

DIRK ZEDLER

CYCLING NEEDS MORE HEAVYWEIGHT CHAMPIONS

It's hard to believe, but the average German, Swiss or Austrian man today weighs about 89 kilograms (196 pounds). A typical e-bike weighs, on average, 25kg. Add in a helmet, clothes and shoes, and an average man on an average e-bike weighs 117kg out the door. And that doesn't account for a briefcase, a backpack, or other luggage.

Yet the globally accepted ISO 4210 standard for bicycles implies a total permissible weight of 100kg. For EN 15194, the comparable standard for e-bikes, it's 120kg. (A kilogram equals 2.2 pounds.)

This means an e-bike that has been tested only to the EN standard has not been sufficiently vetted for nearly 50 percent of its potential male riders in these three countries, or, indeed, in many others. If we assume that many of these riders will carry some sort of cargo, the gap is even greater.

For conventional bicycles, the problem gets worse. A conventional bike weighs about 8 to 10kg less than an e-bike, but the applicable standard for a "safety-tested" bicycle assumes a total weight that is 20kg less.

It's obvious that these standards are insufficient for today's population of bike riders. Bike manufacturers should never be satisfied with testing their bikes only to the standards.

Mind the gap. How can it be that these standards are so far removed from the realities of the market?

The answer is complex: The process of developing standards is very lengthy, and average weights have increased so fast that the standards haven't kept up.

Another problem is that the standards are intended to apply globally. In Asia, the average male weighs barely 70kg, so these global standards remain valid for the majority of Asian cyclists.

In general, however, manufacturers should think of these standards as minimum requirements. They may be good guidelines for initial tests of components and complete bicycles, but manufacturers should understand that they are neither sufficient nor complete.

And the standards have significant gaps. For example, there is no standard for loads acting on a frame from a disc brake, nor is there a reasonable fatigue strength test for wheels.

Enough court decisions have put manufacturers on notice that simply fulfilling the requirements of the standards is insufficient. Instead, several courts have ruled that manufacturers must test their products to the current state of the art in science and technology.

Bikes are doing more. By observing cyclists, it's quickly apparent that, as electric motors become more powerful, the standards are falling further behind.

Not only are cyclists themselves getting heavier, but their e-bikes make it easy for them to carry more stuff with

them, like backpacks or other luggage. Every day, we see pedelecs serving as "mom's taxi" with a children's trailer in tow.

These changes are so dramatic that we can no longer use historical statistics about the type and frequency of component failures to predict what may happen in the future.

My own archives are proof. As an expert witness, I've presented hundreds of expert's reports for courts and insurance companies on accidents involving material failure that resulted in serious injuries or deaths. Two contributing factors stand out as common themes in many of these accidents: bicycles that were carrying heavy loads, and bicycles that had been used intensively.

E-bike accidents typically involve even heavier loads and even more intensive use. These are verifiable facts.

One bike does not fit all sizes. With a little luggage, a 140kg rider on an e-bike equals an overall weight of 180kg — well above the 120kg weight specified in the EN standard. You might argue that few riders weigh 140kg, even in today's society. But let's calculate this in a slightly different way:

Assume our rider weighs 105kg — above average but still common. He's on a 25kg pedelec and carries a 5kg briefcase on the luggage rack. Oh, and he's hauling his kids in a trailer, adding another 40kg to the total.

These very reasonable assumptions take us to a total weight of 175kg. Now we can see why a "normal" e-bike should be tested for a total weight of 180kg.

Because the standard is clearly insufficient, I believe that city and trekking bikes should be categorized by the amount of weight they can carry, as well as their anticipated uses.

It doesn't make sense to sell an e-bike designed to accommodate 180kg of total weight to a woman who only weighs 55kg. It would be too much bike for her to handle safely.

That's why the Zedler Institute has developed weight classifications that we believe do a better job of accounting for different types of riders and different types of uses.

Our Advanced tests cover total weight of up to 130kg, while our Advanced-Plus tests go up to 150kg and our Advanced-Plus-XXL tests to 180kg.

Our tests, as well as real-world experience with XXL-tested products, confirm that bicycles are perfectly capable of carrying 180kg of total weight. But it's up to manufacturers to accept and promote these categories.



Even a step-through frames can be the foundation of a good XXL bike, as long as it is properly tested as shown here (identifying details are blurred). (Photo: zedler.de)

They should also understand that the use of trailers is becoming more and more popular, especially with e-bikes.

Another task requires sensitizing retailers that e-bikes are not all equal. They should inform their customers early in the sales conversation about the importance of accounting for the total weight that a new bike will be expected to carry. Retailers should make sure customers understand that

their bike will have to carry not just them, but the weight of the bike itself, their luggage, and, if relevant, their kids and a trailer.

We have also found that particularly heavy customers, who are accustomed to compensating for their weight in other aspects of their lives, are grateful for the opportunity to buy an XXL-tested bike.

■ Dirk Zedler

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Since 1993, Dirk Zedler has been an analyst and expert witness on bicycle accidents and product failures for courts, bike and insurance companies, and private individuals.



He got his start in the industry by working for a large bike shop in 1986, and now holds the respected advanced engineering degree known as a "Diplom-Ingenieur."

Courts have recognized Zedler as an officially appointed and sworn expert on bicycles since 1994, and on electric bicycles since 2014. His staff prepares some 800 expert's reports every year.

Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH (the Zedler Institute for Bicycle Technology and Safety) has used this wealth of knowledge, derived

from its work in thousands of court proceedings and expert's reports, to enhance research and development in the bicycle industry.

The Institute sets the standards for the bicycle industry. It develops and builds testing equipment that is used by manufacturers to improve the riding quality and safety of their bikes, and by leading European bicycle magazines to test them. The Institute's work provides a basis for European and American manufacturers to communicate with their Asian suppliers. Manufacturers can buy test equipment from the Institute or use its state-of-the-art testing labs.

The Zedler Institute also prepares user manuals for bicycles and pedelecs. These manuals, now available in more than 40 languages, help consumers use their bikes properly — and in many cases have protected manufacturers from liability.

■ For more information, visit www.zedler.de.