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TIRE SIMULATION IN THE FIELD OF TENSION BETWEEN DRIVING DYNAMICS AND TIRE ABRASION

1 Tire abrasion with different chassis configurations

Tires play an increasingly important role in the development process for a new vehicle. This is particularly true in the area of driving dynamics. In recent years, enormous progress has been made through the development of new axle concepts, but also through the symbiotic integration of tire development in the chassis development process.

A very good example of the tire/chassis symbiosis is the simultaneous optimization of the vehicle's driving dynamics properties and the resulting tire wear which is caused by the friction of the tire on the road surface. In rolling contact with the tire, this friction can never be completely avoided, even when the tire is rolling freely.

Low abrasion typically has a negative effect on the tire's steering and braking properties. Efforts are therefore being made to optimize both abrasion and steering properties simultaneously and to ensure that the abrasion progresses evenly across the tire width. Toe-in and camber adjustments of the wheel in particular promote uneven tyre wear. But the right choice of tire pressure also has a decisive influence on abrasion. The optimization of the steering properties alone via camber and toe-in can certainly contradict the optimal abrasion behavior.

Structural tire model

In order to find an optimal solution in this area of tension, full vehicle simulations are increasingly used in the early vehicle development phase. Our structural tire model CDTire/3D offers all necessary characteristics to consider the tire in this process. It not only calculates the local tire wear, but also analyses the contact area of the tire in all maneuvers relevant to driving dynamics, also depending on tire pressure.

On the one hand, this allows chassis settings to be optimized for both tire abrasion and driving dynamics characteristics, and on the other hand it supports the selection of the optimum tire dimension.