

Transcript of 2021 CPSC Podcast Series, “Overview of Consumer Safety and Micromobility Devices”

Slide 1

The slides used in this presentation are intended to be used in an event with verbal elaboration by a knowledgeable presenter. These slides highlight key U.S. product safety requirements for discussion. The slides used in this podcast are not a comprehensive statement of legal requirements or policy, and thus, should not be relied upon for that purpose. You should consult official versions of U.S. statutes and regulations, as well as published CPSC guidance, when making decisions that could affect the safety and compliance of products entering U.S. commerce. Note that references are provided at the end of the presentation.

Slide 4

Hi, my name is Sylvia Chen, and I want to welcome you to this podcast presentation today.

Slide 5

As you heard, “Design of safe products at the outset is critical.” CPSC is the United States federal government agency charged with protecting the public from unreasonable risks of injury or death associated with the use of consumer products under the agency’s jurisdiction. We have developed this podcast series not only to inform you about regulations, standards, and other safety requirements, but also to emphasize the importance of designing products with safety considerations in mind, and to offer best practices for enhancing the safety of a variety of common consumer products.

Slide 6

The series covers six common consumer products and the requirements for keeping consumers safe, focusing on products affecting millions of consumers, such as children’s sleepwear, wearables, batteries, gates and enclosures, micromobility products, and cribs and play yards. In this podcast series, you can expect to learn about the key hazards and risks from products, important design and manufacturing considerations, regulations and standards that CPSC uses to ensure product safety, best practices you can employ, and what resources are available to assist you in understanding and implementing the requirements.

The podcasts include English and Chinese slide decks and Chinese narration to make this important safety information as accessible as possible. Additionally, CPSC has established a dedicated email box, where viewers, at their convenience, can send in any questions, in English or Chinese. Our staff will monitor the email box and respond to your questions. Transcripts in English are available on webpage.

Slide 7

And now, we will begin our presentation on micromobility, a new trending consumer product area, and its requirements and potential hazards.

Slide 8

Let's start by talking a little about what the term "micromobility" means. When people use the term "micromobility," they are usually referring to single-rider, small form factor mobility products. These products can be powered or not, and they tend to operate at relatively low speeds.

Consumers generally love these products because they find them convenient, accessible, and relatively inexpensive. Many of these products allow consumers to have enhanced mobility in areas mostly accessible to pedestrians and are especially popular in more dense, urban settings.

For example, a consumer may use a folding scooter to get from the subway to their workplace or home as part of their daily commute. In some cases, these products can expand commuting options for consumers with limited physical mobility.

Slide 9

In this presentation, we will be focusing on three specific micromobility products: e-scooters, e-bicycles, and hoverboards.

An e-scooter is generally described as having the following characteristics: a foot platform to stand on, a center column with a handlebar for steering, speed that is controlled using the accelerator and brakes. The product is powered partially or fully by a motor, and composed of two or three wheels.

E-bicycles are usually two- or three-wheeled vehicles with fully operable pedals and an electric motor of less than 750 watts/.75 kilowatts. The electric motor will provide either assistance or full propulsion.

Hoverboards can be described as having foot platforms to stand on, and they may have a self-balancing mechanism, operate by controls or the rider distributing their weight, and have one or two wheels in parallel.

All of these products are electrically powered, typically with lithium-ion batteries. Consumers interact with these items as products they own, and as fleet "ride-share" products, where a company owns and maintains the products, and consumers rent them for short periods.

Although unpowered bicycles, scooters, and skateboards have been around for years, the electronically powered versions of these products and analogous products, such as hoverboards, are still relatively new to the consumer market.

CPSC has jurisdiction over consumer products, which includes micromobility products that the National Highway Traffic Safety Administration (NHTSA) does not consider to be a “motor vehicle” under its jurisdiction. NHTSA guidance advises that the following micromobility products are not considered “motor vehicles”:

1. scooters lacking seats that are operated in a stand-up mode;
2. scooters that are incapable of a top speed of 32 kph, that is, 20 mph or greater; and
3. electric bicycles with operable pedals, and an electric motor of 750 watts, that is .75 kilowatts or less, whose maximum speed on a paved level surface is less than 32 kph, that is, 20 mph, when powered solely by such a motor, and ridden by an operator weighing 77 kilos, that is, 170 pounds.

Micromobility products within these technical limitations fall within CPSC’s jurisdiction.

Additionally, CPSC has jurisdiction over low-speed bicycles, and this is codified in CPSC’s bicycle regulations.

Pedal-assisted micromobility products, even if they can exceed 32 kph, that is, 20 mph, that are not capable of continued self-propulsion, fall within CPSC’s jurisdiction. CPSC staff works with NHTSA on jurisdictional issues as they arise.

Slide 10

CPSC staff relies on data to inform its hazard-mitigation efforts. For example, the CPSC’s technical staff evaluated incident data related to e-bikes, e-scooters, and hoverboards, which resulted in a report published in 2020, called, “Micromobility Products-Related Deaths, Injuries, and Hazard Patterns: 2017–2019.” A [link](#) to this report is included at the end of this presentation.

Over the next few slides, I will go over a few key points found in the report.

Slide 11

To start, CPSC staff undertook a study of micromobility-related incidents reported through the CPSC National Electronic Incident Surveillance System (NEISS) in 2020. NEISS is a statistically valid injury surveillance system that collects data on consumer product-related injuries occurring in the United States. CPSC uses these data to produce nationwide estimates of product-related injuries.

This study looked at e-scooter, hoverboard, and e-bike emergency room visits reported in the NEISS database from 2017 to 2019. Staff identified relevant incidents using product codes and key word and term searches.

For E-scooters staff identified key word searches including “electric scooter,” “e-scooter,” “stand up scooter,” “standup scooter,” “motorized scooter,” “power scooter,” “dockless

scooter,” “rental scooter,” “scooter sharing,” any brand known to be dockless/rental e-scooters, and other variant spellings.

For hoverboards, staff used terms such as: “self-balancing scooter,” “hoverboard,” and known manufacturer names to identify hoverboards.

Identified key word searches for E-bikes included: “Electric bike,” “e-bike,” “electric bicycle,” “e-bicycle,” “power (assisted) bike,” “power (assisted) bicycle,” “motorized bike,” “motorized bicycle,” and other variant spellings and known brands.

Slide 12

Staff estimated a total of 132,800 emergency department visits in the United States from 2017 through 2019, with 34,000 in 2017, 44,000 in 2018, and 54,800 in 2019. Hoverboard-related injuries made up the majority of emergency department visits in 2017 and 2018, but e-scooter-related injuries were the majority in 2019. E-bikes were associated with less than 10 percent of emergency department visits for the time period. In addition to these estimates, staff is aware of 41 deaths related to these products from 2017 through 2019, with the majority, 27, related to e-scooters, 4 related to hoverboards, and 10 related to e-bikes.

Slide 13

In addition to examining the NEISS data, staff reviewed data reported through the Consumer Product Safety Risk Management System (CPSRMS) and assigned follow-up in-depth investigations (IDIs) to identify the most common hazards associated with these products.

This study provided staff with a more comprehensive look at how incidents related to micromobility products were occurring.

Staff completed 140 follow-up IDIs related to micromobility products to identify what hazards were present, and the causes of the reported incidents.

For e-scooters, staff found:

- Brake problems
- Unexpected power losses
- Fire hazards.

For hoverboards, staff found:

- Fire hazards
- Other electrical hazards.

For e-bikes, staff found:

- Brake problems.

From the root causes of these failures, staff observed a number of resulting hazards. For example, fire hazards tied to overheating battery systems resulted in burn hazards and even death. Braking problems, such as brakes unexpectedly locking, caused falls, leading to abrasions, contusions, broken bones, and death. Because many of these products are used on or near roads with vehicle traffic, an unexpected fall could result in the rider being hit by another vehicle.

Slide 14

Given the incident data available, and what we know about the potential and reported hazards, CPSC looks for ways to work with stakeholders to enhance micromobility safety for consumers.

Slide 15

Now I am going to talk a bit about requirements and guidance for micromobility products.

Other than e-bikes (where the product falls under bicycle regulations), and children's micromobility products, micromobility products and components are primarily covered by industry consensus standards. Because these standards are developed using a consensus-based process, CPSC encourages stakeholders to take part in creating and maintaining these standards.

It is also important to note that manufacturers, importers, distributors, and retailers are required to report to CPSC under Section 15 (b) of the Consumer Product Safety Act (CPSA) within 24 hours of obtaining information that a product does not comply with a safety rule issued under the CPSA, or contains a *defect* which could create a substantial risk of injury to the public or presents an unreasonable risk of serious injury or death.

Slide 16

When appropriate, the CPSC uses industry consensus standards as a baseline safety threshold for products without specific technical safety regulations. It is important to know what consensus standards could apply to your product and use those standards to characterize the safety of your product. In some cases, there may not be a standard for your exact product. Companies are still required to introduce only safe products into the marketplace, so it is important to work with in-house experts, testing laboratories, and others to develop safety-focused performance requirements.

Now, let's talk about industry consensus standards for E-scooters and hoverboards. Industry consensus standards for e-bikes will be covered later in this presentation.

E-scooters and hoverboards are both included in the scope of the industry consensus standards on this slide.

ASTM subcommittee F15.58 covers powered scooters and skateboards and has two active and two proposed standards under its purview.

The active standards are:

- F2641 Standard Consumer Safety Specification for Recreational Powered Scooters and Pocket Bikes, and
- F2642 Standard Consumer Safety Specification for Safety Instructions and Labeling for Recreational Powered Scooters and Pocket Bikes.

The proposed standards are:

- WK57360 Standard Consumer Safety Specification for Self-Balancing Scooters (Hoverboards), which will be discussed in the next slide, and
- WK70724 Commercial Electric-Powered Scooters for Adults.

ASTM F2641-15 Standard Consumer Safety Specification for Recreational Powered Scooters and Pocket Bikes has performance requirements for children's scooters. The standard includes test methods for curb impact, dynamic braking, dynamic and static strength, and tests for various specific components, such as handles and wheels.

The children's standard will be up for review as part of the ASTM republication process. ASTM plans on learning from the discussions from the adult e-scooter draft standard and incorporating relevant updates to the children's standard.

ASTM F2642-15 Standard Consumer Safety Specification for Safety Instructions and Labeling for Recreational Powered Scooters and Pocket Bikes is a specification intended to cover safety instructions, labeling, and maintenance.

ASTM is currently developing an adult scooter standard to focus on the expansion of ride share scooters. The ASTM working group WK70724 is focused on establishing performance requirements and test methods to minimize the hazards for users of commercial electric-powered scooters for adults. Although there is not an established standard yet, watch for updates as the standard develops.

In addition to the work at ASTM, UL Standards Technical Panel (STP) 2272 developed UL 2272, Standard for Electrical Systems for Personal E-Mobility Devices, which covers safety of the electrical system for e-mobility devices. This standard covers components, such as batteries, chargers, motors, controls, and wiring.

Slide 17

ASTM working group 57360 is developing a specification covering the establishment of performance requirements and test methods used to minimize the hazards to users of self-balancing scooters, such as hoverboards. This specification will include requirements for safety instructions, labeling, and maintenance for both children's and general use products. Requirements being discussed include: controlled stop braking, a reference to UL2272 for electrical systems, a latching device that is designed to prevent unintentional folding when in the use position, a curb impact test, and other component performance tests.

Slide 18

Now I am going to talk about requirements and guidance for e-bikes.

CPSC requires that all types of bicycles, including e-bikes, shall comply with the requirements for braking, protrusions, structural integrity, and reflectors in 16 CFR Part 1512 – Requirements for Bicycles.

Because all bicycles are subject to the bicycle safety technical regulations, manufacturers or importers will need to issue a General Certificate of Conformity (GCC), certifying that the product complies with any applicable regulations based on a test of each product or a reasonable testing program. Testing performed for general use products does not need to be completed by a third party, CPSC-accepted laboratory.

UL 2849, the Standard for Electrical Systems for E-bikes, outlines electrical requirements, including the battery pack, cells charger, and system. At a minimum, the electrical system consists of the drive unit, battery, battery management system (BMS), interconnecting wiring, and power inlet. The standard includes tests for:

- Impact, mold stress, and flexing,
- Inputs,
- Temperature,
- Isolation resistance,
- Dielectric strength,
- Humidity conditioning,
- Overcharging,
- Running overload,
- Short circuit,
- Imbalanced charging,
- Shock, and thermal cycling

ASTM also has a number of specifications and test methods relevant to bicycles, including mechanical structure issues, such as:

- ASTM F2793-14 Standard specification for bicycle grips,
- ASTM F2274-11 Standard specification for condition 3 bicycle forks, and
- ASTM F2711-19 Standards test methods for bicycle frames.

Slide 19

Now, let's look at some general requirements and guidance for micromobility devices.

SAE International, a trade association, developed two micromobility-focused documents: SAE J3194 and SAE J3230.

SAE defined terms and product classifications in SAE J3194 – Taxonomy & Classification of Powered Micromobility Vehicles.

SAE recently released SAE J3230 – Kinematic Performance Metrics for Powered Micromobility Vehicles to provide test methods, conditions, and metrics for powered standing scooters. Specifically, it describes:

- Test procedures to measure the top speed, acceleration, and deceleration performance of powered standing scooters;
- Test scenarios that consider initial vehicle conditions, operator anthropometry, environmental and roadway conditions, and operating domains (*e.g.*, geofence);
- Relevant units, accuracy, and precision of measurement for each test; and
- Methods to collect and report such kinematic data.

Slide 20

There are additional requirements for children’s micromobility products, which are products intended for children 12 years of age and younger. Depending on the specific design and components of the product, manufacturers or importers may need to issue a Children’s Product Certificate (CPC), based on testing from a third party, CPSC-accepted laboratory. These tests may include lead content or paint tests, or small parts testing. For children’s e-bikes, the requirements in 16 CFR part 1512 must be tested by a third party, CPSC-accepted laboratory and the issuance of a CPC based on those tests.

Slide 21

Now I am going to talk about CPSC’s education and outreach activities regarding micromobility. CPSC has been actively reaching out to consumers, manufacturers, and others to gather input and educate on micromobility safety.

Slide 22

CPSC has been working to educate consumers about micromobility hazards and best practices for safe usage of these products. Shown here are some recent examples of guidance that have been released on e-scooter safety.

CPSC works to empower micromobility users with information on how to improve safe usage of these products with safety tips and best practices.

Slide 23

In 2020, CPSC staff hosted a webinar forum on the safety of consumer micromobility products. The purpose of the event was to bring stakeholders together for a broadly focused meeting to exchange information on enhancing the safety of three specific consumer micromobility products: e-scooters, e-bikes, and hoverboards. More than 200 participants took part in the forum, which included 19 presentations over the course of the day.

There were five topical sessions: Data, Standards Development, Best Practices for Enhancing Safety, Micromobility Design and Research, and Policy and Consumer Safety.

- The Data session focused on incident data, considerations, and improvements being made to gather more information in the future, including recent trends in injury data.
- The next session, Standards Development, focused on the state of SAE, ASTM, and UL standards related to micromobility.
- The Best Practices for Enhancing Safety session emphasized the importance of infrastructure for consumer safety, such as bicycle lanes to separate riders from road vehicles.
- The Micromobility Design and Research session provided a technical discussion on topics such as battery systems, R&D testing, vehicle dynamics, rider kinematics, and vehicle intelligence.
- The final session, Policy and Consumer Safety, highlighted activities on federal, state, and local levels and recommendations for safety activities moving forward.

Slide 24

Coming out of the presentations and discussions in the forum, staff summarized several recommendations for CPSC that had been put forward during the day.

Continued Activity with Industry Consensus Standards

- Stakeholders advocated for consensus standards activity, requesting requirements that are not overly burdensome and that do not deter innovation. Micromobility standards working groups have progressed to include taxonomy development, electrical requirements, and some product specifications. Stakeholders identified work to be pursued, such as requirements targeting reduced falls, cybersecurity, and a standard for adult and commercial e-scooters. Presenters referenced other international standards as another focus area. CPSC staff continues to be involved with these efforts.

Work with Federal Government Partners

- To address micromobility-related hazards appropriately, our society needs safer means of micromobility transportation, adequate infrastructure, and public awareness of the hazards. This means that a cooperative, inter-agency approach is imperative for reducing deaths and serious injuries involving these products. CPSC staff cooperated with U.S. Department of Transportation staff in an interagency report on micromobility efforts across U.S. federal agencies and will continue to support these endeavors.

Build Relationships with Local Governments and Advocacy Groups

- There are local municipal programs focused on improving safety and adopting transportation alternatives. Many of these groups host programs, have meetings, and maintain data repositories for their areas of interest. These groups gather information, communicate with their stakeholders, and advocate on behalf of their members, and they can help the CPSC understanding existing issues better and gather input from their vantage point.

Examine Alternate and New Data Sources

- CPSC and its partners may benefit from exploring alternate data sources, case studies, and designed research initiatives. Moving forward, staff can explore opportunities for micromobility-focused special studies, such as research to obtain information on NEISS cases to learn about product characteristics and events leading to injuries.

Slide 25

CPSC emphasizes the importance of a multipronged approach to addressing micromobility safety. Although the CPSC is a regulatory agency, we recognize that there are a number of avenues that, when coordinated, can provide a more robust safety outcome than only using regulation to address an issue, such as:

- Research and data that give us information about hazards, risks, and mitigation strategies.
- Consensus standards that establish best practices and safety requirements developed by a broad group of stakeholders.
- Safety-focused design and manufacturing from the product development stage that results in improved safety outcomes.
- Education and outreach that transfers information on safe operation to consumers.
- Policy that promotes safety by establishing baseline expectations or requirements.
- Regulation that establishes a set of legal requirements codified by law.

Because CPSC considers all of its stakeholders to be partners in safety, we keep this holistic approach in mind when thinking about the best way to enhance the safety of these products.

Slide 26

Thank you, and we hope you enjoyed this podcast. If you have any questions on the presentation, please do not hesitate to submit your questions in English or Chinese to the mailbox mentioned earlier: CPSCinChina@cpsc.gov. This mailbox is routinely monitored.

Slides 27-29

We also wish to remind viewers that CPSC has many technical documents and resources available in Chinese. At the conclusion of this presentation, we provide many links to resources viewers may find useful.

Slides 30-31

We encourage viewers to be sure to check out CPSC's Regulatory Robot, available in English, Chinese, and several other languages. The Regulatory Robot is an automated tool that can help identify safety requirements for many different types of products. Many companies have found this tool to be extremely helpful.

Slide 32

CPSC staff have authored technical and status reports on various safety aspects of micromobility devices. This slide lists two recent reports, including the special data study mentioned earlier in this presentation.

Slide 33

Human factors is the study of how people use products, and how design can guide this usage. The CPSC and Health Canada's Consumer and Hazardous Products Safety Directorate have developed this guidance document to help consumer product manufacturers integrate human factors principles into their product development process.

Slide 34

CPSC hosts publicly available data repositories, including the National Electronic Injury Surveillance System (NEISS) and the Consumer Product Safety Risk Management System (CPSRMS).

Thank you.