

Dirk Zedler

IBDs: Just say no to installing conversion kits for pedelecs

It's a fact that more and more e-bike conversion kits are available on the market. These kits bundle an electric motor, battery and control unit together so consumers can transform a conventional bike into a pedelec.

The proliferation of conversion kits raises many technical and, especially, legal issues. Does it make sense to convert a regular bike using one of these kits? Should an IBD perform the work for a customer?

My answer to both questions is an unequivocal “no.” Conversion kits make a bike significantly less safe — and IBDs that install them are exposing themselves to significant legal jeopardy. Here is why IBDs should just say no to conversion kits.

Fatal attraction. Even their biggest skeptics must accept by now that pedelecs are unstoppable. Climbing hills, or hauling children in trailers, are no longer obstacles; city trips are almost effortless; sweaty rides are a thing of the past.

The boom in pedelec sales is almost self-perpetuating. If one cyclist buys an e-bike, her riding friends will follow suit.

The clientele has also expanded considerably in the last two or three years. Electric bikes used to appeal only to older cyclists, but today, younger riders are investing in sporty electric mountain and road bikes.

Several committed and reputable brands now produce attractive, well-made, fully assembled pedelecs, but the range of conversion kits is also growing. Their starting prices of about 800 euros for a kit that includes a motorized rear wheel, battery and wiring is more than attractive, given that new pedelecs start at about twice the price.

But buyer beware! There are several arguments against these do-it-yourself pedelecs.

Low tech. The technology in a cheap conversion kit is yesterday's news. It represents the state of the art of electric bikes as it existed more than a decade ago, and is worlds away from the quality and functionality of today's drive systems.

Established, reputable pedelec drive manufacturers such as Bosch, Brose, GO SwissDrive, Shimano, Yamaha, etc. have made significant advances in such areas as sensor technologies, battery management, battery quality and efficiency.

Using outdated electronics in a cheap conversion kit makes little sense because they compromise riding fun and safety.

High-quality conversion kits are available, but they cost almost as much as a new “off-the-rack” pedelec on sale. Add in the cost of the base bicycle and labor, and it's often less expensive to simply buy a new pedelec.

Don't go wobbly on me. Adding a motor and battery makes a conventional bicycle heavier and less stable. It is also clear that the loads acting on the bicycle's

components increase considerably. Conventional bicycles are not designed to withstand such loads, which can result in material failure with unforeseeable consequences.

The danger posed by a conversion kit is even more insidious. Because owners can now climb hills or haul cargo or children with ease, they are likely to use their converted pedelecs more often.

We know that pedelec owners ride significantly more kilometers than owners of conventional bikes. While that's generally seen as good news, in this case it becomes bad news because it means they are increasing the chances of an accident.

Conventional bicycles are simply not engineered to carry a battery and a motor in a solid, well-balanced way. Kits that use a battery mounted on the rear rack should be treated with caution, because they place a large mass in an unstable position.

The mass of the battery often oscillates, which can cause the bike to wobble dangerously. With the battery on the rear rack, there is an increased risk of breakage. If the battery is mounted where the bottle cage usually sits, then the rider loses the best location for a water bottle.

Mind the law. IBDs may shrug off these concerns, but there is one thing they should not dismiss so carelessly. Within the European Union, a bicycle is legally classified as a machine once it is equipped with a motor. And under European laws, any machine must undergo an expensive, time-consuming conformity process.

A bicycle cannot be offered on the market for rent or sale before all standards have been met, all tests passed and all technical documentation completed.

Pedelec manufacturers signal their compliance with all of these steps by affixing the CE mark to the finished product.

The CE mark is an affirmation by the responsible party that, for example, a pedelec is fatigue resistant. This is something an IBD installing a conversion kit simply cannot know. The IBD does not know how durable the bike was when it was new, nor whether the bike has been involved in any accidents or suffered any damage.

Pedelec manufacturers are required to subject their bikes to an electromagnetic compatibility test. This test alone costs more than the retail price of a high-end city pedelec.

Anyone who thinks they can slap a CE mark on a bike without doing the required tests is mistaken. The Product Safety Act, which is applicable throughout the EU, explicitly forbids putting a product on the market without the mark.



A mid-drive pedelec conversion kit (Photo: zedler.de)

Just say no. In case of problems, who is legally responsible? Not the motor supplier, because it is not responsible for the entire machine. Not the bicycle manufacturer, because it sold a conventional bike, not a pedelec.

Who's left? The IBD! By installing a conversion kit, the IBD assumes all manufacturer obligations and complete liability. In the worst case, not only is the bike manufacturer's warranty null and void because of the conversion, but the IBD is now liable for any damages

caused by a material failure that leads to an accident.

It is no exaggeration to say that the IBD could face hundreds of thousands of euros in damages, or more, simply by performing the conversion.

For an IBD, the question is not whether installing a conversion kit is possible or even worthwhile. The question is whether doing so is legal — and under European laws, it is not. Installing a conversion kit is forbidden.

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Dirk Zedler

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.