

F i z z

Bonk. Fssss Pwssshhhhhrrrr. "F**k! Get it out of here — it's gonna blow!" As we rounded the corner onto the MIRA timing straight the nitrous bottle in the back of the van fell over and switched itself on. With the zeal of a man dealing with a live grenade, Neil's mate grabbed the bottle and turned the tap on even further, transforming a gentle hiss into an ear-splitting shriek. By the time we'd stopped the van, and Neil had rendered the bottle harmless, there was a mass of ice crystals over the cylinder and a cold burn on Neil's fingers that took ten minutes to warm up again. Nitrous oxide is fairly volatile stuff to work with even before you start injecting it into unsuspecting motorcycle engines.

N_2O . Two atoms of nitrogen to one of oxygen emerging at 800psi and minus 128 degrees Celsius. Squirt it into the inlet tract at full throttle and it rips the heat out of the charge, cramming more fuel and oxygen into a smaller, denser space, then liberating its single oxygen atom at the crucial moment for super efficient combustion. As much power as you can handle at the touch of a button; instant, crisp, smooth. Corny as it sounds, nitrous injection really is a gas.

In Neil Unsworth's case we are currently talking about an extra 11.6 horsepower at the touch of a horn button. An onboard reservoir hanging off the back of the bike provides the gas and a solenoid allows you to blast it into the engine at will, along with enough neat petrol to take advantage of the increased efficiency. A 'law abiding mode' switch near the headstock cuts out the nitrous system altogether and restores the horn button to its familiar 'bleat bleat' operation.

As Trev, the designer of the system, describes, it's a drug at first. The temptation to give it a good squirt every time you get onto full throttle is irresistible. It feels like suddenly finding another quarter inch of throttle cable; a pleasant boost that signifies the engine flowing more air through the same sized carbs and ports. Startline wheelies come easy. Acceleration switches from perky to vicious. Basically, the engine tries harder.

How much harder was what we were at MIRA to measure. It



Sniff the air. Smell the gas. Squirt the nitrous. Rupert Paul reports on the definitive way to convert an RD350 throttle into an on/off switch.

b o m b



Nitrous is banned in road racing but it's a bit of a laugh at Mallory on practice days. Unfortunately the bottle ran out half way round Cerrards on the first lap.

took three hours of pouring rain for us to realise that MIRA's rubber strip timing gear was totally out to lunch and when we tried again a couple of weeks later, using our own quarter mile lights at Bruntingthorpe, we found that MCN had borrowed — and broken — our 400 metre cable. Thanks guys.

Virtually the sole purpose of building the bike had been to hit an eleven second quarter mile time but it was not to be. Instead, Neil rode past the radar with and without nitrous to record 123.5mph against a standard 116. With higher gearing the result might have been even more dramatic but top speed isn't really what nitrous is for (apart from anything else, the gas doesn't last long enough). Far better to use it for acceleration and roll-on performance; on TVM's rolling road the 60-120mph time is 40% less with gas assistance.

Trev uses the rolling road to set up the carburation, altering the fuel/nitrous ratio and the total amount of the two until the roll-on time is as fast as possible. The effectiveness of this was proved when, after two

NITROUS FACTS

“The first limiting factor for nitrous oxide in an engine is the customer. I haven't yet come across someone who has asked for more power than I can give them.”

Thus quoth Trev Langfield of TMC (0302 834343) where Neil's RD350F2 was endowed with its extra horsepower. Trev started developing his own nitrous systems for motorcycles six years ago and has been steadily refining them ever since.

“I started on a B25 BSA. The first two stroke was a Vespa financed by a local shop who reckoned it'd be good publicity to have a 100mph scooter. With someone else financing operations we set to with great vigour. It went from four to twenty-eight horsepower on our rolling road dyno, and from 56 to 96mph. It was impossible to ride.”

“Two strokes are a lot more receptive to nitrous than four strokes, but they're more delicate too — the two stroke is a more sensitive creature. It's more that than a case of the nitrous injection

being too harsh. You can reckon on a 300% power increase as a safe limit for two strokes and 500-600% for four strokes. Even at that level four strokes don't get reliability problems — it's just difficult to keep the charge in. It tends to blow back out.”

Power crazed readers will therefore ask themselves why there aren't more 500bhp GSXR1100s about; the answer is simple.

“One customer drag races a GSXR1100 with a two stage 70bhp system. With an otherwise standard bike he's getting 10.3 quarters and wheelies everywhere but he's still not using the gas early enough.” It comes back down to the customer being the limiting factor.

Trev was surprised that Neil's RD350F2 revved so hard — an extra 400 rpm — when under the influence.

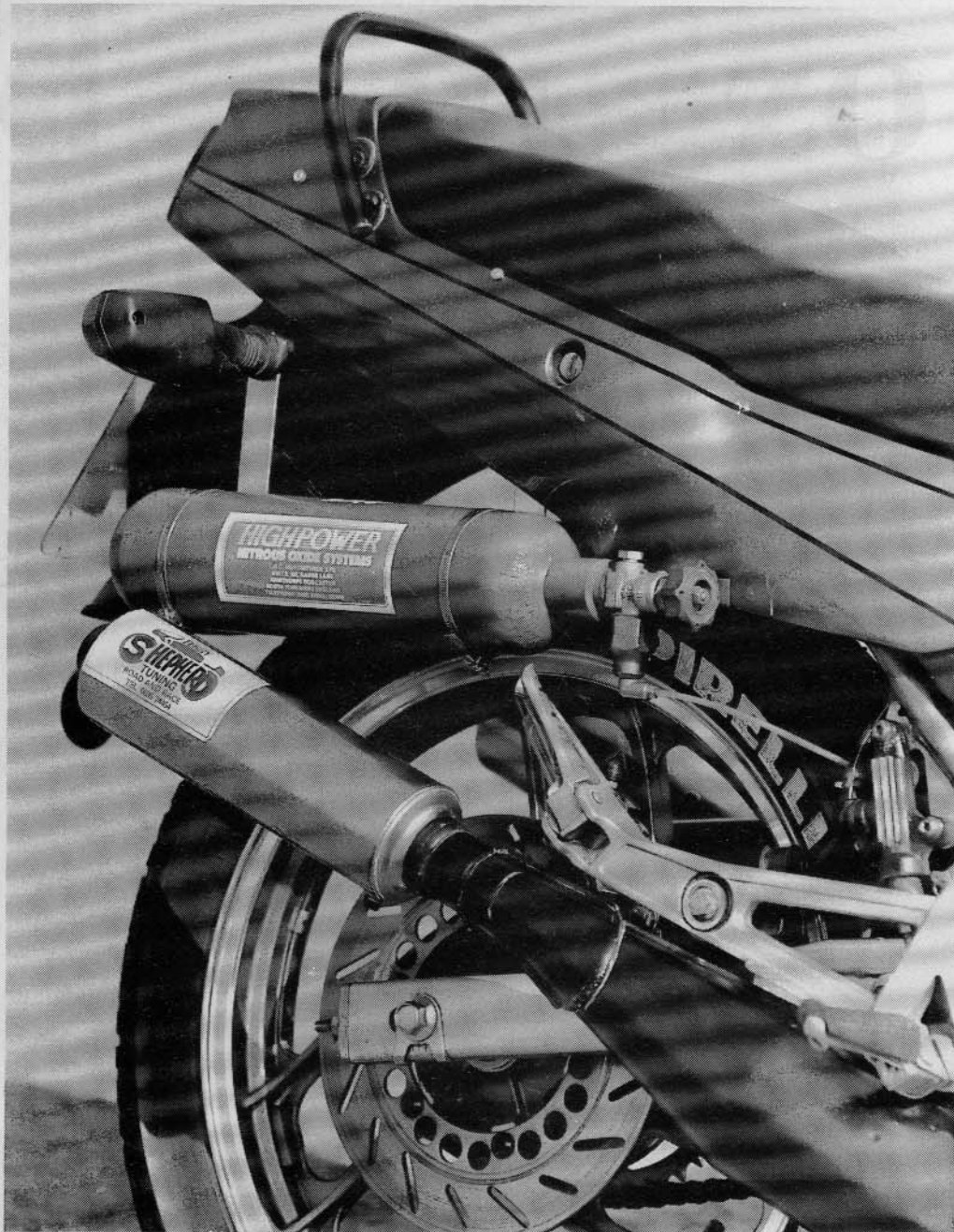
“We had an RD400 in once, tuned to the limit. It made nothing up to 7,000, then revved to 14,000. When we added nitrous it had power from zero to

10,000, but it stopped there. Possibly the power valve in Neil's bike helped with the rpm increase.”

For road use Trev tries to keep the power practical — mild, even. “American nitrous systems give such peaky power that you can't use it. Because of this image, some of my customers say they expected the nitrous to wrench their arms out. They can have it that way if they want but I try to make it useable.”

“When people first use the gas the bottle never lasts long enough, but gradually it becomes a useable piece of equipment rather than a toy. Once the euphoria's worn off the bottle tends to last a lot longer.”

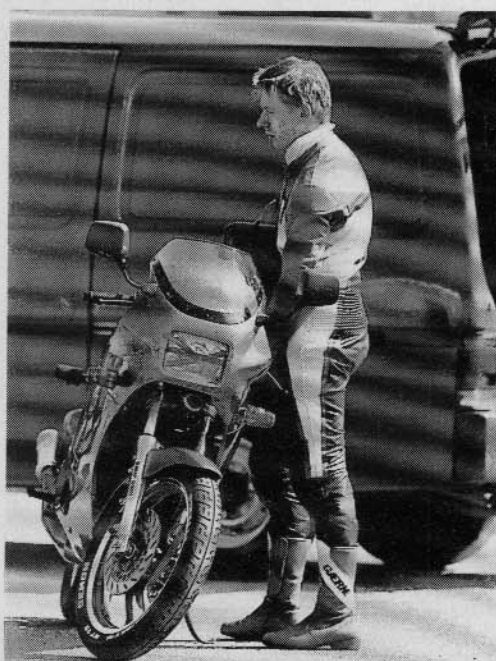
“I've spent six years constantly thinking how I can improve the system. I've had three or four engine failures in that time — pistons normally, and usually attributable to factors other than the nitrous. If you make a mistake with the gas it's unforgiving, but gerrit right and you'll do no harm at all.”



£8.75 worth: enough for about twelve quarter miles on a 350 or three minutes of generally showing off. Neil uses it for drag racing.



N₂O has great scope for impressing your mates.



Neil and his RD. Soft compound Demons were the biz, wet or dry.

days of thrashing it at test tracks, we took the bike to Mallory Park for a giggle: At the end of it all the motor was still in one piece despite liberal abuse of the redline.

At the moment the RD is at an early stage of development. The standard clutch is just beginning to slip and some forged pistons, high compression, straight cut primary gears and judicious porting by Terry Shepherd will all be pressed into service alongside a higher boost from the nitrous. Trev is fairly convinced that injection directly into the airbox will improve things; unlike injection downstream of the carbs, there's no hot metal parts to compete against the inlet charge for the cooling effect of the gas.

What Neil's RD proves is that you can have standard Yamaha reliability alongside the top end of a well-tuned proddy racer. The only problem is that cylinder. It runs out too damn fast.

SPEC

ENGINE

Standard RD350F2 with solenoid operated nitrous oxide/petrol injection between carbs and reed valves. Injection system controlled by jets and a T piece leading to both cylinders. Onboard reservoir holds enough gas for approximately twelve quarter mile runs or two to three minutes of full throttle operation. Solenoid switched manually via the horn button. Total cost around £320 with £100 set-up time on rolling road. Standard pistons. Welded crank, TZ250 cages in big ends all by Terry Shepherd (0695 74454).

TYRES

Pirelli Demon soft compound 100/80V18 MT79 front and 130/70V18 MT78 rear.

PAINTWORK

Dream Machine.

TA VERY MUCH TO

Trev, Terry Shepherd, Keith, Vinnie, Alan at ESB Motors (0204 35443) and the wife.

PERFORMANCE

Stock	
prone	116.0mph
sat up	110.0mph
SS½	12.91sec*
With N ₂ O (same gearing)	
prone	123.5mph
sat up	117.5mph
SS½	12.70sec*

* Figures obtained after our test

