# KW SUSPENSION OVERVIEW

“DEFINITIONS -
Bump = When a spring is made to compress.
This is also broken down into -
Low Speed Bump = Slow compression on the spring such as acceleration, cornering and braking.
and
High Speed Bump = Fast compression of the spring such as kerbs or potholes.
Rebound = When a spring is made to expand.

EXPLANATION
When a car is travelling along the road in a stable condition at a steady speed in a straight line the suspension and springs will be in a state of equilibrium although the springs will have some load already on them due to the weight of the car on each corner.
Things that affect the dampers and springs are acceleration, cornering and braking, but also kerbs and pot holes, or anything that creates a movement effect on the wheels or the car chassis.

ACCELERATION
When a car accelerates the front will tend to lift and the rear will tend to drop. Partly due to the Centre Of Gravity(COG) being affected by its inertia and trying to stay where it is when the wheels are trying to push it forward. Ever seen a motorcycle do a wheelie, this is where the power of the bike combined with inertia of the COG overcomes the weight on the front wheel. Even on a lower power bike the rider can just give a tug on the handlebars as he accelerates and this will be enough to pull the COG back over the rear wheel as the bike moves forward. This is an extreme example and not generally seen on a car because of the relatively low power to weight ratio. Unless - it has massive power to weight ratio such as on a dragster.
The effects are low speed rebound on the front and low speed bump on the rear.

CORNERING
When a car enters a corner, the COG will want to move towards the outside of the corner and will cause the car to try to roll over and if the car had a sufficiently high COG with a narrow track it probably would. Thankfully sports and high performance cars are designed to have a low COG and apart from in extreme circumstances the COG remains inside the wheelbase and track. So the car will simply roll within that area causing the outside suspension to compress and the inside suspension to expand.
So in a corner the outside suspension is subject to low speed bump and the inside suspension is subject to rebound.

BRAKING
When a car brakes, the front will tend to dive towards the road and the rear will tend to lift as the COG is trying to carry on moving forward over the front wheels which of course are trying to slow down. Because of this another effect is that the COG (or weight) moves closer to the front axle and so the front tires take more of the braking force, in extreme circumstances this could be up to 80% or even 90% of the braking efficiency. This is one of the reasons that the rear wheels will lock so much easier than the front, as the braking force between the pad and disc becomes greater than the frictional force between the tyre and the road and this can end up in a skid.

How is this related to KW suspension kits.

ON THE ROAD
Where you have adjustable bump and rebound on a suspension kit it means that you can alter the amount of damping for each type of driving situation, for instance if the car is being driven mainly on the public road it can be set up for a softer ride so that acceleration, cornering and braking are slightly more comfortable not only for the driver but also for the car and this will give the suspension and fittings of the car a longer life.

ON THE TRACK
When on a track the suspension can be set up to be a bit harder as the track is usually a lot smoother than a public road so the emphasis is on resistance to movement of the suspension and this will help to control the chassis in pitch and roll situations. Which means that the car is kept under better control especially when cornering and braking.

The KW suspension has a high speed bump setting which is set at the factory, what this means is that although the low speed bump can be set fairly hard, the high speed bump will allow some movement in the damper should the wheel encounter something that would otherwise jar the suspension, such as a kerb on a track or a pothole on the public road.”