



# THE SUSPENSION SPECIALIST

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Proven Results 2009/2010: Hayward Suspension Bikes have brought home 12 National Championships  
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## HOW GEARING AND CHAIN TENSION EFFECTS SUSPENSION.

All modern dirt bikes make use of a conventional swing arm, and this in conjunction with the chain forces, front sprocket height and sizes in relation to the swing arm pivot point causes the bike to extend or compress the rear suspension when power is applied. We all have experienced this when we hold the front brake and start to release the clutch, and the rear of the bike tends to rise slightly due to the forces transmitted through the drive train. These effects are what we call anti squat and pro squat. These forces are designed in such a way that they benefit the bikes handling with regards to traction, stability and balance.

I am sure you are all also aware that the chain tension increases as the swing arm angle changes and chain tension is at its maximum when the swing arm is roughly parallel to the ground. This is a normal characteristic of all bikes and is especially noticeable on bikes with a lot of suspension travel such as dirt bikes. This is also why we adjust the chain with a fair amount of slack on dirt bikes as this prevents the chain from getting completely taught as the swing arm passes past the parallel position to the ground. **Be very careful to never to over tighten your chain as this has dramatic effects on suspension performance and in some extreme cases can even cause the engine casings to break around the sprocket bearing area.**

The physics behind pro squat and anti squat is complicated and most modern dirt bikes have been designed carefully so that the squat effects benefit the bikes handling in a positive way. Normally bikes have a certain degree of anti squat during the majority of the suspension travel and this in turn changes to pro squat deeper or later in the travel. The relationship between these two is critical to suspension performance and especially traction and I can assure you that a lot of development and experimentation is done by constructors in this area.

One thing to consider is that by increasing anti squat on a bike we can create better traction at the rear wheel due to the fact that the anti squat effect forces the wheel downwards. This is only true to a point where too much anti squat causes the suspension to top out and then traction is reduced again. A balance between pro and anti squat is therefore critical. Obviously the squat effects also affect suspension action and the bikes balance through subsequent changes in geometry.

What this means to you is that if you have **traction and suspension problems** it may be worthwhile to experiment with different sprocket combinations in order to improve traction, handling and suspension action.

### The effects of sprocket size are as follows:

- Smaller rear sprocket = less anti squat
- Larger rear sprocket = more anti squat
- Smaller gearbox sprocket = more anti squat
- Larger gearbox sprocket = less anti squat.

Obviously manufacturers have tried to combine the best sprocket configurations and standard sizes should be close to perfect. This is why you should be careful when you change gearing as it can have negative effects. On the other hand experimenting with different sprocket combinations could help suspension performance and especially traction if you are experiencing problems in these areas. I have noticed considerable **traction** differences just by changing sprocket size combinations, especially on very loose climbs where traction is vital.