



# THE SUSPENSION SPECIALIST

Professional Service and Suspension Set Up • After Market Sales • Mobile Service Van  
Proven Results 2009/2010: Hayward Suspension Bikes have brought home 12 National Championships  
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## UNDERSTANDING YOUR SUSPENSION – DAMPING

Greetings again from Austria. I have been busy the last weeks making the production settings for the new Husaberg 450. It is a great bike as I have found out by riding it fairly often during the tests. I have finished with the settings for production and am very happy with the result. At the moment I would say that's my favourite bike!

In the last articles I have talked a lot about springs. I hope you get the idea now as to how important the correct springs are for proper suspension performance. I presume that by now you have found the correct springs for you weight. I will now start looking into damping so that you can understand a little more as to how we can control the spring energy.

### DAMPING BASICS

#### The tasks of the damping are:

- Control of wheel movement.
- Control of spring movement.

#### Hydraulic damping principle

- A piston with several holes is placed in a tube/cartridge filled with oil.
- The piston is mounted on a spindle.
- Either the spindle/piston combination or the cartridge is (indirectly) connected to the wheel via the axle clamps (front fork) or via the swingarm (shock absorber).
- This means the piston movement is directly proportional to the movement of the wheel.
- As the piston moves through the oil, its speed is slowed down because the oil is forced through the holes in the piston.
- The wheel movement is "damped" by the piston moving through the oil.

#### Compression and rebound damping

- The damping can be separated into two different kinds of damping: compression and rebound
- The wheel can move in two directions (up and down), both directions require a different damping rate.

#### Compression damping

- When the wheel moves up, the suspension component is compressed (against the spring force).
- The damping that controls this movement is the compression damping.

#### Rebound damping

- When the wheel moves down again the suspension component extends (extension is forced by the spring).
- The damping that controls this movement is the rebound damping.

#### High and low speed damping

- Both the rebound and the compression damping can be divided into two types of damping again: High-speed damping and Low-speed damping.
- High and low speed does not refer to the vehicle speed, but to the speed of the damping piston.

#### Low-speed damping

- If the suspension is compressed slowly (low piston velocity), the movement will be damped by the low-speed damping.
- Low-speed damping regulates the damping up to a piston velocity of 0,5 m/s (shock absorber) / 1 m/s (Front Fork).
- Above this speed, the high-speed damping will take over, the influence of the low-speed damping will then be negligible.
- The low-speed damping can be influenced by the 'click-type' adjusters.

#### Piston bleed

- To create more comfort, a small bleed hole is sometimes placed in the damping piston.

#### High-speed damping

- If the suspension is compressed rapidly (high piston velocity), the movement will be damped by the High-speed damping.
- High-speed damping regulates the damping when piston velocity is above 0,5 m/s - 1,0 m/s.
- Maximum piston velocity lies around 3,5 m/s (shock absorber) / 7,0 m/s (Front Fork)
- On some shock absorbers, it is possible to influence the high-speed damping with an adjuster.

I hope the above guide gives you some of the basics about damping, and helps you to understand more about your suspension. It is important to try grasp the concepts of damping in order to further your knowledge and enable you to understand what your suspension does.



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I recommend that next time you ride try get an idea as to what situations involve low speed damping and which high speed. Rolling woops are low speed, jump faces are low speed, rocks are high speed and jump landing are high speed damping. Concentrate on other riding situations and try separate high and low speed damping. Doing this will enable you to adjust your suspension more easily.