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# EVALUATION OF RIDER TRAINING CURRICULUM IN VICTORIA

by

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Motorcycle training in Victoria: Evaluation of rider training curriculum in Victoria


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**Abstract:**

This report presents an evaluation of the rider training courses (both the learner and probationary courses) from the different rider training providers. The evaluation determined the balance between attitudinal and vehicle skill based components and provided recommendations.

Most of the evaluations of training courses identified in the literature review did not set out to compare the effects of the attitudinal and vehicle control components of training. Some evaluation studies suggested that riders who scored higher on vehicle control skills in some tests had more crashes later. The newer tests requiring higher levels of vehicle control skills did not reduce crash rates. Conversely, there was some suggestion that training in cognitive skills can improve these skills and reduce crash involvement. However, to ensure that cognitive skills components receive sufficient focus in training, there is a need to ensure that they are emphasised in the learner permit and licence tests.

The review of the delivery of the course components in Victoria found that vehicle control skills receive about two to three times as much course time as attitudinal skills in both the learner permit and licence courses. Yet all the providers felt that the students, particularly at learner level, had insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road. Commercial considerations severely constrained the time available to teach both attitudinal and vehicle control skills.

Some possible solutions appeared to be increasing the efficiency of delivery of courses by improved time management and improving the effectiveness and consistency of presentation of the attitudinal components. Even if these improvements are implemented, it is still likely that trainees may continue to have insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road. The review also identified a need to develop a hazard perception program and test that can be introduced by all training providers.



**Key Words:**
motorcycle, motorcyclist training


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# Contents

# EXECUTIVE SUMMARY

The Motorcycle Training in Victoria project was commissioned by VicRoads to address two recommendations of the Parliamentary Road Safety Committee *Inquiry into the Review of Motorcycle Safety in Victoria*. This report presents an evaluation of the rider training courses (both learner and licence courses) from the different rider training providers. The evaluation determined the balance between attitudinal and vehicle skill based components and provided recommendations.

The second report**,** entitled *Single training course and test for the motorcycle licence* (Haworth and Smith, 1999), describes the development and trial of a single training course and skills test for an applicant to progress to a motorcycle licence without holding a learner permit. It outlines the background to the new training course and its aims, describes the course and the trial and subsequent improvements to the course. It also discusses short- and long-term implementation issues. This report is available from VicRoads.

**Literature review**

Most of the evaluations of training courses set out to determine whether the courses had any effect on licensing rates, crash involvement, infringements and/or the extent and nature of riding. Methodological deficiencies prevented these aims being achieved in most studies. Given that these evaluations did not set out to compare the effects of the attitudinal and vehicle control components of training, it is not surprising that they contribute little to addressing this issue. Generally, the courses focused on vehicle control skills to train riders to pass tests which emphasised vehicle control skills.

Some evaluation studies suggested that riders who scored higher on vehicle control skills in some tests had more crashes later. The newer tests requiring higher levels of vehicle control skills (such as the Motorcycle Operator Skill Test) did not reduce crash rates. Conversely, there was some suggestion that training in cognitive skills can improve these skills and reduce crash involvement. However, to ensure that cognitive skills components receive sufficient focus in training, there is a need to ensure that they are emphasised in the learner permit and licence tests.

**Review of current motorcycle training courses**

The review of the delivery of the course components found that vehicle control skills receive about two to three times as much course time as attitudinal skills in both the learner permit and licence courses. Yet all the providers felt that the students, particularly at learner level, had insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road. Commercial considerations severely constrained the time available to teach both attitudinal and vehicle control skills.

Some possible solutions appeared to be increasing the efficiency of delivery of courses by improved time management (reducing waiting times and delays between components) and improving the effectiveness and consistency of presentation of the attitudinal components (including using overhead transparencies). Even if these improvements are implemented, it is still likely that trainees may continue to have insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road.

The review also identified a need to develop a hazard perception program and test that can be introduced by all training providers.

# 1.0 INTRODUCTION

## 1.1 BACKGROUND

The Motorcycle Training in Victoria project was commissioned by VicRoads to address two recommendations of the Parliamentary Road Safety Committee *Inquiry into the Review of Motorcycle Safety in Victoria*. These are:

*Recommendation 13*

> That an independent evaluation of the rider training curriculum be conducted to determine the balance between attitudinal and skill based components.

*Recommendation 12*

> That VicRoads determine through a trial study, if rider training skills can be acquired prior to introducing a single licence test so that the Minister for Roads and Ports may report to Parliament with its findings.

Note that a single training course and test would not replace the current motorcycle learner and licensing training and testing system.

The two tasks in this project address each of the recommendations from the *Inquiry into the Review of Motorcycle Safety in Victoria* outlined above.

In Task A, an evaluation was made of the rider training courses (both the learner and probationary courses) from the six different rider training providers in Victoria. The evaluation determined the balance between attitudinal and vehicle skill based components and provides recommendations. 'Attitudinal' was taken to refer to cognitive skills, as opposed to vehicle control skills. Thus, components involving hazard perception and scanning, attention, decision making, judgement, risk taking, anticipation and other cognitive skills were classified as attitudinal.

Task B involves the development and trial of a single training course and skills test for an applicant to progress to a license without holding a learner permit. A report has been prepared that describes the new training curriculum (*Single training course and test for the motorcycle licence*, Haworth and Smith, 1999) and is available from VicRoads.

## 1.1 STRUCTURE OF THE REPORT

This report describes the outcomes of Task A of the project, the evaluation of the rider training courses. It commences with a review of the published evaluations of motorcycle training courses. The current courses in Victoria are then reviewed.

# 2.0 LITERATURE REVIEW

## 2.1 AIMS OF THE LITERATURE REVIEW

The aims of this literature review were to identify the relative importance of cognitive and vehicle control skills in training courses that have been evaluated and to assess the contribution that each type of skill has made to the effectiveness of the courses. The emphasis was on training programs for novice riders, rather than experienced riders.

The relevant literature in this area comprises:

- discussions of the relative importance of attitudinal and vehicle control components in training programs,
- experimental comparisons of the effects of training programs,
- retrospective studies of the effects of training or not,
- retrospective studies of the effects of different testing regimes, and
- general studies of motorcycle crash factors which include training.

## 2.2 CONSTRAINTS OF THE LITERATURE

As noted earlier, the aims of this literature review were to identify the relative importance of cognitive and vehicle control skills in training courses that have been evaluated and to assess the contribution that each type of skill has made to the effectiveness of the courses. There are a number of constraints to this in the published literature, including:

- insufficient details about course content,
- failure to compare programs with different emphases on cognitive and vehicle control skills,
- difficulty in classifying courses as learner or licence, and
- methodological problems in selection of trainees or control groups or small sample sizes.

### 2.2.1 Insufficient details about course content

Most of the studies that have sought to examine the effectiveness of motorcycle training have focussed on whether or not the training program reduced crashes (or violations), rather than on the characteristics of the training program that may be instrumental in bringing about these changes. Many published reports fail to describe the contents of the training program in sufficient detail to be able to identify the relative emphasis on cognitive and vehicle control skills (e.g. McDavid, Lohrmann and Lohrmann, 1989). While many reports state the total length of the course and the amounts of time spent in the classroom versus on the range, this is only a very approximate measure of the split between cognitive and vehicle control skills.

### 2.2.2 Failure to compare programs with different emphases on cognitive and vehicle control skills

Most evaluations have considered only one training program and therefore the relative effectiveness of cognitive and vehicle control skills components of the program cannot be assessed.

### 2.2.3 Difficulty in classifying courses as learner or licence

While the focus of this project is on learner and licence training, the licensing systems vary greatly among jurisdictions. In some jurisdictions there are no specific learner permits and therefore it is often difficult to classify a training course as a learner or licence course. In general, it is only possible to classify training courses as aimed at novices or experienced riders.

### 2.2.4 Methodological problems

Many evaluations of training programs suffer from methodological problems which prevent the separation of the effect of the training program from other, related effects. For example, studies where students volunteer to take a training course often fail to address the issue that these volunteers may have characteristics that differ from other motorcyclists. The volunteer courses suggest that training is relatively more attractive to females and persons who are less confident. McDavid et al. (1989) present a table of the percentages of trained and untrained riders who were female in seven comparison group studies. In six of the seven studies, the percentage of females was greater in the trained group than the untrained group. In four of the studies, the percentage of females in the trained group was more than double that reported for the untrained group.

The volunteer studies are one of a class of studies in which the choice of the control group is not ideal (e.g. Mortimer, 1984; Satten, 1980). McDavid et al. (1989) comment that "a common methodological problem in previous studies is the lack of similarity between persons who seek motorcycle training and those who do not. Age and sex differences, as well as other uncontrolled differences between trained and untrained groups, could account for differences in key independent variables (principally accident rates)" (p.62).

There are quite a few studies in which the number of riders trained is too small to be able to expect a significant difference in the number of crashes compared with a control group (e.g. Kloeden, Moore and McLean, 1994; Satten, 1980). The cost of conducting the training program is often a barrier to an adequately large training group.

In addition, some studies fail to measure distance ridden by trained and untrained riders and therefore any subsequent differences in crash frequencies are difficult to interpret.

## 2.3 COMPARISONS OF THE EFFECTS OF TRAINING PROGRAMS

### 2.3.1 Motorcycle Rider Course

The most frequently evaluated course for novice riders has been the Motorcycle Rider Course (MRC) developed in the United States by the Motorcycle Safety Foundation (e.g. Mortimer, 1984, 1988; Satten, 1980; Shepard, 1986).

The Motorcycle Rider Course (MRC) consists of eight hours of classroom instruction followed by 12 hours of practical on-cycle training. The classroom instruction includes lectures, films, discussions and multiple choice tests. The on-cycle section is based on the assumption that the participants are novice riders and involves basic motorcycle handling skills before more advanced manoeuvres are attempted. At the end of the fourth session, students are given an in-course test which is designed to identify weaknesses in riding, and a multiple choice test at the end of the training course. In some parts of the United States, completion of the Motorcycle Rider Course is sufficient for issue of a licence.

Satten (1980) compared the licensing rates, riding exposure and accident experience of riders who had completed the MRC with a control group of riders who had purchased motorcycles during 1977 or responded to flyers placed on motorcycles or advertisements in newspapers. Unfortunately, the sample size in the study was small.

The MRC riders were less likely to have been involved in accidents or to have traffic convictions. However, they also had fewer years of riding experience and rode a shorter distance per week. They were also more likely to be female. It is not clear from the study whether the lower involvement in accidents and fewer traffic convictions of the MRC group could be explained by less riding but this seems likely.

Mortimer (1984, 1988) conducted two evaluations of the Motorcycle Rider Course. Both studies compared riders who had completed the course voluntarily with control groups consisting of people approached in motorcycle shops. The trained groups appeared to be generally lower risk takers – they were more likely to wear seatbelts when travelling in cars and more likely to wear protective clothing when riding than the control group. Therefore, it appears that the control group may not have been appropriate to establish the effect of training on the lower risk takers who comprised the trained group. Given the above, it is not surprising that Mortimer's studies found that the trained riders rode less mileage, rode less of their mileage on highways and rode less powerful motorcycles.

The MRC riders and controls did not differ in the number of accidents or traffic violations although the second study suggested that the accidents of trained riders were less severe (this may be a consequence of their different riding patterns, however).

Shepard's (1986) study also had methodological and statistical shortcomings. It found that the number of Air Force personnel who had been killed or injured in motorcycle accidents first increased when there were increasing numbers undertaking training but then decreased.

Rockwell, Kiger and Carnot (1990) reported an evaluation of the Ohio Motorcyclist Enrichment Program (OMEP) Basic Riding and Street Skills Course. The course is based on the MRC and comprises eight hours of classroom tuition and eight hours on a motorcycle

riding range. The trained sample were almost 2,000 riders who had completed the OMEP. Almost 6,000 riders who held a motorcycle licence endorsement comprised the control group.

A higher percentage of the trainees who had scored in the highest skill category had been involved in a motorcycle crash than those in all other skill test categories. However, those trainees who obtained scores above 85% on the knowledge test appeared to have a lower motorcycle crash involvement rate in 1989.

In an evaluation of the Illinois Department of Transport motorcycle rider training program, Lakener (1984) compared a group of participants in the training program with a control group of people who had a current valid motorcycle licence. Some members of each group never actually rode. The trained riders rode less often, rode less powerful machines, were less likely to own a motorcycle and were less likely to hold a licence. Not surprisingly, trained riders were less likely to report having been involved in an accident or obtaining a moving violation or infringement notice. They had, however, been involved in fewer accidents per mile ridden.

The California Motorcyclist Safety Program is funded by a $2 levy on motorcycle registration fees. It includes two training courses: the basic Riding and Street Skills (RSS) program for novice motorcyclists and the Experienced Rider Course (ERC). Public awareness campaigns and research projects are also funded as part of the program. The RSS became mandatory for riders aged under 18 in January 1988 and this was extended to riders aged under 21 in 1992 (Billheimer, 1991; Wilson, Dunphy and Hannigan, 1995). The RSS is a 15-hour course which includes both classroom and on-cycle instruction. Level I of the course is designed to give riders an overall understanding of motorcycling and to prepare them with basic riding skills. Level II applies the basic riding skills to street riding conditions on a controlled riding range.

On-going evaluation of the course has shown that the course plays a role in discouraging some individuals from becoming riders. In a survey (reported in Wilson et al., 1995), 44% of students failing to complete the course said they no longer rode when interviewed a year after training, compared with 24% of those who passed. Of those trainees who no longer rode, 16% said that the RSS was a major factor in convincing them not to ride. Trained riders were also more likely to wear protective footwear or jackets. The effects of the California Motorcyclist Safety Program on accidents were examined in a number of ways. Analyses of statewide accident trends showed that motorcycle accidents dropped 59% since the introduction of the program, with a drop of 81% for the under-18 year old riders for whom rider training became compulsory. Accident trends in California also dropped relative to the rest of the US. Matched pairs of trained and untrained riders were used to estimate the effects on accident rates. Preliminary analyses showed that accident rates for untrained riders appeared to be 10% higher than for their trained counterparts in the six months after training. Wilson et al. (1995) noted that the accident rates will be adjusted for exposure in later reports.

### 2.3.2 Canadian studies

One of the few courses that included on-road riding was the Motorcycle Training Program in Canada which included four hours of theory, ten hours of off-road riding and six hours of on-road riding (Jonah, Dawson and Bragg, 1982). The course appeared to have no effect on the number of accidents or traffic violations, after controlling for confounding variables.

Another Canadian evaluation was McDavid, Lohrmann and Lohrmann's (1989) study of the British Columbia Safety Council's training course. The only available details of the course are that it was voluntary and that it was of 37 hours duration. Therefore it was a relatively long course. The design of this study was much more rigorous than many of the other studies. Case and control riders were matched on car accident history (accidents and moving violations) in the two years prior to the motorcycle course, when their motorcycle licences were obtained, age and sex (all members of both groups were male). Unfortunately, this level of matching reduced the sample size to 139 in each group.

McDavid et al. examined the accident and moving violation histories of each group for the five years after the course. Overall, the untrained group had 32% more crashes (both car and motorcycle) than the trained group, a difference which was statistically significant. The untrained group had 64% more motorcycle crashes, which is not statistically significant because of the smaller numbers of crashes. However, the reduction in motorcycle crashes appeared to be greater for younger riders, particularly in the two years following the course. The extent of personal injury and damage to motorcycles in crashes were both less for trained riders but no statistical analyses of these figures are presented.

### 2.3.3 British studies

Raymond and Tatum (1977) report an evaluation of the Royal Automobile Club/Auto Cycle Union Motorcycle Training Scheme in Lancashire and Berkshire. No details of the course were provided in the article. Control riders were chosen from a random sample of provisional licence applicants who had obtained their licence just prior to the commencement of the course. There was no difference between the trained and control groups on accident rates per rider. The trained riders, though, had more accidents per mile travelled. The control group rode more miles.

Another British evaluation is reported by Wisher and Reid (1988). The trained group had undertaken a course at a motorcycle training centre in Norfolk County (lasting between one day and several weeks) and passed the Part 1 Test, an off-road test of motorcycle handling skills which is a component of the licensing procedure. The accident rates for the trained riders were calculated by searching Police records for their names. The results suggest that the casualty rates for the trained riders were higher than the average County casualty rate for all motorcycle riders. There was no significant difference between the accident rate for trained riders who had attended a short course (e.g. one day) and those who had attended a longer course.

Compulsory Basic Training (CBT) was introduced in the United Kingdom in December 1990 as part of an effort to improve the road safety of motorcyclists (Thompson, 1994). By regulation, riders are not permitted to ride on the road until they have completed CBT. The effect of CBT has not yet been rigorously evaluated.

### 2.3.4 South Australian study

Kloeden, Moore and McLean (1994) reported a re-evaluation of the pre-licence training program for motorcyclists in South Australia (Ridersafe). The training was compulsory to obtain a learner permit.

Prior to the introduction of the Ridersafe system in April 1987, riders were required to complete a general theory test and be over 16 years old to obtain a learner permit. Within three months, a practical riding test could be taken to obtain probationary licence. This was a 30-minute test in which the instructor followed and assessed the rider. After one year of serious-violation-free riding this was converted to a full licence. There was only one learner permit for cars and motorcycles.

Under the Ridersafe system, in order to obtain a learner permit, a rider must be 16.5 years old, pass a general theory test, and attend two 4-hour training sessions at a training centre. To obtain a probationary licence, they must return between four and six months later and take a 4-hour course during which their performance is evaluated by an instructor. After one year of serious-violation-free riding they are then eligible for a full licence provided they are at least 19 years old.

The Ridersafe system was phased in by postcode, so those in the selected postcode areas were required to complete the course first, while others still did not.

The two 4-hour training sessions (Session A and B) to obtain a learner permit were held at a training centre and involved 190 minutes of lecture and discussion, 75 minutes of videos and 184 minutes of riding on motorcycles provided for students. Sessions A and B were held on separate days. The courses were designed for people with no riding experience. Areas covered in this training course included starting the motorcycle and using the controls, turning and braking, defensive riding, gear changing, braking in corners and counter-steering. Those who were not considered to be ready for open road riding were asked to return for a repeat course at no cost before being eligible to obtain a learner permit.

The course (Session C) that needed to be completed in order to obtain a probationary licence comprised 74 minutes of lecture and discussion, 38 minutes of video and 75 minutes of on-course riding. There was an introduction and review followed by a preparation for the final testing phase where riders had to complete a number of tasks. The testing phase required riders to complete the following tasks: ride around a sharp S-bend, do a tight U-turn, weave between closely spaced objects and ride very slowly for 15 seconds without putting a foot on the ground. The riders also had to successfully brake to a complete stop within 11 metres at 25 km/h after a hand signal from the instructor. Those judged to be unsafe were asked to repeat the course at no cost.

There was no effect of Ridersafe on crash rates, either positive or negative over time, but there was an increase in the frequency of crashes among a sample of Ridersafe trained riders (4.4%) compared to untrained riders (control group) (1.8%). However, the difference in the control and test groups was probably due to unusual characteristics of the control group. Once the problems with the control groups were taken into account, there was no statistically significant effect on crash rates associated with the Ridersafe drivers. However, it is likely that the sample size was too small to obtain meaningful results.

## 2.4 TRAINING AND TESTING

Most rider training programs currently in use focus on the development of rider skill. This is not necessarily through choice but is often brought about through time constraints, and the need to prepare a rider for an end test that is skill based. Thus the nature of the test influences the nature of training.

Another effect of the type of testing is its role as a filter in allowing those who pass to be licensed (and therefore more likely to ride on the road). Riders with a low level of skill are likely to fail a skill-based test. Those more highly skilled riders who pass may or may not be less likely to be involved in crashes in the future than the less skilled riders.

A number of studies have examined the effects of new testing procedures (with or without training) on later crash involvement, risk and/or exposure.

### 2.4.1 Studies of the MOST and MOST II

A series of North American studies have examined the effects of new testing procedures, including the Motorcycle Operator Skill Test (MOST, Anderson, 1980; Jonah, Dawson and Bragg, 1981) and the revised MOST II (Kelsey, Liddicoat and Ratz, 1986).

The MOST is an off-road skill test consisting of the following exercises: starting and accelerating on a hill, making sharp turns, turning control – right and left at normal speed, stopping judgement, turning speed judgement, making a quick stop on the straight, obstacle avoidance and making a quick stop on a curve.

The MOST II consists of a sharp right turn, accelerating and slowing through an arc to the right, then one to the left, controlled stop with the front tyre inside a marked area, turning speed judgement, quick stop on a straight path, obstacle avoidance and quick stop on a curved path.

Anderson (1980) compared the rate of obtaining licences, crash rates (after 6 months and 1 year) and riding exposure for over 40,000 applicants for motorcycle licences at six field offices in San Diego and Sacramento from 1976-78. Subjects were randomly assigned to one of the three licensing programs:

1. the then current procedures in California,
2. a new manual, knowledge test and skill test (MOST, **with** remedial training for those who failed), and
3. a new manual, knowledge test and skill test (MOST, **without** remedial training for those who failed).

Remedial training consisted of 30 minutes in class and 2.5 hours on motorcycle.

Some subjects in the new procedures groups did not proceed with their application after being informed that they would be required to pass the new knowledge and skill tests and would need to travel to the range to undertake the skill test. For this reason, the current procedures group (control group) had the highest rate of obtaining their licences and the highest rate of instruction permit issuance (this is issued when the knowledge test has been passed and does not allow a rider to ride at night, on a freeway, or carry a passenger).

The improved procedures programs had significantly lower motorcycle accident rates after 6 months than the control group and the lowest rate belonged to the group with remedial training. After one year, riders in the group which included remedial training for those who failed had 14% fewer total fatal and injury accidents than those in the current procedures program. This was still true when controlling for riding exposure. Riders without remedial training showed only a small amount of reduction in accident rates over one year (compared with the current procedures program). Those who had been offered remedial training to help them pass the MOST showed a 22% reduction in motorcycle accidents compared to those who were not offered remedial training. Thus poor initial vehicle control skills were associated with fewer subsequent crashes.

Jonah and his colleagues have reported a series of evaluations of the MOST (Jonah and Dawson, 1979; Jonah, Dawson and Bragg 1981).

Jonah, Dawson and Bragg (1981) examined the effects of performance on the MOST on later crash involvement. Their sample consisted of 548 male and 53 female applicants for motorcycle licences in 1977 at one licensing centre in Ontario, Canada. About 400 subjects were followed up 12 months later and interviewed. Interviews included questions about motorcycle ownership, riding experience (months riding), riding exposure (distance travelled), training, accident involvement, traffic violations, general riding behaviour, and demographics. In total, 538 driving records were obtained. Riders were only included if they had ridden more than 160 kilometres during the year.

Those who passed the MOST were 42% more likely to have had accidents than those who had failed the test. Performance on the MOST did not relate to their likelihood of having reportable accidents. Riders who had passed the MOST were more likely to have accidents recorded on their driving records. However, performance on the MOST did not relate to the likelihood of accidents once age and riding exposure were controlled for.

Kelsey, Liddicoat and Ratz (1986) examined the effects of a modified version of the MOST (MOST II). It consisted of sharp right turn, accelerating and slowing through an arc to right, then one to the left, a controlled stop with the front tyre inside a marked area, turning speed judgement, a quick stop on a straight path, obstacle avoidance and a quick stop on a curved path. The standard test (control group) consisted of a written test and a skill test comprising an exercise in which riders had to weave between cones at slow speed followed by a requirement to ride in a circle to the left and then to the right.

Motorcycle applicants in California were randomly assigned to either control – standard California test (over 28,000), or test group – MOST II (over 30,000). Remedial training was not offered to applicants who failed the MOST II. Some people in each group were required to travel a distance of about 20 kilometres in order to take their test at feeder offices. This was to insert the 'inconvenience' factor noted in the Anderson study.

The combined attrition and failure rates for the knowledge tests were similar for the standard and MOST II groups. The combined attrition and failure rates for the skill test were higher for the MOST II group than the control group.

Analyses of covariance were used to compare the effects of the two tests. This allowed the effects of age, sex and prior driving record (total convictions, injury and fatal accident involvement and property damage only accidents for the 12 months prior to the application

for the motorcycle licence) to be removed from the effects of the tests. Two sets of analyses were conducted: the first for all applicants to measure the total effects of the program and a second set of analyses restricted to those riders who completed the licensing process within the timeframe of the study. The effects on the following variables were examined:

- total reported motorcycle accidents
- fatal and injury motorcycle accidents
- motorcycle convictions and failures to appear in court
- total reported accidents for all vehicles
- fatal and injury accidents for all vehicles
- convictions and failures to appear in court for all vehicles.

These variables were measured at the 1 and 2 year stages after application for the licence. An additional set of analyses was conducted on the driving records of the licensed riders 12 months subsequent to the issue of the licence.

The inconvenience of having to travel about 20 kilometres to undertake the skill test appeared to reduce the motorcycle licensing rate and encouraged the applicants to switch to car driving instead.

The overall findings of the study were that applicants assigned to the MOST II group had more fatal and injury motorcycle accidents and motorcycle convictions than applicants assigned to the Standard Test. When the analysis was restricted to the licensed riders, the MOST II riders had more total motorcycle accidents at the 2-year stage and more motorcycle and total convictions than the riders in the Standard Test group.

Buchanan (1988) compared the MOST II with the current system in New York. The sample comprised 26,000 New York residents applying for a motorcycle licence between 1981 and 1983. Subjects were assigned to one of four groups:

1. control group: current system comprising 5-item motorcycle knowledge test and the existing New York State In-Traffic Road Test (almost 7,000 subjects, 35% completed licensing process). The Road Test consisted of the rider executing 2 figure eights, 2 right circles, 2 left circles (Manoeuvre Phase) and 2 starts from the kerb, 3 right turns, 3 left turns, 2 traffic lights, 2 stop signs, one yield right of way sign (if available) and 2 uncontrolled intersections (In-Traffic Phase).
2. MOST II group: new 25-item motorcycle knowledge test and the MOST II (over 6,000 subjects, 29% completed licensing process)
3. three hour training group: three hour training course, new 25-item motorcycle knowledge test and the MOST II (almost 7,000 subjects, 25% completed the licensing process)
4. twenty hour training group: Motorcycle Rider Course, new 25-item knowledge test and the MOST II (almost 7,000 subjects, 26% completed the licensing process)

The three-hour training group were given a guide which consisted of descriptions of the eight exercises which would be covered in the course. This training course was called the Rider Skill Development Program and was developed by the National Public Services Research Institute for the Californian Department of Motor Vehicles. It comprised half an hour of classroom instruction and two-and-a-half hours of practical training on MOST II exercises.

A questionnaire was mailed to participants one year after their application for a learners permit. Certain information was also obtained from the New York State Department of Motor Vehicles driver record files.

Non-motorcycle accidents within 18 months of the application date for a learner permit were lower for the control group (standard in-traffic test) compared to the three experimental groups.

The experimental group subjects (Groups 2, 3 and 4) had higher motorcycle conviction rates than the control group riders at both 3 and 6 months, and this did not appear to be because of higher exposure, but seems to be because riders in the experimental groups were on their Learner Permit for longer and received more convictions relating to violating the restrictions of Learner Permit.

There were no differences overall in motorcycle accident rates among the groups of applicants. The three-hour training group had a 30% higher accident rate than the control group. When the analysis was confined to those subjects who received their licence, there were no significant differences between the four groups on accident rate.

The twenty-hour training group had a significantly lower mean motorcycle conviction rate than the control group at 3- and 6-month intervals. Neither the skill test nor the training course was shown to be any more effective for riders who had previous riding experience compared to novice riders.

There were no statistically significant differences for motorcycle accident severity amongst the four groups, either for unlicensed or licensed riders, one year after obtaining their learners permit or their licence respectively.

Riders who attempted the MOST II had higher failure rates on their first attempt at a licence than control group riders who attempted the current New York test. Trained riders did not do better on their first attempt at the MOST II than untrained riders. Riders in the twenty-hour training group did worse than those in the three-hour group on their first attempt at the MOST II. The untrained riders performed better than the trained riders on their first attempt at the sub-tests of the MOST II that assessed correct braking procedures and obstacle avoidance.

Those riders who were assessed by the MOST II as showing higher skill levels were not significantly less likely to be involved in subsequent motorcycle accidents.

### 2.4.2 Learner permit tests in Victoria

Wood and Bowen (1987) reported an evaluation of the revised testing procedure for obtaining a learner permit in Victoria, introduced in June 1983. The study compared licensing rates, exposure and crash rates for four groups of riders:

1. pre-introduction group: those who obtained a learner permit before the new testing procedure (n=290),
2. post-introduction group: written and skill tests with a training course (n=107),
3. post-introduction group: written and skill tests without the training course (n=189), and
4. post-introduction group: only the written test required (n=84).

All riders were posted questionnaires. Riders who took the skill test as part of the training course rode a significantly lower mean distance than those who took the skill test without training. Overall, the post-introduction groups rode further, but this was not statistically significant. Riders in the post-introduction groups obtained their licences sooner, although there was no difference in eventual licensing rates.

In metropolitan and non-metropolitan areas, there was a reduction in motorcycle casualty accidents involving learner permit holders, compared to a much smaller reduction for fully licensed riders. The involvement of motorcycle learner permit holders in casualty accidents decreased by 29% in the 1983/84 period, and by 46% in the 1984 period relative to the 1982 level. Wood and Bowen concluded that "Over the 12 month period before and after the introduction of the new system, the accident rate/million kilometres ridden for permit holders decreased about 22% for the State as a whole but increased by about 9% for the inner metropolitan areas. These areas were the only ones where skill tests were required to be undertaken as part of the permit issuing process" (p 38).

### 2.4.3 Summary of training and testing studies

The results of the North American studies suggest that there is an association between better vehicle control skills as measured by performance on the skill test and a larger number of subsequent crashes. The Victorian study supports this by finding that learner rider crash reductions were smaller in areas where it was necessary to pass a skill test for the issue of a learner permit.

## 2.5 GENERAL STUDIES OF MOTORCYCLE CRASH FACTORS

A number of case-control studies of risk factors for motorcycle crashes have examined the role of training, along with other factors (Haworth, Smith, Brumen and Pronk, 1997; Hurt, Ouellet, and Thom, 1981; Kraus, Riggins and Franti, 1975; Mullin, 1997).

In their univariate analyses, Kraus et al. (1975) reported that being trained approximately doubled the risk of having a crash whereas Hurt et al. (1981) found that it halved the risk of having a crash. Once they controlled for other factors such as distance ridden, age and sex of the motorcyclist there were no significant effects of training.

### 2.5.1 New Zealand studies

In New Zealand a person is eligible to ride a motorcycle on public roads from the age of 15 years (with certain restrictions). Applicants for a learner motorcycle licence must pass a theory test and obtain a basic handling skills certificate through an approved motorcycle training school. Thus all motorcyclists who have obtained a learner permit since 1987 should have completed at least one training course.

Reeder, Chalmers and Langley (1996) discussed rider training of a sample of 18-year old motorcyclists in New Zealand. Most had not undertaken formal training and had often learnt to ride before the age at which formal training was available. They conclude that "overall, the official training and licensing system in New Zealand seems less than ideal and coexists with widespread informal, and sometimes illegal, learning practices" (p.373).

Mullin (1997) examined the effects of training beyond the basic handling skills certificate on risk of involvement in a casualty crash. She found that most riders had not undertaken any additional courses. Those who had completed additional courses had about a 30% lower risk of crashing. However, when a range of other factors were included in the model, the size of the risk reduction was unchanged but it was no longer statistically significant.

If experience as a car driver reduces risk of motorcycle crash, then this is indirect evidence that cognitive skills (which are more likely to be similar for both types of vehicle) are more important than vehicle control skills. Mullin (1997) found no such effect, after controlling for factors such as age, experience and distance driven.

### 2.5.2 Australian studies

Haworth et al. (1997) examined risk factors for motorcycle crashes. They concluded that having completed at least one training course had no significant effect on the odds of crashing after adjusting for age group, BAC or licence status. Inexperience was associated with a higher likelihood of having had training. This is likely to have occurred because basic skills training has become more widespread in recent years and so is prevalent among novice riders. Across each age group and licence status, inexperienced riders appeared more likely to have undertaken training. However, completing an advanced course, as compared to a beginners course, was associated with a significant decrease in the odds of crashing.

The results suggest that training may be associated with a lower likelihood of riding after having consumed alcohol. Riders with a positive BAC (both cases and controls) were less likely to have completed a training course than riders with zero BAC. Crashed riders with BAC>.000 tended to be more likely than other crashed riders to state that machine handling skills were the most important thing that they had learnt from training. However, there were only small numbers in this group.

## 2.6 DISCUSSIONS OF THE RELATIVE IMPORTANCE OF ATTITUDINAL AND VEHICLE CONTROL COMPONENTS IN TRAINING PROGRAMS

It has been hypothesised that the apparent lack of success of rider training in reducing accident risk stems from the content of the training programs (Chesham, Rutter and Quine, 1993; Crick and McKenna, 1991; Reeder et al., 1996; Simpson and Mayhew, 1990). The rider training programs currently in use focus mainly on the development of vehicle control skills. This is not necessarily through choice but is often brought about through time constraints and the need to prepare a rider for an end test that is skill-based.

There is considerable room for the important attitudinal concepts of cognition, perception and reaction to be more effectively delivered. Rothe and Cooper (1987) concluded that 'the lack of riding skill is not the major problem. Attitudes, personality and awareness of others are'. They went on to recommend that 'motorcycle rider training courses should be more attentive to education than training' and these courses 'should use instructors who are better prepared to implement the education-oriented programs' (p.203). Chesham et al. (1993) concluded that 'training courses concentrate on riding technique and pay little attention to why safe riding is important. That is, they offer little by way of cognitive underpinning for the behaviours they promote. Already evidence is pointing to the types of underpinning that courses should aim to develop, and we hope that they will' (p.428).

Recent research supports this argument. Many crashes are now known to be the result of a lack of *cognitive underpinning*'s, namely; scanning, attention, decision making, judgement, risk taking, anticipation and other cognitive skills. These are key components of what is known as 'hazard perception'. Crick and McKenna (1991) give a useful working definition of hazard perception in the driving domain:

> Hazard perception refers to the ability to identify potentially dangerous traffic situations. The failure of drivers to perceive road hazards in good time has been implicated as one of the most important contributory factors among behavioural causes of road accidents. Empirically, hazard perception is one of the few component skills of the driving task to have shown significant correlation with accident involvement, and one of the few that have shown to be validly measurable not only on the road but also using laboratory simulations. (p.100)

McKenna and Crick (1992, cited in Crick and McKenna, 1991) found that their test of hazard perception discriminated between a group of expert police drivers and a group of experienced drivers. They considered that this difference most likely resulted from the difference in the quality and quantity of training received by the two groups. They concluded that "this implies that hazard perception skills are amenable to modification and improvement through advanced training courses, which, given the established link between hazard perception and accident involvement, suggests in turn the potential value of advanced training courses as a means of countering road accidents" (Crick and McKenna, 1991, p.100).

Crick and McKenna ascribe the lack of evidence for the benefits of advanced training in road safety to a lack of methodological soundness in previous evaluations and to the content of the courses: "it may be the case that the [advanced] courses assessed have focused very little on the acquisition of hazard perception skills. The same might be said of basic, pre-licensure training courses, which if true, may explain other puzzling or paradoxical findings in the literature" (p.104).

Jonah, Dawson and Bragg (1981) attributed the failure of the Motorcycle Operator Skill Test (MOST) to predict accident involvement to the absence of testing for danger perception and risk-taking. "The focus of the MOST test and indeed most licensing tests is still primarily geared towards the acquisition of basic vehicle control, a fact which inevitably influences the content of elementary training courses aimed essentially, whether consciously or unconsciously, at equipping novices to pass the test" (Crick and McKenna, 1991, p.104).

Simpson and Mayhew (1990) speculate that some riders may actually benefit from skills training while others will not. They posit that perhaps trainees who begin with a relatively low level of skill development could benefit from training while others who are more skilled in vehicle control may find little safety benefit in completing a course.

## 2.7 CONCLUSIONS FROM THE LITERATURE REVIEW

Most of the evaluations of training courses set out to determine whether the courses had any effects on licensing rates, crash involvement, infringements and/or the extent and nature of riding. Methodological deficiencies prevented these aims being achieved in most studies.

Given that the evaluations did not set out to compare the effects of attitudinal and vehicle control components of training, it is not surprising that they contribute little to addressing this issue. Generally, the courses focused on vehicle control skills to train riders to pass tests which emphasised vehicle control skills.

Some evaluation studies suggested that riders who scored higher on vehicle control skills in some tests had more crashes later. The newer tests requiring higher levels of vehicle control skills (such as MOST) did not reduce crash rates. There was some suggestion that training on cognitive skills can improve these skills and reduce crash involvement. However, to ensure that such components receive sufficient focus in training, there is a need to ensure that they are emphasised in the learner permit and licence tests.

In general, training appears to be successful in teaching novices to ride. There is no clear evidence that it makes them safer riders.

# 3.0 REVIEW OF CURRICULA

## 3.1 STATUS OF MOTORCYCLIST TRAINING AND LICENSING IN VICTORIA

Currently in Victoria a novice rider must be at least 17 years and 9 months old before obtaining a learner permit. The rider is required to hold the learner permit for a minimum period of three months before attempting the licence test. If the test is passed, the rider is issued with a restricted licence for one year. During the learner and restricted periods, the rider is subject to an engine capacity restriction of under 260 cc and is prohibited from carrying a pillion passenger. During the learner period there is a zero blood alcohol restriction that continues for the first year of licensing if on a probationary licence (i.e. if the rider does not hold a full car licence). There is no exit test for the restricted licence.

Most newly licensed motorcyclists have car licences. In 1998, 84% of riders obtaining a motorcycle licence in Victoria had a full car licence. This means that they had at least three years solo driving experience in addition to up to two years driving with a supervisor.

Under the current motorcycle licensing system, there is little real difference between the restrictions on learner permit holders and restricted licence holders. Learner permit holders are allowed to ride unsupervised. The original rationale for allowing learners to ride unsupervised on public roads was to allow them to gain on-road experience before attempting the (now discontinued) on-road test. However, there now exists the anomaly that a rider may fail the current licence skills test and continue to ride on the road as a learner permit holder.

Training is not compulsory to obtain a learner permit or a restricted licence, but most riders attend one or more training courses. Since 1993, VicRoads has accredited six external providers of motorcycle training to offer training and testing services in the state of Victoria. VicRoads, as the state licensing authority, is responsible for the administration of the contracts under which the providers operate. Each provider has its own curricula incorporating all the requirements of the contract with VicRoads. Some of the providers utilise the earlier VicRoads motorcycle training curricula while others have developed new curricula.

### 3.1.1 Learner permit courses

The learner course for a student with no experience takes nine or twelve hours, depending on the provider. This includes administration of the learner permit test (less than 10 minutes) and, in some cases, break time. In recognition of previous experience, not all the riders undertaking training at learner permit level are required to complete the full course. A person who has the ability to ride forward, maintain balance and change gears, is permitted to undertake a course which comprises the latter six hours of the twelve hour course. The six hour course includes almost all of the cognitive skills coverage of the twelve hour course.

The components of the learner permit training programs can be grouped under two general headings:

**Practical Skills**
Identification/location of controls
Mounting and dismounting techniques
Manoeuvring the motorcycle by hand
Friction zone - getting under way
Gear changing
Turning corners
Slow riding techniques
Riding curves
Braking – normal stop/quick stop

**Knowledge Training**
Protective clothing
Visibility/conspicuity of riders
Braking and steering techniques
Traffic riding situations/strategies
- lane positioning
- communication
- speed regulation
- following distance

Some instructors may include a cognitive skills component in the practical skills. The extent of cognitive skills components in the knowledge training is dependent on the instructor.

### 3.1.2 Licence courses

The licence courses are of six or eight hours (one provider only) duration, including the administration of the test. The courses vary in the range of skills covered. Some newer courses cover a wider variety of material than that simply required to pass the test. All riders are required to complete the entire course, regardless of level of experience or skill.

The components of the licence training programs can be grouped under two general headings:

**Practical Skills**
Counter-steering techniques
- application to U turns
- application to swerving around obstacles

Riding curves
- progressively tightening curve (gentle to sharp curvature)

Braking
- quick stops on the straight
- quick stops in a curve

**Knowledge Training**
Setting up motorcycle controls
Principles of Counter steering techniques
Principles of emergency braking
- straight
- in a curve

Traffic riding situations/strategies

Some instructors may include a cognitive skills component in the practical skills. The extent of cognitive skills components in the knowledge training is dependent on the instructor.

## 3.2 REVIEW AIMS, DEFINITIONS AND METHODS

### 3.2.1 Aims

The review of the motorcycle training curricula sought to establish:

- the current balance between attitudinal and vehicle control skills across the present learner courses (averaged across providers) and across the present licence courses (averaged across providers);
- the variations between courses (the evaluation of the individual courses of each provider is not discussed in the report due to confidentiality reasons);
- suggestions for improvements and additions to the average course, and how any additional skills could be effectively taught to potential motorcyclists.

### 3.2.2 Definitions

For the purpose of the review it was necessary to define attitudinal concepts and skill based training as follows:

- **Attitudinal/Cognitive**: any instruction or advice which directly relates to mental strategies or safe interaction on the road. It may be delivered in the context of teaching practical skills on the range or in the classroom.

- **Vehicle skill**: any instruction or activity directed towards the development of vehicle control ability. It may be delivered in the context of teaching practical skills on the range or in the classroom.

### 3.2.3 Methods used in the review

The review involved an examination of the rider-training courses (both learner and licence) from all the rider training providers to determine the balance of cognitive and vehicle skill based components. The subcontractor, Motorcycle Safety Services, evaluated the written curricula and visited each provider to observe the courses being run. Unfortunately, one provider was not able to participate in the project. This provider trained a relatively small number of riders (approximately 2% of the state total) and had a similar curriculum to two other providers.

To provide an objective measure of allocation of time, a stopwatch was used to measure the amount of time spent riding a motorcycle during a course and the amount of time spent receiving attitudinal training.

## 3.3 METHODS OF TEACHING ATTITUDINAL AND VEHICLE CONTROL SKILLS

### 3.3.1 Attitudinal skills

All the providers introduce 'attitudinal' concepts when teaching a range of subjects including braking, cornering and "roadcraft". Roadcraft is the term commonly used for classroom activities which usually revolve around a video presentation and a lecture delivered by the trainer. The roadcraft sessions are commonly of between 20 and 90 minutes duration.

During 'roadcraft', all the providers use drawings drawn by an instructor on a whiteboard to illustrate intersections and on-road scenarios. These are then used as the basis for discussion. Anecdotes are often included to support the concepts and add realism. These anecdotes tend to be from the instructor's experience or from the realms of popular urban myth.

None of the providers have developed a practical method of teaching how to identify hazards while riding.

In the classroom discussions of emergency braking and cornering there appeared to be little consistency. Although the general themes were similar, certain issues were given more attention and importance, depending upon the instructor's familiarity or personal beliefs on the subject. For example, some providers taught trainees that it was important to change gears while braking, while other courses did not. The preferred line for cornering also differed among providers.

### 3.3.2 Vehicle control skills

Rider skill in handling the motorcycle is a vital part of safe operation. All of the providers address key vehicle control areas identified in the VicRoads specifications, and develop those skills to a level that allows the rider to probably pass the statutory tests.

Motorcycle rider training in Victoria has focussed primarily on those fundamental vehicle control skills identified as being critical in controlling a motorcycle and avoiding collisions. These are braking, swerving and riding curves, the areas identified in the Hurt Report (Hurt et al., 1981). As a result, the current learner permit and licence tests in Victoria are largely skill based. While there is a motorcycle-specific written test for the learner permit, there is no such test at the licence stage. Thus, the emphasis on skill in the tests promotes the teaching of vehicle control skills in the courses.

In the licence course offered by one provider, most of the last four hours is spent practising the Motorcycle Licence Skill Test (MLST), rather than the general skills some of which are assessed by the test. The emphasis on practising the test components hinders students from developing the broad range of skills and expertise that they will require for safe operation on the road. In contrast, other providers' courses prepare the student by exposure to a variety of exercises using the skills which are later tested.

## 3.4 TIME SPENT TEACHING ATTITUDINAL AND VEHICLE CONTROL SKILLS

Table 1 summarises the amounts of time spent by the rider on the motorcycle receiving practical vehicle control instruction and the amounts of time spent on 'attitudinal' training in each of the providers' courses. These values include times spent in certain exercises where the rider is stationary waiting for a turn at a particular skill, such as emergency braking. Waiting can account for around 20% of the overall time and can severely limit the amount of time a student has to practice and receive instruction.

The ratios of time spent on vehicle skills compared to cognitive skills and the percentage of course time spent on each type of skill are presented in Table 2.

**Table 1. Time spent on vehicle skills and attitudinal skills in the learner permit and licence courses.**

| | Time spent (hours:minutes) | | | | | |
|---|---|---|---|---|---|---|
| | **Provider A** | **Provider B** | **Provider C** | **Provider D** | **Provider E** | **Average** |
| **Learner permit course** | | | | | | |
| Nominal course duration | 12:00 | 12:00 | 9:00 | 12:00 | 9:00 | **10:48** |
| Vehicle skills | 3:04 | 2:24 | 2:17 | 3:25 | 2:14 | **2:41** |
| Attitudinal skills | 1:10 | 1:18 | 0:56 | 0:54 | 0:58 | **1:03** |
| **Licence course** | | | | | | |
| Nominal course duration | 6:00 | 6:00 | 6:00 | 8:00 | 6:00 | **6:24** |
| Vehicle skills | 2:23 | 1:32 | 1:40 | 2:32 | 1:38 | **1:57** |
| Attitudinal skills | 0:34 | 1:05 | 0:52 | 0:34 | 0:56 | **0:48** |

### 3.4.1 Attitudinal skills

*Learner courses*

The average time spent on attitudinal training was 1 hour and 3 minutes, of which up to 29 minutes comprised related videos. The remaining time was spent describing vehicle control skills, the subsequent exercises and moving between exercises.

The total time spent on attitudinal skills varied from 54 minutes to 76 minutes. In general, 12-hour courses spent more time on attitudinal skills than 9-hour courses (except Provider D).

On average, attitudinal training comprised just under 10% of the course time. The time spent on vehicle skills was 2.6 times greater than that spent on attitudinal skills.

**Table 2. Relative amounts of time spent on vehicle skills and attitudinal skills in the learner permit and licence courses. Other activities include delivery of explanations, descriptions of exercises and course administrative activities.**

| | Provider A | Provider B | Provider C | Provider D | Provider E | Average |
|---|---|---|---|---|---|---|
| **Learner permit course** | | | | | | |
| Ratio of time vehicle skills to cognitive skills | 2.6 | 1.8 | 2.4 | 3.8 | 2.3 | **2.6** |
| Percent of time on vehicle skills | 25.6 | 20.0 | 25.4 | 28.5 | 24.8 | **24.8** |
| Percent of time on attitudinal skills | 9.7 | 10.8 | 10.4 | 7.5 | 10.7 | **9.8** |
| Percent of time on other activities | 64.7 | 69.2 | 64.3 | 64.0 | 64.4 | **65.4** |
| **Licence course** | | | | | | |
| Ratio of time vehicle skills to cognitive skills | 4.2 | 1.4 | 1.9 | 4.5 | 1.8 | **2.8** |
| Percent of time on vehicle skills | 39.7 | 25.6 | 27.8 | 31.7 | 27.2 | **30.5** |
| Percent of time on attitudinal skills | 9.4 | 18.1 | 14.4 | 7.1 | 15.6 | **12.6** |
| Percent of time on other activities | 50.8 | 56.4 | 57.8 | 61.3 | 57.2 | **57.0** |

*Licence courses*

Attitudinal training comprised an average of 48 minutes, with approximately 30% (14 minutes) comprising videos. The remaining time of the course was spent teaching vehicle control skills, describing the skills and moving between the exercises.

The total time spent on attitudinal skills varied from 34 minutes to 65 minutes. The 8-hour course did not spend more time on attitudinal skills than the 6-hour courses.

On average, attitudinal training comprised about 13% of the course time. The time spent on vehicle skills was 2.8 times greater than that spent on attitudinal skills.

### 3.4.2 Vehicle control skills

*Learner courses*

In learner courses, the average amount of time a novice rider spent on the motorcycle receiving skill based training was 2 hours and 41 minutes. Approximately 20% of this time was spent waiting for the opportunity to practice a particular skill, resulting in a net time of 2 hours and 9 minutes. However this measurement did not include explanations of skills or descriptions of exercises.

On average, vehicle skills training comprised about 25% of the course time.

*Licence courses*

In the licence level courses, the average amount of time spent riding the motorcycle was 1 hour and 57 minutes. Of this time, approximately 15% was spent waiting to attempt exercises resulting in a net time of 1 hour and 40 minutes.

On average, vehicle skills training comprised about 30% of the course time.

### 3.4.3 Summary

*Learner courses*

In the average learners course duration of 10 hours and 48 minutes, 10% of the time is spent covering attitudinal issues and 25% practising vehicle control skills. Thus, the time spent on vehicle control skills is 2.6 times greater than that spent on attitudinal skills.

In the courses currently offered to learner riders, there is a relatively small amount of time spent riding the motorcycle in the course prior to being tested and then being allowed to ride on the road. In addition, a comparatively small amount of time is spent addressing attitudinal issues. The remaining time is primarily spent describing skills and techniques, as well as providing feedback to students.

*Licence courses*

In the average licence level course duration of 6 hours and 24 minutes, 13% of the time was spent covering attitudinal issues and 30% was spent practising skills needed for the licence test. Thus, the time spent on vehicle control skills is 2.8 times greater than that spent on attitudinal skills.

The average proportion of time spent on attitudinal and vehicle control skills is similar for the learner and licence courses. On average, trainees spend more than twice as long on vehicle control skills than attitudinal skills.

*Efficiency*

The proportion of the course time accounted for by the attitudinal and vehicle skills component was calculated as an index of the "efficiency" of the course. Among the learner permits courses, this index ranged from 0.31 to 0.36. Among the licence courses, the index

ranged from 0.42 to 0.52. According to this criterion, the licence courses were more "efficient" than the learner permit courses, with little variation among providers in the index of "efficiency". However, learners probably require and benefit from more individual feedback, which has the effect of lowering the amount of time available for learning attitudinal skills and practising vehicle control skills.

## 3.5 CONCLUSIONS OF THE REVIEW

The review of the written curricula found that:

- all contents of the curricula provided by the accredited providers comply with VicRoads requirements,
- all curricula have satisfactory progression through the practical components, in terms of increasing difficulty,
- all have structured "roadcraft" components, and
- all are severely constrained by time limits due to commercial considerations and the licensing process.

The review of the delivery of the course components found that:

- vehicle control skills receive about two to three times as much course time as attitudinal skills in both the learner permit and licence courses,
- there is widespread inconsistency among instructors in the delivery of the programs at all but one of the providers, particularly with attitudinal concepts,
- lack of repeated practice due to time constraints restricts skills acquisition frequently to only just sufficient to pass the statutory test, and
- none of the providers have developed a practical method of teaching how to identify hazards while riding.

The providers deliver similar programs with similar content but with their own style of presentation. All the providers felt that the students, particularly at learner level, had insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road. This was also supported by many of the students themselves.

## 3.6 SUGGESTED IMPROVEMENTS

The following improvements are suggested to address the issues raised in the previous section:

1. Increase the amount of time spent on the motorcycle practising vehicle control skills. Improving time management by providing feedback to the students without delaying practice time may be possible. Better range control and use of speakers on instructor motorcycles appears to minimise delays.

2. Increase the time spent on the attitudinal and cognitive components to give a broader and more focused understanding.

3. Improve the structure and content of the attitudinal components.

4. Improved training, monitoring and supervision of instructors to improve competence in delivery and ensure adherence to the set curriculum.

5. Develop a hazard perception education program and test that can be introduced at all training providers. This may require lengthening the course or being provided at a later stage in the licensing procedure.

The VicRoads requirements for accreditation have ensured that there is little variation among providers in the content of the courses. There is, however, some variation in the techniques used in the delivery of the courses.

From observing both learner permit and licence courses, it is clear that formal identification of key cognitive concepts needs to be implemented and a structured and uniform method of delivery developed. These important components are highly dependent on the ability of the instructor to deliver. To be most effective any program must be delivered at a very high standard, with enthusiasm and with consistency.

One area where improvement in consistency could be achieved easily is in the use of overhead transparencies to present the attitudinal components described as “roadcraft”. Currently, all the providers use drawings drawn by an instructor on a whiteboard to illustrate intersections and on-road scenarios. These are then developed further into discussions. Three providers have overhead transparencies that are occasionally used instead of drawings. The practice of drawing on a whiteboard has the disadvantage of the drawing becoming cluttered and unclear. Consequently the important messages and concepts are frequently lost. The use of overhead transparencies allows a more consistent and time-effective method of teaching. It is recommended that overhead transparencies be developed that will be accepted readily by the instructors.

# 4.0 CONCLUSIONS

This report reviewed the published evaluations of training courses to identify the relative importance of cognitive and vehicle control skills and to assess the contribution that each type of skill has made to the effectiveness of the courses. It then reviewed the learner permit and licence courses currently offered in Victoria to determine the balance between attitudinal and vehicle skill based components, and provided recommendations to improve this.

## 4.1 LITERATURE REVIEW

Most of the evaluations of training courses set out to determine whether the courses had any effect on licensing rates, crash involvement, infringements and/or the extent and nature of riding. Methodological deficiencies prevented these aims being achieved in most studies.

Given that the evaluations did not set out to compare the effects of attitudinal and vehicle control components of training, it is not surprising that they contribute little to addressing this issue. Generally, the courses focused on vehicle control skills to train riders to pass tests which emphasised vehicle control skills.

Some evaluation studies suggest that riders who scored higher on vehicle control skills in some tests had more crashes later. The newer tests requiring higher levels of vehicle control skills (such as MOST) did not reduce crash rates. There was some suggestion that training on cognitive skills can improve these skills and reduce crash involvement. However, to ensure that such components are included in training, there is a need to ensure that they are emphasised in the learner permit and licence tests.

## 4.2 REVIEW OF MOTORCYCLE TRAINING COURSES

The review of the delivery of the course components found that vehicle control skills receive about two to three times as much course time as attitudinal skills in both the learner permit and licence courses. Yet all the providers felt that the students, particularly at learner level, had insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road. Commercial considerations severely constrained the time available to teach both attitudinal and vehicle control skills.

Some possible solutions appeared to be increasing the efficiency of delivery of courses by improved time management (reducing waiting times and delays between components) and improving the effectiveness and consistency of presentation of the attitudinal components (including using overhead transparencies). Even if these improvements are implemented, it is still likely that trainees may continue to have insufficient skill and inadequate attitudinal training to ensure their safety while learning on the road.

The review also identified a need to develop a hazard perception program and test that can be introduced by all training providers.

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