

Engine Modifications

By: V2Sam (Riderforums.com)

Was going to go down the ZX-10R Throttle Body route but decided to keep it simple and keep the stock TB's. Just started having a play this week and finished the boring (tapered and straight sections) +4 mm which equals 22% larger cross sectional area.

Made a jig to machine the new butterflies at the correct angle, just need to cut some 2mm brass sheet and skim down to 1.2mm then mount on the jig to machine the correct edge angles.

Then need to modify and waste the spindles a bit further.

Once these are done I will have a better idea of where to go with the inlet rubbers and heads.

The TB's is only the first part, now doing the heads/valves and inlet rubbers, then need to build rest of engine with new cams and h/c pistons and also make a slightly bigger set of exhaust headers.

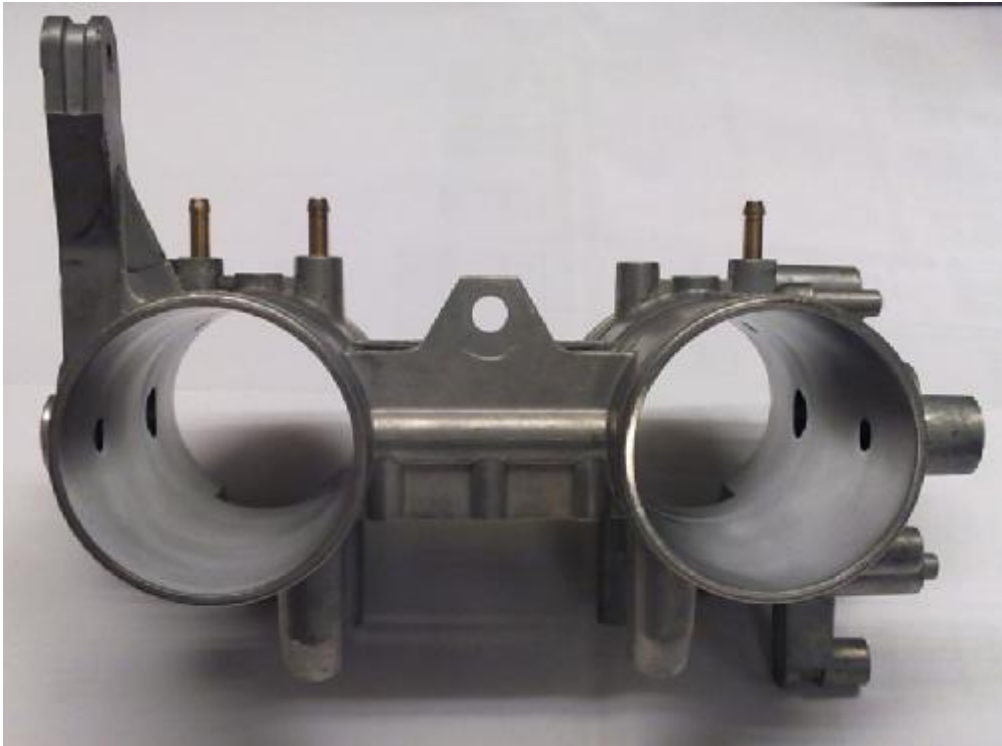


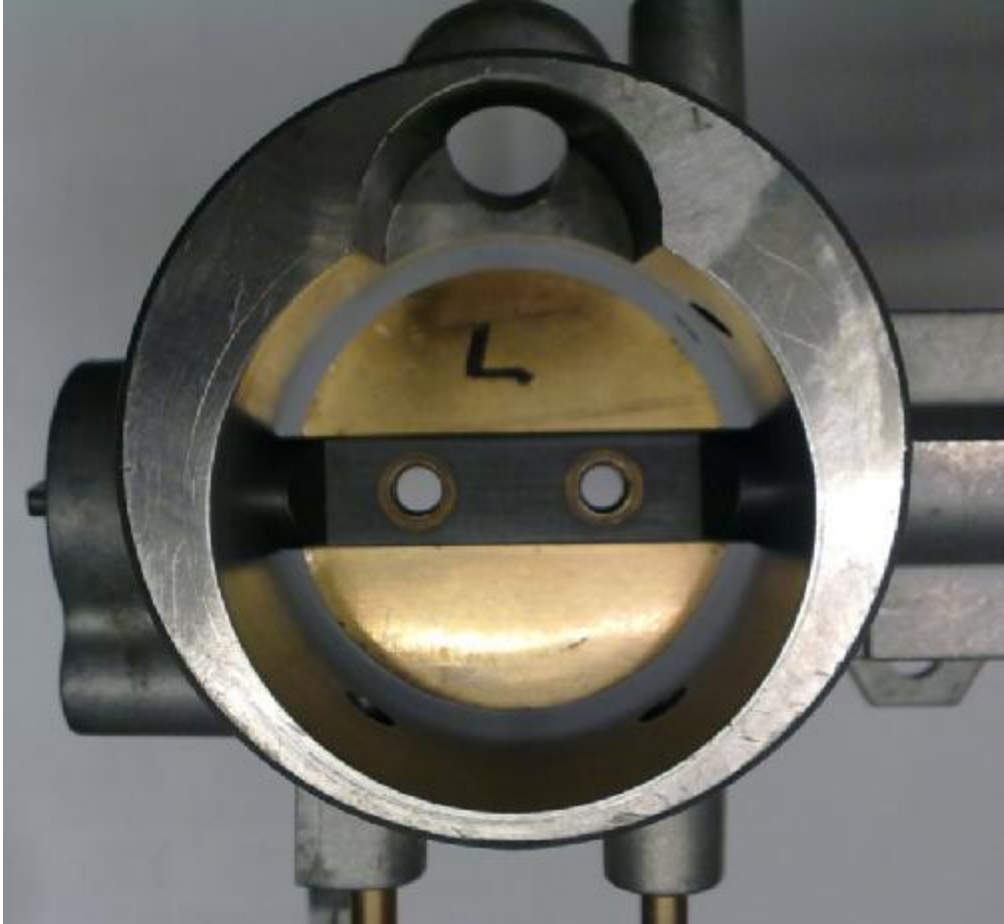
Finished the Boring (Tapered and Straight Sections) Just need to make the new bigger butterflies and waste the spindles a bit further.



I use a program called Engine Analyzer Pro to play around with various settings but most of this engine work is best guess at the moment. Cams are similar to the Webcams race profile but slightly different.

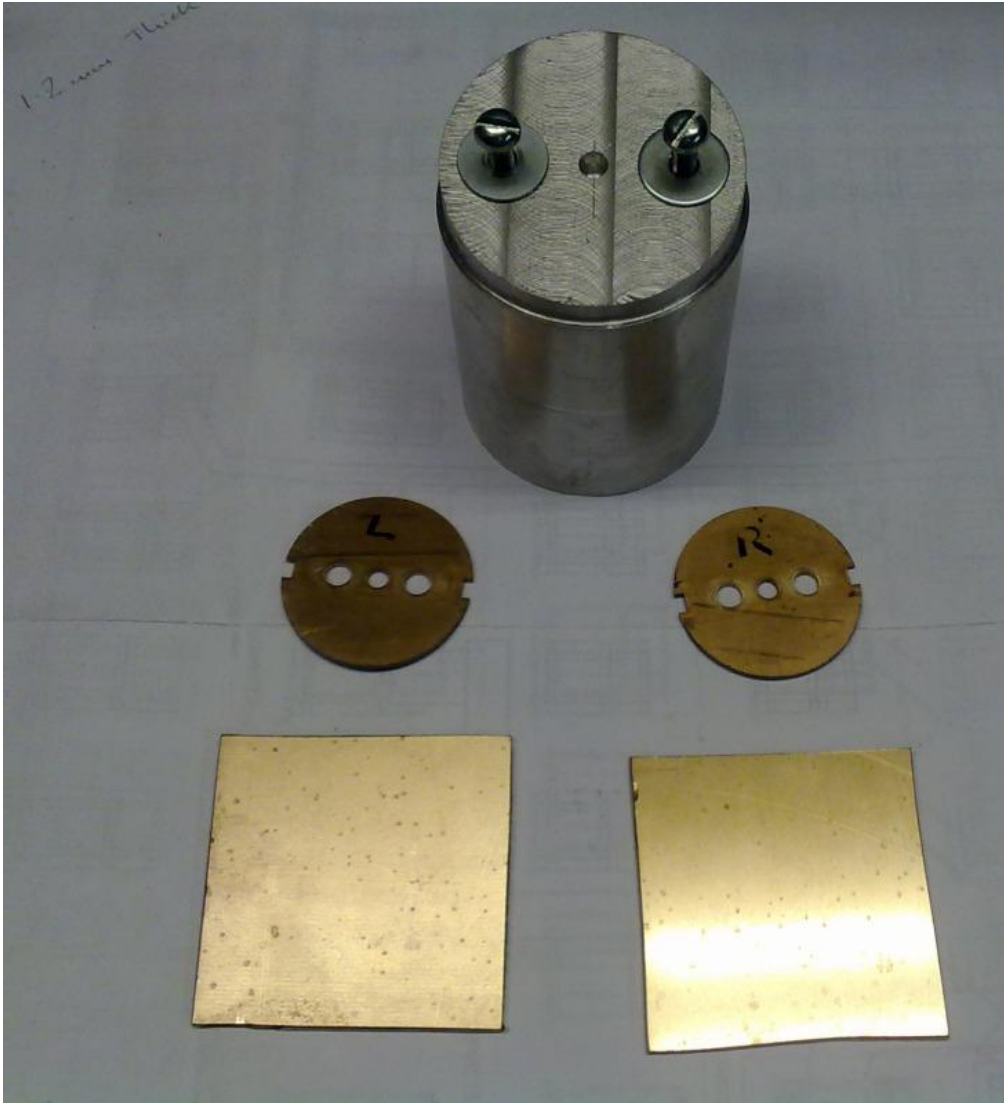
I'm hoping to be into the mid 80's at the rear wheel but with the power not tailing off before 9k at it does now.

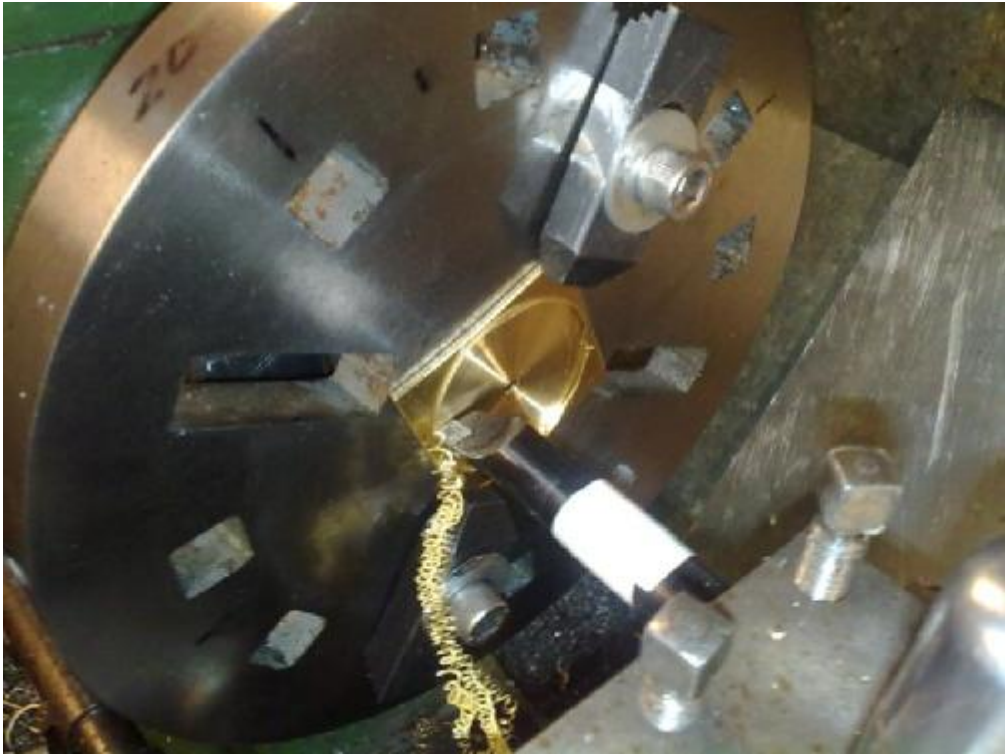




Not that clear from the photo's but the new butterfly is actually machined at an angle, hence the special jig to hold it.

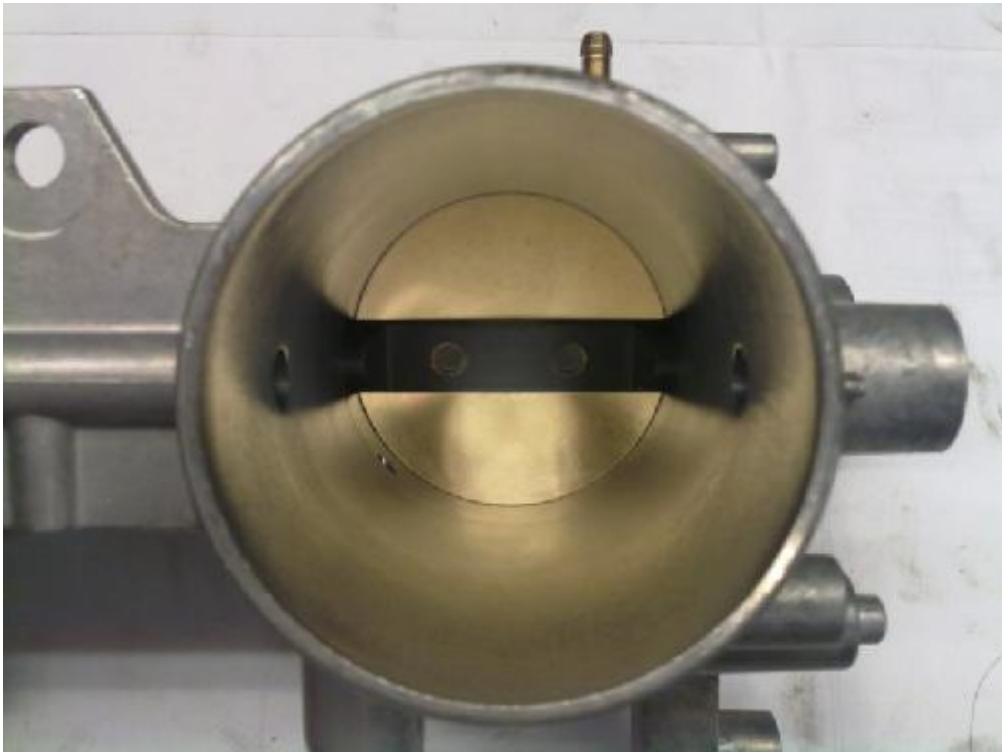


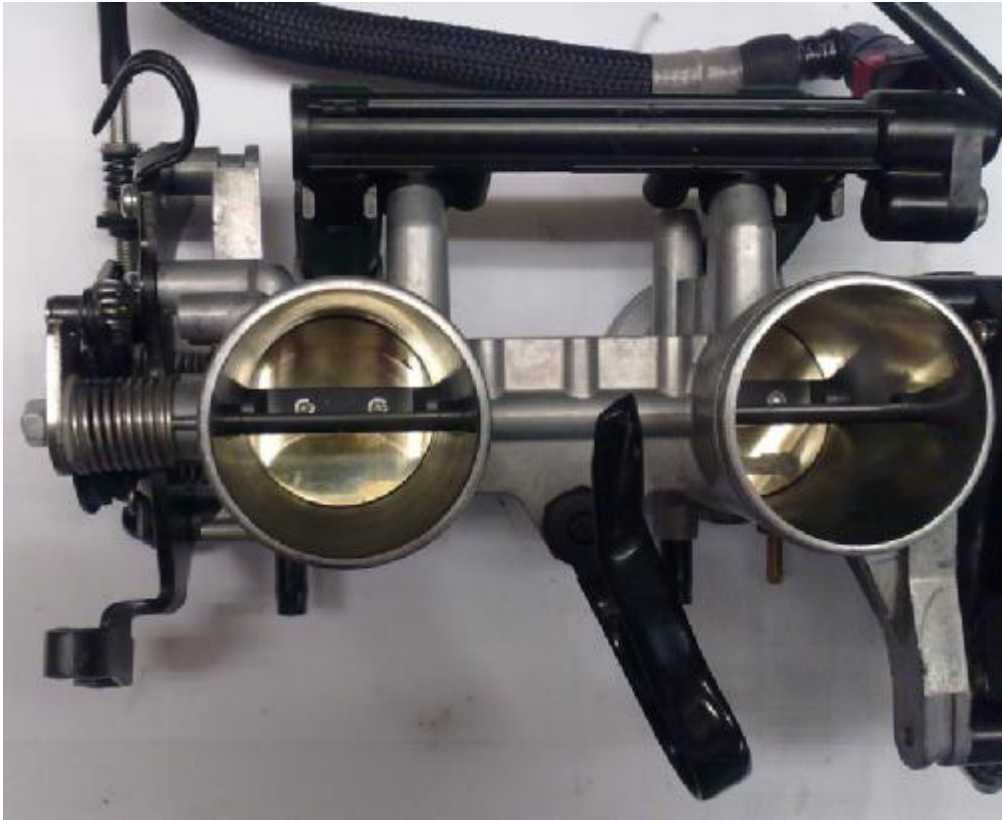






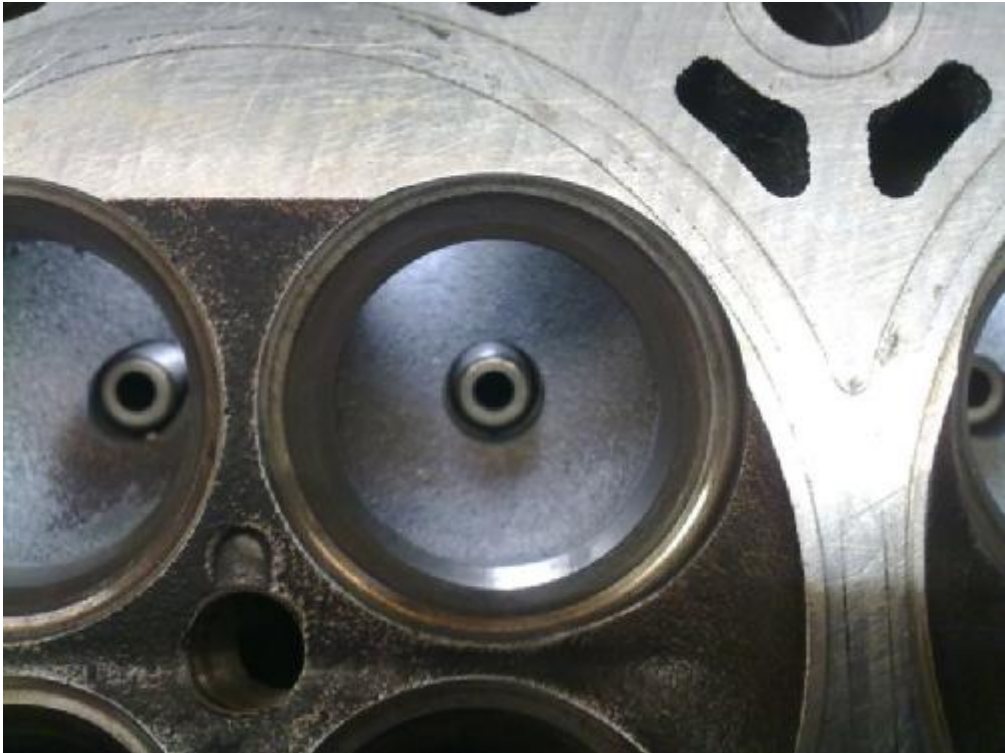
I already have the cams and pistons bought, the inlet rubbers need to be matched to the TB's and the rubbers need to be matched to the head as well as the porting, so basically the whole inlet track is looked at in one go.





The stock valve seat throats are certainly designed for torque and not top end power, great if you deliver pizza but not for racing. So a little work is needed.

1st stage is boring the valve seats to a more respectable size. Next are blending and a bit of flowing of the ports which I'm doing at the moment.







I haven't touched the valves or seat faces; they are in the stock position. I've only opened up the throats and some minor porting.

I have opened up the port area behind the seat quite a lot to blend in with the enlarged seat throats, also opened up the point at which the inlet rubber connects to blend in with the bigger throttle bodies, the mid point of the inlet port is just cleaned up as that is ok and I didn't want to slow the gases down too much mid port.

Just finished the new exhaust headers, polishing will have to wait until after the dyno as I'm running out of time. Fired the engine up last night for the first time but only for a few seconds as the radiator wasn't fitted at that point and the burning engine assembly lube was making my eyes sting with the door shut.

Put an extra tag on for the sump plug lock wiring.







I went for 1.5" out of the heads (Heads needed opening up a few mm) then enlarged to 1.75" then merged to 2" into my existing 2Bros can, I wanted to put a 2" loop under the engine to give more mid pipe length but started to run out of time, so that will maybe be something to try later if everything done so far is heading in the right direction.

I've quite a few photos of the ports but very hard to photo, you can see below where I've changed the shape slightly on the inlets to make them more round to suit the bigger throttle bodies before splitting.













After a frantic few weeks building the engine and exhaust, I got it on the dyno today.

Peak figures varied from about 79-84bhp at the back wheel depending on temperature and at what stage we were at with the custom mapping etc.

The Co2 probe was stalling at around 7-8k so the exhaust really needs a couple of lambda boss's to get a more accurate reading for the higher rpm range, so we erred on the rich side of caution and the rear tyre was starting to get too sticky hence the figures dropping from 84 to 80.5, not bad figures for a first hit and a great linear curve.

