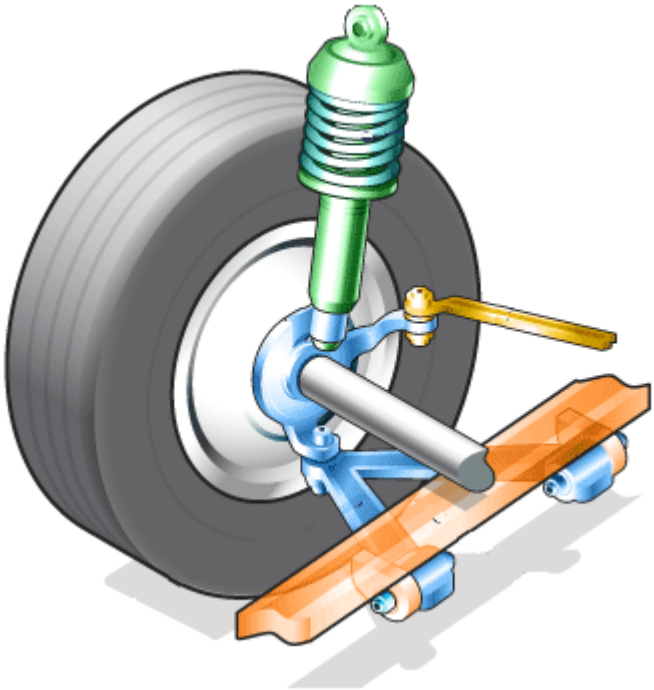
Suspension System 1



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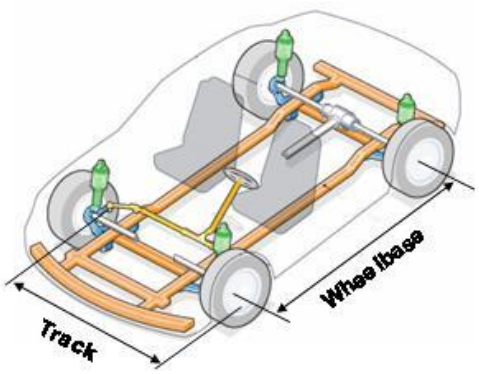
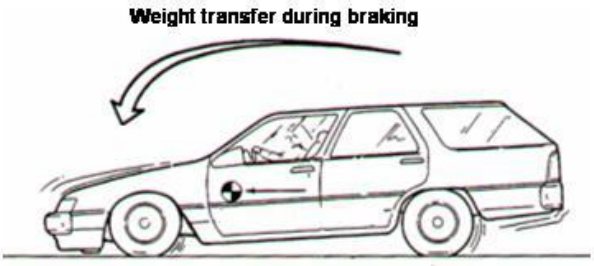
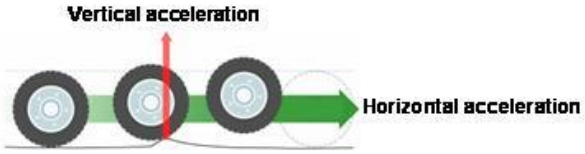
Fundamentals of suspension

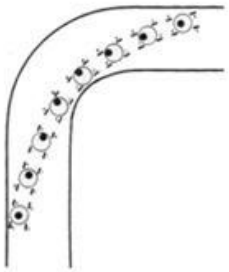




Tire force variation



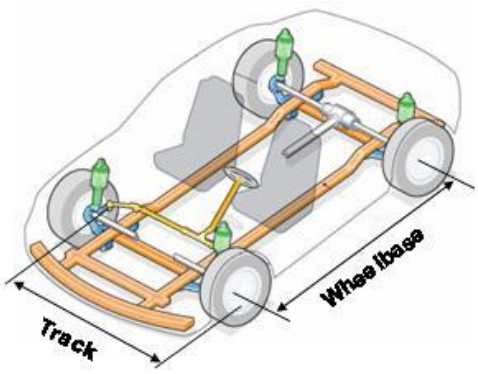
Road Isolation

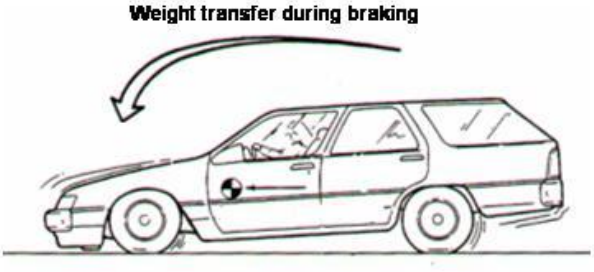


Vehicle turn

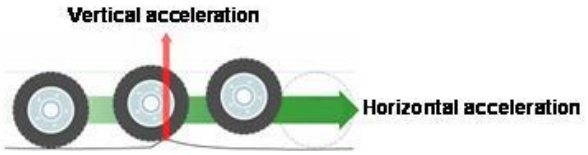
Wheelbase and Track:

The side to side distance between the centerline of the tires on an axle is called track. The distance between the centerline of the front and rear tires is called wheelbase. If the vehicle is in proper alignment, the wheels will roll in a line that is parallel with the vehicle's geometric centerline. The amount of grip or friction between the road and the tires is the major factor that limits how the vehicle accelerates, maneuvers through corners, and stops. The greater the frictions, the faster the car can accelerate, corner and stop. The tire to road contact of a vehicle is affected by several forces. Vehicle dynamics is the study of these forces and their effects on a vehicle in motion. Vehicle geometry, suspension, and steering design all affect the handling of a vehicle. Road isolation is the vehicle's ability to absorb or isolate road shock from the passenger compartment. The degree to which this is accomplished is controlled by the condition of the suspension system and its components. A properly functioning suspension system allows the vehicle body to ride relatively undisturbed while traveling over rough roads. This is accomplished through the combined use of bushings, springs, and hydraulic dampers.

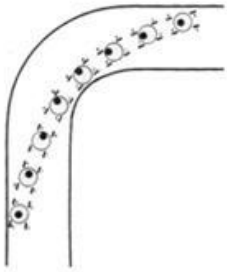




Tire force variation



Road Isolation



Vehicle turn

Tire force variation is a measure of the road holding capability of the vehicle and is directly influenced by shock absorber or strut performance. Shock absorbers and struts help maintain vertical loads placed on the tires by providing resistance to vehicle bounce, roll and sway during weight transfer. They also help reduce brake dive along with acceleration squat to achieve a balanced ride. Tire loading changes as a vehicle's center of gravity shifts during acceleration, deceleration, and turning corners.

The center of gravity is a point near the center of the car; it is the balance point of the car. As the vehicle brakes, inertia will cause a shift in the vehicle’s center of gravity and weight will transfer from the rear tires to the front tires. This is known as dive. Similarly, weight will transfer from the front to the back during acceleration. This is known as squat. As a vehicle turns a corner, centrifugal force pushes outward on the car’s center of gravity. Centrifugal force is resisted by the traction of the tires. The interaction of these two forces moves weight from the side of the vehicle on the inside of the turn to the outside of the car, and the car leans. As this occurs, weight leaves the springs on the inside and that side of the vehicle rises. This weight goes to the springs on the outside, and that side of the vehicle lowers. This is what is known as body roll.