

Denis Racing Team

The innovation station

I love the new breed of Italian tuning houses, not only for their extreme products, but also for the characters involved. Falc's mad-haired lunatic Lauro is a perfect example; producing both beautiful tuning parts and evil smallframe sprinters at his farmhouse lair. Max Quattrini is another: mild-mannered baker by day, but producer of excellent tuning kits by night (or is it the other way around?). Adding to this talented trio is Denis Innocente: perhaps better known as DRT Denis.



Denis has provided the missing component in unlocking the potential of the latest tuning developments; the transmission. Over the last three years his gearbox solutions – providing both closer ratios and stronger components – have become widely adopted in classic scooter racing and are now starting to filter out to road use. But the innovation doesn't stop there.

Surprisingly common among his breed is the fact that Denis does not actually have a formal background in engineering. His chosen studies at university were humanist subjects: philosophy and theology. His chosen steed however was a humble Vespa 50. Like so many Italians growing up in the 70s and 80s he decided that the standard performance was not quite as Special as advertised, so he began to investigate how his

scooter worked. Within two weeks of owning it (aged 15) he'd stripped the engine down and began to tune it.

In 1983, after military service, Denis finished school, joined the trade union and continued his work with scooters. Denis' reputation grew when he began to tune his friend's Vespa engines for gymkhana competitions leading to a long succession of wins. Denis Racing Team (DRT) started as a



DRT's genius Vespa largeframe clutch nut eliminates the need for those hideous castle nuts. And all those trips to casualty when the peg tools slip.



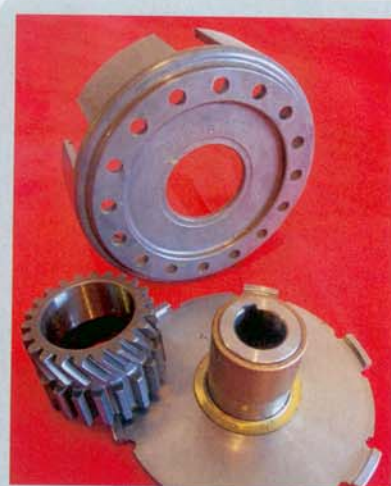
Billet Lambretta clutch spider and matching pressure plate which will take up to 16 springs.



A selection of uprated Vespa clutch components: billet additional-spring baskets for old-style PX and P2/T5 clutches.



New smallframe clutch components.



The 'Old Star' uprated clutch for vintage Vespas from 1952 onwards. Available exclusively from SIP.

business in the early 80s on the back of that success, and has continued ever since.

Even though Denis's university courses were not in mechanical studies they gave him a very logical way of thinking. His method is very scientific, always writing down every specification change so he can evaluate exactly what works and what doesn't.

Denis soon came into contact with two-stroke guru Franco Tormena (who has prepared engines for Aprilia among others) and Denis began a collaboration with him that has lasted since 1983. Franco helped Denis by showing him that it was important not trying to deal with engine symptoms, but to investigate the root cause of each problem and deal with it there. This helped Denis to find new ideas and feel confident to carry them out.

I'm part of the union

To label Denis merely as a scooter shop owner would be a great injustice because there is much more to him. Denis is very much an ideas man: always thinking and learning new skills, and happy to encourage others to do the same via his connections with the local Trade Union. He was the president of the young entrepreneurs of the Treviso Province for eight years and then vice-president of the Trade Union for several more. He has recently stepped back from Union activities due to the sudden expansion of DRT's engine parts business.

One amusing aside during our interview was the revelation that Denis was also quite a well-known DJ not only in nightclubs but also for mix-tapes produced in his home studio. Where the UK had Clive Jones of CJ Scooters DJing

Northern Soul, Denis played 70s and 80s disco music. This didn't go down so well with the rock fans in the clubs, so to prove he wasn't musically narrow-minded he produced an AC/DC mix-tape of a fantasy live gig with lots of crowd noises and cheering connecting the tracks. This cassette would be little more than a footnote were worldwide sales not enough for Denis to buy his first house from the proceeds!

Scooter saving

There is a lesson for everyone who is blasé to the threat of legislation to the scooter scene in its effects on DRT. His business specialising in old Vespas and Lambrettas was almost wiped out overnight in the 1990s.

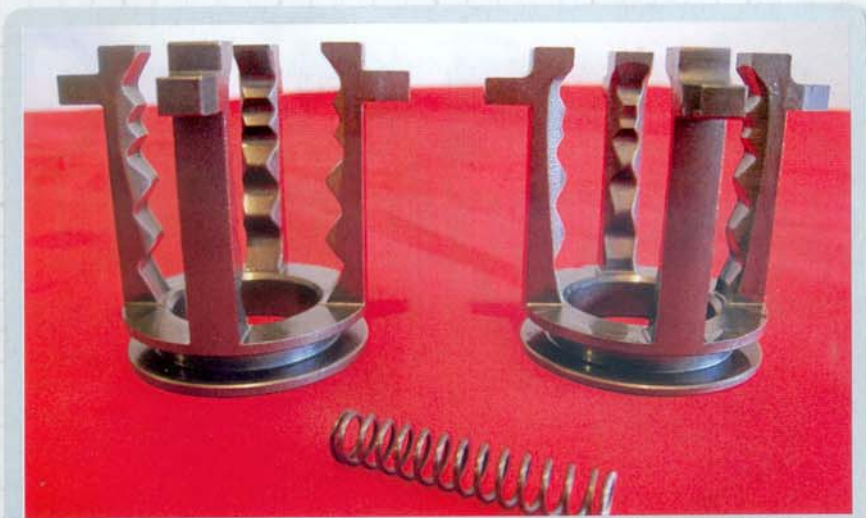
The first EU-spawned disaster was when the law changed so that over-125cc machines could no longer be ridden without a



A selection of DRT cogs that can be pressed onto a specially-modified Lambretta gear cluster in order to create a close ratio gearbox.



The new smallframe Nurburg gear cluster has a special 11 mm x 1 mm thread. The special clutch nut can now be tightened to 9kgm instead of the standard figure of 4.5kgm.



Up-rated gear selectors and strengthened selector springs are popular in tuned engines. The one on the left with the rectangular dogs is for older smallframe. On the right is the later PK type noticeable by the curved profile where the dog joins the upright legs.



One of DRT's many different interchangeable loose gears. Special tooth profiles allow cogs with different numbers of teeth to mesh with the same gear cluster.

full motorcycle licence. From one day to the next his market evaporated, leading to many of Denis' independent rivals closing up business and going to work for large motorcycle shops.

After resisting that first crisis, another came in the late 90s when the government offered 'rottamazione' which was a subsidy towards a new scooter for destruction of an old one – much like the UK car scrappage scheme. Denis took in many Vespas destined for the scrap heap and instead gave them for free to people who were passionate about classic scooters rather than see them destroyed.

Puzzle solving

In recent years Denis has decided to turn his talents towards solving technical problems on scooters; through innovation and quality manufacture. In the last three years he has designed 700 parts for scooters and is steadily putting many of them into production.

Some parts – like the Vespa largeframe clutch nut that is tightened with a conventional 15mm socket rather than the ridiculous peg tool – are simply works of genius. Others – like his vast array of close ratio gear components – are quite specialist, and only important with highly tuned engines in racing environments. In the middle-ground are upgrades of important standard components using advanced metallurgy and machining. Ostensibly DRT's Vespa and Lambretta gear selectors look exactly the same as standard ones and even the cheesy-puff junk produced by many of the pattern manufacturers. The ones Denis produces cost much more because they are produced in small batches to a very high specification. For those building high-end scooters, a source for quality gear selectors hasn't come a moment too soon.

The problem with up-rated transmission components is that they aren't very sexy. They are hidden away inside your engine so

there's no point making them look pretty. They don't give you any more power either, but they do allow you to harness the power of the latest cylinder upgrades. This is why you'll find DRT components in the gearboxes of leading scooter racers the world over.

Grinding gears

Denis currently produces a dizzying array of gear components. In the most basic form are loose gears that can simply be swapped for a standard one to narrow the gap between ratios. This is commonly required with the fitting of cylinder kits or exhausts that produce a narrow spread of power: hence the reason that a 36-tooth T5 4th gear is often fitted to a Malossi 210 engine in place of the original 35-tooth PX200 gear.

DRT's loose gears are made in small batches of no more than 50 at a time by 'artigiani' (master craftsmen) to ensure that they remain strictly to specification. The gears have usually been re-drawn to increase strength, improve gear selection and reduce weight where possible. Denis says that the materials and heat treatment are up to the standards of HRC's (Honda Racing Corporation) competition parts.

Where even closer ratios are required then either a completely new gear cluster can be produced or a standard gear cluster must be modified. Original Lambretta or smallframe gear clusters can be machined down to remove the old 4th (and often 3rd) gear teeth before machining the remaining shaft to a very exact dimension. The DRT replacement cogs can then be heated in water at 90-degrees for four-minutes before being treated with green Loctite and pressed on to the cluster using a hydraulic press. Denis says that the interference fit and the Loctite are sufficient to prevent the new gear from spinning on the shaft.

So far he has done almost 3000 cluster conversions this way without problem. For those not wishing to have a standard gear cluster modified, Denis can also supply complete Lambretta gearboxes based around modified Indian GP parts of which he says the standard cluster and 1st and 2nd gears are strong enough to suit these conversions.

The most expensive options are DRT's dedicated racing gearboxes where the cluster and many of the loose gear cogs are made from scratch to suit particular applications such as short circuit racing or sprinting. The



DRT's eccentric crankpins can be used to increase crankshaft stroke.



Tomas Pozza won the Italian V1 classic scooter race class using a DRT Matrix complete gearbox.

(Photo: www.scooterracingitaly.com)



Prototype reed valve conversion for large frame Vespa engines.



Charlie Edmonds uses a gearbox made exclusively by Denis to his own requested ratios.

smallframe Nurburg gearbox is interesting in this respect because Denis has machined the cluster with a stronger 11mm thread and special nut allowing the clutch to be tightened to double the Piaggio-recommended torque value without shearing the thread right off.

One area Denis has investigated thoroughly is the old idea of five-speed gearboxes. At the moment he claims he should be able to modify and improve on the previous ones produced for PX and Lambretta. However, he's still not certain that it will be possible to make one that will cope with much over 15-20hp because the gears and selector dogs have to be made much thinner than standard.

Future developments

Denis truly has let his inventiveness take over, and his wife Vilma currently has hundreds of different product lines to dispatch. His claimed intention to rationalise this stock to only popular items seems unlikely because he can't seem to help coming up with new ideas and putting them into production. Of those he showed me the PX reedvalve conversion that accepts both standard and large carbs seemed fairly promising, as did Franco Tormena's idea to produce a cheap and cheerful pressed-steel smallframe performance exhaust based on a reworked Polini pipe.

Accessing DRT

At the moment there is no shop stocking DRT parts in the UK, though Performance Tuning, Chiselspeed and DLR are able to get parts to order. For Vespa parts SIP is a main stockist with some DRT products only available exclusively through them. Alternatively it is possible to buy non-exclusive parts directly from DRT's website (www.drtdenis.com), though be warned that the English version of the site is not yet up and running. **SC**

Sticky

Thanks to Denis and his family for all their hospitality and also to Silvia Toffolon and Franco Tormena for their help with this article.



DRT is very much a family affair, with Denis' wife Vilma working in logistics and his son Alberto testing Vespa products both on and off-road.



Italian two-stroke specialist Franco Tormena is a close collaborator with Denis. This is a prototype of an upgraded Polini exhaust that they are considering putting into production.



Denis is heavily involved in encouraging other entrepreneurs in the Treviso area: a region that has more than its fair share of innovative companies including Sidi, Alpinestars, Geox etc. The sign says 'Giving legs to your business ideas'.