



KJ Special

Harley Engine & Norton Frame

Stage One

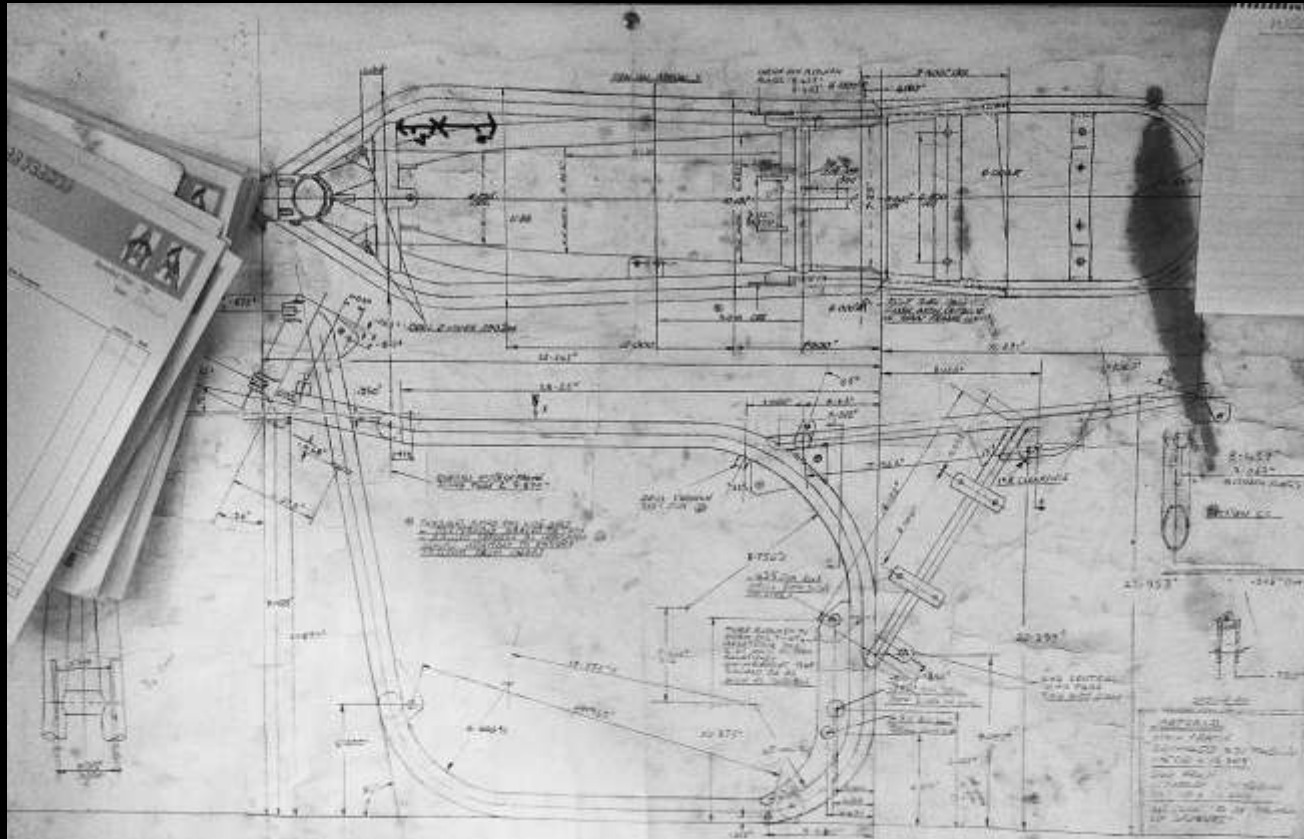
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The following photographs plot the work carried-out building my 'Harley-based' bike project. I've wanted to build a 'Special' using a Norton Featherbed frame for years and I finally decided to start such a project using my Harley Davidson Sportster as the 'Donor Bike' (pictured right).

I've owned the Harley since 1999 and have enjoyed riding my Sportster immensely but have always hated how heavy the Sportster was. The 'project' Frame is a replica Manx Norton 'wide line' frame, made from T45 aircraft quality steel tubing, bronze-welded and modified to accept the Harley Davidson 'Evolution' Sportster engine. [Stage One: the Beginning.](#)

I intend to use as many of the HD original equipment (OE) as I can and then complete the 'Build' by making my own bespoke parts - made specifically for this bike. All remaining OE parts to be reconditioned, polished & lightened before being put back into service.





The 'Drawing' (pictured left) was used as the initial starting point for this frame. This technical drawing based upon a Manx Norton Wideline Frame (circa 1957) was used with various amendments and modifications made to accommodate the Harley Davidson Evolution Engine. With special attention to the unconventional rear engine mounting bracket 'set-up' which needed an unusual solution (photo below right).





The first job was fit the unit-construction engine into the frame and make sure everything fits around these two major components. I started work on fabricating the 'under-seat electrics tray' (above) made using alloy plate - to provide a neat and tidy 'out-of-sight' compartment for the fuses, electrical connectors & wiring loom. The Suspension was set on full compression / full travel; with the Wheel in situ, to identify the correct wheel clearance on maximum travel. The photos above also show my rudimentary alloy mudguard panel.

There are quite a few challenges to overcome with this project, but one of the first problems discovered was the fact that the engine chain casing touched the frame and swing arm (photos below) with No clearance at all when the engine was 'Bolted' in place. Another issue being the Chain touching the Swing Arm & the engine mounting support bracket (i.e. Chain-line out of synch with the rear wheel spindle and gear box drive sprocket (see photos below). None of these problems caused me real concern, as this project was in its infancy and I know that with enough time and patience the appropriate solution will be found to all of these challenges.



The photo (above right) shows the original HD Rear Wheel (16" Chrome steel Rim). The plan is to have HD OE Hubs stripped & polished, and replaced with new Aluminium Rims and stainless steel spokes (front and rear).

The HD OE Belt Drive system was changed to a 530 'O' Ring Chain & Sprocket Drive system (years ago) and has proved a successful and reliable modification (using a 48 tooth Rear Sprocket & 21 tooth Drive Sprocket). The gearing can be changed a lot easier with a chain-drive than the original Belt Drive system (and at a fraction of the cost of the Belt Drive system too).

The next stage was to put as many components onto the frame as possible to make sure everything fits together properly – before dismantling everything again for reconditioning





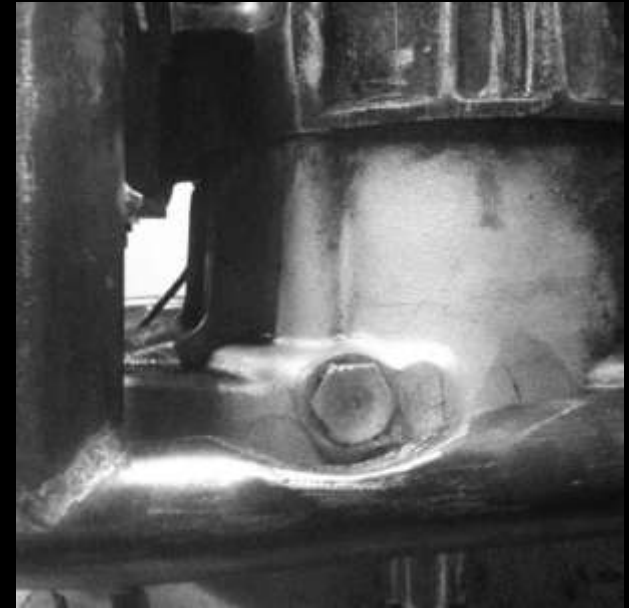
I've bronze-welded 'retaining nuts' to the top engine mounting stay (photo above). The 'bolts' to be used on the finished project will be high tensile bolts ('lock-wired' into position). I have also bronze-welded as many of the fastening nuts (where-ever possible) to various brackets on and off the Frame. This will make assembly, maintenance and future repairs a lot easier (only having to use one tool to release threads and components).

The remaining photos below; show the next stages of construction & modifications as the enging is fitted & removed several times as adjustments are made.

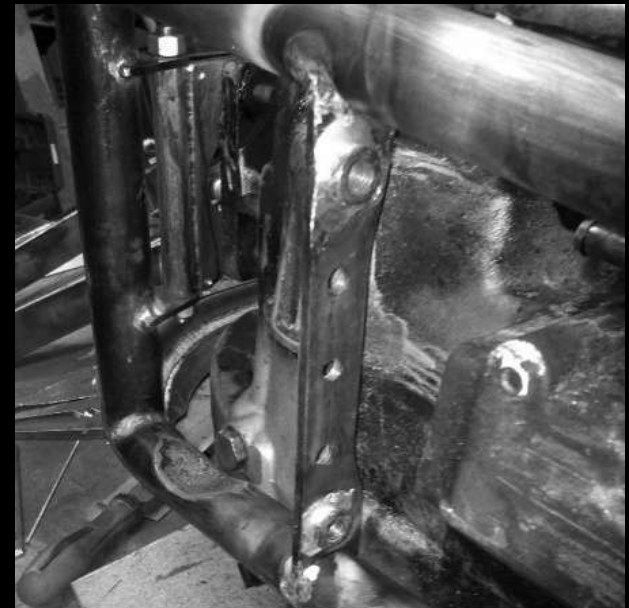


Once the engine had been fitted into the frame it became obvious that it was impossible to drain the gearbox of oil (with the engine in situ) because the bottom frame tube obstructed the 'Gearbox Drain Plug' removable.

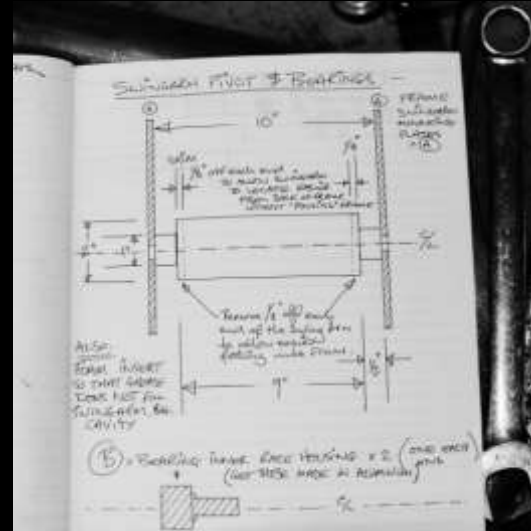
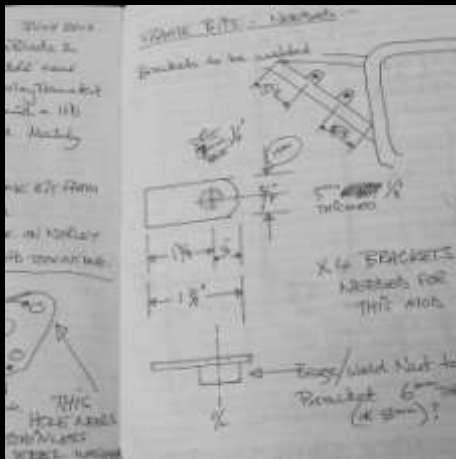
There were several options open to me to overcome this problem, but the one I chose was to re-shape the frame tube (with the aid of oxyacetylene) to allow 'access' clearance to the gearbox drain plug. You can see from the pictures (right) the drain plug can now be easily removed with the engine bolted in position.



Just to make sure the strength of the structure had not been compromised by this modification, an extra support bracket was bronze-welded between the bottom frame tubes. This support bracket also doubles as an ideal anchor point to mount future brackets and stays to the frame (photos right).

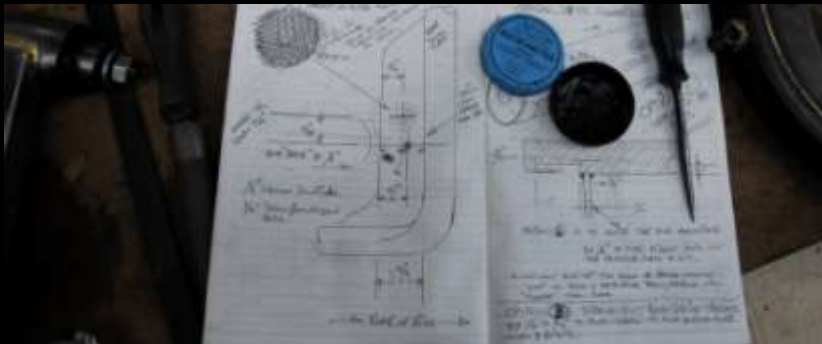


Another alteration involved repositioning the Swing Arm position (1/8" backwards & 3/4" lower) because on Full Suspension Travel (both up & down) the drive-chain comes into contact with the top of the Swing Arm Bearing Hosing & the frame rear engine support bracket (photos below)



Another job I felt needed attention was to reduce the width of the Swinging Arm Bearing Housing (main Pivot Point) by an eighth of an inch each side.

This modification doesn't affect the Bearing Spacers, the Oil Seals or the distance or positioning of the Swing arm, but it does allow the Swing arm to pass through the Rear Frame Tubes without the need to twist and turn the Arm when offering the Arm into position for 'Fitting'.



The first two photos (below left) are 'Before Photos' & show how the Chaincase/Gearbox casing touching the SwingArm & Frame. The second two photos (below right) are the 'After Photos' & show the clearance gained by moving the Swing Arm 'one eighth of an inch' back from its original position.





The photos above: show the modification to the Cam Gear Case (Cut-Away), in order to improve access to the Oil Pump & to the main Oil Feed & Return Pipes (for ease of fitting, inspection & future maintenance). This 'mod' allows easier access to the Crankcase Breather Elbow (photo No.3 above). But just as importantly, I did it because I like the 'Look' of the trimmed-down Cam Gear Case.

The photos below: show a modification to the rear top engine mount support bracket. This alteration gives extra clearance for the chain (when the rear suspension is fully compressed – on full travel) so as not to 'Foul' the support bracket. This 'Cut-Away' allows the chain to move freely up & down without coming into contact with this bracket. I welded a plate into the cut-away to ensure the strength of the tube was not compromised.





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Stage Two

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The engine has been 'in and out' so many times now, it takes me less than five minutes for me to put the engine in, and tighten up all of the engine mounting bolts & fit all of the engine support brackets (or to reverse the process, undo everything and remove the engine).

This is a good thing, me thinks! because when it comes time for me to 'Finally' fit the engine – for the Big Start-Up, I know it's going to fit without hassle. But more importantly, it's going to 'Go-In' without scatching any of the 'New' frame finish, and/or 'Go In' without damaging any of the polished Alloy engine parts.

I've also bronze-welded a couple of gearbox mounting nuts to the rear engine mounting plate (photos below left) and welded a 'Sharks Fin' Bracket to the off-side lower Swing Arm.

Plus; version # two of the 'Electrics Tidy Tray' (photos below right) this time, in 'GRP' that fits the frame (under the seat). I know this is a contradiction in terms, but; One thing you find out when building a 'One-Off' project . . . you end up making more than 'One' item for the same purpose. But then, that's part of the enjoyment . . .

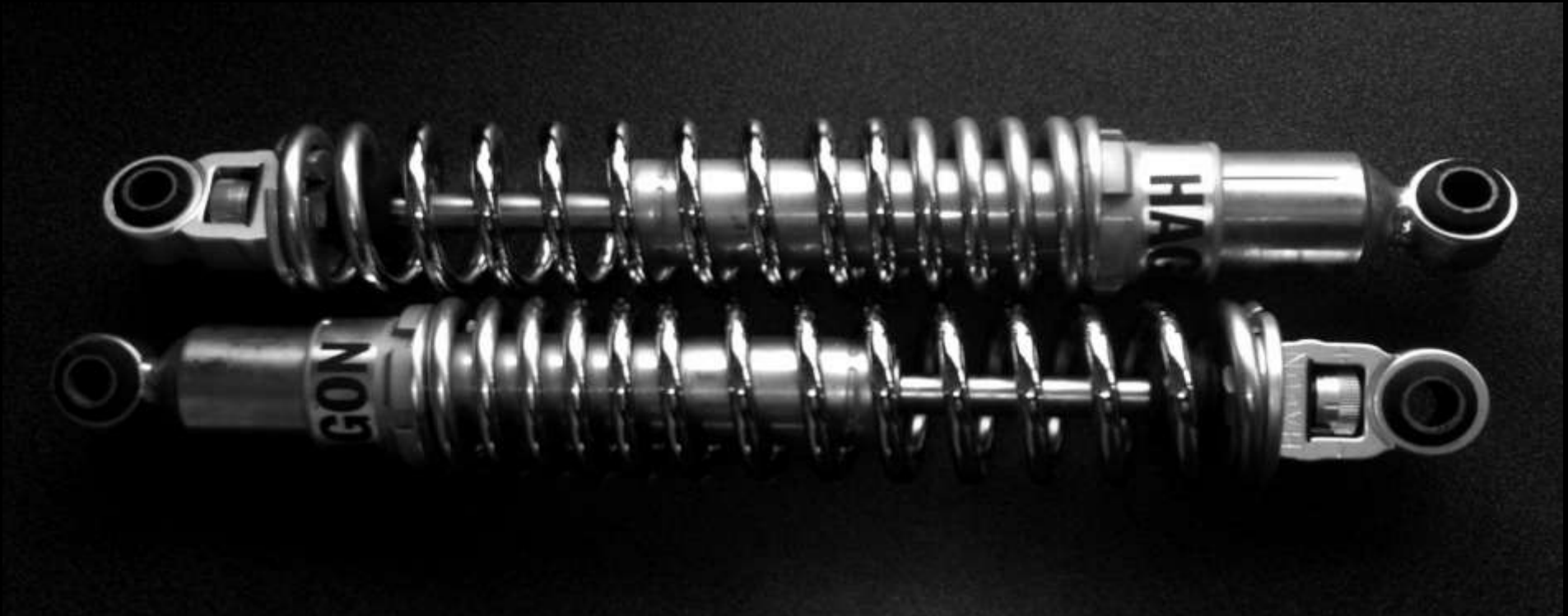




Photos Left:
AP Lockheed Racing Rear Brake
Calliper (complete with AP
Lockheed Brake Pads).

Plus:
'Up-Side-Down' Hagon Rear
Shock Absorbers with fully
adjustable Damping system.
And these Shockers were made
especially for my weight.

I've used Hagon Shocks for
Years on my Sportster, so I didn't
want to use any other make.

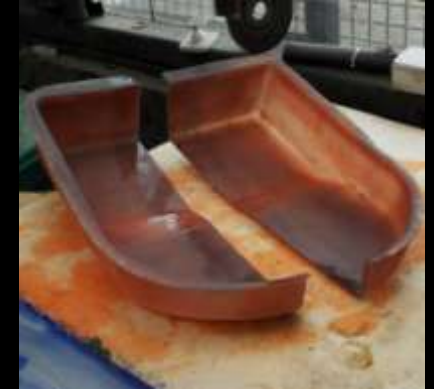


A 'Sharks Fin' bracket was made using a homemade Perspex Template (to get the desired look) and then transferred to 5mm aluminium plate.

Finally being drilled, filed into shape & polished.



Version 3: The Under Seat Electrics Tidy Tray 'Mould' & Rear Mudguard mould being made in Glass Reinforced Plastic (GRP), see photos below. The final mouldings will be taken from these two 'Moulds' using fibre glass material.



A bit more bronze-welding needed - fixing extra brackets in place to mount the rear mudguard plate and other fittings.



The photos below; show the fabricated under-slung battery bracket & rubber-mounted rear alloy-mudguard.

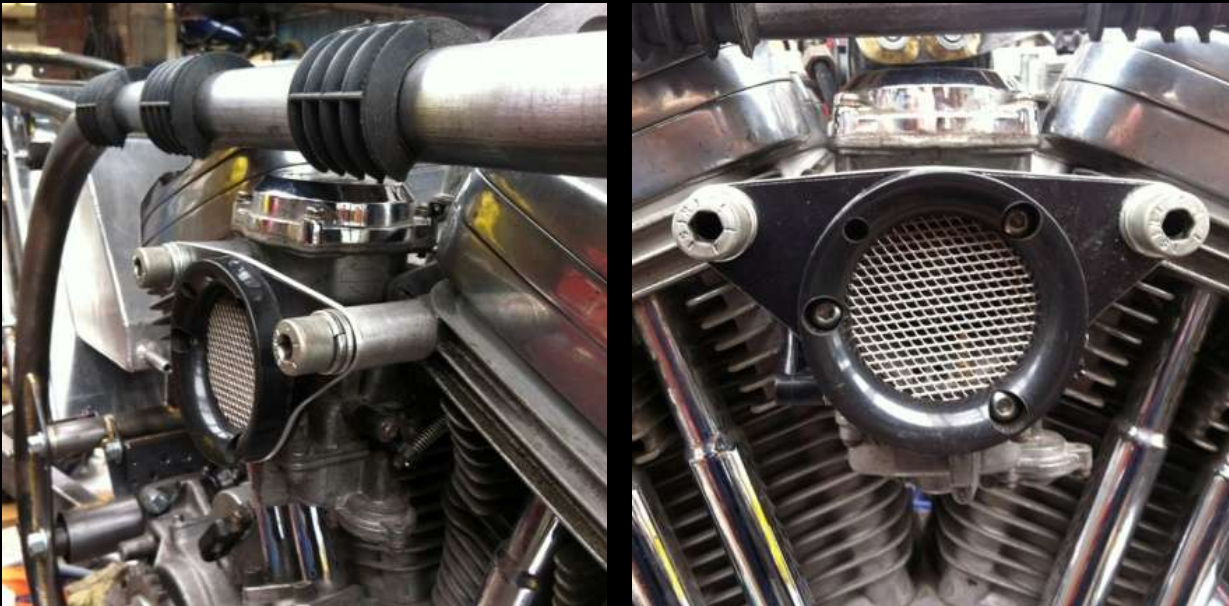


I've made the Oil Tank 'Filler Hole' bigger to accommodate the new Monza quick-release filler-cap, and also to gain better access to the inside of the tank.



(Photo above) New Front & Rear 'Floating' Disk Brake Rotors.

(Photos below) My fabricated carburettor bracket & rudimentary, but efficient gauze intake filter.





New exhaust studs & nuts fitted. The old ones have been in the engine for the past 13 years and so they presented quite a challenge to remove!

And as you can see, I'm making the exhaust system from 'scratch' to suit the frame/engine configuration.

Exhaust system in the making Version one





More Drilling & Tapping.

Plus;
'Reaming-Out' the
Duralumin Bar, to be used
as Spacers.

As can be seen from the photos below, the oil pipes run too close to the rear exhaust pipe and although the flexible oil pipes can be bent downwards a bit more, they are still just 'Too Close' for the heat generated by the exhaust pipe! After 'annealing' the aluminium inlet & outlet pipes, both pipes were bent downwards to direct the oil pipes away from the rear exhaust pipe.



The Oil Tank before polishing & after the first polish (stage one)! The rear mudguard plate in position & the Perspex template for the rear brake calliper

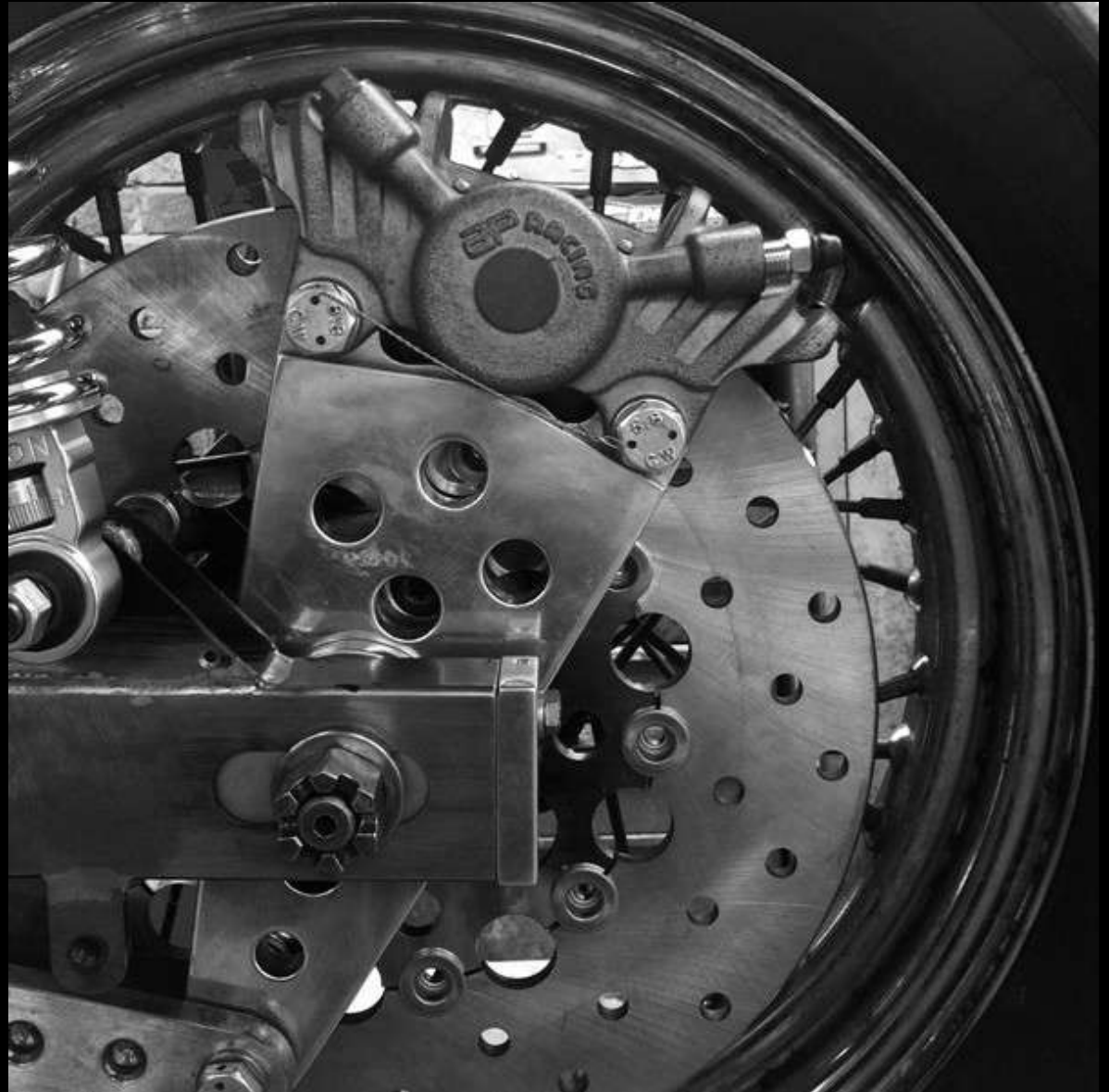


I know that mounting the Rear Brake Calliper below the Swinging Arm is more efficient and uses Less Aluminium Plate, and is probably better at transferring braking loads into the Brake Stay

But . . .
the idea is to keep the Calliper & Pads further away from Road Dirt & Crud (rather than using the under-slung version).

Plus: I quite like the design.

The Plate used for the Brake Anchor is Aircraft quality Dural - Alloy Plate (13mm thickness)..



Petrol Tank Polishing: my least most favourite job on the bike (any bike!) is 'Polishing' But, it's a job that's got to be done, if I'm going to do 'justice' to this project. I've always been more interested in 'Riding' them rather than 'Polishing' them.





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Stage Three

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I decided to get the original Harley Hubs stripped and polished and then fitted with Morad Alloy Rims 'Laced' together with stainless steel spokes.

The rim sizes:

Front = 19" x 2.50 Morad Alloy Rim.

Rear = 16" x 3.50 Morad Alloy Rim.

Avon Venom Tyres - Front & Rear with new Inner Tubes fitted.



Photos Above & Below : Frame being polished in preparation for Powder Coating.

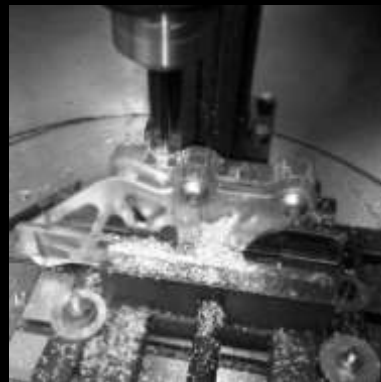
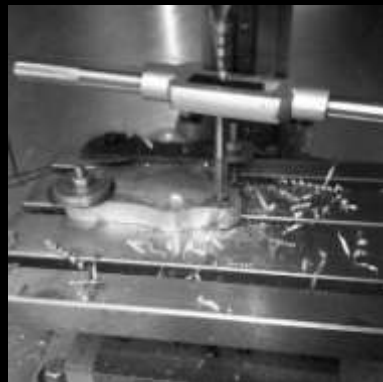


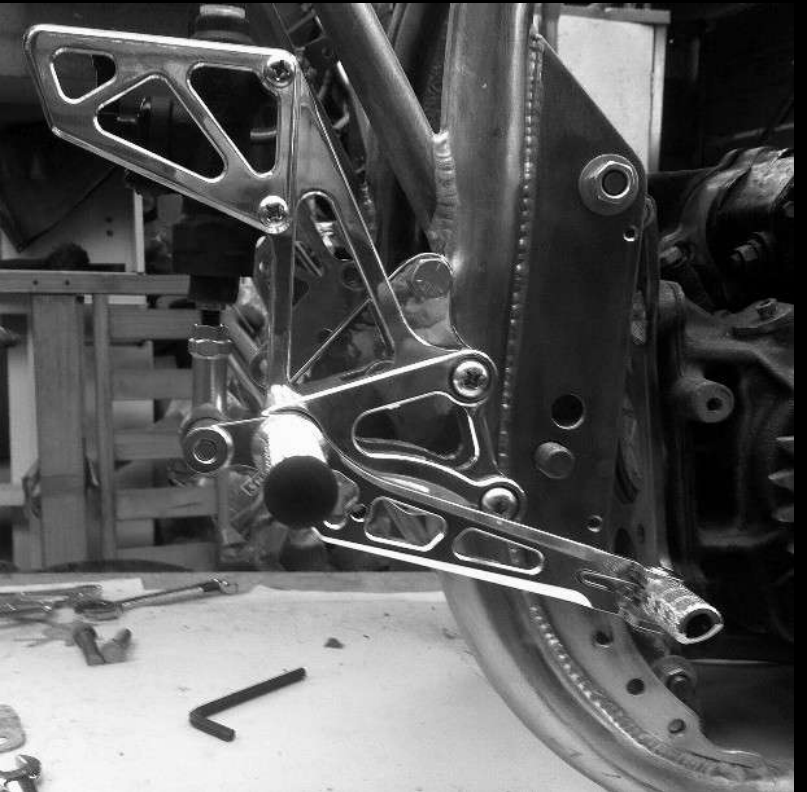
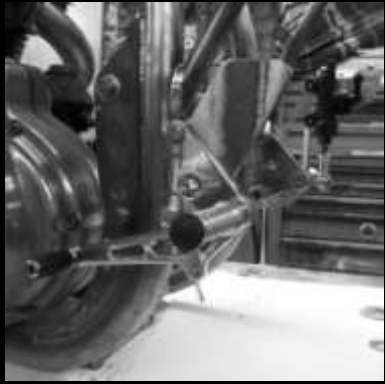
Frando Hydraulic Brake & Clutch Master Cylinders (Handlebar Levers) & Hydraulic Slave Cylinder for the Clutch (below), with Venhill Quick-action





The Photos (above & below) show more milling, drilling and thread tapping to the Steering Yoke and other components. Plus, Cutting & Milling-out new Rear-Set Foot Rest plates.







Seat No.2 being made. . . . (above photos) the next stage - after smoothing down & reshaping - is to 'lay-up' with Fibre Glass to make yet another mould.



After a whole year of 'NO WORK BEING DONE' on the KJ Special I've finally re-started work again. I think it looks great now its painted.

A family friend – Tharinda – got the frame powder coated via Richard at POWDERTECH of Corby. They have done an excellent job on the Frame, Swing Arm and other parts, with a really high quality durable finish.

It is exactly as I expected, and in my favourite colour too – 'Sky Blue'. I am really pleased with the 'Outcome' and am looking forward to the 'Rebuild'. My sincere thanks go to Tharinda & Richard.













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Stage Four

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(Version Two of the) Exhausts Pipes I made (below)

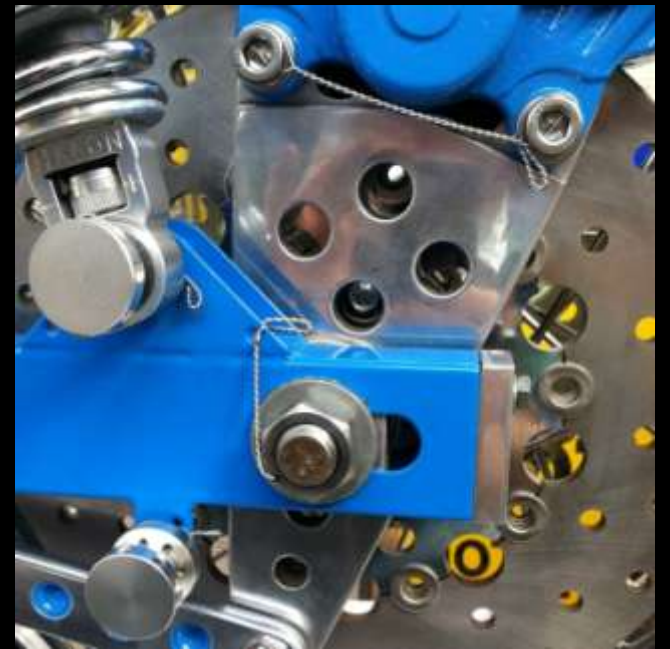
Also; New Wheel Bearings & Seals Fitted, & New Sprockets & Disks.

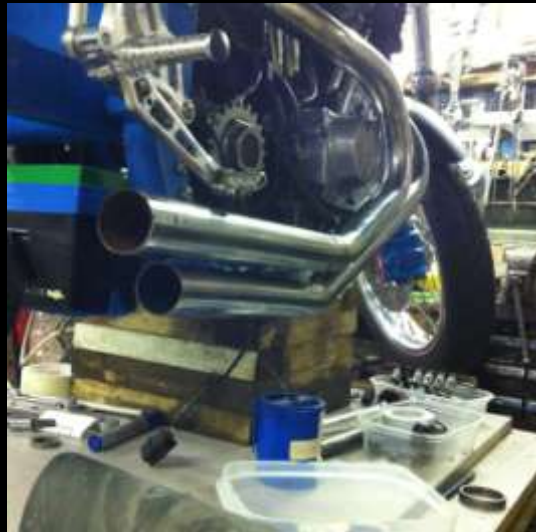




A slight adjustment was needed to get this brand-new 2015 brake calliper to fit my 1999 Sportster front Forks & Wheel assembly. With a bit of 'milling' here & there, and a new Brake Anchor plate made to suit, all fitted nicely. Obviously, the colour may need to be changed . . . There's nothing wrong with 'Red', but . . . it just ain't BLUE !











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Stage Five

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As can be seen from these photos, I tried several options and combinations with regards finishing-off the Norley Exhaust System. But, eventually decided to use my good-old (well-tried and tested) Harley Davidson Screamin' Eagle Exhaust Silencers.

I've had these Exhausts on the HD since 1999 (when I first purchased the Bike). I've obviously had to modify the fitting Lugs and make new mounting brackets, but it's lookin' Good! Exhaust Done !









a few more Jobs completed:

*** Made & Fitted a New Chain Guard (for the Front Drive Sprocket Cover).**

*** Modified the Engine Breather Pipes (located on the Carb to Cylinder Head mountings).**

*** Converted the Cable-operated Clutch to a Hydraulic-operated Clutch system. With new Linkage for the Clutch Slave Cylinder, and Bled the Clutch hydraulics (still requires attention & adjustment).**

*** Fitted New Throttle Cables**

*** Made & Fitted New Side-Stand.**

*** Engine Ignition system ready for 'Timing'.**

*** New Seat Fitted (photos below), 'Hinged' at the front to enable easy access to the Oil Tank Filler & Electrical Fuses.**





More Photographs to follow