



EFFECT OF SUSPENSION ON CORNERING



The suspension system of a vehicle plays a crucial role in its cornering performance. The design and characteristics of the suspension system have a significant impact on how a vehicle handles during cornering. Here are some key effects of the suspension system on cornering:

Tire Contact Patch and Grip:

Proper suspension geometry and tuning help maintain optimal tire contact with the road during cornering. This maximizes the available grip and contributes to better handling and stability.

Roll Stiffness and Body Roll:

The roll stiffness of a suspension system influences the amount of body roll a vehicle experiences during cornering. Body roll can affect the distribution of weight among the tires, potentially impacting tire grip.

A well-tuned suspension system strikes a balance between minimizing body roll for stability and allowing enough compliance for comfort and traction.

Cambers and Tire Loading:

Suspension geometry, including camber settings, affects how the tires are loaded during cornering. Proper camber angles help ensure even tire loading, promoting consistent grip across the tire contact patches.

Negative camber on the wheels is often used to compensate for body roll, ensuring that the tires maintain optimal contact with the road during cornering.

Damping Rates:

Suspension dampers (shock absorbers) control the rate at which the suspension compresses and rebounds. Proper damping rates help prevent excessive bouncing or oscillation, contributing to stability and control during cornering.

Damping also affects how quickly the suspension responds to inputs, such as steering or road irregularities, influencing the overall feel of the vehicle during cornering.

Spring Rates:

The stiffness of the suspension springs, known as spring rates, influences how the vehicle weight transfers during cornering. Balanced spring rates contribute to a predictable and controlled cornering behavior.

Soft springs may lead to excessive body roll, while overly stiff springs can result in a harsh ride and reduced tire contact with the road.



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Anti-Roll Bars (Sway Bars):

Anti-roll bars connect the left and right sides of a vehicle's suspension to reduce body roll during cornering. They help maintain a level chassis and distribute weight more evenly among the tires.

Adjustable anti-roll bars allow for fine-tuning the vehicle's handling characteristics based on driving preferences or specific performance requirements.

Bump Steer and Ackermann Geometry:

Bump steer, caused by changes in suspension geometry during suspension travel, can affect steering stability during cornering. Proper suspension design minimizes bump steer for consistent and predictable steering response.

Ackermann geometry in the steering system is important for achieving optimal tire angles during cornering, ensuring that the inside and outside tires follow the correct paths.

Ride Height and Aerodynamics:

Suspension settings, including ride height, can influence the vehicle's aerodynamics during cornering. Lower ride heights and well-designed aerodynamics contribute to improved high-speed stability.

In summary, the suspension system is a critical component influencing how a vehicle behaves during cornering. Engineers carefully design and tune suspensions to achieve a balance between comfort, stability, and performance, ensuring that the vehicle responds predictably and safely in various driving conditions.