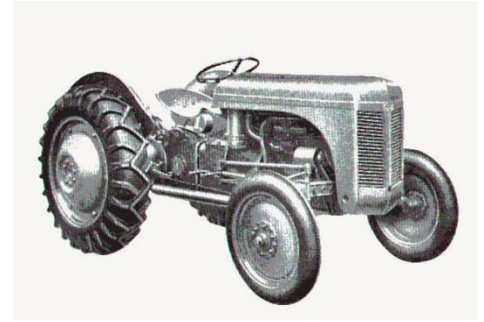


# Tractor Diary

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I bought a tractor, an old Ferguson TEA20, to mow the acreage on the property. When I bought it the engine would not start and the shift lever would not move. Battery was dead, one tire was flat. I was told even when the tractor was running it was down on power.

But I bought it anyway.

I thought, I can fix it, might take a weekend or a bit more.

That was two years ago.

I guess I have to give the tractor a bit of slack as it is almost as old as I am and that means it has a bit of wear and tear on it. I sure know how I feel sometimes.

When I started the repair on the Fergy it wasn't long as it soon turned into a disassembly and rebuild as everything I touched needed attention. So where do you stop?

Personally I stop when everything is either back to normal or better than new.

In the mean time I bought a John Deere to mow with.

That does not mean I have given up on the Fergy, it is now a mission. I didn't need a new project, but I got one. They say that discretion is the better part of valour and I probably should have pulled the pin on the project, but here we are now.

During the disassembly I had to educate myself on the Fergy since the last one I had seen was when I was a kid and we were planting tobacco on the farm back in Kentucky. I remember John Kennedy was just elected President and shortly after Fidel Castro defeated Batista in Cuba.

But back to the Fergy. I bought a manual on the Fergy which was very helpful, written layman's terms it was obviously written for a farmers use as it provided many down to earth helpful hints with simple no frills advice and guidance.

The manual was a wealth of information to understand the Fergy.

I want to state up front this is not a Fergy tractor restoration. In other words to return it to its original as new condition. That is not in my character.

Although I have built many dozens of cars and various other projects one project stands out in particular not because it brought so much pleasure, just the opposite. It started in 1974 when my sister in law wanted me to help her buy her new car. One rainy cold Saturday we headed off to the Chevrolet dealers. I could see it in her eyes, she wasn't just looking, today was the day she would buy. Upon arrival there sitting in the show room was a new 1974 Camaro, all shiny and nice painted orange with a tan vinyl top and a black and white checkered interior. A typical girls

car-YUCK!! Quickly I had to find an alternative and there wasn't much around and the clock was ticking she wanted THAT car, and I didn't want her to have THAT car. Personally I could think of nothing worse. After almost an hour strolling around looking at alternatives to the "girls car", a truck drove in with a load of new cars. Sitting on the top row was a suspiciously plain white Camaro with a set of black rally wheels. I asked the salesman what that was and he responded with the information that it was the new fully optioned Z-28 ordered in for the service manager. The stripes and spoiler had not yet been installed. My next question was "Is it for sale?" He said yes so I told him to get it down off the truck so we could drive it. He said he couldn't as it had not been processed, pre-delivered. I told him if you want to make a sale today get it down now or we walk out the door. Within thirty minutes we were in the car going for a drive and my sister in law fell in love it and bought it on the spot. After almost ten years of driving the car, she got married, had a kid, and now wanted to sell the car. I asked how much and within a few moments I owned it. This was my first restoration project. I worked hard to return the Z back to its original condition and when finished I was very disappointed as it was just exactly as I first saw it. Everyone who saw it fell in love with it, but I hated it. All that work and you couldn't tell I had done anything to the car. I spent three days getting the black paint for the inner fenders the right shade of dull. Not flat, not shiny just the right tint of dull. Never again. From now on any project I undertake as I progress through the project I will make improvements as I go. I have a 1965 Chevelle that I owned for over 35 years now, having bought it off the lady that bought it new. Since I have owned it all I did was put a set of wheels and fresh tires on, new brakes and new exhaust. Someday I will freshend it up and when I do I will replace the drum brakes with new disks, update the suspension and make it a fully modern car underneath. It will still look like a 65 Chevelle but looks are only skin deep. The Fergy is no different as I go through this project I will make improvements as I can find them. The essence of the Fergy should remain though and honestly there is nothing I am changing that can't be unbolted and returned to the 1948 standard.

As stated earlier the Fergy started as a repair and became a project. Getting the shifter to move was the first step.

My first challenge was to unstick the shift levers, even removal of the trans cover provided little in the way of information. I could see no reason for the shift levers to be frozen in the case, there was no rust so it had to be a faulty part. As it turned out it was not a faulty part but it was corrosion. In normal use the oil in the transmission would be slung around the inside of the trans keeping everything lubricated but the old Fergy had not been used for over a decade. I didn't want to start hammering away on things until I learned why the rods were stuck so I was taking things slow. The manual showed me how the rods came out but not why they were stuck in the housing. While scraping the old gasket from the trans case my scraper brought up some bright metal. This startled me as cast iron does not do this and I as a race car builder and racer immediately recognize what I see. A quick check with a magnet confirms this .... The trans case is

magnesium and the corrosion is not rust but just the white powder that forms on magnesium as any old time racer would know. Some good old Castrol DWF sprayed on and left to soak, a brass bar and a two pound hammer knocked everything loose. New rule... don't let your Fergy sit around, keep the oil in the transmission splashing around. What I don't understand is why Ferguson in 1948 decided to use mag as a material for a tractor transmission case.

While I had the transmission apart I cleaned it out and seeing the gunk inside the transmission I thought I had better look at the inside the diff as well as it is all connected and part of the hydraulic system for the three point hitch. Yep scooped it out there as well.

I removed the hydraulic system top and bottom and cleaned everything out finding over sixty years' worth of crap in there. The further I went the more I found. While I had things apart I replace worn pins and bushings, put new pinion bearings in. Also while I had it all apart naturally I put new PTO shaft seals in too.

I should point out that many of the parts I got were from Wagga Tractor that I found on ebay. Very knowledgeable and very helpful and great prices too.

I didn't know it at this point but the Fergy was becoming a project.

The rear wheels had stains on them from where the axle grease had been running down the inside. Removing the wheels, and brake drums and then the axles I found the rear axle seals were between the flange on the axle and the axle bearing. Meaning I would have to remove the axle bearings to install new seals. I have been here before and I know that I will destroy the perfectly good axle bearings when I remove them. Thank goodness for the internet as I found a set of seals called Sure Seals that go between the diff oil and the axle bearing. I pack the axle bearings in grease, like a normal wheel bearing and put the Sure Seals in the axle housing and reinstall the axles. Job done.

The brake shoes are like new and even though I have a brand new set to install the old ones measure the same as the new ones so I don't put them on.

Now the trans, diff and hydraulics are all up to scratch leaving just the engine now.

Soon after starting to work on the Fergy the decision to upgrade to a 12v system was a no brainer. There are plenty of off the shelf hardware to help you do this. I did use a fresh ring gear (old one was missing a few teeth and the ones left were pretty chewed up. The previous owner had told me the old starter needed a tap with a hammer from time to time and the flywheel ring gear was pretty sad so I ordered a new ring gear and a new starter. New ring gear went on pretty nice. I didn't have an acetylene torch at the time so I put it in the oven in the kitchen and turned the oven all the way up and let it "cook" for about 45 minutes and it just went on. The new starter was a little bit of a problem as the starter bendix gear only engaged the ring gear by about

4mm which in my opinion was not enough. I took the nose off the starter put it in the lathe and faced off the mount enough so that now I have almost full engagement on the starter ring gear.

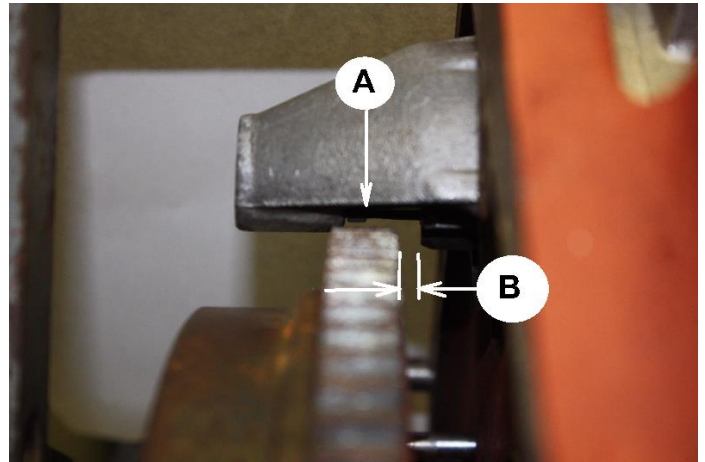
A is the maximum travel possible on the starter bendix gear.

B is the current amount of clearance between the starter ring gear and the starter bendix gear.

Therefore B less 0.025" is the amount I can move the starter back and get more tooth engagement on the flywheel. This means longer starter life and longer ring gear life as well.

As you can see there is heaps of room between the starter bendix gear and the ring gear and all you

need here is just enough so they don't hit each other while the engine is running.



The conversion to 12v needed a nice alternator; I went to the wrecking yard to find an alternator that would do the job. At first I considered a little Daihatsu alternator at 30amp as that is all I really needed, for a normal situation, but I thought that I might use the tractor as a self-propelled battery charger as well and that if I want to run a bunch of lights on the tractor I would need a more powerful alternator. I found an 110amp alternator off a FORD passenger car that was reasonably price as I picked it up for 30 dollars. Nice part is that if I need a replacement they are a very common component available almost anywhere.

The FORD alternator came with a 6V serpentine belt pulley. Looking at the original Fergy belt I knew that old fat belt would never work as it just won't have the traction power of the modern multi groove belts.

I had to make a mount for the alternator.

I had to make a multi groove pulley for the water pump.

I had to make a multi groove pulley for the crankshaft.





## Serpentine Belt Finished Project

I completed the belt drive before I started on the engine rebuild. Here I don't have the alternator belt adjustment bracket completed at this point. It was a bit tricky getting all that stuff around the governor lever.



I had to buy a short piece of 100mm aluminium bar stock and spend a bit of time on the lathe to carve up this little nugget. I am pretty happy with the results as well.

A bit of 25mm scrap aluminium I had laying in the shop was the donor to make the alternator bracket. A bit of drilling and tapping and then a few minutes on the mill and I have an alternator bracket.



I made a new 6v multi groove pulley for the crankshaft. I used the original Fergy hub cutting off the front belt flange and made a aluminium ring that was 0.010 smaller than the cleaned up original hub. I put that in the oven at 250c for 25 minutes and when I pulled it out I checked it and it had grown 0.012" making a nice slip fit on to the original hub and when it cooled the 0.010" interference fit insures it will never come off. Once that was done the hub was put in the lathe and I cut the grooves for the belt once I had trimmed it up nice and round based on the center of the original hub.

Disassembling the engine found the engine worn as one would expect and considering where I am at on this project it seems like a complete freshen up is called for.

Once the decision to freshen it all up naturally that means all new rod and main bearings and all new seals front and rear. Naturally this would also mean a fresh set of pistons and rings as well. A review of the specifications revealed that the stock compression ratio was 5.77-1. This astonished me as I could not understand why the compression was as low as this is a petrol engine and even in 1948 the gasoline was not that bad. Then it twigged on me that the compression was that low so the engine could be hand cranked. Ah Ha! I will state right now that I NEVER plan on hand cranking the engine so why would I leave the compression so low? A bit of research found the Standard Vanguard engine is the same engine used in the Triumph TR2 sports car and their specifications call for 8.5-1 compression. Same crank, rods, block. Research found that the TR2 pistons were flat top as well and the difference in compression was the combustion chamber volume of the cylinder





head. I searched out a TR2 cylinder head to discover they wanted 1200 dollars for one, but even that was not the problem.

The problem is that the TR2 engine is used on a road car and operates up to 6500 rpm and as such has much larger ports than my Fergy engine which operates up to 2200rpm. So I am stuck with the Fergy head. Next step is to get some high compression pistons. Being a racer this is no problem for me. A bit of design work and a phone call and a set of pistons, rings and new pins arrive at my door.

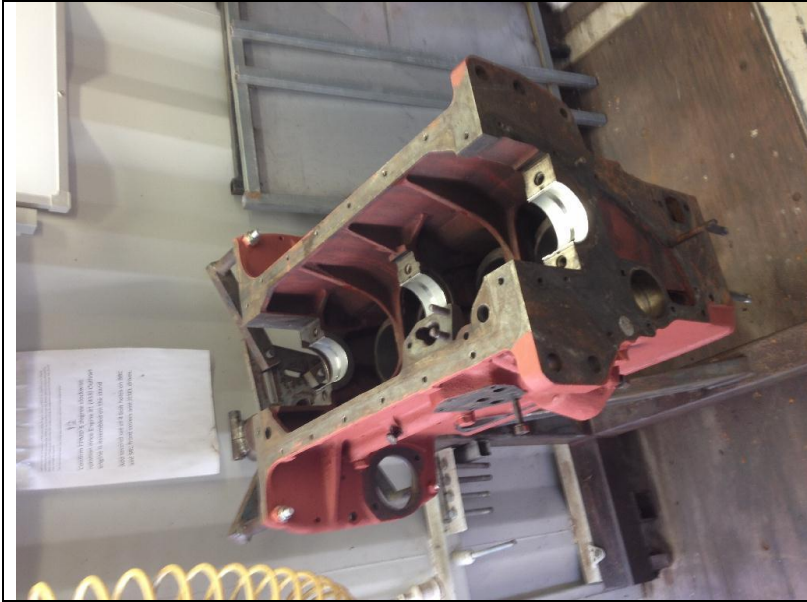


Original piston with a 'bog' dome to represent the combustion chamber, sent to custom piston manufacturer to make a set of forged high compression (9-1) pistons to use all the power that modern standard grade gasoline will make. At 5.77-1 compression you are wasting the energy that the fuel can make. Much like putting high octane fuel in a normal car engine which makes no more power because you are not using the energy that is present in the fuel if you don't compress it to the required level. The 9-1cr in my Fergy will now use all the energy that standard 91 octane fuel can generate.

A step from 5.77-1 to 9-1 should wake the little Fergy up ... a lot. Now I can pull that 72" mower deck easily.



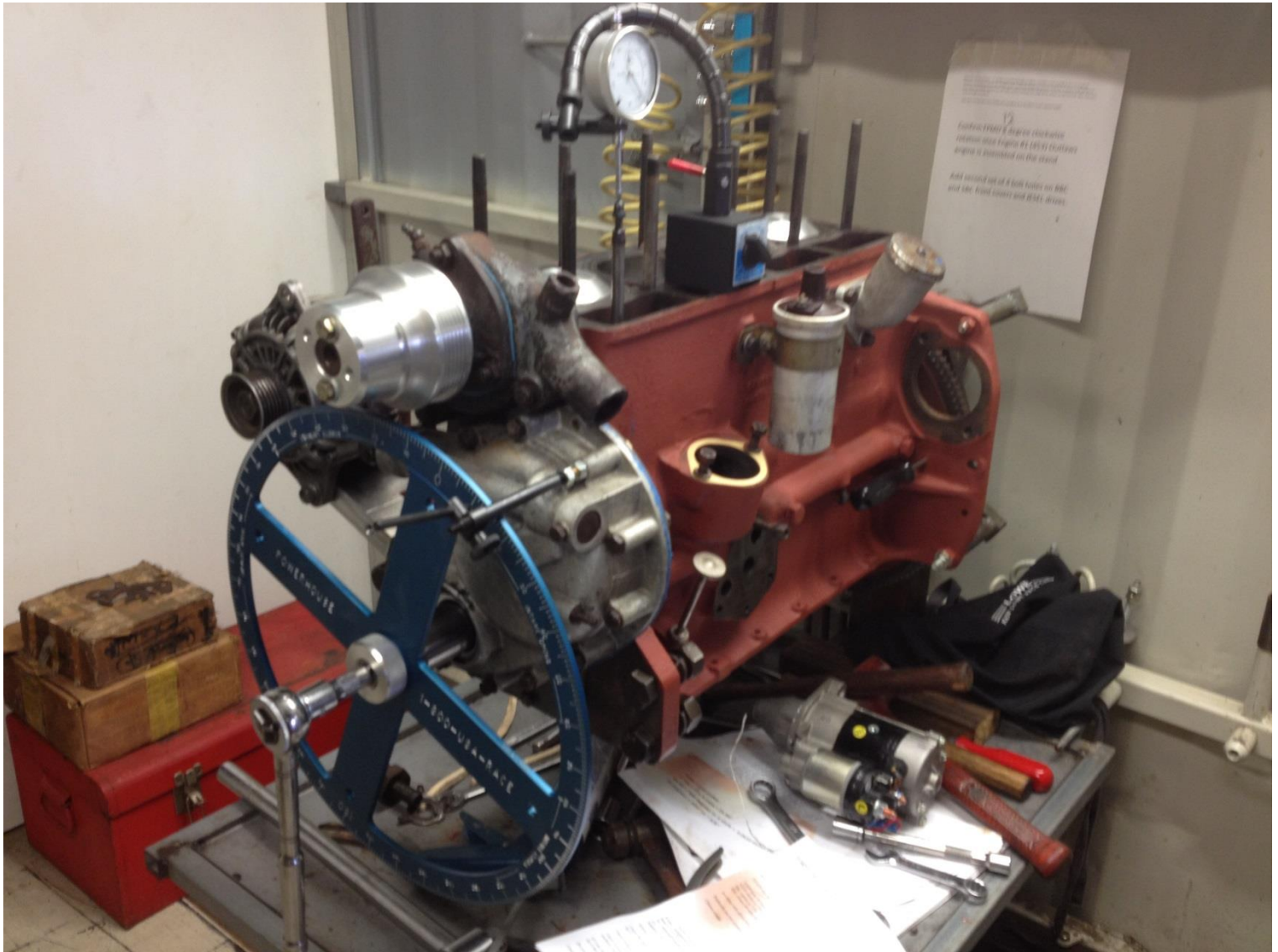
Cylinder head got all new valves 2mm larger and they received a full race treatment of a multi angle valve job (couldn't help myself)



Engine block ready for crankshaft.  
This is a little out of sequence as I made the 6V belt drive prior to pulling the engine apart for rebuild and while the new pistons were on order.



## Degreeing in the camshaft.



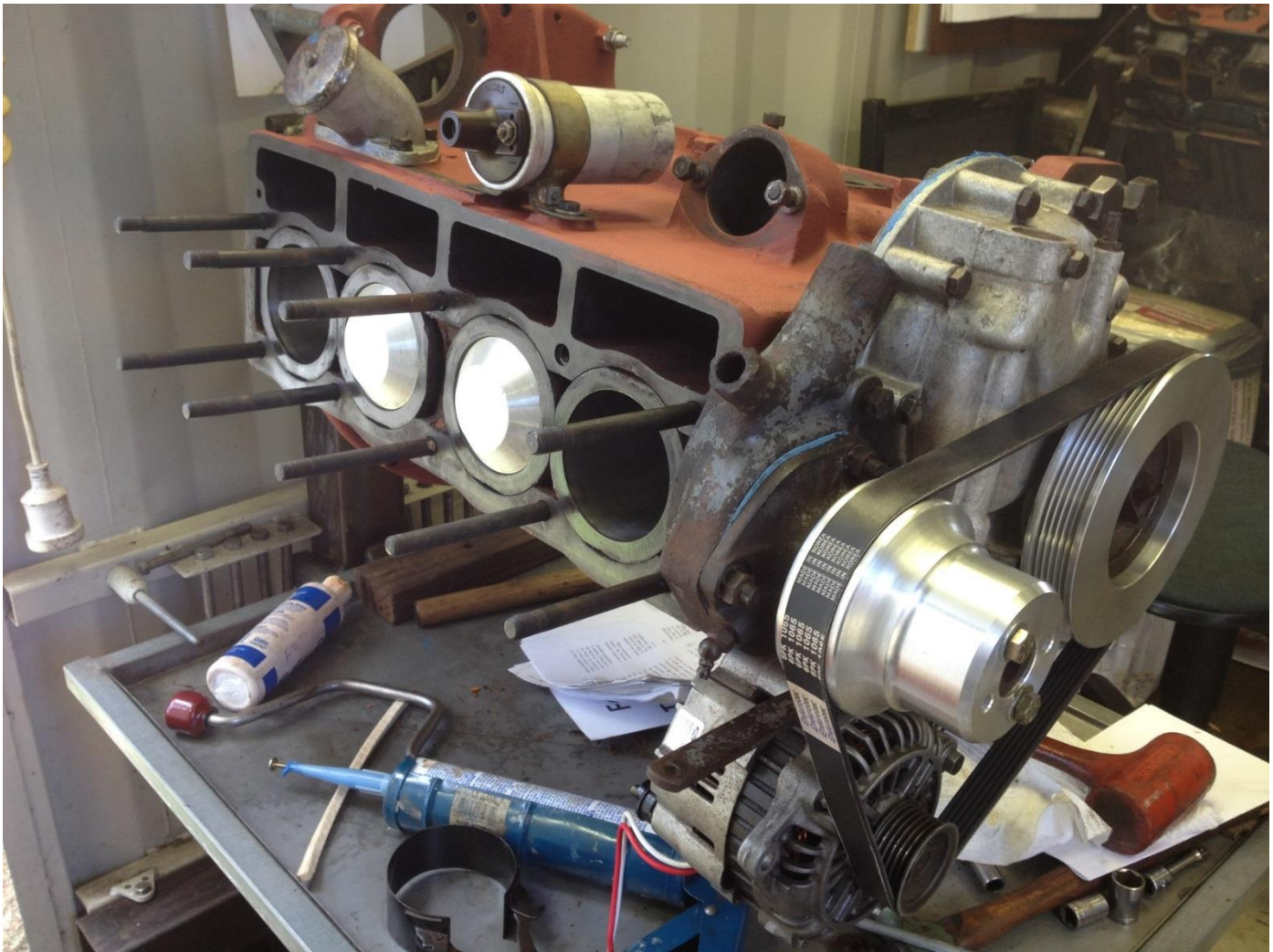
When I disassembled the engine I carefully marked the camshafts location and upon reassembly I put it back there. As I turned the engine over I could see the exhaust pushrod reaching the bottom its travel long before the piston got to the top of its travel. .... That's not right. When I read the Fergy manual on how to set the camshaft I didn't much care for how it said to do it as it was all a bit vague. I could not find any specification's on the camshaft that would help me degree the cam in. I found valve specifications of opening and closing but if you understand camshafts you can't really rely on them for dialing in the cam, especially on a worn camshaft. I want to know intake lobe center.

I put my degree wheel on the engine to see where it was originally. As it turns out it was in at 87 degrees ATDC. Pondering that for a moment that NOTHING goes in at 87ATDC. I called my buddy Marty at Crow Cams and asked him if they ground up stock Fergy cams and he said that they do and I asked him with the intake lobe center was and he said they are ground on 105ATDC. After a



bit of discussion we agreed that the cam should be in at 103ATDC. So that is where it is now.

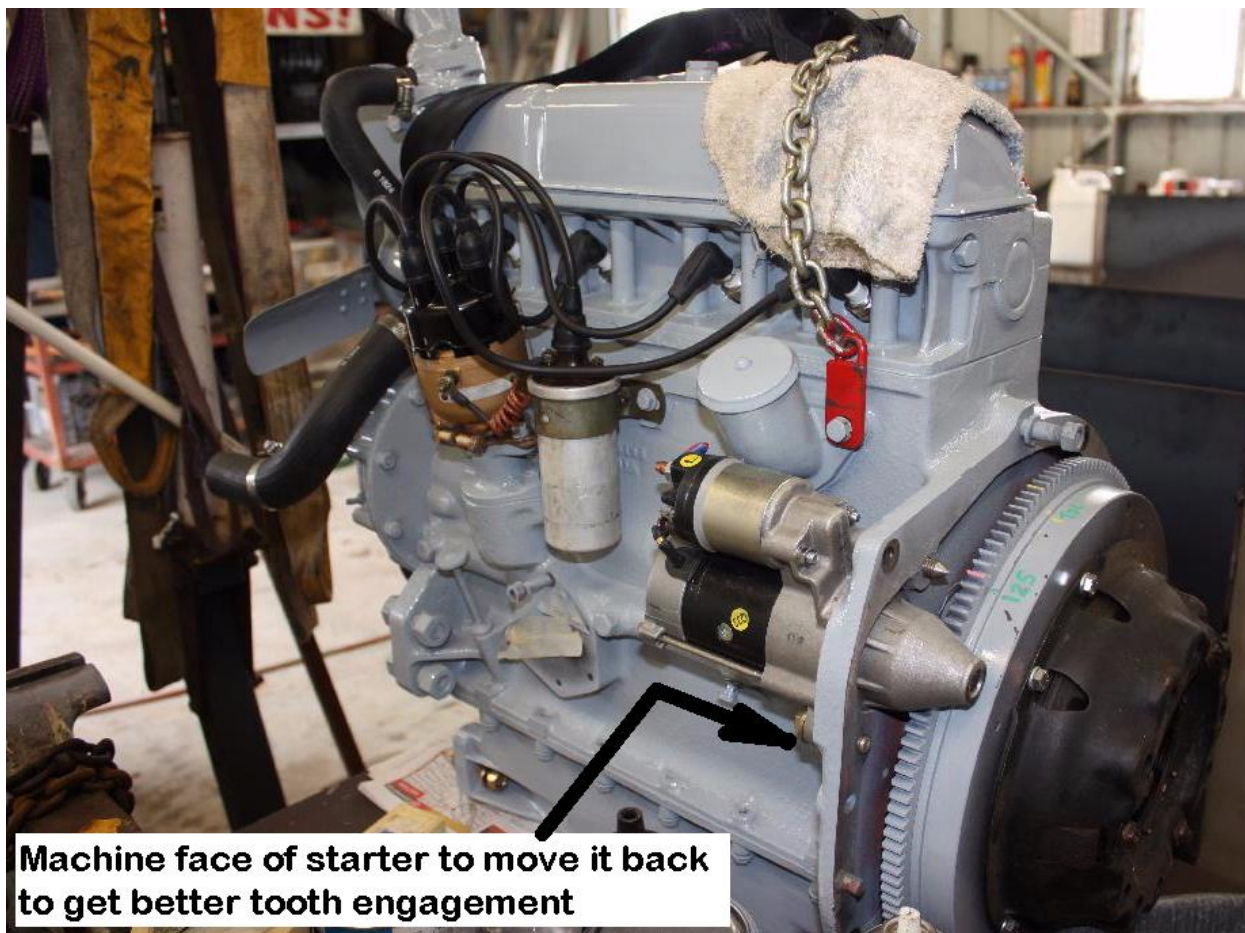
Short block assembled with high compression pistons. Note: 6V serpentine belt and pulleys.



*The oil pan had been broken previously and repaired (poorly). Cut the old repair out and weld in new aluminium plate.*







You may notice the pointy starter bolt which has become my TDC pointer and using the starter ring gear teeth at degree points. There are 145 teeth divided into 360 degrees each tooth is pretty close to 2.5 degrees. AND I am fitting a Hall sensor to the bellhousing to read the teeth and relay that info to my new tachometer that I am fitting to the refurbished dash board. How do I see the pointer you ask? I drilled a hole in the bellhousing so I can see the pointer, tapped it to NPT and put a plug in when I don't need it.

While everything was apart this was a chance to disassemble the distribution, clean it all up and put new bearings in. A fresh set of points and condenser with a new rotor button, cap and wires tidied all that up. While apart I bead blasted the distributor housing and sprayed on a nice gold coat of paint. I have a new coil to go with the ignition as well and will put a ballast resistor on when I wire the tractor.

The thought of wrestling with the dirty cartridge oil filter at every oil change did not appeal to me so I sought out a spin on filter kit to replace it. After an exhaustive search and conversations with several tractor parts suppliers I came to the conclusion that none was available so I was left to create my own and I am very happy with what I have made and since no one else makes these things I thought of those who do not have a machine shop at their doorstep and I thought I would offer to all of you the chance to have a spin on oil filter for yourself.

## Oil Filter Adapter

Massy Ferguson TE-A20

Petrol Engine (Gasoline) Standard Vanguard Engine

Never again will you have to clean out the oil filter canister when changing oil filters. Unscrew one old dirty filter and screw on a fresh new clean one.

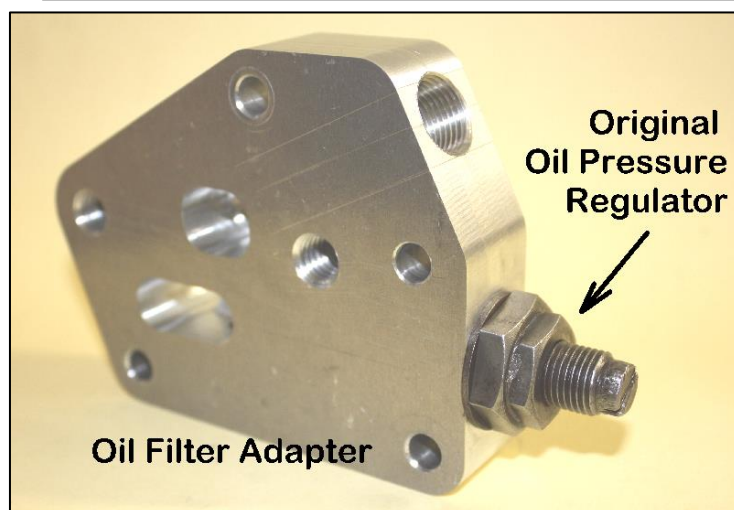
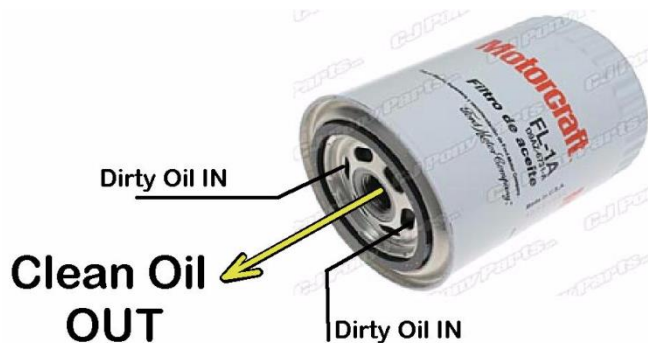
Complete kit includes filter mount, filter head, engine adapter and all bolts, O-rings, gaskets and includes a standard FORDV8 screw on oil filter. Replacements available at any auto parts store.

You must use the original oil pressure regulator that was in the factory canister oil filter mount. This means you will not change the oil pressure setting on your tractor when you change over to the spin on oil filter kit.

Complete kit with installation instructions

PN 41350-00001 Price \$ 195.00+

Fits TEA-20 Petrol engines -  
Standard Vanguard Engine





At this point the trans and diff, hydraulics and rear brakes are all up to scratch. The engine is assembled and ready for installation.

Sand blasting the chassis is next.



Fergy chassis sandblasted and in primer soon to be ready for shiny top coat of 2 pack grey paint. I don't want to put the finish coat of paint on until the ROPS cage and fenders are ready as will be cutting grinding and welding around the tractor while I am doing this.

Sandblasting the trans and diff and a coat of primer gets that part all ready for paint so now I start on the ROPS cage and fenders.

I pulled the tires off the rims so I could sand blast the rims, one front rim was bent pretty badly and I was going to get it fixed (re-rolled) but after pulling the front tires off the rims were rusted so badly and new ones from Wagga Tractor were so reasonable I just bought new ones. While the tires were coming off the rims you could hear the cords breaking inside the tires I just could not bring myself to put the old tires back on so new front rims and new front tires.

Then the back tires were almost the same story as well but the rims were not badly rusted so I got the blasted and powder coated. I bought some new rims (again from Wagga) and put new turf tires on the new rims and had the original cleated tires with new tubes but back on the sandblasted and powder coated original wheels.

## ROPS Cage - Running Boards - Fenders

The tractor never had a ROPS cage on it and I like the idea of having a roof as well. Remember it is Queensland meaning that you need a roof for when it rains, and a roof for when it doesn't.

Some 50 x 50 x 3mm RHS and some 50 x 100 x 3mm RHS made up the ROPS cage which will provide a mounting platform for the lights so I can mow at night should I want to. Cooler then.

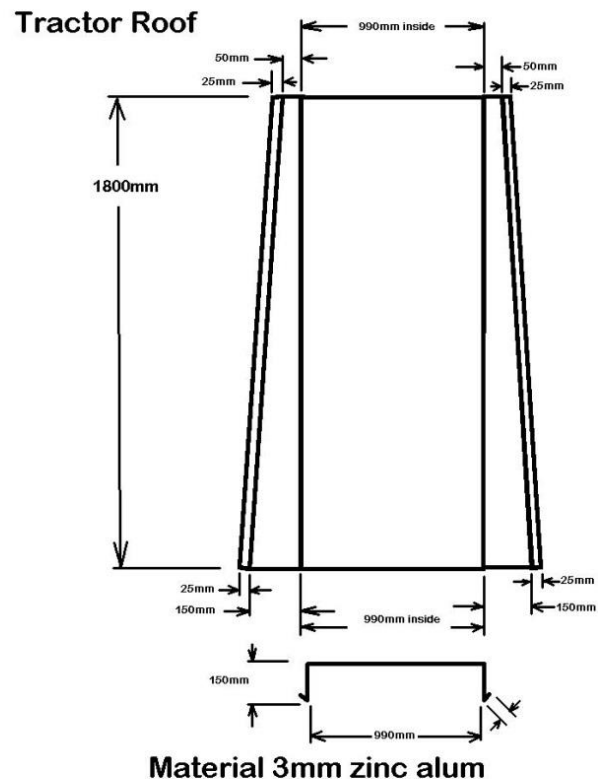
The bit of metal I need for the top of the cage is bigger than my sheetmetal brake can handle so I have someone bending it up for me, I have put a little gutter around the outside to direct any rain away

Hope to pick it up on Monday.

Running boards seem like a good idea. The little foot pegs don't seem to be such a great idea. If your foot slips off you could be in a challenging situation. I reckon I can make something that will slide into the front port on the ROPS cage bottom mount near the fenders. Photos coming.

Fenders too seem inadequate so I got some 5mm steel sheet and have cut and bent some up. I started with an idea and it is a little design on the fly, meaning I start with an idea and as I go along if I see improvements I will incorporate them into the finished product.

The ROPS cage bolts to the original Fergy fender mounts on the axle tubes and the fenders will weld to the ROPS cage frame once it is completed. The ROPS cage is a work in progress at this time.



Originally the Fergy had minimal instruments but I want to keep track of several things. Engine RPM, Hours, Oil Pressure, Alternator Output (amps), and Battery Condition (Volts). A review of what is available in the market place that would best suit this low rpm application with a big alternator I decided on the following hardware.

## VDO Gauges

**1ea Tach PN 333 035 010 80mm dia 3000RPM**

**1ea Eight pin plug kit PN 340 824**

**1ea Inductive pickup PN 340804007004C Inductive RPM sender with 3/4"x16NF thread**

**Set to 145 pulses per revolution (flywheel teeth)**

**1ea Pressure Gauge 0-100psi (oil) 52mm od PN 150 077 027**

**1ea Fitting Kit PN 230 012**

**1ea Water Temperature Gauge 1-120c with 1600mm capillary length 52mm od PN 180 077 022**

**1ea Volt Meter 8-16v 52mm outside diameter PN 332 010 004**

**1ea Ammeter 0-150 amp with external shunt 52mm outside diameter PN 190 504**

www.howardinstruments.com.au email: sales@howardinstruments.com.au		<b>Quote</b>	
<b>Howard Instruments Pty. Ltd.</b> A.B.N: 70 083 170 432 110 Northern Road Heidelberg Heights 3081 Ph: (03) 9457 4755 Fax: (03) 9457 6902		Invoice #: 00057310  Ship To: KEN LOWE	
Bill To: KEN LOWE			
Phone:	Fax:	Customer ABN	
SALES PERSON	ORDER NO.	SHIP VIA	SHIP DATE
RODGER D		Pick Up	
		TERMS	DATE
		C.O.D.	2/04/2013
		PAGE	1
QTY.	ITEM NO.	DESCRIPTION	Unit List Excludin GST
1	333035010	Cockpit International Tachometer Electric 0-3000 rpm SET TO 145 PULSES 80mm 12/24 volt Flood Lit black	\$253.5333
1	340.824	VDO 8 Pin Plug Kit for WWG Speedo & Tacho	\$9.6867
1	340.008	VDO Sender Speed Inductive 3/4 X 16 L=44mm	\$121.2533
1	150077027	Cockpit Vision Oil Pressure Mechanical Full Sweep 0-100 psi 52mm 12 volt Through Dial black	\$75.1067
1	180077022	Cockpit Vision Water Temperature Mechanical Full Sweep 120 c 1.6m Capillary 52mm 12 volt Through Dial black	\$101.98
1	332010004	Cockpit Vision Voltmeter Electric Short Sweep 8-16 volt 52mm 12 volt Through Dial black	\$49.84
1	190.504	Cockpit Vision Ammeter Electric Full Sweep 150-0-150 52mm 12 volt Through Dial black Kit	\$285.6133
			Disc. GST
			Extension Excluding GST
			Extension Including GST
			\$190.15
			\$7.25
			\$90.94
			\$56.33
			\$78.47
			\$37.23
			\$199.21
			\$219.13
Bank Deposit Details Bank: Commonwealth Bank BSB: 083512 Account Number: 10422564 Please notify us when payment made. accounts@howardinstruments.com.au			SALE \$857.58
			TOTAL GST \$85.78
			TOTAL INC GST \$723.34
			PAID TODAY \$0.00
			BALANCE DUE \$723.34
We appreciate your business.			
Sale: KEN LOWE			
12 month Warranty on installation and 6 months on repairs subject to Howard Instruments Terms & Conditions of Sale. E&OE Items sold are subject to the manufacturers terms and conditions of sale and warranty unless otherwise stated in writing.			

I share this price information with you as I found them to be very reasonable on their pricing.

The selection of instruments for the Fergy will give me a comprehensive overview of the operating condition of the tractor. Tach and Hour meters are in one. Tach is good as you know what your PTO shaft is turning. If I wanted to run a PTO driven water pump this information would be handy.

The Hour meter is critical for keeping maintenance up to date on the tractor as well.

Oil Pressure and Water Temperature (coolant temp) are a no brainer.

Most people feel all you need is an ammeter but I find the addition of a voltmeter provides a more complete instrument package.

I am filling in the unused original holes and going to cut 52mm (2") holes to fit the new VDO gauges.

I plan on putting the four small gauges, Oil and Water and Volt and Ammeter on the left and putting the Tach on the right along with the ignition switch.

For more information on dashboard / instrument panel stuff see further down this diary....





## TACHOURMETERS, electrical with LCD Hourmeter

The programmable tachometer w/LCD hourmeter can be used with most engine electronic control ignitions with tachometer output terminal, standard coil ignition, alternator signal, and 12V square wave applications. Non-resettable engine hourmeter is displayed in LCD windows.

Suitable for most petrol and diesel engines. Adjustable through LCD and reset button. Field programmable to 1, 2, 3, 4, 5, 6, 8 or 12 cyl./4-stroke, 1, 2, 3 or 4 cyl./2-stroke ignition and alternator pick-up ("W" terminal). Also suitable for signal from generator or inductive sender unit. Incorporated hourmeter shows true engine hours. Operating hours 99,999.9. Pulse range 0.5-200 pulses per rev. Not suitable for magneto system.

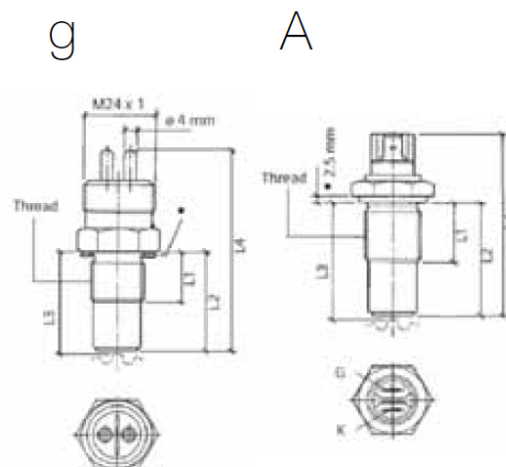
Illumination 12V included. For 24V application use globe #240.053 (2 required). For matching sender units refer to page 83.

## RPM SENDERS

### Inductive Type - 2-wire set-up

Part No.	Thread Size	L1 mm	L2 mm	L3 mm	L4 mm	Picture
340.007	M18x1.5			25		g
340.008	M18x1.5			44		g
340.009	M18x1.5			84		g
340804007013C	M18x1.5	27	34	35.1 ± 0.1	62	g
340804007004C	3/4-16 UNF-2A	27.5	28.5	29.6 ± 0.1	70	g
340804007011C	M18x1.5	33	34	35.1 ± 0.1	70	g
340804007019C	M18x1.5	18.2	70.7	71.8 ± 0.1	79.7	g
340804005015C	M18x1.5	18	99.1	101.15-100.55	135.6	A

**Note:** Use twisted pair or shielded cable between inductive sensor and device requiring signal to eliminate possible electrical interference.



## PRESSURE GAUGES, mechanical

Suitable for most vehicles.  
Supplied with nut and cone to suit 3/16" PVC tubing.  
Illumination 12V included.

Pressure Gauge - Air, Oil & Water		52mm
Part No.	Range	Size
150 077 010	0 - 15psi	52mm
150 077 011	0 - 30psi	52mm
150 077 027	0 - 100psi	52mm
150 077 026	0 - 150psi	52mm
150 077 020	0 - 700Kpa	52mm





## TEMPERATURE GAUGES, mechanical

Suitable for most vehicles.

Process connection is 1/8"-27NPTF threaded removable thermowell.

Temperature is transmitted via capillary tube.

Coil up excess capillary tubing - do not cut to shorten!

Illumination 12V included.

Adaptors are listed on page 80.

Temperature Gauge - Water		52mm
Part No.	Range	Capillary Length
180 077 022	40 - 120°C	1600mm



## VOLTMETER

Suitable for most engines/vehicles where battery and charging systems need to be monitored.

Illumination 12V included.

Voltmeter		52mm
Part No.	Range	Voltage
332 010 004	8 - 16V	12V

**Note:** 2 pin plug kit part no. 240.031 recommended. Not included in kit.



## AMMETERS, with external shunt

Suitable for monitoring heavy duty electrical charging system.

Voltage dependent - suitable for 12V or 24V.

Illumination 12V included. For 24V application use dropping resistor N05801180 and globe 240.051.

Ammeter with External Shunt			52mm
Part No.	Description	Specifications	Voltage
190.504	150-0-150 ammeter kit		12V

**Note:** For installation use 10mm wire.



Spare Parts for 190.504 ammeter kit		
Part No.	Description	Specifications
190 075 004	150-0-150 gauge, 52mm	
190.080	Shunt - 150 amps	50mV @ 150 amps
190.888	5m loom	

**Because of the size of the alternator I am using is over 30 amp rating (110amp) I had to use the more expensive external shunt for the ammeter gauge.**

It only niggles me a little bit that all my gauges are 270 degree sweep face except for the volt meter which is a 90 degree sweep face. Not that many people would notice that but it kinda drives me a little nuts. I will have to get used to it.

9 May 2013 While working on the ROPS cage for the Fergy I needed a cover for the frame on top and the size of the desired material exceeded my sheet metal tool capabilities so I had a friend bend it up for me and I picked it up today and slid it in place. Cool, now I can finish the ROPS cage and once I do this I can paint the tractor chassis.

10 May 2013 picked up the stuff at the powder coaters today. I got all my engine stands powder coated. I built them back in 1974 and they have evolved with time after a few improvements. I got the heads and arms all zinc plated gold as paint just does not hold up there but the chassis I got powder coated along with the original tractor wheels. The original cleat tires go back on the original wheels but the new wheels get the turf tires.

11 May 2013 Wife is shopping, son is studying and I am off to get the tires put back on the tractor wheels. Rebuilding a tractor or any large project is like eating an elephant. How do you do that you ask... one bite at a time. But along that same train of thought one must add the wisdom of my old friend McCord. When you start a project you MUST do something to it every day. This is a mantra that although is not always possible but must be strived for. If you ever put a project on the back shelf.... It will never be done.

I had to leave the tires and rims as they were booked out with work.

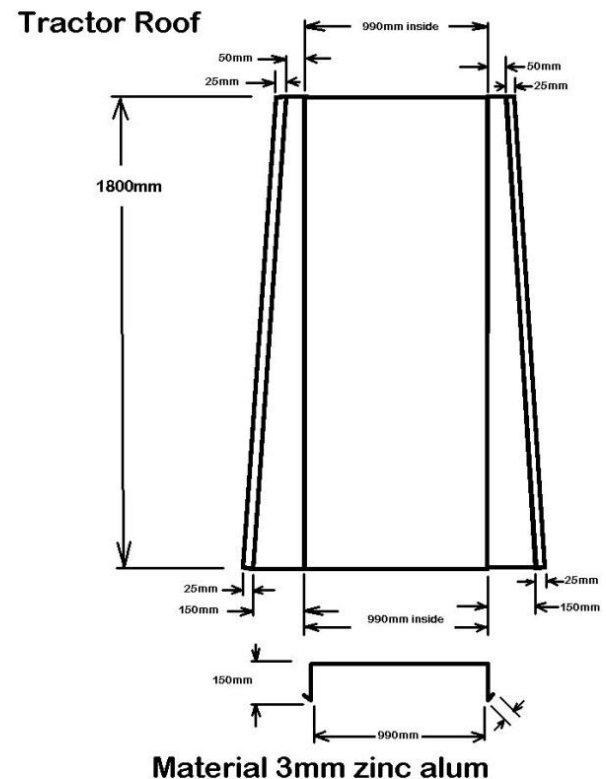


I found a front tire I want to go with the new rear turf tires they are mounting. But will they fit and what kind of rims are available. They are a 16" tires and 760mm tall while the original 19" tires were 740mm tall. This means getting some more rims from Wagga Tractor. I will have to check with them on Monday morning. The new 4.00 x 19 tires and rims I have will stay with the rear tires I am getting mounted on the freshly sandblasted and powder coated rims and will be used should I decide to use the tractor for something other than mowing.

12 May – I didn't work on the Fergy today as I had a bit of work to do in the machine shop for customers.

13 May I get the specs on the 16" rims and here is the drill. What is available is Bepco 449-3 rim which is similar to B6808 - Bepco rims are available locally.

The rear offset 116.5mm, the front offset 55.5mm, and pilot 117mm and stud hole PCD 152mm. Between flanges (where tyre beads sit) is 139mm or 5.5"



Wheel Specs	19" wheel (4.0 x 19) Original	16" wheel (7.50x16) Implement tires used as turf tires
Rear offset	105mm	116.5
Front offset		55.5mm
Pilot	117mm	117mm
Stud hole PCD	152mm	152mm
Rim width at bead		139mm - 5.5"
Distance from wheel to steering knuckle	35mm	To be determined
Tire width at bulge		7.5"

Considering the data above It is going to be CLOSE !!!

Pilot hole and PCD are OK

The 19" wheel has a back space of 105mm

I put the hub on the spindle of my fergy and put a wheel on and measured to the steering knuckle (where the wheel might hit) and there was 35mm of clearance.

Now the Bepco wheel is 139mm wide (5.5") inside (bead to bead)

The smallest Farm Implement tire is 7.5" x 16" or 7 ½" wide.

The extra width of 2" would be split with half going to each side or 1" on the inside and 1" on the outside.

I checked the OD on the tires. The 19" tires are 740mm OD and the 7.50 x16 Farm Implement tires are 760mm OD so that should be OK.

If mounted on a 5 ½" rim there should be 1" (25mm) bulge on each side and that takes the 116.5mm back space of the Bepco wheel out 25mm to 141mm (back space plus tire bulge)

Since the 19" wheel has 105mm back space and has 35mm distance to the spindle housing that is  $105+35 = 140\text{mm}$

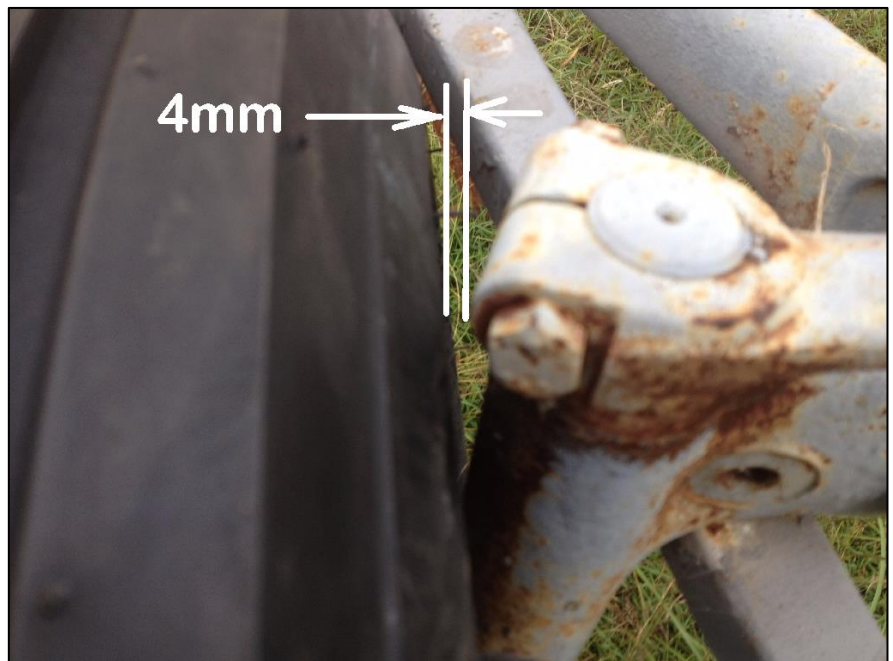
According to the math.... That leaves 1mm of clearance.

16 May – Get the rims and my list of other items I need on order from Wagga and after picking them up I hop in the truck to drive to Gatton to get the new tires fitted.

And the results are ...

**JUST ENOUGH**

I have 4mm of clearance!!!







Note I have not worked on the front axle yet... yes it is still rusty.



I arrive back at the workshop (home) with my load of new tires. The new turf tires on the new rims are on the top, the old cleat tires on the old rims (after sandblasting and powdercoating) are on the bottom.





As part of the Fergy restoration the original rims were pretty badly rusted and one was bent badly and removal of the old tires you could hear the popping of the cords inside the tire as it was removed. A bit of research found some new tires and after a few moments of consideration the decision was for new rims as well. But then....

When it came time to consider the rear tires which were cracked but operational for a moment the idea was to replace them as well to bring the tractor back up to scratch.... But considering the primary use for the tractor will be for mowing the

obvious tires was a turf tire not a cleat tires so turf tires were bought for the rear. If that makes sense then the 19" rib front tires would probably cut up the grass as well so it was decided if I could fit them to put a set of turf tires on the front. I couldn't find any so a wide low pressure farm implement tire seemed to make sense there. Now I have a set of rib and cleat tires should I ever want to use the tractor for dirt work and a set of turf tires for mowing.

As I posted earlier I had some of the hardware from the Fergy zinc plated. Here is a photo of those parts.

Too bad they lost some of my wheel nuts so I had to order more from Wagga Tractor.



I think I found the tractor seat I want today, it is one of those nice padded, spring supported seat with arm rests. I will have to look into that soon.

First photo of the ROPS cage, not done yet as I am still working on the fenders.

Tomorrow I have to get some work done so I won't be working on the Fergy tomorrow.. or that is the plan. Often I get side-tracked and end up doing some work on the Fergy.



**Alternator  
Harnass  
Ashdown PN-HXK-25  
Suits  
BXF-1260 FORD EF & EL  
BMX-1236 DRS Car 50**

Putting a new plug with the FORD alternator insures a more reliable electrical system. Cheap insurance in my opinion. I got mine from Ashdown part number PN-HXK-25

If I want to get a new replacement alternator for the Fergy the Ashdown part number is BXF-1260 which fits FORD EF and EL series.



I have pretty much decided to wire the Fergy using WeatherPac connectors.

1 August 2013

The Fergy project has taken a little bit of a back seat here lately because we have been very busy. While I was away on the road racing our United Tools Top Door Corvette on the Slamfest rounds my son Winti finished the running boards for the Fergy. I felt the running boards were a convenience and safety thing. They would make the tractor easier to mount and dismount and provide safety to the driver in rough terrain. The little tin things I see on some Fergys just didn't see adequate to me.

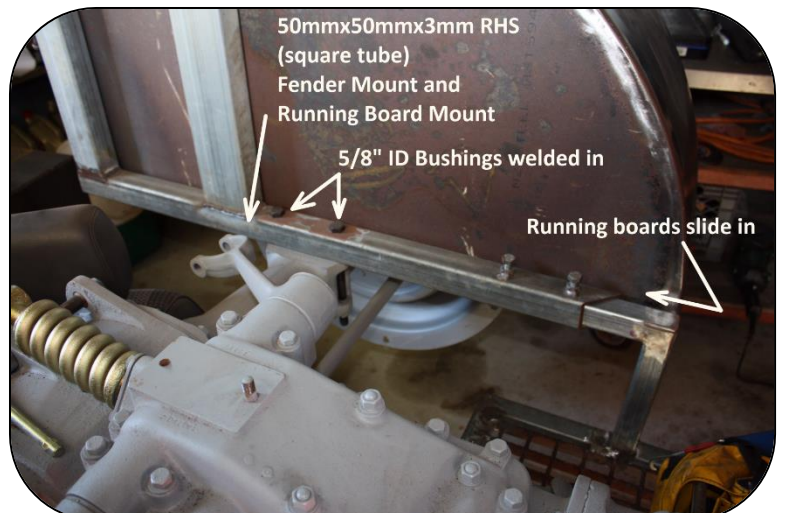




I used the original Fergy fender mounts on the axle and started with a piece of heavy wall 50x50 RHS (square tube) and put some weld in bushings through the RHS with 5/8" holes to mount the RHS with. This would be the base mount for the fenders and a receiver for the running boards. The running boards slide inside the RHS to hold them in position. We picked up some scrap grid mesh to make the center of the running boards to provide a tractive footing for the driver yet allow any mud or dirt to pass through.

The fenders were made from some 5mm plate steel. They have been cut, welded and one is ground up but the other one needs to be ground yet, hope to get to that this weekend. The mounting tabs have been made and again I hope to get them mounted this weekend.

As soon as the ROPS cage and fenders are done I will load them up in the truck and take them to the powdercoaters for a nice finish of GREY.





When I bought the Fergy my buddy Dave Coles found the tractor for me. The Fergy came with a mower that was completely rusted away but still had a good gear box and driveshaft. Dave is driving back from Western Australia to pick up his race car that I have stored for him for the last two years and is taking a holiday from work to do so. He will be staying with us for two weeks while he is here on the east coast. He tells me he will get some 5mm steel and make me a new mower deck for my tractor while he is here. Cool!!

A few weeks ago a neighbour brought his little CASE bulldozer over to cut out my back yard for a big pad to put my big shed up on (12m x 32m) the first day it worked it blew out the hydraulic pump, I took the old one off, he got a new one and I put the new one on for him. The bulldozer worked for another day and the track idler wheel got very hot. Removing it we found the bearings were completely gone so he took it out to get a new shaft made and some new bearings. While it



was down we pulled the other one off to check it out, but it was OK. Track pins are good and the sprocket is good. While he was waiting for the machine work to be done on the track idler wheel he took the starter and alternator off and had them rebuilt.

Yesterday we got the tracks back on and the little CASE running again.

He worked for several hours today and got some more dirt moved. Still have a heap more to move. Flat land is good land, providing it is not a flood plain. We aren't in fact before I bought the property I checked out the altitude and we are 5 meters higher than the TOP of the Brisbane Story Bridge and 8 meters higher than the Wivenhoe Dam. There are mountains around here that are taller than we are but



standing in the yard you look down in all directions. We will NEVER be flooded. Altitude is the best flood insurance. Screw that crap living by the water. The pad for the shed (and all my containers) is going in the back yard about 8 meters lower than the house, which means from the patio out back someone would look over the shed and not at it. I will still be able to see the lights of downtown Rosewood at night... all three of them. There is not one stop light in the whole town and we still have passenger train service here four times a day although we are the last stop on the line.

Since we are going to place an order for some steel I reckon I will get some 75x75x 10mm angle and make a leveller carry all for the back of the Fergy. 1200x2400 seems to be a good size as I can just lay a bit of plywood on the leveller and it becomes a nice carry all for moving things. Photos when I have some.

I should point out the new mowing strategy, the Fergy will be used in the back paddock with the slasher that Dave and I will fix up in the next day or so and be used with the finish mower deck for the big areas in the yard



around the house (we are on acreage), the new John Deer is a very nice mower with a large 52" deck and when I bought it the proviso for the dealer was I would buy it if my wife can drive it. She can and she does, electric start, auto trans and all the safety features and even has a sun shade, and finally the little old Snapper 26. This mower I have had for decades, several of them now. It is on its third engine, fourth seat, third set of tires. The mower deck has been welded up several times, the steering has been rebuilt now with spherical rod ends (like a race car). The Honda 11HP is electric start and has heaps of power for the 26" deck and this little mower will be used by my son for doing the trimming where the John Deer can't go. And he does the string trimming as well. The end result should be that the mowing even here on acreage should take no more time than a suburban lot. Or that is the plan, but you know how plans often work out.... not.



I just ordered the mechanical suspension seat for the Fergy, I would go and pick it up today but they are out of black and it will be 4-6 weeks before the black ones arrive.

Should be about the time I need to bolt it on the tractor.

They had yellow and blue in stock, but yellow is kind of John Deer, blue is kind of New Holland so it seems black is what it needs to be.

I have to place an order with Wagga for the last of the hitch parts for the back of the Fergy. The old stuff was just completely flogged out, so if everything else is fresh... better have the hitch parts fresh as well.

2 August 2013 Friday – going out with a trailer today to pick up the steel for the mower deck and the leveller carry all. Looks like a busy weekend making things.



Mower deck almost done, needs some castor wheels on the back to finish. Have the wheels, need to make some frame work to support it. Just a bit of 4mm plate and some flat bar and a little work and you have a mower deck.



Castor wheel swivels.



Leveller or Drag to suit the tractor, but with a tow hitch

I made a drag for the tractor but the tractor is not ready so I made a hitch and pulled with my old Nissan Patrol paddock basher. We have had a heap of earth work done and the bulldozer left the place pretty rough so the drag did a great job of smoothing things out.



Bulldozer (Drott) found a soft spot. Took us a day to get it out.





7 October 2014 – Fergy project has slowed to a near crawl, actually nearly a complete stop. Not for the lack of desire but for the lack of time. Life has gotten in the way.

Some time ago I decided to extend the fenders another 150mm and got the material in to do that, cut it to length and bent it up but so far have had no time to weld them together.

A few weeks ago I was doing some work for a company that builds trailers and they have converted all their production stuff to LED and had a large box of halogen lamps so I was given a few to mount on the front and back of the ROPS cage to light up the night.

As soon as the fenders are done, and mounted I can take it apart for a trip to the powdercoaters.

Speaking of powdercoaters last week I had to get a race car chassis sand blasted so I could paint it and I needed the space on the big work table where the mower deck was sitting so while I had the use of my friend Michael's truck the race car got sand blasted and the mower deck got a powdercoated. Had to choose a color and John Deere yellow seemed a good idea so I can find the mower when the weeds grow up around it.



Chassis for the Supercharged Outlaws car sandblasted and ready for paint.

(I don't like powdercoated race car chassis)



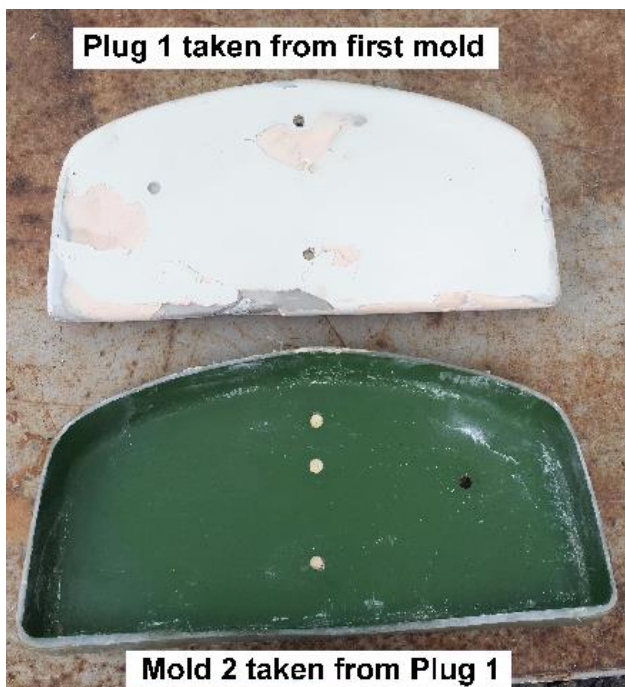


Work has slowed to a crawl on the Fergy, more accurately has slowed to glacial speed in fact. Life got in the way, I got distracted, or any excuse I can think of. Now back on the tractor, the original dash board was pretty beat up and the holes were all in the wrong place for the gauges I wanted to use. Welded up the holes and tried to beat it back to flat, sometimes flat is hard to get. I looked to see if I could purchase a new one from someone and none were to be found and like the oil filter it came to me to resolve this problem and possibly supply a product to others who are as insane as I am. it twigged on me to make a fiberglass one.

I know I am being pedantic and that the Fergy project has gone way past a tractor for the paddock. I took the original steel dashboard (Instrument Panel) and got it pretty straight (see photo) but for a brief moment it seemed like no big deal to knock out a fiberglass reproduction.

I sprayed the original dashboard with some PVA release agent and laid up a simple fiberglass mould to get the general shape to start with. Using Mould 1 I made Plug 1.

In fiberglass work a plug is the shape of the finished product you wish to replicate, a mould is the opposite of the plug and is the same shape as the finished product but in an inverse configuration. I got Plug 1 finished to a very nice finish and a very nice shape, a lot of work goes into a plug because the finished goods never get better than the plug is. I used Plug 1 to lay up Mould 2 and to insure the nice finish I had on Plug 1 instead of using PVA release agent I used wax which is perfectly normal a process we use here frequently. The Plug 1 was finished in a two pack primer to bring it to a nice finish and I think I did not adequately wax the plug so when I went to pull the new mould off (mould 2) the plug stuck and to get it apart I destroyed the plug 1. After that the project sat on the shelf for a while. Frustration on a project that was not going to make any money....



Finally, Starting again on the project I finally got all the stuck bits out of the mould and laid up a new plug (plug 2) and to insure I don't have a repeat Plug 2 has no bog or primer as I have shot gel coat and sanded that back and polished it and I might add a hell of a lot of work. At this point seriously considering presenting myself for some psychological examination as it seems no sane person would go this far. See plug 2 and it is ready for moulding now. That will be Mold 3 As mentioned earlier aftermarket Fergy dashboards are not available so I might offer this one to others that are as insane as I am.



160831 Update – plug 2 done, polished and triple waxed and now gel coated ready for tile layer to make mold 2

I laid the plug 2 on to a section of waxed melamine wood sheet using some clay to hold the plug in place. I considered using tooling gel coat but I did not have a lot in stock and what I do have is allocated to the mold for the SOH scoop (another project) so I shot it with some regular gel coat as seen in the photo on the left.

160828



After the gel coat goes off I have put on a tile layer of glass. The tile layer is a thin layer of glass that easily conforms to moderately intricate shapes insuring no air pockets between the gel coat and the fiberglass mat and resin.

Always insure the gel coat has gone off and don't rush it because if the gel coat has not gone off when you put the tile layer on it will tripe meaning the activator in the resin will send the gel coat off and cause what looks like crinkled up tin foil finish on the gel coat. In this case this is your mold and that means either you have to repair that or your product will bear these marks. Don't rush it. 160829





After the tile layer has gone off, give it a light sand to remove any furry bits and you are ready for the heavy layers.  
Here I am laying up the heavy layers, fit the glass matt to the shape, tuck into places, use pinch clamps if necessary to hold the mat in place before you start and mix up your resin and apply and roll out completely to remove any air bubbles and insure the matt gets stuck into the tight corners and crevices.  
160830



Once the heavy layup has gone off completely the whole assembly will easily pop off the waxed melamine panel.  
Here is a photo of the plug inside the mold after it has been released and turned over. Now to remove the plug from the mold.  
Get some hardwood 1" square stakes from the hardware store and make some tapered wedges after cutting to shape use a belt sander to make them smooth. Use the wood wedges to pop the plug out of the mold.  
Trimming the mold will make it easier to get the product to release later. 160831



Here is the plug removed from the mold, it came out with a nice finish. Now I put the plug in a safe place should I need again.

I turn my attention now to the new mold.

160901





To trim the mold I have taken a square and marked an cut line on the mold flange to trim the mold to.

For all my cutting I use a diamond wheel on an right angle air grinder, been using the same blade and cutter now for over 25 years. I like the air tool as it does not get killed by the dust and the power level is such it can be easily used with one hand.

160901



Ready for cutting the flange.

160901



I had noticed some small defects in the mold and after the flange was cut off to the marked line I used some masking tape to build a small dam and used a different color gel coat so you could see it in the photo where I have added some gel coat to fill the small divot, once the gel coat has gone off I remove the masking tape and sand back smooth.

160901



Here you can in the close up where I have removed the masking tape and am ready to sand this back smooth to repair the mold.

160901



Mold has been touched up and any rough bits sanded smooth, then polished and now it has been triple waxed and ready for gel coat for the lay up of the product. The dashboard.

160902



Here is the mold with a nice layer of gel coat shot into the mold, give this time to go off and it will be ready for tile layer.  
Getting closer to a dashboard.

160902



Tile layer was laid in, let to go off, then a light sand and then the finish layer laid in. Here it is in the sun basking for the final cook off.

Closer to a dashboard.

160903



Here is the dashboard popped out of the mold, the mold is on top and the new dashboard is on the bottom. Now trim up the dashboard.

Take the mold and put it with the plug for safe storage.

160904



Here is the new Fergy Dashboard. Trimmed up and ready for drilling for mounting.

160904





Dashboard drilled for mounting, now turn it over and spot face,

Then cut out the slot for the steering column.

160905



To give a nice smooth surface for the flanged nuts to seat against we used a spot face tool to make a seat for the nuts to sit against.

160905



Used a band saw to cut most of the material out of the way then a sand roll to finish to size.

160905



Sand roll finish the notch to size, now ready for fitting.

Woo Hoo we have a NEW dashboard.

160905



Here is the new dashboard mounted on the tractor steering column.

160905



Drivers view of new dashboard.

Didn't want to cut out for the gauges just yet.

You may notice the running boards my son Winti made for the Fergy... Nice too easy to get off and on and much safer as well. We have added some tool ports to the front of the running boards which we can slide tools into and lock down.

160905





View of the mounting on the rear. Yes I know one nut is missing.

160905



Made up a sample pattern and a mounting guide for the gauges. Thought about it and decided to move to the other side as I want to put the tachometer on the left the opposite side of the throttle lever. Seems to make sense to me.

160905

160906 I have sprayed the fenders in preparation for marking for the final grind. Progress – rain has prevented me from taking them outside for grinding and life.. gets in the way too.

160911 I get bad ideas sometimes....

After finishing the dashboard I realized that the top curve of the dashboard had a very familiar arc to it. In my shed I found this 32 Ford grill shell. Considering about making a one piece tilt forward (like the original Fergy) front hood assembly with the 32 Ford grill shell.





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