
28	9	1	22	2	5.0
29	8	1	22	2	4.4
30	3	1	17	2	2.2
31-35	10	3	63	7	2.0
36-40	19	3	59	6	4.0
41-45	18	3	40	4	5.4
46-50	9	1	34	4	3.3
Over 50	10	2	54	6	2.3
Totals	636	100	929	100	8.1

Source: I.R. Johnston, P.W. Milne and M.H. Cameron, 'Age, Experience and Motorcycle Engine Capacity in Motorcycle Accidents', *Motorcycles and Safety Symposium*, Table V.

TABLE 1

MOTORCYCLIST DEATHS AND YEARS OF EXPERIENCE IN NEW SOUTH WALES IN 1970 AND 1971

Years of Experience	Percentage of Deaths
0 - 1	60
1 - 2	14
2 - 3	9
3 - 4	5
Over 4	12
	100

Source: G.F. Messiter, *An Assessment of Measures to Reduce Cyclist and Motorcyclist Accidents*, Traffic Accident Research Unit, New South Wales Department of Motor Transport, Report No. 4/72.

TABLE 2

MOTORCYCLE CRASHES AND YEARS OF EXPERIENCE IN TASMANIA IN 1974 AND 1975

Years of Experience	Percentage of Crashes	
0 - ½	26)	
½ - 1	17)	43
1 - 2	18	
2 - 3	11	
3 - 4	8	
4 - 5	5)	21
Over 5	16)	
	100	

Source: Evidence, p. 1298.

TABLE 3

ACCIDENT INVOLVEMENT AND RIDER EXPERIENCE

SOUTH AUSTRALIA, 1973

Motorcycling Experience (Months)	Usual Riders of Accident Motorcycles No.	%	Usual Riders of Non-Accident Motorcycles No.	%	Accident Probability
0 - 12	120	19	135	14	10.2
13 - 24	171	26	163	17	11.8
25 - 36	88	14	125	13	8.3
37 - 48	78	12	77	8	11.5
49 +	190	29	436	48	5.3
Total	647	100	936	100	8.1

Source: I.R. Johnston, P.W. Milne and M.H. Cameron, 'Age, Experience and Motorcycle Engine Capacity in Motorcycle Accidents', *Motorcycles and Safety Symposium*, Table VI.

TABLE 1

NUMBER OF MOTORCYCLE CRASHES INVOLVED AND NUMBER REGISTERED BY CAPACITY IN TASMANIA, 1974-75

c.c.	Crash % (1)*		Registration % (2)		Ratio $\frac{(1)}{(2)}$
50 and under	2		4		0.5
51 - 200	32	45	52	68	0.6
201 - 250	11		12		0.9
251 - 450	24		15		1.6
451 - 750	26	55	15	32	1.7
751 and over	5		2		2.5
Total	100		100		

* "Not stated" excluded

Source: Evidence, p. 1297.

TABLE 2

ENGINE CAPACITY OF MOTORCYCLE INVOLVED IN FATAL TRAFFIC ACCIDENTS IN WESTERN AUSTRALIA, JULY 1, 1973 to JUNE 30, 1975

Engine Capacity c.c.	Motorcyclist fatalities			Motorcycles on register, June 30, 1975	
	Number	Per Cent		Per cent	
0 - 100	6	9.1	24.3	24.4	64.5
101 - 250	10	15.2		40.1	
251 - 500	24	36.4		20.7	
501 - 750	20	30.3	71.2	12.5	35.5
Over 750	3	4.5		2.3	
Not stated	3	4.5		-	
Total	66	100.0		100.0	

Source: Evidence, p. 2137.

APPENDIX 7

TRAFFIC CRASHES IN THE NEW SOUTH WALES LEVEL TWO STUDY OF MOTORCYCLE CRASHES, BY THE TIME OF DAY AND DAY OF WEEK OF THE CRASH OCCURRENCE

TIME OF DAY	DAY OF WEEK								Total Frequency	Total %
	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	Unstated		
12-2 am	10	-	1	2	1	8	13	-	35	2.3
2-4 am	4	1	-	1	2	2	1	-	11	0.7
4-6 am	2	2	2	2	3	-	1	-	12	0.8
6-8 am	4	30	29	27	31	30	4	-	155	10.4
8-10am	11	18	24	20	25	17	12	-	127	8.5
10-12am	22	9	12	6	10	12	40	-	111	7.4
12-2 pm	17	26	21	21	13	20	28	-	146	9.8
2-4 pm	27	32	22	24	30	20	28	-	183	12.2
4-6 pm	27	53	48	53	60	74	37	-	352	23.5
6-8 pm	11	28	19	23	38	36	27	-	182	12.2
8-10pm	10	13	8	12	15	19	20	-	97	6.5
10-12pm	7	9	9	7	16	20	16	-	84	5.6
Unknown	-	-	-	-	-	-	-	-	0	0.0
Total Frequency	152	221	195	198	244	258	227	0	1495	
Total %	10.2	14.8	13.0	13.2	16.3	17.3	15.2	0.0		100.0

Source: R.G. Vaughan, K. Pettigrew and J. Lukin, *Motorcycle Crashes: A Level Two Study*, Traffic Accident Research Unit, Department of Motor Transport, New South Wales, Report No. 2/77, Table 2.

TABLE 1

OCCURRENCE OF MOTORCYCLE ACCIDENT TYPES, MARYLAND, USA, 1971

Type	Single/Multi-vehicle	Urban/Rural	Intersection/Non-Intersection	%
1	Multi-vehicle	Urban	Intersection	29%
2	Multi-vehicle	Urban	Non-Intersection	17%
3	Multi-vehicle	Rural	Intersection	9%
4	Multi-vehicle	Rural	Non-Intersection	6%
5	Single-vehicle	Urban	Non-Intersection	21%
6	Single-vehicle	Rural	Non-Intersection	14%
7 *	Single-vehicle	Urban	Intersection	3%
8 *	Single-vehicle	Rural	Intersection	1%

* Types 7 and 8 were omitted in Table 2 due to their very low percentage of total accidents.

Source: *A Summary Report: Analysis of Motorcycle Accident Reports and Statistics,* Motorcycle Safety Foundation, Maryland, USA, 1974, Table 1, p. 10.

TABLE 2

ACCIDENT CULPABILITY, MARYLAND, USA, 1971

At Fault	Type of Accident					
	Multi-vehicle Accidents				Single-vehicle Accidents	
	URBAN		RURAL		URBAN	RURAL
	(1) Inter-section	(2) Non-Inter-section	(3) Inter-section	(4) Non-Inter-section	(5) Non-Inter-section	(6) Non-Inter-section
	%	%	%	%	%	%
Motorcycle	29	49	27	45	44	36
Other Vehicle	69	49	72	41	15	10
Joint MC & OV OP*	2	-	-	3	2	-
Vehicle Related	-	1	1	-	12	20
Environment	-	1	-	11	27	33
Total %	100	100	100	100	100	99

* Joint Motorcycle and Other Vehicle Operated

Source: As above, Figure 3, p. 14.

TABLE 3

ACCIDENT CAUSATION FACTORS IN JAPAN, 1975

	Cause	Example	Sub Total	Ratio %	Total %
(a)	Causes attributed to driver condition				
1	Not seeing a hazard in time	Roadside distraction, inattention, poor visibility in the dark or rain.	10169	32.6	
2	Wrong judgement	Oncoming car did not stop against expectation, no advance recognition of hazardous condition, wrong judgement of distance or clearance.	9605	30.7	
3	Failure to heed traffic signal		528	1.7	
4	Traffic violation	Speed limits, one-way traffic, sudden entrance to roadway.	1834	5.9	
5	Unfamiliar road	First drive on road.	189	0.6	
6	Physical disability		34	0.1	
7	Poor physical condition	Overwork, lack of sleep, drinking.	748	2.4	
8	Improper speed		4141	13.3	
9	Loss of control	Over-steering, wrong gear shifting, confusion between brake and accelerator pedals.	2078	6.7	
10	Unfamiliar car	New car, rented car	288	0.9	
11	Poor driving technique	Technically inexperienced or unfamiliar to traffic rules.	1582	5.1	
12	Continuous long hours' driving		25	-	
	SUB TOTAL:		31213	100.0	81.4

	Cause	Example	Sub Total	Ratio %	Total %
(b)	Causes attributed to road condition				
1	Inadequate road design	Steep slope, sharp curve zig-zag road.	925	13.9	
2	Obstructed view	Sight distance 5 m, 10 m, 15 m.	2000	30.1	
3	Irregular road width	Narrow, wide - narrow, narrow - wide.	1023	15.4	
4	Obstruction on road	Defects on road surfaces, rough surfaces, wet or frozen.	535	8.0	
5	Obstruction on road	Under work, parked car, sign board, traffic congestion.	540	8.1	
6	Invisible traffic sign or road marking	Incorrect position, facing in wrong direction, fouled.	51	0.8	
7	Improper traffic safety facilities	Defective signal, pedestrians' crossing, road light, guard rail.	1580	23.7	
	SUB TOTAL:		6654	100.0	17.4
(c)	Causes attributed to vehicle condition				
1	Brake	Inoperative, one of the two brakes is operative, or lack of braking power.	142	30.0	
2	Steering handle	Loss of steering control stiff.	100	21.1	
3	Engine trouble	Loss of steering control	3	0.6	
4	Lights	Faulty headlight, tail-light, stoplight, turn signal.	57	12.1	
5	Wheel	Accidental falling off of wheel.	4	0.8	
6	Tyre	Flat tyre, bursting, excessive wear, or incorrect tyre pressure.	51	10.8	

	Cause	Example	Sub Total	Ratio %	Total %
7	Front window	Fouled windshield, insufficient visibility.	315	3.2	
8	Mirror	Not installed, broken, dirty, improper mounting position.	3	0.6	
9	Defective door		1	0.2	
10	Seat	Not fixed, incorrect installation.	1	0.2	
11	Projection		10	2.1	
12	Suspension	Broken.	3	0.6	
13	Power transmission	Broken or faulty.	2	0.4	
14	Fuel system	Broken, leakage.	2	0.4	
15	Electrical system	Broken wire, shorting	3	0.6	
16	Exhaust system	Abnormally hot, broken.	6	1.3	
17	Improper loading	Overloading, inclined load, load shifting to one side.	22	4.7	
18	Incorrect modification		17	3.6	
19	Miscellaneous		31	6.6	
	SUB TOTAL:		473	100.0	1.2
	TOTAL:		38384		100.0

Source: Evidence, pp. 1557-1589, Tables 2 - 4.

TABLE 4

ACCIDENT CAUSING FACTORS IN TWO VEHICLE COLLISIONS IN BELGIUM, 1968

(1)	The Driver	92.3%
(2)	The Rider	
(3)	The Road Surface, Design and Condition	0.8%
(4)	The Motorcar	1.5%
(5)	The Motorcycle	
(6)	The Road Laws	-

Source: Evidence, p. 346.

APPENDIX 9

SUMMARY OF TYPES OF REPORTED CASUALTIES IN MOTORCYCLE CRASHES

	Motorcycle Riders and Pillion Passengers				Motor vehicle	Pedestrian
	Killed		Injured		Injured	Injured
	Wearing Helmet	Total	Wearing Helmet	Not wearing Helmet		
	%	%	%	%	%	%
Whole Body	6.0	5.5	2.6	-	3.0	3.2
Head	42.0	45.5	5.1	25.0	9.1	25.8
Face	4.0	3.6	6.2	-	30.3	8.1
Neck	4.0	3.6	0.6	-	-	-
Upper extremities	8.0	7.3	24.1	37.5	18.6	12.9
Back	-	-	2.4	-	3.0	4.8
Chest	2.0	1.8	1.7	-	9.1	-
Abdomen	6.0	5.5	1.0	-	-	1.6
Pelvis	-	-	3.9	-	-	3.2
Lower extremities	-	-	43.3	37.5	18.2	32.3
Unknown	28.0	27.3	9.1	-	9.1	8.1
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Frequency	50	55	1574	8	33	62

Source: R.G. Vaughan, K. Pettigrew and J. Lukin, *Motorcycle Crashes: A Level Two Study*, Traffic Accident Research Unit, Department of Motor Transport, New South Wales, Report No. 2/77 Tables 9-10 and 12-15.

TABLE 1

NUMBER AND TYPE OF COLLISIONS INVOLVING

PEDAL CYCLES, AUSTRALIA, 1963 TO 1976

TYPE OF COLLISION	YEAR													
	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Collision between pedal cycle and -														
motor vehicle	3549	3354	3404	3124	3154	2946	2975	2741	2607	2556	2340	2249	2263	2493
motor cycle	73	57	47	36	56	44	46	55	67	69	95	101	90	99
pedal cycle	26	22	24	22	20	21	23	9	16	17	17	13	16	15
pedestrian	91	94	72	80	74	66	70	37	41	47	51	32	40	42
fixed object [1]	83	82	85	68	82	99	135	125	109	85	91	80	91	98
other	28	17	17	27	8	9	15	14	24	11	8	3	10	20
TOTAL	3850	3626	3649	3357	3394	3185	3264	2981	2864	2785	2602	2678	2510	2767

1. Includes parked vehicles.

Source: ABS Road Traffic Accidents Involving Casualties, Table 14.

TABLE 2

NUMBER OF PEDAL CYCLISTS KILLED OR INJURED IN ROAD TRAFFIC ACCIDENTS, AUSTRALIA, 1963 TO 1976

Year Ended December	Pedal Cyclists	
	Killed	Injured
1963	125	3918
1964	132	3750
1965	129	3736
1966	104	3379
1967	99	3449
1968	109	3269
1969	102	3303
1970	98	3012
1971	85	2905
1972	89	2847
1973	87	2587
1974	78	2540
1975	85	2543
1976	93	2861

Source: *ABS Road Traffic Accidents Involving Casualties*, Tables 3 and 4, Quarterly.

TABLE 3

NUMBER OF PEDAL CYCLISTS KILLED OR INJURED IN ROAD TRAFFIC ACCIDENTS, AUSTRALIA, 1976

AGE (YEARS)	CYCLISTS KILLED			CYCLISTS INJURED		
	MALES	FEMALES	TOTAL	MALES	FEMALES	TOTAL
Under 5	-	-	-	14	5	19
5 - 6	1	2	3	72	11	83
7 - 16	46	8	54	1513	291	1804
17 - 20	5	1	6	234	38	272
21 - 29	4	-	4	169	38	207
30 - 49	3	-	3	139	45	184
50 - 59	4	1	5	87	17	104
60 and Over	18	-	18	104	12	116
TOTAL [1]	81	12	93	2399	462	2861

1. Includes "not stated".

Source: ABS Road Traffic Accidents Involving Casualties, Tables 5 to 10.

TABLE 4

NATURE OF ACCIDENTS INVOLVING PEDAL CYCLISTS, AUSTRALIA, 1976

TYPE OF COLLISION	NUMBER OF COLLISIONS	NUMBER OF PERSONS	
		KILLED	INJURED
Collision between pedal cycle and -			
Motor vehicle	2493	80	2503
Motor cycle	99	4	133
Pedal cycle	15	-	20
Pedestrian	42	1	47
Fixed object[1.]	98	2	96
Other	20	2	19
TOTAL	2767	89	2818

1. Includes parked vehicles.

Source: ABS, Road Traffic Accidents Involving Casualties, Tables 12, 13 and 14.

DRAFT REGULATIONS AND AUSTRALIAN DESIGN RULES

The Commonwealth Government, in conjunction with the States through the Australian Transport Advisory Council (ATAC) has considerable responsibility in vehicle safety matters. Through this body the various laws and regulations relating to transport are reviewed. Governments attempt to maintain a uniformity of approach through ATAC towards transport administrative procedures and policy.

The Australian Transport Advisory Council has appointed a number of specialist committees to assist it in its tasks. One such committee is the Advisory Committee on Vehicle Performance (ACVP) which advises ATAC on the "on road" standards for road vehicles, their equipment and loads. Draft Regulations formulated by this committee detail minimum standards of vehicle construction, equipment and performance. These regulations are recommended for adoption in the legislation of States and Territories. Where adopted they are enforced at the point of registration.

The Australian Transport Advisory Council also endorses Australian Design Rules (ADRs) for vehicle safety. The Advisory Committee on Safety in Vehicle Design (ACSVD) formulates these rules to cover cases where the requirements are too complex for compliance to be established at registration. These rules are detailed technical specifications for each safety feature to be incorporated in new vehicles. Certification for compliance with design rules is the responsibility of the Australian Motor Vehicle Certification Board (AMVCB) which was also appointed by ATAC. Where compliance with

the design rules applicable to a vehicle at the date of manufacture has been established to the satisfaction of AMVCB, the manufacturer is issued with approval to affix a compliance plate to his vehicle. This plate indicates to registering authorities that the vehicle complies with the appropriate design rules.

DESIGN RULE REQUIREMENTS - AUSTRALIA

1. ADR 7 - Hydraulic Brake Hose.
2. ADR 28 - Motor Vehicle Noise.
   Levels are based on ECE Regulation 9. United States Environmental Protection Authority (EPA) expected to issue a notice of proposed rule making for motorcycle noise in July 1977. ACSVD has expressed its intention of following the United States' requirement.
3. ADR 33 - Motorcycle Brake Systems. Based on Federal Motor Vehicle Safety Standard (FMVSS) 122.

DRAFT REGULATION REQUIREMENTS - AUSTRALIA

Specific requirements are shown in Section 18. Includes location, operation and identification of controls and displays which is based on FMVSS 123.

UNITED STATES REQUIREMENTS

1. FMVSS 106 - Hydraulic Brake Hoses. Hose which meets FMVSS 106 will meet ADR 7.

2. FMVSS 108 - Lamps, Reflective Devices and Associated Equipment.

   Specifies requirement for original and replacement lamps, reflective devices etc. Applies to passenger cars, multi-purpose passenger cars, trucks, buses, trailer and motorcycles.

   No equivalent Australian requirement.

3. FMVSS 111 - Rear View Mirrors.

   Applies to passenger cars, multi-purpose passenger cars, trucks, buses, school buses and motorcycles.

   Specifies either flat or convex mirror, minimum surface area, stable support, both horizontal and vertical adjustment, and distance from motorcycle centreline.

   No equivalent Australian requirement.

4. FMVSS 116 - Motor Vehicle Brake Fluid.

   Specifies requirement for 3 grades of brake fluid.

   (FMVSS 122 requires the master cyclinder reservoir cap to be labelled with the appropriate fluid grade.)

   No equivalent Australian requirement.

5. FMVSS 119 - New Pneumatic Tyres for Vehicles Other than Passenger Cars.

   Applies to multi-purpose passenger cars, trucks, buses, trailers and motorcycles.

   No equivalent Australian requirement.

6. FMVSS 120 - Tyre Selection and Rims for Motor Vehicles Other than Passenger Cars.

   Applies to multi-purpose passenger cars, trucks, buses, trailers and motorcycles.

   No equivalent Australian requirement.

7. FMVSS 122 - Motorcycle Brake Systems.

A motorcycle which complies with FMVSS 122 will comply with ADR 33.

8. FMVSS 123 - Motorcycle Controls and Displays.

A motorcycle which complies with FMVSS 123 will comply with the relevant Clauses of Section 18 of Draft Regulations.

9. FMVSS 218 - Motorcycle Helmets.

Specifies minimum performance requirements. Relationship with Australian Standard is not known.

10. Exhaust Emission Regulations for Gasoline Fuelled Motorcycles built after 31 December 1977 - Issued by EPA.

The Committee on Motor Vehicle Emission (COMVE) has instructed the motorcycle sub-committee to investigate Australian requirements for motorcycle exhaust emissions.

The United States' requirement will probably mean the end of 2-stroke motorcycles.

ECONOMIC COMMUNITY OF EUROPE REQUIREMENTS

1. ECE Reg. 9 - Noise.

ADR 28 noise levels and test procedure is the same as ECE Reg. 9.

2. ECE Reg. 13 - Braking.

Specifies braking requirements for all categories of motor vehicles.

Requirements are not directly comparable with ADR or FMVSS.

3. ECE Regs. 1,2,3,5,8,19,20,31, - Head Lamps.

Specify design and performance requirements for various types of headlamps (halogen beam etc.) for all motor vehicles.

No equivalent Australian requirement.

4. ECE Reg. 22 - Protective Helmets.

Specifies design and performance requirements.

Relationship with AS is not known.

MOTORCYCLE TRAINING COURSES IN AUSTRALIA

NAME OF SCHEME	LENGTH OF COURSE	COURSE OUTLINE	NUMBER TRAINED	INSTRUCTORS	EVALUATION/ ASSESSMENT
NATIONAL					
Yamaha Learn to Ride (LTR)	45 min.	Techniques and principles of how to ride and safe riding. Assists intending riders	1000 (20 courses)	Registered driving instructors	Qld, NSW, Vic, SA, WA - mainly 10 to 16 age group but as young as 6 and over 21
Military Police School Motorcycle Training	7 days (52 hours)		10 to 25 students per course	Experienced qualified motorcyclists	Last Course - 25% failed. Now maybe extending course by 3 days with 1 day in safe riding and 2 on highways.
ACT					
ACT Police	½ day	Understanding motorcycle operation. Training on the roads - correct faults. Cornering and braking properly	1976 - 78 people 1977 - 69 people	Police from the Traffic Division	The 1976 group were checked in the records after 12 months for any adverse notices. There were none but not completely comprehensive. (23% of riders had no experience)
NSW					
NSW Police Driver Training School, St Ives		Mainly for learners where they are taught the art of motorcycling to ensure a competent and safe motorcyclist		Highly skilled	

NAME OF SCHEME	LENGTH OF COURSE	COURSE OUTLINE	NUMBER TRAINED	INSTRUCTORS	EVALUATION/ ASSESSMEMT
Willoughby Motor Cycle Club, Seven Hills	2 week-ends, now 2 days	5 day course. Learner's permit or licensed. 100cc motorcycles. Traffic regulations and motor-cycle itself - controls. Second weekend practical on the road. They can do the first day again if they are not considered up to riding on the road. One instructor works with 2 learners	1 course per month 9-20 per course. Has been running for 4 years	Instructor in charge has a NSW Transport Dept instructor's licence. Members of the club act in an honorary capacity as instructors	Not government supported. $50 per course.
Newcastle City Driver Training School		Closed after first course through lack of attend-ance (despite extensive publicity).	17 people, March 1974	Volunteer instructors from University of Newcastle Motor-cycle Club	
Honda Driver Promotion Centre, Sydney		Motorcycle on rollers - trains the rider in controls and balancing before he gets on the road	Not greatly used		There are diffi-culties with this motorcycle simulator-cannot go straight onto the road after this. Three in Australia - in NSW, Qld and Vic - cost about $1650

NAME OF SCHEME	LENGTH OF COURSE	COURSE OUTLINE	NUMBER TRAINED	INSTRUCTORS	EVALUATION/ ASSESSMENT
NT					
NT Police		Eleven hours of defensive driving in student driver education program during six months		17 from the NT Police Force are qualified driving and riding instructors	
QLD					
Qld Road Safety Council	18 hrs (6 x 3 hrs session)	Novice riders to licence standard. Riders with licences can do course also. Motorcycles donated. No research.	15 courses up to Sept 1977 - 328 students trained. Started May 1976	Volunteer instructors (av. 20 to 21 yrs old) with at least 2 yrs riding experience and current motorcycle traffic record good. Trained by Qld Road Safety Council	Maximum of 24 students a month compared with 828 motorcycle registrations a month (2.9%). Course costs $30
Qld Police	3 weeks	Run for the police - machine maintenance, handling of the motorcycle, high speed, and trail bike			

NAME OF SCHEME	LENGTH OF COURSE	COURSE OUTLINE	NUMBER TRAINED	INSTRUCTORS	EVALUATION/ ASSESSMENT
SA					
SA Road Safety Council	1 day, 16 students per course	Motorcycle appreciation course	Regular courses since May 1975	Trains instructors	Courses are free. Funded on a $1 levy on all drivers' licences (similar courses for motorcycles and motor vehicles)
TAS					
Tasmania Police				Three fully qualified instructors	
VIC					
Preston, Vic.	3 months	School children are given the opportunity to learn, to ride a motorcycle in a controlled environment, to be taught mechanics of it. It is done during school hours like football and tennis	Voluntary - majority of Form VI students from four schools wanted to learn. (Underprivilege area)		State government grant to establish a training area
Shepparton, Vic	3 day course				Students come from all over the State
WA					
National Safety Council of WA Inc.		Novice and licensed riders courses	200-300 per year	Trains instructors, retest every 3 years	

Source: Evidence.

RECOMMENDATIONS APPLICABLE TO RIDERS OF MOTORCYCLES

R.S. Coppin, *Driver Licence and Driver Improvement Program - A National Review*, Commonwealth Department of Transport, September 1977.

The Initial Applicant

Page 39.

It is recommended that the Department of Transport sponsor or carry out a systems oriented evaluation of the range of safety education needs of drivers licence applicants in order to determine the desirability of preparing safety material tailored toward upgrading the general safety knowledge of drivers. This effort should be closely co-ordinated with the existing efforts of the Publicity Advisory Committee on Education in Road Safety (PACERS).

Page 42.

It is recommended that the Department of Transport take the leadership, in co-operation with the Department of Education, to investigate the need for establishment of pre-licence driver training and to determine what optional program administration configurations can be generated to formulate an efficient and effective program for all new licence applicants.

Page 49.

It is recommended that the States of Australia seriously consider a uniform minimum licensing age of not more than 16 years. Realising the implications, it is further recommended that before final agreement is reached the Department of Transport either undertake or sponsor research to determine the social, economic and political consequences of such a decision - this has not been possible during the scope of this review.

Page 54.

It is recommended that the following items be considered as guidelines to the issuance of learners licences to operate regular private passenger vehicles and light trucks:

(1) Minimum age eligible to apply for a permit to be 15 years 6 months.

(2) Use of the learners permit require the learner to be accompanied by a person who has held a valid driver licence for four years.

(3) Persons operating with a learners permit must display 'L' signs both in front and rear of vehicle.

(4) Persons applying for a learners permit must pass a visual screening test and a written knowledge test of

traffic laws, road signs and safe driving practices.

(5) A learners licence should be recognised between States providing all conditions are being adhered to.

Page 61.

It is recommended that learners licences to operate motorcycles be issued at the age of 17 years subject to the following conditions:

(a) that applicants pass a thorough written examination of the rules of the road, safety riding practices and a visual acuity check,

(b) that learner riders display 'L' signs and not carry a pillion passenger unless such passenger is either a licensed instructor or a person who has held a valid motorcycle licence for four years.

(c) that the learners permit be valid only for the operation of motorcycles of 250 cc engine capacity or less.

It is further recommended that the first motorcyclist licence be restricted to operation of motorcycles of 250 cc engine capacity or less for a period of two years.

Page 62.

It is recommended that, in view of the seriousness of this problem in Australia, a co-operative research effort between the Department of Transport and the respective States be undertaken in an attempt to better define the motorcycle crash problem through which more refined effective licensing schemes can be developed.

Page 63.

It is recommended that, in view of the difficulty expected in obtaining legislation from restriction of riders to lower powered motorcycles for the first two years of experience, the Department of Transport prepare a national public information program of the current research facts on Australia's motorcycle crash problem and specifically of the data that support the need for a sub-classification of licences based upon engine capacity. This pamphlet should be given wide circulation to governmental decision makers in all States, the motorcycle industry, the automobile clubs, the Road Safety Councils and the public at large in order that the public be made aware that this decision is based upon sound data and is not intended to be punitive in nature.

Driver Testing

Page 74.

It is recommended that the Department of Transport develop suggested questions in the area of drinking and driving and provide them to the States for suggested use on driver licence tests.

It is recommended that:

(a) To provide some uniformity and equality to road testing and to ensure that drivers are being required to use all the techniques of safe driving States should develop standardised routes which provide a good sample of real world driving experience. Routes can vary with local test environments but routes in a given State should all contain defined manoeuvres and wherever possible have consistent traffic situations.

(b) To minimise rater (testing officer) variation and arbitrary value judgements, States should develop rating scales for use in scoring road tests. Such scales should attempt to measure the entire driving process not just the skill manoeuvres.

(c) Upon completion of the scoring of the road performance test, drivers should be provided with a copy of test results. This will provide immediate feedback to applicants regarding weaknesses and will inform future applicants of the criteria of performance expected.

(d) To provide a minimum time period whereby applicants can gain further supervised driving experience States should require that failed applicants be required to wait at least two weeks before being re-tested.

It is further recommended that the Department of Transport support and input to (a) and (b) by providing the necessary funds and/or research expertise including necessary pilot testing and evaluation.

Page 83.

It is recommended that the Department of Transport evaluate the utility of the California cycle performance test project as a possible pilot program in Australia.

It is further recommended that, with the increasing magnitude of motorcycle fatality and injury situations in Australia coupled with the fact that rider experience seems to play a major role, the Department of Transport take a leadership role in problem identification, program development and evaluation of countermeasures in this area.

Driver Improvement Programs

Pages 116-117.

It is recommended that the following recommendations made by the Committee on Driver Improvement in 1968 be adopted with the minor modifications shown:

(1) 'Licensing authorities should be expressly authorised by Statute to cancel or suspend driving licences by reason of repeated traffic offences'.

- The States should expressly be authorised to call for re-examination of those drivers involved in repeated accidents.

(2) 'A central register should be maintained covering the entire State, in which are recorded particulars of drivers licensed, licences issued and conviction or 'on-the-spot' penalties imposed for moving traffic offences and also involvement in reported accidents'.

(3) 'Licensing authorities should institute driver improvement programs incorporating letters of warning, interviews, show cause letters and finally suspension or cancellation of licences'.

- Driver improvement programs be developed and implemented on a pilot evaluation basis and then, depending upon results, implemented on a more universal basis.

Driver Licence Records

Page 128.

It is recommended that the Department of Transport in co-operation with the States investigate the feasibility of establishing a National Disqualified Data File (NDDF) for the purpose of determining status of drivers. If feasible, the Department of Transport should select a pilot State and evaluate such a system.

COMPARISON OF PERFORMANCE REQUIREMENTS FOR MOTORCYCLE HELMET STANDARDS

Standard	Equivalent Standards	Impact Energy			Penetration Energy (Joules)	Extent of Protection below Crown (mm)	Strength of Retention System (Kgf)	Remarks
		Joules	No. of Blows	Criteria				
AS E33	BS 2001-56 NZS1215	122	2	5000 lbf about 800 g	10	41	45	Tested with Fixed Headform
AS E43	BS 1869-60 NZS1214	164	2	5000 lbf about 400 g	16	about 58	90	Fixed Headform NZS 1884 identical but with 210 J impact energy
ISO 1511-70	BS 2001-72 but with 2 IE blows	122	1	4400 lbf 400 g	30	41	100	Swingaway and fixed headform test. Includes 140 lbf test for rigidity
AS 1698	ANSI Z90.1 FMVSS 218	68 90	2 x 2 2 x 2	400 g 200 g/3s 150 g/6s	90	73	136	FMVSS 218 is the same as AS 1698 except for acceleration limits of 200 g/2s and 150 g/4s, and additional tests for flammability etc. in AS 1698

Standard	Equivalent Standard	Impact Energy			Penetration Energy (Joules)	Extent of Protection below Crown (mm)	Strength of Retention System (Kgf)	Remarks
		Joules	No. of Blows	Criteria				
Snell 70		90 120	2 x 2 2 x 2	300 g	90	73	136	AS 1698, FMVSS 218 and Snell are tested by the falling headform method
Snell 75		110 140	2 x 2 2 x 2	300 g	90	73 plus an additional 60 mm at back of head	136	
BS 5361		88 120	3 x 2	400 g	90	About 65 mm	136	Replaces BS 2001-72 and BS 1869. Tested with swingaway and fixed headforms
BS 2495-77		98 122	3 x 2	400 g	90	About 65 mm with additional 25 mm at back of head	136	Swingaway and fixed headforms

Standard	Equivalent Standard	Impact Energy			Penetration Energy	Extent of Protection below	Strength of Retention System	Remarks
		Joules	No. of Blows	Criteria	(Joules)	Crown (mm)	(Kgf)	
ISO 1511-78 (Draft)		88 122	3 x 2	300 g 150 g/5s	75	About 65 mm	136	Swingaway and falling headforms. Includes side impact test (74J/250 g). Rigidity Sliding resistance Conspicuity Dynamic test of retention system.

Notes: 1. 10 Joules are equivalent to dropping 1 kg from approximately 1 metre.

2. Extent of protection of BS 5361, BS 2495 and ISO 1511-78 are estimates only.

Source: Evidence, pp. 1712, 1713, 1714.

AUSTRALIAN MOTOR VEHICLE STANDARDS COMMITTEE

DRAFT REGULATIONS

CHAPTER III - EQUIPMENT REQUIREMENTS - PEDAL CYCLES

3001.

Every bicycle when ridden upon any road shall be capable of being braked by either or both of the following means:

(a) An effective foot brake operated by turning the pedals in the reverse direction.

(b) An effective hand operated brake fitted to the rear wheel having the operating handle fixed in a position providing for convenient operation.

3002.

Every bicycle when ridden upon any road shall have a bell or other effective warning device fixed in a convenient position.

3003.

The handlebar of the bicycle being ridden upon any road shall extend not less than 8 inches nor more than 13 inches on each side of the centre of the bicycle, nor shall the height of the upper most point of the handlebar exceed the height of the upper most part of the seat by more than 12 inches.

3004.

The horizontal distance between the axle of the front wheel of a bicycle ridden upon a road, and a line dropped vertically from the centre of the pivot head bearing on the front tube of the frame shall not exceed 10 inches.

3005.

The overall width of any equipment or load carried on a bicycle being ridden on any road shall not exceed 26 inches.

3006.

(1) Every bicycle when ridden upon any road shall have affixed a reflector which will effectively reflect red light when illuminated by the headlight of a vehicle approaching from the rear. Such reflector shall:

(a) comply with the requirements specified in Draft Regulation 503 and have a reflective area of not less than the area of a circle of 1½ inches diameter;

(b) be mounted on the rear part of the bicycle at a height which is not less than 13 inches nor more than 36 inches;

(c) be mounted vertically and facing to the rear in such a manner that the light reflected from the head light of a vehicle approaching from the rear is clearly visible to the driver of that vehicle.

(2) The reflector may be in the form of a reflecting lens fitted to the rear lamp.

(3) No bicycle when ridden upon any road shall have affixed any reflector capable of reflecting red light in the forward direction.

3007.

(1) Every bicycle when ridden upon any road under conditions which require the provisions of lighting shall have affixed thereto:

(a) upon the front of the bicycle, a lighted headlight showing a clear white light to the front visible under normal atmospheric conditions at all distances up to 600 feet.

(b) upon the rear of the bicycle, a lighted rear light showing a clear red light to the rear visible under normal atmospheric conditions at all distances up to 600 feet.

(2) The head and taillights shall be fixed in positions such that the vertical distances from the ground to the centres of the lights shall not be less than 13 inches.

3008.

If a rear mudguard is fitted the surface facing to the rear shall be painted white.

Source: *Draft Regulations Defining Vehicle Construction, Equipment and Performance Standards for Road Vehicles*, Australian Transport Advisory Committee, Department of Transport, Melbourne.

PHYSICAL IMPROVEMENTS AND FACILITIES NEEDED BY CYCLISTS

(a) Improved Safety on High Stress Roads

NOTE: The concept of stress is used to indicate the amount of harassment and danger perceived by a cyclist when riding in traffic, ie, it is only intended to indicate which roads would be preferred by cyclists, all else being equal - the cyclist being presumed to prefer cycling on a road shown as lower stress. It is not intended to indicate any precise psychological or medical measure. Stress level is calculated from traffic volumes, lane width adequacy and traffic speeds. Factors affecting the physical effort of cycling (gradient, wind, frequency of need to slow down or stop, surface condition) are also important in route choice. Although further study is required to refine both concepts - stress and physical effort - they can be combined as a means of measuring the 'rule of least effort', which appears to govern the average cyclist choice of route when on non-recreational trips.

(i) Signal Control at Busy Intersections

The accident statistics show that main road intersections are six times more dangerous than residential intersections.

It is more difficult for a bike to turn right into, or across, a heavily trafficked road, than for a motor vehicle. This is because bikes are not given priority by motorists, and being slower, require a longer gap in the traffic to pull into. Except in situations where priority can be altered to favour the cyclist, traffic signals are the only solution, given an irreducible volume of traffic. Cyclists therefore support the continuing program to introduce traffic signals at busy intersections. Where signals cannot be justified, traffic islands to act as a central refuge might be of some assistance. There is also evidence that introduction of stop and give way signs helps cycle safety, although these do not substantially assist the cyclist to undertake turning movements.

Cyclists consider that the Road Safety and Traffic Authority (Victoria) requirements for signalisation should include allowance for heavy bike use.

Many cyclists prefer traffic signals with right turn filters. Also left and right turn only lanes reduce the possibility of:

- Straight-on cyclists being cut-off by left turning motorists.
- Right turning cyclists being struck from behind by straight-on motorists.

Presence detectors also need to be designed to sense bicycles. Forester[1] recommends providing figure eight pattern detection loops to operate at 10% interception. The kerbside lane loops should extend to within 0.30 m of the kerb to detect cyclists in their normal riding position. If cyclist presence detectors are not provided, then push-button controls operable from the road side should be installed.

(ii) Pedestrian Crossings for School Cyclists

At locations on high stress roads where large numbers of school cyclists make turning or crossing movements, normal school or pedestrian crossings are desirable (the cyclist being required to dismount and walk across the crossing).

(iii) Adequate Kerbside Lane Width

On a heavily trafficked road, the most important factor for the cyclist in terms of road geometry is the width of the kerbside lane. Where the lane is wide enough for a moving bicycle and motor vehicle (and where necessary, parked vehicle) to share the lane, without the motor vehicle having to move out of the lane to overtake the cyclist, then the width is adequate for safe cycling. Where the width is inadequate, potential danger arises if the overtaking vehicle is unable to pull out into the oncoming lane because of approaching traffic, and cannot slow to the cyclist's pace to wait for a break in the traffic. This results in the motorist passing too close to the cyclist during overtaking. This problem is only serious on roads with substantial flows of motor traffic (taken as over 4000 Average Daily Traffic Volume, because only then will oncoming traffic flows be high enough to create the situation of dangerous overtaking.

Speed of traffic affects the width necessary, as does the existence of multiple lanes (since motor vehicles are more easily able to nudge into the adjacent lane to overtake).

Of course it will generally not be possible to follow suggested lane width standards for cyclists in existing areas if the main road system has been constructed to lower standards of width. While it may be possible to widen the kerb lane by re-striping, reducing footpath width during re-construction, or sealing the road for a greater width, often the only real benefit to cyclists can be to maintain the road surface to a high standard. It may in addition be of benefit to cyclists to mark moving traffic lanes next to the centre line of the road, which should result in the path followed by the traffic stream being moved away from the average cyclist's path.

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[1] John Forester, *Cycling Transportation Engineering*, 1st Ed., Custom Cycle Fitments, 682 Allen Court, Palo Alto CA 94303 USA.

(iv) Provision of Parallel Alternative Low Stress Routes or Enhancement of Existing Parallel Low Stress Streets

Where no alternative route to a main road exists, and where there is an opportunity in the form of an open space or similar reserve, and where the demand warrants it (particularly in the case of school children), then bike path links can be constructed to open up parallel alternative routes to main roads.

Where an alternative route already exists, its usefulness to cyclists can be enhanced by modifying priority at intersections to favour cyclists, while discouraging or obstructing use of the road by through motor traffic with traffic management measures.

(v) Elimination of Squeeze Points

Squeeze points, such as narrow bridges and railway crossings, force cyclists into the path of traffic, which is generally travelling much faster than the cyclist, exposing him to considerable risk.

(vi) Elimination of Broken Edges, Potholes and Badly Finished Road Surface in Kerbside Lanes

Potholes and broken edges cause riders to swerve in front of cars and subject them to risk of bike damage and personal injury from falls. An unbroken surface is most important on heavily trafficked roads, where risk of collision following a swerve or fall are much greater.

(vii) Improvements to Rail Crossings

Many rail crossings are so badly surfaced that damage can occur to wheel rims. Some rail crossings also act as squeeze points.

Where the angle at which the rails cross the road is acute, and the road is high stress, measures should be taken to provide an approach to the crossing that allows cyclists to cross the rails at right angles without pulling into the path of motor traffic.

(viii) Replacement of Dangerous Storm Drainage Grates and Man-Hole Covers

Storm drainage grates with parallel bars running with the direction of traffic flow can be dangerous for bikes because the wheels can get trapped in the grate, causing a serious fall. Man-hole covers should all be flush with the road surface.

(ix) Road Maintenance Requirements

The fundamental requirement is to maintain a smooth, unrutted kerbside lane free of debris and other foreign matter. Regular inspection by road maintenance teams will be necessary to monitor conditions. The following specific requirements need to be met:

Sweeping

The kerbside lane tends to collect rubbish whip-off, broken glass, gravel and other debris. The regular mechanical sweeping program should ensure that such matter is removed.

Debris at Intersections

Intersections should be regularly inspected for debris and swept as necessary. Locations prone to the collection of debris may benefit from alignment modifications (such as channelization and reduction of curve radii) to ensure that all parts of the road surface are 'swept' by the action of passing traffic.

After a re-seal, whip-off material should be removed each day for a fortnight.

Where an unsealable road runs into a sealed intersection, its pavement should be sealed for 15 m before the intersection to minimise intrusion of gravel onto the sealed surface.

Ripples and Corrugations

Ripples and corrugations in the pavement surface can occur at locations where motor vehicles regularly brake and accelerate. These should be removed by regulating the pavement. At high density motor traffic locations it may be necessary to replace the flexible pavement with a rigid pavement, such as the kind frequently used at bus stops.

Edges of Un-Kerbed Pavement

Pavement edges where no kerbing exists are prone to breaking up. It is most important that repair of broken edges occurs at an early stage, otherwise deterioration will increase, forcing the cyclist to ride in the path of motor traffic.

Unsealed Shoulders

Unsealed shoulders are not suitable for cycling, but should be maintained in a condition that is safe for emergency use. Progressive coarsening in texture and disappearance of the shoulder material are the main problems. Defective shoulders

should be resheeted with granitic sand or carefully graded gravel (maximum size 10 mm) and maintained by grading and rolling at a frequency sufficient to maintain shape and texture, (frequency will be dictated by cycle and motor traffic volume).

(b) Improved Safety on all Roads

(i) Clearly Marked Priority at Intersections

Most cycle accidents occur at intersections. Because motorists often fail to see and give priority to cyclists at intersections, the give-way-to-the-right rule is dangerous to bike riders. Where priority is clearly marked with stop lines, cyclists' safety benefits considerably because observance of priority rules does not depend on being seen in the first place.

(ii) Shoulder Stripes on Rural Roads

On rural roads, painting solid white line stripes about 0.75 m, in from the edge of the sealed surface assists motor vehicles by better definition of the road alignment and width, and improves the riding environment for cyclists. It probably also reduces the risk of rear end collision. Shoulder stripes are discontinued at intersections. Shoulder striping is common practice on rural roads overseas.

(c) Improved Safety on Residential Streets Only

(i) Programs to Remove Through-Traffic and Reduce Speeds

Street closure programs and other policies that reduce traffic speeds and volumes in residential areas enhance the attractiveness of neighbourhood bike riding and make the streets safer for young cyclists, particularly those who are below the age at which they can be expected to act responsibily.

(d) Better Riding Environment

(i) Smooth Riding Surface

The biggest single factor affecting the comfort of cycling is a smooth riding surface. As cyclists mainly ride at the edge of the road, they generally encounter the worst part of the surface. A rough surface requires more pedalling effort, and can be very uncomfortable, because bicycles are unsprung. A long stretch of riding on a rough surface causes the hands to go numb because of vibration from the handlebars.

(ii) Bike Paths to make Short-Cuts or Avoid Steeply Graded Roads

Although only usually justifiable as opportunity investments, sensitively placed short lengths of path that avoid a long detour or a steep climb are much appreciated by cyclists.

Wherever possible, street closures should incorporate openings for cyclists to use; one-way streets may in some cases be able to have a contra-flow bike lane.

Such measures are beneficial because the extra distance caused by the detour that is necessary to avoid such traffic management measures penalises cyclists much more than motorists.

(iii) Recreational Bike Paths

While recreational bike paths are not an indispensible need for cyclists, they help to promote bike use and healthy exercise. They are especially justified where they serve a utility function in addition to being pleasant paths, ie, they can be constructed along routes that could also be used by bicycle commuters or school children.

(e) Improved Cycle Security

Programs and facilities to reduce cycle theft are a fundamental requirement of cyclists. Existing locking devices are no deterrent to serious criminals. More secure parking facilities are needed, together with programs to increase cycle security, such as cycle registration schemes, which enable owners of stolen bikes to be contacted.

(f) Better End-Of-Trip Facilities

Places to park bicycles are needed at all destinations, including schools, shops, offices, factories and recreational facilities. Commuter cyclists often appreciate changing rooms and showers at their destination.

Source: Scott, M., 'Planning for Cyclists' Real Needs', *Geelong Bikeplan Seminar*, Geelong, 2 September 1977.

TABLE 1

MOPED REGULATIONS IN EUROPE

	Capacity	Permissable Speed Limit km/h	Maximum Noise Level DB	Horse-power rating PS	Additional Speci-fications
Austria	Uniformly not more than 50 cc	40	73		
Belgium		40	73		Pedals
Denmark		30	73	1.2	Motor Throttle
Finland		40	75	1.5	Vehicle wgt. max. 55 kg
France		45	73		Pedals
Holland		40	73		Pedals
Italy		40	81	1.5	Motor wgt. max. 10 kg
Norway		50	75	2.5	
Spain		40	80		Pedals
Sweden		30	75	1	Throttle
Switzerland		30	70	0.8	Pedals, Vehicle wgt. max. 42kg
United Kingdom		48	77		Vehicle wgt. max. 250 kg
West Germany		25	70		Pedals Throttle Max Revs 4000 RPM
West Germany		40	73		
Yugoslavia		40	78		

Source: Submissions by Milledge Yamaha Pty Ltd, P.O. Box 171, Glen Waverley, Victoria, dated 14 July and 17 November 1977.

MINIMUM AGE FOR DRIVING A MOPED (LESS THAN 50cc)

The minimum age for driving a moped is, generally speaking, 16 years. There are, however, certain exceptions: in Canada, the age limit for driving a mini-bike can be as low as 13 or 14 years for mopeds less than 100 ccm. in certain States; in Finland, the age is 15 years if the moped weighs less than 50 kg and has a maximum speed of 30 km/h; in Germany, also, the age is 15 years if the moped has a maximum speed of less than 25km/h at 4,800 revs/min., and, in France, the age is 14 years if the moped has a maximum speed less than 45km/h.

Source: Organisation for Economic Co-operation and Development Road Research Group, Young Driver Accidents, Paris, March 1975, p. 156.

CURRENT MOTORIZED BICYCLE LEGISLATION, UNITED STATES, AS AT JULY 1, 1977

	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	WASH.D.C.	FLORIDA	INDIANA
CC	50 or less	No more than 50	None	No more than 50	Less than 50	Less than 50	No more than 50	None	No more than 50
POWER	1.5 bhp or less	No more than 2 bhp	Less than 2 gross bhp	No more than 2 bhp	No more than 2 bhp	No more than 1.5 bhp	No more than 1.5 bhp	Max. of 1.5 bhp	No more than 1.5 bhp
MAX. SPEED	25	30	30	30	30	25	25	25	25
REG.	Yes $8 yr	No	No	Yes $5 3yr	No	Yes $5 3yr	Yes $6 yr	No	No
DEFINED	Ped. bicycle w/helper mot.	Mot. bicycle	Mot. bicycle	Mot. bicycle	Bicycle	Moped	Mot. bicycle	Moped under bicycle def.	Mot. bicycle
MIN.AGE	16	14	15	16	16	16	16	15	15
LICENCE	Any valid or spec. licence at 14 yrs	Any valid or learner perm.	Any valid	Any valid	Any valid	Any valid	Any valid or mot.bic. permit no rd. test	No	No
INS.	No (fin. resp.)	No	No (fin. resp.)	No	No	No	No (fin. resp.)	No	No
HELMET	No	No	No	No	No	No	No	No	No Amended eff. 7/77

	IOWA	HAWAII	KANSAS	LOUISIANA	MAINE	MARYLAND	MASSA-CHUSETTS	MINESOTA	MICHIGAN
CC	No more than 50	None	No more than 50	No more than 50	No more than 50	Less than 50	No more than 50	Less than 50	No more than 50
POWER	None	1.5 bhp or less	No more than 1.5 bhp	No more than 1.5 bhp	No more than 2 bhp	Less than 1 bhp	No more than 1.5 bhp	Max. 2 bhp	Max. 1.5 bhp
MAX. SPEED	25	None stated	25	25	30	None stated	25	30	25
REG.	Yes $5 yr	No	Yes $5 yr	No	Yes $5 yr	No	Yes $3 2yr	Yes $3 yr	Yes $2 yr
DEFINED	Motoris. bic. or motor bic.	Bicycle	Mot. bicycle	Mot. bicycle	Moped	Bicycle	Mot. bicycle	Mot. bicycle	Moped
MIN.AGE LICENCE	14 Any valid or mot. bic. at 14 no rd. test	15 No	14 Any valid or licence w/writ. tst only at 14	15 Any valid	16 Any valid	16 Any valid	16 Any valid or learner perm.	16 Any valid	15 Any valid or moped licence (no rd. tst.)
INS.	No (fin. resp.)	No	No (fin. resp.)	No	No (fin. resp.)	No	No	No (fin. resp.)	No
HELMET	No	No	No	No	No*	No	No	No	No

* Until 10/77 helmet is required.

	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK (a)	NEW YORK (b)	NORTH CAROLINA	OHIO
CC	None	No more than 50	Less than 50	Less than 50	None	None	None	None
POWER	None	No more than 2 bhp	No more than 1.5 bhp	None	None	None	Less than 1 bhp	Less than 1 bhp
MAX. SPEED	30	30	25	25	20	21-30	20	20
REG.	No	Yes $3 yr	No	No	Yes $5 yr	Yes $5 yr	No	No
DEFINED	Moped	Moped	Bicycle	Mot. bic.	Ltd use Cl.C mc	Ltd use Cl.B mc	Bicycle	Bicycle
MIN.AGE	16	16	15	None stated	16	16	16	None
LICENCE	Any valid	Any valid	No	Any valid restricted	Any valid or special lic.	Any valid or special lic.	No	No
INS.	No (fin. resp.)	No (fin. resp.)	No	No	No (fin. resp.)	Yes	No	No
HELMET	No	No	No	No	No	Yes	No	No

	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	TENNESSEE	TEXAS	VERMONT	VIRGINIA
CC	No more than 50	None	None	No more than 50	Less than 60	50	None
POWER	No more than 1.5 bhp	No more than 1.5 bhp	Less than 1 bhp	No more than 1.5 bhp	None	Max. 2 bhp	Less than 1 bhp
MAX. SPEED	25	25	20	25	20	30	20
REG.	Yes $6 yr	Yes $10 yr	No		Yes	Yes $10 yr	No
DEFINED	Motorised pedal cyc.	Mot. bic.	Bicycle	Mot. bic.	Motor asst. bic.	Moped	Bicycle
MIN.AGE LICENCE	16 Any valid	16 Any valid	12 No	16 Any valid	15 Yes (written test only)	16 Any valid	16 No
INS.	Yes (no fault)	No	No	No	No	No (fin. resp.)	No
HELMET	No	No	No	No	No	No	No

Source: Motorised Bicycle Association, 1001 Connecticut Ave, N.W. Washington D.C. 20036 July 1,1977.