Legal status of SEGWAY PERSONAL TRANSPORTER in New Zealand

Segway New Zealand Limited is of the view is that the Segway Personal Transporter (PT) falls within the definition of a mobility device. Any person is entitled to operate a mobility device (whether mobility impaired or otherwise) in New Zealand.

The Land Transport Act 2005 defines a mobility device as a vehicle that:

(i) is designed and constructed (not merely adapted) for use by persons who require mobility assistance due to a physical or neurological impairment; and

(ii) is powered solely by a motor that has a maximum power output not exceeding 1500 W

We present evidence in the following areas to support our view:

1. the Segway PT is designed and constructed for the purpose of providing mobility assistance (as well as for other personal mobility roles).
2. the Segway PT is officially approved in other countries as a mobility device suitable for persons who require mobility assistance.
3. the Segway PT is widely used both in New Zealand and worldwide by persons who require mobility assistance.
4. the Segway PT has a power output of up to 750 W.
5. the Segway PT is a “good fit” with the intention of this part of the Act.

SECTION ONE - DESIGN AND CONSTRUCTION

1. Patents pertaining to the Segway PT

Patents have been granted in New Zealand for the self-balancing two-wheeled “Segway PT” device. For example, US Patent 6,302,230 - “Personal Mobility Vehicles and Methods” is illustrated with diagrams of persons standing on devices resembling Segway PTs, and makes the following claims:

“We have found that a vehicle in accordance with the invention may act suitably...for persons with a disease (such as Parkinson’s Disease or ear disorders) or defect, in their ability to maintain balance or to achieve locomotion.”

and elsewhere in the same filing:

“We have observed a dramatic restoration of balance and locomotion control to a person suffering from Parkinson’s Disease who utilized a vehicle in accordance with this invention. Surprisingly, the effect is to substantially reduce tremors.”

US Patent 7,370,713 is illustrated with a diagram and claims:

“The invention provides, in a preferred embodiment, a device for carrying a standing person...”
and later in the same filing:

“[T]he present invention, may advantageously be used for ameliorating the symptoms of balance-impairing diseases”

These patents show that from first conception onwards the Segway PT was designed and constructed to provide mobility assistance for impaired persons.

2. Segway, Inc. states that the Segway PT is suitable for disabled persons

Segway, Inc. specifically set out to design and construct the PT in accordance with the principles of Universal Design, which is the recognised design ethic to consciously build equipment to be suitable for use by impaired persons in the first instance, and by fully-able persons as a consequence. Segway, Inc. addressed this issue in a press release (3 June 2009), clearly asserting that the PT was designed for use by disabled persons:

“Shegway has incorporated the concepts of Universal Design into its commercially-available products [eg: the Segway PT]...Our products are designed for a person (any person, whether disabled or not) who...is capable of exercising good riding judgment, and who is capable of riding in accordance with our instructions.”

These instructions state that a person be able to step up 180 mm onto the Segway PT (a similar capability to being able to ascend a stair step), and off within 10 seconds in the event of a Safety Shutdown. For many mobility impaired persons this is easier than transferring from standing to sitting down into a mobility scooter, and up again.

Segway, Inc. has never applied for FDA to approval of the Segway PT as a medical device because this is not required for how the Segway PT is sold in the US market. In New Zealand mobility scooters are not regulated as medical devices, so FDA approval is not relevant, and there are many brands of mobility scooter sold here that are not FDA approved.

3. Segway, Inc.’s “Keeping Up Has Never Been So Easy” brochure promotes to mobility market

Segway, Inc.’s own advertising materials present and promote the Segway PT as an assistive device to persons who might otherwise consider using a mobility scooter. For example, the brochure “Keeping Up Has Never Been So Easy” features photos of older persons, and someone unable to keep up with their child or grandchild. It uses language consistent with a presentation about the needs and concerns of mobility users. It is significant that this brochure also reads properly throughout if the term “Segway PT” is substituted with the term “mobility scooter” but at all if other vehicles are substituted (eg: electric bicycle, low-powered electric stand-on scooter, moped, golf cart, motor car, etc). There can be no doubt this brochure is aimed at individuals with mobility issues, and that the Segway PT is a appropriate solution.

4. Owner of Segway, Inc. gifts 1,000 Segway PTs to mobility charity

In 2010 Jimmy Heseldon, the owner of Segway, Inc. donated 1,000 Segway PTs to the US charity Segs4Vets, for distribution to injured soldiers returning home from overseas duty. Recipients are primarily those who lost limbs or sustained permanent leg or spinal injuries. This donation a large number of Segway PTs is a clear and unambiguous statement by Segway, Inc. that the Segway PT was designed, constructed for and capable of providing mobility assistance, and is intended to be used for this purpose.

SECTION TWO - OFFICIAL RECOGNITION

1. Recognised by governments

The Segway PT is officially recognised as a mobility device by governments in many other countries.

In September 2010 the US Federal government specifically classified the Segway Personal Transporter (PT) as a mobility device under the Americans with Disabilities Act (ADA). According to the official announcement, this new rule accommodates:

“...the growing use of the Segway® PT as a mobility device by returning veterans and others who are using the Segway® PT as their mobility aid of choice.”

The US Federal government exempted the Segway PT from regulation as a motor vehicle in 2002, and most individual states have gone on to define the Segway PT in legislation as a type or category of mobility device -
typically as an “Electric Personal Assistive Mobility Device” or EPAMD (ie: an electrically powered device to assist a person with their mobility). Users - whether disabled or not - are permitted to ride on footpaths and in public places and parks like a pedestrian, and in cycle lanes and along urban roads with cars like a bicycle. Segway PTs can be operated in these spaces in 47 US States, and on private property in all states. The ADA overlays and where necessary over-rides state laws to ensure equal access nationwide for mobility users of Segway PTs (and wheelchairs, power chairs, mobility scooters, etc).

Provinces in Canada and many European states officially recognise the use of Segway PTs by impaired persons. For example, some such as Canada and Netherlands enabled pilot programs permitting use by disabled persons long before legislation for all persons were established. The European Commission has exempted the Segway PT from its motor vehicle legislation, releasing it from regulations as a road vehicle. In 2003 the Chairman of the Transport Committee of the European Parliament invited all Member States to authorise explicitly the use of the Segway PT as soon as possible. By 2008 most European states permitted the use of Segway PTs on both footpaths and roads (in some places one or the other). In some states this was through new enabling legislation, in others through exemptions to current legislation. In a few states current legislation does not restrict their use.

2. Recognised by medical profession and government agencies in New Zealand

In New Zealand, Occupational Therapists and other medical practitioners proactively recommend the Segway PT as a mobility device, on the basis of its health benefits over mobility scooters (for example, standing versus sitting). ACC, Ministry of Health and Ministry of Education were amongst the first government organisations in the world to recognise the Segway PT as an excellent mobility device for impaired persons, and since 2004 have funded and/or supported the purchased of dozens of Segway PTs for disabled New Zealanders. It is a very cost-efficient and complete mobility solution compared with other options (which often require expensive modifications to home and car to be usable by the recipient) that has delivered significant savings to our health services.

3. Recognised in scientific and medical literature

Many published studies confirm the Segway PT is an equal or better mobility solution for persons with a wide range of disabilities and conditions. Examples include:

- A very thorough study into the use and safety of the Segway PT in urban spaces conducted by the German Federal Board for Road Traffic (Segway in Public Spaces, 2005) concluded the PT is suitable “....not only for healthy people but also for mobility handicapped.”

- American Journal of Physical Medicine and Rehabilitation (November 2007) featured “The Segway Personal Transporter as a Mobility Device for People With Disabilities: A Pilot Study” and concluded “[This] study has shown that the Segway is a useful device for populations with a range of functional disabilities. Our results indicate that using a Segway may increase personal mobility for some people with functional limitations. This would enable them to become more involved in meaningful activities, and therefore it has the potential to increase one's self-esteem and quality of life. The Segway...[is]...a viable mobility option for people with disabilities.”

- Scientific American (February 2007) reports how the Segway PT is providing enormous benefit to those for whom impairment is a gradual process, noting Segway PTs: “....have also lengthened the careers of older workers, who were finding the constant walking increasingly difficult.”

- “Universally Designed Technology Solutions: People who have trouble walking and the Segway PT” by Jerry Kerr (2007), sets out in detail the many advantages of the PT over traditional mobility solutions for disabled persons, and for the communities and spaces in which they move around on mobility devices.

A common theme identified in multiple studies by researchers is that the Segway PT is a superior mobility solution that overcomes for many users the significant disadvantages and impediments intrinsic to using what are described as “technologically outdated 20th century mobility scooters.”

Numerous governments around the world have conducted careful studies into the suitability of the Segway PT for use on footpaths, roads, and other public spaces (many of these can be viewed online at the website of Segway, Inc. Every study found the Segway PT to be safe and appropriate for use on footpaths and other shared public spaces. Segway New Zealand has been unable to find any scientific evidence to suggest that the Segway PT is anything other than entirely safe and appropriate for use on footpaths throughout New Zealand.

SECTION THREE - WIDELY USED

Use of Segway PTs by disabled persons is not an incidental or spin-off application of the device, but is one of its most significant applications.
As of early 2011, well over 100 disabled New Zealanders own and use Segway PTs. Segway New Zealand has completed a Group Case Study that details how 80 mobility impaired Kiwis use their Segway PTs, and numerous detailed Individual Case Studies on individual owners. The range of physical and neurological impairments for which New Zealanders have found the Segway PT to be suitable is very wide:

- permanent spinal injuries (including incomplete paraplegia)
- permanent leg injuries (including above-knee and double below-knee amputee)
- temporary reduction in/loss of mobility due to injury or disease
- leg and foot deformities
- CP (Cerebral Palsy)
- Muscular Dystrophy
- many other peripheral ataxia conditions
- Lung Disease and Emphysema
- Arthritis
- Fatigue/IM/weakness
- impairment from Deep Vein Thrombosis
- MS (Multiple Sclerosis)
- Parkinson’s Disease
- Stroke
- Heart Disease
- Scoliosis
- other general age-related loss of mobility

Worldwide, it has been estimated that by 2010 more than 20,000 disabled persons owned and used Segway PTs for mobility assistance. In the USA alone, DRAFT (Disability Rights Advocates For Technology) reported in 2008 that disabled users of Segway PTs exceeded 9,000 individuals.

In New Zealand, more than half (>50%) of all private buyers of Segway PTs in 2010 were mobility impaired. This type of use has been growing year-on-year since 2004 (when it was about 25% of sales), and Segway New Zealand projects Segway PTs to account for more than 10% of annual mobility scooter sales by 2014.

SECTION FOUR - POWER OUTPUT

The Act requires that a mobility device:

> “is powered solely by a motor that has a maximum power output not exceeding 1500 W.”

The Segway PT operates within a power envelope up to 750 W. Legislation in many US states require EPAMDs (eg: Segway PTs) to have a maximum continuous power output of 750 W (or 1 horsepower), and some also set limits on speed. Accordingly, all Segway PTs manufactured to date operate within this 750 W limit, and have a top speed electronically limited to approximately 20 kph. That is to say, the Segway PT’s software permits up to 750 W to be delivered to the wheels for the purpose of moving the device along from point A to point B.

Mobility devices in New Zealand are permitted to have more than one motor because Section 33 of the Interpretation Act 1999 permits the singular to include the plural. Most of the ~5,000 power chairs (“electric wheel chairs”) in New Zealand have two electric motors, as do many of the ~20,000 mobility scooters.

The phrase “powered solely by a motor” is intended to exclude devices that have more than one type of motive power, such as power-assisted pedal bicycles/tricycles.

The Segway PT has two brushless DC motors, one for driving each wheel. The direction and rotation of these motors are controlled by software, which sets limits on acceleration and top speed. The actual continuous power output at any point in time depends on speed, slope of the surface being climbed, and the weight of payload (rider plus any cargo), and there are also instantaneous fluctuations. This continuous (or average, or nominal) output can vary from a few tens of Watts at rest on a flat surface, to a hundred or so Watts when moving at pedestrian speeds, through to 750 W when going “full steam” (such as when carrying a heavy rider up a hill). This is illustrated by examples provided by Segway, Inc.’s engineers:

1. At 12.5km/h on level ground carrying a 82kg rider, power output is ~111 W. When climbing a 5 degree hill the power output rises to ~508W.
2. At 20km/h (maximum speed) on level ground carrying a 82kg rider the power output is ~227W.
3. When carrying a rider up a steep hill, the power output will rise to 750 W while reducing the speed of the ascent, as dependent on weight of rider and degree of climb. If the grade is steep enough, the Segway PT will slow to rest once 750 W is insufficient to proceed further, and alert the rider to step off.
4. Segway New Zealand conducted its own independent tests in 2006, and measured ~740W as the maximum continuous power output of the Segway PT in the field. This was calculated by measuring the time taken to ride up a slope whilst operating the Segway PT at maximum power, where the height of climb against gravity and weight of the PT plus rider was known.

The motors used in the PT are supplied by Pacific Scientific, for which the following data has been published:

| Model: YZ05107, with continuous ratings of: | max speed: 8250rpm | Voltage: 72V | current: 8A |
EUROPE (as of 2008)

Certain states have not yet enacted legislation affirmatively permitting Segway use on public ways. This does not necessarily mean that Segway PT use in public areas is prohibited, so check your local regulations prior to use. In general, the following states do not allow use of powered conveyances on sidewalks and bike paths, but may allow them on roads and in public spaces:

- Connecticut
- Massachusetts
- North Dakota
- Wyoming

EUROPE (as of 2008)

- Austria: approved 2004 for bicycle lanes, and pedestrian areas where bicycles are allowed.
- Belgium: new 2007 enabling legislation permits use in pedestrian areas, on footpaths, and cycle lanes.
- Czech Republic: approved 2004 for pedestrian areas and footpaths.
- France: approved 2003 for footpaths.
- Germany: 8 of 16 states had enabled use through their own regulatory powers prior to 2008. In 2008 new Federal enabling legislation passed to permit use in all 16 states in pedestrian areas, on footpaths, and cycle lanes.
- Hungary: approved 2002 by Ministry for use in pedestrian areas, footpaths and cycle lanes.
- Greece: exempted from type approval legislation as a motor vehicle (ie: not considered to be a motor vehicle so can be used anywhere).
- Netherlands: new 2008 enabling legislation permits use in pedestrian areas, on footpaths, and cycle lanes.
- UK: currently meets moped definition but not type approval, footpath use currently prevented under an ancient 1891 law. British government has stated intention to develop new enabling legislation as quickly as possible, and in the interim the Minister of Transport has directed Police not to prosecute persons operating PTs in a safe manner on footpaths and roads. First prosecution of rider on a footpath in 2011, while riders on roads are not currently being prosecuted. Under EU obligations the UK must harmonise vehicle regulations with those common in other EU member states - a process that begins mid-2011 - and when complete this process will enable Segway PT use on roads and footpaths.
- Portugal: exempted from type approval legislation (ie: not considered to be a motor vehicle so can be used anywhere).
- Spain: approved 2006 for pedestrian spaces and footpaths, while new enabling legislation is developed to integrate use into transport law to permit use in these spaces and on cycle lanes and roads.
- Switzerland: type-approved for use in public spaces and on roads (headlight and tail light accessories must be fitted, and a number plate displayed).