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## OIL HEIGHT

Setting the oil height in modern Motorcycle forks is an often over looked tuning tool.

The most difficult part of understanding oil height tuning is that it controls the air spring inside the fork and needs to be tuned with respect to changing load, not fork motion. The fork springs we use today are straight rate or linear. The air spring is progressive. For example, under very hard braking, almost 100% of the weight of the bike will be held up by the front end. The fork compresses under this increased load. As the fork compresses, the air space of the fork decreases. With this reduced air space in the fork, the air must compress, resulting in the increased rate of the air spring.

By adjusting the oil height, the rate of the air spring can be adjusted to soak up bumps while under hard braking and situations that use large amounts of travel. If the fork is bottoming, the oil height will need to be increased (less air space). If the fork is not still soaking up bumps in this situation, oil height will need to be lowered (more air space). While not always the solution to a problem (example: If the fork is bottoming from square edged bumps, while not under braking, the shim configuration should be changed), it is a variable that is often over looked.

Oil height must be taken into consideration in the general set-up goals of the front suspension. In general, a rider will want the suspension to lightly bottom at least once a lap; this ensures that full travel is being used. Increments of oil should be no more than 5-10cc at a time. Oil can be added or removed from the fork by pouring out or injecting through the air bleed screw hole.

Finding the minimum oil height needed for a given rider will reward you with a controlled, balanced set up.

### **In conclusion:**

The oil height of a fork effectively controls a progressive air spring inside the fork. The less air inside the fork (i.e. more oil), the quicker the air spring will ramp up its effectiveness and the more resistant to movement the fork will be in the last part of the travel. In general, stock oil heights are established to ensure that an under sprung fork will be resistant bottoming. This is due to the varying rider weights and skill levels the stock fork must endure.

When performance tuning, we know exactly who is going to be on the bike and the conditions that it will be used. Oil height tunes how progressive the fork is during hard, prolonged braking, jumping forces (take-off and landing), etc. Usually the springs in the fork are changed when setting the bike up, so the oil height needs to be changed as well. The volume of space the new spring takes up in the fork must be taken into account, as it may differ from spring to spring. We do not want an ill-chosen oil height to effect the spring and damper tuning.

