

## CBR 150 engine failure.

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I have had 2 race engines fail and both exhibit the same symptoms. I'm not sure how many Km these motors have done as they are ex road registered commuter bikes. Probably 20 000+ km. Both motors has been raced for around 18 months. One probably a fair bit more that the other.

The symptoms are

No Piston

Conrod Broken

Bottom of the barrel virtually all gone

One has both inlet valves bent and the other both exhaust valves.

One motor ended its life mid corner, the other after a set of SS and going onto a short straight.

### IGNITION

Both motor had race ignitions with 'no' rev limiter. The red line on the original Honda starts at 11500 and ends at 13500.

### PISTONS

Both motors had 1.5 mm oversize pistons taking the motor from 149 to 156 cc.

New Piston 124 g old 109 g. The new piston has a thicker side wall. In comparison the FXR pistons are 135g. Their rods do look thinner than the Honda ones.



The bore and stroke is 65 x 47.2. At 14000 RPM this gives a mean piston speed of 22 m/s. This is up there not near the limit. Wikipedia gives– Medium speed petrol ~16m/s, Sport engines and motorcycles ~20-25m/s, Top fuel Dragsters ~30m/s. The after market pistons are Race pistons and I have had no failures with the same brand in 8+ Suzuki FXR engines. The FXR racers tend to keep the std ignition which I believe limits the rpm to 12500. It has a slightly longer stroke and gives a speed of 20.3m/s

When machining the pistons, I found no inclusions in the castings. Visually, they look excellent.

There was one comment that the pistons could have broken around the oil ring groove, but on inspection of the larger parts of piston bits, the oil ring groove is still intact.

## CAMS

One had race cams and one standard. (One produce more power that the other. )

## CONROD

The Suzuki race motors (not built by me) have been known to destroy big ends. The rollers lock-up. The actual cause is unknown but has been put down to roller slippage. I replace the big end on any FXRs I build and have not had a failure.

In both cases, the Honda's big ends still rotate freely. Both however, have the conrod broken off at the same spot, right at the base of the rod. This was either due to the crank spinning freely and hitting something in the engine casing and this spot was the weakest point or, metal failure. PS the small ends look fine in both cases ie no overheating evident.



The rod has broke at the thick/strongest side near the base where there would be limited flex.

The rod has been heat treated. It is interesting to see that the breakage is next to the HAZ, heat affected zone. My gut feel is that the rod snapped at the HAZ where the metal structure has been compromised. The other possible reason is, if the piston broke and while the rod was still in one piece, for it to break, it must have hit some other engine component. (I cant see any internal bits that could have been hit !). If this was the case, the front of the break would split open and then as the rod was torn off, the rear of the break would show signs of being peeled back before finally separating. There is nothing like this at all. It looks like a straight tension break so we are back to the HAZ breakage. See the red arrow on the rod below for metal tearing example.



Comment from one of my forums from an noted engine designer and builder.

'What do the rods look like Wallace - are they "bronze" coloured full length or silver coloured around the BE with blue coloured beam ? If the latter - this is your problem - a recent trend in cheaper engines is to case harden the whole rod then anneal back the beam - which leaves the BE hard on the inside & out with less ductile "core" thickness. ( Saves money on copper plating )



The Honda rods are the latter and this could have create a HAZ. All the after market ones I fit to the FZR from Japan are copper plated.

The rod's break is not at the narrowest point. Possibly the bigends could have worn slightly oval and this extra up down movement added to the rod stress. Not sure

MISC

Both motors has their head ported and produce 20-30% more power than std.

My suggestion will be to keep the STD CDI box with rev limiter.  
Any comments, please reply to my email

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Cheers Wallace