

Press Release



Maintenance of the braking system is crucial for safety

Cargo bikes: loading has a significant influence on braking performance

- ▶ Modern hydraulic disc brakes achieve good deceleration values
- ▶ Often technology from the pedelec segment is used
- ▶ Depending on use and topography, wear quickly becomes an issue

The braking system is a crucial component for safe driving. This is not only true for motor vehicles, but also for bicycles – and even more so for cargo bikes, which are often used to transport large masses. The influence that loading can have on braking performance has now been examined as part of a student research project at DEKRA Accident Research. The results are positive overall – the hydraulic disc brakes of modern cargo bikes provide decent to good deceleration values. However, the topic of brake wear and maintenance becomes important, especially when the bike is frequently used with a full load.

The study used empirical tests to examine how braking performance differs under different loading conditions and whether current braking systems meet safety requirements. Five different models and types of cargo bike were used – some new, some with high mileage and brake systems that had already been used. During real rides with an experienced test driver, the bikes were each braked from 25 km/h (15.5 mph) to just before the locking point – and this was done in different load setups: in one test series with only the driver and the measurement technology, in a second with an additional load of 50 kg, and in a third test series with a full load up to the permissible total mass specified by the manufacturer. This reached up to 270 kg in the case of a two-track front-loader model with a large transport box.

The tests initially revealed the fundamentally high performance of modern bicycle brake systems. “Overall, the average braking performance was convincing,” says DEKRA accident researcher Luis Ancona. “With deceleration values of 4.4 to 7.7 m/s² in the unladen state, they partly fell within the range legally required of motor vehicles.” In the case of the classic Long John models, deceleration values of up to 8 m/s² were even achieved during individual braking maneuvers.

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At the same time, the deceleration values decreased significantly (-7% to -22%) with increasing load; however, they remained largely at a good level, the hydraulic disc brakes proving their reliability. In particular, the Long John model with the largest brake disc dimensions (two-part brake disc: 203 mm at the front, 220 mm at the rear) achieved – with the maximum total weight of 225 kg according to the manufacturer's specifications – an average deceleration value of 6.07 m/s².

High load on the brakes causes high wear

“When choosing a cargo bike, it is important to ensure that the braking system is sufficiently dimensioned. In order to decelerate large masses, the brake needs the appropriate power. It's simple physics,” says the DEKRA expert. “Often, the built-in braking systems come from the normal pedelec segment, although cargo bikes move significantly higher masses. Our tests show that these brakes may be sufficient, but the intended use and topography should always be considered in the decision.”

Especially when riding frequently with a full load or on mountainous routes, the brakes can quickly reach their limits. “Just as important as the right braking system is regular maintenance,” says Ancona. “Wear is much higher on cargo bikes than on normal pedelecs that only transport one person. For safety reasons, it is therefore crucial to regularly check the brake discs and brake pads and, if necessary, replace them in good time.”

Captions

1. The hydraulic disc brakes on modern cargo bikes usually achieve decent to good deceleration values. However, as the load increases, these can decrease significantly in some cases.
2. Brake tests as part of a student research project at DEKRA Accident Research.
3. Using a data logger, the deceleration values of different models and types of cargo bikes were measured – each in different loading setups.

About DEKRA

For 100 years, DEKRA has been a trusted name in safety. Founded in 1925 with the original goal of improving road safety through vehicle inspections, DEKRA has grown to become the world's largest independent, non-listed expert organization in the field of testing, inspection, and certification. Today, as a global partner, the company supports its customers with comprehensive

services and solutions to drive safety and sustainability forward—fully aligned with DEKRA's anniversary motto, "Securing the Future." In 2024, DEKRA is expected to generate revenue of 4.3 billion euros. Around 48,000 employees are providing qualified and independent expert services in approximately 60 countries across five continents. DEKRA holds a Platinum rating from EcoVadis, placing it among the top 1% of the world's most sustainable companies.