Projects to date

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I have found a good way to get through some projects on the car is to make a list of jobs and then try and do them as quickly as I can. For this reason the job list contained a majority of things to machine for the car - but no actual hands on stuff on the car as such.

My main aim was to lighten the flywheel that I made for the 7.25" Tilton clutch. The first version weighed up at 4.6kg with the ring gear fitted. While not bad I have recently had the opportunity for someone to CNC mill some slots in the flywheel to reduce more weight. I drew the shape I wanted and gave the necessary co-ordinates to the toolmaker. The time taken to program the mill was longer than the actual milling. When done the final weight came out at just over 4kg. A very pleasing result.

The Mill

The reason that I want to get the flywheel as light as can (sensibly and safely) is that the flywheels weight affects the way the engine accelerates and decelerates. More importantly is the position of the weight on a flywheel as this is what determines the 'rotational moment of inertia'. Put simply you can have two flywheels of identical mass. One with a majority of the mass located at the outer diameter, a second flywheel with the majority of mass located towards the centre. The second flywheel will have a lower rotational moment of inertia so it will be easier to accelerate and decelerate. The power and torque output of an engine isn't changed by lightening rotating components - but its response time through changes in speed are quicker. As a rough rule of thumb 1kg removed from the flywheel can be similar to 25kg removed from the car itself.

When lightening a flywheel you do have to be very careful. Most OE flywheels are cast iron, this is a material that is great in compression but poor in tension. A spinning flywheel is subjected to tensile forces due to centipetal forces. For this reason it is never wise to try and be adventurous with a cast iron flywheel. Failure of a flywheel will see it quite literally explode through the bellhousing and bodywork. For a cast iron flywheel only machine any excess material off near the ring gear. Also aim at a minimum 13mm thickness at any point. For a Ford 1600 crossflow engines' standard flywheel doing this will reduce its weight from 10kg down to around 6.5kg. To go lighter ideally a steel

flywheel should be used as these are far stronger. High tensile steel is over double the strength of mild steel, mild steel in tension is almost three time stronger than cast iron. For the added security a piece of high tensile steel is marginally more expensive for the advantage of extra strength. Beware that steel is more dense than cast iron - if you 100% reproduce a cast iron flywheels profile in steel then you will find the steel item will be considerably heavier. Not to worry the steels superiour strength allows for thinner sections. 10mm for the conservative, 8mm for the racer, and 7mm for the brave. I have mentioned machining slots in the flywheel to reduce its mass or more correctly its rotational moment of inertia. For any slot to be worth while it must be located as close as possible to the outer diameter as any material removed from here will have a positive effect. Don't get to carried away with trying to remove weight from the centre of the flywheel as this will have little effect on the engines performance. It will however weaken the flywheel.

My latest efforts for a steel flywheel to suit a OE Ford crossflow clutch for a Ford crossflow style engine has come out at 3.62kg. Allowing for a 0.6kg ring gear should have the final assembly weight of 4.25kg. This on a crossflow should really help it rev.

Well time to get back into it all again.