

Dangers of personal mobility devices

Since PMDs were allowed on footpaths, cycling paths and park connector networks, there have been more accidents. In many instances, pedestrians were injured.

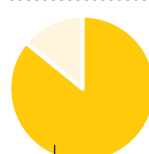
CURRENT RULES AT A GLANCE

Type of device	Footpaths (speed limit of 10kmh)	Shared paths (cycling paths and park connectors) (speed limit of 25kmh)	Roads (keep within speed limit)
Personal mobility aid (PMA) (e.g. motorised wheelchair, mobility scooter)			✗
Conventional bicycle	✓	✓	✓
Personal mobility device (PMD) (e.g. kick-scooter, electric scooter, hoverboard, unicycle)			✗
LTA-approved power-assisted bicycle (PAB)	✗		✓

BY THE NUMBERS

228

Reported accidents involving PMDs on public paths in 2017 and 2018



Of these, there were **196 with reported injuries**

1 death

A PMD rider skidded and subsequently died from his injuries

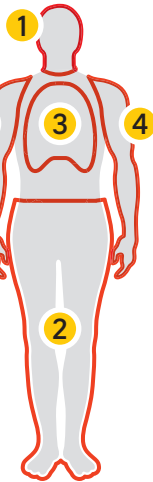
COMMON INJURIES SEEN IN...

Pedestrians

Most frequent

Least frequent

- 1 Head and neck trauma**
 - Skull fracture
 - Intracranial bleeding
 - Bruising
- 2 Fractures, sprains and strains to lower limbs**
- 3 Rib fractures and lung bruising**
- 4 Trauma to arms and shoulders**



PMD riders

- Bruises and abrasions on hands and knees
- Nasal fractures
- Broken teeth
- Facial fractures
- Hand and wrist fractures
- Torn shoulder ligaments
- Broken ribs
- Traumatic brain injury

WHAT'S THE IMPACT LIKE?

If you are hit by a 65kg rider on a PMD weighing 10kg:

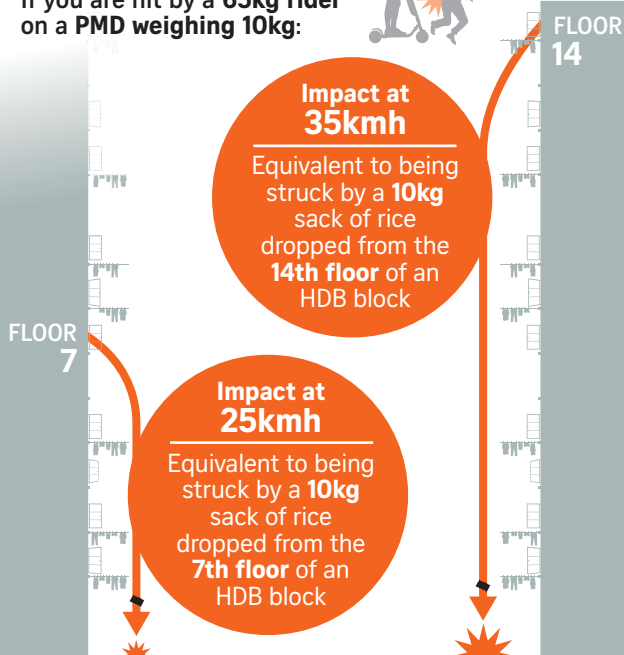


Impact at 35kmh

Equivalent to being struck by a 10kg sack of rice dropped from the 14th floor of an HDB block

Impact at 25kmh

Equivalent to being struck by a 10kg sack of rice dropped from the 7th floor of an HDB block



WHAT HAPPENS IN A COLLISION WITH A PMD?

If a pedestrian is hit by a PMD that is moving at **15kmh or slower...**



- If the person is wearing track shoes that offer good friction with the ground and the pavement is dry, the shoes are likely to absorb the impact
- The person is not likely to slide away from the PMD or fall onto the ground.

RESULTS OF SPEED TESTS*

Footpaths

Numbers who flouted speed limit of 10kmh

- Cross Street and River Valley

23 out of 23

Shared paths

Numbers who flouted speed limit of 25kmh

- Bay East Garden
- Pasir Ris Drive 3

8 out of 11 | **9 out of 24**

NOTE: *The Sunday Times team captured the speed at which e-scooters and e-bikes were travelling at four locations over three days.

If a pedestrian is hit by a PMD that is moving at more than 15kmh...

- It is unlikely a person of average size can stand still upon being hit
- The person will most likely not have enough time to react to the collision
- The person may bounce off the PMD and fall onto the ground

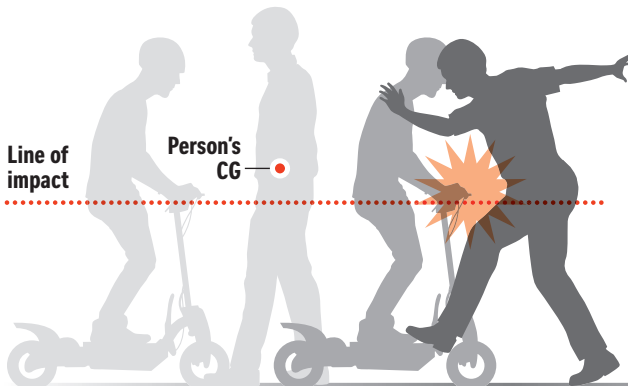
Three scenarios depicted below

SCENARIO A

Who
Tall person

Person's centre of gravity (CG)
Roughly around the belly button region

Where PMD is likely to hit
Below the person's CG



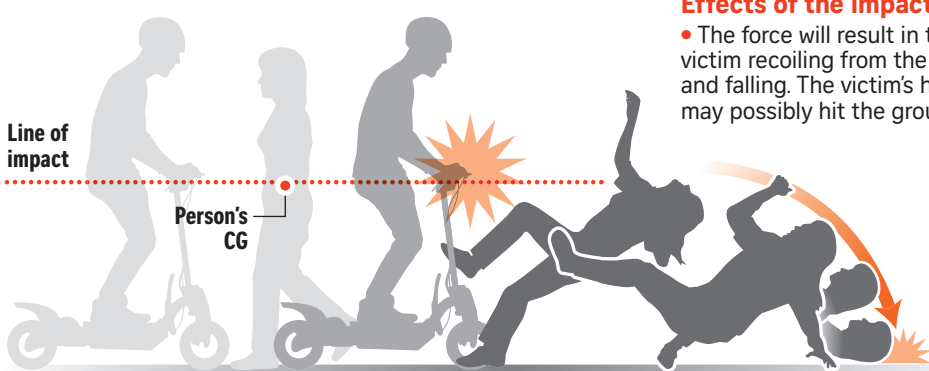
Effects of the impact

- The person will topple and rotate towards the PMD rider
- The duration of contact between the victim and PMD will be long, thus reducing the impact force that the victim experiences.
- Both persons will sustain injury, but perhaps they won't hit their heads on the ground.

SCENARIO B

Who
Person of medium height

Where PMD is likely to hit
Close to the person's CG



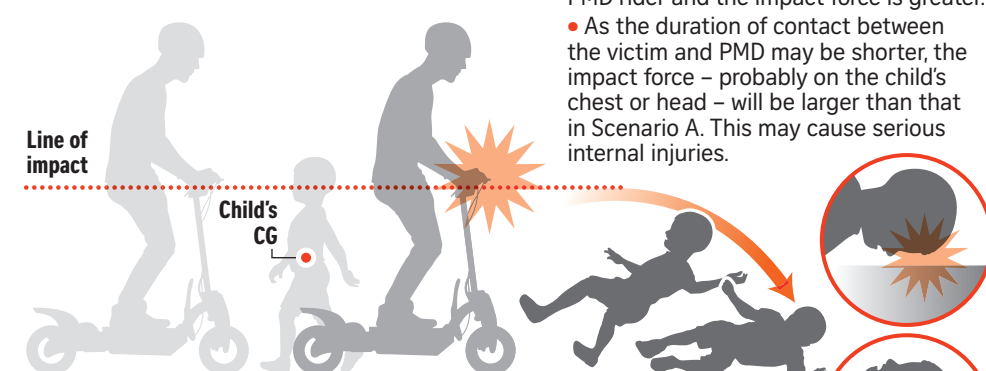
Effects of the impact

- The force will result in the victim recoiling from the PMD and falling. The victim's head may possibly hit the ground.

SCENARIO C

Who
Short person (e.g. a child less than 1m tall)

Where PMD is likely to hit
Above the child's CG



Effects of the impact

- The child is likely to bounce off the PMD rider and the impact force is greater.
- As the duration of contact between the victim and PMD may be shorter, the impact force – probably on the child's chest or head – will be larger than that in Scenario A. This may cause serious internal injuries.

- The child will also hit his or her head on the ground. Depending on whether the child is facing towards or away from the rider at the time of impact, either the front or back of the head will hit the ground.