

# ROAD HANDLING

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Road handling plays an essential role in the relationship of trust that is built up between the driver and his car. As well as “road holding” in the traditional sense, **the vehicle must not react in disconcerting way**, or give the sensation of becoming difficult to control during acceleration or braking, for example.



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## THE BASICS

**The dynamic behaviour of a car involves extremely complex phenomena.**

The notion of weight transfer on each wheel is used. For example, on acceleration, the rear axle will be subjected to a greater vertical load than when the car is stopped or driving at a constant speed.

The acceleration to which the vehicle

is subjected modifies the initial distribution of the vertical forces between the front axle and the rear axle. It is as if an additional vertical force is applied to the rear axle, and an equivalent force is removed from the front axle, hence the name weight transfer. Inversely, on braking, this weight transfer occurs on the front axle. Similarly, in a bend,

depending on direction, the weight transfer occurs on the left or right wheels of the vehicle (inside or outside the bend). The problem gets even trickier when cornering is combined with acceleration or braking. The longitudinal and lateral weight transfer are combined, which sometimes leads to considerable weight transfer on a single wheel.

▸ Safety

▸ Environment

▸ Life on board

▸ Mobility

▸ Competitiveness

## IN SHORT

THE DYNAMIC BEHAVIOUR OF A CAR IS ESSENTIAL IN ORDER TO ESTABLISH A RELATIONSHIP OF TRUST BETWEEN IT AND THE DRIVER. UNFORTUNATELY, NO UNIVERSAL TECHNICAL SOLUTION EXISTS. RENAULT IS THEREFORE CONDUCTING NUMEROUS STUDIES TO FIND THE CONFIGURATION BEST SUITED TO EACH TYPE OF VEHICLE – MPV, SALOON OR SPORTS MODEL.

**The phenomena involved are complex**, and so are studies of the dynamic behaviour of a car. Mechanical solutions which are satisfactory during a static

study may prove to be unsatisfactory if not ineffective for the dynamic behaviour of the car. Finally, the overall architecture of the car also considerably affects

weight transfer phenomena and consequently, the vehicle's handling. Hence, the issue is relatively different on a passenger van or a saloon, or even a coupé.

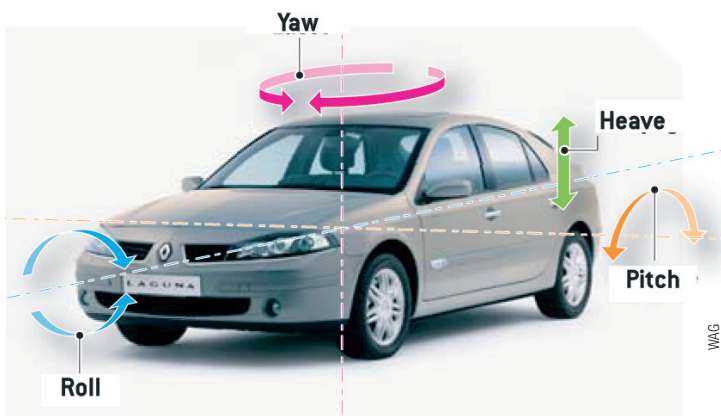
## HOW DOES IT WORK?

**Usually, the aim is to find innovative solutions** whose primary function is to control the movements of the wheels in relation to the vehicle body. A first approach lies in optimising suspension systems and dampers. Among other things, Renault has developed variable damping systems able to combine comfort on low displacement amplitudes and better control of body movements in the case of greater displacement.

**The rear suspension of the Espace** contains hydroelastic mountings and a Panhard bar, a long, very stiff transversal bar, able to resist considerable lateral forces to provide good guidance of the rear wheels in a bend without hindering longitudinal or vertical flexibility, essential for a high level of comfort.

**Still for the rear wheels,** the trigonal suspension system (see sheet) equipping Vel Satis

ensures perfect control of the wheel movements in the three axes (vertically, laterally and longitudinally), while being particularly compact. On some sports models, the front suspension with independent pivot enables the handling of the vehicle to be adapted to strong accelerations. Steering remains light, ideally calibrated and hardly affected by high engine torques.



The various movements of the body