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Rust Special: *2016 Yamaha WR450F*



Spaghetti Ops...

"In this world there's two kinds of people, my friend:
those with loaded guns and those who dig... You dig."
- Clint Eastwood in *The Good, the Bad and the Ugly*.

RUST tests the all-new Yamaha WR450F...



By Jon Bentman
Photographs Milagro



AS LOADED GUNS go, the new WR450F is a very real deal. It's packing serious heat and with a hair trigger it's not made to the usual enduro specification - and by some measure. It deserves respect, and you either give it that respect, or indeed... 'you dig'.

The Spaghetti Western references are here on account of the fact that we're in Clint's Eastwood's old back yard to ride the all-new WR450F. These hills in Andalusia in south eastern Spain were the setting for *The Good, the Bad and the Ugly* movie and in fact we drank in the very same bar that was used in the film. The terrain in this region is quite the big dry wilderness, and just as it substituted rather well for the wild west in North America, so it also substitutes equally well for the Patagonian pistes that typify the going on the Dakar Rally, in South America. And yes, it's significant that we were riding rally terrain rather than enduro going, on this test.

We are here to evaluate Yamaha's new WR450F, the sixth generation WR since the very first one took to the dirt 18 years ago. Back in 1998 the WR400F - developed in conjunction with the YZ400F

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motocrosser - was big news as it was a leading protagonist in the conversion of off-road motorcycles from two- to four-stroke. It was updated in 2001 as the WR426F, then again in 2003 as the WR450F. In 2007 Yamaha swapped the ageing steel frame for an alloy one, then in 2012 they swapped that frame for a more svelte version, based on the YZ250F chassis, while they fuel-injected the motor. Throughout, the WR had always been a big bike, often too big, and while typically gutsy never quite the cutting edge racer.

For 2016 Yamaha are redressing that situation. Just as in 1998 we again have a WR that is very, very closely linked to its YZ-F brother, sharing a motor - now, at last, the reverse-cylinder unit - and chassis. So the new WR is no trail bike. In fact Yamaha have gone so far as to state that this is a machine for advanced riders and above (*that's expert and professional*), and not for beginners. Unusual in an enduro bike don'tcha' think?

YZ with Lights...

Just how close this WR is to the 2015-16 YZ450F is quite staggering. Yamaha have simply taken the latest reverse-cylinder

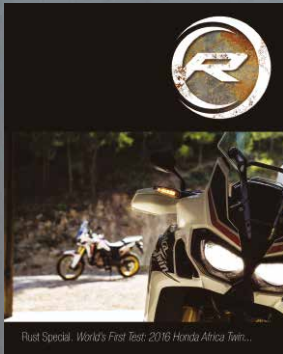
A wide-angle photograph of a rocky, sparsely vegetated hillside. Two motorcyclists are riding down the slope. The rider in the foreground is wearing a green and blue suit, while the rider further up the hill is in a red and black suit. The background shows a vast, hazy landscape with distant mountains and a body of water under a clear sky.

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Back Issues



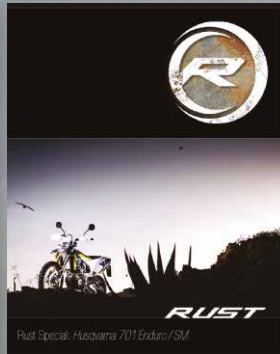
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motor, revamped for the 2015 model year, and worked on the fuel and ignition mapping, while adjusting the crank weight (*and adding a large capacity generator on the end*). That and the addition of a wide-ratio five-speed gearbox is about it. So it's the exact same camshafts, same compression ratio as the YZ-F, which means if you give it the most aggressive mapping options then it's all but full-YZ-F spec, probably cranking out something close to 60bhp. Which is either exciting or worrying depending upon your viewpoint on these things. Actually it has an enduro-spec clutch as well, with different plates and actuating arm, but as concessions to enduro-friendly engine tuning goes, you sense this set-up is not going to be a soft option.

Chassis-wise again it's been a light touch. So it's the same frame as the YZ-F, only with the top and front engine plates reduced in thickness by 2mm to 6mm to allow a little more flex, more feel, more comfort. Even the suspension is the same, carrying the same springs (*4.5N/mm in the fork and 56N/mm in the shock*) only with the valving modified to what Yamaha term a 'plush firmness' to effect 'comfort and control'. Even the fuel tank remains the same as the YZ-F, with a capacity of 7.5-litres. Larger tanks, with upgrades to full rally-spec capacity, will be made available.

It is then, extremely close to being a YZ450F with lights. And for those who do much of their riding in the woods you should have been hearing the alarm bells ringing loudly long before reading this paragraph.





Skating Along

First impressions are positive. Yamaha really do like to build quality into their dirt bikes these days and when you survey the WR450F it is so very pleasing. The alloy frame is a feast for both eye and brain. Slim and precision welded, it's a 10-piece aluminium confection with parts extruded, cast, forged and even hydro-formed. It looks so much better than a steel frame when new and it stays looking good as it fights the ravages of time. Steel frames typically lose their paint and will corrode over time, whilst alloy frames just seem to stay looking fresh and only in circumstances of the severest neglect will you find a sub-standard appearance.

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The quality is apparent in every component too, right down to the plastics with the now industry-standard moulded-in graphics. It is a handsome beast - and that's saying something given how ugly the headlight unit is, but it carries this one blemish without setback. Equally Yamaha have given thought to adjustability and it was a relief to see that the handlebars had four options on positioning with a range of 36.5mm front to back.

I chose the forward mounting position, in fact full-forward although I suspect position two, with the clamps swiveled rearward, would have been better. The seat meanwhile is long and flat and with the fuel cap buried under the saddle you can sit far more forward than with a conventional set-up. However, the radiator shrouds - which look both bigger and stronger than your typical shrouds - do seem quite wide so you don't necessarily sit as far on top of the headstock as you might first imagine.

Second impressions - on this occasion - were negative. We had an immediate hurdle to straddle inasmuch as Yamaha had elected to fit new mousses to the Metzeler Six Days enduro tyres on account of the extremely rocky terrain we were set to ride. And when we say new mousses, we mean rock-hard, feeling more like the equivalent of 30psi rather than 13psi, and so we skated across



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the shingle car park as we rode out, then teetered along on the tarmac for a few miles, before again finding ourselves skating rather sketchily over the hard-pack-with-marbles that constituted the local trails. Slippery is how it was, and with the best part of 60hp lurking somewhere between the 44mm intake choke and the curly-wurly exhaust we needed maximum concentration to stay rubber-side down.

While all this was happening we were being near-deafened by the howl emitting not from the exhaust but from the airbox, which on the WR450F sits in a line directly below your ears. Seriously, you need earplugs for this bike. Good news is it's only the rider who's deafened. The external noise rating, if we can call it that, is suitably muted, almost inoffensive in fact.

Throttle response was immediate with not so much as a nano-second of lag. Which alone would have caused further issues with maintaining grip, only whilst the throttle was immediate, the actual engine response was curiously less impressive. Bottom end power as we know it, was oddly lacking, while the mid-range through to top didn't quite have the solid boot of say a KTM/HVA 450. Perhaps it's in the nature of the Yamaha's DOHC motor as against the SOHC of the KTM lump to require a bit more '*winding up*' to reach its peak, but having said that the previous WR450F with conventional engine (*and DOHC*) had plenty of grunt available instantly, so go figure. In all the effect wasn't so much torquey as revvy - but still eye-wateringly fast.

Spaghetti Oops...



Five Speeds to Heaven?

The transmission was slick, being a sweet shifter with a light clutch action. Absolutely faultless in operation. But - and here we go again - the WR felt to be well over-gear, even for the fast terrain we were riding. And whilst a five-speeder might seem more than sufficient for a bike with this much horsepower, it's a measure of the WR's curious power delivery that we felt it needed an extra ratio in order to maximize the motor's output.

Yamaha have gone wide-ratio though, and they report that first and fifth gears are exactly as found in the 2015 WR450F (*first being a fair bit lower than on the YZ-F, fifth a fair bit higher*) and that they've raised second, third and fourth gears slightly. However, given a few laps of an extreme course Yamaha had laid on for us, we found a worrying dependence on first gear for most of the obstacles.



With the bike's lack of punch at low revs, second gear becomes redundant in the technical sections and our preferred technique for hill climbing was to use momentum and the rev of the midrange rather than risk a 'flame-out' attempting a second-gear slog.

Incidentally, the motor didn't like to be restarted in gear. Almost subconsciously I found myself rocking the bike gently as it returned to neutral and then restarted. Not an issue most of the time, but far from ideal when mid special test, or stuck high up on a slippery bank.

Given a brief stretch of tarmac I revved the WR out in fifth gear to see a reasonable 140km/h clicking up with possibly another 10km/h more to come. Perhaps lower gearing would help it reach maximum rpm in top, but whilst dropping a tooth on the counter-shaft sprocket would get second engaged more often in the tight stuff, that would come at the cost of top speed which we guess might then become 130km/h or so. In all, we really would prefer a six-speeder for enduro.

Heaven is a rocky stream bed...

After so much negative feedback it was something of a relief to find that once we got into some seriously decent enduro type going the WR450F really did start to shine.

Spaghetti
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That happened when we reached a gorge with a dry stream bed at its floor. The bed was a carpet of pea-shingle that weaved back and forth around bigger rocks that had obviously blocked the passage of the stream. Sometimes you had to ride over those rocks, proper trials style, while between bends you could be hooking up the gears under full throttle. It felt, to all intents, like a proper EWC enduro test.

Here the WR450F got into its stride. The suspension that had felt insecure on the hard-pack now kept the forks high in their stroke whilst pushing through the sand-like shingle and resisting tuck-in.

It also shrugged off occasional blows from unseen rocks without any issue. For a 450 there was a sense of great agility, and direction changes came easily. But everyone agreed there's a way to ride this bike which works, and you should only deviate from that at your peril.

That technique requires standing in the '*attack position*' with your weight positioned about the middle or slightly rearward of the centre of the bike. In the corners there was no hunching over the bars loading up the front - there simply isn't a feeling of dependency on the front

Spaghetti Ops...





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end. So instead the trick was to hang back a little and steer it with the throttle and a bit of good old-fashioned body English. But at least the experience was enjoyable, the WR was at last feeling like a contender.

What wasn't so apparent on this test was the mass-centralisation dynamic that you sense so obviously on the new WR250F. That bike feels positively new-age given the way it feels so light on its wheels. But the WR450F actually feels quite conventional with a sense of front-to-back balance that's quite normal as is the speed of turn-in and mid-turn behaviour.

Yamaha make a lot of noise about the mass-centralisation project and indeed the whole point behind the 'reverso' motor is to try to concentrate the mass of the heaviest components within close proximity of the middle of the bike. And we recall that when they first



Masato Yokoi -
WR project manager

RUST: You've been working on many projects in the Yamaha off-road range Masato?

MY: Yes, I am the project manager responsible for the engine in the YZ450F and I am the overall project manager for the WR250F, WR450F, YZ250FX and YZ450FX.

RUST: The WR450F is very closely based on the YZ450F, what are the key differences between the two models?

MY: The tuning of the chassis: the engine brackets are very important to create the correct feeling, and for enduro we're looking for flexibility and comfort, that is why we adopted the thinner engine brackets. With the engine we worked on the mapping of the fuel injection and ignition - and that involves test after test after test. It's a very similar bike to the YZ but the feeling is very different.

RUST: The engine spec is almost identical to the YZ450F, can it make the same power?



Spaghetti
Oops...

debuted the YZ450F with reverse-cylinder motor (back in 2010) this was quite a talking point (with both proponents and detractors), but here that dynamic seemed to be entirely absent.

Where the WR450F truly shone was in another dry river bed. This one broader, about 200m across and miles long, again with a pea-shingle base that would trench down to a depth of about 6-9in. Where the water had meandered back and forth across it, it had created banks and hollows that could cause grief, as equally could the minefields of larger rocks that were ranged around - the worst danger being the unseen almost-submerged ones. Here the WR would hold fifth gear and simply storm through. Just as with the 2015 WR450F this bike displays exemplary high-speed stability and the only limit to your speed through a section like this is your own bravery.

MY: Almost. In standard tune it produces less horsepower than the YZ but if you put on the YZ's exhaust system the horsepower will be al-most the same because the cam timing is the same, the only significant difference is the compression is reduced during the start cycle to help the electric starter.

RUST: Did you develop the bike with any external input?

MY: We went to America to test, two or three times, but in Japan we have a lot of enduro test facilities, in the mountains, so we have good conditions to test at home.

RUST: There's a lot of emphasis on the rally potential of the bike. Was this intended from the beginning?

MY: We didn't develop specifically for rally, we focused on enduro, but it's good also for rally.

RUST: At the briefing there was specific reference made to this being a bike for advanced riders.

MY: By using the soft settings we think there's enough flexibility for it to fit to every rider, but as this is

a powerful 450cc competition machine it's not for the beginner. It also depends on your situation... extreme enduro would be more difficult on this bike.

RUST: You've not fitted a six-speed gearbox?

MY: I think there's not the need for a six-speed gearbox because of the wide spread of power.

RUST: Is there any one aspect of the bike that makes you proud?

MY: I think it's the same as with the YZ450F, we focus on centralised mass, you can feel the light weight.

RUST: Thank you Yokoi-san.





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Our guide, Franz Verhoeven - a ten-time Dakar racer and winner of five stages in the Marathon and Production classes - explained the rally technique of dealing with this terrain. This runs something like... hold it flat-out and anytime you see a big hole or bank just pull back on the bars and go faster!

Wild as that sounds it does work and especially so with the WR450F. Where the suspension had lacked the subtlety to deal with the small stuff we'd ridden earlier, in this terrain it was fully optimised; and as Franz said, when you hit those obstacles hard, the forks and especially the shock could be relied upon to absorb the blow without rebounding the bike into a deadly endo.



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It's a Rally Bike

Yamaha had stated the dual use for this machine - enduro and rally - right from the outset of the launch, and such factory-backed racing teams as they've named so far have all been from the rally sector. And the more we rode the bike the more the rally aspects of its characteristics came through. The suspension, with identical spring rates to the motocrosser, is at the very firmest end of the enduro spectrum, but ideal for rally. Rally riders set up their suspension for safety ahead of compliancy, and safety for a rally rider is about a bike not endo-ing when they hit a wash-out or a rock flat-out. Enduro - at least as Europeans know it with its technical sections, frequent woods riding and slow-speed extreme tests - requires an altogether different approach to suspension set-up.

The rally influence, we suspect, is also a reflection of such testing as the bike has seen in America - by which we can assume western states of America - where again high-speeds are a big part of the culture whether it be desert racing or cross-country. When we start to take into account all these influences we can see the WR450F is looking very good for the sectors it's been designed for, but that does make it the antithesis of a European enduro machine. How this bike responds when ridden in the often wet, hilly woodlands found across Europe remains to be seen.



2016 YAMAHA WR450F

Engine: liquid-cooled DOHC
single-cylinder four-stroke
Capacity: 449cc
Bore & stroke: 97x60.8mm
Compression ratio: 12.5:1
Fueling: fuel injection,
44mm throttle body
Ignition: TCI
Starting: Electric & kick
Transmission: Five speed
Clutch: Wet multiplate,
cable actuation
Frame: Semi double cradle,
aluminium
Front suspension: USD 48mm
Kayaba AOS, travel 310mm
Rear suspension: Monoshock
Kayaba, linkage, travel 318mm
Front brake: 270mm disc,
twin-piston caliper
Rear brake: 245mm disc
Tyres: 90/90-21 130/90-18
Weight: 123kg wet (claimed)
Seat height: 965mm
Wheelbase: 1465mm
Fuel capacity: 7.5-litres
Top speed: 140-150km/h indicated
Price: £7499 (UK)
Availability: January 2016
Contact: www.yamaha-motor.eu

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So Good, Bad, or Ugly?

Our assessment is that the new WR450F is probably a very good bike. That is... a very good bike if you ride in the western states of America, parts of south America or most of Australia where the terrain is vast, dry and ridden at speed. And for the same reason it will make an excellent rally bike (whatever country you ride in), albeit we can still imagine a six-speed gearbox would better serve that purpose. For those who ride European enduro type terrain (*and we can include countries like New Zealand in this*), where we are riding mostly in the woods, then there are countless better-suited options available. In fact you're far better off with the WR250F, even though that model too prefers fast and frenzied over slow and technical.

The WR does come with some adjustability though, in the suspension and of course via the engine mapping, which you access using the Yamaha Power Tuner - a must-have accessory for this model (£257 in the UK). But it'll need a proper test in forest conditions to ascertain whether the WR can be re-tuned to work well here in Europe.

So clearly what the WR450F *isn't*... is a direct competitor to the KTM 450EXC. There really does seem to be an AMA vs FIM difference going on here. That is a shame because there will be a good number of

A whole stack of official GYTR accessories are available along with a tasty titanium Akrapovic exhaust...



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European Yamaha devotees who will have been hoping for exactly that - a Japanese alternative to a KTM, who will for the most part be disappointed by the new blue bike.

It is, as Yamaha stated, a bike for the advanced rider. And probably one who favours *fast-n-vast* over *slog-n-bog*. It is no doubt an awesome unit when in the right hands and the right terrain but for us here at RUST, where mud, roots and slippery banks are a staple part of our diet, it's as alien as the desert terrain it was built for... RUST

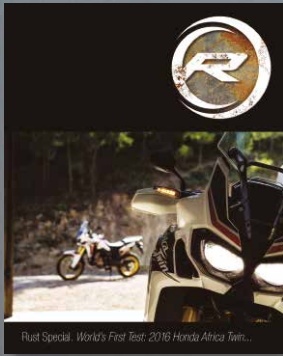
YAMAHA WR450F TECHNICAL HIGHLIGHTS

- YZ450F-based 450cc liquid-cooled DOHC, fuel-injected four-valve engine
- Reverse cylinder head with front facing intake
- Engine behaviour is fully adjustable with optional Yamaha Power Tuner
- Wide ratio 5-speed transmission with light enduro clutch
- Efficient cooling by enduro-spec radiators with fan
- Top mounted, quickly removable air filter
- YZ-F based aluminium bilateral-beam frame with optimised rigidity balance
- Latest Kayaba air-oil separation (AOS) type front forks
- Link-type Monocross suspension
- Switch-free electric starter (no more on-off button)
- Instrument panel featuring enduro computer, fuel warning and more
- Metzeler 6 Days Extreme tyres

Back Issues



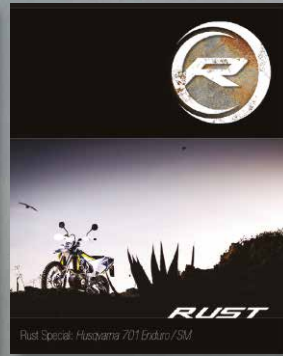
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