Amending NSW Legislation to Prohibit the use of Petrol-Powered Bicycles

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Abstract

Commonwealth legislation defines a power-assisted pedal cycle as either a bicycle fitted with a motor that has a maximum 200 watt output; or a type of electric bicycle known as a "pedalec". In NSW, power-assisted pedal cycles are deemed to be a form of bicycle, and are subject to the same rules and regulations as conventional bicycles. Bicycles fitted with petrol engines were permitted to be used as power-assisted pedal cycles if they met the Commonwealth definition, despite concerns about their safety. Following the death of a boy in October 2013, the Centre for Road Safety carried out research to determine the status of petrol-powered bicycles. The research found that petrol-powered bicycles are not *bona fide* power assisted pedal cycles, and a number of NSW regulations were amended in October 2014 to exclude petrol-powered bicycles from the exemptions and other allowances given to power-assisted pedal cycles.

Background

Power-assisted pedal cycles supplied to the Australian market must meet the definition within the Commonwealth *Motor Vehicles Standards Act 1989* (the Act). Traditionally, this has meant a bicycle which is fitted with one or more auxiliary motors that have a total power output not exceeding 200 watts, but it was amended in May 2012 to include a *pedalec*, which is specific type of electric bicycle that complies with the European Standard EN 15194:2009 Cycles - Electrically power assisted cycles - EPAC Bicycles. The definitions of *power assisted pedal cycle* and *pedal cycle* are given in Appendix A.

Importantly, this definition specifies that a power-assisted pedal cycle is a form of *bicycle*, which, according to the definition in the Act, means it must be designed to be propelled solely by human power. This in turn means that the primary source of power must come from the cyclist, with the motor used to provide assistance, such as when cycling into a strong headwind or up a steep hill, or if the cyclist is not fit enough to sustain a certain effort over an extended period.

Pedalecs are a newer type of power-assisted pedal cycle. Although they have more power than older types of power-assisted pedal cycles – 250 watts compared to 200 watts – this is offset by other features: the rider must pedal for the motor to activate (with the exception that they may run up to 6km/h without pedalling to facilitate low-speed start-up), and the motor must cut out once a speed of 25km/h is reached, or sooner if the rider stops pedalling.

The recent demand for more efficient, environmentally-friendly vehicles has seen a growth in the market for power-assisted pedal cycles. This has resulted in a number of motorised bicycles entering the market that are not genuine power-assisted pedal cycles, but a form of moped or even small motorcycle. Typically, the primary source of power on these motorised bicycles is from the motor not the rider – in fact, many models cannot be set up to be ergonomically ridden as a bicycle, and some even have inoperable pedals; and/or the motor produces more power than the 200 or 250 watt limits. These vehicles must meet the necessary mandatory safety and performance standards specified in the Act for mopeds or motorcycles, and be issued with an identification plate by the Commonwealth Department of Infrastructure and Regional Development. To be used in NSW, they must be registered, and their riders must hold a motorcycle licence and obey the road rules applicable to motorcyclists.

Under NSW road transport legislation, a power-assisted pedal cycle is deemed to be a standard bicycle. It does not need to comply with vehicle standards or be registered. The rider does not need to be licensed or be above a specified minimum age, and is subject to the same road rules as one riding a conventional bicycle. A person subject to intervention by a NSW Police Officer for riding a motorised bicycle other than a power-assisted pedal cycle may be charged with riding an unregistered motor vehicle and riding without the appropriate licence. Both of these offences attract a maximum penalty of 20 units, which equates to a maximum fine of $2,200 for each offence (a penalty unit has the value of $110).

There have been particular road safety concerns about bicycles fitted with petrol engines due to the amount of power these engines can produce. A petrol engine capable of producing a maximum 200 watts output has a capacity of about 4cc, which is the size of a standard medical syringe. In contrast, the engines used on petrol-powered bicycles range from 48cc to 90cc, and they are capable of producing comparatively high speeds, with some claiming a top speed of 80km/h. Some of the engines are fitted with limiting devices in an attempt to restrict their power output to 200 watts and therefore meet the definition of a power-assisted pedal cycle, but it has been suggested that the limiting devices can be easily removed or circumvented.

Queensland had prohibited petrol-powered bicycles from its road network under its road transport legislation. Other jurisdictions allowed them providing they meet the Commonwealth definition for power-assisted pedal cycles. There are similar inconsistencies in dealing with petrol-powered bicycles elsewhere in the world. In Canada, most provinces have rules limiting the size of the motor and the maximum speed capability. In most of Europe and Russia, there are rules for the minimum age of the rider. Some countries – France and the UK – also have more complex requirements covering design, registration and licensing. Most states in the USA have rules based on the speed and/or engine capacity.

In NSW, there seemed to be no control on the sale of any petrol-powered motorised bicycles, and little advice on their legality for use on roads or road related areas. NSW Police were reluctant to take enforcement action against people riding petrol-powered bicycles, especially as a number were overturned on appeal due to difficulties in determining the engines' power output.

There has been a history of crashes involving petrol-powered bicycles in NSW, including some where the bicycles ignited. As a result of a fatal crash involving a 14-year old boy riding a petrol-powered bicycle in October 2013, the Centre for Road Safety decided to investigate petrol-powered bicycles to assess their status under road transport legislation and the road safety risks they pose, and whether they should be prohibited from being used on roads and road-related areas.

Equipment

Motorised bicycles

Three petrol-powered bicycles were purchased from internet suppliers; one with a 48cc engine fitted with a restricted device to limit its power to 200 watts; one with an unrestricted 48cc engine; and one with a 66cc engine. These were chosen as the 48cc model represents the smallest engine fitted to bicycles, and the petrol-powered bicycle involved in the October 2013 fatal crash was fitted with a 66cc engine. In addition, a device used for restricting engine output to 200 watts was obtained for independent analysis. A pedalec that was marketed as complying with the definition of a power-assisted pedal cycle was also purchased to compare against the petrol-powered bicycles. A summary of the bicycles' specifications is given in Table 1, and the pedalec and one of the petrol-powered bicycles are shown in Figure 1. (Note: From hereon, the term "motorised bicycles" is used to cover the three petrol-powered bicycles and the pedalec when common items apply to them all.)

Figure 1. Left – Pedalec; Right – 48cc restricted petrol-powered bicycle

Table 1. Summary of specifications for each motorised bicycle

Item	**Pedalec**	**48cc Restricted**	**48cc Unrestricted**	**66cc Unrestricted**
Mass (kg)	27	24	24	25.5
Motor	Panasonic 250W electric	48cc petrol engine with limiting device	48cc petrol engine, no limiting device	66cc petrol engine, no limiting device
Frame	Custom made	Malvernstar	Malvernstar	Viper K2500
Front chainring: No. of chainrings No. of teeth	Shimano Nexus 7 speed internal transmission	 3 28-48	 3 28-48	 3 24-42
Rear cluster: No. of sprockets No. of teeth		 6 14-28	 6 14-28	 6 14-28
Gear ratio [1] max-min	1.582-0.647 [2]	3.628-1.000	3.628-1.000	3.000-0.857
Wheel & tyre diameter (mm)	711	600	600	600
Max distance travelled per pedal revolution (m)	3.533	6.839	6.839	5.655

Notes:
1 Gear ratio is taken as the number of teeth on the driving chainring divided by the number of teeth on the driven sprocket
2 Taken from Shimano website

Other equipment

A GPS-based data acquisition device was fitted to each motorised bicycle to recorded top speed and the time elapsed to reach the top speed. The data from the test runs were transferred from the data acquisition device to a laptop computer for analysis; refer to Figure 2. Laser activated speed measuring devices were set up to record when the motorised bicycles crossed predetermined points marked on the ground. Distances were measured using a metre-wheel and measuring tape. All equipment had been calibrated in accordance with established crash testing specifications.

Figure 2. Information from data acquisition device being downloaded

Procedure

Detailed observations of the motorised bicycles tested and components

Pedalec

The pedalec was assessed and found to comply with EN 15194 – the rider had to pedal to activate the motor (except for low-speed assist); and as the pedalec's speed increased the power provided by the motor decreased progressively until it stopped altogether close to 25km/h, or sooner if the rider stopped pedalling. The pedalec could continue at higher speeds but all the motive power had to come from the rider. The motor and a battery pack were designed to be an integral part of the pedalec and were properly contained with no moving or sharp components in proximity to the rider (see Figure 1). It was fitted with hydraulic disc brakes that were capable of bringing it from maximum speed to a complete stop smoothly and while retaining control of the pedalec.

Petrol-powered bicycles

The petrol-powered bicycles had engines fitted to standard bicycles from the lower end of the price range. There was no indication that the components – brakes, wheels, gears, etc. – had been upgraded to handle the high speeds these motorised bicycles are capable of achieving with the engines fitted. Both the 48cc petrol-powered bicycles had cantilevered rim brakes, while the bicycle fitted with the 66cc engine had a combination of a front disc brake and a rear cantilever rim brake. All the petrol-powered bicycles had a clutch lever on the left hand side of the handlebars either above or below the brake lever, and the right hand side handle-grip was modified into a throttle control. These were in addition to the standard gear levers and the brake levers on each side of the handlebars. The engines were all of a 2-stroke internal combustion type with an intake covered in green housing with one intake orifice, and they were fitted to the frames between the seat tube and the down tube. The handle bar setup and motor setup can be seen in Figure 3. The exhaust was fitted with a muffler internal unit. A motor drive chain connected the engine to the sprockets on the rear wheel on the opposite side of the rider's drive chain connecting the front chainring to the rear sprockets; this can be seen in Figures 1 and 3.

Figure 3. Setup for 48cc petrol-powered bicycle showing (L-R) silver clutch lever above the standard brake lever on the left handlebar; the right grip modified as a throttle; and the motor – note the exposed engine and components, including fuel lines and drive chain

Riding the petrol-powered bicycles was more complicated than a standard bicycle or the pedalec. To engage the engine, a fuel flow regulator first needed to be switched on, and then the engine was turned on via a button fitted to the right handlebar. The rider needed to pedal prior to engaging the clutch to avoid stalling the engine and then engage the clutch by pulling the clutch lever while simultaneously depressing a clutch button (refer to Figure 3). Once the engine was activated, the power output was controlled by twisting the modified right hand grip; the further the grip was twisted, the more power the engine provided and the faster the petrol-powered bicycle went. The engines functioned independently from the pedalling operation so, once the engine was engaged, the rider did not have

to pedal to propel the petrol-powered bicycle, nor was it necessary to change the gears. Indeed, the gearing on these petrol-powered bicycles meant that, except when starting the engine, it was unnecessary for the rider to pedal at all. The engine became the primary source of power at low speeds and became the only source as the speed increased.

Controlled braking proved difficult as the clutch needed to be disengaged just prior to pulling the brake levers to avoid stalling the engine. This required pulling in the clutch lever while pushing the clutch button, which caused a delay in pulling the left brake lever that operates the rear brake with a corresponding increase in the stopping distance. The alternative was to pull both brake levers simultaneously and not release the clutch. This resulted in an uncontrolled braking operation, and also caused the engine to stall. Similarly, in emergency braking where there is not sufficient time to disengage the clutch, the engine stalled and the rear wheel locked up.

To add to the problem, a rider had to remember which lever was the clutch and which was the brake and accidentally pulling the brake lever before releasing the clutch also resulted in an uncontrolled braking and the engine stalling. It is anticipated that further problems would be experienced by children and other riders with small hands as they would have considerable difficulty operating the clutch with one hand. Instead the other hand would need to be released from the handlebar to push the button. In such a scenario, it would not be possible to simultaneously pull both brake levers, and the rider could lose control of the petrol-powered bicycle.

The position of the combustion chamber units, in the frame between the seat tube and the down tube, meant that they are immediately beside the rider's lower legs. The test rider reported it was difficult to avoid contacting the hot units around the knee region. Additionally, the fuel hose fitted by the supplier to the engine for the 48cc unrestricted petrol-powered bicycle was in contact with the top of the engine housing, next to the spark plug (see Figure 3). This could cause heat damage to the hose, especially after long-term exposure. The 48cc petrol-powered bicycles also had various cable loops in front of the handlebars, which can be seen in Figure 1; these could have been better secured to the frames, as they presented a potential snagging hazard.

Overall, because the petrol engine and components are retrofitted to standard bicycles, rather than petrol-powered bicycles being manufactured as a discrete unit, many of the parts are not properly housed. This means they either pose a risk to the rider during normal activities or they can be damaged to such an extent that they present a risk to the rider, including the fuel hose being punctured due to localised contact with heat and the fully exposed engine drive chain rotating at a considerable speed.

The risks associated with retrofitting petrol engines onto standard bicycles are not confined to vehicles sold as petrol-powered bicycles, as most suppliers also supply the engine assemblies for members of the public to fit to a bicycle. This can compound the risks as most people retrofitting an engine to a standard bicycle are unlikely to have done the operation regularly and may not have developed the necessary skills to fit one properly.

Power limiting device

The kit for limiting the power output from the petrol engines was found to consist of gaskets with smaller orifices to restrict intake and exhaust fluid flows, an air intake cover with more flow restrictions, and an exhaust pipe muffler with more restricted flow (see Figure 4).

Continuous power and peak power

Electric motors are designed to produce a continuous power output, which is the amount of power they generate while they operate over a prolonged period. They are also capable of producing considerably more power for a very short period, known as "peak power". Peak power cannot be

maintained for more than a few seconds; it does not affect the continuous power rating, and is allowed under EN 15194. This is a useful feature as it allows a rider to have extra power at certain times, such as when pulling away from traffic lights or starting to climb a hill.

Figure 4. 200 watts restricting kit

Review of suppliers' websites

In addition to the tests, a number of websites of suppliers of petrol-powered bicycles were reviewed to find out the range available to the public and the advice purchasers were given about their legal status.

Tests

General

All the motorised bicycles were subjected to a series of dynamic tests on a flat, sealed pavement within the grounds of the Roads and Maritime Services' Crashlab road safety research facility at Huntingwood. The motorised bicycles were also tested on a chassis dynamometer at a motorcycle maintenance company to determine their maximum and continuous power outputs, top speeds and continuous speeds. Further tests were done to establish the effectiveness of the restricting device. A competent person with a NSW motorcycle licence rode the different motorised bicycles for the dynamic tests, and rode the pedalec for the dynamometer test. The petrol-powered bicycles were warmed up for several minutes before each test.

Top speed test

To determine their top speeds, each motorised bicycle was taken to their maximum speed and ridden across a sensor line as shown in Figure 5. The speed was calculated by measuring the distances between set points on the front and rear tyres, and the time taken for the two tyres to pass the sensor line. The test was done twice for each motorised bicycle, and the top speed taken as the average of the two readings. The rider built up to the top speed without pedalling. For the pedalec, the rider pedalled as fast as possible without losing power assistance from the electric motor.

Acceleration test

Each motorised bicycle was ridden along the test path to achieve maximum speed in the shortest possible time. The test was carried out twice for each motorised bicycle and the acceleration rate calculated from the average results using the data obtained from the data acquisition device.

Brake test

The brake test established the braking distances for the motorised bicycles. To assess the brakes' compatibility against the motorised bicycles' performance capabilities, for each test, the motorised bicycle was taken to its top speed, and the brakes applied when the centre of the front tyre passed a specified yellow line marked on the path, as shown in Figure 5. The braking distance was the distance

between the braking line and the centre of the front tyre when the motorised bicycle came to a complete stop. For all the motorised bicycles, their maximum braking capacity was measured by applying the brakes with as much force as the rider was capable of generating. As this caused the petrol engines to stall, additional tests were done on the petrol-powered bicycles to control the braking without stalling the engines. This required the rider to depress the clutch before pulling the brake levers.

Dynamometer test

A series of tests were done for each motorised bicycle using a dynamometer, usually used for testing motorcycles, to record each motorised bicycle's maximum power output, average power output, top speed and average speed. After being warmed up, each petrol-powered bicycle was mounted on the dynamometer so the drive wheel was in contact with the dynamometer roller drum, and run for up to five minutes; this setup is shown in Figure 5. The throttle was then opened to obtain maximum power for some minutes prior to recording the outputs. As the pedalec had no throttle, the rider was required to mount and pedal it while it was on the dynamometer. The rider pedalled as fast as possible without losing power assistance from the electric motor.

In addition, the power limiting kit was fitted to the 48cc unrestricted petrol-powered bicycle, and the bicycle submitted to the speed test to compare its performance with the dealer-supplied 48cc restricted petrol-powered bicycle. The kit was then removed to restore the unrestricted engine. The muffler piece was also removed from the exhaust, using a basic screwdriver, and additional orifices drilled into the engine's air intake cover, which promoted air flow into and out of the combustion chamber. Both these minor modifications increased the engine's power output. The modified petrol-powered bicycle was re-tested in this configuration.

Figure 5. Tests showing (L-R) speed sensor setup; brake testing; and dynamometer setup for 48cc unrestricted petrol-powered bicycle

Power limiting device

The kit for limiting the power of the output of the 48cc petrol engine was assessed to determine how easy it is to fit to, and remove from, the engine.

Results

Tests

The results of the dynamic tests are given in Table 2 and the dynamometer tests are given in Table 3 (see below for key to the tables).

Power limiting device

The limiting device was easily fitted to the 48cc unrestricted bicycle engine in a matter of minutes using nothing but a simple Philips screwdriver. It was just as easy to remove the limiting device, returning the engine to its original, unrestricted condition. This process took less than five minutes.

Table 2. Results of the dynamic tests

Test	Petrol-powered bicycle			
	Pedalec	**48cc Restricted**	**48cc Unrestricted**	**66cc**
Top speed (km/h)	21.3	23.4	33.7	34.4
Controlled brake stop (m)	4.95	8.6	12.9	13.2
Emergency brake stop (m)	N/A	4.6	6.6	8.6
Acceleration (ms^{-2})	0.42	0.28	0.45	0.51

Table 3. Results of the dynamometer tests

Test	Pedalec	Petrol-powered bicycle			
		48cc Restricted	**48cc Unrestricted**	**66c**	**48cc Mod**[2]
Max power (W)	596.56 [1]	521.99	1267.69	521.99	n/a
Continuous power (W)	74.57	149.14	447.42	298.28	970
Top speed (km/h)	19	24	34	38	46
Continuous speed (km/h)	18	22	32.6	37	43.2

[1]High peak power due to the rider's pedalling effort, possibly at the start of test.
[2]Modified 48cc engine.

Assessment of results

The rider had to pedal the pedalec for the motor to engage. The continuous power from the pedalec was below 200 watts, even with the rider pedalling. Although its peak power exceeded 250 watts, this legal maximum only applies to continuous power. The pedalec's motor cut out just below 25km/h, and higher speeds could only be attained solely by the rider's pedalling effort.

The pedalec's acceleration rate was faster than the petrol-powered bicycle fitted with the restricted engine, and comparable to the one fitted with the smaller, unrestricted engine. This was largely due to the efficiency of the motor and that the motor engaged instantly as soon as the rider pedalled, and this initial engagement activated the peak power for a short period of time.

All the petrol-powered bicycles were capable of travelling faster than the assisted speed provided by the pedalec. The speeds achieved by petrol-powered bicycles by their engine alone exceeded the capabilities of most riders, and it is likely that only moderate cyclists could maintain even the slower maximum speed of 24km/h on standard bicycles over extended periods, while the higher maximum speed of 46km/h would be outside the capacity of even elite cyclists for more than a short period.

The continuous power produced by unrestricted petrol-powered bicycles greatly exceeded the 200 watt limit set by the regulations. Although the power output from the restricted petrol-powered bicycle was less than the 200 watt limit, the restricting device that limited the power was easily removed, and once it was removed, the power exceeded 200 watts. The minor modification to the petrol-powered bicycles fitted with a 48cc engine – removal of the muffler and drilling additional orifices into the air intake cover – further increased its continuous power output and maximum speed to levels approaching that of a small motorcycle.

The comparative quality of the brakes fitted to the pedalec and the petrol-powered bicycles is shown by the fact that the heavier pedalec was brought from top speed to a complete stop in less distance than the lighter petrol-powered bicycles doing the controlled stops, and the emergency stops. As would be expected, the braking distances for the petrol-powered bicycles reflected their comparative

power, and the more powerful ones, travelling at faster speeds, took longest to stop. The stopping distances were decreased considerably in the emergency stops, but this operation caused the engines to cut out. A factor in the poorer braking performance of the petrol-powered bicycles was that their brakes were those that were fitted to the standard bicycle and not upgraded to deal with the higher speeds generated by the engine. It is probable that the braking performance would deteriorate further with extended use at the higher speeds.

Correctly operating the brakes on the petrol-powered bicycles was not intuitive, and required more than one action of releasing the clutch prior to pulling the left hand brake lever which delays the braking operation. This added to the distance it took to safely stop the petrol-powered bicycles. If a more prompt emergency braking was required and the left brake was pulled before engaging the clutch, the engine cut out.

Review of websites

The websites of six Australian companies that supplied petrol-powered bicycles and/or engines that could be fitted to bicycles were reviewed. This review found that all sites openly advertised petrol-powered bicycles that did not comply with the definition in the Commonwealth Act, yet only some sites had a warning that the petrol-powered bicycles may not be legal for road use, and to check their status with the road authorities. Some suppliers sold models with limiting devices fitted with a corresponding statement that they can be used on the road.

Conclusions

Summary

The research found:

- Petrol-powered bicycles do not comply with the definition of power-assisted pedal cycle specified in NSW legislation because:
  - The primary source of power is not from the rider but the motor. The continuous speeds of between 22 and 43km/h generated by the engines mean it is difficult for a rider to contribute to the overall motive force, meaning there is no incentive for the rider to pedal. Indeed, some of the speeds exceed the capabilities of even elite cyclists for a prolonged period.
  - Where limiting devices are not fitted, the power exceeds the 200 watt limit.
- Devices fitted to petrol-powered bicycles to restrict their power output to the 200 watt limit can easily be removed resulting in a motorised bicycle that does not comply with the definition of power-assisted pedal cycle specified in NSW legislation.
- The risks associated with petrol-powered bicycles can be increased as minor tweaks to their engines and exhausts can produce even greater power.
- In addition, some of the characteristics of petrol-powered bicycles pose a risk to the riders:
  - The maximum continuous travel speed is comparable to the speeds produced by mopeds and small motorcycles which require a licence to operate.
  - Given that these petrol-powered bicycles are in effect mopeds or small motorcycles, the components fitted to them do not meet the mandatory standards applicable to mopeds and small motorcycles that are required for safe control of these vehicles at the speeds they can reach. These risks are compounded as the components are typically cheaper, standard components, fitted to bicycles at the lower end of the price range.
    Note: There are mandatory safety standards under the Commonwealth Act for mopeds and motorcycles that include requirements for items such as brakes, location and protection of wiring, chain guards and lights.
  - Braking is unsafe – the braking operation is confusing to novice riders and liable to cause the engine to stall or delay the braking operation.

  - Even for experienced riders, the braking operating will either cause the motor to stall in an emergency braking operation, or will increase the stopping distance if used correctly without stalling the engine. These risks are compounded for people with smaller hands, such as children.
  - The location of the engine on petrol-powered bicycles means the rider can burn themselves on exposed parts or snag their legs or clothing on components.
  - The components of petrol-powered bicycles are exposed and some contact other parts, meaning they can snag on items or be easily damaged and pose a fire risk, which is shown by petrol-powered motorised bicycles that have combusted in a crash.
- Petrol-powered bicycles were marketed with insufficient information to advise their prospective users of their status under NSW legislation. This can lead to people unwittingly using prohibited vehicles on roads and road related areas in contravention of road transport regulations.

Outcome

As noted above, NSW road transport legislation deemed motorised bicycles to be a standard bicycle if they met the Commonwealth definition of a power-assisted pedal cycle. Based on the findings outlined in this paper, a number of NSW regulations were amended in October 2014 to exclude bicycles fitted with an internal combustion engine, which includes petrol-powered bicycles, from the allowances that apply to power-assisted pedal cycles. The effects of the changes were as follows:

- petrol-powered bicycles are now excluded from the definition of a *bicycle* in the Road Rules 2008;
- petrol-powered bicycles are no longer exempted from the registration requirements in the Road Transport (Vehicle Registration) Regulation 2007; and
- riders of petrol-powered bicycles are no longer exempted from the requirement to hold a motorcycle licence under the Road Transport (Driver Licensing) Regulation 2008.

The amended regulations are included in Appendix A.

Note: Based on assessments and supported by the NSW research, the ACT has also prohibited petrol-powered bicycles.

Despite this, it is still possible to obtain petrol-powered bicycles and motors to fit to standard bicycles, either from some retailers or from internet suppliers, as their sale is not prohibited, and they can be used on private property. The Transport for NSW submission to the Australian Competition and Consumer Commission on its paper reviewing CPN 6 *Consumer Product Safety Standard: Pedal Bicycles: Safety Requirements*, released for public comment in October 2016, requested that petrol-powered bicycles and the engines be prohibited from sale in Australia.

Feedback from NSW Police

NSW Police has reported that the changes to the regulations mean the prohibition can be enforced without risk of appeal. This has resulted in a substantial decrease in the number of petrol-powered bicycles being used on NSW roads, as well as a number of retailers ceasing to sell them.

The NSW Police examined the petrol-powered bicycle that the boy was riding in the fatal crash in October 2013 and found that the standard bicycle chain had been removed, meaning it was conclusively being ridden as a form of motorcycle and not a power-assisted pedal cycle, and the brake adjacent to the clutch lever had been disconnected, presumably to avoid the problems identified in the research project.

Appendix A: References to *power assisted pedal cycle* in selected legislation

Commonwealth *Motor Vehicles Standards Act 1989*

The Australian Design Rules (ADRs) are administered by the Australian Government under the *Motor Vehicle Standards Act 1989.* The Act requires all road vehicles, whether they are newly manufactured in Australia or are imported as new or second hand vehicles, to comply with the relevant ADRs at the time of manufacture and supply to the Australian market. Among the ADRs is the document *Vehicle Standard (Australian Design Rule - Definitions and Vehicle Categories) 2005*, and it includes the following definitions:

> **Pedal Cycle**
>
> A vehicle designed to be propelled through a mechanism solely by human power.
>
> **Power-Assisted Pedal Cycle**
>
> A pedal cycle to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 200 watts; or
>
> A *'Pedalec'*.
>
> **Pedalec**
>
> A vehicle meeting European Committee for Standardization EN 15194:2009 or EN 15194:2009+A1:2011 Cycles - Electrically power assisted cycles - EPAC Bicycles.

Inserting the definition of a *pedal cycle* into the definition of *power assisted pedal cycle*:

> **Power-Assisted Pedal Cycle**
>
> A [vehicle designed to be propelled through a mechanism solely by human power] to which is attached one or more auxiliary propulsion motors having a combined maximum power output not exceeding 200 watts; or
>
> A *'Pedalec'*.

NSW Regulations

The regulations below were amended in accordance with the Road Transport Legislation Amendment (Power-assisted Pedal Cycles) Regulation 2014 under the *Road Transport Act 2013*, with a commencement date of 1 October 2014; reference LW 1 October 2014 (2014 No 653).

> **Road Transport (Vehicle Registration) Regulation 2007**
>
> **Schedule 1 Application of Chapter 4 of Act and Regulation**
>
> **15 Power-assisted pedal cycles**
>
> The registration provisions do not apply to any registrable vehicle that is a power-assisted pedal cycle within the meaning of vehicle standards, as amended from time to time, determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth other than one that has an internal combustion engine or engines.

Note. *Power-assisted pedal cycle* is defined in the *Vehicle Standard (Australian Design Rule – Definitions and Vehicle Categories) 2005* determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth. The definition of *power-assisted pedal cycle* includes pedalecs within the meaning of that Standard (which may have one or more auxiliary propulsion motors generating a combined power output not exceeding 250 watts).

Road Transport (Driver Licensing) Regulation 2008

Part 11 Exemptions from requirement to hold driver licence

102 Other exemptions from licensing [in part]

(1) A person is exempted from the requirements of section 53 (1) of the Act in respect of the driving of any of the following vehicles:

(c) any power-assisted pedal cycle within the meaning of vehicle standards, as amended from time to time, determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth other than one that has an internal combustion engine or engines,

Note. ***Power-assisted pedal cycle*** is defined in the *Vehicle Standard (Australian Design Rule – Definitions and Vehicle Categories) 2005* determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth. The definition of ***power-assisted pedal cycle*** includes pedalecs within the meaning of that Standard (which may have one or more auxiliary propulsion motors generating a combined power output not exceeding 250 watts).

(2) Section 54 (1) (a), (4) (a) and (5) (b) (i) of the Act does not apply to the driving of any of the following vehicles:

(c) any power-assisted pedal cycle within the meaning of vehicle standards, as amended from time to time, determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth other than one that has an internal combustion engine or engines,

Road Rules 2014

Dictionary

Bicycle [in part] means a vehicle with 2 or more wheels that is built to be propelled by human power through a belt, chain or gears (whether or not it has an auxiliary motor), and includes:

(b) a power-assisted pedal cycle within the meaning of vehicle standards, as amended from time to time, determined under section 7 of the *Motor Vehicle Standards Act 1989* of the Commonwealth other than one that has an internal combustion engine or engines,

but does not include:

(d) any vehicle with an auxiliary motor capable of generating a power output over 200 watts (whether or not the motor is operating), other than a vehicle referred to in paragraph (b), or

(e) any vehicle that has an internal combustion engine or engines.