RAW

This is part of a Mountain Cycle San Andreas. As far as we know this is the first one in the cou

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ntry, and it belongs to one of the staff. So nerr...We thumb our noses in your general direction...

Mountain Cycl

What can I say? Words fall a little short when it comes to describing a Mountain Cycle San Andreas. Obviously I will be biased towards this bike because it's mine, and no bike rides as well as your own no matter what it is. But there is also a huge amount of uniqueness attached to the bike. Alloy box construction with separate seat subframe (*adjustable*), upside down forks, banana shaped rear swingarm (*gullarm?*) with monoshock, roller bearing headset, hydraulic disc brakes with floating discs, straight pull spokes, large diameter alloy front axle and the fact that it was the first one to enter this country. Mention the majority of the above to anyone who is remotely interested in motorcycling and they will ask you how much you paid for an RGV250. (*Don't mention the straight pull spokes or the alloy axle though*) Then tell them it's a push bike and cost nearly as much as a good secondhand RGV, they'll either ask you for a go, or tell you you're mad. Mention all of that to a half clued in mountainbiker and they should instantly know it's a San Andreas.

The San Andreas is the result of a hell of a lot of hard work from Robert Reisinger and the guys 'n' gals at Mountain Cycles. A little more about the man behind the machine first though. Robert Reisinger is one of those ex motorcycle guys, he used to be a test rider for Kawasaki during the eighties as well as racing in the AMA nationals (*American Motorcycle Association*). Over the years Robert's involvement with the racing and development side of things began to slow down, but he obviously spent his new found spare time wisely by studying engineering. Over a period of about four years the San Andreas began to take shape. First came the Suspenders upsidedown suspension forks, the problem here being the mounting of the brakes. That problem was soon solved by

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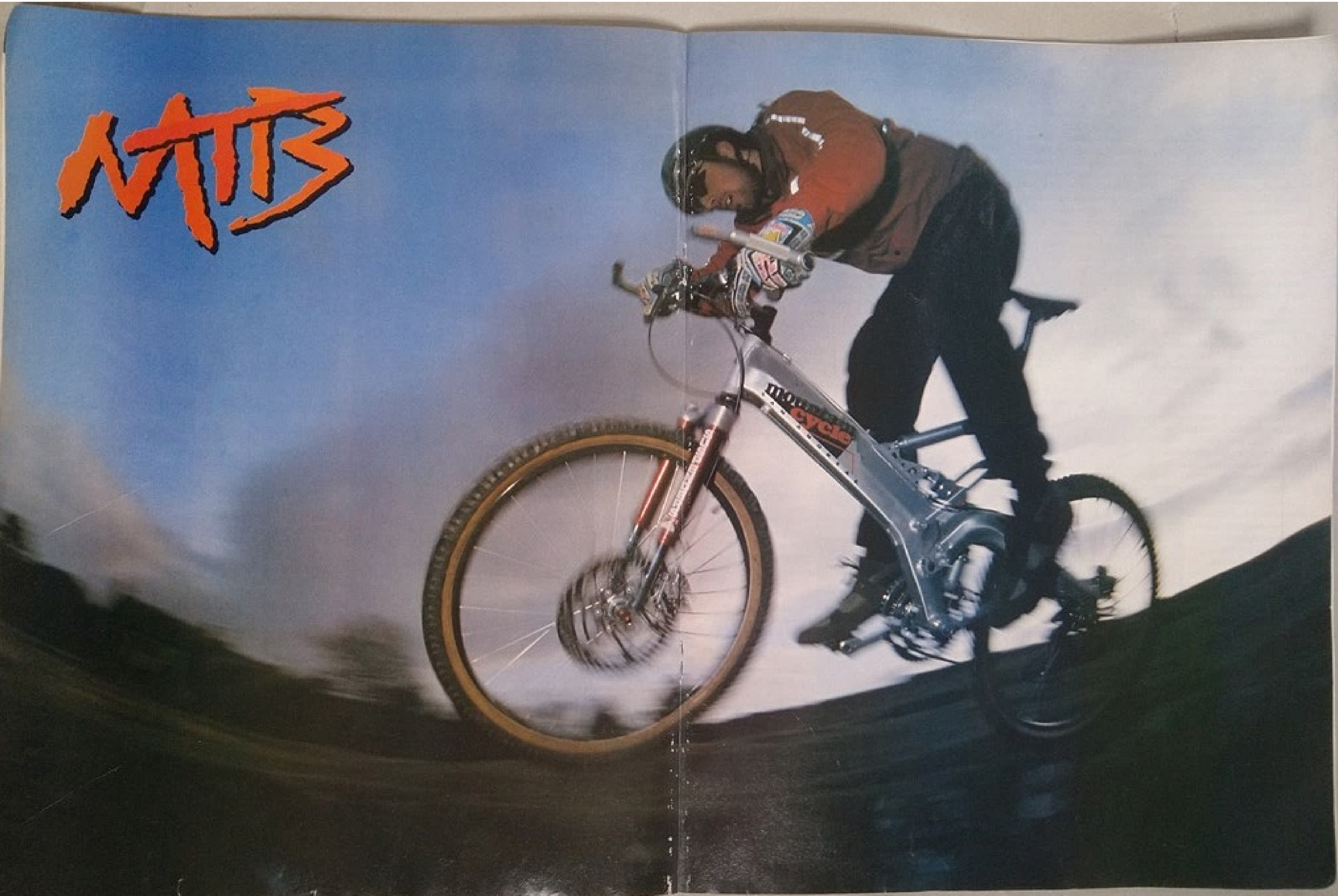
Robert designing the Pro Stop hydraulic disc brakes. So now he had the forks and brakes sorted out all that was left was the rest. Gradually this came along and has since been a constant development, always changing, always progressing. The sort of thing bike companies should do, but all to often don't. Oh well, they'll soon catch up with the likes of Mt Cycles.

How is it made? The main spar (where the front triangle is on so called traditional bikes) is formed from sheet 6061 alloy, gauges vary from 1.13mm to 1.6mm. These sheets are pressed into shape with a 2-ton hydraulic press which forms the two halves of the main monocoque using aluminium moulds and urethane blocks. The same procedure is used for the creation of the swing arm. As you can see, the sides of the main monocoque and the swing arm bulge out slightly, forming a slight hex shape. This is where the strength and rigidity comes from, look at today's motorcycles and you will see much the same thing. After the parts have been pressed into the desired shape (*this can take a few passes through the press and some hand forming also*) they are sorted into matched sets. From here the two halves are welded together to form a box section. I don't know the exact details, but the welding must be real tricky to complete. Having done basic aluminium welding myself I know just too well how difficult it is to keep everything straight and true whilst welding. Just how they manage to get such neat, well penetrating welds is beyond the imagination of a mere welding amateur like myself. While the two halves are being welded to form the box section the bottom bracket, headtube, subframe-shock mounts, swingarm pivot and cable stops (*slotted*) are added.

A bit about boxes. On a suspension-equipped racing MTB, the main points where things are happening are the head tube, the swingarm pivot (*'chainstays' is now a redundant word*), the rear shock mounting


MTB
cycle

points and the bottom bracket. The seat isn't as important; supporting the rider's weight is a less difficult job than handling power transmission or suspension mounts. The seat mounts are thus a secondary consideration. It just so happens that the bottom bracket, swing arm pivot, shock top bolt mounting and headtube are in a neat, nearly straight line. Why not connect them together with a structure that just goes straight from one to the next? The San Andreas' box-beam is just such a structure. Mountain Cycles have realised that the traditional trianguloid 'diamond' shape would offer no advantage. When the main points of interest were the diversely located rear axle, the seat, the headtube and the bottom bracket, the double-triangle of the 'gent's diamond frame' made sense. OK, why is the beam a box? Why not a tube? I could go into lots of detail here about stress models, or other bits of engineering theory, but it would take up a *lot* of space. One large-diameter tube has a lot of useful features and advantages, but they are not all applicable here. Instead, a fabricated box offers stiffness in the directions where it is needed (*where it is* designed *to be*) and nowhere else, no surplus material mass (*weight!*). This is especially true of the bit in between the swingarm pivot and the bottom bracket shell, which noticeably changes shape from the rest of the beam, to resist the stresses in that area. Another advantage is that by fabricating a box, the wall thicknesses in various parts of the beam can be easily varied, whereas a tube with lots of variation in wall thicknesses rapidly becomes an expensive commodity to source. The main box is not an extrusion, like most alloy spar-type motorcyle frames, because this would interfere with build quality. In much larger production, it might be a useful technique, but Mountain Cycles are not a pile-them-high, sell-them-cheap Taiwanese factory.

Aluminium is an obvious material for the application, as it is relatively cheap, easy to work with, light and easily available in high quality. Although I can't help thinking this would be the perfect application for carbon composites. I wonder if the next five years might contain some nice surprises?

The seat area is interesting. It is a separate sub-chassis, but it only has to hold your weight up. This isn't as demanding an application as you might think; the traditional diamond frame is probably least stressed at the seat cluster. To this end, the San Andreas uses a trio of alloy tubes, held on with bolts. This usefully allows a few other design points too. There is no seat tube to artificially limit the number of possible locations for the rear shock, so it has been mounted where it can best do its job. There is, of course, a vestigial seat tube you can still fit a seat post. A pair of bottle bosses have been put at the rear of this seat subframe, to supplement the ones on the top of the main beam. Yes, you are expected to ride on more occasions than in 5-10 minute downhill races.

Being a separate subchassis on a frame that is otherwise complicated to build, the seat assembly is where Mountain Cycles have built in the facility to vary frame sizes. The position of the tube can be varied slightly by undoing a bolt, allowing the seat angle to change from about 71.5° to 73°. The same frame will therefore fit people who would normally ride bikes from around 17" to 20". It's not an ideal way to do this, as *reach* is only adjustable by stem length, and at the time of writing no other main frame or seat subchassis sizes are available. But then, the market for popular sizes isn't the same as for your Marins and Konas, so the market for extra-large or extra-small San Andreas frames, even worldwide, probably isn't big enough to warrant their manufacture. Not just now, anyway…

The San Andreas gets interesting once again when you go rearwards from the suspension pivot. More fabricated alloy boxes, with precision machined dropouts. The theory remains the same as with the frame, and indeed, you need only peek at modern quality motorcycles to spy many an alloy swingarm.

No, the fun starts when you notice the banana-shape of the swingarm boxes, eliminating contact with the front mech. No matter what you *want* to do with a frame, as long as MTB gear systems remain the way they are now, they are going to have front mechs just where it's most inconvenient. (*I wonder where I can get an FM-5 planetary transmission from?*) Anyway, the curve isn't just to make the arm reach around the front mech, it also allows the rear shock to locate onto a small horizontal spar linking the two swingarm parts across in front of the rear tyre, without resorting to complicated linkages. The resulting realisation is actually very simple and elegant.

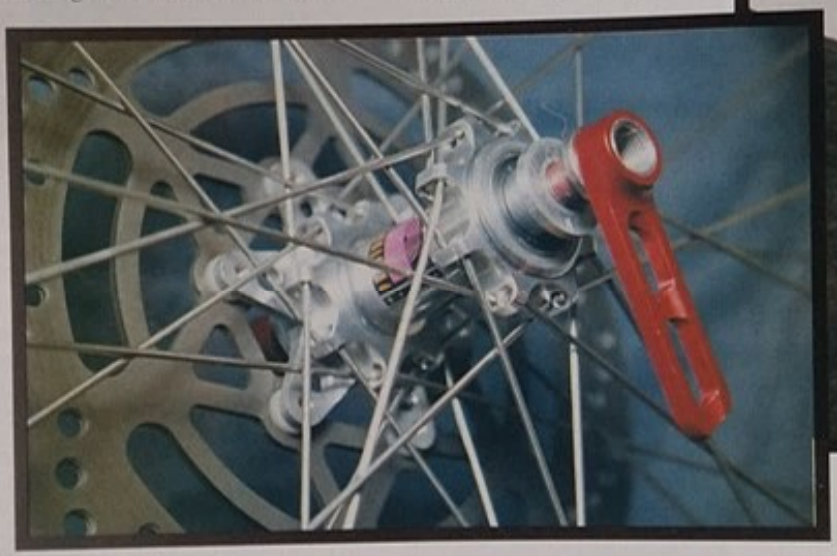
Once the main monocoque and the rear swing arm are finished they are sent for heat treating. This then modifies the material to T-6 temper and the whole thing can now be referred to as 6061 T-6. Heat treating also plays a vital role in the strength and durability of the frame but if done wrongly it can ruin the whole thing. Heat treating involves quenching of the chosen item, and it is this process that can warp the parts. If the main monocoque was to be lowered into the quenching bath on its side then the whole thing would bend in that direction. It's all due to the contraction of the metal during

quenching, if the monocoque is lowered into the bath bottom bracket first then the whole thing stays straight. Once this is done the finished frames are brushed off to remove the brown tarnish left over as a result of heat treating. Paint is not applied, Mountain Cycle leave the paint option open to the buyer, as a result of this the frame comes with a spare set of decals to be applied if you decide to paint it. Bare alloy seems to be the only thing that does this bike justice. Look at all those lovely welds, look at the quality of construction, drool dribble etc… After heat treating the frame and swingarm are joined by the insertion of a centerless (*ie a rod hollowed out to make a tube*) ground pivot shaft. This shaft has an external helical galley running along its length. It works like this: The shaft is hollow, at the centre is placed a small alloy insert with a countersunk seat at one side. This seat accepts a long nozzle grease gun (*such as the Dualco one featured in last months products pages*). Leading out from the inside of this are two holes drilled through the shaft. Where these holes exit the shaft on the outside surface there is a machined groove running spirally around and out towards the ends. As you pump the grease in it is forced along this galley and hence lubricates the pivot shaft and forces any crud out at the same time. This shaft pivots on teflon-impregnated bushes. One thing to note here, beware of suspension systems that boast cartridge bearings in the pivots. All they are doing by fitting cartridge bearings is playing on the hype factor surrounding this type of bearing at the moment. Cartridge bearings are designed for high rotation applications such as bottom brackets and wheels, they are no good for something that will only rotate through 10° for the rest of its life. Bushes are much better, cheaper and easier to replace, and far lighter.

Next comes the seat subframe, this is made from 7005 Easton Varilite tubing and accepts a 31.6mm seat post. The seat clamp in the photo's is a DKG item, available from Mt Cycles when you purchase the fame kit. Headset - an OnZa Mongo 2 needle roller type - is next, which then enables the forks to be fitted. A little about the forks before I rant on about the rest of the bike. The forks on the San Andreas featured here are Suspenders System Two. The main differences from the first Suspenders are there are four less bolts in the crown, the forks upper legs are now screwed and bonded into the crown and the crown is now hollow. Also the dropouts are no longer alloy and bolted to the stanchions, they are now steel and welded. The forks are elastomer sprung and each leg contains five elastomers separated by nylon washers. These washers are not just your regular round and flat things with a hole in the middle, they have small bobbles in the middle that locate the elastomers and also help prevent bottoming. It works like this: As the elastomers reach large amounts of travel the bobbles on the washers will touch together and prevent further travel that may damage them. Trick eh? Next comes the Mountain Cycles rear shock unit. This consists of three elastomers, separated by cupped alloy washers. The internals of the rear shock unit are a little tricky to describe and I'm not showing you a photo of it so then nobody goes and rips it off. All I will tel you though is that it is well trick. The two smaller elastomers are interchangeable so you can tailor the springs characteristics to your required needs. The black elastomer is soft and the grey elastomer is medium. Lighter riders can run two black and heavier riders could run two grey. Preload is adjusted by turning the preload adjusting ring at the top of the shock, no surprises there eh? Preload will basically adjust the amount of force required to start the spring compressing, it will also control the ride height. A heavy rider should not just crank in more preload to get the ride he or she likes, this is defeating the object. The idea is they should switch to a harder of softer spring rate and then set the preload for that spring. Seeing as this is my bike and I like a quite *soft* rear suspension set up, this is how I went about setting up the shock for preliminary testing. First I measured from the ground up to a given point somewhere on the bike, in this case it was the two bolts under the seat in the seat post head, with the bike unladen (*Nobody on it*). Then I sat on the bike in a fairly common riding position and measured, once again, the distance from the floor to the bolt under the seat. By adjusting the preload I settled upon half an inch of sag when sat on the bike. This means that when I'm seated I have roughly half an inch of rear suspension extension (*Required when the rear wheel drops down small holes etc*) and two and a half inches of compression (*For when the rear has to lift over bumps*). Slowly, as the elastomers bed in, I expected the amount of preload needed to slowly increase. Hence before every ride I re-check the ride height and adjust it as required.

Finishing off the package are front and rear Pro stop hydraulic disc brakes and a pair of Pulstar hubs. The disc brakes are actuated by regular brake levers and cables. On each calliper there is an alloy lever that depresses the master cylinder piston. As the lever is pulled the master cylinder piston is forced down its bore. This causes a displacement of brake fluid (*Supplied with the kit*) which, due to it being non-compressible, acts upon the back of the slave cylinder piston and causes it to move. On the outside of this slave piston is fixed the brake pad, this then presses against the disc and slows you and the bike down. Considering the engineering involved the Pro stops remain quite small and fairly light. Well… Light for a set of hydraulic disc brakes, anyway. The discs, 9inch diameter on the front and 8inch on the rear, are made from 6061-T6 hard anodised alloy. These discs 'float' on small teflon

bushes that are mounted on aluminium rotors. These rotors are splined onto the hubs and held in place with an alloy lockring which is the same as a lockring used on most bottom brackets. Now… That word 'float' eh? The idea is that the disc is located loosely to enable a small amount of sideways movement which, in turn, (*no pun intended*) will allow the disc to self align under braking. Once again this is the same as most motorcycles today. The hubs are not standard Pulstar items. On the left hand side of each hub are the splines for the discs, which leads to the front wheel being dished,. Also the front hub has a 12mm diameter 7075 alloy axle. Unlike normal front axles that have a hole down the centre for the quick release to go through, the Mt Cycles front axle *is* the quick release. It works just like a huge skewer, one end of the axle is threaded where the quick release lever screws on. All you do is tighten the axle whilst holding the lever until it just starts to squeeze the dropouts, then simply twist the lever around until it locks against the underside if the stanchion. Large diameter front axles are the way to go with suspension forks. Mountain Cycles got it right first time, why doesn't everyone else?That just about sums up the *basic* outline of what you get in a San Andreas kit, 'nuff of the technical babbling rubbish, how does it ride?



Proot… Peep peep! The first real blast I had on the San Andreas was, sadly, a short one. The reason for this was rain, thousands of gallons of water seemed to fall from the sky in my general area. Why when you get something new that you want to get used to or try out does it toss it down with rain? The answer I suppose is because we live in Britain, oh well time to move to California me thinks. Returning home slightly wet and cheesed off I cleaned every inch of my little baby and wrapped it up in cotton wool for the next few days. The weekend came and we headed up to Pete Tomkins' place for an interview with the man himself, a spot of riding, some photos and a bit of power kiting. Power kiting? I never knew flying a kite could be so enjoyable. Just carving around getting dragged down the field, laughing at Russell ('dumpf'), watching Roy get lifted up in the air by the sheer power of the thing and Pete 'not showing off honest' showing us all how it is done. Hmm… Power Kiting eh? I'll have some of that please. Anyway, Pete thrashed us all at pool, again, but we beat him at drinking. One-all draw away from home. MTB win on aggregate. Sunday came and it was time to thrash the San Andreas. Due to my obvious bias towards the bike I swallowed my pride, threw all caution to the wind and let Pete, Roy and Russell ride it. Now for me to do this is extremely rare with my own bike, even rarer when it's a brand new San Andreas. First comments from the threesome could be placed into two categories as follows. "Gibber gibber…Poop poop…" and "Frroot…Peep peep" (*Like the Road Runner*). No seriously, first impressions gathered were all in praise of the bike. I was left speechless. Oh well, my turn now. Heading down a bridleway I let the others get a safe distance in front and then I really began to turn it on. Big ring time (*A mere 50*) and I was away. The ground was frozen, making the going rough for poor old Pete, who was on the non-suspended KHS featured elsewhere in the issue, but it was slightly better for Roy and Russell who both sported front suspension. Within a few seconds of starting to crank I was catching them fast. Drawing up behind them with a gentle one finger squeeze of the front brake I noticed just how hard it was on the other bikes. Looking at their bums (*Naughty naughty*) I could see how much of a battering they were taking by the shocks passed through the saddles, then I realised I was sitting down pedalling smoothly over everything. The rear suspensions performance was one of the most pleasing aspects of the bike. There was no weave or wag from the rear end (*sideways in other words*) just pure power transmission. Sure, on paper and calculators the swing arm fulcrum (*where it pivots*) location would mean that pedal force would try to extend the rear suspension, but when you are on the bike where you should be (*Bollocks to paper and calculators, go ride…*) there is no detectable pedal feedback. The only way to get the bike to react to pedal input was to spin really fast in the small chainring. To be fair though all that was happening was the bike was bobbing up and down slightly due to the action of the riders fast pedalling. Riding the bike normally instead of spinning away like a loony there was no pedal induced suspension movement any of us could detect. Climbing was one of the big surprises we had with the San Andreas. Due to the conditions (*frozen ground*) the San Andreas out performed all the other bikes. Descending was outstanding. Steering was quick and precise and the overall handling of the bike was simply bliss. Once you really get moving the benefits of the suspension system become startlingly apparent. The thing that makes the San Andreas perform so well is the fact that it has been designed as a whole bike, not just a frame with a swing arm, somebody elses shock and any old pair of forks slapped on.

The bike functions as one unit, balanced seems to be an appropriate term. Words seem hard to find when it comes to describing how the San Andreas rides, gorgeous, fluid, fast, chuckable, smooth and flowing are ones that spring (*joke?*)to mind. Summing things up I'd like to say a few things about the bike as a whole. The parts fitted to the bike you see here are my own choice because this is my bike and there is nothing I hate more than the 'groupset' mentality. In addition to the normal parts I could have slapped on there are some interesting additions that require a brief explanation. The rear wheel features three TNT titanium products, a titanium axle, titanium Hyperglide lockring and a titanium freehub body bolt. The reasoning behind this is simple. Suspension efficiency is affected mostly by the ratio of sprung (*the bits supported by the springs, rider, frame etc*) to unsprung (*the bits that move when you hit bumps, wheels, brakes etc*) weight. The basic idea is to lighten the unsprung mass as much as is safe to, which will allow the suspension to do it's job easier. Hence the reasoning behind the titanium goodies on the unsprung mass.

Where do you get 'em? The San Andreas is currently available in kit form which contains: Frame, forks, headset, seat subframe, swing arm, rear shock, hubs, spokes, discs, brake callip- s, spare stickers (*incase you want to paint the frame*) elastomer kits for the forks and the rear shock and a brake bleeding kit. Currently there is no price in the UK as they don't have a UK importer at the time of going to press. Soon to be available from Mountain Cycle will be just the frame, seat subframe, swing arm and rear shock. This will have cantilever bosses on the rear enabling you to fit canti brakes that will be operated by a bell crank system on the swing arm. Fork choice is your decision. This is probably the cheapest way of getting a San Andreas. Also available is a Risse racing shock for the rear end. Lookout for a feature of the shock in a few months here in MTB magazine. This bike will be doing a hell of a lot of downhill and slalom events this year, if you see me at any of these events don't even think of asking the obvious ("can I have a go mister?") unless you have proof of a very very large bank account and a cheque book handy.

For more info about this and other Mountain Cycle products contact:
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Tel: 0101 805 545 8004
Fax: 0101805 545 9790

One final note: Thanks Greg! ***(And all at Mountain Cycle)***

Paul Smith

Item	Description
Bar Ends:	Controltech Team issue
Grips:	ODI Tech 7
Brake levers:	Oddesey RX5
Shifters:	XT thumbs
Cables:	Campag 'n' Dia-Compe
Bars:	Advanced Composite
Stem:	Controltech 135mm 0°rise
Seat:	Flite
Seatpost:	Control post
Rear axle:	TNT titanium
Freehub body bolt:	TNT titanium
Hyperglide lockring:	TNT titanium
Rear gear cluster:	12-28 7 speed
Rear mech:	XT long cage
Rear Mech hanger bolt:	I.D.Sports alloy
Chain:	Sedis SL
Crank arms:	Deore LX '92
Chainrings:	EGG rings 24 35 50
Front mech:	Deacre DX
Bottom bracket:	Royce titanium
Pedals:	737 SPD's or GT platforms
Bike weight:	28lbs (Truth)