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International Police Mountain Bike Association

Board Position Paper - Use of e-Bikes by Public Safety Cyclists - August 2020

As the leader in the field of public safety cycling, IPMBA endeavors to keep abreast of changing technologies, methodologies, and other factors that affect public safety bike operations. This includes equipment and devices for use in training and in the field. IPMBA comprises a diverse group of law enforcement officers, EMS personnel, and security professionals. These public safety cyclists operate their equipment under a wide range of environmental conditions, from rocky trails to urban settings, and in all kinds of weather. IPMBA teaches the skills necessary to safely operate a bicycle in a patrol capacity. As in other areas of public safety, different environments call for different apparatus; therefore, vehicle operations skills are designed to be transferable to other, similar vehicles.

IPMBA has long encouraged its members to remain open-minded and to experiment with new products and technologies in an ongoing effort to increase safety, comfort, and effectiveness.

Electric bicycles, referred to as e-Bikes, have experienced widespread adoption throughout the cycling industry. Advancements in technology and a corresponding reduction in the cost of many makes and models have made them more appealing to and effective for public safety agencies, many of which have added e-Bikes to their bicycle fleets. In keeping with the mission of providing the best practices for public safety cycling training and operations, IPMBA will strive to meet the needs of those public safety cyclists who operate e-Bikes in the line of duty.

Content for this position paper includes input from IPMBA members, industry representatives, and other subject matter experts, as well as the results of an e-Bike survey conducted by IPMBA in January 2019.

This position paper was reviewed and approved by the IPMBA Board in April 2019, and updated in August 2020.

Background:

There continues to be confusion amongst consumers, retailers, suppliers, policy makers, and public safety professionals as to what comprises a legal e-Bike.

According to People for Bikes:

Under federal law, an electric bicycle is referred to as a "low-speed electric bicycle (LSEB)," which is defined as "a two- or three-wheeled vehicle with fully operable pedals and an electric motor of less than 750 watts (1 h.p.), whose maximum speed on a paved level surface, when powered solely by such a motor while ridden by an operator who weighs 170 pounds, is less than 20 mph." Significantly, this definition provides a maximum assisted speed that an electric bicycle can travel when being powered only by the motor, but does not provide a maximum assisted speed for when an electric bicycle is being powered by a combination of human and motor power.

Federal law does not preempt any state traffic laws or vehicle codes. While there is a preemption provision in Public Law 107-319, that provision is limited in scope to product safety regulation. Therefore, Public Law 107-319 has no impact on state traffic laws or vehicle codes, which regulate the use of electric bicycles, and it is still necessary to update these laws to incorporate these devices.

Electric-assisted bicycles have been defined and regulated at the federal level since 2002. Public Law 107-319 established that electric bicycles are regulated as consumer products under the Consumer Product Safety Act, and more specifically, subject to the same regulations that govern traditional, human-powered bicycles. Thus, electric bicycles are regulated by the Consumer Product Safety Commission, and must comply with the bicycle safety standards at 16 C.F.R. Part 1512. In addition, electric bicycles are explicitly not "motor vehicles" for the purposes of federal law, and are not subject to National Highway Traffic Safety Administration vehicle standards. As a practical matter, Public Law 107-319 ensures that electric bicycles are designed, manufactured, and tested like traditional bicycles for the purposes of consumer product safety law. The main provisions of Public Law 107-319 are codified at 15 U.S.C. § 2085."

In an effort to establish a uniform definition of an e-Bike, People for Bikes promotes a three-class system to categorize e-Bikes. As stated on their website, "In 2015, the Bicycle Product Suppliers Association (since merged with People for Bikes) mobilized manufacturers and suppliers to establish e-bike classifications based on the product sold in Europe and consistent with U.S. federal regulations around e-bike manufacturing and sales. E-bikes were organized into three classes, which separated low-speed e-bikes from higher-powered vehicles and simplified the process of establishing regulations around the use of each class."

The three classes of e-Bikes are as follows:

- **Class 1:** a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 20 miles per hour.
- **Class 2:** a bicycle equipped with a motor that may be used exclusively to propel the bicycle, and that is not capable of providing assistance when the bicycle reaches the speed of 20 miles per hour.
- **Class 3:** a bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the bicycle reaches the speed of 28 miles per hour, and is equipped with a speedometer.

For all classes, the maximum power output is 750 watts (1 h.p.), and manufacturers and distributors of electric bicycles would be required to apply a class identification label to each electric bicycle.

The three-class system also creates rules governing the use of electric bicycles, with safety as the top priority. Class 1 and 2 electric bicycles are permitted to travel anywhere traditional bikes are permitted, as the maximum assisted speed of these devices is closely aligned with speeds traveled by traditional bicycles. Class 3 electric bicycles may be ridden on streets and roadways where traditional bicycles are permitted, including bicycle lanes, but are restricted from slower speed areas such as multi-use paths. Class 3 electric bicycles are subject to additional requirements, such as a minimum user age and helmet mandate. Electric bicycles are not subject to any licensing, registration, or insurance requirements.

Electric vehicles which do not meet the definition of one of the three classes are referred to as Out of Class Electric Vehicles (OCEVs). E-Bikes that are designed or illegally modified to exceed the maximum speeds in each classification are not LSEBs and are subject to different regulatory standards for equipment and use. Some OCEVs can reach top assisted speeds of 50 mph/80 kph and weigh more than 150 pounds/68kg, not including accessories and duty gear. These OCEVs may be defined as mopeds, motorized bicycles, scooters, motorcycles, or motor vehicles, depending on the applicable vehicle code and may be marketed, sold, and used in compliance with the law. However, while OCEVs may have a place within a department's vehicle fleet, agencies are advised not to treat them in the same manner as conventional bicycles or low-speed electric bicycles.

A current state-by-state status report pertaining to the model legislation is maintained on the People for Bikes website.

Position:

IPMBA recognizes there are distinct differences, advantages, disadvantages, and other factors each agency must consider when deciding whether to integrate e-Bikes into a specific service environment. Therefore, IPMBA hereby authorizes participants in IPMBA training to ride e-Bikes that meet their agency's needs and that can be safely used to complete the training requirements. In addition, IPMBA recognizes that OCEVs are not legally defined and regulated as e-Bikes and, therefore, will not allow OCEVs in any IPMBA training. IPMBA does not believe that training designed to teach public safety personnel how to safely operate conventional bicycles or low-speed e-Bikes in the line of duty is sufficient for personnel assigned to use the potentially much faster and heavier OCEVs.

Decision Factors:

When determining whether or not to invest in e-Bike technology, the following should be taken into consideration.

Advantages: Faster response times, less fatigue, expanded patrol range, increased carrying capacities, enhanced community engagement, and potentially more interest in bike units.

Disadvantages: Increased cost, increased weight, additional maintenance costs, and potentially more complicated technology failures.

Other factors: Effects on riding techniques, including slow-speed handling and obstacle-clearing skills; effects of increased speed on cycling in traffic and/or during group rides; technology-related factors such as battery life and riding range; tactical considerations; and legalities.

Those responsible for equipment selection and procurement are encouraged to conduct a needs assessment that includes such factors as operational environment, riding style, frequency, laws pertaining to e-Bike use and access, etc. They are encouraged to consult subject matter experts within the public safety and cycling industries to help ensure they make the right choices.

Training:

IPMBA recommends that students first complete the applicable course on a conventional bicycle in order to develop competency in the basic skills and then undertake e-Bike-specific training to learn how to successfully transfer those skills to an e-Bike. Instructors may benefit from making conventional bikes available to those who choose to undergo initial training on an e-Bike in case they need to first gain confidence and skills on a bicycle that is not equipped with power-assist features.

IPMBA Instructors are responsible for ensuring that each student is equipped with a well-maintained, properly fitted, legal e-Bike and for evaluating the safety of all e-Bikes prior to the start of each course. These assessments are to identify obvious equipment problems that may jeopardize the safety of the operator. If an e-Bike is found to be poorly constructed or maintained, poorly fit or otherwise unsafe, illegally modified, or does not meet the classification of an LSEB, it is the instructor's responsibility to prohibit the rider from using it in training. It is the student's responsibility to heed the advice of the subject matter expert and either withdraw or locate a more suitable bicycle.

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IPMBA has assessed the use of e-Bikes in the current basic Police, EMS and Security Cyclist Courses and makes the following observations of the performance of e-Bikes in the skill stations. At this point, there has been no modification to the testing standards set forth in the current curriculum that differs for e-Bikes. These observations are applicable to LSEBs only.

- All the cone courses were completed successfully under no power assist and low power modes. As the motor assist increased, the braking resistance had to increase equally to maintain good control. It appears that several models of e-Bikes are extending the length of the frame to accommodate the motor assembly in mid-drive units, so space in the nine-foot Slow Box is tight and does take some skill to accomplish.
- Curb and stair ascents can be more difficult using the power pedal technique if the battery is located toward the front of the bike, skewing weight forward. Models that have the battery located in the rear do not seem to create the same situation. The technique will work; however, it takes more power and skill to achieve. The motor engagement delay does not assist in the lofting, but does engage for assistance in the follow through and the remaining ascent. Certain makes and models are programmed with a "walk-assistance" mode which can facilitate the stair ascent methods taught in the EMS Cyclist curriculum. Cyclists must be aware that the pedals will turn while this mode is engaged.
- Power assist (or mode) awareness is a must for effective urban and team riding. E-Bikes have a variety of power assist levels and also use standard gearing in the front/rear (mid-drive) or rear only (rear hub drive). You must be aware of your mode/gear combinations when operating in different environments. If you are in too high of mode and gear at a stop, you will need more pressure to start, but when the assist engages at the higher levels you will feel an unexpected burst of power. Mode awareness is also important in the opposite scenario. You may find yourself coasting or not maintaining a "good spin" and inadvertently shifting your weight on the bike. Power mode awareness is important.
- The ability to achieve higher speeds with significantly less effort demands greater awareness of speed and the inherent associated risks. More speed requires more braking, and depending on where the weight is skewed, requires solid braking techniques. Skill stations such as the Quick Turn, Decision-Maker, and Rock Dodge must be practiced at gradually increasing speeds. Students must be acclimated to the significant speed that can be achieved with less effort. Flat pedals appear to be the preferred pedal retention among e-Bike riders, which appears to make sense as the increased speed requires the ability to more easily disengage from the bike.
- The increased weight of an e-Bike may have a negative effect in tactical situations where the bike may need to be lifted or moved by means other than riding. For example, some Bicycle Response Team members may have difficulty lifting the bike and moving it forward during dismounted formations. Some of the defensive tactics taught to EMS cyclists are more difficult to perform with the weight of the bike coupled with the weight of the EMS equipment.
- The power-assisted e-Bikes made distance riding and quick-response riding significantly easier. Riders were less fatigued and more capable to act in their respective job functions when responding to calls in comparison to the same calls on conventional bikes.

Out of Class Electric Vehicles:

IPMBA foresees potential safety concerns, legal limitations, negative community perceptions, and liability issues arising from treating OCEVs like e-Bikes and therefore urges agencies to differentiate between low-speed electric bicycles and higher-speed OCEVs with respect to training and operations. While OCEVs may have a place in a department fleet, they should not be incorporated into bicycle operations for reasons including, but not limited to ones listed.

- Public safety cycling courses are not designed to teach riders how to operate at high speeds. Even riding a conventional bicycle at speeds greater than 28 mph/45 kph greatly increases the risk of serious injury in the event of a crash. Developing such skill requires a level of training and practice beyond what a public safety agency typically invests in bicycle training.
- Public safety cycling apparel, eyewear, and helmets are not designed to withstand the impact of high-speed crashes. The faster the vehicle, the greater the need for heavier, more durable personal protective equipment.
- OCEVs may or may not be equipped with adequate braking systems to compensate for their weight, speed, and rate of acceleration, putting riders at risk for collisions and crashes.
- OCEVs are not necessarily appropriate in environments and situations for which bicycles are uniquely well-suited. For instance, a rider may have difficulty operating an OCEV slowly and safely in crowds, navigating around and over obstacles, and carrying it up a set of stairs. OCEVs are also impractical for Bicycle Response Team maneuvers and less effective for stealth operations. OCEVs cannot be quickly mounted and carried on vehicle-mounted bicycle racks.
- Depending on the jurisdiction, it may be illegal to operate an OCEV on facilities often patrolled by bicycle, such as multi-use and off-road trails. Operating an OCEV in these areas may not be well-received by community members who are not afforded such privilege. In addition, operating an OCEV on pedestrian facilities during exigent situations, even if legal, could unduly endanger other users.
- There is a greater potential for equipment damage as the result of being dropped in the event of a dynamic dismount or otherwise in the course of normal operations.

Conclusion:

It is the responsibility of instructors to familiarize themselves with e-Bikes and their operation, differences, advantages, disadvantages, and other considerations unique to public safety cyclists. If an instructor has little or no experience with e-Bikes, it may be difficult to instruct students on the proper operations of an e-Bike and the need to alter certain techniques to successfully complete required skills. However, instructors are not, nor should they be expected to be, experts in e-Bike construction or knowledgeable about all makes, models and drive unit (motor) types.

IPMBA teaches the skills needed to operate bicycles safely and effectively within a front-line service environment. We embrace technological changes and encourage agencies to select bicycles that best suit their service environment. It is the responsibility of the IPMBA instructor to ensure that each rider masters all skills necessary to successfully complete the training requirements so they will be able to handle their individual bicycles competently in technical, vehicular, and operational cycling situations.