Setting it up .... but you may think this is all bollocks

Now suspension consists of those long bouncy things at the front which hold the wheel on and the little bouncy thing behind the engine which gets covered in crap from the back tyre.

On any half decent sports bike you've got 8 adjustments in total - ride height, spring pre-load, rebound damping and compression damping front and rear. 'Course, that's 12 if you count both forks.

Raise the forks through the yokes to drop the front end

Use a suitable spacer to increase rear ride height

Ride height does what it says, changes the height the bike rides at ... clever, eh? The most common mod is to speed up the steering by raising the front forks through the yokes, so lowering the front end, and jacking up the back end either by using a spacer between the shock top and mount or, if you've got a really posh bike, winding up the inbuilt ride-height adjuster. Normally the most you want to go is 10mm each end. Raising the rear will also help ground clearance.

Alloy collar above spring screws down to increase preload

Spring pre-load determines the amount of static sag. An easy way to check this is to park the bike on its sidestand, then simply rock the bike and watch what happens to the suspension. If it compresses noticeably as it comes upright then time for a proper check. Get someone to hold the bike upright and measure the distance from the axles to a mark somewhere above on the chassis. Then lift each end in turn and measure between the same points. Now sit on the bike and do it again. If you're a quick rider you want only minimal sag, perhaps 10 mm at the rear and no more than 25 mm at the front. Too much and the bike will get very unsettled over uneven roads at high speeds.

The little screw does the rebound and the silver nut does spring preload

Rebound damping, adjusted by the little screws at the top of the forks and the screw or knob on the bottom of the rear shock. Start by backing all the screws out and then do a static test, bouncing the bike up and down and increasing rebound until you can feel some resistance as the springs unload. Now go for a ride. If the front bobbles as you come off the brakes or weaves about as you bounce out of small dips you need to increase rebound at the front until this goes. If the back end weaves about as you power through bends then increase rear rebound. Keep fiddling until the bikes feels stable. Go too far and the tyres will have to help the suspension too much as it fails to recover quickly enough from the last bump and pumps down - then you'll start to lose grip.

Knurled knob at top adjusts compression on rear shock

Compression damping - probably the hardest one to get a feel for. Adjustment is by the little screws at the bottom of each fork leg and either a screw on the shock top or the knob on the remote gas reservoir. Too much fork dive under braking and a loose feel when suddenly tipping into a corner indicates insufficient from compression damping. A slappy front end when accelerating hard means the rear shock is compressing too much, so unloading the front - increase rear compression. A loose feeling from the back when powering though bends also indicates insufficient rear compression damping. The end result is a very personal thing, as it's a compromise between bone-jarring accuracy of line and luxomatic plushness with 'orrible vague handling.

Don't be afraid to experiment hugely with the suspension settings. If you're a scaredy-cat note down your original

Projecting screw on the bottom of the fork leg adjusts compression

settings on a piece of paper and stick it on your fridge. If you've never fiddled properly with all those little screws and spring collars you'll be amazed how much you can change the feel of your bike. And you can create some proper set-ups for track use - rather than wallowing about in the slow group you will be Mr. Getoutamyway in the fast lot! At the end of the day you can simply return your suspension to pot-holed crap British roads settings and wallow homeward in perfect comfort, but this time with nicely re-profiled footpegs and end can and thoughts of rearsets for more ground clearance ....

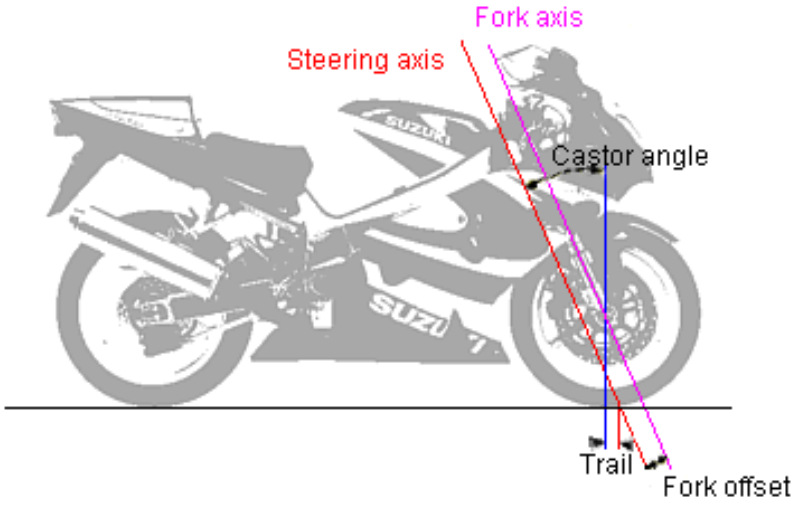
Regular twiddling will also keep your bike handling as best it can. All of us are guilty of getting good settings and then forgetting them for ages. Then we ride a new bike and think "Blimey, this is sharp". So immediately we start adjusting our own bike and bingo ... mega sharp handling again, as we compensate for wear and tear on springs, damping oil, etc. If your bike's a few years old it's worth changing the fork oil and seals. If the rear shock is showing its age it's probably best replacing with Ohlins, WP, Penske or whatever takes your fancy rather than going for a rebuild - many factory shocks aren't rebuildable anyway. Trouble is, the front end will then be letting you down as standard production forks are often built way down to a price, and valving can be suspect. You don't necessarily need to buy new forks, but replacing the internals with Ohlins kit can improve control and the cost of the bits you need should not be much more than £200 plus fitting.

A word on high and low speed damping, as it all gets a bit confused. Bang though a bloody great pothole in the road and wham!, the suspension has to blow oil fast to allow a sudden large amount of spring movement to absorb the shock. Basically the shim stacks lift and allow the oil to flow through bypass holes - this is high speed damping, which often happens when you're travelling slowly.... Now you're belting along a good road with some cracking dips and rises, compressing the suspension by fine degrees, the oil flow controlled by the shims. This is low speed damping in action, even though you're going quickly the suspension is moving relatively slowly to absorb the rise and fall of the bike as the loading changes.

Tie wraps on both the fork legs and the rear shock (or O rings if you can be bothered to fit them) show you how much suspension travel you are using. On a given road or track outing, if the units bottom out the suspension effectively stops working - if you're only using 50% of the available travel the units are probably set up too stiffly for general road and trackday use. Reader John Higham suggests fitting adjusters to the top nuts so you can turn them easily and tighten up or slack off till you've got 80% / 90% travel. When you've got that far it's time to fiddle with damping. He sees loads of guys adjusting damping at the track when they've got the springs set up too stiffly and they end up overcompensating. He got his info from the WP Suspension school ("course I have to push that as they sponsor me...") Visit his site at teamemmenracing

Fork oil level

Upside down forks are very sensitive to variations in oil level. The level does not have much affect in the early stage of fork travel but increases as the forks compress. When the oil level is lowered the 'air spring' in the latter half of travel is lessened, thus the forks are softer. Manufacturers normally quote their recommended air gap, the distance between the top of the fork stanchion and the oil surface. Usually this is in the range 80mm to 110mm with the spring removed and the fork fully compressed, although Ohlins forks are measured with the spring in place.



The above diagram shows the relationship between the fork offset, trail and castor, the latter two often quoted in bike road tests in magazines. These determine the level of resistance to turning the forks from the straight ahead position and the stability of the steering in its steady state. With telescopic forks, everything changes when you hit the brakes, as the steering head dives down, shortening the forks and reducing the castor and trail and also the wheelbase of the bike. This effectively quickens up the steering, helping the bike to turn, but unsettling the front when the suspension unloads on release of the brakes. For fast road and track riding, fork dive is minimised by stronger springs and increased compression damping, while increased rebound damping helps control the change in attitude when the brakes are released.

If you really get into suspension tweaking you will meet such fascinating mysteries as air gaps, linear versus progressive springs, oil viscosity, shim stacks, etc. etc. Learn enough about all this stuff and you can phone up Ron Williams and tell him why he set your forks up all wrong! Yup, you too can fine tune your compression damping by decreasing your air gap by 2mm ...

If your bike looks like this then sell it and get something with adjustable suspension!

Some common front end problems

Front wheel chatters entering a corner, the problem disappearing as soon as you let the brakes off or when power is applied.
The fork is working too low in its travel.
Solution:
Apply more preload
Change to a harder spring
Reduce oil level if a tie wrap on the fork tube indicates a lot of stroke is unused

Check fork friction (stiction)
Rear ride height is too high - possibly too much spring preload. Reduce ride height.

Front wheel skips during heavy braking
Forks are bottoming out
Solution:
Increase spring stiffness
Lower oil level if a lot of stroke remains

Front end feels vague mid corner
Poor damping control
Solution:
Insufficient rebound damping - increase
If suspension feels harsh it may be too much rebound or compression damping - reduce

Front end loses grip exiting corners
Insufficent spring compliance or damping control
Solution:
Increase front rebound damping
Reduce front spring preload
Increase rear compression damping or spring rate

Unfortunately the rear shock set-up affects the behaviour of the front end in some circumstances, so there is often no easy answer to a particular handling problem. The most important thing to remember is **never change more than one thing at a time ....** Always test the bike after any change in the setup to see what affect it has. And make sure you note down your original settings, so if it all goes haywire you can start again from scratch.