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Are E-Bikes Less Safe?

Higher speeds could mean more crashes, new research suggests.

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A visitor looks at electric bikes made by French company Moustache displayed at a cycling trade show. (REUTERS/Charles Platiau)

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In American cities, e-bikes don't have a huge presence yet. But elsewhere, they're taking to the [streets in ever-more-noticeable numbers](#). In China, they may have already reached market saturation. In Europe, between 700,000 and 1,200,000 e-bikes were sold in 2012, twice as many as in 2009 and eight times as many as in 2006. It's no wonder; the small, battery-powered motors tucked inside e-bikes' hubs or tubes permit considerably swifter, less sweaty progress.

Projections show these machines are even [slowly breaking through to car-loving North Americans](#).

But the ascent of the e-bike raises safety questions. With normal speeds topping out around 20 mph, are e-bikes more prone to crashes? Do e-bike riders behave any differently than regular ones? And do pedestrians, drivers, and other cyclists respond any differently to these motor-powered two-wheelers, which often look much the same as non-motorized ones? A study published this week in [Transportation Research](#) suggests that e-bikes do indeed carry a specific set of safety implications, and that transportation policy makers might do well to adapt.

Vehicle safety researchers from Sweden's Chalmers University of Technology set up 12 Gothenburg cyclists with e-bikes decked out with special research instruments, including GPS units, video cameras at front and rear, and sensors measuring acceleration and brake force. The cyclists, most of whom had no prior experience with e-bikes, rode these bikes for two weeks, going about their normal lives and commutes. In total, some 1,500 kilometers of data—more than 900 miles—were gathered, including 88 "critical events," which the researchers defined as crashes and near-crashes with cars, trucks, pedestrians, and other cyclists.

Based on analysis of the video footage and travel data, the researchers were able to determine the causes and contributing factors of these critical events. They were also able to compare the results with those of a previous study set up the same way but with regular bikes, and which involved 8 out of 12 of the same participating cyclists. Their analysis controlled for weather, time of day, light conditions, and whether the bike was on the road or a bike lane. Here's what they found:

E-bikes take faster, shorter, more frequent trips

Compared to the earlier study of regular bike-riders, the average speeds of the e-bike riders were, as expected, higher (by about four kilometers per hour). They made shorter, more frequent trips than those in the previous study, "in accordance with previous research suggesting that electric bicycle users travel more" as well as traveling faster, the study reads.

E-bikes run into hairy situations more often

For e-cyclists, speed was highly associated with crashes and near-crashes—more so than the number of kilometers ridden or riding time. E-bike riders experienced 88 critical events (versus 63 for regular cyclists), and they got into trouble at a higher rate, per kilometer (every 16.7 km, versus every 24.5 km).

The most common catalysts of critical events for e-cyclists were conflicts with pedestrians and other cyclists (49 percent of critical events), and motorized vehicles (29 percent). Fairly similar proportions were found in the earlier study with regular bike riders (45 percent and 33 percent, respectively).

But the number of times e-bikes came into conflict with cars, per kilometer, was 30 percent higher than with regular bikes. Based on the video evidence, the authors surmise this might have something to do with drivers making false assumptions about the electrified two-wheelers. Since e-bikes resemble traditional bikes, drivers may underestimate their speed. Plus, e-bikes might be entering into collision paths with cars more often as a result of their speed.

E-bikes: still awesome

These findings shouldn't be considered deal-breakers, though. First of all, the study was clearly quite small—a larger dataset, tracking more riders and different experience levels, over a longer period of time, might have produced findings of greater confidence. This research does still support others that have found differences in e-cyclist behavior and the mechanics of e-bikes themselves can produce greater likelihoods of [involvement in crashes](#). And it's a no-brainer that faster speeds create more opportunity for dangerous encounters.

So as e-bikes become a more familiar sight in cities around the world, special safety measures might be in order. Here, the authors suggest that e-bikes become more visually conspicuous, "possibly to a point where they can be perceived as different from traditional bicycles." That might help drivers, pedestrians, and other cyclists better anticipate their behavior in traffic. Improved lighting on the bikes themselves might also help cyclists increase their range of visibility and therefore the amount of time they have to react to road conditions ahead. In the U.S., [expanded networks of protected bike lanes](#) would go along way to protect e-bike riders, [regular cyclists, pedestrians, and drivers alike](#).

But even if they call for extra precautions—and, at least in the U.S., some [regulatory detangling](#)—e-bikes still carry promise as a potential breakthrough

in energy-efficient transportation. As Nate Berg reported for CityLab in 2014, the [speed and ease](#) of e-bikes seem to speak to Americans reluctant to break a sweat. Many U.S. owners report that they chose an e-bike over an automotive commute; the more e-bikes there are, the more cars they might replace. And, assuming the “[safety in numbers](#)” phenomenon holds true for e-bikes, the [safer all cycling might become](#), too.

About the Author



Laura Bliss is a staff writer at CityLab. She writes about the environment, infrastructure, and cartography, among other topics.

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