

TUNING HONDA

SUSPENSION, GEOMETRY

This month, we are taking a look at suspension, geometry and the handling of the car.

As with all production vehicles, when a stock car leaves the factory its suspension is not set-up for the optimum handling performance. Therefore, it is only natural that performance enthusiasts will want to make improvements.

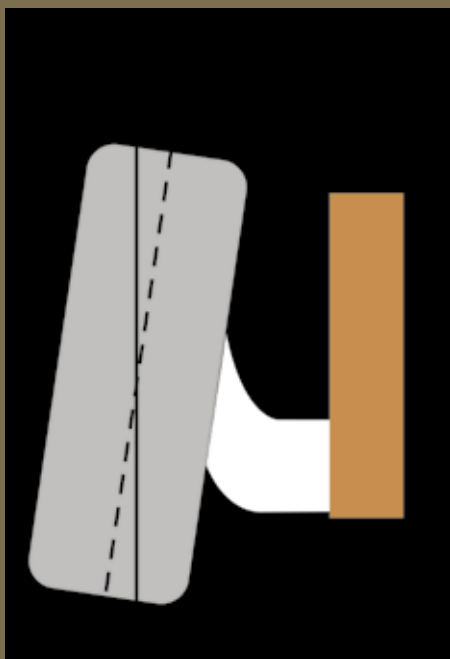
This can practically be done in three ways:

- Reset geometry to better settings, using existing factory springs and dampers
- Reset geometry using performance springs, with existing factory dampers
- Reset geometry using performance springs and dampers (coil-overs).

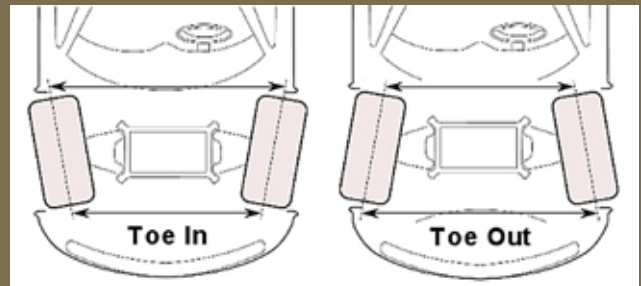
When adjusting the chassis geometry there are four main areas which can be adjusted practically and they are

- Camber
- Toe
- Caster
- Ride height.

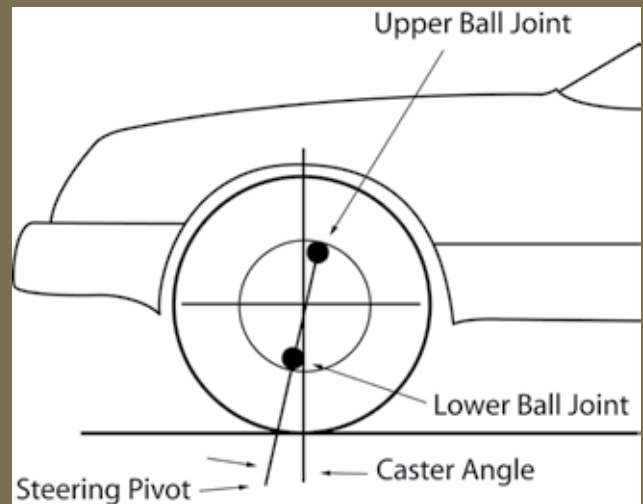
Adding or subtracting camber involves increasing or decreasing the angle shown in the following illustration:



Below are some illustrations that demonstrate toe. As shown, vehicles can be adjusted for toe in or for toe out. This is true of both the front and rear wheels.



The caster angle is demonstrated below:



Ride height is self-explanatory.

Okay. Now we understand what aspects can be adjusted, let us look at how you can adjust them.

TOE

Most Honda vehicles have adjusters to facilitate realigning the wheels both to the front and the rear. It is these adjusters that are used to alter the toe settings. It goes without saying that all cars will have factory toe settings directly off the production line, however performance shops will have devised and developed their own settings in order to enhance the handling of the car.

HONDA ENGINES

AND HANDLING

WITH CPL RACING

CAMBER

Camber is not normally adjustable from the factory on a Honda vehicle. However, it can be achieved by fitting camber adjusters to the front and rear. The design of the camber adjusters varies from model to model. Some examples are shown below:



RIDE HEIGHT

Ride height can be adjusted in two different ways:

1. Firstly, by fitting lowering springs that can reduce the ride height of the car. This lowers the centre of gravity and thereby improves the handling. With lowering springs, however, the car can only be lowered by a fixed amount, which is dictated by the design of the spring.
2. Some dampers have the ability to adjust the ride height independently of the spring preload, this is the best way to achieve the desired ride height adjustment, as it is adjustable within a large range and can be set according to the car's intended use. In addition, being able to adjust the height, without affecting the spring preload, is imperative to ensure that the correct amount of bump and rebound travel, in addition to the desired ride height, is achieved. (Bump is the amount that the body of the car can travel downwards from the static position, while rebound is the amount that the body can travel upwards from the static position.)

CASTER

Caster can only be adjusted using dampers that are equipped with top mounts that have this facility specifically incorporated.

WEIGHT DISTRIBUTION (CORNER WEIGHTING)

Weight distribution is also an area that can be set-up, if you have a good set of adjustable dampers fitted. This is achieved by varying the spring preload adjusters on the damper bodies, until even amounts of load are placed on both front wheels and both rear wheels. Once this is completed, weight can be shifted on or off the front and rear axles, in order to achieve a desirable front and rear bias. The exercise is carried out with the car positioned on a set of corner weight scales, so that it can be seen how much load is on each wheel. By having the weight distribution set-up like this, you can be sure that the same amount of force is on (for example) both front tyres, in both left and right hand turns, and you will therefore have the same amount of traction.

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> Another aspect that will have a huge effect on your FWD Honda's handling is to fit a good aftermarket differential.

Most front-wheel-drive Hondas come from the factory with an open differential. This means that, when driving through a bend, the inside wheel is driven and the outside wheel is free-wheeling. This condition causes what is known as understeer, in other words, if you are negotiating a left-hand bend at speed, the car will drift from the inside to the outside of the bend due to a lack of traction, this means that the cornering speed is limited.

The addition of a limited-slip differential (LSD), such as the units manufactured by Quaife Engineering, would eliminate this trait. A Quaife LSD is an automatic torque biasing differential, which means that it automatically senses a loss of traction on one of the front wheels and apportions the power to the wheel that has the most traction. It will constantly shuttle the power to where it is needed the most. Thereby understeer can be eliminated and faster cornering speeds can be achieved. A picture of a Quaife differential can be seen on the right.



IN THE NEXT EDITION OF TOTAL HONDA MAGAZINE, WE SHALL LOOK AT THE BIRTH OF A NEW PRODUCT, FROM THE INITIAL CONCEPT, RIGHT THROUGH TO ITS LAUNCH.

CPL Racing has been working with Total Honda Magazine since its launch to bring readers a valuable insight to tuning Honda engines. If you have missed any part of the Tuning with CPL series, please visit www.totalcarmagazines.co.uk/cpl racing.htm to catch up.

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