



Australian Government
Department of Infrastructure
and Regional Development

Adoption of Anti-lock Braking Systems (ABS) for motorcycles in Australia

Discussion paper

December 2015

Discussion of research conducted by
Monash University Accident Research
Centre on the effectiveness of motorcycle
anti-lock braking systems - Report No.327.

 **MONASH** University
Accident Research Centre

EVALUATION OF THE EFFECTIVENESS
OF ANTI-LOCK BRAKING SYSTEMS ON
MOTORCYCLE SAFETY IN AUSTRALIA

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Report No. 327

Preface

The Australian Government is committed to reducing the number of deaths and serious injuries on our nation's roads and is working cooperatively with the states and territories to implement the National Road Safety Strategy (NRSS) 2011–2020. The strategy sets national goals and priorities for improvement in all areas of road safety. The Safe Vehicles pillar of the strategy includes a number of regulatory initiatives aimed at improving vehicle safety and increasing the uptake of crash avoidance and road user protection, such as by the introduction of new or amended Australian Design Rules (ADRs).

Motorcycles are the registered vehicle type currently experiencing the highest growth in Australia. This growth has led to an increase in new and inexperienced riders who may benefit the most from improvements in motorcycle safety technologies. Given that there is also a relatively high turnover of motorcycles in the fleet, this means that these benefits will be realised rapidly.

In May 2014, the Commonwealth Department of Infrastructure & Regional Development (the Department), in partnership with VicRoads, commissioned research into the effectiveness of anti-lock braking systems (ABS) on motorcycles towards reducing deaths and injuries of motorcycle riders in Australia. This research is unique in that it builds on international work to identify the benefits of ABS within the Australian context using an internationally adopted *induced exposure* methodology. In doing so it is able to report on real-world effectiveness in Australia with a high degree of accuracy.

In October this year, Monash University Accident Research Centre (MUARC) published the results of this research¹. In line with action item 16c of the NRSS 2011-2020 and action item 7 of the NRSS Action Plan 2015-17, the Department will shortly be considering the MUARC report towards the development of a Regulation Impact Statement (RIS) for the adoption of ABS for new motorcycles in Australia. This does not include retro-fitment of registered motorcycles.

The Department is releasing this discussion paper to invite preliminary comment on the adoption of ABS for motorcycles in reducing trauma on Australia's roads. This will help draw out relevant issues to shape the RIS. The RIS process itself will be subject to public comment before any decision is made by the Government. At that time, calls for feedback will be advertised through national publications as well as through standing consultative groups for the ADRs and vehicle safety.

¹ *Evaluation of the effectiveness of ABS and CBS technologies on motorcycle safety in Australia*. Fildes et al. 2015: <http://www.monash.edu.au/miri/research/reports/muarc327.html>



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Motorcycle ABS

ABS is a closed-loop system that reduces wheel lock during braking, resulting in improved vehicle stability and control during stopping maneuvers. Although established for many years on passenger cars and heavy vehicles, it is less widespread on motorcycles.

Research indicates that the effectiveness of ABS in reducing crash risk for motorcycles is higher than for passenger cars. This is attributed to the manner in which motorcycle wheel lock and skidding may cause the motorcycle to slide or overturn, resulting in loss of control and evasive opportunity. Conversely, failure to brake sufficiently can impact upon stopping distances.

Motorcycle ABS typically uses sensors on both wheels to accurately determine wheel speeds, as well as a control unit to determine the extent of wheel lock (Figure 1). If the wheels are locking (e.g., due to excessive braking or braking with slippery road conditions), the ABS hydraulic unit momentarily modulates (reduces) the excess brake pressure applied by the rider, so that the tyres may continue to retain road traction. The modulation can be rapid and cyclical. A rider shouldn't notice modulation during normal braking, nor during typical braking up to the tractive limit of the tyre-road interface, but the rider can be confident that in an emergency full brake force can be applied without the risk of wheel lock.

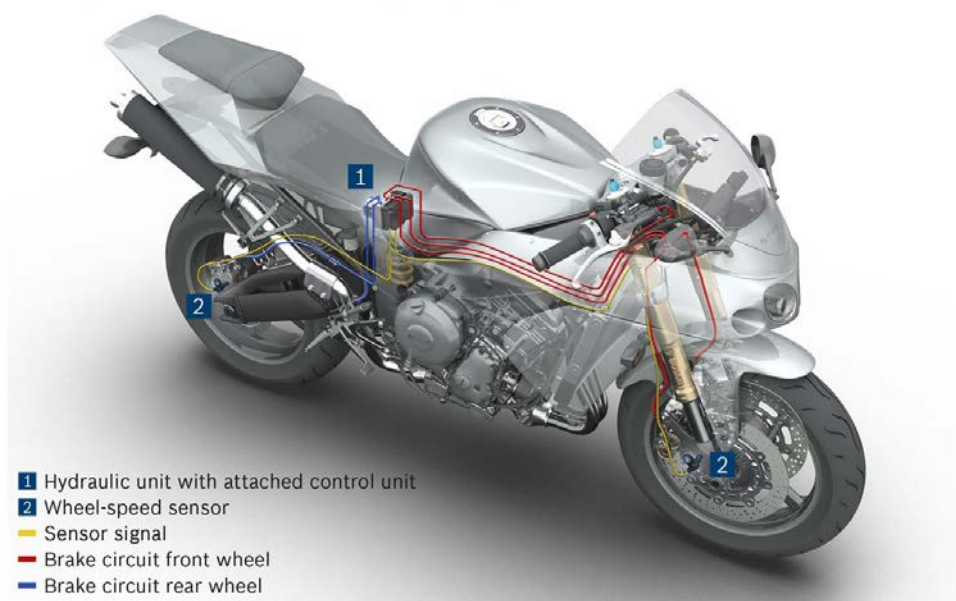


Figure 1: Motorcycle ABS – example system by Bosch²

Availability

ABS is available on a range of production motorcycles, either as a standard or optional feature. Several manufacturers equip road motorcycles with ABS as standard in the Australian market³,

² Reproduced from <http://mylicence.sa.gov.au/safe-driving-tips/safer-vehicles/motorcycleabs>

³ For a list of makes and models of motorcycles offering ABS, see <https://www.vicroads.vic.gov.au/safety-and-road-rules/motorcyclist-safety/abs-for-motorcycles/list-of-motorcycles-with-abs>

including KTM, BMW, Aprilia, Ducati, Indian and Harley-Davidson⁴. Numerous motorcycle manufacturers offer ABS as an option, including Can-Am, Honda, Husqvarna, Kawasaki, Suzuki, Triumph, and Yamaha.

For super-sport (and racetrack) use, motorcycles available in Australia in 2015 incorporate race-oriented ABS as part of an electronics package for performance enhancement, including BMW S1000 (standard on R and RR)⁵, Ducati Panigale (standard on 899 and 1299)⁶, Kawasaki ZX10R ABS⁷, Yamaha YZF-R1⁸, Honda CBR-1000RR ABS⁹, Suzuki GSX-R1000 ABS¹⁰, and others. Several of these models promote advanced race-oriented ABS Combined Braking Systems (CBS), such as the Yamaha YZF-R1¹¹:

“The distribution of braking force is based on input from the IMU regarding the machine’s attitude and banking angle at the time of brake application. When brake force is applied to both the front brake lever and the rear brake pedal, the Unified Brake System functions to control the distribution of braking force between the two brakes, but when only the rear brake pedal is used, the system operates only the rear brake so that there is no unnatural operational feeling for the rider.”

Motorcycle CBS is defined as a braking system where the brake force applied at both wheels can be initiated by a single rider input, such as a brake pedal or lever¹². In addition to racing applications, traditional (hydraulic) and electronic CBS (eCBS) are available in several variations both simple and complex, depending on the type of motorcycle fitted. For example, according to Honda¹³:

“Honda’s CBS can be largely classified into two types: Combi brake adopted for scooters, medium sized motorcycles and American custom models; and dual CBS used by large sports and large tourers [...]. The main purpose of the two types is the same; to increase the deceleration obtained on application of the pedal brake (or the left lever) which was previously relatively lower during the application of the rear wheel brake alone [...] it was made possible to apply the brakes simultaneously on the front and rear wheels. In case of dual CBS, furthermore, it was made possible to apply the brakes simultaneously on the front and rear wheels when the right lever was operated to reduce nosedive. [...] Honda’s [CBS with ABS] creates the optimal balance of front and rear braking forces and the control of an advanced ABS system that helps you stop with confidence on even wet or dirty road surfaces. Honda has also pioneered [eCBS] specially designed to electronically distribute front and rear braking forces to maximize braking in a light-weight, short-wheelbased package.”¹⁴

⁴ 500cc LAMS Harley-Davidson does not have ABS as an option.

⁵ http://www.bmwmotorrad.com.au/au/en/index.html?content=http://www.bmwmotorrad.com.au/au/en/bike/sportbikes/2014/s1000rr/s1000rr_overview.html

⁶ http://www.ducati.com.au/bikes/superbike/899_panigale/index.do

⁷ <https://www.kawasaki.com/Products/2015-Ninja-ZX-10R-ABS>

⁸ <http://www.yamaha-motor.com.au/promotions/motorcycle/all-new-yamaha-yzf-r1>

⁹ <http://motorcycles.honda.com.au/Supersports/CBR1000RR/ABS>

¹⁰ <http://www.suzukimotorcycles.com.au/range/road/supersport/gsx-r1000-abs>

¹¹ <http://www.yamaha-motor.com.au/promotions/motorcycle/all-new-yamaha-yzf-r1>

¹² CBS definition available at UN-ECE Regulation 78, 2.6, p5: <http://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/r078r1e.pdf>

¹³ <https://motorcycle.honda.ca/honda-advantage/motorcycle>

¹⁴ <http://world.honda.com/motorcycle-technology/brake/p4.html>

Motorcycles and road trauma

In the year to May 2015, 206 of the 1,169 Australian road user deaths were motorcyclists¹⁵ (Figure 2). This represents 17.6 per cent of all road deaths.

In the year to June 2011, 12,933 of the 45,731 hospitalisations specified as land transport accidents were motorcyclists¹⁶. This represents 28.3 per cent of all road related hospitalisations.

12 months ended May	Driver	Passenger	Pedestrian	Motorcyclist ^b	Pedal ^b cyclist	Total ^c
2011	601	282	166	224	28	1,301
2012	565	271	195	206	35	1,274
2013	624	242	154	215	35	1,277
2014	527	222	163	187	61	1,162
2015	543	235	152	206	30	1,169
Latest per cent change	3.0	5.9	-6.7	10.2	-50.8	0.6
Average trend change per year (per cent)	-2.7	-5.5	-3.5	-2.6	7.2	-3.0

Figure 2: Motorcyclists represented 17.6 per cent of road user fatalities in the 12 months to May 2015

At the time of the 2014 Motor Vehicle Census there were 17.6 million motor vehicles, including 780,174 motorcycles (4.4 per cent), registered in Australia. Motorcycles were the vehicle type that experienced the largest growth rate over the five years to 2014 with an increase of 25.0 per cent¹⁷ (Figure 3).

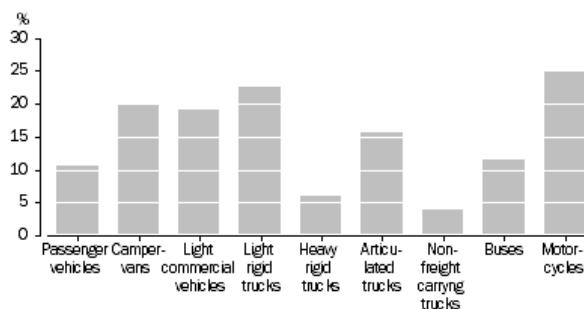


Figure 3: Growth in Australian road user types 2009-2014

Motorcyclists ride for various reasons including recreation, low-cost transport or ease of commuting in congested areas. However, the reality is that an Australian motorcycle rider or passenger is faced with 26 times the fatality risk per kilometre of a car driver or passenger¹⁸. The situation is not unique to Australia. The European Transport Safety Council reported the risk of a motorcycle user having a fatal accident is 20 times greater than for a car user¹⁹. In Australia, risk is compounded with the growth in the size of the sector and consequent reduction in average rider experience, as


¹⁵ http://bitre.gov.au/publications/ongoing/rda/files/RDA_May_2015.pdf

¹⁶ <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129544396>

¹⁷ <http://www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0>

¹⁸ https://bitre.gov.au/publications/2014/files/report_140.pdf

¹⁹ http://ec.europa.eu/transport/road_safety/specialist/knowledge/vehicle/safety_design_needs/motorcycles_en.htm



well as an increase in motorcycle kilometres travelled. The result is that road trauma risk increases annually with motorcycle crashes growing as a proportion of fatal crashes in Australia²⁰ (a net 8 per cent increase in motorcycle deaths for the 10 years to 2014 and a net increase in hospitalised injuries of 52 per cent for the 5 years to 2009). Based on Australian Government Office of Best Practice (OBPR) 'Willingness to pay' estimates²¹, this trauma currently costs the Australian community over \$2 billion a year.

Following on from work undertaken in Europe and other countries that have demonstrated significant benefits in fitting ABS to motorcycles, the Australian Government and Victorian Government jointly commissioned MUARC to examine whether those findings would translate across to Australia.

²⁰ https://bitre.gov.au/publications/2014/files/report_140.pdf

²¹ https://www.dpmc.gov.au/sites/default/files/publications/Value_of_Statistical_Life_guidance_note.pdf

Motorcycle ABS effectiveness

Internationally

A Bosch survey²² indicates that effectiveness of motorcycle ABS is consistent internationally – the more recent studies referenced in the survey include Swedish research demonstrating that ABS fitment yields a crash reduction in Europe of up to 39 per cent for all motorcycle injury crashes; the Insurance Institute for Highway Safety independently estimated a 37 per cent effectiveness in the US, and a separate Bosch study found a 33 per cent effectiveness in accident reduction in India. Another German study concluded that in 93 per cent of motorcycle crashes, ABS would have avoided or reduced the severity of the crash²³.

Australia - MUARC research

MUARC utilised an internationally adopted ‘*induced exposure*’ methodology to analyse over 100,000 Australian motorcycle trauma crashes from five states. The induced exposure methodology determines the effectiveness of the underlying technology itself, eliminating confounding factors such as rider behaviours, styles and experience, and differences in distances travelled and types of motorcycles.

MUARC found that the results from European studies translate across to Australia with remarkable coherence. MUARC reports that in Australia, 93 per cent of motorcycle crash types would benefit from ABS. When fitted, ABS would be 33 per cent effective in reducing all motorcycle injury crashes and 39 per cent effective in serious and fatal motorcycle crashes (Table 1).

Key MUARC research findings

Motorcycle ABS relevance in reported Australian crashes	Effective in 93% of accidents
Motorcycle ABS effectiveness, all Australian trauma crashes	33% reduction in all injury crash instances
Motorcycle ABS effectiveness, fatal and serious injury crashes in Australia	39% reduction in serious and fatal crash instances
Growth trend for Australian motorcycles	4.7% per year (25.0% 2009-2014)
Predominant Australian motorcycle type	62% are LC>125cc
Annual growth in new Australian LC>125cc with ABS	17% (2014)
Current ABS fitment on new Australian motorcycles	20% of new motorcycles sold have ABS
Predicted ABS fitment for all Australian motorcycles (new and old)	20% of all registered motorcycles will have ABS by 2025

Table 1: Key MUARC research results

²² http://www.bosch-motorcycle.com/media/ubk_zweiraeder/related_content/downloads/Motorcycle_ABS_effectiveness.jpg

²³ http://ec.europa.eu/transport/road_safety/specialist/knowledge/esave/esafety_measures_unknown_safety_effects/anti_lock_braking_for_motorcycles_en.htm

What do the MUARC results mean?

For Australia, the potential reduction in fatalities and injuries via motorcycle ABS is significant. At current trauma rates, fitment on all registered Australian motorcycles (new and old) with 93 per cent crash relevance, 33 per cent effectiveness against trauma would have amounted to an annual reduction of 1,128 minor injury crashes; and 39 per cent effectiveness against serious injuries and fatalities would have amounted to an annual reduction of 1,083 serious injuries and 74 fatalities. Based on OBPR 'Willingness to pay' estimates, this could have saved over \$700 million in trauma consequence expenses in the year to May 2015. Nevertheless, MUARC reports that only around 20 per cent of new motorcycles sold in 2015 incorporate ABS, and projects that by 2025, less than 20 per cent of all registered Australian motorcycles would be fitted with ABS.

Projected reductions in motorcycle road trauma with ABS – MUARC research

The MUARC research modelled the projected impact of widespread adoption of motorcycle ABS in Australia. Using Victorian data, Figure 5 depicts potential crash reductions (all injury, left; only fatal and serious injury, right) for 125cc and greater motorcycles, excluding scooters (this aligns with EU requirements for ABS) under three scenarios: (i) assuming the uptake of ABS remains constant at 2014 rates, (ii) assuming the uptake of ABS changes in line with current trends; and (iii-iv) assuming the uptake of ABS is mandated through the Australian Design Rules (ADRs) for new vehicles.

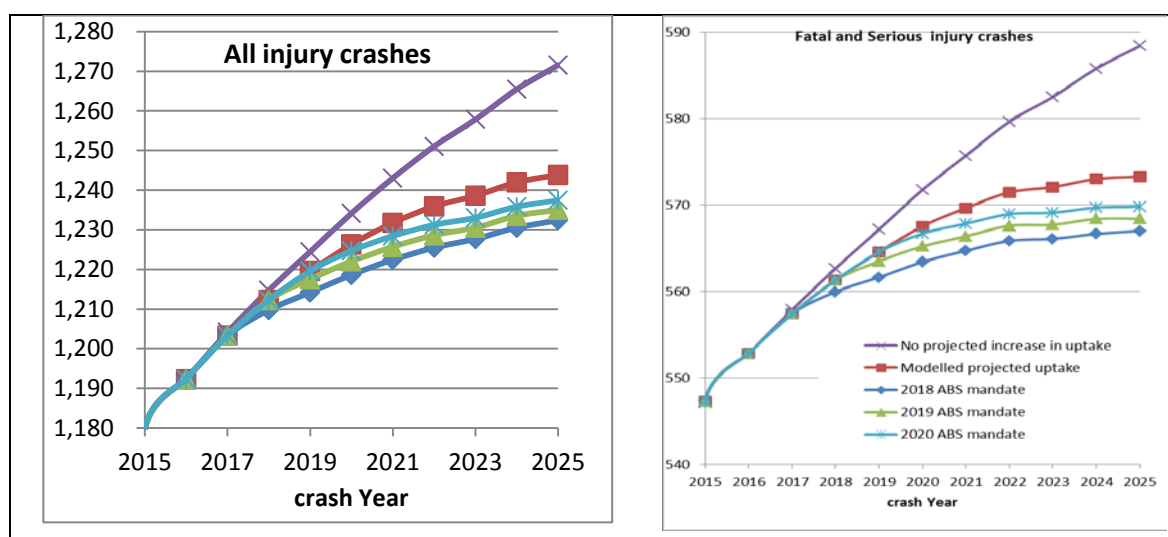


Figure 5: MUARC - Projected motorcycle crashes in Victoria according to year of regulation

MUARC extended this to estimate reductions in road trauma across Australia through mandating of ABS. Projected reductions to 2025 are summarised in Table 2, according to the starting year.

Trauma type	Trauma reduction, current fitment rates	Trauma reduction with regulation introduced in		
		2018	2019	2020
Trauma crashes	643	1029	898	802
Fatalities	22	35	31	27
Serious injuries	345	553	482	430
Minor injuries	367	587	512	458

Table 2: MUARC - Projected cumulative trauma alleviation to 2025, by year of regulation introduction

If motorcycle ABS fitment rates increase naturally, there would be a reduction of 643 trauma crashes (involving single or multiple fatalities and/or injuries) between the start of 2015 and end of 2025, with expected trauma reductions of 22 fatalities, 345 serious injuries, and 367 minor injuries. If an ADR were to come into force in 2018, this would improve significantly to a reduction of 1029 trauma crashes and reduction of 35 fatalities, 553 serious injuries, and 587 minor injuries. Setting aside the human cost to families and the community of these crashes, in today's dollars, MUARC calculates an average annual saving of over \$49 million to 2025 (MUARC report, Table 20). MUARC concludes that, depending on when it could be introduced, an ADR could lead to an additional 60 per cent reduction over current trends in death and injury crashes of motorcyclists.

The associated reduction in trauma via ABS would become apparent earlier for motorcycles than for similar requirements set for other vehicle types (for example, the ADRs mandating Electronic Stability Control (ESC) in 2011 and Brake Assist Systems (BAS) in 2015 for light passenger vehicles – both of which require an ABS system to operate) due to the unique crash and age profile of Australian motorcycles. The difference in crash distribution by age for motorcycles and light passenger vehicles is most pronounced around 5 years (Figure 6). At this age, motorcycles are about 30 per cent more likely to have been involved in an accident than a car. Furthermore, the age distribution of motorcycles (Figure 7) shows that most registered motorcycles are younger than 6 to 8 years. Due to the rapid growth in the number of motorcycles on Australia's roads, as well as the relatively young typical crash age, the benefits of ABS being introduced into the expanding Australian motorcycle fleet could be realised more rapidly than with other vehicle types. Increased uptake of effective technologies may be particularly beneficial to the motorcycle sector and the increasing number of new or inexperienced riders recently driving growth in the motorcycle fleet.

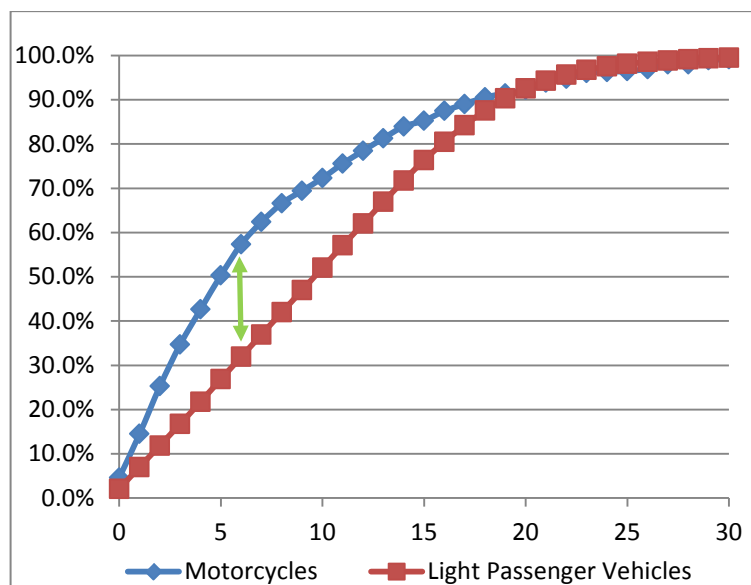


Figure 6: Highlighting the difference between crash distribution by age for Australian motorcycles and light passenger vehicles²⁴

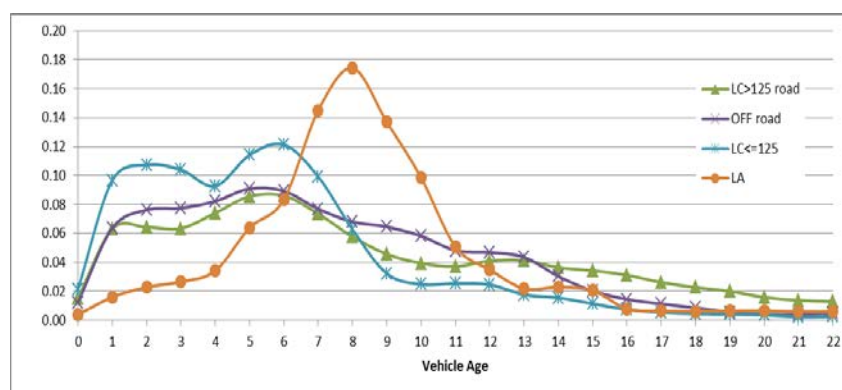


Figure 7: MUARC - Average 2013-2014 age distribution of Victorian motorcycles by vehicle type (from 0 to 22 years)

²⁴ Public data available at: <https://www.data.vic.gov.au/data/dataset/crash-stats-data-extract>

Increasing the fitment of ABS

Initiatives to increase the fitment of motorcycle ABS can include road user information and awareness campaigns, rider education, training and skills development schemes, safety equipment and technology promotion, as well as market incentives.

In-line with international initiatives, there have been various campaigns (mostly on-line) across Australia that both emphasise the benefits of ABS and encourage choosing it if possible when purchasing a motorcycle. These include initiatives by industry, consumer groups, and state and territory jurisdictions.

Support and campaigns for motorcycle ABS fitment in Australia (Figure 4) have come from organisations including Spokes.com.au and TAC²⁵, NRMA²⁶, RACV²⁷, Motorcycling Australia²⁸, as well as jurisdictions including Victoria²⁹ and NSW³⁰.

Internationally, support and campaigns in support of ABS fitment (Figure 5) includes those from Bosch³¹, Continental³², GlobalNCAP³³, the Institute for Advanced Motorcyclists (IAM)³⁴, the Association of European Motorcycle Constructors (ACEM)³⁵, and Federation Internationale de l'Automobile (FIA)³⁶.

In addition to campaigns, international research³⁷ has indicated that regulation of ABS for motorcycles can lead to even greater safety benefits. As a result, fitment of ABS has now been mandated in major markets such as all 28 member states of the European Union (EU), Japan, Taiwan, Brazil and announced in India.

²⁵ <http://www.spokes.com.au/the-latest/safety-campaigns/current-campaign>

²⁶ http://www.mynrma.com.au/media/NRMA_Submission_to_Staysafe_Inquiry_into_Vulnerable_Road_Users.pdf

²⁷ <https://www.racv.com.au/wps/wcm/connect/b6dc69ff-eded-4ba5-bf83-77576b6552ce/RACV-Inquiry-Motorcycle-Safety.pdf>

²⁸ <http://www.ma.org.au/index.php?id=644>

²⁹ <http://www.roadsafety.vic.gov.au/vehicles/motorcycles/56-motorcycles-safety.html>

³⁰ <http://roadsafety.transport.nsw.gov.au/stayingsafe/motorcyclists/speeding.html>

³¹ http://www.bosch-motorcycle.com/en/de/fahrsicherheit_fuer_zweiraeder/motorrad_abs/evolution.html

³² http://www.continental-automotive.com/www/automotive_de_en/themes/two_wheelers/electronic_brake_systems/

³³ http://www.unescap.org/sites/default/files/3.4.NCAP_.pdf

³⁴ <http://www.roadsafetygb.org.uk/news/1810.html>

³⁵ <http://www.acem.eu/index.php/media-corner/press-releases/126-motorcycle-industry-welcomes-vote-of-the-european-parliament-on-the-type-approval-regulation>

³⁶ <http://www.spokes.com.au/the-latest/lowdown/2012/eu-mandates-abs-for-motorcycles-in-2016-january-2012>

³⁷ Rizzi et al. 2014 - Effectiveness of antilock-brakes (ABS) on motorcycles in reducing crashes, a multi-national study, Traffic Injury Prevention.

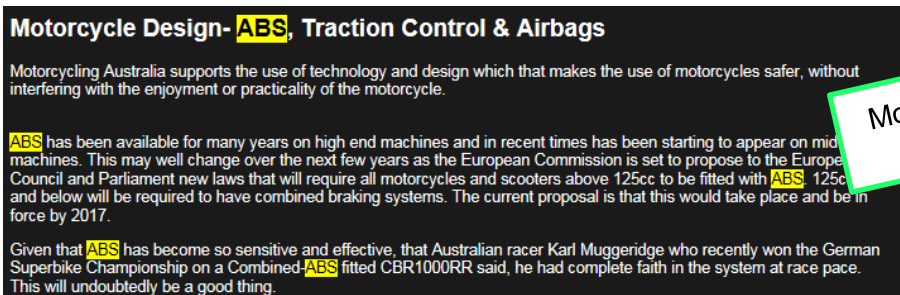
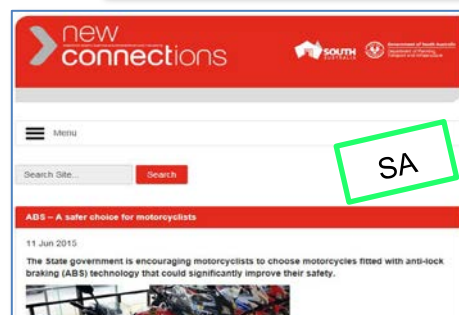
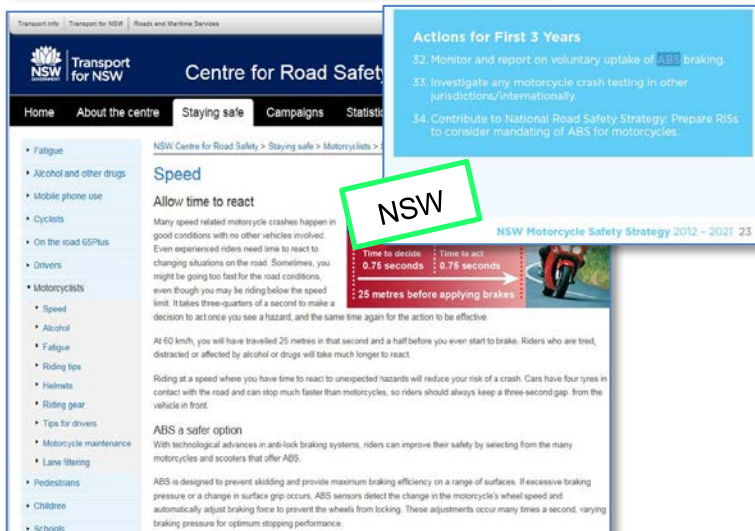
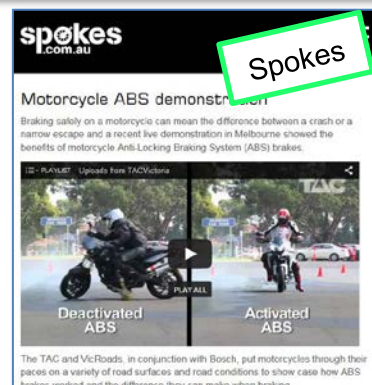
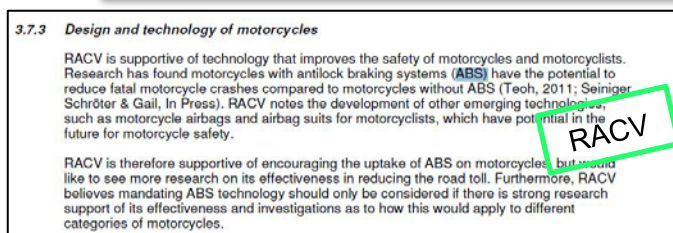
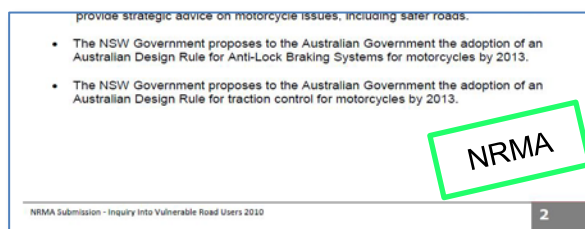
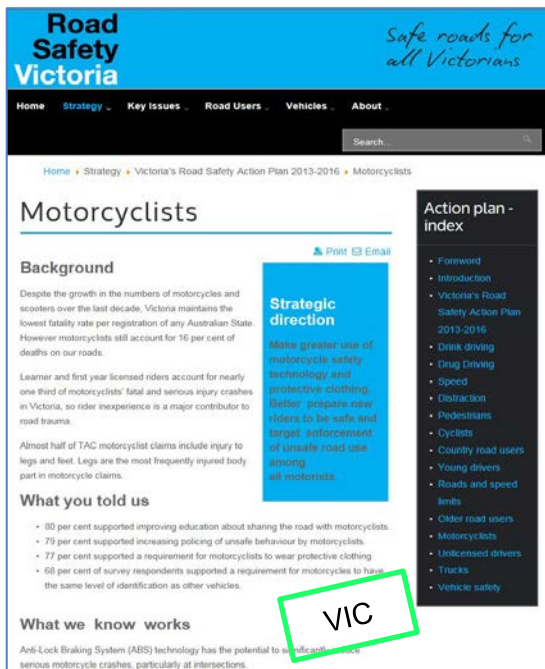


Figure 4: Support for fitment of motorcycle ABS in Australia

Bosch

Statement

Public Consultation
on a Framework Regulation on Type-Approval of
two- and three wheel motor vehicles and quadricycles

BOSCH
Invented for life

Reply to questions (6) and (7) regarding new safety measures (advanced braking systems for motorcycles, i.e. ABS/coupled braking devices).

6. What is your view on the mandatory fitting of ABS on all motorcycles? Why?

Modern vehicle safety systems have made significant contributions in reducing four-wheeler traffic accidents in the EU. However, the level of motorcycle accidents remains stagnantly high. Safety experts have identified motorcycle ABS as the safety technology with the highest accident reduction potential for motorcycles available today. The wider proliferation of ABS technology contributes significantly to motorcycle riding safety.

- Motorcycle ABS is a proven technology and justified in terms of projected benefits. The effectiveness of motorcycle ABS to avoid or mitigate serious and fatal accidents under real driving conditions has been analysed and proven in several European and international studies. A recent study by the German Federal Highway Research Institute (BAST) shows that a 100 percent installation of a motorcycle ABS could avoid approximately 12 percent of both fatal accidents and accidents with serious injuries for all motorcycles above 50cc, resulting in an avoidance potential in Germany of 97 fatalities per annum (BAST, 2008). A study by the Allianz Center for Technology (AZT, 2005) on severe motorcycle accidents shows that between 8 and 17 percent of severe accidents with injuries and fatalities could have been avoided if the motorcycles were equipped with ABS. A reduction of approximately 100 fatalities and over 1,000 severely injured per annum could be expected for Germany. An accident research project for two-wheeler accidents from the Saarland police department came to the conclusion that approximately 20 percent of all motorcycle accidents (>125ccm) with injuries and fatalities could be avoided by ABS (Brutscher/Priester, 'Unfallforschungsprojekt Zweiradunfälle', 2005). Other studies from the US published by the Insurance Institute for Highway Safety (IIHS) in conjunction with the Highway Loss Data Institute (HLDI) show a 38 percent decrease in fatal crashes and a reduction of insurance claims of 19 percent for motorcycles fitted with ABS (IIHS, 2008).
- Motorcycle ABS is technically available since more than 20 years, and most motorcycles with high engine displacements have this system as optional or standard equipment. We estimate that approximately 30 percent of the motorcycles above 250cc produced in Europe are currently equipped with an ABS. However, only a few of the vehicles in the small engine displacement segment (such as scooters) currently offer an optional ABS. The estimated installation rate in the large volume market of machines smaller than 250cc stands at below 5 percent.
- A timely market deployment of Motorcycle ABS to all vehicles above 125cc will allow the maximization of the safety potential of the technology and accelerate the full adaptation of ABS technology in the large volume market of 125cc to 250cc. The German Bureau of Statistics (DESTATIS, 2007) reveals that 89 percent of all fatal motorcycle accidents involved bikes with an engine displacement above 125 cc. Vehicles below 125cc currently lack the technical requirements (i.e. battery, hydraulic brake) for being equipped with a motorcycle ABS.
- A regulation on motorcycle ABS should refer to technical requirements as defined in the Global Technical Regulation (GTR No.3) on motorcycle brake systems, completed by the UNECE in 2006, and the ECE 78.

7. In your opinion, are there other/supplementary solutions better suited for certain categories (i.e. coupled braking, stability control systems, etc.) that would produce the same/better effect at better costs?

- In our knowledge, there is currently no other system for motorcycles on the market providing the same driving safety for the same cost efficiency as a motorcycle ABS. Advanced coupled braking systems for motorcycles such as CBS, eCBS or Integral Brake etc. are currently mainly provided for high segment bikes.
- Advanced coupled braking systems or stability control systems already partially utilise motorcycle ABS components, therefore reducing the economical impact of any future introduction of advanced systems into the market.
- For bikes below 125cc there is currently no safety solution available on the market. Fitting those bikes with an ABS would be theoretically possible with future systems that can cope with the technical environment of the bike (e.g. small battery capacity).

ACEM

The Motorcycle Industry in Europe

INNOVATION AND TECHNOLOGY : KEY DRIVERS OF THE MOTORCYCLE INDUSTRY

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Press Releases
Motorcycle Industry welcomes vote of the European Parliament on the Type Approval Regulation

Motorcycle ABS – the Two Wheel Priority

Anti Lock Brakes in Motorcycles is a global priority for powered two wheelers.

Studies of fatal crashes, insurance claims and test track performance all confirm the importance of antilock brakes.

The rate of fatal crashes is 37 per cent lower for motorcycles equipped with optional ABS than for those same models without ABS (IIHS 2011).

Collision insurance claims for motorcycles with ABS are filed 23 per cent less frequently than for motorcycles without it (HLDI 2012).

In the EU from 2016 ABS will be mandatory for new models above 125 cc, and from 2017 for all motorcycles in production.

Global NCAP

FIA

Continental

Electronic brake systems for motorcycles

Accelerate. Enjoy. Brake like a pro. - Electronic brake systems for motorcycles

Electronic brake systems prevent wheels locking – and can thus avoid a fall.

Driving pleasure on two wheels: enhanced functions.

The increased safety provided by an anti-locking function is quite enough to justify investing in an electronic brake system.

IAM

IAM backs motorcycle ABS proposals

Wednesday 21st September 2011 17 readers have commented

The IAM is supporting calls to make anti-lock braking systems (ABS) compulsory on all new motorcycles more than 125cc by 2015.

MEPs will soon debate the proposals which have a deadline set of 2017, but the IAM is calling for the deadline to be brought forward by two years.

Despite motorcyclists making up just 4% of road users, in 2010 the number of motorcyclists involved in fatal accidents in the UK came to 403 – 21% of all road deaths, according to DfT figures.

Based on recent research by the FIA (Fédération Internationale de l'Automobile), and from experience in Italy – where nearly a quarter of all new large bikes already have ABS – the IAM

Figure 5: International support of motorcycle ABS fitment, various

Standards for motorcycle ABS

Australia participates in the peak United Nations (UN) forum that sets both the framework and technical requirements for international vehicle standards, known as WP.29³⁸. The Government has been involved for over thirty years and is a signatory to the two major treaties for the development of UN Regulations (the 1958 Agreement) and Global Technical Regulations (GTRs) (the 1998 Agreement).

In relation to motorcycle ABS two international regulations exist, both containing substantively the same requirements, UN Regulation No.78 [Braking – category L vehicles] and GTR No. 3 [Motorcycle brakes]. Both regulations cover general motorcycle braking requirements and include performance and system requirements where ABS is fitted. It is left up to each country to mandate the actual fitment of ABS when calling up either of these regulations into national or regional legislation.

Through the Australian Design Rules (ADRs) Australia adopts UN Regulation No. 78 as its primary motorcycle braking regulation for new vehicles under ADR 33/00 – Brake Systems for Motorcycles and Mopeds. ADR 33 was introduced in 2006 and was last updated in 2007 to allow certification to the latest version of UN Regulation No. 78 and GTR No. 3.

The adoption of international regulations as a basis allows for the highest safety levels at the lowest possible cost. The majority of contracting parties to the 1958 Agreement including 28 EU member states, Japan, India, Taiwan and Brazil have announced mandates for the fitment of motorcycle ABS through UN Regulation No. 78³⁹. The US is not a signatory to UN regulations but is to GTRs and has adopted GTR No. 3⁴⁰ but has not at this stage set ABS as a mandatory requirement for motorcycles supplied into the US market. In the case of the EU, the mandate was introduced in 2012 via regional legislation PE-CONS 52/12⁴¹, with phased-in implementation from January 2016 to 2017.

The EU has included exemptions for specific motorcycle types – for example, three wheeled vehicles, small two-wheeled vehicles with a reduced capability (such as battery capacity) to support ABS or CBS, and vehicles designed for off-road use (enduro and trials motorcycles). Notably, the EU legislation exempts many popular off-road type enduro motorcycles (typically under 400cc with single seat) with the exception of dual-purpose on/off road motorcycle types (typically heavier or more powerful and capable of high on-road speeds and pillion carriage). Provision for disabling ABS to cater for off-road use of dual-purpose motorcycles is a topic in discussion within WP.29 with both UN Regulation No. 78 and GTR No. 3 currently silent on the matter.

If ABS were to be mandated for motorcycles in Australia, it would likely align substantially with the EU requirements⁴². EU requirements for on-road motorcycle classes are summarised in Figure 6.















³⁸ <http://www.unece.org/trans/main/wp29/introduction.html>

³⁹ <http://www.unece.org/trans/main/wp29/wp29regs61-80.html>

⁴⁰ <http://www.unece.org/fileadmin/DAM/trans/doc/2013/wp29/WP29-160-29e.pdf>

⁴¹ <http://register.consilium.europa.eu/doc/srv?l=EN&f=PE%2052%202012%20INIT>

⁴² http://europa.eu/rapid/press-release_PRES-12-519_en.htm

Category & Category Name	Sub category & Sub category name	Example	
L1e, light two-wheel vehicle	L1e-A powered cycles		
	L1e-B Moped		
L2e Three-wheel moped			
L3e, motorcycle	A1, A2, A3		
L4e, motorcycle with side car	-		
L5e, tricycles	L5e-A Tricycles		
	L5e-B Commercial tricycles		
L6e, Light quadricycle	L6e-A Light quad		
	L6e-B Light mini car		
L7e, Heavy quadricycle	L7e-A On-road quad	L7e-A1	
		L7e-A2	
	L7e-B Heavy all terrain quad	L7e-B1 all terrain quad	
		L7e-B2 side-by-side buggy	
	L7e-C Heavy Quadri mobile		

ABS/CBS not mandatory

A1 (50 to 125cc): ABS and/or CBS mandatory
A2, A3: ABS mandatory

Timing for affected categories:
1st January 2016 → new models only
1st January 2017 → all new motorcycles

ABS/CBS not mandatory

Figure 6: Introduction of motorcycle ABS mandate in European Union, on-road classes (source: EC PRES-12-519)

Next steps

The Department is releasing this discussion paper to invite preliminary comment from motorcyclist groups, manufacturers, governments and other interested parties on the adoption of ABS in order to reduce the deaths and injuries on Australia's roads.

In line with action item 16c of the NRSS 2011-2020 and action item 7 of the NRSS Action Plan 2015-17, the Department will shortly be considering the MUARC report towards the development of a Regulation Impact Statement (RIS) for the adoption of ABS for new motorcycles in Australia.

Comment on this preliminary discussion paper would be welcome in order to draw out the issues and shape the RIS. The RIS process will itself be subject to public comment before any decision is made by the Government. This process is expected to occur in the first half of 2016 and calls for feedback will be advertised through national publications as well as through standing consultative groups for the ADRs and vehicle safety.

In the meantime, comments can be emailed directly to the Department which may help towards the following topics:

- 1) The nature of the road safety problem.
- 2) The advantages or disadvantages of ABS for motorcycles.
- 3) Proposed legislative or non-legislative solutions.
- 4) The cost to fit ABS to (new) motorcycles.
- 5) The timetable for any requirement for ABS for new motorcycles to be introduced.

Submissions should be emailed to: standards@infrastructure.gov.au

An acknowledgement will be sent to the sender's email address to confirm receipt of the submission.

The closing date for submissions will be 26 February 2016.