



Mono cup series on a BMR Suzuki fitted with an Apfelbeck head in 1998.

And these are just a couple of the designs that have made it into the public domain. If legends are true, Honda and the other Japanese manufacturers have investigated dozens of wildly different engine designs along the way to what we have today.

But this sort of technological development has been going on since the motorcycle was first designed - some have worked, some have been shelved way before they got much further than early prototypes. Others go on to get more development and ultimately, pass some of that on to road bikes.

The biggest issue with

Opposite page, clockwise from top left: The Nessie endurance racer; Tony Foale's Quantum Leap (sic) One; The completely bonkers-looking NSU with enclosed fairing that was hounded out of racing by rival teams; Honda's NR750 was designed to sidestep FIM engine regulations; Honda patent drawings from 1981 show oval-piston engine

This page, clockwise from top: The Elf Honda endurance race; One of the later Elf Honda GP bikes, a stripped down Elf Honda 500 V4; The earlier Elf Honda three-cylinder bikes; The Elf bikes still look radical today

racing is the time restraints placed on the development of radical technology. Unless it has an immediate benefit, new ideas can easily get dumped straight away - not because the technology doesn't work but because it doesn't work well enough within a short period of time.

This doesn't mean the technology is dumped forever though. Tony Foale was involved in many radical bike engineering projects, including two road bikes called Quantum Leap (sic) One and Two.

These tried to take the road bikes of the time and move them on, in terms of aerodynamics and riding position.

Now aged 63 he, is about to move to America to take up

the position of director of engineering for the Segway Company - the firm that makes the stand-up electric scooters. But his background was always in bikes. At 16 he designed and made his own rotary valve two-stroke 125 engine which he then went on to race - and won his first event on it.

He said: "So much of what has been done on motorcycles could change at any point because of the evolution of materials and tolerances getting better.

"I think the best example of this will be rotary engines. They consistently failed because of the issues of sealing and lubrication causing seizures as the metals expanded. Modern materials could end these

problems because modern alloys, sealing technology and lubrication are all better. It could mean this sort of technology and engineering makes a comeback.

"The road market always follows racing in terms of technology - lots of things in racing get shelved before being given the full time to develop and racing technology has been held back by the racing regulations.

"NSU experimented with shortened streamliner fairings for road bikes - these had a recumbent riding position and were enclosed.

"It's one of the great conspiracy theories of racing that the other factories were so worried

about this they conspired to get rules chiefly concerned with 'safety' brought in.

"I'd love to be able to see what the motorcycles we would be riding today would look like if developments like this hadn't been artificially killed.

"This is true of many developments - aerodynamics are a big part of that. Racing rules have stopped aerodynamics developing as they should.

"One of the biggest parts of the development of motorcycles has been the fact that the motorcycle industry is inherently conventional and top flight riders do not want to be involved in spending time on radical innovations because they know they

can't win on them. Without the likes of Valentino Rossi taking time to develop things, they won't work.

"There are lots of things from racing that will improve bikes, but it's only the current problems that will be addressed to make the bikes go faster. At the moment there is no real problem with the front end grip of motorcycles so no-one is looking for radical improvements there.

"What is a problem is getting the power down to the ground - and that's why such big steps are happening with electronics, including traction control. "It's always going to be like this - current problems will get solved. Then we'll move on to the next one. Radical steps aren't that