



Our Precision, Your Advantage

HISTORY OF SUSPENSION

With the development of means of transport, the need to isolate passengers from the vibrations caused by rough ground soon became clear.

An initial solution was to separate the body (sprung mass) from the wheels (unsprung mass) using springs or leaf springs. Although it made for a somewhat more comfortable ride, the disadvantage of this system was that any form of impact meant that the “body” rocked continuously and uncontrollably, leading to vehicle instability.

It was necessary, therefore, to incorporate another component or improvement to detain this rocking. These devices were shock absorbers. The earliest designs consisted of discs that managed to damp vibration through friction with one another. Telescopic hydraulic shock absorbers, the type most commonly used nowadays, were then developed.

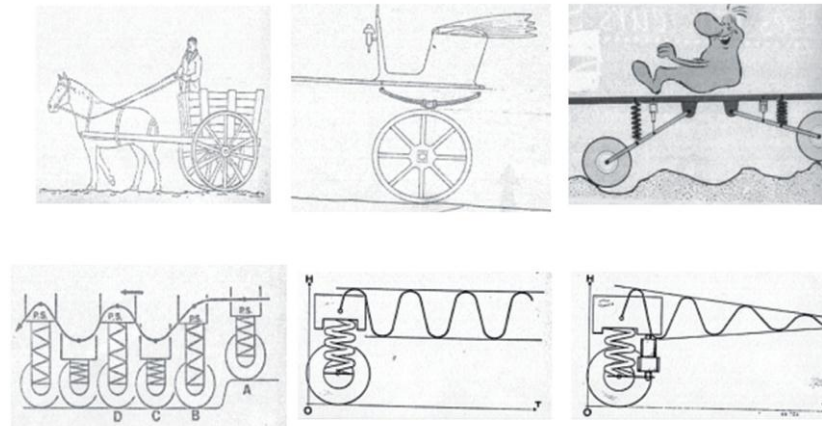


Figure 1. Examples of damping systems

Figure 1 shows how at first carriages were fitted directly onto the axle. All forms of disturbance were communicated directly to the carriage and its passengers. This system was improved by incorporating leaf springs between the wheels (unsprung mass) and the carriage (sprung mass). Although this led to greater ride comfort, it was also an unstable system because when vibration was produced, it failed to stop, causing the carriage to rock continuously.

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Damping systems to counter this rocking movement were brought in at a later date. Nowadays, the suspension systems employed on automobiles have evolved to such an extent that we can control the degree of comfort and safety in line with market requirements.

FUNCTIONS OF SUSPENSION

The word suspension is used to refer to the set of elastic parts that join and intercede between the sprung parts (frame, body, passengers and load) and the unsprung parts (wheels and axles). The job of these parts is to absorb the reactions produced on the wheels by uneven terrain, thereby ensuring passenger comfort and, at the same time, keeping the vehicle stable. These reactions are absorbed by the combined action of the tyres, the elasticity of the seats and the suspension system.

The different parts of the suspension system of a modern vehicle are:

- Control arm: Suspension arms
- Elastic parts: Rubbers, spring, stabilizer bar.
- Damping parts

The functions of the suspension system or axles are as follows:

- Bear the vehicle and withstand its inertia overload, produced on accelerating, braking and changing direction.
 - To permit wheel contraction on vertical movement.
 - Guide the vehicle precisely. When the brakes are applied, the car must be prevented from moving to the right or left and must hold straight.
 - Steer the vehicle: Steering system.
 - Drive and brake the vehicle.
 - Isolate the passengers from jolting (comfort).
 - Ensure wheel grip to the ground at all times and in all conditions.
- This is where the shock absorber plays its most important role.



Figure 2. Diagram of a suspension axle

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