

Press Release

DEKRA road tests reveal issues with worn tires

Stopping Distance on Wet Surfaces: Tread Depth Can Decide About Crashing

- Poorer deceleration and increased risk of hydroplaning
- Shallower treads make vehicles unstable to drive at lower speeds
- 1.6 millimeter is the minimum in Germany, but more depth is recommended

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Tires' tread depth can be crucial in determining whether or not a critical situation on the road turns into an accident. Recent road tests from DEKRA show how as tread depth decreases, stopping distances on wet pavements increase. "Our tests reconfirm that the legally required minimum tread depth is the absolute lower limit – for their own safety's sake, drivers should replace their tires before they have been worn down that far," says DEKRA tire expert Christian Koch.

The tests on a variety of test tracks at DEKRA Lausitzring were aimed at finding specific results on how tread depth alone can affect a car's handling, including with regard to accidents. "To do this, we had new sets of tires in two different sizes from well-known manufacturers mechanically worn down by a retreader – in other words, the tread depth was reduced," Koch explains. Several road tests were performed with tread depths of 7-8 mm (as new), 4-5 mm, and 2-3 mm.

16 to 18 percent longer stopping distances than with new tires

In the first series of tests, the brakes were applied in a car traveling at 100 km/h (62 mph) with the different sets of tires on both wet and dry surfaces (ABS braking in accordance with DIN 70028). This resulted in the shallowest tread depth having a longer stopping distance than the as-new tires, especially on the wet pavement. "We measured an increase in stopping distance of between 16 and 18 percent across the two different tire sizes," Koch notes.

Peter Rucker, head of DEKRA Accident Research and Accident Analytics, explains what a difference like this means in serious cases: "At the point where a car with brand-new tires comes to a complete stop, a vehicle with tires down to 2-3 mm tread depth is still moving at around 30 km/h (19 mph). If you crashed into the rear of a truck at that speed, for instance, it could result in serious injuries.

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Specifically, if you collided with a cyclist, for example, they would likely be very seriously or even fatally injured.”

The stopping distance with the worn tires was also longer on dry roads, but only by 2.4 to 8.5 percent.

Maximum cornering speed drops with shallower tread depth

The second series of tests consisted of a steady-state circular drive (in line with ISO 4138). This involves a professional test driver gradually accelerating a vehicle in a constant cornering radius until the lateral force reaches the limit range and the vehicle swerves off – i.e. up to what is known as the maximum cornering speed. In these tests, tread depth made little difference on a dry surface. But things looked different in wet conditions: “The maximum cornering speed with 2-3 mm tread depth was 10 to 18 percent lower than with the new tires,” reports tire expert Koch. “This means that the vehicle was unstable to drive at significantly lower speeds, which can easily result in an accident.”

The results were corroborated by the third series of tests: the double lane-change (as set out in ISO 3888-1), also known as the moose test.

“Overall, we found that as tread depth decreased, the tires were significantly worse at applying force between the vehicle and the road, especially in the wet. This means that dangerous situations can arise more easily, and, at the same time, the ESP stability program is less able to intervene effectively. On top of that, hydroplaning becomes a more pressing concern with shallower treads,” Koch adds. Hydroplaning is when the tires float on the layer of water over a wet road, causing them to lose contact with the pavement. “When the treads are deeper, more water is able to pass through them, which reduces the risk of hydroplaning,” Koch states.

Tire age is also a significant additional factor in real life conditions

The tests with mechanically inflicted tire abrasion only show one side of the picture when it comes to worn tires. “In real life, the rubber also tends to harden over time, which also impairs performance. We can assume, then, that real worn tires which are already a few years old would have performed even worse in these tests,” Koch says. “But we specifically only wanted to investigate the effect of tread depth, so the worn tires were still new in terms of rubber compound.”

Within the EU, tires are always approved and licensed in factory-new condition when it comes to rolling resistance, noise emissions, and wet grip. “How well a tire continues to do its job while worn is not yet taken into account,” Koch says. “There will be changes here in the future – the relevant specifications and standards are currently being coordinated.”

Tire defects are a significant cause of accidents

There is currently no consensus among tire manufacturers about the minimum tread depth or age from which force applied between vehicle and road noticeably decreases.

“The fact is that official accident statistics in Germany list defective tires as the cause of 38 percent of all accidents stemming from a technical fault on the part of the car,” says DEKRA accident expert Peter Rücker. “One factor here might well be that, for example, a worn tire is relatively easy for police officers to recognize at the scene of an accident, so tires may tend to be statistically overrepresented. But notwithstanding that, it is clear that tire defects play a significant role in accident statistics.”

More broadly, the DEKRA tire expert has a message for all drivers: “Always bear in mind that the only connection between your vehicle and the road consists of four small areas, each just slightly larger than a postcard. And remember that a tire's performance in extreme situations will decrease as the tread depth gets shallower, especially on wet roads.”

Caption:

Road tests at DEKRA Lausitzring show that vehicles with shallower tread depths become unstable to drive at a lower speed.

About DEKRA

DEKRA has been active in the field of safety for almost 100 years. Founded in 1925 in Berlin as Deutscher Kraftfahrzeug-Überwachungs-Verein e.V., it is today one of the world's leading expert organizations. DEKRA SE is a subsidiary of DEKRA e.V. and manages the Group's operating business. In 2021, DEKRA generated sales totaling more than EUR 3.5 billion. The company currently employs almost 48,000 people in approximately 60 countries on all continents. With qualified and independent expert services, they work for safety on the road, at work and at home. These services range from vehicle inspection and expert appraisals to claims services, industrial and building inspections, safety consultancy, testing and certification of products and systems, as well as training courses and temporary work. The vision for the company's 100th birthday in 2025 is that DEKRA will be the global partner for a safe, secure and sustainable world. With a platinum rating from EcoVadis, DEKRA is now in the top one percent of sustainable businesses ranked.