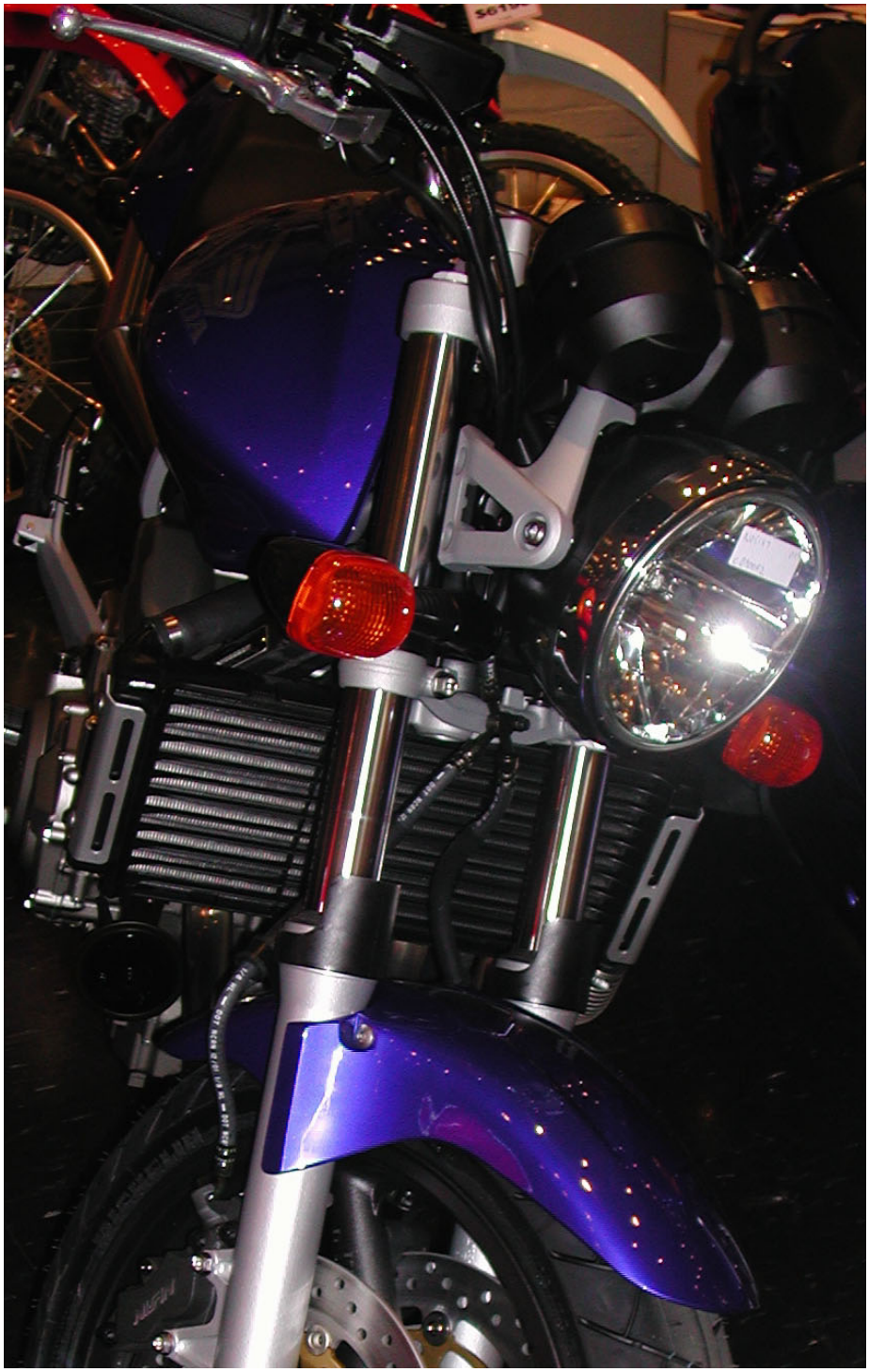
Visual Front Motorcycle Number Identification

Suitable for photographic camera detection



Report for **VicRoads**

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Abstract

The options for visual frontal identification methods for motorcycles were developed and assessed. Extensive consultation with users, Police, Registration Authorities, industry bodies and other stakeholders showed that there was a far greater concern over the method of visual identification than the basic issues of having front identification on the machines. The requirement for front number plates has not been in operation in almost all countries of the world for between 15 and 20 years, and motorcycle design no longer provides for it. Aerodynamic, cooling and styling designs now assume the absence of a requirement for a front mounting area for front registration number display. The best practical option identified and recommended is a pair of adhesive decals. The first with the registration letters and numbers arranged horizontally in a single line at a size approximately 80% of standard letter size [160mm wide by 80mm high], and the second vertically oriented, also reduced to 80% of the standard sized letters and number, with two horizontal lines, one of the letters and the next of the numbers [70mm wide by 124mm high]. Approximately 50% of the motorcycle fleet will also require a bracket or fixture that the adhesive decal can be stuck on to. The design of a suitable bracket is the subject of a separate project. Analysis of the Victorian motorcycle fleet and the likely operational and resource costs indicated that the cost of the proposal would cost a minimum of $13.8 million up to the end of a rollout in 2003, and $0.94 million a year thereafter.

FRONT COVER NOTES

The front cover picture is of a current unfaired 600cc motorcycle and was taken in a shop in Elizabeth Street Melbourne: the oldest motorcycle precinct in the world.

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EXECUTIVE SUMMARY

Oxford Systematics was commissioned by VicRoads and Transport WA to research options for front number plates on motorcycles that are practical and safe.

There have been substantial rises in motorcycle deaths in the last four years, against a background of a 21% rise in new on road registrations, and coupled with a greater than 24% rise in the number of registered motorcycles in Victoria in the last three years.

Front numbers on motorcycles would be a virtually unique requirement world wide. As Australia has no significant manufacturer of motorcycles and Australian Design Rules (ADRs) are in the process of harmonisation with global standards such as those of the European Union, the United Nations Economic Commission for Europe and the US Federal Motor Vehicle Standards: none of whom have provision for front number plates, Australian proposals for the reintroduction of front number plates would be unlikely to attract manufacturer involvement of the initiation of the development of appropriate standards.

Motorcycle manufacturers have not had to cater for front number identification for about 20 years worldwide, and over the same period the design of motorcycle front ends has become a key component in engine cooling, aerodynamics and styling. These integrated design approaches have successfully addressed the issues of instability that were a concern 20 years ago (Australia: House of Representatives,

1979) by treating the aerodynamics and the suspension and the tyres as an integrated whole with the rest of the machine.

Australia would therefore have to develop and apply local after-market measures to reintroduce frontal number presentation on motorcycles. The present report addresses this process and makes recommendations for the best way to implement the proposed reintroduction and retrofitting of front number plates for motorcycles.

The objective for reintroducing front number identification is to ease the task of State Police in speed enforcement using their present operational camera practices. The context for such an investigation is the rise in motorcycle deaths, and the concern that motorcyclists might not be fully subject to the speed environment management strategy now a cornerstone in State Road Safety programs.

However, the knowledge that the Police place such reliance on frontal images was not widely known amongst motorcyclists across most of Australia until the recent publicity. There have been increases in fatal crashes involving motorcycles in Victoria, against a background of rising sales (half of which are not usually registered as being designed mainly for off road use on farms etc), rising new registrations (21% since 1998) and rising numbers of motorcycles on the register (15% since 1998) and increased participation levels especially by older motorcyclists. There is also some evidence that speed is over represented in motorcycle fatalities in particular, leading to an enhanced focus on speed management practices for motorcyclists.

The two major options available to raise the level of frontal image detection and identification are to reintroduce and retrofit front number identification to Australian motorcycles or to modify police practice to make greater use of rear and dual front/rear camera configurations. Both are likely to be pursued. The present report addresses the best means of reintroducing and retrofitting frontal numbers on the entire motorcycle fleet on register.

The research for this project included consultation. This was very successful, and secured a large number of substantive responses form industry, government and user stakeholders as well as individual motorcyclists. See Appendix 5 for a selection of the formal responses. The verbal, email and written feedback obtained from motorcycle users included thoughtful cost benefit analyses, details of possible approaches, support for identification (if not necessarily for front plates , as there were many concerns over their fitment to many machines), a consistent pattern of puzzlement over the problems of enforcement that appear to demand reintroduction of front visual plates when rear plates are used world wide with the same enforcement equipment, and a widespread lack of conviction that the proposal was for safety goals.

Practical investigations have shown that adhesive front number plates (decals) offer the best solution for front number display. Mounting these decals on the motorcycles will still require special brackets or other fitments to more than half the motorcycle fleet. The recommended option is a combination of horizontal reflective decals with registration numbers and letters somewhat smaller than current plates, and a vertical variant with numbers and letter on two successive lines. The best option is a pair of adhesive decals, one with the registration letters and numbers arranged horizontally in

a single line at a size approximately 80% of standard letter size [160mm wide by 80mm high], and one vertically oriented, also reduced to 80% of the standard sized letters and numbers, with two horizontal lines, one of the letters and the next of the numbers [70mm wide by 124mm high]. Adhesive front number plates can easily be attached to motorcycles that have fairings or detachable aftermarket windscreens, although the curved screen angles and curvatures may restrict visibility in some situations.

The cost of this proposal, as a retrofit to the existing motorcycle fleet, will take less time than an ADR approach, which could not alone cover the existing fleet. Analysis of the Victorian motorcycle fleet and the likely operational and resource costs indicated that the cost of a full retrofit proposal is estimated to cost $13.8 million dollars for the retrofit and first year of operation up to the end of 2003 by which tome all motorcycles should be fitted with the new frontal plates (assuming that the program begins in January 2003, which is the earliest possible date), with $0.94 million dollars recurrent annually thereafter, based on the combined total of 11794 new on-road and recreational registrations in Victoria in 2000, the most recent year for which these full figures are available. These values are based on conservative assumptions, all of which are laid out in the body of the report.

This covers only the State of Victoria, which had 94,741 registered motorcycles of a median age of 11 years at the last ABS vehicle census date of 2001, plus another 3013[1] recreational registrations in 2000 making a total registered fleet of ~ 98,000

[1] Unpublished VicRoads Registration and Licensing data for the year 2000.

plus a similar number off road motorcycles, many of which would be eligible for registration at any point.

A spreadsheet is available to assess the effects of varying any of the values and assumptions made in this report. The outputs are given as Tables 7, 8 in the body of the report.

The minimum lead in period is 18 months from a decision to put the proposal into effect. Six months are required before registration bodies could complete the necessary upgrades to their registration software, and a minimum of 12 months for registration renewal rollout. This assumes that the six month lead time would be sufficient to:

- Develop prototype plates and hard rubber mountings for machines where a suitable surface is not available for a decal; etc

- Develop tests to certify the safety of any external projections created thereby

- Trialing the plates on the new mountings in the field by both motorcyclists and police on both on-road and dual purpose motorcycles

- Testing of the camera equipment with the new forms of front plate

- Refining Police operational and technical procedures to ensure that the overall system can function effectively and deliver pictures acceptable to the Courts

If the Victorian proposal to the Australian Transport Council to develop an Australian Design Rule were to be progressed further, then a complete Regulatory Impact Statement would also be necessary and the whole ADR process would require at least a year with further delays in implementation on complying machines arriving in Australia due to the manufacturer lead times in their model cycles. Retrofitting would still require action on the lines proposed in this report.

The recommendations are:

1 Trials on the interactions between decal adhesives and the gel and other finishes on a range of motorcycles be undertaken.

2. Adhesive number plates (decals) currently provide the best available solution for front registration number display.

3. Due to the practical problems in fitting decals in a suitable manner to a significant number of models and types of motorcycles, trials be undertaken of vertical, separated and unconnected number decals are undertaken with these mounted on curved and angled surfaces and using smaller numbers. Such trials will need to address the operational effectiveness for camera purposes of the proposed 80% sized numbers, the fitment complexities and costs, and the procedural processes to address any warranty or liability issues and the refinement of the operational definition of an 'obscured number plate' to address the fresh issues raised by the more vulnerable adhesive registration plates.

4. In view of the costs reported by R&L officers a full Regulatory Impact Statement be undertaken to ensure public acceptance. In the case of an ADR approach this would have formed part of the ADR development process.

5. Consider alternative Intelligent Transport System (ITS) approaches to vehicle identification applicable to all types of vehicles. This is addressed in a complementary report (Wigan and Patterson, 2002).

6. Undertake detailed design studies for decal mounting plates and fitment systems. This is being addressed by a further VicRoads project.

THE BRIEF

Oxford Systematics was commissioned by VicRoads and Transport WA to research options for motorcycle front number plates that would be both practical and safe.

Consultation was required with motorcycle users, industry, Registration and Licensing in all States, the Police and other stakeholders.

Indicative costing for the best option was required, and any trials that may need to be undertaken were to be considered.

A complementary report (Wigan and Patterson, 2002) considers alternative forms of vehicle identification suitable for all vehicles.

A further VicRoads project is currently addressing the detailed design of mounting brackets and fixtures for front number plates.

INTRODUCTION AND CONTEXT

Concern has been expressed in several Australian States that some motorcycles may be unaffected by current speed control enforcement strategies through the lack of front registration number plates. Consequently the reintroduction of some form of front display of motorcycle registration numbers is being considered. This requirement was discontinued on safety grounds across the world[2] many years ago and front number plates are specifically banned in a number of jurisdictions. Motorcycle designs have been refined for nearly 20 years without provision for front number plates at a time when aerodynamics as part of integrated motorcycle design has helped to reduce steering instabilities (Australia: House of Representatives, 1979) and frontal impact dangers and to address cooling requirements.

Adjustments to motorcycle design for this purpose are extremely unlikely as the Australian motorcycle market is very small by global standards. Many ADR standards have yet to reach harmonisation with global standards such as those of the EEC or the US, and a new unique front number plate ADR is unlikely to be successful[3].

The recent rulings in the European Union[4] for pedestrian-friendly front ends of motor vehicles has ensured that modifications to frontal treatments (already critical in integrated motorcycle design), would not be addressed by European motorcycle manufacturers[5]. The Federal Chamber of Automotive Industries (FCAI) has a similar view. The FCAI represents Aprilia. BMW, Ducati, Honda, Harley-Davidson, Suzuki,

[2] Singapore requires plates. These are usually metal, and screwed onto fairings or longitudinally on front mudguards (see Figure 3) and which cannot be viewed from the front.
[3] Australian Transport Safety Board (ATSB)
[4] See Appendix 3 for the appropriate extracts of the relevant Directive.
[5] Association of European Motorcycle Constructors (ACEM)

Yamaha and Kawasaki in Australia. These companies make up most of the motorcycle market in Australia.

Fitment of front registration numbers will therefore have to be developed, refined and all design and liability issues resolved at State level in Australia, on a case by case basis for the extensive range of current and past motorcycles. This effort could be costly to motorcyclists and the community and involve retrofitting to a very large number of different models and types of machine going back 20 years and more.

Consequently the present project was set up to examine the different methods of after-market attachment of front registration numbers and recommend the most appropriate strategy and trials so that the overall proposal could be considered appropriately. Indicative costing was therefore required.

Western Australia has not yet proclaimed their new owner onus provisions regarding speed infringements, and currently operates an advertised location speed management strategy and has a high level of dependence on frontal camera shots for speed enforcement. Furthermore the Police concerns over some motorcyclists expressing their negative attitudes through gestures, wheelies (not necessarily a speed issue as they can be done at very low speeds with many modern machines) and high speeds through the speed sites have been given very wide publicity across Australia.

This has led to a high level of awareness of the dependence on frontal photographs and the inability to capture motorcycles using this operational procedure amongst riders who previously were unaware of this. The issue in WA has now become one

where either changes in Police procedure (to take rear plates) or front number plate identification is now necessary. Both options are being considered as owner onus legislation is available to bring into effect but the necessary enforcement infrastructure is not yet complete.

In Victoria and States other than WA owner onus legislation is already in effect, and means other than speed cameras set up to take images from the front are also used for speed enforcement. The awareness of motorcyclists in these other States that they could be identified when only frontal pictures were taken was at a low level, until recently, when Police statements and media publicity drew it to their attention. In general, only the CityLink centre lane cameras were previously known to be ineffective for motorcycle speed enforcement by a significant group.

The present report summarises the information and views of those consulted, and makes recommendations for front number plate identification in the context provided by this feedback. Some of the consultation parties are listed in Appendix 4, and a selection of the responses received to the consultation are provided in Appendix 5.

BASIC ISSUES

Reasons for front identification

The major concerns over the issue of front number identification expressed by those consulted in several jurisdictions are outlined below:

- Police concerns over the behaviour of some motorcyclists exploiting their knowledge of the current inability to be detected from the front in some locations. Those of concern pass known camera sites at excessive speeds and sometimes with inappropriate manoeuvres and gestures. These views were given from several different States, in conjunction with a belief that this knowledge was widely held by all or most motorcyclists and it was also believed that there was a general lack of compliance of motorcycles with speed laws.

- Road safety concerns that if speed enforcement is not perceived to effective by some groups of road users, then the strategy of reducing the general speed environment could be undermined. Even small general reductions in speed are associated with significant safety gains. This has been confirmed in both metropolitan (Kloeden and McLean, Moore, and Ponte G. 1997) and rural environments (Kloeden, Ponte and Mclean, 2001)

- The desire to address any area of motorcycle safety where improvements might prove to be possible, as a response to the recent rise in the number of deaths of motorcyclists, which parallels the rise in motorcycle sales and an increase of new or returning older riders.

No adequately detailed exposure data is yet generally available[6] to assess if this is a change in the number of participants, a change in the profile of experience of new or returning users (although older riders are over represented in the recent figures), or changes in behaviour (and increase in use of existing registered machines, or possibly a higher fraction of the trips made by the current population speeding on road).

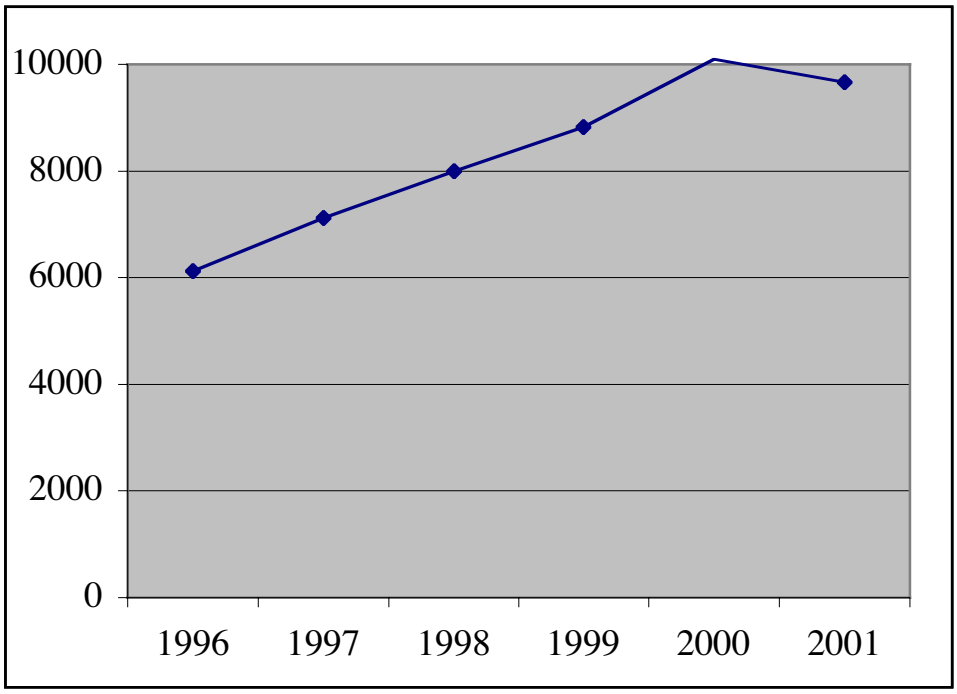

Figure 1. New motorcycle registrations in Victoria (ABS)

The overall numbers of fatalities show a significant rise in the last few years, even though the data to analyse it in exposure or population terms is at present very limited. In addition to a 15% rise in the number of motorcycles on the register in the last three years, there has been a 21% increase in new registrations over the last four years, from 7997 in 1998 to 9665 in 2001. This less than the raw increase in fatalities

[6] An as yet unpublished NSW survey of the older rider group suggests that there is an increase in riding by that group. A general survey of older motorcyclists has recently been embarked upon by MUARC, but no results are yet available.

in that period, but until suitable exposure data becomes available[7] it is not clear what changes there have been in the levels of risk to riders.

Registered new motorcycles comprise only half of all motorcycle sales in the Victoria: a pattern is similar to those in other States. Only a small number of these purchased but not normally registered off-road and dual purpose motorcycles appear in the registration statistics, but many still remain eligible for registration.

The numbers are not small, and the number of such off road machines sales never registered is approximately equal to the total number of motorcycle sales that do appear on the registration statistics. This is an important point to note, as this doubles the potential pool that may at some point need to be retrofitted with front number plates.

[7] The most recent comprehensive analysis of motorcycle risk based on exposure and detailed population assessments was based on the Office of Road Safety National Exposure Survey of 1985 (Anderson, Montesin and Adena, 1989). The more recent Victorian work is based on a far smaller 1994 survey, and cannot distinguish between motorcycle and car drivers (Diamantopoulou, Skalova, Dyte and Cameron

THE SCALE OF THE ISSUE

Each jurisdiction has slightly different practices and methods of data collection and is described separately, however the figures are broadly comparable.

Victoria

Victoria has owner onus legislation. Both front and rear image capture, and a mix of speed detection methods are in use. The lack of frontal identification is a problem encountered with all types of vehicles, including those required to be fitted with front number plates. Images that had to be rejected because there were two vehicles in the frame are not included in this Table. Overall 0.3% of all recorded camera shots involved in a potential violation could not be proceeded with for all types of reasons..

Car violations that could not be issued (no frontal identification)	Motorcycle violations that could not be issued (no frontal identification)
703	1044

Table 1. June-Dec 2001 Speed camera data from Victoria

South Australia

Some motorcycle notices could not be issued were for a variety of reasons, only one of which was that the pictures were taken from the front.

Speed camera Shots taken	Violation notices issued	Car violations that could not be issued	Motorcycle violations that could not be issued
347,598	266,986	80,612	1,553

Table 2, Jan-Dec 2001 South Australian Speed Camera Data

Motorcycle infringement notices that could not be issued comprised 1.9% of the number of car notices that could not be issued, this is twice the 0.9% proportion of vehicle/km carried out by motorcycles in Australia as a whole (Australia: Bureau of Statistics, 1996).

Western Australia

WA advertises the approximate locations of the camera sites but not the times they will be in operation. The WA Police have found little change in violation rates whether or not advertising is done, but advertising of the locations has allowed some motorcycle riders to put on displays of excessive speed in the knowledge that frontal images are currently essential and that the general location of the cameras is known. WA currently has the highest level of dependence on frontal images and also the widest knowledge of this amongst motorcyclists of all States. The current overall fraction of all vehicles infringing is much the same as in Victoria.

Cars monitored	**Motorcycles monitored**	**Total vehicles Monitored**
unknown	unknown	18,826,160
Car images taken	**Motorcycle images taken**	**Total images taken**
663,695	20,578	684,273
Cars violations issued	**Motorcycles Violations issued**	**Total Violations issued**
531,588	0	531,588
Cancelled car images *	**Cancelled motorcycle images**	**Total cancelled images**
132,107	20,578 ***(164,822)****	152,685 ***(29,699)****

- Images may be cancelled by the device, two vehicles in field of view, no registration plate, obscured registration plate, no record of registration, or the whole film being cancelled

** Allowance for the same cancellation rate for motorcycles as for cars, were they detectable and vice versa

Table 3 Jan-Dec 2001 Speed camera data from Western Australia

Although the WA police camera equipment is capable of taking both front and rear images, frontal images are currently essential due both to the lack of owner onus and the requirement to link the person to the vehicle[8] to secure a penalty from the courts and the current lack of proclaimed owner onus legislation for speed enforcement.

Tasmania

Tasmania uses both front and rear camera photographs. Radio stations advertise the camera locations, but the police do not. Motorcycles detected speeding represented 1.7% of car violations, slightly less than twice the percentage of vehicle/km travelled by motorcycles in Australia as a whole (0.9%).

Tasmania: all 2001	**Motorcycles**	**Other types of vehicle**	**unknown vehicles**
Violation notices issued[1]	155	55,424	-
Notices not issued due to:			
More than one vehicle in the shot[2]	-	-	3,345
No number plate visible[3]	-	-	383
Obscured number plate[4]	-	-	1,582
Number plate caught by the shot[4]	-	-	2,122
Unreadable number plate[5]	-	-	6,145
Subtotal	**-**	**-**	**13,577**
Motorcycle-specific notices not issued			
No front number plate in a front shot	469	-	-
Front or rear number plate unreadable	359	-	-
Subtotal	**828**	**-**	**-**
TOTAL for all categories 69,984	**624**	**55,424**	**13,577**

1 Volations issued are an exact count using the make and model of the vehicles
2 Occasionally contains motorcycles
3 Rarely used for motorcycles
4 Could contain motorcycles
5 Never used for motorcycles.

Table 4 Jan-Dec 2001 Tasmanian Speed Camera data

[8] Successfully campaigned for by RACWA when speed cameras were first introduced.

CONSULTATION

Consultation included the full mailing list of the ITS Australia[9], the members of Victorian Motorcycle Advisory Council in Victoria, several motorcycle oriented email lists and a program of direct email and telephone contact with motorcycle user groups, stakeholders in the motorcycle retail industry, Registration and Licensing Authorities, motorcycle manufacturers and distributors, professional committees such as the US National Science Foundation Transportation Research Board Motorcycle and Moped Committee and motorcycle industry and user groups overseas. A visit was made to Western Australia, and ten meetings and a weekend round table with user groups were held in Perth to ensure that WA circumstances and views were fully taken into account.

A selection of the written and emailed consultation responses is given in Appendix 5, and only some of the common concerns are summarised here.

Motorcyclists:

Motorcyclists expressed concern over safety, appearance and damage aspects of front decals. Generally no concern over a front decal if it could be fitted while addressing these guidelines. Significant concern was evident over the surveillance (and particularly covert) implications of electronic alternatives. Frequent themes were puzzlement over the inability of Police to use pictures of rear number plates, a lack of belief that any safety issue was involved, and a conviction that the front number plate

[9] The umbrella body for Intelligent Transport Systems in Australia

issues were focussed solely on revenue collection and had no safety rationale. The latter view concurs with the more general findings of Elliott and Shanahan (1995a,b).

The dangers of providing a frontal aluminium or steel plate are widely recognized, and no official or other party has suggested that their use would be acceptable on the front of motorcycles. An adhesive decal was broadly agreed to be the most workable frontal solution for visual identification purposes. A significant number of motorcyclists[10] suggested that that they would voluntarily comply if simply provided with such decals – as long as they were not unsightly and could be placed on their windscreen or front mudguard (where suitable extensive in coverage of the wheel and wide enough) without obscuring their frontal view and caused no damage to their motorcycles or scooters.

Registration and Licensing

Not greatly concerned: the proposal was seen simply as an issue to administer if and when it came into effect. Costs incurred by a retrofit program could be substantial. NSW has recently spent a year securing agreement not to have to supply two plates to motorcycles and hope not to see this reversed so soon. Victoria was concerned over costs of any retrospective ("retrofit") program (see the costing section later in this report). Some concern was also expressed over the issuing process that would be required for existing machines, especially if a variety of methods and repeated contacts had to be catered for to ensure coverage of all machines.

[10] Responses received from riders and groups in NSW, WA, Victoria

Police

Senior officers appear to have higher levels of concern than the junior and field operations officers involved in enforcement activities. Some strong views were expressed over motorcyclists who exploit the lack of a front number plate to express their resentment of the Police on camera.

There was a concern that an awareness of the reliance on frontal recognition had led to excessive speeds by a broader cross-section of riders than this small group in the knowledge that they could not be caught by frontal images. Technical issues in terms of camera deployment, constraints on operational procedures and the processes required to ensure convictions in the Courts from the data presented were regular themes.

Motorcycle Distributors and retailers

Significant concern was expressed over legal liability issues from attachment methods other than adhesive stickers, interactions with airflow, warranty, and safety implications. The huge range of machines likely to need specialised one-off treatment is also a concern, and a Government Liability Waiver was expressed to be needed by one substantial importer and manufacturer representative if attachment methods other than an adhesive sticker (requiring clamps of additional bolts or brackets) were required. The issues raised by a legislative requirement to retrofit the entire motorcycle fleet were not addressed.

Motorcycle manufacturers

Figure 2 provides a perspective on the relative market shares for new machines by each manufacturer. The Federal Chamber of Automotive Industries (FCAI) represents Honda, Ducati, Harley-Davidson, Aprilia, Yamaha, Kawasaki, Suzuki and BMW. The Australian representatives of Triumph, Honda and Harley-Davidson also responded separately, and were specifically concerned that any modifications made to the front of new machines would lead to repudiation of the warranty by the manufacturer. This would affect them directly as well as the owners.

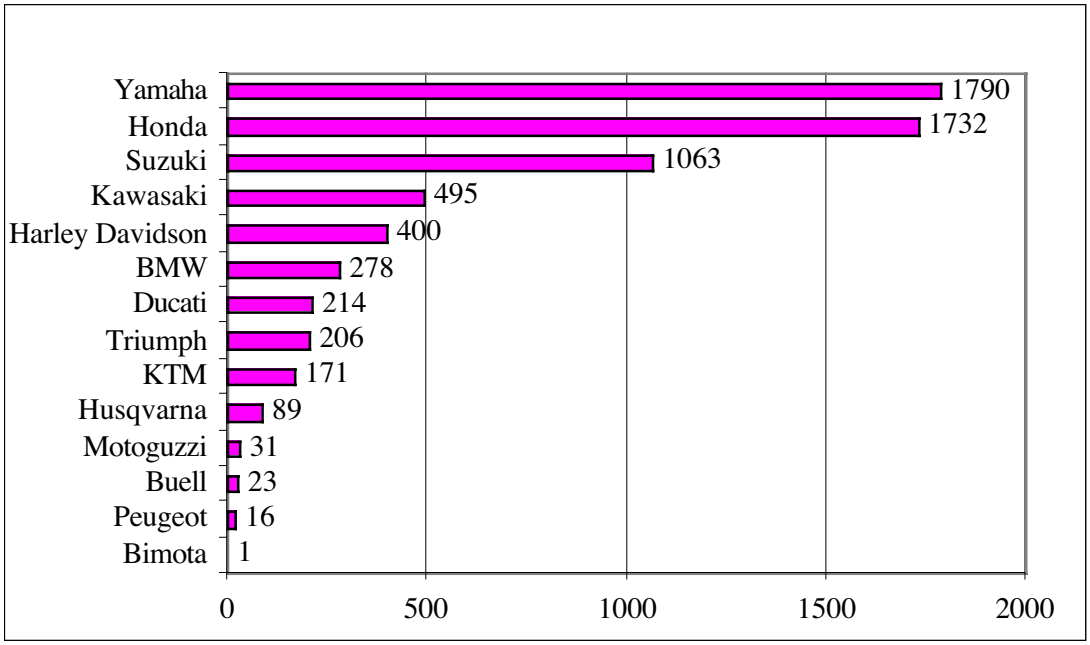

Figure 2. Reported[11] new Motorcycle Sales in Victoria Jan-September 2001

The FCAI and the Association of European Motorcycle Constructors (ACEM) focussed on future machines and not current or past models. Concern was expressed at the effects of any new and unique Australian ADR, as the market in Australia is so

[11] There is known to be underreporting of motorcycle sales to the ABS (for example several smaller manufacturers are not represented here, but may not have had to report to the ABS). The Australian Bureau of Statistics has now terminated the collection and publication of motorcycle registration statistics as of January 2002.

small in global terms that securing special action for Australia would be very difficult and costly.

There was concern both over any possible ADR compliance procedures, and the physical effects on the integrated design, cooling and stability factors on the front end on their extremely varied range of motorcycle and scooters. FCAI asserted that existing machines still under warranty would also lose the manufacturers warranty if modifications were made to the front end of the machines.

It was pointed out that front number identifiers are not required (and are indeed sometimes banned) in almost every other jurisdiction in the world. Local parties have had difficulty in having their questions taken seriously by their overseas manufacturers, even when one manufacturer had their ADR specialist raise the matter personally with the key staff of the manufacturer in Japan.

ACEM suggested that the recent European Union motor vehicle manufacturer agreements on pedestrian safety would also appear to preclude consideration of frontal attachments to motorcycles.

TransUrban, and CityLink Camera Enforcement

TransUrban has in the past preferred front images (every single vehicle is detected) as the prime mover of articulated trucks has the registration plate at the front of the prime mover itself, while trailers have separate and different registration numbers. TransUrban is currently actively considering moving to a dual camera arrangement to take front and rear simultaneously. This would address their detection problem for

motorcycles, as the TransUrban system is already designed explicitly to detect vehicles at all speeds up to well over the speed limit.

Under the CityLink Act the charging enforcement camera systems cannot be used or directly connected to traffic enforcement camera systems. Motorcycle speeding problems have been restricted to the centre lanes of the Domain tunnel where the fixed cameras are set up to take pictures from the front of the vehicles. All of the other Domain tunnel lanes and traffic enforcement sites take pictures from the rear.

LITERATURE REVIEW

Extensive searches on the key Silverplatter Transport CD OECD database elicited nothing explicitly on front number plates for motorcycles. Online and web searches confirmed that the rest of the world does not require front number plates, and a number of jurisdictions have clauses forbidding their use: examples include Colorado and Minnesota. The UK DLVR requires front number plates only for motorcycle-based tricycles.

Personal email contacts finally elicited a single response, from the Singapore Land Transport Authority, who use longitudinally or transversely mounted front number plates on motorcycles to ease visual enforcement by police. Motorcycles in Singapore also carry a specially developed form of eTag for the road pricing system, and so front plates are not required for enforcement identification. Longitudinal front plates are an option that has been rejected in all other countries for a range of reasons including pedestrian safety, and are not visible to cameras from the front.

PRACTICAL OPTIONS FOR VISUAL IDENTIFIERS ON THE FRONT OF MOTORCYCLES

A wide range of options was developed for second round consultation. These are given as Table 5, which was provided to Registration and Licensing bodies and a number of other parties as a follow up to the initial consultation.

The old style longitudinal vertical bolt on plates as used 30 years ago were not regarded as satisfactory for camera enforcement purposes by any party. The safety issues involved when they were discontinued have not changed, and the mounting issues have become more acute with the slimmer clearances between tyres and mudguard lower surfaces and to tyre throw with rotational velocity. This option was therefore not offered.

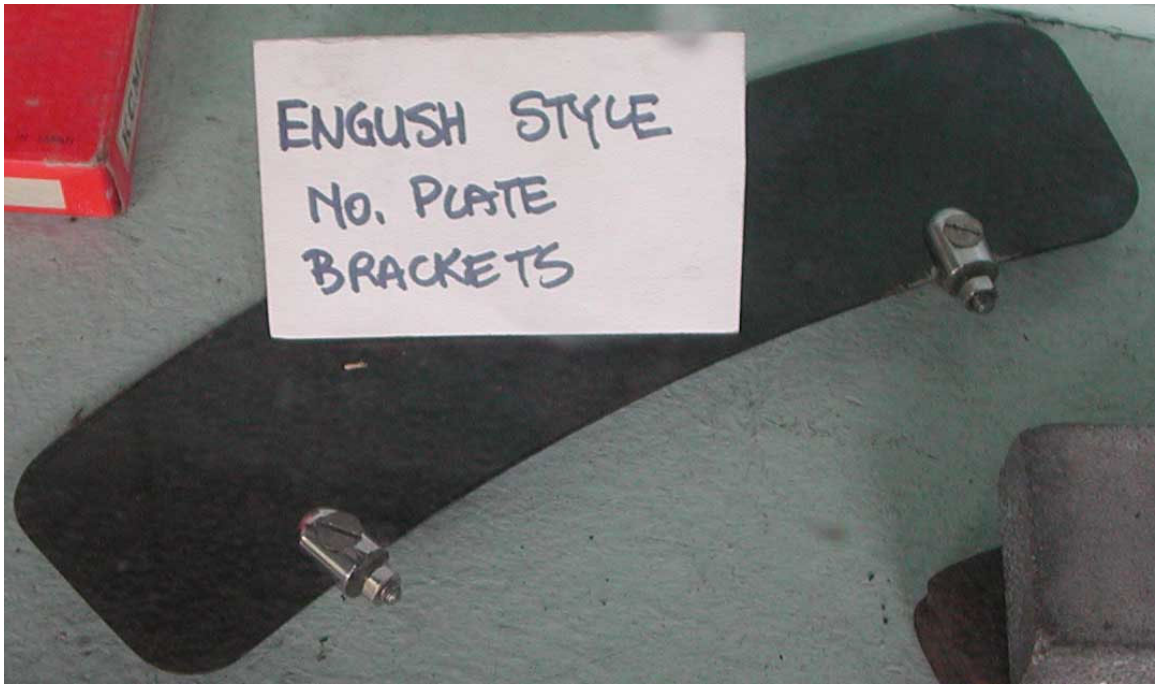

Figure 3. The style of number discontinued across most of the world 20 years ago

Options In order of preference	Requires	Desirable	Problems	Estimated Coverage[12] of the motorcycle fleet
Adhesive front number plates	Fitment in a variety of locations on different machines. An ability to use smaller numbers for fork legs or instrument mouldings.	Fit above headlamp level for aerodynamic design and to enable plate to be kept reasonably clean. Ability to add a special small visual ID tag.	Very wide variety of surface angles and profiles will require enhanced camera practice. Vulnerable to rapid insect and dirt coverage. Special mountings required for a large fraction of machines.	50-100%
Adhesive Helmet decals	Fitment on upper part of helmet above facial opening.	Smaller numbers.	Multiple motorcycles, one helmet. Multiple helmets, one motorcycle.	90-100%
Lower fork leg collar mounts	Lower fork legs that do not have shrouded sliders, or integrated mudguards.	Combination of high quality adhesive wraparound retained by wide plastic external clips to ensure stability. Best used with smaller vertical numbers.	Cannot be fitted to the open slider areas where they would be visible. Cannot be used with most 'upside down' front suspension designs. Will necessarily be below mudguard level and thus of occluded visibility. Very vulnerable to rapid insect and dirt coverage. off road risk of catching brush etc.	20-40%
Slipover transparent headlamp covers with numbers in contrast	Suitable headlamp shapes (current Honda, Cagiva, MV and others not suitable). Headlamps to be wired 'on'.	Adequate mounting clearances to allow positive retention.	Readily removed by third parties. Loss of light at night: No such equipment is currently available.	30-40%
Spray-on numbers on mudguards or other surfaces	Suitable facilities and surface characteristics.	Apply to areas not otherwise available for aerodynamic reasons.	Requires painting what are often very expensive mouldings, paint durability issues and abrasion/cleaning issues.	80-90%
Lightweight plastic plates attached by adhesives or new bolts or ties	Suitable points above or just below the headlamp where they can be attached, outside the cooling and airflow areas. Could be seen from a wide frontal angle range.	Only to be used in locations where any adverse safety consequences can be avoided.	Can only be used effectively in a minority of cases. Cannot be used without support at both ends.	60-90%
Numbers on plastic or metal, mounted transverse to the airflow (low mount)	Solid mounting due to wind pressures. Placement where suspension movement permits, away from areas where this could be a crash hazard to riders or third parties.	Not to be used outside the swept path of the type/fork combination to avoid catching, inadvertent movement into wheel arc or safety issue in a crash.	Fitment possibilities around the wheel spindle are likely to be unsafe, fitments on the mudguard present a real risk of the mounting bolts cutting into tyres and in vitiating the airflow relied upon for engine cooling or radiators. Previously abandoned on safety grounds.	50-75%

[12] Very approximate and preliminary estimates of the approximate range of coverage levels likely to be possible

Numbers on plastic or metal, mounted transverse to the airflow (high mount)	Solid mounting due to wind pressures. Placement to ensure that riders are not at risk in collisions.	Provision to correct for steep windscreen angles to allow easier camera capture.	Mounting likely to require drilling expensive mouldings. Solid mountings above headlamp likely to present a rider risk; below it a suspension travel limitation.	60-75%
Key general Issues				
Warranty risk in options affecting airflow or with potential to move into wheel arc	Some form of dealer and mechanic indemnity to ensure warranty is maintained if otherwise disclaimed by manufacturers or distributors, and to ensure that retailers numbers are saved harmless fitting brackets etc.	Clear and monitored guidelines for fitment and maintenance.	This will have problems due to the need to regulate fitment processes and standards on a huge variety of machines all requiring individualised fitment treatments.	
Use of dual direction cameras or rear-shooting cameras in operational programs	Would lose nothing in terms of motorcyclist individual facial recognition (due to helmets already making this impossible from the front).	Are already proven. Able to secure usable camera shots without any other measures or numbers being required.	May require retraining of camera operators, and in some cases additional cameras .	
Problems for R&L in managing the issue and reissue of two different types of 'plates'	Investment in R&L systems to handle two plates for motorcycles once again, provision for replacement of front 'plates' (likely for all solutions barring helmet stickers) due to the vulnerability of most of these options to weather, vibration, cleaning and encounters with brush etc.	Universal owner onus legislation. Unification of regulations permits whatever the CEO (of the relevant R&L) issues being deemed to be a valid number plate. This will cover both these variations and future adjustments.	Costs of internal IT have been estimated to be of the order of $20-50,000 by two R&L offices, cost to suppliers have been put at up to a third to a quarter of this sum. Costs of the current trial adhesive plates are $26+ each for supply to VicRoads, so overall costs are likely to be significant	
Need for an objective and demonstrably reasonable subjective test criterion for 'Obscured numberplates'	A basis other than the subjective opinion of a Police Officer to be credible as the issue is not contestable unless a certified picture can be taken before the driver proceeds.	Trials needed to assess the degree to which road dirt and insect impacts degrade the ability of camera photos to be recognised and these to be matched to on the ground police assessments.	The current lack of reproducible criteria reduces the credibility of the enforcement process and tightening the enforcement is thus likely to be readily misinterpreted without a clear and contestable foundation for the judgements required.	

Table 5. The range of visual identification options sent out for comment

Adhesive decals

Adhesive decals (self- adhesive plastic sheets) attached to fairings, flyscreens offer a reasonable solution to many recent on road machines. There are still areas of difficulty, where their attachment would be constrained by rider vision requirements

and would have to overlap the edges of fairing screens, necessitating cutting of the decal to allow maintenance and replacements to be undertaken. The effects of this constraint on camera effectiveness has not yet been assessed, but should form part of any trials. Provision for removal and replacement when the screens on which they are mounted are broken will also need to be catered for.

Etched metal strips

Etched light metal strips (attached with adhesives or by small bolts) would at first sight appear to offer some advantages, but the durability and safety of the mountings would be in question.

Mountings

Plates attached by angle brackets to the steering head or across the headlamp for naked bike (ie. those without fairings) can be a solution in a limited number of cases.

Aluminium or hard rubber plates attached by brackets to brake mounting points, or front wheel spindles have might appear at first sight to be practical. On closer examination this approach is not workable. The external projections that they would create are a hazard, and the wind pressure would make cause substantial disturbance to the airflow. The availability of suitable mounting points to ensure resistance to rotation in this sensitive area is limited or absent on many machines.

Any rotation of the plate in this location would carry the risk of moving into the rotating path of the wheel. Any travel near brush or bush would catch the plate, precluding this approach for on/off road machines and road machines likely to travel on unmetalled roads. Any mounting of this type would probably require inspection to

safeguard the dealer from liability to misadventure from subsequent knocks where the number plate is caught or rotated into the wheel.

Clamps around the lower part of fork legs is a possibility for machines with out the so-called 'upside down fork' , or 'springer' suspension designs, but must ensure that they are clamped tight enough to resist rotation or movement into the brakes or wheel spokes under use, and loose enough to stop binding of the suspension that moves within the fork. This design is also hazardous to pedestrians, and vulnerable to brush and accidental knocks. Lower mounted numbers will rapidly collect disc brake dust, mud in rain and road dirt and in practice it would probably not be possible to keep clean enough for camera detection.

Spray on numbers

Spray on numbers onto fairings, flyscreens or fork legs in cases where the sliders permit this are a possibility, but create problems in terms of longevity, panel damage and application cost to meet reflectivity and number/letter shape and size standards.

Lower fork leg decal attachment

Vertical fork leg decal attachments may be possible for some machines. Some on/off road machines have fork cover sliders which run over the surface of the fork legs, but are too short themselves for a standard size of number decal to be attached. These mudguard/fork cover treatments also extend to many new sports machines on road.

This could be a possible option, if the decals could be successfully wrapped around the fork legs and bumps where attachment points for brakes and mudguards are cast

in. The upside down fork suspension designs (generally restricted to high performance sports machines) leave nowhere for the decal to be attached.

In most cases the radial curvature of the fork leg would make camera detection difficult, and lower fork legs quickly collect dirt, dust and mud.

Headlamp covers

Patterned covers for headlamps with numbers as contrast offers another attractive possibility at first sight. It would protect headlamps, and in the case of permanent hardwiring of headlamps would present a clear image to the front. Although this might work on older motorcycles, newer ones increasingly adopt integrated lighting, cooling, and fairing designs where a separate round headlamp is not available.

Helmet identification

A consultation respondent[13] proposed that identification be placed on the helmet and not the motorcycle - and be linked to an email address. The numbers would in most cases have to be on the side of the helmet due to ventilation and visor movement provisions, and would be in violation of the AS1698 prohibition of decals on the helmet. The latter could be argued to be acceptable as long as they were applied below the test line, but this would rule out many of the helmets in daily legal use.

[13] Graphic Computer Systems

DISCUSSION OF PREFERRED OPTIONS

Of the options outlined in Table 5 only adhesive stickers and spray on numbers can be expected to meet safety and visibility criteria. Adhesive decals stuck onto fairings or windscreens are the preferred option. However ,a full sized rectangular form of decal is not suitable for all machines.

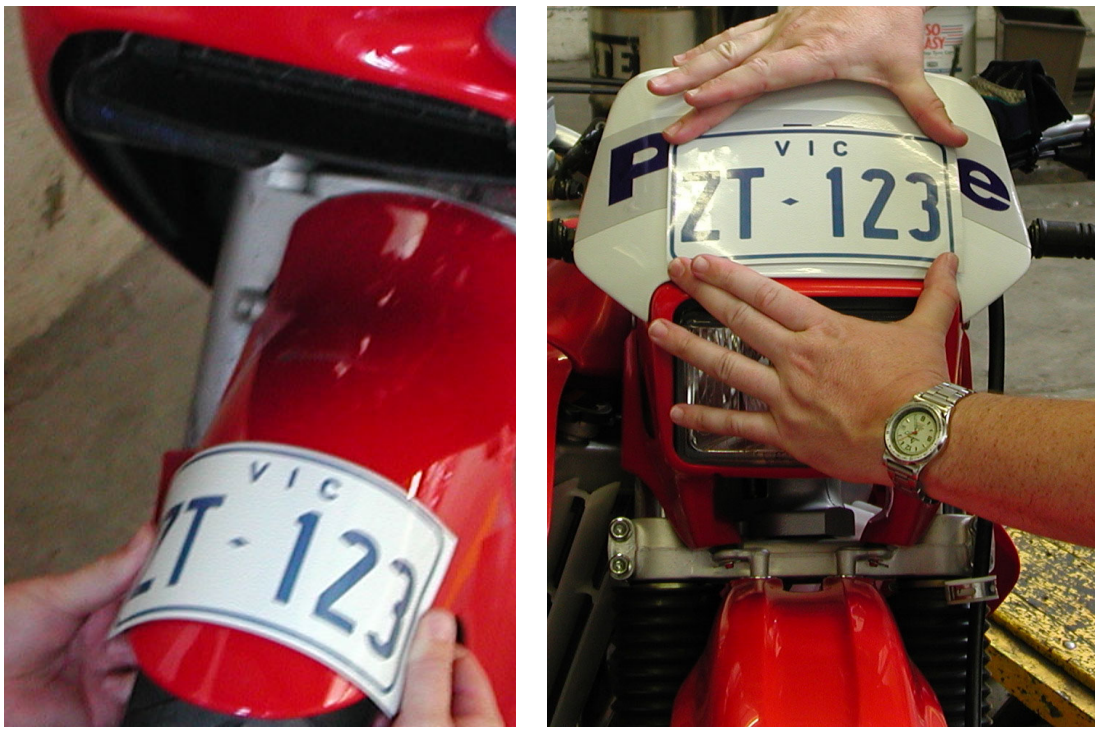

Figure 4: Police BMW and trail bikes with full sized decal

In Figure 4 the trail bike on the right is entirely suitable for this decal,

Using decals of a different shape or orientation, especially with smaller numbers and letters, adds considerably to the number of machines that can be fitted.

On some machines the high levels of single and double curvature of many of the suitable mounting surfaces could present problems in camera pictures. Obscuring of the numbers by the front wheel and mudguard would also present problems in many orientations.

General problems can be expected regarding the adhesive used, where permanence would be insisted upon by the registration authority to prevent the decal coming off, and the users view that (extremely expensive) fairings and mouldings need to be safeguarded. It is proposed that decals be applied to clear screen areas where this is possible, or mounted on rubber backing plates with ancillary brackets where it is not.

The advanced aerodynamic design of the front end of modern motorcycles has several other effects, one of which is to accentuate the adhesion of road dirt, bugs etc due to airflow guiding into frontal and lateral (eg. The Honda VTR, VFR800 model series) radiators and air intakes. Thus if decals or decal backing plates were mounted on mudguards, wheel spindles or brake mounting points, some form of warranty indemnity cover has been requested by dealers (which still leaves the users' interests uncovered). It is therefore recommended that Road Authorities consider an inspection process and an indemnity program if the entire current fleet of motorcycles is to be properly and safety addressed in a retrofit program.

Dual purpose on/off road/on motorcycles have carefully designed front end treatments deigned to avoid snagging and to deflect grass, bushes and other solid or mud obstacles (see Figure 4 for a typical legally registerable off road agricultural motorcycle). This emphasises that number plate fitment will need to be above the

headlamp level. Decals should be mounted above the level defined by the bottom of the headlamp to minimise airflow disturbances and the build up of road dirt. Similarly, on naked bikes (ie. those without a fairing), the decal or decal backing plate and mounting brackets should not extend above the line of the instrument nacelles. Several models of motorcycle already have the warranties voided if they are operated without the entire fairing structures, as the airflow is controlled over the surfaces to such an effect that side intakes for cooling radiators are very effective and critical to the operation of the motorcycle.

Figure 4. 200cc fully-registerable 'Ag bike' with handlebar and headlamp guards

Airflow criticality might be thought to be not a concern for 'naked' (unfaired) motorcycles. This is not the case, as Harley Davidson makes this explicitly clear. Harley Davidson has a large share of the market for big motorcycles. The majority of their models sold in Australia are designed and styled for use without fairings. However a range of after market and original equipment screens are available which suggests that compromises might be possible for decal attachment to such screens when they are fitted before or after sale.

Attachment of registration decals on fairings or on a backing plate and mounting bracket at a point above the headlamps appears to be possible for a large fraction of the 805 machines directly examined. The angles and curved profiles onto which they would have to adhere are very varied, some at steep rearward angles and on a sharply curved profile, others shallower and flatter. These are typically found on touring and sports touring motorcycles with large perspex screens, which provide an otherwise suitable surface.

If front plates were to be introduced only on new motorcycles, then the rate of penetration into the exiting motorcycle fleet would quite slow (Wigan and Thoresen, 1979; Thoreson and Wigan, 1987). Consequently a retrofitting program would be required, and motorcycles of up to 30 years old will need to be catered for. Few of the older machines have fairings, and so some form of backing plates for the decals, and brackets and fixtures will be needed to mount them on these motorcycles.

Overall, the adhesive decal remains the most promising of all the approaches identified, in conjunction with suitable mounting brackets and fittings and proper placement at or above headlamp level.

FIELD CHECKS ON THE AVAILABILITY OF SUITABLE SURFACES FOR ADHESIVE DECALS

The field investigation of 805 new and recent seco 'naked bike' machines – new or second hand - with an after market windscreen were assumed to have a suitable and available decal attachment surface. Attachment of a registration decal to a quickly removable aftermarket windscreen certainly provides a place to mount the decal, but may present some problems in enforcement as the entire screen can be removed and remounted on another machine in a few minutes. The results are given in Table 6 below. About 30% of the new and recent second hand machines are likely to present mounting problems, and this fraction increases with age for motorcycles registered in the past.

The retrofit market will have a substantially higher number of naked bikes, but this cannot be estimated accurately as there are several hundred models in each year, and motorcycles over 30 years old are still in use. FCAI estimate that over two thirds, and quite possibly 80%, of motorcycles will present mounting problems. The higher figure could well be realised if a significant number of previously unregistered off road and dual purpose machines had to be retrofitted.

Fairings are sometimes fitted as an aftermarket addition, so an individual census would be required to determine the number of machines requiring a specialised mounting or fixture for the decal.

Motorcycles on the shop floor In Elizabeth St Sat 13 April 2002 **Total Numbers**	**With a possibly adequate surface**	**Without any suitable mounting surface**	**% Problematic**
New and used dealers			
77	61	16	21%
56	38	18	32%
175	103	72	41%
15	14	1	7%
66	62	4	6%
Used motorcycle dealers			
20	5	15	75%
78	63	15	19%
110	86	24	22%
Total observed 805	**586**	**219**	**27%**

Table 6 Motorcycles with and without suitable surfaces for decal placement

Table 6 should be treated with caution as the overall motorcycle market is about half off road machines, and only a small number of such machines were on display as the Elizabeth Street trade concentrates on road machines.

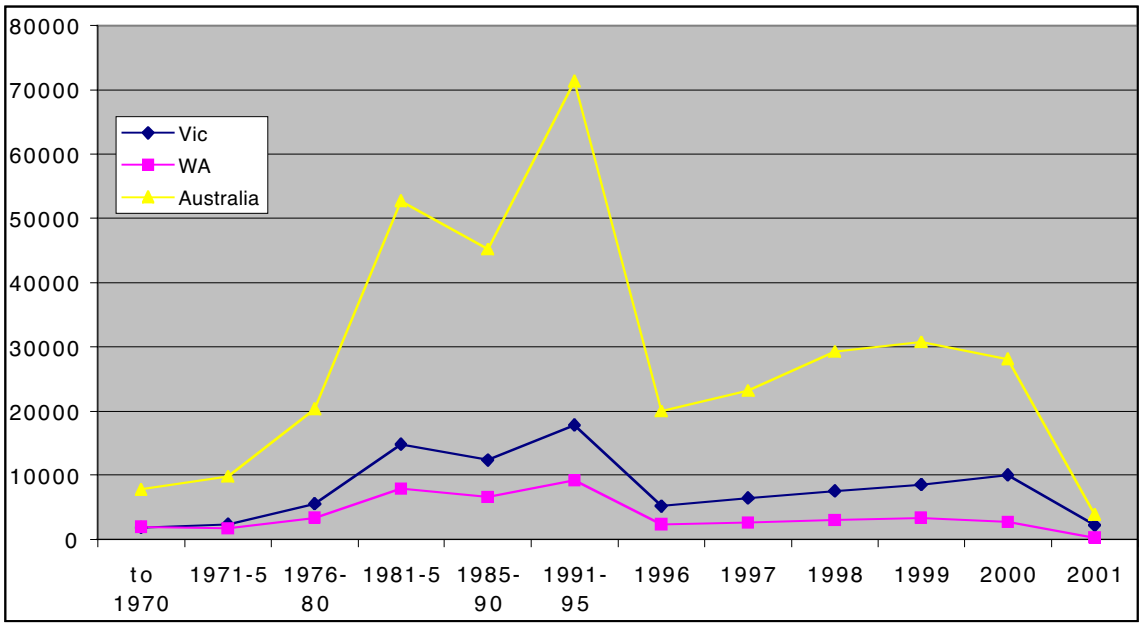

Figure 5. Age distribution of motorcycles on register in 2001 in Victoria and WA

The large fraction of the motorcycle fleet that is older than five years is also underrepresented on trade displays. The importance of this age bias is shown by Figure 5, which is a cumulative plot of motorcycles on the register in 2001 by age of manufacture for, Western Australia, Victoria and Australia as a whole (Australia: Bureau of Statistics, 2001).

VICTORIAN POLICE CAMERA TRIALS OF A REFLECTIVE FRONTAL ADHESIVE DECAL

Observations made at a series of daylight Police trials in Victoria showed that front mudguard adhesive stickers are not satisfactory for the camera on a BMW and a dual purpose off road machine due to flat angles of presentation and strong curvature of the surface (see Figure 4 in the previous section).

On the motorcycles with fly screens or reasonably tall perspex screens they could be attached easily and the camera could detect them. In Figure 4 the BMW mudguard is wide and well presented to a forward view, but is still not satisfactory in the application method shown. However, a vertical plate, 80% of standard number sizes with the letters and numbers in two rows could possibly work. The dark area to the top left of the mudguard is an area where the frontal warning lights have hit the mudguard in course of use, and illustrate the limited scope for number plates (of any material) to be mounted between the bottom of a headlamp and a mudguard on such machines. The on/off road machine on the right hand side of Figure 4 can clearly accept a decal on the flyscreen.

The night time Police trials with these same reported to be satisfactory at night.

STATIC FEASIBILITY TESTING OF DIFFERENT DECALS

Complementing the Police field tests on road, a series of dummy front registration plates were made up to be offered up to a wide range of motorcycles in dealer showrooms to test how various designs could be fitted onto each machine. A series of photographs were taken using this range of dummy plates, and a selection[14] of these visual feasibility trials are shown and discussed here.

Several variants of the current size and shape of plate were made up into dummy decals, and tested on a range of machines. The options chosen were:

1. The full sized horizontal decal used in Police camera testing trials;
2. A full size set of numbers on a vertical decal;
3. 80% reduced numbers on a vertical decal with two rows (3 letters, three numbers); and
4. 80% reduced letters on a vertical decal.

The initial basic test design is shown in Appendix 1. It is a horizontal decal with standard sized numbers and letters. Two alternative designs of decal and a second set sized at 80% that of the standard were prepared for photo tests on motorcycles. The smaller sized vertical and rectangular designs are also shown in Appendix 1. The reduction to 80% of standard size appears to make a significant difference to the range of machines which can be treated, especially the vertical two-row design which

[14] A CD containing many these images was supplied to VicRoads in April 2002.

appears to offer the most promise. It could form the basis of the on road camera and fitment trials if and when the front number plate proposal is implemented.

It is likely that two variants, the 80% sized horizontal and the 80% sized two letter - row vertical design could be used on almost all machines, as long as rubber mounting or backing plates were also available.

After a series of such tests on a wide range of motorcycle types, the best practical option identified and recommended was a pair of adhesive decals, one with the registration letters and numbers arranged horizontally in a single line at a size approximately 80% of standard letter size [160mm wide by 80mm high], and one vertically oriented, also reduced to 80% of the standard sized letters and number, with two horizontal lines, one of the letters and the next of the numbers [70mm wide by 124mm high]. These slightly smaller decals could be fitted onto the largest range of front screens without, which could make enforcement more difficult..

Figure 6 shows a common 250cc learner machine with a full sized horizontal decal, and the 80% reduced vertical and rectangular decals in position. The horizontal decal is too large, and would be difficult to mount in this position, but the 80% reduced horizontal version would be practicable. Like all of the pictures taken in these tests, the dummy decals were attached using Bluetack temporary adhesive, which is easily removable from any surface. All of the dealers approached in Elizabeth St readily agreed to these photographic tests.

Figure 6. 250cc learner machine with upper, lower fork, and front of nacelle positions

The vertical rectangular decal cannot be fitted onto a mounting in front of the upper fork leg without being obscured by the indicator stalk. At first sight it would appear that the lower fork leg could easily take the reduced size of vertical decal, but underneath the decal are several awkward mountings to which would be difficult to secure. Figure 6 shows the dummy decal attached to but not wrapped around the lower fork leg, and so would require an additional mounting backing to appear as shown when in use. More to the point for enforcement use, this decal is in an ideal

position to collect brake dust and road dirt, making it unlikely that it would be easy to keep clean enough for enforcement purposes in many conditions.

An objective test of 'cleanliness' will be an essential component of any Victorian legislation for front identification as all these decal variations will be subject to accelerated wear in use, even if mounted high enough to avoid much of the brake dust and road dirt. This is a quite distinct to the exiting legislation that refers only to 'obscured' a word normally applied to placing a physical barrier - such as a boot or an arm - over the number, but recent cases confirm that this clause is currently also far more widely and subjectively interpreted by the police to apply to light road dirt and situations where genuine and currently unverifiable differences of opinion can arise.

Such proven problematic points will need to be addressed to ensure smooth and successful implementation and operation, given that adhesive decals are more vulnerable to wear and cleaning processes. The warranty offered to VicRoads on the test number decals is five years as compared to ten for metal plates: this takes no account of the far more frequent cleaning required of decals mounted on the front of on a motorcycle, which will accelerate wear.

The conclusion is that lower fork leg mountings are of doubtful value or function (as enforcement aids), but that fitment in front of the instrument nacelles or attachments to the top segment of fork tubes between the upper and lower fork yokes are workable in most cases. The length of lower fork legs (when in a structure enabling them to have a decal applied, which already excludes many front suspension designs) is rarely adequate to mount a longitudinal decal.

On some machines there are few or no suitable fitment points in front of the instrument nacelles. This because they are either highly styled (see for example the Cagiva naked bike shown on the left in Figure 7), or have integrated nacelle mouldings mounted on vibration reducing stays at the rear which leave few practical mounting points for a decal in front of the instrument nacelle.

Figure 7. Cagiva and Harley Davidson 'naked' motorcycles

There are other models of Cagiva which even more congested frontal treatments. A series of different frontal motorcycle shots are given in Appendix 2. The Harley Davidson illustration on the right hand side of Figure 7 shows a different but similar problem where the frontal treatment is so congested as to make fitments to mudguard, upper or lower fork legs or nacelle positions equally problematic. The highly styled Harley Davidson range presents other problems. The Harley Davidson 'springer'

forks shown in Figure 7 rule out both upper and lower fork leg positions, and can also mean that almost the only site is an attachment to a shock absorber shroud. This does not provide an adequate base for a decal mounting as it is flimsy and the suspension sliders with little clearance.

Lower fork leg mountings have been tested and found to be unworkable for strip decals, and the mounting of a plate with a ring support to be very vulnerable to wind pressures, brush and casual impacts and also to present a real risk of swivelling into brake or wheel structures presenting an avoidable safety risk to the rider. Lower fork enclosure legs (in those forms of fork design that have them as not all do) are also vulnerable to binding of the internal suspension plungers and assemblies if a ring clamp is used to mount a decal plate to resist wind pressure. Again, this form of mounting presents an avoidable safety risk to the riders.

The field inspections confirmed that a slightly smaller number sized plate in a vertical two row layout (See Appendix 1) has the widest applicability. A horizontal version of the same decal also fits in front of most instrument nacelles. The detailed mounting bracket and fitment issues are being dealt with in a separate VicRoads project.

The guidelines emergent from these visual assessment trials are for two smaller sized decals, one vertical and one horizontal, as shown in Appendix 1. The decals should be available in both of these formats. It is recommended that in addition to the bare plastic sticker format, that VicRoads supply the decals on a fairly firm hard rubber base, with attachment nuts moulded in. The fitment to upper fork legs would have to

fit a wide range of radii (and many machines have decorative covers in this area which further increases the radii). This sets the design parameters quite clearly.

Two vertical ribs up to 8mm high are needed on the back of the mounting, spaced approximately 2cm apart. With suitable embedded nuts on either side of these ribs a rubber attachment sleeve can be made up to attach the rubberised plate. It is not possible to use a strong adhesive as the fork legs have to be removed through the fork yokes for maintenance. If this was the 'standard' form of decal supply (analogous to the current metal plates) then a wide range of machines could be handled with a range of fitments without having to drill or damage the decal.

The airflow issues of expressed concern to manufacturers can best be addressed in the first instance by requiring:

1. Decals be stuck to the front of deeply valanced front mudguards where available, subject to approval by the manufacturer or to the frontal bodywork (not likely to be acceptable to many riders) or on the screen of a fairing if fitted or an after market or optional original equipment bolt-on windscreen such that it does not obscure vision of the rider when using the machine on or off road. Field and procedure trials on these factors will be required.

2. Decals that have to be stuck across the boundaries of fairing screens and body work can be cut at the points where these boundaries occur, however the effects on camera pictures will need to be assessed in the field and procedure trials.

To summarise, the safety and indemnity issues can be addressed by requiring:

1. Decals on the rubber mounting plates should be attached above the base of the headlamp and such that they do not protrude above the instrument nacelles. Suitable inspection standards will need to be tested in the field and procedure trials. There are formal provisions[15] which are relevant here.

2. Any mounting brackets used be approved as safe to riders and pedestrians from a VicRoads safety inspection. Suitable inspection standards will need to be tested in the field and procedure trials.

[15] In both the Australian Design Rules (ADR 42/03: see ATSB comments shown as Item 26 in Appendix 5) and the European Union Directive 97/24/Ec on external projections, given in Appendix 3.

COSTING THE FRONT NUMBER DISPLAY PROPOSAL FOR VICROADS

The basis for the costing has a number of considerations. The requirement to supply two registration 'plates' has been standard for all motor vehicles, even for motorcycles in the case of customised plates, and the need to supply only one plate for motorcycles has only just been achieved in NSW. There are no grounds for varying the standard registration charge, so the costs of rewriting of the Victorian Registration Information System (VRIS) to handle the variations in supply that will be required will need to be to be absorbed within VicRoads.

If front decals were to become a National (ADR) requirement then no retrofitting would be required as ADRs apply from the point of implementation of the ADR. The ADR route will (if endorsed) impose costs in terms of increased machine costs and more limited range of choice[16]. Retrofits are not part of the ADR process. ADR compliance is an issue that applies as of the date of manufacture, and is applied to the test that a vehicle is roadworthy based on the date of its manufacture. This route would therefore lead to a mix of front-identified and non front-identified machines over a period which will to extend up to over 30 years.

To meet the Victorian Government objective of having camera readable registration numbers on the front of all motorcycles and scooters, a retrofitting program will be necessary, and would have no support from any ADR initiative even for new

[16] This is now a common ground for consideration of all ADRs by ATSB, where harmonisation is seen as the means to move forward with the rapidly developing ECE, EU and FMVSS agendas without imposing the additional costs and product delays of ADRs.

machines until the relevant ADRs were developed, approved and the necessary tests and design variations incorporated into the forward program of motorcycle manufacturers.

If the priority for visual identification from the front of motorcycles is high enough, then a retrofit program will be needed by State governments. This would require well over 350,000 machines to be handled Australia wide, and over 97,500 in Victoria alone, plus the new registrations for the year of implementation and new registrations that take place from now until the start of the scheme. This will require special staffing to handle the administration. The setting up and maintenance of this administration needs to be costed. It may also require an inspection process to ensure that decals mounted on brackets were safe, and to underpin and cover liability issues for users and dealers alike.

The ADR route would not require any inspection processes to cover safety, warranty and indemnity for manufacturers and dealers. In this regard is the superior process for implementation. It is certainly the cheapest, if the increased costs of machines and more limited choice for the users is discounted, but could only cover new machines.

However a retrofitting program would be necessary whatever route is taken, and this will potentially incur all these liabilities for motorcycles not covered by a new ADR. Several distributors and manufacturer representatives in Australia (ie. Honda, Triumph and Harley Davidson) indicated that their approval would be required for any front number plate fitment to new machines before release to the purchaser. It is likely that compliance with manufacturer or FCAI guidelines for attachment of

adhesive decals to windscreen would be satisfactory, but any other form of decal mounting system would require inspection at some point.

While this could be done by inspection by the distributor, this will add a further cost to the end user and would not necessarily address any safety liability issues that could arise. Some form of official inspection may still be necessary to ensure that motorcycle owners and dealers do not lose manufacturer warranty support. If VicRoads were to provide inspection services to cover these safety and indemnity risks the manufacturers could well agree not to withdraw warranty support from the dealers and owners. Any charge for such inspection must be added to the end-user or road authority cost of the proposal to retrofit the existing fleet.

COSTING TEMPLATE

The number of motorcycles registered in Victoria 2001 was 94,476 (Australia: Bureau of Statiscics, 2001), to which must be added the State recreational registrations of 3030[17] as the ABS data does not include the recreational registration numbers. The total 2001 motorcycle fleet registered in Victoria was therefore 97,506, including the state recreational registrations. This the base number that will be used for the costing analysis, which will be based on 2002 dollars. The total costs of the proposal to retrofit the existing registered fleet will be expressed in 2002 dollars, and so all the costs incurred at various points in the next 10 years will be discounted at 5% per year to be brought back to 2002 dollar values. Consequently costs to be incurred in 2007 would be scaled down by[18] 0.78. This means that $1.00 in 2007 would be expressed as being worth $0.78 in 2002. The total cost of the retrofit proposal will therefore be expressed as the Net Present Value of costs incurred.

It is considered that an inspection process will probably be required, but not for the entire 2001 fleet of 97,506 motorcycles, as this fleet has an over-representation of non-windscreen and non-fairing machines.

A retrofitting requirement would also impose significant time and monetary costs for motorcyclists either through their own lost working or other time costs and inspection or dealer charges for this same service.

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[17] This is for 2000 and is the most recent figure available from VicRoads. It is made up from 417 new motorcycles, 1398 second hand motorcycles registered as recreational for the first time and 1222 recreational registration renewals.

[18] This weight would be 0.78, computed from $1/ (1+0.05)^{5.}$

VicRoads Fixed costs	
Vicroads VRIS setup cost.	Rewriting software to handle front plate issue for several decal variants
Peak load staffing supplementation to handle retrofitting.	97,506 motorcycles to be handled, plus registrations since 2001
Set up for inspection costs for safety approval.	Initial administration and staffing hiring costs.
VicRoads Variable costs	
Costs for adhesive decal supply (several variants).	Expected to be the same for all decal variants.
Costs for moulded rubber bases.	Decals mounted onto rubber base with attachment points for non-windscreen mountings.
Costs for moulded open ring mounts for fork top fitment.	Decals mounted on moulded back shaping for attachment to rounded surfaces.
Inspection costs for safety approval.	Staffing costs at city and country VicRoads inspection sites.
End Users and /or Road Authority Added Variable Costs	
Added costs for front registration fitment brackets.	Costs for brackets to mount flat or rounded back moulded rubber mounting variants.
Added time for front registration bracket fitment.	Estimated by VACC in terms of resource cost and time: requires profit and tax for full user cost computation.
.	
User time for all retrofitted motorcycles without suitable flat mounting surfaces.	Estimated as an average of one half-day minimum of working time per retrofit machine including a subset requiring inspection for delivery, collection and additional inspection time.
.	

Table 7. Template for a Motorcycle Front Identification Retrofit Program in Victorian

The hardware costs for bracket mounting fabrication and fitment also impose a cost. While the costs could be somewhat reduced by the production of a range of fitting kits, the huge range of models involved make this largely impractical due the hundreds of models – and indeed also model variants – involved in a retrofit program ranging over motorcycles up to 30 years old.

The Australian Bureau of Statistics reported 10,100 new motorcycles registered in Victoria in 2000. The new State recreational registrations must be added to this. There were 471 new machines and 1223 existing machines brought into the recreational registration system for the first time. The total 'new' registrations in 2000 was therefore 11,794.

An apparent anomaly exits between 10,000 new registrations in 2001, 97,500 motorcycles on the current register at that time and an average age of 11 years for the machines on the register is due largely to the multiple vehicle ownership amongst motorcyclists, where not all the machines are registered at any given time.

Unless the fixed costs of setting up the system are large, the annual cost for newly registered machines coming onto the State registration systems would be in proportion to the number in the current 2001 fleet. Using the 2000 values, this would be 12% of the cost of the initial retrofitting process. This will apply each year, and if the front number plate scheme started in 2003, taking into account the lead time required, then an additional 12% would need to be added to account for the new machines registered in 2003 during the rollout year. This takes no account of either any sales from the end of 2001 to the start of the scheme, or to any increase in sales over time. This is a conservative assumption, in accord with the rest of the costing assumptions made. This is evident from the sales trends shown in Figure 2.

COSTS OF FRONT IDENTIFICATION FOR MOTORCYCLES IN VICTORIA

The only costs that can be reasonably firmly set at this stage, prior to field trials are the VRIS amendments at $45,000 including the preferred vertical decal variant.

Road Authority registration software changes required $0.045 m

The cost of the current design of adhesive decals ($23.65- $25.14 plus GST). The digital version of the decal design has been used the basis of the calculations. This is a resource cost, expressed ex-GST as it is a Road Authority expense, based on the value of $25.14 ex GST for each basic decal

First year ex-GST cost of basic decals for the full 2001 registered fleet $2.45 m

The decal manufacturer offers no warranty for any period after the decal is attached to the machine, and only half of the metal plate warranty period of 10 years. On a continuing program basis the first year cost should be applied again five years hence. However these replacement costs will be paid in 2007 dollars, and so to bring the costs back to 2002, the $2.45 m must be discounted five years at 5%[19] to become a charge of $1.92 m in 2002 dollars. This is the Net Present Value of the expenditure known to be committed to arise in five years time.

[19] The 2007 value must be weighted by 5 years of 5% discount. Ie. $1/(1+0.05)^5$ which is 0.784

ex-GST cost of 5-year replacement decals for the 2001 registered fleet $1.92 m

Estimating the cost of retrofit mountings requires information of the age of the current motorcycle fleet. This has been drawn from the recent ABS Motor Vehicle Census (ABS, 2001). Figure 8 shows that most motorcycles and scooters are 6-26 years old. This confirms that a much higher fraction than in the fleet as presently sold will require special brackets or fixtures. The median value (at the 50th percentile) is at 1990, 11 years of age (median values are not the same as the average, and it is the median value that is most appropriate here).

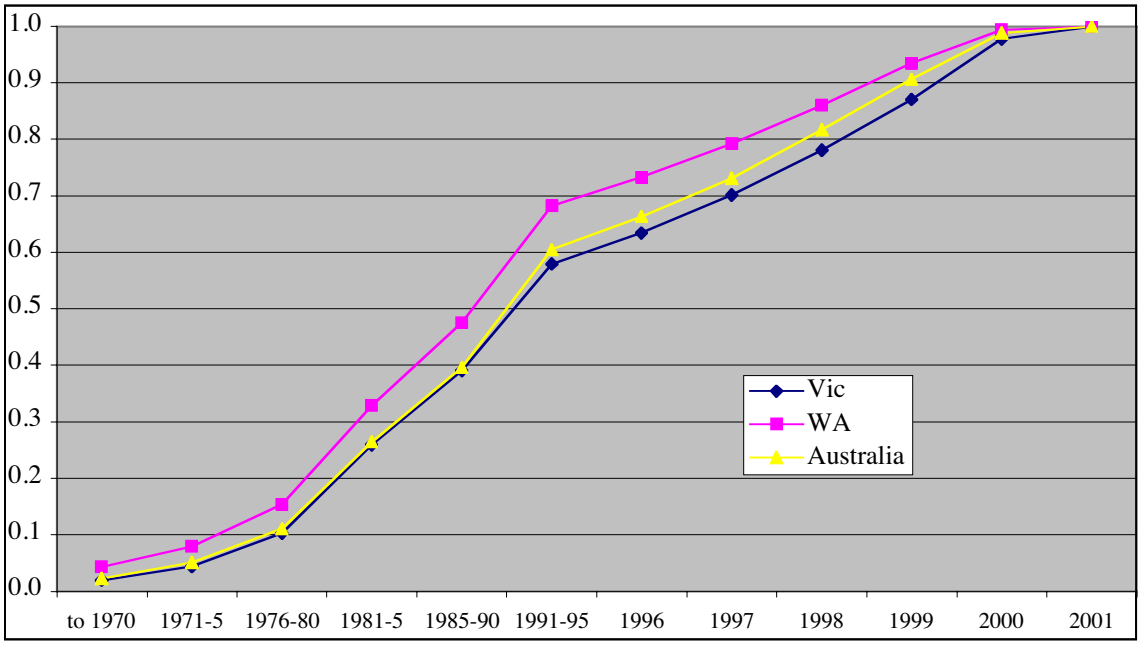

Figure 8. Cumulative age distribution of motorcycles on register in Victoria and WA

The FCAI estimates that 80% of machines currently on register[20] would require special brackets and fixtures. As a highly conservative basis for assessing the costs of

[20] FCAI

the front plate retrofitting proposal we shall use the much lower figure of 50%. As the current motorcycle fleet in shops shows 27% of machines on display would need special fitments, this is a very conservative value, but provides a lower bound to the overall costs.

The addition of rubber decal mounts, brackets and fitment costs would be expected to add at least $50 to approximately half of the 2001 fleet, a further[21] $ 2.44 m dollars for the currently registered fleet.

Decal mounting and bracket costs for 50% of 2001 fleet	**$2.44 m**

Time costs for riders would be applicable to the estimated 50% of bikes needing specialized fitment other than a simple decal application. This is very conservative, as the FACI estimate is that 80% of the current fleet will require special fitments. Based on an average wage of $750 per week, allowing half a day for all delivery, fitment, inspection and collection times, would yield 0.5 x 750/7 x 97500 x 0.5. is $2.61 m in resource costs for the community.

User time costs for 50% of 2001 fleet	**$2.44 m**

Annual Costs for new registrations during	**$0.94 m**

Total cost of retrofitting the current 2001 fleet plus handling the 2 years of new registrations [2002, plus 2003 during the implementation year]	**$13.8 m**

[21] (97506*0.5*50)

VicRoads Fixed Costs		**Number**	**Unit cost**	**Total Cost $m**	***Variable parameters***	*Vary these values*
Vicroads VRIS setup cost.	Rewriting software to handle front plate issue for several decal variants	1	**$45k**	**$0.05**	Cost of VRIS software rewrite	$45k
Peak load staffing supplementation to handle retrofitting.	97,506 motorcycles to be handled, plus all registrations in 2002 and 2003 if started in 2003				Cost of one decal	$25.14
Set up for inspection costs for safety approval.	Initial administration and staffing hiring costs.				Number of years Discounted for replacement decals	5
VicRoads Variable costs					Discount rate (interest rate)	5.0%
Costs for adhesive decal supply (several variants).	Expected to be the same for all decal variants.	97504	$25.14	**$2.45**	Number of motorcycles to be retrofitted in the first operational year*	97504
Costs to correct for the 5 year against 10 year life of the metal plates	Discounted cash flow for the same costs again 5 years out	0.784	*$2.45*	**$1.92**	Fraction of existing fleet to be fitted with some form of brackets/mountings	50.0%
Costs for for moulded rubber bases or moulded open ring mounts for fork top fitment.	Decals mounted on moulded back shaping for attachment to rounded surfaces.	50%	$50.00	**$2.44**	Cost of one moulded rubber base.	$50.00
Inspection costs for safety approval.	Staffing costs at city and country VicRoads inspection sites.				Costs of brackets when required	$10.00
End Users and /or Road Authority Added Variable Costs					Cost of fitting time for machines requiring mountings	$40.00
Added costs for front registration fitment brackets.	Costs for brackets to mount flat or rounded back moulded rubber mounting variants.	48,752	$10.00	**$0.49**	User time taken up by visits to dealers etc in days	0.5
Added time for front registration bracket fitment	Estimated by VACC in terms of resource cost and time: requires profit and tax for full user cost computation.	48752	$40.00	**$1.95**	Average wage basis	$750.00
User time for all retrofitted motorcycles without suitable flat mounting surfaces.	Estimated as an average of one half-day minimum of working time per retrofit machine including a subset requiring inspection for delivery, collection and additional inspection time.	0.5	$53.57	**$2.61**		
Total in 2002 Dollars				**$11.90**		

Table 8. Costs of current (end of 2001) motorcycle fleet retrofit of front numbers

VicRoads Variable costs		**Number**	**Unit cost**	**Total Cost $m**	***Variable parameters***	*Vary these values*
Costs for adhesive decal supply (several variants).	Expected to be the same for all decal variants.	11794	$25.14	**$0.30**	Cost of one decal	$25.14
Costs to correct for the 5 year against 10 year life of the metal plates	Discounted cash flow for the same costs again 5 years out	0.784	*$0.30*	**$0.23**	Number of years Discounted for replacement decals	5
Costs for for moulded rubber bases or moulded open ring mounts for fork top fitment.	Decals mounted on moulded back shaping for attachment to rounded surfaces.	27%	$50.00	**$0.16**	Discount rate (interest rate)	5.0%
Inspection costs for safety approval.	Staffing costs at city and country VicRoads inspection sites.				Number of machines to be registered for road or recreational use in 2002	**11794**
End Users and /or Road Authority Added Variable Costs					Fraction of existing fleet to be fitted with some form of brackets/mountings	**27.0%**
Added costs for front registration fitment brackets.	Costs for brackets to mount flat or rounded back moulded rubber mounting variants.	3,184	$10.00	**$0.03**	Cost of one moulded rubber base.	$50.00
Added time for front registration bracket fitment	Estimated by VACC in terms of resource cost and time: requires profit and tax for full user cost computation.	3184.38	$40.00	**$0.13**	Costs of brackets when required	$10.00
User time for all retrofitted motorcycles without suitable flat mounting surfaces.	Estimated as an average of one half-day minimum of working time per retrofit machine including a subset requiring inspection for delivery, collection and additional inspection time.	0.5	$28.93	**$0.09**	Cost of fitting time for machines requiring mountings	$40.00
Total in 2002 Dollars				**$0.94**	User time taken up by visits to dealers etc in days	0.5
					Average wage basis	$750.00

Table 9. Annual cost for new registrations (used for the 2002 and 2003 costings)

If the proposal takes effect from January 2003 , then there will be a full year of motorcycle registrations from 2002 plus the registrations during 2003 to cater for as well. Using the 2000 number of 11794 as a minimum for 2002 and subsequent years, the annual cost for new registrations are shown in Table 9 ($0.94m per year). The

costing basis is the same as above, less the fixed costs for setting up. The percentage of motorcycles requiring special fitments was set to 27% as observed as part of this study. Other wise that same calculations apply. The two years must be added to bring the fleet size up the end of 2002, the earliest starting date possible, and to cater for the new registrations that will arise during 2003, again the full year will be the minimum practicable roll out period. Table 8 also provides a base estimate of the annual ongoing costs

Motorcyclists knowledge of reliance on frontal images has been very limited until recently and this could well limit the revenue impact of the measure. Fine revenue changes are not included as the proposal is a safety project.

The results given here have been estimated using conservative values, and provide a lower bound to the first year and recurrent costs. In particular, no allowance has been made for the increasing long term sales trend (see Figure 1), for rises in recreational registrations from the very large pool of registerable off road and dual purpose machines.

The substantial costs of the proposal suggest that there is a cost-effective enforcement role for greater use of both rear cameras and dual front/rear camera combinations, and the addition of two rear view cameras on the two central lanes of the CityLink Domain tunnel.

TRIALS

The minimum lead in period cannot be less than 18 months. Six months is required to set up the necessary Registration Authority software to handle the changes, and 12 months for the full registration renewal cycle.

Field trials can be carried out to refine the decals, the mounting systems and the operational procedures required for inspection, mounting and camera detection processes. Developing prototype plates and hard rubber mountings and brackets is the first stage, and testing may well show the need to revise the initial designs after testing in the field.

The key aspects of field trials should include:

1. Test decal mountings and decals for robustness and reliability.
2. Testing camera equipment on the new smaller plates in the mounting positions used.
3. Development of inspection procedures and both safety and warranty indemnity issues in consultation with the relevant parties.
4. Trialing Police operational and technical procedures to ensure that the overall system can function effectively.

It is recommended that a sample of at least 100 models of the wide range currently on register be tested for mounting problems, and a smaller number be tested on the road and under normal cleaning and road dirt collection circumstances.

As these trials would need to involve a number of parties and stakeholders, the full costing is not possible to provide, as it will depend on the internal costing of Police and other parties. However, if undertaken under consulting guidance an operational field trial is estimated to require a budget of about $100,000 over a period of at least six months.

RECOMMENDATIONS

1 Trials on the interactions between decal adhesives and the gel and other finishes on a range of motorcycles be undertaken.

2. Adhesive number plates (decals) currently provide the best available solution for front registration number display.

3. Due to the practical problems in fitting decals in a suitable manner to a significant number of models and types of motorcycles, trials be undertaken of vertical, separated and unconnected number decals are undertaken with these mounted on curved and angled surfaces and using smaller numbers. Such trials will need to address the operational effectiveness for camera purposes of the proposed 80% sized numbers, the fitment complexities and costs, and the procedural processes to address any warranty or liability issues and refinement of the operational definition of an 'obscured number plate'.

4. In view of the costs reported by R&L officers a full Regulatory Impact Statement be undertaken to ensure public acceptance. In the case of an ADR approach this forms part of the ADR development process.

5. Consider alternative Intelligent Transport System (ITS) approaches to vehicle identification applicable to all types of vehicles. This is addressed in a complementary report (Wigan and Patterson, 2002).

6. Undertake detailed design studies for decal mounting plates and fitment systems.

   This is being addressed by a further VicRoads project.

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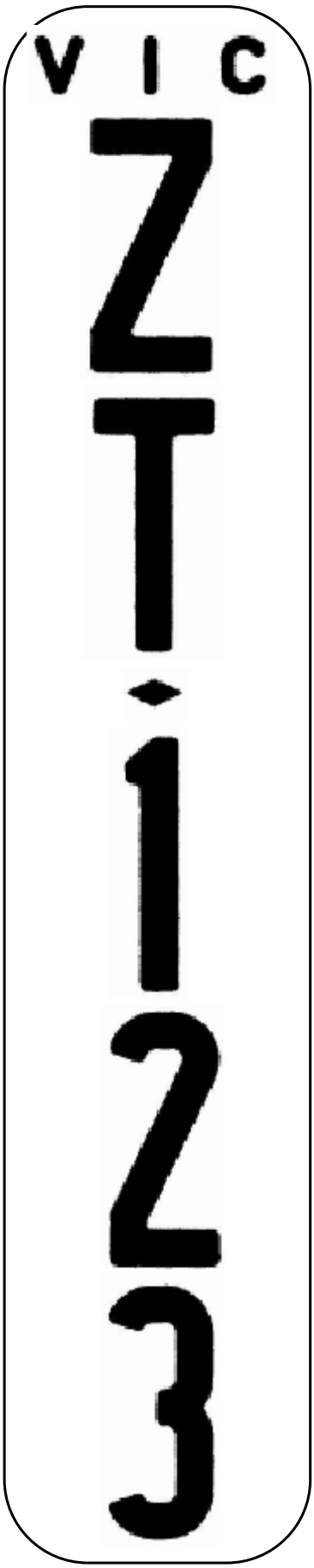
APPENDIX 1 PROPOSED MOTORCYCLE PLATE/DECAL DISPLAY AT FULL SIZE

The' full size' decal layout as supplied by VicRoads was 200mm wide x 32 high

The trial dummies were (vertically with two rows of numbers and letters of the same size as the VicRoads sample) 81mm across by 155 mm high and were not found to be very useful.

However, the reduced version, 100mm wide by 228mm high was found to be quite effective across a range of machine types.

Arranging the registration letters and numbers vertically produced a thin plate 256mm high by 56mm wide. Almost no use was found for this, but once again the reduced version 230mm wide by 46mm high was found to be more practical in a number of the cases tested and was the single most usable version tested.


VIC
ZT
1
23


VIC
ZT
123

APPENDIX 2 A VARIETY OF FRONTAL TREATMENTS OF CURRENT MOTORCYCLES ON SALE

The Cagiva in the middle of the bottom row is typical of the problems induced by 20 years of design developments without any requirement for front plates. This machine has no fairing, the styling strakes protecting the instrument nacelle have a space between them, and make it difficult to apply a standard decal. The fork treatment also precludes fork leg applications to lower or upper segments of the fork leg assembly, and the mudguard is short and too narrow for a full sized plate. A 80% sized two-row vertical plate is about the only practicable option for this machine.

APPENDIX 3 EXTRACTS FROM THE EU DIRECTIVE 97/24/EC ON EXTERNAL PROJECTIONS

DIRECTIVE 97/24/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 June 1997 on certain components and characteristics of two or three-wheel motor vehicles
THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

CHAPTER 3 EXTERNAL PROJECTIONS FROM TWO OR THREE-WHEEL MOTOR VEHICLES

LIST OF ANNEXES

ANNEX I

REQUIREMENTS APPLYING TO EXTERNAL PROJECTIONS FROM UNBODIED TWO OR THREE-WHEEL MOTOR VEHICLES

1. DEFINITIONS
For the purposes of this Annex:
1.1. 'outer parts of the vehicle`: means the parts of the vehicle likely to be involved with external obstacles in the event of a collision;
1.2. 'grazing`: means any contact which, under certain conditions, could cause injury by laceration;
1.3. 'collision`: means any contact which, under certain conditions could cause penetration injuries;
1.4. 'type of vehicle in respect of external projections`: means vehicles not differing essentially from one another with regard, in particular, to the shape, dimensions, direction of travel and hardness of the outer parts of the vehicle;
1.5. 'radius of curvature`: means radius 'r` of the arc of the circle most closely approaching the rounded shape of the part under consideration.

2. CRITERIA FOR DISTINGUISHING BETWEEN 'GRAZING` AND 'COLLISION`
2.1. When the testing device (shown in Figure A in the Appendix) is moved along the vehicle as described in item 4.2 below, the parts of the vehicle touched by that device must be considered to fall within:
2.1.1. group 1: if the parts of the vehicle graze the testing device; or
2.1.2. group 2: if the parts of the vehicle collide with the testing device.
2.1.3. In order to differentiate unequivocally between group 1 parts or components and those falling within group 2, the testing device must be applied in accordance with the method shown in the following diagram:

3. GENERAL REQUIREMENTS
3.1. Notwithstanding the requirements of item 3.2, the outside of all types of vehicle shall incorporate no pointed, sharp or protruding parts, pointing outwards, of such a shape, dimension, angle of direction or hardness that it increases the risk or seriousness of body lesions suffered by any person struck or grazed by the vehicle in the event of an accident.
3.2. Vehicles shall be designed in such a way that the parts with which other road users are likely to come into contact comply with items 5 and 6, as appropriate.

3.3. All external projections covered by this Annex which are made of or covered with soft rubber or plastic having a hardness of less than 60 Shore A are considered to meet the requirements set out in items 5 and 6.
3.4. However, the following specifications shall not apply to the space between the side-car and motorcycle in motorcycle combinations.
3.5. Where mopeds are fitted with pedals, compliance with all of the requirements or parts of these laid down by this Directive in respect of the pedals is optional. Where the requirements are not met, manufacturers' shall inform the authorities receiving the request for the component type-approval of external projections from a type of vehicle and shall at the same time describe the measures taken in order to ensure safety.

4. TEST METHODS
4.1. Testing device and test conditions
4.1.1. The testing device shall be as described in the Appendix, Fig. A.
4.1.2. The test vehicle shall be held in a straight line and a vertical position with both wheels touching the ground. The steering device shall be free to move within its normal range.
An AM 50 percentile anthropomorphic dummy or a person of similar physical characteristics shall be placed on the test vehicle in the normal driving position in such a way that it does not hamper the free movement of the steering device.
4.2. Test procedure
The test device shall be moved from the front towards the rear of the test vehicle and (if it is able to strike the testing device) the steering control shall be rotated into its fully locked position. The test device must remain in contact with the vehicle (see Figure B in the Appendix). The test shall be carried out on both sides of the vehicle.

5. CRITERIA
5.1. The criteria set out in this item shall not apply to the parts covered by the requirements of item 6 below.
5.2. Apart from the exemption set out in item 3.3 above, the following minimum criteria shall apply:
5.2.1. Requirements applying to the group 1 parts:
5.2.1.1. Plates
- the corners of a single plate shall have a radius of curvature of at least 3 mm,
- the edges of a single plate shall have a radius of curvature of at least 0,5 mm.
5.2.1.2. Stems:
- stems shall have a diameter at least 10 mm
- the edges on the end of a stem shall have a radius of curvature of at least 2 mm.
5.2.2. Requirements applying to group 2 parts:
5.2.2.1. Plates:
- the edges and corners shall have a radius of curvature of at least 2 mm;
5.2.2.2. Stems:
- shall not be longer than half of the diameter of the stem if that diameter is less than 20 mm.
- the radius of curvature of the edges at the end of a stem shall be at least 2 mm if the diameter of the stem is at least 20 mm;

6. SPECIFIC REQUIREMENTS
6.1. The upper edge of the windscreen of fairing shall have a radius of curvature of at least 2 mm or else be covered with an edge-protection material in accordance with item 3.3.
6.2. The ends and the outer edges of the clutch and brake levers shall be perceptibly spherical and have a radius of curvature of at least 7 mm.
6.3. The leading edge of the front mudguard shall have a radius of curvature of at least 2 mm.
6.4. The rear edge of any filler cap located on the upper surface of the fuel tank and thus likely to be struck by the rider in a collision shall not extend more than 15 mm above the underlying surface; any connection with the underlying surface shall be smooth or perceptibly spherical. If the 15 mm requirement cannot be met other measures - such as a protective device located behind the filler neck - must be provided (see, for example, the following sketch).
6.5. The ignition keys shall have protective cap. This requirement does not apply to folding keys or keys which are flush with the surface.

APPENDIX 4 PARTIES CONSULTED INCLUDE

Allen, Guy - individual response

Bailey, Mary - DoT Tasmania

Beresford-Wiley, Adrian – Director of Road Safety ATSB

Brooks, Chris – Research Director ATSB

Carey-Clinch, Craig - Director of Policy Motorcycle industry Council UK

Carroll, Ray - National Motor Vehicle Theft Reduction Task Force

Cercarelli, Dr Rina Deputy Director WA Injury Research Centre university of WA

Chapman, Rod - Australian Motorcycle News

Chaytor, Neil – Principal Policy Officer Licensing WA DoT

Chica, Franka - R&L VicRoads

Chiodo, Steve - VMAC & MD Peter Stevens Motorcycles retail & distribution group

Crackel, Linley – Principal Policy Officer DoT WA

Croker, Geoff – Managing Director, Graphics Computer Systems

Czajka, Michael - Road Safety Officer MRA Victoria

Daly, Peter – Chief Traffic Engineer, RACV

Donnelly, Tom - LMT Australia

Dunphy, Peter - Divisional manager VACC Motor Cycle Division

Fanciulli, Lisa Principal Licensing and Chair Motorcycle Reference Group WA DoT

Fisher, Craig – Senior Sergeant WA Police Camera Office

Galliano, Dr Frederico - Secretary General ACEM

Grey, Neville - Ulysses Club

Hutchinson, Trevor and Deb - ALERT Motorcycle Training Wa

Jack Haley - Senior Environment Specialist NRMA

Killen, Jennifer - individual response

Kirby, Gary - DoT WA

Lonergon, Tom - individual response

Luk, James - Associate Professor Nanyang University Singapore

Marsland, Craig – Divisional Manager Motor Trade Association of WA

McGoran, Ron – Registration Policy DoT SA

McInerney, Rob – Research at ARRB TR

Menon, Gopinath - Land Transport Government of Singapore

Mesnil, Jean - Moto Sport Suisse

Moormann, Bob - Acting Superintendent Traffic WA Police

Murison. Robert – Manager WA Motorcycle Division Honda MPE

Nankervis, Mark- individual response

O'Day, Bernie - TransUrban

O'Donoughue, Adrian - Harley-Davidson in Australia

Pearson, Rhod - Road Safety Officer MRA WA

Perhrson, Gordy - DoT Minnesota USA

Peter Keogh - Superintendent Victoria Police

Phillips, Mick - Bike UK

Prower, Steven - Research Officer BMF UK

Quincey, Ray – Director Ray Quincey Motorcycles Melbourne

Quinlan, David - ACT Government

Reid, Eric – Queensland R and L

Reeve, Bruce - Cycle New Zealand

Richardson, Dave - Chief Inspector Victoria Police

Roberts, Richard - individual response

Rogers, Jason - individual response

Scott, Dick - RAC WA

Smith, Rob- VMAC

South, David, - Road Safety VicRoads

Stafford, Brent – Executive Director ITS Australia

Standford, Guy – Vice President NSW Motorcycle Council

Strickland, Stuart – Senior Director Honda MPE

Syner, Joey – Safety Specialist NHTSA USA

Taylor, David - DoT State of Illinois

Thiollier, Eric - ACEM Association of European Motorcycle Constructors

Tierney, Paul – VMAc and Research Manager TAC

Trainor, Simon – Territory Manager-Motorcycles WA Honda MPE

Walker, Dr Conrad- Director Netstar South Africa

Wootton, Ken - Australian Motorcycle News

Zurzolo, Gino – Individual response

APPENDIX 5 A RANGE OF THE RESPONSES TO THE CONSULTATION PROGRAM

1. Land Transport Authority, Government of Singapore

The information that you have requested for:-

Q1 I gather that you have front number plates in Singapore motorcycles - but that these are mounted longitudinally along the front mudguard, is this correct?

A A motorcycle front registration number plate is either mounted longitudinally on the mudguard or facing forward on the front fairing of the motorcycle.

Q2 Is the fitment of the plates done by the rider?

A Vehicle registration number plates are fitted by the number plate makers or the motor agents.

Q3 Do the mountings have to be approved by the Singapore government or the manufacturer?

A Under the Road Traffic (Motor Vehicles, Registration and Licensing) Rules, vehicle identification marks (i.e. registration numbers) must be exhibited not more than one metre from the ground. A motorcycle front
number plate, if mounted longitudinally, must be mounted such that from whichever side the motorcycle is viewed, the registration numbers are easily distinguishable.

Q4 Are the resulting mounting used by frontal speed camera detection systems?

A All our enforcement cameras (ERP, speed, red light) capture the view of the rear number plates

Q5 What purpose do these longitudinal plates serve?

A The motorcycle front registration number plates are for easy identification by enforcement officers or motorists traveling next to motorcycles.

Q6 Are electronic road pricing tags fitted to motorcycles? What is your experience in using them? In enforcing this? In stopping theft in the exposed motorcycle environment?

A Motorcycles are permanently fitted with water-proof In-vehicle Units (IU) for collecting Electronic Road Pricing (ERP) charges. It was a difficult exercise because motorcycles come in different shapes and sizes. There is no issue of stolen IUs as the IUs have unique identification numbers which are captured at the ERP gantry. Motorcycles fitted with
stolen IUs will be detected and have their image taken. However, if the rider forgets to remove the CashCard (a prepaid stored value smart card for paying the ERP charge), this might be stolen. The riders are always advised to remove the CashCard at the end of each journey.

Gopinath_Menon Land Transport Authority

2. Individual response via email

I received a copy of an e-mail you sent to Sydride on the 5th March on the subject of Front Number Plates. I would be interested in any information regarding the push by politicians & police, for the reintroduction of front number plates or frontal identification of motorcycles. You are probably already aware of the front page story in last weeks Queenslands Sunday Mail, on how peeved the police are that they are missing out on revenue. This is a copy of the reply I sent to the editor of the Sunday Mail.

"So, the police are concerned about lost revenue because motorcycles are only required to display rear number plates. Firstly, let me point out that front number plates have been banned world wide, not just in Queensland or Australia.
After reading the comments from the police, they are only concerned about the hundreds of thousands of dollars they are losing through lost revenue. Not once has it been reported that they are concerned about the safety of motorcyclists or other road users. The police & our politicians keep telling us that revenue isn't the issue with speed cameras, but road safety is the main reason for them & that the fines are the deterrent. So now I'm told the main concern is losing revenue (which I am more likely to believe). To place front number plates on motorcycles will go against world wide practice. Some motorbikes will even have their handling affected to the point of being dangerous to ride.

With the styling of motorcycles these days it would not only be dangerous but would look absolutely horrible. So, if the police do have a concern, then use speed cameras to snap the rear of vehicles. This can be done. Oh, by the way, motorcyclist & car drivers will still give the police gestures as they ride / drive past the speed cameras."

As yet I haven't had a reply, but then again, I don't expect one. I have been riding motorcycles now for over 30 years, & the invasion of big brother is only around the corner. I'm am all for road safety, but our rights as individuals & motorcycle riders, is being constantly reviewed by big brother, who only wants our hard earned (revenue) disguised as road safety. So any information regarding motorcycling would be greatly appreciated.

Bill Denton, Queensland (individual response forwarded by the NSW Motorcycle Council)

3. AMIA via the Motor Trades Association (ACT) Ltd

The RTA should be advised of these points before considering any further action. The following points, most of which are centered on safety issues, should be considered.

1. This is not a new idea and front mounted plates were previously used and rejected because of injuries caused to the rider in the event of an accident.
1.1. Also refer to ATV hazard issues eg. fishing poles and other front mounted accessories.

2. Manufacturer's warnings from Harley-Davidson specifically state "Altering a motorcycle's standard configuration could result in death or serious injury"

"Unstable handling and/or loss of control may result from .....Adding unapproved accessories"

3. Comments from qualified and experienced motorcycle technician:

Motorcycles without fairings do not provide any room for plates and suspension movement will cause contact.

Safety Issue - wind buffeting against licence plates causes front end stability issues creating unsafe riding conditions.

Aerodynamic style motorcycles will be affected by change in motorcycle aerodynamics

Will restrict or upset air flow to radiator inlets on liquid cooled motorcycles and also on air cooled motorcycles.

Creates unsafe conditions in relation to personal injury of rider or pedestrian injury in the event of an accident (same principle as bullbars, fishing rod mounts or any sharp or jagged objects).

Personal experience from workshop perspective has shown that motorcycles fitted with front mounted licence plates are dangerous when ridden even within speed limits and especially in high winds.

This proposal is anti-safety and the RTA should not risk endangering lives when changing the angle of speed cameras would be of far less danger to road users.

Christine Macauley Chair of AMIA

4. Western Australia Police

Q2. Problems in securing convictions from the courts from rear pictures

A. Traditionally in WA, courts are reluctant to convict even with a photograph from the front showing the driver. Rear shots are not accepted by the courts. It is not known until tested how magistrates will interpret new legislation.

Q3. Any aggravation of scale of the issues due to very extensive WA media coverage advising all motorcyclists of the operational procedures

A WAPS is in partnership with the media in televising the location of speed cameras so that motorists will slow down prior to the locations, in some instances this has allowed motor cyclists with no front number plates to take advantage and speed or demonstrate other forms of messages to the camera operator without fear of getting caught.

Q4. Ability to take rear pictures is not in question, it is an operational issue and could be corrected easily in most cases

A. The question of rear photographs is not there, the issue is one of driver identification and identification of the motor cycle itself and acceptance by the courts.

Carl Fisher Camera Section WAPS

5. Motorcycle Industry Division of the VACC

The Motorcycle Industry Division (MID) at VACC represents employer retailers and repairers in Victoria and is affiliated with the Australian Motorcycle Industry Association (AMIA). VACC in turn is affiliated with the Motor Traders Association of Australia (MTAA).

We have surveyed our membership report as follows on the questions raised in your study:

1. General concerns about front number identification:

No in principle objection to front number identification on motorcycles if for the purpose of law enforcement and vehicle identification. Such policy would be consistent with other registered vehicles in use. Consideration of national uniformity is important for effectiveness.

2. Concerns re attachment and application of number plates:

* The cost of fitment could not be borne by our members. The consumer would have to pay (as part of pre-delivery) or alternatively and subject to adequate lead-time, manufacturers would need to build with specifications incorporating provision for fitment of front plates, depending on design considerations.

* Retrofit would be an issue. The existing car park would need to be addressed, including veteran, vintage, sidecar, scooters and every other configuration of motorcycle. Members would need access to fitting instructions from suppliers and consumers would require product warranty for late model retrofit. Who underwrites the cost of any warranty arising from poor design, quality would be an issue to be resolved in any contemplated universal campaign .
* In all probability any front plate bracket would need to be affixed to the front forks given the vast array of model specifications and guard configuration on various models. Modern motorcycle design and materials are not suitable for affixing of number plate frames/mountings to guards or fenders. Further consultation with manufactures will clearly demonstrate the engineering technicalities to be overcome.

* Metal number plates are hazardous in the event of impact with pedestrians, or falls by the rider. They were removed for this reason many years ago, in the interest of road safety. No serious technology advances have occurred to redress this safety problem, other than transparencies or microdots.

3. Issue relating to costs:

* Member retail labour rates range from $25-$55 per hour depending on make, model and nature of work. The prime cost would be approximately $15-$30 per hour to achieve this retail rate. Provision and fitment of a front bracket and pate would take approximately 15-20 minutes, if straightforward.
* If dealers are not given a provision by suppliers for pre-delivery to account for the cost of fitting front plates, then members would have to pass on the charge to consumers, rather than absorbing it themselves.
* Fitting devices/instructions would need to be obtained for every potential motorcycle in the fleet if a retrofit campaign was launched. Some dealers would have to improvise in sourcing parts to fit plates and this could further compromise safety and significantly inflate costs for customized fitment. Customers would become irate if charges were too high thus bringing our members under criticism.

4. Concerns relating to safety issues:

* The same reasons for eliminating front metal number plates from motorcycles in the past remain valid today. Both pedestrian and rider safety would be compromised. The fleet has grown substantially to include widespread use by commuters, enthusiasts, farming and industry use. We believe occupational health and safety issues would need to be considered for any fitment proposal involving a metal plate.
* Should frontal plate fitment proceed then an alternative to metal plates must be considered as the only responsible alternative such as flexible rubberised material etc.

5. Electronic identification:

- This seems to be the safest alternative and the technology is available. (See attachment "DataDots Go After-Market" Theft Torque, NMVTRC no. 10 January 2002) Standards would need to be established for the technology nominated. It should be a serviceable item, replaceable at minimum cost to motorcyclists and ideally fitted by distributors or suppliers before retail. The dealer would require the necessary hardware/software to activate the device.

* Motorcycles are used for road (commuters), recreational (motocross) and work (farming etc) applications and registration is required for most. A number plate/transponder etc would be subjected to harsh environmental conditions and given motorcycle low profiles to the ground, they are much more vulnerable to dirt, mud and other foreign items fouling any exposed areas. This would present a challenge for any form of technology depending on visual sighting (ie cameras) of front identification as fouling and dirt would obscure the plate, thus defeating the exercise. An electronic device would eliminate this problem, but would this alone be sufficient evidence to mount a prosecution for any breaches of road rules?

Generally speaking VACC representing the motorcycling sales and repair industry is anxious to be party to any initiative to reduce road trauma on Victorian roads with motorcycle fatalities and serious injuries of particular interest. We are concerned therefore that VicRoads has instituted this review, given the clear benefit of hindsite as to why fitting of front metal number plates number plates was considered dangerous to vulnerable road users. That situation remains valid today. Electronic identification would not be resisted provided they are cost effective and efficient under all operating conditions and a satisfactory regulation regime could be introduced, to protect motorcyclists civil liberties, consistent with all road users.

The fitting of transparencies incorporating the motorcycle registration number etc would be well considered, depending once again on technology, a standard application procedure, durability and accessibility to replacements at minimum cost.

Finally, from our members perspective, if the major motivation is law enforcement through effective detection devices, we would question the economies of scale to effect universal change. The sheer size of existing motorcycle car park makes this a formidable task. An extensive media campaign supported by direct marketing would be recommended to support a retrofit campaign.
Based on practicalities, an amnesty period of up to 12 months should be considered, to enable owners to fit the approved system(s) before penalties are introduced. Manufacturers would need sufficient notice for in-production changes to new models and they should be consulted on this matter.

We would question whether the motivation for this proposal is strictly for law enforcement against a small proportion of offenders in the motorcycle population and if so can fixed camera technology be upgraded more cost effectively, to capture rear numbers, as opposed to alternatives under consideration.

VACC and its MID members welcome the opportunity to provide this feedback. We wish to participate in any initiatives to reduce road trauma amongst motorcyclists. If we can be of further assistance, please do not hesitate to call the writer on 03 9829 1146.

Peter Dunphy Manager Motorcycle Industry Division

6. Honda

In response to your request of Honda for comment regarding frontal identification for motorcycles, we provide the following comments:

1. Front number plates were removed from motorcycles in Australia several years ago. The metal number plate and its bracket were causing injury to riders and pedestrians.

2. Front number plates are not required to be fitted to motorcycles in any other countries.

3. A large percentage of motorcycles being sold in Australia do not have any provision for the fitting of any frontal identification.

4. For the purposes of identification, the rear number plate is considered by us to be appropriate. Our understanding is that this matter has been raised as a matter of law enforcement. An appropriate method of identifying motorcycles from the rear would seem to be the most appropriate way of addressing this issue.

5. Any move to legislate on the addition of an "appliance" to a motorcycle and front identification is likely to cause more political reaction in the motorcycle community than the "lights on" issue which was repealed several years ago.

Our National Motorcycle Service Manager is visiting Japan this month. I will ask him to discuss the issue with those responsible for design, research and development at Honda. I am dubious of any discussion being successful however as the Australian market is minuscule in terms of Honda's world market.

Stuart Strickland Senior Director

7. FCAI Motorcycle Group

The Australian Motorcycle Industry

The Federal Chamber of Automotive Industries (FCAI) Motorcycle Group is the peak body representing the Australian Motorcycle Industry.

The FCAI Motorcycle Group comprises eight member companies - **Honda, Kawasaki, Suzuki, Yamaha, BMW, Harley-Davidson, Ducati and Aprilia**. This represents about 90% of the Australian Motorcycle Industry.

The Australian Motorcycle Market
Total imports of motorcycles into Australia for the past three years have been in the 60,000 to 70,000 units per annum while for the same period, registered motorcycles have been in the 30,000 to 33,000 units per annum. Many of the total units do not comply with ADR's and are not eligible for registration. Some examples of this are mini bikes (about 8,000 pa), ATV's (about 12,000 pa) and competition motorcycles (about 5,000 pa).

Front Number Plate History

Motorcycles of the past were fitted with front number plates usually mounted longitudinally on the front mudguard. These were established as highly dangerous in road accidents, especially to pedestrians, and were discontinued in favour of transversely mounted number plates fitted to a steel bracket either on the front mudguard or in the region of the headlight or instruments. This however still proved dangerous to riders and pedestrians in road accidents and as a consequence motorcycle front number plates were abandoned for safety reasons in all countries of the world. This situation continues today.

International Market Comparison

With one or two minor exceptions, Australia does not manufacture motorcycles in any significant number. The vast majority (99%) of all motorcycles available in Australia are produced overseas where manufacturers are not required to design-in brackets for accommodating fixing of front number plates. Factory priority is given to building motorcycles for large international markets such as Germany where around 270,000 motorcycles are registered per annum. Australia's market of 70,000 units is indeed tiny by comparison and does not warrant special attention by the international manufacturers. The Australian importers are therefore unable to have mounting brackets designed or fitted at point of manufacture.

1. RE-INTRODUCTION OF FRONT NUMBER PLATES

Flexible Plastic Adhesive Plate

Recent efforts to consider the re-introduction of front number plates on motorcycles in Australia have suggested a flexible plastic number plate fixed to the front of the motorcycle with adhesive. Whilst it may be possible to affix this style of number plate to some motorcycles with windshields or small flat areas surrounding the headlight, the FCAI estimates these motorcycles to be in the minority (20% or about 6,500 of current new motorcycle registrations). The industry warns that fixing adhesive plates to windshields of some motorcycles may also create a safety problem of obscuring part of the riders' field of vision with the potential of causing an accident.

Mounting Brackets

The FCAI estimates that motorcycles with no suitable windshields or flat area for mounting the adhesive plate account for 80% or about 25,000 of all new motorcycle registrations per annum. For these motorcycles it would be necessary to fit a locally produced mounting bracket in order to affix the plate.

Given that there is some 200 different models of new motorcycles currently on the Australian market that comply with ADR's for registration purposes it would be highly unlikely that a "universal" mounting bracket could be produced that would suit the varied shapes of the mudguards or instrument panels of all 200 models.

Furthermore, the majority of motorcycle front mudguards and bodywork are made from plastic and the fitment of a bracket and plate would in all likelihood cause fracture of the plastic under pressure from the wind and road vibrations.

Safety Concerns

The mounting bracket, including a suitable flat area for affixing the plate, would probably need to be made of steel or aluminium thereby recreating the very safety problems for which motorcycle front number plates were originally removed.

In the event of injuries sustained in an accident due to the fitment of a metal plate, litigation would undoubtedly result against the person who fitted the plate and / or against those who prescribed the fitment. Litigation may also arise out of fixing the plate to the windshield and partially obscuring the riders' view.

Fitment of the plate and bracket to the front mudguard may also cause damage to the suspension under severe conditions or aerodynamic interference that may make the motorcycle unstable at certain speeds resulting in potentially unsafe situations.

Warranty Concerns

In addition to the safety issues, the fixing of a plate to the front mudguard would likely interfere with airflow to the forward intake cooling system of many motorcycles that could potentially cause overheating problems and engine failure. At the very least the fitment of the plate could void the warranty causing consumers considerable financial loss for which they would likely seek compensation.

Costs of Brackets and Fitment

The FCAI conservatively estimates the cost of the bracket and fitment by the dealer to be in the vicinity of $50 per motorcycle. Based on earlier estimates of 26,000 new registrations per year this would produce an annual cost of $1.3m for fitment of plates to new motorcycle registrations alone. Given that total motorcycle registrations in Australia number about 325,000 the costs of retro fitting front number plates, even to 80% of this number would be an almost impossible task and possibly cost prohibitive.

Further, the brackets would need to be professionally designed to prevent damage to bodywork, mechanical operation or appearance of the motorcycle. The FCAI considers the design and production of the variety of brackets should be the responsibility of the registration authority requiring the fitment of the number plate.

The FCAI Motorcycle Group and their dealers are unable to absorb any of the costs associated with the production of brackets or the fitment of plates to motorcycles

Industry Position on Re-introduction of Front Number Plates
Based on the above points of safety, warranty and cost the FCAI Motorcycle Group is totally opposed to the re-introduction of front number plates uniquely for motorcycles in Australia.

2. BARCODES, ETAGS OR OTHER TECHNOLOGIES

This part of the submission deals with the Industry's position on various forms of electronic frontal identification of motorcycles including barcodes, eTags, GPS or other technologies.

The use of electronic technologies in the frontal identification of motorcycles appears on face value to provide a much safer approach for riders and other unprotected road users and with far less potential damage or instability to the motorcycle.

However, because there are a number of possible technologies that may be selected and because detailed understanding of these technologies is largely unknown the ability to provide definitive comment is limited.

The FCAI Motorcycle Group acknowledges this option is preferable to that of fitting an adhesive flexible plastic plate and takes a position of supporting in principle the use of such technology for frontal identification. Before offering unqualified support however the Group requires further

information / consultation from authorities on the type of technology proposed including the issues identified below.

Size / Shape of Device

As with the fitment of the flexible plastic plate, the barcode or transponder may be difficult to fix to the motorcycle in a position where it can be easily read. Assuming the device is considerably smaller than the adhesive plastic plate it should be capable of being fitted to a forward section of the body or frame. It is also assumed the device will not require a bracket or reasonably flat surface for mounting. Advice on the size and shape of the device is required.

Information Contained on the Device

There is potential with some such technologies for private information to be contained on the device for recognition and surveillance of certain persons by the authorities. For example, identifying the location of the motorcycle even when it is parked or stationary. The FCAI requires further advice in relation to this matter.

National Uniformity of the Device

Acknowledging the different approaches amongst the States to current forms of electronic monitoring on Toll Ways the FCAI requires advice on the use of a nationally uniform approach to the type and size of device to ensure that all motorcyclists will be treated equally in this matter.

Cost of Installation / Fitment

The costs identified for fitment of a plastic adhesive plate to all new motorcycles and to the total number of motorcycles in Australia were identified as significant and bordering on prohibitive. The FCAI requires advice as to the estimated cost of producing and fitting an electronic device to each motorcycle in order to judge the cost effectiveness of utilizing electronic technology for frontal identification of motorcycles.

As with the proposal for adhesive flexible plastic plates the FCAI motorcycle Group is unable to bear any of the costs associated with the use of electronic technologies for the frontal identification of motorcycles.

Industry Position on Use of Electronic Technology

Based on the proposals as identified to date the FCAI Motorcycle Group offers support in principle to the use of electronic technologies in the frontal identification of motorcycles.

The FCAI looks forward to regular consultation regarding progress of this matter at both a State and National level.

Ray Newland FCAI Motorcycle Manager

8. Motorcycle Riders Association Western Australia Inc.

Let Those Who Ride Decide

The MRA WA is opposed to front number plates on the grounds of rider and pedestrian safety. We are not against identifying speeding riders. We cannot support those who knowingly break the law.

Riders and Pedestrian safety.

I believe Australian Design Rules banned the fitting of front motorcycle plates on safety grounds after a number of serious injuries attributed to plate design, position or composition. Any type of front plate must meet the requirements of the ADR and safety standards. I find it hard to believe these standards have changed.

Plate location and Cost.

We also have concerns over the complexity of designing a plate to fit ALL types of motorcycle, (sports, tourer custom etc) Motorcycle design has changed from the standard high, heavy, "open engine" style machines of the 60's and 70's clearance between tyre and mudguard are down to critical tolerance. There is no room for the old bolt head that used to secure the front plate. The space between the mudguard and headlamp surround has all but disappeared from modern sports style machines. There is no physical room to fit a front plate on the mudguard and still allow for up and down travel of suspension components. A front plate must be fitted to a standard location and be a standard size if detection is to be uniform on all motorcycle designs.

We are also concerned of the cost of design, supply and fitting of front identification which will be passed on to the consumer. We are being asked to pay for a system designed with one purpose in mind, to prosecute motorcycle riders.

Safety, handling, performance and manufacturer warranty.

Modern motorcycles are designed using computer simulation and "wind tunnels" for efficiency and optimum airflow for cooling and handling. (Increasing rider comfort and reducing the riding task.) This has proven so critical in recent years that certain bikes must not be ridden if sections of the "fairing" or moulded body panels are removed or damaged, as interrupted airflow will cause overheating leading to engine damage or failure and increasing rider vulnerability.

Braking, hollow twin disc rotors and twin disc brake callipers are designed for efficient braking and heat dispersal.
Any item fitted to a bike without manufacturer approval that caused interruptions to airflow or cooling could also cause a loss in effective braking, increasing stopping distances and reducing rider and other road user safety.

The modern motorcycle steering geometry is also "Hi-Tec". Fork tubes, wheels and mudguards are lightweight and stream lined. Additional fittings may unbalance the design or deflect wind or cause excessive drag resulting in speed wobbles, poor performance and reduced stability.

Identification

With front camera photos identification of the rider will be almost impossible. Helmet and sunglasses hide the riders face. Tinted visors on full-face helmets completely cover the face making identification impossible, hence their use in robberies.
To enable conviction, legislation must be passed to make the owner of the machine responsible for identifying the rider. If this legislation were in place then rear camera photos of "existing" rear plates would be sufficient for conviction purposes.

Detection.

The Multanova camera system used in WA can support the use of two camera units spaced apart to allow vehicles to be caught between two cameras by one detection unit. (Barker Technics. NWS. Appendix)

Estimated Cost

There are approximately 48,000 motorcycles in WA. (Reported Road Crashes in WA 2000 Edition)
The cost to manufacture a front plate is not known. Custom plates are available for about $200 a pair from WA Transport for other vehicles.

Assuming mass production will reduce costs by 50% and allowing for 1/2 hour installation at current workshop rates of between $35 and $40 per hour lets assume to supply and fit a plate costs $120.

Number of motorcycles		48,000
Supply and fit plates	X	$120.oo

Total cost	$5,760,000.oo

Estimated cost of additional Multanova camera, flash and fittings to existing unit $15,000

Estimated cost of Multanova existing system	$85,000
Total	$100,000

Therefore you could purchase an additional 57 camera units that will detect front or rear of ALL registered vehicles. Additional units allow increased road coverage, detection and enforcement, which, according to police figures will benefit all road users.

Summary

The Motorcycle Riders Association of WA is in favour of and support the use of Multa-nova camera photos taken from the rear as is the case for traffic control signal "Red Light" cameras in Western Australia.

We also support "Owner Onus" legislation making the vehicle owner responsible for operator identification. This legislation is currently before West Australian Parliament, and has been for a number of years in various forms, and is awaiting final reading and enactment.

We do not support the introduction, installation or attachment of any type of front identification plate or device.

Appendix

Copy of e-mail from Barker Technics [barkert@mpx.com.au] when asked if Multanova cameras can use two cameras.

What you are asking is possible. Multanova the manufacturer of the cameras used in WA have a number of fixed sites in Europe where they are set up to take both front and rear photo of the same vehicle. This is not a simple set up and requires two cameras separated by enough space to allow the target to be between cameras when the image is taken. If you like I can make enquiries with Multanova regarding the possibility of setting up the equipment with two cameras and the practicality of doing it with mobile, not fixed site, cameras. Other consideration will be things like security of the remote equipment, the need to have a second flash and increased visibility of the site.

Rhod Pearson Road Safety Officer MRA WA

9. Individual response received via email

To any and all that are concerned with the issue

In the year 1982 or 1983 I fitted and aftermarket fairing to the Yamaha XV1000 TR1 which I owned at the time. Immediately I fitted the fairing I noted steering problems. On examination I found that , even under moderate braking, the fairing would dive far enough to touch the front number plate, which was compulsory at the time. and that this plate, being mounted on the front mudguard, would cause the steering to start to lock. Under hard, or emergency braking , it would make the steering lock completely rendering the bike completely uncontrollable. I rectified this problem by cutting away part of the fairing.

This solution worked but it raises a second issue. When I cut the required parts of the fairing away then half the number plate would be obscured by the diving fairing during any form of braking rendering the front number plate useless anyway.

I have raised this second issue because the whole issue of front mounted number plates is being raised over a very few gantry mounted speed cameras. If front mudguard mounted number plates are re introduced they will still be completely obscured from these cameras by the fairings,

effectively rendering these cameras just as useless as they are if the bikes have no front number plates but rendering the bikes far far more dangerous.

In the twenty years I have been riding I have made numerous emergency steering and braking maneuvers at the same time, in order to avoid jaywalking pedestrians. With front plates, locking my steering, at least three of these pedestrians, all of them toddlers, would have been killed.

Paul Torney

10. Harley Davidson

I represent Harley-Davidson in Australia. Our views are similar to BMW's and most likely the other manufacturers.

We do not know of any other country using the front plate. The two main reasons are safety and no place to put it (motorcycle handling issues). For safety I would refer to the EEC External Projections requirement (97/24/Chapter 3). This regulation deals with no shape edges or projections can be present on the exterior of the motorcycle. H-D's feeling is this front plate requirement would go against the European requirement.

A suggest would be for the government to use a barcode system or some type of transmitter system.

Adrian O'Donoughue Harley-Davidson Representative in Australia

11. BMW

BMW's position is that it is impractical to affix standard number plates to the front of any current motorcycles primarily because of safety considerations. There is danger to both rider and pedestrians in a collision situation. Even more importantly there no place to mount a front facing plate on most bikes without affecting the airflow to the cooling system and/or the suspension travel. Interference with either of these finely tuned things could have catastrophic consequences for the rider, pillion and /or anyone involved in the aftermath of a mechanical failure caused by the positioning of such a front plate.

Manufacturers have worked very hard to remove sharp objects from the front of motorcycles where they can cause damage. This would be a dangerous step backward. "Stick-on" number plates limit the vision of the rider if they are placed on the windshield as has been suggested. In most cases however there is simply no place to stick them as most bikes don't even have a windshield. Affixing them to any available panel work would likely damage the panel surface if removed such as in a transfer of registration or as souvenirs for vandals.

One must also ask if the addition of a front number plate will make any difference to those who currently deliberately flaunt the law. (The apparent targets of this change.) It is highly likely that this group would simply reach forward and cover elements of the plate, in areas where cameras shoot from the front, to continue to evade detection. As the vast majority of cameras shoot from the rear anyway the rear number plate would appear to be sufficient.

Cameron Cuthill, BMW Motorcycle Marketing Manager

12. Triumph

Being contracted to the Triumph Motorcycle Company (UK) to handle their local homologation in Australia I have sought the Company's advice on these key points and their response is as follows:-

1. What markets -if any- still require front number plates, or front facing registration numbers on motorcycles/mopeds/tourers/sports/cruisers/on-off road machines?

To the extent of our knowledge there are no markets in the world that require a front number plate on a motorcycle. Although there are none that have so far asked us to make provision for a front plate, there may be some that are making their own arrangement. On my travels, I seem to remember small bikes in Thailand and Indonesia had front plates.

2. Are there any preferred ways in which they deal with providing mounting points/areas in such cases?

Since provision for a front plate has long since been dropped, this would require a new mounting system to be developed and proved off. I am of the opinion that this would have to be designed to suit a specific plate size, weight and mounting position. Proving would need to be done to ensure durability, corrosion resistance etc. We know some parts have a hard time with vibration when mounted at the front of a motorcycle.

3. Do the Companies have any views on the best ways of providing for front numbers on their models? (front mudguards, vertically on front forks, areas on fly screens or fairings, mounted on stalks above headlamps, mounting across forks below headlamp level etc?.

We don't have a particular view since each bike would probably require a different solution. It really depends on the Victoria state requirements for vision angles, attitude, position etc.

4. Does the Company have any opinions on the provision of front number plates on motorcycles?

Yes, we would prefer to avoid doing this as it will be costly to prove and difficult to allow for in a 'one-world' design.

5. Other methods of vehicle Ids are also possible. Does the Company have any views on this second stage approach to motorcycle ID?

Electronic data tagging is a common anti-theft technique in Europe that does not seem to offer any technical problems in respect of EMC etc. Although more costly to the owner, it would seem to be a solution that is more elegant and modern.

13. ACEM

(Association of European Motorcycle Manufacturers)

I was hoping to provide you with some information concerning the "front plate" for motorcycles. Actually, at the moment in Europe this is not a requirement and, in light of the recent development in pedestrian protection,

I doubt that it will be raised in the future as a potential obligation. Although it seems that in case of accident motorcycles are well designed in avoiding complementary injuries of the rider, a concern has been voiced in UK and Germany on the effects that some part of motorcycles could produce in accidents involving pedestrians. In this sense, the introduction of an obligation for a front plant would go under severe scrutiny so to ensure that it would not have effect on pedestrian in case of crash.

On the other hand, I am quite interested to understand why the Australian government is so eager to introduce this front plate and what is the position of the industry and rider organisations.

Federico Galliano ACEM Secretary General

14. Individual response via email

As has already been stated in a number of publications,

"this is required so the traffic cameras are able to photograph the number plates of motor cycles,"

At the instant the photo is taken, the cyclist is now booked for speeding. On an empty road, 70 in a 60 area. Has it saved him/her from an accident at that point in time. No. The spiel -- it may save an accident in the future does not wash, the future is not here yet. The motor cyclist may well go back to pottering along well within the speed limits for the rest of the day, week month, year and eventually be T boned by a car. In the here now of present time this is nothing but a revenue raiser.

The ***** that deliberately goes through the camera at warp speed for the hell of it, won't be affected, because he may have dirtied his plate or he is too fast for the camera to register the number. They won't get any revenue from him anyway, so where's the point.

The South Australian Police who are putting numbers on their motor cycle windscreens are now breaking the state laws they are sworn to uphold -- what the hell is any of this all about? Put stick on number plates on the sidewall of the front tire

Ken Bateman

15. Individual response via email

Step 1. Take one large shifting spanner, apply the spanner to the "safety" camera mounting bolts anti clockwise.

Step 2. Swivel the camera round so it faces the retreating traffic rather than the approaching traffic.

Step 3. Tighten the bolts clockwise.

Step 4. Spend the millions of dollars that would otherwise be spent developing a standard for front numberplates, promulgating a standard for front numberplates, installing the front numberplates on new bikes, retro fitting front number plates to old bikes, inspecting the front numberplates, enforcing the front numberplates, defending law suits from people who claim to have been injured by impacts with the new front numberplates, (ie proving in court that the new front numberplates are safe in ALL rather than MOST crashes no matter which of the thousands of different types of bikes that have been and will be sold in Australia), defending law suits from people who claim to have crashed because the dynamics of their bikes had been altered (ie presenting a case in court that proves altered aerodynamics, weight distribution, polar moment, and natural oscillation frequency can have no adverse effect on motorcycle dynamics...) and creating a system to deal with overseas and interstate motorcycles that don't have front numberplates and... spend it on car driver training.

Presto, a plan for motorcycle front identification that will save hundreds of motorcyclist's lives.

Are these the same people who brought us a motorcycle safety proposal that has as a cover photo two guys riding on the wrong side of the road? Perhaps it's a different group. Can't have too many study groups for important stuff like this.

Don't get me wrong here, I'm all for front identification. I won't need insurance for the bike from now on, because if it tankslaps and spits me off, I for one know what will have caused the crash and who is going to pay for my time off work and new bike, leathers, boots, gloves and helmet for me.

Your tax dollar hard at work.

Jason Rogers

16 Individual response via email

I am writing to you about the proposal for front number plates on motorcycles. Many years ago, when I started riding, metal front number plates, mounted on the front mudguard, were required in many states and many other countries. Safety considerations led to their abolition.

I have looked at your pdf document* outlining pros and cons of various possible designs and there does not seem to be an option that is appropriate for all bikes. Surely the solution is to turn the cameras around to photograph back number plates.

Might I also comment that considering the small number of motorcycles on the road compared to cars and trucks, that the taxpayers dollar might be more wisely spent on researching more common problems.

Yes there is a minority of motorcyclists who do the wrong thing but they are a minority of a minority, small in absolute numbers.

Much more common is the blatant defiance of laws regarding mobile 'phone use whilst driving. Large vehicles parked on the street are very dangerous, restricting the drivers' and riders' view of the traffic situation but many large vehicles park illegally in the same place, day in and day out, year after year, while police and governments do nothing.

In the overall scheme of road safety this obsession with front number plates is out of proportion. It would be almost impossible to fit safely any of your suggested plates to any of my bikes and if the number is on the helmet which bike should it match?

Jennifer Killen

17 Individual response via email

I have no real problem with frontal identification. I do have a problem with having my machine stuffed up. On the old Laverda, the stainless steel mudguard would split around the holes where the numberplate bracket was mounted. That guard cost $478.00 and is totally disfigured.

On my Suzuki RF900, to put a numberplate on the front mudguard requires drilling holes in it. That front guard is of a very lightweight and flexible plastic and will be distorted by wind pressure upon a numberplate acting through a bracket to the guard. This will break it, causing loss of the numberplate and requiring a new guard at a cost of $ 300.00 plus painting at a cost of about $150 .

By mounting the numberplate on the front mudguard, even at the furthest forward point, does not allow the front suspension to work through its entire travel without having the numberplate hit the underside of the fairing. This has several potential consequences, (a) that I would lose control of the motorcycle (b) that the upper fairing would be broken, at a cost of about $980.00, (c) that the restricted airflow over the top of the mudguard and into the radiator would cause the motorcycle to overheat, causing damage to the engine at a potential cost of about $ 3,000 (d) that the numberplate would dislodge due to breakage of the mudguard and the numberplate would fly back and hit the radiator, damaging it, causing coolant loss and consequent engine damage, (e) that the front guard would be broken, by the force of the upper fairing, hitting the numberplate into contact with the front tyre under severe braking, causing a momentary lock up of the front wheel and loss of control of the machine, or a failure to stop.

Holes in the upper fairing to mount a numberplate will have a similar effect in breakage due to windage on the mounted plate and its brackets. The RF900 has no space on the front that is large enough to accommodate a number plate of the same size as is on the rear without covering part of the cooling air intakes, covering part of the headlight or obscuring the windscreen. Where brackets would be affixed so as to provide support for a numberplate without creating vision or cooling or suspension issues is a mystery. There is no space for an adhesive plate.

A further problem with an adhesive plate is that the adhesive will destroy the paintwork underneath. The front fairing area of the RF900 includes decals and these would be part covered over, even by a miniscule numberplate type adhesive sticker. The removal or replacement (such as on re-registration) of these adhesive type numberplates would necessitate repainting and re-application of the decals, this is at a cost in the order of $400.00.

To place the numberplate in an off-set manner on brackets, so as to avoid suspension or cooling

problems, has a number of potential problems. The brackets would need to be substantial to counter the off-set leverage from windage on the plate at touring speeds. This creates a dangerous protrusion from the motorcycle. The windage induced leverage from the offset plate creates instability in the front end of the motorcycle which could easily lead to loss of control in certain circumstances.

The leverage from windage also sets up stresses in the bracketing designed for frontal pressure only, which would lead to flexing and variable distortions of the front bodywork holding the windscreen and headlight, resulting in damage to the entire front fairing, where close tolerances are used in fit. This could result in the headlight no longer maintaining correct aim or alignment, or the breaking of the windscreen or fairing mountings. Breakage of windscreen mountings could easily result in loss of the windscreen when the fairing flexes at highway speed from the offset numberplate mount.

Guy Stanford NSW

18 DoT State of Minnesota USA

The State of Minnesota has not explored the issue of frontal identification for on-road motorcycles or other vehicles, except older collector automobiles. Collector vehicles which are 25 years old or older are not required to display a front license plate. Motorcycles have only one license plate which is affixed to the rear of the vehicle.

Gordy Pehrson

19 Moto Sport Suisse

In Switzerland motorcycles need only end-mounted number plates, fixed behind the vehicle. In our country, they are two automatic speed cameras each time, making one picture from front view and one from behind.

Jean Mesnil

20 Individual submission via email

Any road safety initiative needs to consider the cost of implementation verses the benefits, this is known as the Benefit / Cost Ratio (BCR).

The Benefit

In the case of frontal identification for motorcycles 'the cost' is in providing and installing the identification and 'the benefits' are in apprehending the following:-

1/ The very small number of riders who are taking advantage of riding through speed cameras at excessive speeds knowing that they cannot be identified. Their action is deliberate and associated with other actions to indicate they know they will be detected but not identified.

2/ The small number of riders who exceed the speed limit but their actions are not deliberate as those above. Frontal identification will only be of benefit in the very few cases where motorcyclist are evading detection by existing methods. Motorcyclists represent only 1% of the traffic flow. Those currently avoiding detection therefore represent only a fraction of one percent of the total traffic flow. The cost of implementation may be better spent on other road safety initiatives.

Lost revenue as a result of not being able to identify motorcyclists who are exceeding the speed limit using existing technology would not be taken into consideration when calculating the Benefit / Cost Ratio. The 'benefit' is in detecting the small number of riders in these two categories to reducing their likelihood of crashing where speed is a major contributor to the crash.

It is beyond my resources to calculate the number of riders who go undetected due to the lack of frontal identification and the likely reduction in the number of crashes that could result by being able to identify these riders.

The Cost

I believe that the cost of introducing frontal identification for motorcycles will be prohibitive. I have assumed that should frontal identification is introduced it will take the form of a 'plate' that can be identified by eyesight and can be interpreted by humans. This 'plate' could be rigid as are the current rear plates or flexible so they can be installed on non flat surfaces such as a fairing or screen.

There seems little benefit in having identification that requires sophisticated technology to read and interpret the 'plate'. Current vehicle identification uses a number plate that can be read by eyesight and the current speed cameras relies on being able to 'read' this plate. If some other form of identification is to be introduced for motorcycles, then all vehicles will need to be converted to this technology or two systems will need to be used, one to detect number plates as at present and the other to identify motorcycles. Considering the small number of motorcycles in the traffic flow, the cost of a dual system of detection will, I believe, be prohibitive. For this reason I have confined my comments to the costs associated with the introduction of a readable plate.

A Plate Mounted on a Front Mudguard

Prior to the 1980's it was a relatively simple matter to mount a front number plate on a motorcycle as the front guard was made of steel and rigidly supported by steel brackets. The guard extended to in front of the axle and a plate was bolted to a bracket which was in turn bolted to the guard. Currently the majority of guards are made of plastic supported by moulded plastic supports. The whole arrangement is usually quite flexible. If a plate were to be mounted to this type of guard, additional brackets will be required to stiffen the guard. In the case of motorcycles which have fairings and the guard does not extend very far past the axle, it will not be possible to mount a plate that will not impact with the fairing or headlight when the suspension is compressed.

As current motorcycles are not designed to have a plate attached to the front wheel assembly, testing will be required to ensure that the stability of the motorcycle will not be compromised. It is unlikely that this assurance can be given without wind tunnel testing with the motorcycle in operation so centrifugal forces of the wheels and engine components are simulated. The handlebars will need to be upset to gauge any changes in stability due to the addition of a number plate. There are several thousand different model types of motorcycles currently registered in Australia, each model type will require testing.

As plastic front guards are quite flexible, additional brackets will be required to provide the strength necessary to support the plate. Each model type will require individually designed support brackets. To ensure that they are installed correctly, this work should be performed by a suitable qualified tradesman. It would also be unreasonable to expect the owner of a motorcycle to pay for the testing, support brackets and installation of the plate.

A Plate Mounted on a Fairing

Many motorcycles are equipped with fairings and screens, many of these would have insufficient area to mount a plate. Fairings and screens are curved and angled to provide an aerodynamic shape. Each model type would have to be individually assessed to determine if there is sufficient area that is flat enough and sufficiently vertical to accept a plate.

The method of attachment needs to be considered. It is generally recommended that adhesive labels not be applied to motorcycle helmets as the effect of the chemicals in the adhesive on the helmet material is unknown. The materials used in fairings are similar to those used in helmets so testing will be required to ensure that the chemicals used in an adhesive do not adversely effect the strength of the fairing or screen.

If the plate is to be mechanically attached, individual assessment will need to be made to ensure any holes made in the fairing or screen do not act as stress raisers and ultimately lead to the failure of the

fairing or screen. In some cases brackets may be required to provide a sufficiently flat and vertical surface on which to mount the plate.

As current motorcycles are not designed to have a plate attached to the fairing or screen, testing will be required to ensure that the stability of the motorcycle will not be compromised by altered aerodynamic properties of the fairing and screen. It is unlikely that this assurance can be given without wind tunnel testing with the motorcycle in operation and complete with rider to ensure that the rider is not subjected to wind buffeting as a result of the altered aerodynamics. It would also be unreasonable to expect the owner of a motorcycle to pay for the testing of the materials, the wind tunnel testing, the determination of the installation procedure or installation of the plate.

A Plate Mounted on a Motorcycle without a Fairing

Back in the 1980's few motorcycles were equipped with fairings. This situation gradually changed until the majority of motorcycles were so equipment. Motorcycles without fairings are now becoming popular again and are now classified as 'naked' bikes.

Due to the size and strength of the front mudguard and the amount of travel of the suspension, not all these motorcycles would be suitable to have a plate mounted on the front mudguard. A more suitable location may be near the headlight. Brackets will need to be provided for this purpose.

As current motorcycles are not designed to have a plate attached to the headlight area testing will be required to ensure that the stability of the motorcycle will not be compromised by altering the aerodynamic properties. It is unlikely that this assurance can be given without wind tunnel testing with the motorcycle in operation and complete with rider to ensure that the rider is not subjected to wind buffeting as a result of the altered aerodynamics due to the introduction of the plate.

It would also be unreasonable to expect the owner of a motorcycle to pay for the wind tunnel testing, the determination of the installation procedure or installation of the plat

In Summary

To determine the cost of introducing frontal identification it will be necessary to assess each model type to determine whether there is a least one suitable method of attaching a plate. It would be unwise to proceed unless all of the several thousand different model types current on register can be converted to frontal identification. This assessment will require the following:-

1/ A guarantee from the manufacture that the proposed method of attachment of a plate with not effect the stability of the motorcycle nor the mechanical integrity of the components such as the fairing and screen, or

2/ Wind tunnel testing to determine the effects of the proposed method of attachment on the stability on the motorcycle and the effect on the aerodynamics and testing to ensure that the integrity of the various components are not effected.

All guarantees and testing would need to be completed before the decision is made to proceed with frontal identification in the form of a 'number plate' to ensure that all motorcycles are suitable for conversion.

Assuming that the average cost of converting a motorcycle to frontal identification is $500. There are currently 324,080 motorcycles registered in Australia. The cost of converting the existing fleet will be approximately $162 million. Currently 30,000 new motorcycles are registered in Australia each year so the on-going cost of conversions at $500 each will be $15 million.

Assuming the 'project' has a life expectance of 30 years, converting these costs to present day values will be $162 million plus $15 million times 19.08, i.e. $448 million or $15 million per year. The cost to the community of a fatality is $1.5 million and a serious injury $325,000. The ratio of motorcycle fatalities to serious injuries is approximately 40 serious injuries for each fatality. Therefore the cost to the community for one fatality and 40 serious injuries is $14.5 million.

To be able to justify the expenditure on the introduction of frontal identification the Benefit / Cost Ratio (BCR) will need to be at least 5. Therefore, the saving to the community will need to be in the order of $15 times 5 which is $75 million per year.

This is equivalent to a reduction in the road toll of 5 fatalities and 200 serious injuries. As the current Australian motorcycle road toll is about 200 this represents a 2.5% reduction in the road toll of motorcyclists which is directly attributable to the introduction of frontal identification on motorcycles.

This benefit is unlikely to be achieved so the cost of introducing frontal identification on motorcycles is not justified.

Brian Wood

21. Peter Stevens Motorcycles

(This dealer chain is the largest in Victoria, has interstate branches and distribution responsibilities for Harley Davidson and Triumph)

Some comments on difficulties we, as a Retailer, would have with affixing number plates to the front of motorcycles.

1/ 50% of road registerable bikes we sell are 'off road' [trail bikes] with no place to attach a number plate whether it be a metal plate or even a decal. Front mudguards are 'high mount' and a metal plate mounted there would block out part or all of the headlight.

2/The other 50% of road registerable bikes are made up of approximately 110 to 130 different front profiles that would need a variety of UNIQUE 'mounts' that would have to take into account the following difficulties,

a/ plates affixed to 'low mount' mudguards would block air flow to engine cooling systems [air oil or water]

b/ decals affixed to the lower part of screens for models with fairings could obscure forward visibilty.

c/ warranty rejection issues could arise from affixing decals or plates to any part of the motorcycle that has not been specifically designed to accommodate them... i.e.glue interaction with plastics, plastic mudguard fatigue from number plate mounting brackets etc..

d/ legal liability issues with accidents or other damage caused by plates fitted by dealers [we might require some form of indemnity if it became mandatory to fit plates]

This is a BIG issue that would have to be taken up with manufacturers and the difficulty there is of course that no other market has a 'front number plate' requirement and they would be most unwilling to R&D just for our tiny market. Sorry to just be bringing up all negatives , but I can't see any easy solutions here.

Steve Chiodo Managing Director

22 Ulysses Club (South Australian Branch)

(This is a State branch of a national Club with approximately 15,000 members . Members are required to be over 50, junior members over 40)

We had a meeting with the SA Police last Thursday. In attendance were the AMC (covers Ulysses Club), The Motorcycle Riders Association of SA (MRASA),the Motorcycle Trade (MTA), Motorcycle Industry Association (MIAASA),Transport SA safety managers, RAA (Royal Automobile Association-equivalent to RACV),the Insurance Council of Australia (ICA) and various SAPOL representatives.

As you know, the front number plate saga started in WA but is being driven from SA with other States looking intently on. SAPOL still want the solid front plates fitted to all motorcycles but are gradually reluctantly agreeing to the fact that it is not technically feasible for so many obvious reasons. It has taken a long time for the penny to drop!

Frontal ID is now the catch cry. We do not have a problem with this, however just how this will be achieved is anybody's guess.

Frontal ID in the form of a transponder would be preferable as not only would rogue motorcyclists be rightly caught for speeding, but unregistered bikes could also be detected assuming that transponders would be issued when the bike is registered - no transponder equals no registration! With the proportion of unlicensed/ unregistered riders involved with fatalities now up to 30%, this could go a long way to improve the situation.

The technology apparently exists to detect numbers that are only 25mm high but at what distance was not divulged. The feasibility of a small mounted number plate was discussed. I am aware of the problems that Transurban had with Citylink in Melbourne but I guess it is now over to the authorities to come up with a viable solution to the frontal ID quest. We have heard that a Melbourne Co. is looking into the problem, info is scarce on that topic.

Thursdays meeting ended on that note - the Police will be exploring all avenues to ascertain if such a device is available. Who pays for theses devices has not been talked about. I personally have 7 bikes registered - do I have to purchase 7 devices or just the one - there goes the unregistered bike ability! We are not going to rush around to find a suitable device - it's up to them! The authorities just have not done their homework and to avoid looking like fools, are resorting to placing 'stick-on' number plates to their Police motorcycles here in Adelaide.

The legality of these number plates has been publicly questioned by the Commissioner for Licensing and Registration himself. Peter Mount (AMC) will be writing a report on the meeting which should be out next week.

Neville Grey SA

23. Individual response from a VMAC member

1. Adhesive m/c number plates

It will be very hard to find a 'standard' position for all types of motorcycle due to differences in design and shape. There is a far greater variation than with cars, and the frontal aspect is far from regular. this would make the actual wording of any regulation highly ambiguous and open to misinterpretation.

2. Helmet decals

Many riders renew helmets regularly due to wear or damage. This means that each time a new sticker will have to be issued adding cost and inconvenience to the rider and administrative work for VicRoads.

There would also be problems with cleaning practices, weather damage and accidental removal.

3. Fork leg collar mounts

Any small variation in attachment position will impair visibility and risk of damage is great. The position is particularly 'dirty' especially in wet conditions so cleaning is a major issue. Due to the varying size of mudguard shrouds and exposed fork leg there may not be room to position the sticker on all motorcycles.

4. Headlamp covers

Any covering which impairs the light may be infringement of construction and use regulation. Given the previous stance on lights on, if the light is impaired and a crash occurs then there is the potential for litigation. Similarly if the cover is accidentally left on at night. Also what happens with identification at night?

5. Spray on numbers

If the paint is to be durable enough to withstand weather and cleaning, then who pays for the respray when the bike is sold?
6. Plastic plates

Mounting would require expensive damage to the motorcycle as they don't have purpose made mounting positions like cars.

7. Numbers on plastic/metal low mount

Once again litigation issues relating to damage to the host vehicle whether through mounting, causing mechanical defect or interfering with the safe operation of the bike. Also injury to others.

8. High mount

As 7

key general issues

At this point is there a justifiable case for pursuing this. Are riders escaping detection in significantly higher numbers than car drivers. If not what steps are being taken to catch those drivers evading detection?

How effective are cameras at taking pictures from the front. I note that almost all other countries take pictures from the rear, why? Is there some problem with taking pictures from the front? If there isn't why aren't cameras taking pictures from the front now?

Is it because oncoming vehicles are too far away and the numbers therefore too small to read?

Rob Smith

24. NRMA Comments on Motorcycle Identification Study brief

Many types of bikes have no structure at the front suitable for mounting even a small identification plate.

The old system of a bracket on the front mudguard holding the thin metal plate was deleted due to the dangers to pedestrians in a collision. The ADRs long ago prohibited fixed bonnet mascots on cars because of similar danger to pedestrians. Bike mudguards are now almost universally made of fibreglass or carbon fibre and are not designed to have a bracket mounted on them. Fitting it in the years when it was required often led to cracking of the mudguard and this tendency would be even more prevalent now.

Cooling and control of fuel mixture is a major factor now in the front end design of motorcycles, particularly in road bikes, with ram-air being a common feature. These designs are optimised by the manufacturer and adding a plate in front of the engine and air intakes would prejudice this design work, causing operational problems and possibly engine damage, by leaning out mixture and reducing cooling air flow.

The justification for forward facing identification should be clearly made. Speed and red light cameras detect from the rear. Most “head to head” observations are going to be at such a closing speed, even under urban conditions, that visual identification is difficult. In the front-on detection situation, which is presumably for radar/laser speed measurement, the speeding vehicle is pulled over to issue an

infringement and front identification is not an issue. If the vehicle refuses to stop, police normally initiate a pursuit, which will catch up with the vehicle from the rear, where there is identification. The necessity for front-on identification therefore seems to be minimal.

Several US states now do not require front number plates on any light vehicle, including cars, light trucks and 4WDs.

If a transponder or similar is envisaged that could be interrogated remotely, there would be equity and privacy considerations involved, as there would be for any type of private vehicle.
Below are some pictures of a range of types of current new bikes. On none on them is there a suitable place for a number plate apart from the front mudguard which, as can be seen on the road-orientated bikes, are very close to the tyre, raising issues of safety of projecting screws/bolts as well as the above-mentioned issues of cooling and fuel mixture.

Jack Haley Senior Environmental Specialist

25 Individual response via email

There has been a lot of talk recently on the forum [melb-moto@yahoo.com] about front number plates being just an excuse to introduce electronic vehicle tracking systems.

Is this really the "hidden" agenda?

In the outset I must say that I am totally opposed to the concept of FNP for the following reasons:

1.looks and durability, I have spent a lot of time and money making my bike look the way I like it and would be totally opposed to any thing will make the front end look "ugly".

I am also worried that some forms of FNP would adversely affect the performance and safety of my bike by retarding air flow to the motor limiting the travel of the front suspension.

2.reliabilty: should we end up with some sort of electronic output device, what guarantee will there be that, should that device stop operating (considering the vibrations etc on a motorcycle) that we will not be hit with hefty fines from the police ?

2. Safety, for both the rider and anyone or any object that comes in contact
with the number plate either during an accident (eg pedestrians) or in the case of a rock hitting the FNP and shattering, causing bits to hit the rider.

3. As far as I am aware FNP's on motorcycles are no longer in use anywhere else in the world, so why start here ? If FNP's are re-introduced here and someone does become adversely affected, is the government ready for the litigation spree that will certainly eventuate?

thank you for the opportunity to provide input.

Mark Nankervis

26. ATSB Frontal identification of motorcycles: ATSB comments

Overview

It is clear that speeding contributes significantly to motorcycle deaths and injuries (see below).
It is also clear that significant numbers of riders are avoiding speed camera penalties, when cameras are used in “approach” or “two way” mode. However, it is difficult to estimate how much effect this has on motorcycle speed distributions, and to what extent motorcycle speeding might be reduced with the introduction of front number plates (or alternative forms of identification).

- The "common sense" view is that an increase in the number of penalty notices issued would affect speeds through improved specific deterrence: but it is not clear how large this effect might be.

- "General deterrence" effects are also difficult to estimate; non-camera enforcement activities do not depend on front licence plates, and in some jurisdictions at least, the majority of speed camera photographs are taken from the rear of the vehicle.

-

There is a broad consensus among members of the National Road Safety Strategy Panel including the ATSB that options for frontal identification of motorcycles should be explored.

Any regulatory solution would need to meet the formal requirements of a regulatory impact statement, including definition of objectives, full analysis of expected benefits and disadvantages, and consideration of alternative ways of meeting the stated objectives.

Non-regulatory options also need to be considered, including the possibility of changes to enforcement practices. One obvious option is more frequent use of cameras aligned in “away” or “two way” mode. This would not involve any regulatory change and it already happens: more frequently in some jurisdictions than others.

One problem with “away” mode it that it is easier for a speeding motorist to spot the camera and slow down before detection. A possible solution to that problem would be to hide the speed camera (and publicise the fact that this will happen). This might well have a greater safety impact than motorcycle front plates, because it would help deter speeding by other vehicle drivers, not just motorcyclists.

Obviously, many people in the community would oppose this option, but it is the sort of issue that needs to be examined, if we start from the basic objective of reducing road fatalities by improving compliance with speed limits.

Regulatory framework

Within the Commonwealth Department of Transport and Regional Services, the Transport Regulation Division (not the ATSB) has carriage of design rules for vehicle safety standards.
Current Australian Design Rules (ADRs) do not require provision of a mounting point for a front number plate. This is consistent with international practice.

As a matter of general principle, the Commonwealth is committed to international harmonisation of regulations for vehicle standards.

Non-harmonised standards tend to restrict consumer choice, increase costs and can be criticised as de facto trade barriers. The Federal Chamber of Automotive Industries, which represents both vehicle importers and manufacturers, has expressed strong opposition to a unique Australian requirement for front licence mounting points on motorcycles.

In theory, it would be open to the States and Territories to require front number plates without an ADR change. The current ADRs do not explicitly preclude front plates, but any form of front number display would need to be consistent with ADR 42/03 (Clause 12), "External or Internal Protrusions"), which prohibits objects or fittings "*likely to increase the risk of bodily injury to any person*" .
In principle it should be possible to develop a non-hazardous form of number display (eg a soft flexible plate or transfer). However, there would clearly be some practical objections to a plate-display requirement, if the ADRs did not require an appropriate mounting point.

An in-service requirement would come into effect more rapidly than one reliant on ADR changes, which would only affect new motorcycles.

The Commonwealth has formal legislative responsibility for vehicle standards, but in practice the ADRs are developed in consultation with the State and Territory regulatory authorities, industry representatives and consumer groups.

Changes to an ADR require a regulatory impact statement cleared by Office of Regulatory Review (ORR), a formal public comment process, consideration by Transport Agency Chief Executives (TACE) and approval by a two thirds majority of ATC Ministers.

Agreed NRTC procedures require a minimum period of six months from the start of the public comment period to consideration by ATC. Additional time is required between the various stages to collate and address comments received before moving on to the next stage. This adds at least another two months to the process.

The period required for consultation with ORR depends to some extent on the complexity of the RIS and the clarity of the case for change; a period of 3 months is not unusual, in relatively straightforward cases.

Ideally, the main thrust of the RIS should be completed prior to public comment and the version of the RIS provided to TACE should have ORR approval; certainly there would be no point consulting with ATC without an ORR-approved RIS.

In principle, ATC could direct that elements of the process be fast-tracked, including reduction of consultation periods: but there would need to be a compelling case for such a decision, particularly if the matter was controversial. In short, it is realistic to allow the best part of a year for the entire process.

Role of speeding in serious motorcycle crashes

For vehicles in general, the causal link between speeding and involvement in serious crashes is well established. Speeding increases both the risk of crash involvement, and the risk of death or injury, if a crash occurs.

While there is little motorcycle-specific research, there is no reason to believe that speed has less effect on the casualty risk of riders, compared to other vehicle users. Moreover, any risk multiplier has more serious consequences for riders, because the “base” level of risk associated with motorcycle use is already high.

ATSB Fatality File data for 1997 indicates that 44% of motorcycle riders involved in a fatal crash were classified as "definitely over the speed limit", compared to 25% of light passenger vehicle drivers.

- these are percentages of known cases; with unknowns included, the percentages are 31% of riders and 16% of light passenger vehicle drivers

- it is likely that these figures are conservative (since moderate speed violations are unlikely to result in a case being recorded as "definitely speeding").

Adrian Beresford-Wiley Director Road Safety

For abbreviations see the Glossary at the front of the report

28. RACV

We understand that it is not normal practice anywhere in the world that modern motorcycles be required to have a front number plate. For this reason, given that most if not all motorcycles in use in Australia are imported, there would need to be an exceptionally strong reason why such a change should be made in this country alone. In particular, if the reason for proposing that motorcycles be fitted with a front number plate has to do with simplicity and convenience for enforcement authorities, then the proposal would not have our support. It is the responsibility of the enforcement authorities to tailor their enforcement to the technology and vehicles on the road, rather than the other way around.

We do not of course condone any road user, motorcyclist or other, breaking speed limits or committing any other traffic offence. It would be of concern to us, as I am sure it is to the responsible motorcycl e community, that some motorcyclists may choose to break the law on the basis that they believe that they cannot or will not be detected because the machine does not have a front number plate. RACV believes that there is a need to reform the way in which roads are funded, by moving towards a road user charge. Under this system, road users would pay according to the cost they impose on infrastructure, together with recognition of unfunded costs of road crashes, environmental impact, and congestion.

We would expect that, if and as Australia moves towards such a system, motorcycles would be incorporated. Further to point 4 above, we would expect that there will be, not only in Australia but overseas, moves towards some form of inbuilt electronic vehicle identification, to facilitate real time road user charging. As we move towards this situation, the need for external number plates should disappear. I would envisage that this comment would apply to all road vehicles, including (but not especially) motorcycles.

Ken Ogden General Manager Public Policy

29. Points raised by MRA SA at Transport SA Working group on front plates

Apropos of your request for relevant points to consider in preparing a brief on the above issue, I trust the following may be of some assistance, being reflective of the motorcyclists' position:

1. Motorcyclists are concerned that frontal ID is attracting so much attention under the guise of a safety measure, when the returns are likely to be far less rewarding than focussing on any one of a number of widely-recognised issues which contribute significantly to motorcyclists' death and injury. With that said, and with the objective in mind, any system of frontal ID must show a genuinely viable and worthwhile benefit/cost ratio (BCR). To this end, a BCR must be an integral part of any research.

2. If a device is utilised as an attachment to the motorcycle it must not in any way be detrimental to the functioning of the machine; to wit, aerodynamics, steering, suspension, brakes, cooling and handling.

3. Today's motorcycles are commonly wind-tunnel developed and tested, hence airflow is critical to both the handling and cooling of the machine. Therefore, any attachment which affects airflow may void the manufacturer's warranty, and should be considered from this perspective.

4. Any device must not adversely affect the chemical composition of any component of the motorcycle, e.g. plastics and fibreglass used in fairings, windshields, mudguards, petrol tanks and so forth.

5. Any device must not in itself pose a safety hazard for the rider, pillion, pedestrian or any other person who may be involved in a crash of the motorcycle.

6. Any device of an electronic nature, whether fitted to or external to the machine, must not interfere with electronic engine management systems or any other componentry.

7. Any device or system must be 100% effective and reliable. That is, it must work in all climatic conditions; it should not deteriorate due to weather or the passage of time; it should not be affected by engine or motorcycle vibration, harsh suspension or wind.

8. Any device must be and remain securely attached to the vehicle.

9. Any device must be tamper- and theft-proof.

10. Any device, system or method relating to frontal ID must have Standards Australia approval and comply with relevant ADRs; it should not contravene any state vehicle standards rules, nor should it contravene any national or state road traffic act.

11. Any such device should not inhibit or be a deterrent to free trade between Australian states and territories, or between Australia and any other country, neither should it be in breach of any international declaration, agreement, memorandum of understanding, treaty or obligation Australia has.

12. Any system of ID must be rationally determined and have the approval of both motorcycle industry and user representative organisations.

13. Any such system must have the unanimous endorsement of federal, state and territory governments.

14. Any decision regarding the use of any method of frontal ID must be in accordance with world's best recognised and accepted practice.

Peter Mount Chairman Motorcycle Rider's Association SA forwarded by Transport SA by request

30. Summary of points raised at Transport SA Working group on front plates

A working group was formed some months ago to look into the issues. It is comprised:

Peter Mount (Chairman MRA)
David Sutton (Transport SA – Registration and Licencing)
Jack McLean / Giulio Ponte (Adelaide University)
Andrew Garrett (Transport SA - ITS)
John Spencer (Transport SA - Road Safety)
David Povey (Vice President MRA)
George Bolton (Chairman Motorcycle Industry Assoc.)
Roger Ballantine (Motor Traders Assoc.)
Chris Newland (Insurance Council of Aust.)
Ian Kay (SA Police. Chair)

SA Police are particularly keen to investigate the issues and have been experimenting with various forms of numbers with their equipment - I am expecting further results in days. The working group agreed that it would seek to input to your study so that we did not reinvent the wheel - nevertheless some are keen to progress it as soon as possible. I agreed to be a point of contact and here are some dot-point comments made at the last meeting (they represent the views of individuals and not necessarily the group)

- Not happy with the progress of frontal identification, and that the safety aspect of motorcyclists had not been taken into consideration, and until motorcyclists are reassured that frontal identification had some relevance in safety, it would be an awful hard thing to sell to them. He further stated he was not trying to stop the process, but to get some commitment to the definition of motorcycle safety.

- Spoke about the increase of stolen number plates from vehicles, and put forward the idea of self voiding adhesive number plates. This would reduce the number of stolen plates and would assist in the identification of all vehicles including motorcycles.

- Believed that the issue we are dealing with, is in addition to other road safety initiatives, and frontal identification of vehicles, would be most reliable in terms of photography. He also questioned if there was input from industry, as well as Police. He spoke about the considerations needed for the fixing or attachment of frontal identification

- Stated he was involved in a whole range of safety issues, dealing with things like pedestrians, school buses, cars and semi trailers. One element in the issue of motorcycles, is frontal identification.

- Also spoke about the need for a cost benefit ratio, whereby it would have to be proved that there was a cost benefit nationally, to change any ADR's. Also stated it is a rigorous system and unlikely to be easily changed

- Also believes we should await the out come of the Victorian study before proceeding further with our research. The outcome of the research is due at the end of June and we should be guided by their outcome

- If we went down the road of changing the Motor Vehicles Act, the amendments would have to go to all of the ministers, including Police minister, Transport minister the Government then put through Parliament. Even then there is no guarantee that it would be agreed to, and could be a long time before the legislation could be legally implemented. He also stated that any results from experimentation conducted by this group, should be directed at the Victorian study so that there was no duplication of the process

- Put forward the fact that now that national study is being done {ie SCOT/ACT agenda items}, we have the opportunity to input to that study. Also encouraged us not to rush ahead with experimentation, until we have a finding from the Victorian study. Their studies would involve Federal agencies and all concerned vehicle manufacturers, and although it is only a small study it would include many stakeholders.

- Said that while the safety issue is immediate, to get things done through the process takes a long time

- Implied that it was highly unlikely that South Australia could change the legislation in isolation to other states. It would not be hard to change, but would not get through unless other states were doing a similar thing

- Would be interested in research after the implementation of frontal identification, to see if there had been any effect on enforcement, reduction of speed or any other overall benefits

- Brought to the attention of members, that the need for continued research, was still a major safety issue and highlighted a number of high speeds recorded by frontal speed camera on Good Friday. Suggested the members remain as a reference group, and continue input to the research. Also mentioned minor experimentation has been done with the Speed Camera unit, using small numberplates and 100 ASA film. This experiment was not very successful. However more stick on

type plates have been made, and are about to be experimented with using black and white film, which Speed Camera unit are now using. Members will be advised of the results when experiments have been completed

- Stated Motorcyclists in general feel very deeply about safety, and they are very vulnerable on the roads. He condemned the behaviour of a few that have no respect for themselves or other road users, and they do the average community riders, who take these issues seriously, a disservice

- Questioned the fact that of 80,000 frames missed by speed camera, 1,500 frontal motorcyclists was only a small portion of this. He also spoke about an issue which he had noticed while travelling around, in relation to car number plates. Are Police doing anything about unreadable number plates?

- All road users are accountable for their behaviour on our road system, if it means by frontal identification we can save even one life, surely at the end of the day it would be worthwhile. Police regularly pay attention to the like of unreadable and obscure number plates.

- Mentioned from the last meeting, that a group called Australian College of Road Safety should be included with our group. The contact person was Paul Simons for the South Australian branch, details were obtained for information to be sent to him. Agreed that it was a relevant group and would have an interest in this groups activities

- Spoke about some issues relating to motorised scooters.

Chris Newland, Manager for South Australia, Insurance Council of Australia Ltd e-mailed me to say:

- As the general insurance industry representative on the Road Safety Consultative Committee I have had first hand witness to the examples of arrogant excessive speed by motor cyclists in the knowledge that they will not be captured on film by speed cameras. Injuries by motor cyclists, their pillion passengers and any other persons or property will be accentuated by the speed of the vehicle. Speed camera detection of speed is but one means of curbing the extent of injury. Frontal identification is necessary to use this facility. It is conceded that when plates were required to be displayed the sharply edged and shaped plates inflicted serious injuries although probably not less brutal than some "roo bars" on other vehicles now. Flexible vinyl is used quite successfully on jet skis to display registration numbers

- However, the incidence of unregistered/uninsured motor cycles in accidents involving serious injury significantly exceeds that of other classes of vehicle and to make it less obvious plates are transferred to other cycles. A good case exists to introduce adhesive registration identification upon material that will "self void" when attempts are made to remove them. Hopefully this would increase the proportion of registered motor cycles on the road

- Police statistics have identified a massive increase in the incidence of the theft of plates from vehicles to be used in connection with crimes such as service station drive throughs, ram raids and stolen vehicles. Self voiding identification would arrest some of these activities providing additional cost justification for the introduction of adhesive identification on all vehicles

- In my preparation of this response I have also spoken to the Motor Accident Commission and they too are supportive of the introduction of frontal identification of motor cycles to reduce speed which produces disproportionate injuries because of the absence of protection afforded to persons travelling in sedan and cabin type accommodation

A number of candidates for consultation were listed:

Industry eg Federal Chamber of Automotive Industries,
Australian Motorcycle Industry Association;
Australian College of Road Safety (Paul Simons)
Motor Accident Commission.

It would be fair to say (but we didn't vote on this) that there would be support for ongoing investigation of the matter.

Notes forwarded by Andrew Garrett. ITS Transport SA

31 SA Report to Australian Motorcycle Council

The police accepted our argument that metal plates are dangerous, and suggested stick-on ID using digits or barcodes, advising that, as the resolution power of cameras now can read characters of 1 " (25mm) high, the stickers could be placed anywhere on a bike. They also suggested ID numbers or barcodes on helmets (which might gain support from multi-machine owners) and transponders, notwithstanding the Victorian experience of their present (non)compatibility with bikes

RARU suggested increasing enforcement (everywhere, I presume; roll on 1984)

TSA suggested a microchip in the rego label.

R&L advised it would not be against changing legislation.

The RAA said if we really wanted equity we would want front number plates just like all other vehicles on the road. We responded that it is not possible to have true equity as different road user groups have different safety criteria, and that if equity were the main concern, or of any relevance at all, the road authorities could start with laying down skid-resistant road marking paint and crack sealant, making barrier systems so that they didn't kill motorcyclists, improving road maintenance, improving the quality and increasing the number of rest stops. . . and so on ad nauseum

We argued that if there were any safety benefits at all to be derived from frontal ID (which we strongly doubted), they would be insignificant compared to the benefits derived from focussing on anyone of the above areas, that the resources and funding being put into this frontal ID issue would be better spent in these areas, and that if the police and everyone else at the meeting were serious about improving the safety of motorcyclists they would support us in this. Answer: That's not within the purpose of this group

The ICA suggested the stickers be self-destructive on removal to avoid swapping them to other machines (I won't waste your time commenting on this).

This stalemate was overcome by TSA asking us if funding could be arranged for research and improvements in these areas would we accept the inclusion of research into frontal ID? We responded in the affirmative, on the basis that we are opposed to metal number plates not the principle of frontal ID, and provided some safety benefit can be demonstrated.

Although this was a hypothetical question, I shall continue to argue for funding in these areas as a sign that the authorities are serious about motorcycle safety and as a condition of including frontal ID in any safety strategy, and will resist frontal ID until there is a real commitment to action where it will count.

After all, at this time there is no indication whatsoever of any benefit to us or the motorcycle industry of having frontal ID. We view it as a purely punitive and discriminatory measure

Neither is there any support for the proposal anywhere in the world, let alone in any Australian state or territory. Nobody sees it as a significant issue: it is being driven exclusively by a very limited SAPOL enclave

The outcome of the meeting is that SAPOL will test their speed cameras to determine with greater accuracy their power of resolution, and will identify government departments, groups and individuals who can contribute expertise in researching technological methods of developing a vehicular frontal identification system and convene a working group to this end

Forwarded by Neville Gray SA

APPENDIX 6 Abbreviations

ACEM	Association of European Motorcycle Constructors
ADR	(Federal) Australian Design Rule
ATC	Australian Transport Council (of Federal, State and Territory Ministers)
ATSB	(Federal) Australian Transport Safety Board
BMF	British Motorcycle Federation
DCF	Discounted Cash Flow
DVLR	(the UK authority for) Driver Licensing and Vehicle Registration
ECE	UN Economic Commission for Europe (Australia is on Working Party 29)
EU	European Union
FCAI	(Motorcycle Division of the) Federal Chamber of Automotive Industries
FMVSS	(US) Federal Motor Vehicle Standards
FNP	Front Number Plates
MUARC	Monash University Accident Research Centre
NHTSA	The US National Highway and Traffic Safety Administration
NRMA	(NSW) National Motorist and Roads Association
OH&S	Occupational Health and Safety
ORR	(Federal) Office of Regulatory Review
RACV	Royal Automobile Club of Victoria
RIS	Regulatory Impact Statement
SA	South Australia
TACE	Transport Agency Chief Executives
TRB	(US National Academy of Sciences) Transportation Research Board
ULP	Unleaded Petrol
VACC	(Motorcycle Division of the) Victorian Automobile Chamber of Commerce

VMAC	(Minister of Transport's) Victorian Motorcycle Advisory Council
VRIS	Victorian Roads Corporation Information System