Written evidence submitted by Swifty Scooters

1. INTRODUCTION

About Swifty Scooters

Swifty is an established British scooter brand based in Manchester [ref. 1]. Swifty Scooters was founded in 2010 to design, engineer and manufacture high quality adult-scooters. Swifty have been selling e-scooters since 2015. Swifty work closely with the DIT and hold the accolade of Export Champions 2019 and 2020. Swifty Scooters is a manufacturer and a consumer brand, who have in recent years supplied fleets of scooters to private businesses and organisations like Team GB at the 2018 Winter Olympics.

In light of the 'call for evidence' by the Department for Transport (June 2020), we have compiled our knowledge in our Scooter Safety Manifesto. We urge the DfT to consider our advice and evidence when writing new legislation for scooters in the UK, in particular a comprehensive British Safety Standard.

2. MICROMOBILITY TYPES

Micromobility

Micromobility is a recent phrase to describe a broad variety of lightweight vehicles. This document addresses the category of scooters within micromobility. We believe scooters are an important category for the future of mobility and long-term environmental sustainability. As an established manufacturer of adult-scooters, this document will provide insight and detailed analysis that is specific to the UK scooter market.

Further classifications of TYPE A light vehicles

To avoid confusion or doubt we feel it is important to recognise that there are many types of scooter. E-Scooter, Kick Scooter, Push Scooter, Electric scooter, Kick Bike and so on are all terms used to describe the different form factors, shapes and sizes.

It is common practice and perception that these are all grouped into one category. We do not recommend grouping all types into a single field. Our evidence in this document clearly demonstrates that some scooters have design and engineering specifications that will severely compromise safety. Some design features affect the rider's ability to retain control in the event of colliding with an obstacle or pothole in the road, cycle lane or pavement.

It's also important to note that the scooter sharing economy (Bird, Lime, Jump etc) generate the largest source of data which is often cited. This is however unrepresentative of the diverse array of vehicles the public has access to and is one reason why we conducted our own study.

The ITF report 'Safe Micromobility' [ref. 2] attempts to classify and group the large number of micro mobility vehicles into types as shown in [Figure 1] below.

We believe grouping all vehicles by weight and speed alone is not comprehensive enough because some vehicles present safety concerns. We believe there should be more stringent safety tests and standards in order to inform the consumer.

Light vehicle classifications, our proposal

When it comes to a realistic assessment of each mode and UK regulation it is important to establish between safe TYPE A modes and unsafe modes, and where they should be permitted to ride. The TYPE A vehicles are described as unpowered or powered up to 25kph and weighing less than 35kg.

Figure 1. Proposed micromobility definition and classification

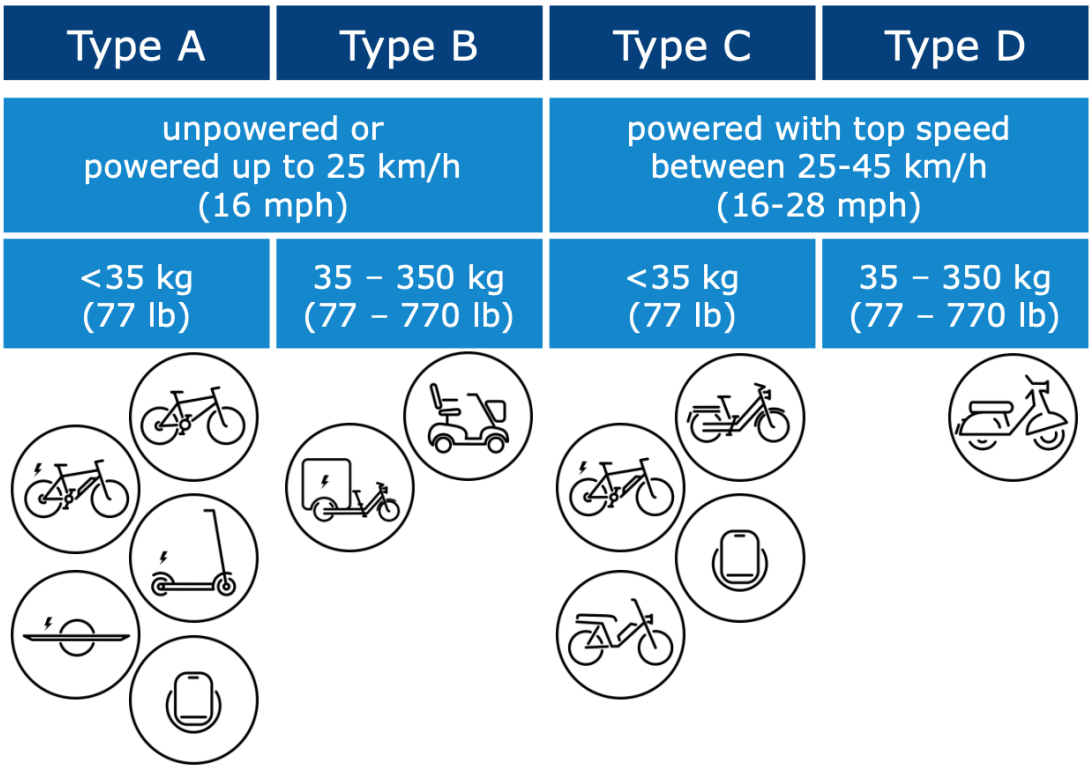

Figure 1. Taken from page 15 of the IFT report 'Safe Micromobility'

The tables below show Type A split into three sections, A1, A2 and A3, and defined primarily by where they are suitable to be ridden.

Currently [May 2020] 'TYPE A' vehicles that are permitted in the UK include only bikes and e-bikes (see Figure 2 below), and these are to be ridden only on the road and cycle lanes according to regulations (highlighted). It is our opinion that adult-scooters (highlighted) should align with bikes in terms of safety and regulations as these testing methods are well proven. There are scooters that would pass a test similar to a bicycle or e-bike, already on the market. Adult-scooters from Swifty are an example of these, but we are not the only brand.

TYPE A1

Roadworthy Scooters and Bikes

These can be defined as approved bikes and scooters that are unpowered or powered up to 25kph weighing less that 35kg, designed and tested for use on bike lanes and roads.

TYPE A1						
Description	Pedal cycle	E-bike (EPAC)	Kick-Scooter	Electric kick-scooter	E-scooter	Light Seated e-scooters
Safety Standard	BS EN ISO 4210-2:2015	BS EN 15194:2017	*	**	***	***
Where to ride	Bike lanes and roads	Bike lanes and roads	Bike lanes and roads	Bike lanes and roads	Bike lanes and roads	Bike lanes and roads
Max speed		15.5mph				
Power type	Human power	Human and electric hybrid	Human power	Human and electric hybrid	Electric	Electric
Max power		250W				
Min. age		14 yrs				

Figure 2: Roadworthy scooters and bikes, a suggestion to increase diversity in modality

* There are some types of kick-scooter that should be included in new policy in order to increase diversity. These include larger kick-scooters (sometimes kick-bikes) which feature bike type wheels.

** At Swifty we make sure our scooters can be ridden or ‘kicked’ even when the battery has run out of power. This enables a combination of human and electric power. This is not the case with most e-scooters.

*** There are some types of e-scooter which should be type-excluded from the current “Powered Transporters” category if they pass a safety test. The current BSEN tests are insufficient, but the modes listed above are readily available on the market. They should be tested for their roadworthiness.

TYPE A2

Powered Transporter Category

These can be defined as typically smaller electric powered vehicle types which have insufficient safety features and therefore unsuitable for the road. There could be further classification within this group to advise against night-time riding and such like.

TYPE A2				
Description	Electric skateboards	Hoverboards	Small wheeled e-scooters	Electric unicycles
Safety Standard				
Where to ride			*	

Figure 3: Powered Transporters that are unsuitable for the road.

* According to our recent survey [ref. 3], opinion is divided for small wheeled e-scooters. If these were allowed their safe use would require smooth road surfaces and well maintained infrastructure. Road conditions vary across the UK. (See more in section 4.)

TYPE A3

Roller Category

These can be defined as human powered and non-mechanically propelled modes.

This category is perhaps where we have the most experience. 80% of our revenue is from the sale of adult kick-scooters. In our recent survey, we compiled some data to outline why, where and who are riding these.

Many of our customers want better legislation around scooter use on pavements. There should be better guidance for speed and right-of-way on pavements in order to allow more diversity in light roller micromobility types. We have evidence that use of kick-scooters on pavements (highlighted) is reducing car trips, reducing CO2 and contributing to active lifestyles (see section 4).

There is a particular consideration to people who feel unsafe cycling on roads, ie. families, those with disabilities and senior citizens. In particular along routes with inadequate cycle lanes.

TYPE A3				
Description	Adult kick-scooters with pneumatic tyres	Kick-scooters with small pneumatic or solid tyres	skateboards	Roller skates
Safety Standard	BSEN 14619:2019	BSEN 14619:2019		
Where to ride	*Pavements, cycle lanes	*Pavements, cycle lanes		

Figure 4: Roller category, or non-mechanically propelled devices.

* According to our recent survey [ref. 3] amongst kick-scooter riders, 50% ride on the pavement, compared with 10% riding on cycle lanes and 13% on roads.

Our survey also suggests that people with disabilities and minor injuries use their scooter as a mobility aid on the pavement and cycle lane. (opinion of 31% of our sample, see more in section 4.)

3. ADULT-SCOOTER SAFETY TESTING

We have major concerns when it comes to small wheeled scooters. Many have hard or solid small wheels, have poor design and geometry and often under-performing braking ability.

We are not the only ones who agree, in a recent report by the International Transport Forum [ref. 2] there is a long list of recommendations to make these small wheel scooters safe (page 36-47). This report also sheds some light into many injuries and fatalities of scooters riders in other countries have experienced on vehicles with small wheels and poor geometry.

Scooter Injuries

According to the IFT report, *“riders of standing e-scooters largely injure themselves in falls.”*

From our experience in the scooter industry, this is true for riders of low-quality and badly designed scooters, and these falls could be preventable by good design.

While the data of the cause of accidents may not be detailed, it is plain to see these types of accidents by looking at instagram account @birdgraveyard [ref. 4]. Poor handling due to poor design together with speed and inexperience can often lead the rider to lose control.

In our experience of the scooter industry, many injuries on small wheeled scooters are also caused by the rider colliding with an obstacle like a pothole, raised paving stone or debris in the road. These injuries could be prevented with more stringent safety standards, in particular larger minimum wheel-size.

Table 1. Standing e-scooter injury studies comparison

Ref.	Area	Sample	E-scooter riders	Non-riders	Helmet use	Male	Motor vehicle involved	Admitted to hospital
[1]	Austin, Texas, United States	ED / EMS patients	190	2	0.5%	55%	16%	14%
[2]	Portland, Oregon, United States	ED patients	174	2			14%	
[3]	Baltimore, Maryland, United States	ED patients	63			75%	23%	
[4]	Auckland, New Zealand	ED patients	244	2		56%	2%	31%
[5]	Santa Monica, California, United States	ED patients	228	21	4.4%	59%	9%	6%
[5]	Santa Monica, California, United States	On-street survey	193		5.7%			
[6]	San Francisco, California, United States	Police injury data	28	4	7%	78%		
[6]	San Francisco, California, United States	Trauma patients	8	1	25%	100%	50%	
[7]	San Diego, California, United States	Trauma patients	103		2.0%	65%		
[8]	Santa Monica, California, United States	Police collision data	122	9			47%	

Notes: ED: emergency department; EMS: emergency medical services; E-scooter: standing e-scooter.

Sources: [1] Austin Public Health (2019); [2] PBOT (2019) and Multnomah County Health Department (2019); [3] Baltimore City (2019); [4] Bekhit et al. (2020); [5] Trivedi et al. (2019); [6] VZSFIPR Collaborative (2019a); [7] Kobayashi et al. (2019); [8] City of Santa Monica (2019b).

Figure 5: e-scooter injury data published in the ITF report showing a low percentage of injuries are caused by motor vehicles, and instead 84% of injuries (in Austin) were caused by riders losing control by themselves.

What is the UK going to do?

If scooters are to share the space with bikes and be permitted on cycle-lanes and roads, there needs to be a safety test and an update to the BSEN standards. An obstacle/pothole test should be made mandatory to ensure the quality and handling of the scooter is good enough for road use.

In the case of the death of e-scooter rider Emily Hartridge, it has been reported that the condition of the road could have been the cause of the fall, and the fall happened to be in the path of an oncoming truck (ref. 5). In this case, one possible scenario could have been that it was the rider's inability to maintain adequate control over uneven road surfaces that caused this catastrophic accident and tragic fatality. This is however our theoretical observation.

Shared-Scooter riders are most at risk

One element of the ITF report is clear, and that is that riders of the shared e-scooters are most at risk. The reason is that they are statistically inexperienced, young and highly likely not to be wearing a helmet.

We have major concerns about the strategy that was announced by Grant Shapps in May 2020, that the DfT would start e-scooter trials by way of permitting scooter-share operators to offer rental e-scooters in public schemes.

Before trials can begin, the scooters must be able to pass safety tests, otherwise the trials may not only damage the industry, but the scooters could be unsafe and unroadworthy.

Introduce a nobstacle/pothole test for handling and control

What is an obstacle/pothole test? And what does it demonstrate?

A nobstacle/pothole test is an excellent measure of the scooter's handling, and tests the rider's ability to maintain control in the event of a riding over an obstacle or pothole. Potholes are a common occurrence on UK roads and cycle lanes.

The pothole test is important for the UK regulations because of the nature of road surfaces in the UK. In the event of injury or loss caused by a crash caused by a pothole, the local authority could be liable if there is sufficient supporting evidence. It is in the interest of the UK government to make sure scooters are 'road-worthy', as there are many types of e-scooter on the market that we believe would fail a 'pothole test'.

The test simulates riding over debris, uneven paving stones, dropped curbs (that are common in transitions between roads and cycle-lanes), as well as potholes of varying depths and lengths. We have demonstrated this with a 23 minute video which is live on the Swifty Scooters youtube channel [ref. 6]: Please watch the video here: https://youtu.be/3DCiATL-kbc

“Scooter Pothole Test - Big Wheels vs Small Wheels”

Scooter Pothole Test - Big Wheels vs Small Wheels

Conclusions of our Scooter Pothole Test

We believe wheel size and geometry play a huge part in delivering a safe vehicle that is fit for the urban environment. In light of this, it is our recommendation that an additional obstacle / pothole test should be introduced to the current BS EN standard. This test would ensure only vehicles that can demonstrate no loss in rider control over a given obstacle or pothole be permitted on our cycle lanes, roads and pavements.

The video clearly shows that an 8 inch wheel Xiaomi M365 fails at even the shallowest of our simulated potholes (a pothole of 36mm in depth). The features that causes it to fail are:

Wheels: the small wheel size doesn’t easily roll over obstacles like the larger wheels do. The lack of spokes, rim and hub on the front wheel means lack of ‘crumple zone’. This causes the rider to be thrown upwards on impact. The way the scooter loses contact with the road after impact, and the way the rider’s feet loses contact with the deck after impact also demonstrates a complete loss of control.

Geometry: The smaller scooter has a high centre of gravity and a short wheel base. This leaves less space for the rider to dampen any front impact forces with knees and arms. This causes the rider to lose control more easily as they are thrown forward.

Frame and steering column construction: the construction of the steering column is unable to take the force of a front-impact collision and is close to failing during our short test. The height of the handlebars and narrow design of the handlebars also makes the scooter difficult to control. The pothole test also puts significant strain on the frame, headtube, headset, forks etc. and must be tested to prevent failure in the event of a pothole collision.

For a more in-depth written analysis of design elements to be considered in our recent blog entitled, “Are E-Scooters suitable for UK roads? The Pothole Test for Safe Scooter Design” [ref. 7] which can be found here: https://swiftyscooters.com/blogs/journal/e-scooter-safety-and-design

The Swifty, with 16-inch wheels passes even the largest pothole test (72mm deep) and clearly demonstrates the difference between a safe scooter and an unsafe one.

Other safety features to align with bike safety

Scooters aligning with bikes for safety

As outlined in section 3, we believe that adult-scooter safety and regulation should align with bikes. In our recent survey, 70% agree. There was also strong support (90%) for scooters that were intended to be used in public spaces to comply with more stringent manufacturer’s safety standards.

There are some features that must be considered additionally to bike standards.

Pothole test

As outlined above, a pothole test should be included into a manufacturer’s safety standard. Even where there is a smooth road surface, a pothole test is a good measure of stable and safe scooter design.

Riding scooters at night

For riding at night, we recommend front, rear and side reflectors, front light fitted to handlebars, and rear light attached to the riders back at waist height. (The rear light attached to the rear of the scooter is too low when riding on the road.)

Directional signalling

It can be more difficult to hand signal when riding an e-scooter. This depends on the design of the scooter, the terrain, and if the throttle has to be continuously depressed. All Swiftys are designed to have enough stability to enable hand signalling. Many e-scooters on the market are impossible to signal due to the design. Traffic rules like right-of-way could cater for this. Motorists need to be aware of this.

Bikeability and Scootability

We don't believe that scooter riders should have to pass a driving test. Rules of the road for scooters can be taught in schools in 'bikeability' lessons. This should include 'Scoot-to-School' initiatives and how to kick-scoot safely on the pavement. Motorists need to be aware of the rules for bikes and scooters.

Helmets

In our recent survey, our respondents overwhelmingly agreed (71%) that it should be a legal requirement to wear a helmet when scooting on the road. This reflects an overwhelming concern for road safety among our sample.

However, we think that rather than criminalising scooter riders in this way, it is more effective to make helmet use advisory in combination with creating safer spaces in infrastructure.

Industry Problems and Best-Practice

We are in position where the scooter market is dominated by cheap and low-quality scooters. This represents a problem in the industry.

- Product longevity - many scooters fail and break after a short period of time which contributes unnecessarily to landfill
- Battery management - it should be mandatory to recycle batteries at the end of the product life cycle. Some e-scooters cannot easily be disassembled.

- Replacement parts - many e-scooter brands do not supply replacement parts intentionally to increase sales. These scooters are not designed to be fixed, but designed to be thrown away and replaced.
- Counterfeit parts - the lack of replacement parts has led to a side industry of untested counterfeit parts being available on ebay.

These problems in the industry can be solved by more stringent regulation. In contrast to the above, Swiftys are designed to be fixed, repaired and ridden for thousands of miles. Swiftys can easily be maintained by a regular bicycle mechanic and will last a lifetime if looked after.

Conclusion: More stringent safety tests are needed

The evidence in this test is clear, as a scooter manufacturer we believe that a pothole test should be mandatory for all scooters if they are to be ridden on the road or cycle lane. A rider must be able to maintain reasonable control during the test.

Our video evidence proves that there are design features of some scooters that will cause a catastrophic failure of this test, and that the safety of scooters can be solved by design. The critical factors for safe scooter design are wheel size and geometry. The UK must update the current BSEN for all adult-scooters that are intended to be used on pavements, cycle lanes and roads. We believe that the current scooter tests are not comprehensive enough to guarantee the consumer has a safe vehicle.

Providing an adequate safety test and obstacle test is the most effective way to discriminate between modes that are and are not roadworthy. We hope this evidence helps to inform you about safe scooter design.

4. WHY PEOPLE RIDE KICK-SCOOTERS

At Swifty we have conducted some questionnaires [ref. 3], and often receive feedback from our customers about why they scoot. The following section summarises our industry insight. The data is based on majority kick-scooter use, rather than e-scooter use.

Modal Diversity is Inclusive

For anyone who's striving to increase cycling and walking in the UK in an effort to reduce car use and increase population health at the same time, scooters may be an eye opener. Scooters represent diversity. Diversity in light modes of mobility caters for diverse needs, and there are many reasons why someone might choose a scooter instead of cycling or walking.

Gender split in scooter use is more equal than in cycling. According to our recent pilot survey, our user base is made up of a 43% female / 57% male gender split.

Respondents to our survey also show that scooters are not just for the young, but are the mode of choice of a varied range of ages, 11% were over 60, and the majority were between 30 and 59 yrs. Respondents were also from across socioeconomic groups, which gives evidence that even a high quality scooter remains an 'affordable' item and often represents cost savings when compared to public transport.

Active travel: Walking, Cycling and Scooting

In a recent pilot survey, we asked respondents about why they scoot. The results give insight into why an individual might choose a scooter over walking or cycling. 21% say that they are not confident cycling, 20% use scooters to travel with children as a family, while 10% simply don't have time to walk.

Scooters allow for some people with disabilities and minor physical impairments to travel actively and independently. A significant 21% of respondents have a physical impairment and a scooter allows them to travel. The types of physical impairment were lower limb impairment and cannot walk far (35%), back and spine problems and cannot cycle (32%), ME and chronic fatigue (14%). We also have customers who use kick-scooters to manage diabetes and a massive 39% of respondents say scooting helps them to maintain good mental health.

This further supports our view that it is important to review active travel policy in order to include kick-scooters on pavements with accompanying guidance for speed and right-of-way.

Evidence that Scooters replace Car Trips

According to our sample (majority kick-scooter riders), 29% frequently replace car trips with scooter trips, and 33% occasionally substitute the car for their scooter. Many (50%) of these kick-scooter trips are made primarily on pavements.

Our users are keen for more regulation and guidance around kick-scooters and e-scooters for use on pavements, cycle-lanes and roads.

Legislation, Wheel Size and space to ride

With reference to section 2 regarding different types of TYPE A vehicles, we asked our community their opinion about where to ride. The results showed concern about the safety of small-wheeled scooters in relation to where to ride.

Overall most respondents were of the opinion that all types of adult-scooters should be ridden on pavements, cycle lanes and roads. However, when given the option of small-wheeled scooters, the overall result showed that our sample didn't think the small wheeled scooters were suitable for the road.

50% said that small wheeled kick-scooters should be ridden on pavements and cycle lanes, and not roads.

Regarding small wheeled e-scooters, opinion was divided between pavements and cycle lanes only (27%), cycle lanes and roads only (29%), and pavements cycle lanes and roads (25%). This shows that people are unsure of the safety of small-wheeled e-scooters.

We are aware of the complexity of pavement regulation, however, as outlined in the ITF report (page 21), there must be a level of perspective retained when discussing pedestrian safety. The space provided by pavements can further be utilised if rules for speed and right-of-way are written. For example, this could be in the form of shared-use pavements along main roads as seen in Manchester's Bee Network. The main source of danger in the urban environment remains to be heavy vehicles like cars and trucks.

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5. CONCLUSION

At Swifty Scooters, we would like to offer the DfT support in creating new regulations for safe scooters. In our experience, small wheels do present potential dangers, but there are other common features of e-scooters that are on the market that are inherently dangerous for use on the roads. We are approached on a daily basis by Chinese suppliers of e-scooters of varying qualities and designs, many are cheap copies of respected brands. The low-quality end of the market is a safety problem for the UK and these scooters are in plentiful supply. Consumers need to be more informed about which ones are safe to ride.

As outlined in this document, the different types and designs can be regulated by way of a more thorough manufacturers safety standard. These types can be identified most easily by wheel-size.

We welcome the inclusion of scooters in the UKs transport plans as they provide diversity in modality, and provide for the diverse needs of the population. We would like to see inclusion of kick-scooters in active travel policy as the evidence in this report shows how a kick-scooter can provide mobility for a more diverse group of people.

We would welcome incentives like the cycle-to-work scheme to encourage active travel modes over electric modes. Our passion for kick-scooters and hybrid ‘kick-assist’ e-scooters is helping people to stay fit and healthy.

The increase in use of ‘micromobility’ as a whole, or light and zero-emission vehicles is a positive step forward. Although scooter trips account for fairly short distance trips, they represent significant mileage and therefore a significant CO2 saving. According to a recent questionnaire, we estimate that our users have clocked up 6,900,000 miles since we started our company. That’s 277 times around the world on a scooter! Our study revealed that 40% of these scooter miles were replacing car journeys. We look forward to a safer, greener and cleaner future for urban mobility.

June 2020

6. References

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Glossary

Adult-scooter: Stand-on kick-scooter or electric stand-on scooter for adults

Kick-scooter: A stand-on scooter that is human-powered by kicking, designed for adults.

E-scooter: A stand-on scooter that is electric powered, designed for adults.

Scooter-share operators: Companies that operate an app based public e-scooter rental service ie. Bird, Lime, Circ etc.

Large wheels: 16 inch or larger

Small wheels: 8 inch or smaller