

10 X Modifications/Additions

There are many modifications, enhancements and extras that can be and often are added to a 4WD vehicle. Here I will endeavour to show you some that you may or may not be aware of. Understandably they do not apply to all 4WD vehicles, in fact most are mainly beneficial to the type of 4WD ute fitted with a tradesman type canopy. In a previous article for 'Western 4WDriver' (88th Spring Edition 2013), 'Tradie's Transformation', I alluded to a few of these ideas but here I hope to elaborate a bit more on each.

Front tow hitch.

As you are probably aware some of the more expensive bull bars are supplied already kitted out to enable the fitting of an electric winch. This type of bull bar is often fitted to a vehicle with the intention of adding a suitable electric winch in the future, either when money



permits or circumstances dictate; often nothing further eventuates. Looking at this unused space on my own ARB bull bar one day I



realised that it could be the perfect spot to include a front mounted

'Hayman Reese' type hitch. I had previously had a front tow hitch

fitted to the front of a Triton ute about eight years ago and it had proved to be very useful.

Scrounging around in my 'it might come in handy one day' stash, I located the old tow hitch. Basically all I had to do was cut it shorter on both ends, weld on a couple strips of steel flat bar with appropriately placed holes to line up with the mounting



bolt holes already drilled into the bull bar (the holes that would normally secure the electric winch in place) and slip it in behind the bull bar and bolt in to place. All forces

applied to this tow hitch should be less than or at most equivalent to the force exerted by an electric winch. Obviously it would be both

illegal and dangerous to leave

any tow hitch 'plugged' into this fitting when driving on the road.

However off-road it has a number of beneficial uses. Apart from the obvious use of now having somewhere to fit a recovery hitch when

required, using it to back a trailer or caravan into a tight space is very handy and can make an otherwise tricky job very easy to achieve.



Another use I sometimes put it to, if I don't have my tractor with me when I am constructing a rural type fence, is as a stationary anchor point (see adjacent photo) from where I can apply tension and successfully strain the fence wire.

Should you be concerned about your airbags going off while using a front tow ball? Probably not, airbags have to be subjected to a collision of approximately 23kph (12-14mph) with a stationary and solid object before they deploy. I suggest that you are more likely to be travelling at 5kph or less while reversing a trailer, caravan, boat, horse float etc.

Vice & stowage



Sometimes to successfully complete a job an engineer's vice is required to properly secure an item while work is carried out on the item. A classic example is sharpening a chainsaw. Other reasons could include but not necessarily be limited to; holding a part



securely while a hole is being drilled, holding a part securely while filing or grinding off erroneous material, etc.



In a former life I was the Launch Commander of a 12m Customs Patrol Vessel (some of you may remember - 'ACV Edwin Abbott' based in Fremantle) and this is where this idea was born. There wasn't anywhere in the engine room where a vice could be stowed and successfully used. Nor did we want the vice permanently mounted in the wheelhouse where there was room to use

it. My 2IC at the time came up with the brainwave of keeping the vice stored in the engine room but have it mounted in such a way that it could be quickly relocated to the wheelhouse when it was required for use. The same principle also applies to a vehicle; the vice needs to be stowed out of the way and yet be quickly movable to a spot where it is convenient to use. I have my 100mm (4") engineer's vice stowed securely on the tow bar when not in use and when required it is simply relocated and used at a convenient height attached to the tray of the ute. In both locations it slips into a slot and is held in place by a sturdy wing nut (actually the 'wing nut' is a 3/8th bolt with a small length of 1/4" rod welded on to the hex head).



I also use the same idea for the engineer's vice fitted to my steel welding bench in my workshop but for a slightly different reason. For the majority of the time the vice is stored and used fitted into its slot on the bench but occasionally I need the bench top to be completely unhindered for whatever reason and it is simply a matter of undoing the wing nut and removing the vice. You could also use the same vice from the workbench swapped across to the vehicle, should you wish to save dollars and only have the one vice instead of one in each location. The observant amongst you will notice that I have used the vice off my work bench (because it was quicker and easier to set up) for the photo above showing the chainsaw awaiting sharpening. *(The photo of the chainsaw is staged in another respect as well; I rarely sharpen this chainsaw as it has tungsten tipped teeth and they only require sharpening once compared for up to 10 times that of an ordinary chain, but that's another story...)*

Folding bracket for flashing amber light & antenna mount



'Why?' I hear you ask. The main reason is so that in the bracket's folded down position it leaves the roof or roof rack completely clear to fit a large item such as 1.2m x 3.6m sheet of plywood, lengths of timber or pine

poles, or a large rural gate as shown in the accompanying photograph.

Oh, you mean 'Why have a flashing light at all?' For the average 4WD driver there is no real reason to have a flashing light whatsoever. If however you are a tradie you may have cause to visit various restricted sites. Some of these sites (especially mine sites) may insist that you have an amber flashing light before access to the site is granted.



Second spare wheel removable bracket

On many trips into remote regions, such as deserts, a second complete spare wheel is usually considered mandatory, but where to stow it can soon become a problem. It is usually preferable to stow the wheel outside the vehicle due to the restricted space inside and the possibility of the swapped flat tyre being very dirty. This invariably results in the wheel being carried on the vehicle's roof rack where it can easily be tied down. Problem solved. Well yes, if you have a roof rack. No, if you have a tradesman type canopy with no rack or like me, a flat pop-top that can partially double as a roof rack but is near impossible to secure a spare wheel to without out some form of bracket.



So that is where this idea fits in; a bolt on plate with a 1/2" 'Whitworth' (BSW) bolt welded to it. Why a 'Whitworth' bolt and not a metric bolt? Because that is the thread on the large base spring used on HF antennas that can easily be screwed on tight by hand without the need for a spanner. With the addition of an old HF antenna topped with an orange flag, the base spring can double as the mounting spot for a sand flag when in desert or sand dune country.



In the photos above you will see another flat plate without a bolt welded on, this is screwed into place when not carrying the spare wheel and as mentioned above, allows for the carrying of large objects on the roof unhindered. Both plates (with and without bolt) have a rubber gasket underneath to keep the roof watertight. The counter sunk bolts that screw either plate to the roof are screwed into

two captive nuts welded to a small plate on the inside of the roof. This plate and nuts are held in place by two Tek screws.



The spare wheel when fitted to the roof face down discloses a large amount of storage space on the inside of the rim. Utilising the 'spider' shaped clamp, I use this space to carry a reasonably long nylon rope. You will also notice that the wheel has a rubber mat placed between it and the checker plate roof. This is to protect the inflated tyre from the checker plate and the rim of the wheel from the checker plate on a deflated tyre.

Roof Step(s)

Assuming you are going to mount a second spare wheel to the roof or a roof rack or you are going to transport a large object on the roof or roof rack you will probably need to climb on to the roof to secure/unsecure the item. The easiest way I have found to accomplish this is as follows. Construct two (one for each side of the



vehicle) small steps made from bent aluminium checker plate or any other suitable item that can be safely used as a step. The steps are located about half way up the front of the canopy and permanently secured in place with two or three Tek screws.

To climb onto the roof, first reach up and grab the roof rack tie down rail with both hands, then with the foot nearest the rear of the vehicle step on to the top of the rear wheel. Hauling yourself up now place your other foot on the newly fitted step. Continuing the upward motion haul yourself up and on to the roof or roof rack. This idea works very well if, like me, you have long legs and all is achieved in one fluid motion. Once on the roof you have quite an elevated view, useful if trying to locate something or someone or it can be a great vantage point to take photos from.



Under floor storage - built in toolbox

Unless you have a full length under body drawer built in to your Tradesman's Canopy or under a tray fitted on the back of your ute, you will have a lot of wasted space underneath. To use some of this unused space, ascertain from underneath the floor what space can be utilised and the appropriate measurements of this unused space. Using these measurements build a 'bowl' shaped container constructed with a bottom, four sides and with a small lip (25mm wide) bent over running around the top edge. When complete the 'bowl' will resemble a plastic washing up 'bowl' but with square rather than rounded corners. The best material for this is possibly aluminium, so having it professionally made is probably the easiest way to achieve this.

Cautiously transfer the position of this box to the floor of your ute tray or canopy, mark out it's precise final location allowing for the bent over edge to fit up under the floor when fitted. For strength, safety and visual appeal, round off the corners of the rectangle that you have now drawn by drawing around a twenty cent piece or similar in each corner. Using an angle grinder fitted with a really fine blade (around 1mm thick), plunge cut into each of the four straight sides being careful to not cut into the curved corners. Next, finish of the curved corners with a narrow metalworking blade fitted into a jigsaw. You should now have a 'lid' for your 'bowl' ready to fit back into almost the same size hole. Fit the newly manufactured 'bowl' up from



underneath the floor and secure into place with counter sunk bolts or Tek screws. Drill a small hole approximately 25mm (so the knuckle of your finger can pass through) into the front part of the lid. Finally fit the lid into place by riveting on a length of piano hinge and secure the lid into its final position. Your manufactured 'bowl' has now become a very useful storage box with a flush fitting lid. If this is all a bit too much for your mechanical capabilities I'm sure any reasonable Canopy Manufacturer worth his/her salt would be able to complete all of the above for a reasonable price.

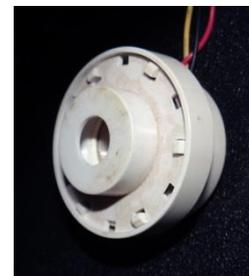
As you can see from the accompanying photos when the floor is fitted with indoor/outdoor carpet the storage box practically disappears. You will notice in the last picture that I have modified the box to now incorporate a dividing wall, on the right-hand side of which has become my permanently built in toolbox, heavy/larger tools underneath and smaller lighter tools located in the (red) tool tray. On the left-hand side recovery tools, air-compressor, etc. are located.

Door alarms

After a hard day supervising the collection and counting of votes in the 2008 WA State Election, I was in the process of conveying the counted ballot papers and other election material back to the collection point for our Division when, while negotiating a roundabout, the left-hand side door of my Tradesman's Canopy suddenly flew open. Luckily only a 10 litre water container left the vehicle and was slightly damaged, none of the election material, which included the ballot papers, left the vehicle (so no new election had to be called!). The door had spontaneously opened due to the outward inertia from rounding the roundabout and the fact that the door lock was not latched securely. That's when I 'should' have fitted door alarms to all the Canopy doors.



In February 2009 on returning home from a job, a distance of about 10 kilometres, unbeknown to me I had inadvertently left the passenger side door of the Canopy completely open. (When the door is open it is above the level of the view in the side mirrors). This wasn't a problem (nothing had fallen out), until negotiating a small loop driveway when I got back home, when the open door connected with a large and very solid Marri tree near the edge of the driveway, bringing the ute to complete and sudden stop. The result was one badly redesigned door which can clearly be seen in the adjacent photo. After this episode I 'did' fit an alarm to all the doors.



Initially the job seemed a bit complex, but like all such jobs when broken down into individual segments isn't really that hard at all. The door alarm system consists of three main parts. Firstly, the actual alarm or buzzer (see photo) (buzzer - Jaycar Cat. No. AB-3456 \$8.95 - 2013 catalogue Page 167). Secondly the switches fitted to each door (door-switch - Jaycar Cat. No. LE-8777 \$7.95 - 2013 catalogue Page 162). All the switches are linked together by a suitable length of wire which then continues on through the vehicle to a convenient location behind the dash where it is connected to the black wire of the buzzer. When I say all the doors, I mean all five doors as I have included the under body boxes as well. I called this the 'door earth' to distinguish it from the normal negative from the battery. (The 'door earth' is also used for the earth to the internal LED lights. As soon as the roof and all the doors are closed, any lights that may have been left 'on' will automatically switch 'off'.) Thirdly a wire has to be run from the 'ignition' side of the ignition switch (not the 'accessories' position) to the yellow wire (or to the red wire if you would prefer a continuous rather than a pulsating buzzer).

Being a bit wary of the possibility of either accidentally setting off the air-bags (whilst poking around trying to find the correct wire) or of damaging the 'CAN bus' system now found in most new vehicles, I left the locating of the 'ignition' wire in the capable hands of my friendly local auto-electrician. (While he was at it I got him to run individual wires from the 'accessory' circuit, 'brake' wire and from the two wires for the central locking, as well for the same reasons as above; these were needed for other purposes.)

So how does it work? Two things have to happen before the door buzzer sounds, any one of the door switches has to be 'on' (door open) AND the ignition key has to be turned all the way through to 'ignition' not just 'accessories'. Should you attempt to start the engine with a door open the buzzer will sound as a warning to close the offending door. You can however have the 'accessories' switched on, say, to listen to the radio or keep the CB on and have one or more Canopy doors open without the buzzer sounding.



I have subsequently added another switch that is activated if I have the pop-top 'popped' up, also enabling the buzzer should I go to start the engine. The total cost of this exercise is less than \$50 (the switches are cheaper from Jaycar if you purchase 4 or more at a time) plus the auto-electricians fee. Moral to this is 'Just Do It'.

Engine Oven

It has become a tradition of ours that we have homemade sausage rolls for lunch on the first day of any trip. The sausage rolls are placed in the 'oven' at morning tea time and are very warm (not extremely hot, but still delicious) by lunchtime.



Dipped in tomato sauce, yum...

I have been using the heat from the engine block as the 'oven' to heat sausage rolls for nearly 20 years. Using various models of Triton utes, Mazda BT50 and now my Isuzu D-Max. On all previous utes including the Mazda BT50 it has been a bit of a squeeze to fit more than a couple of sausage rolls wrapped in Alfoil down in the 'V' of the engine block.



Now I have the D-Max and the plastic 'cowling' that fits over the engine is almost made for the job. All I had to do to make it perfect was to bend up a small 'oven' out of some weld mesh with 20mm square holes, make a lid out of some insulated bubble wrap and some gaffer tape (see photo). The whole 'oven' then fits neatly up and under the plastic 'cowling' allowing the heat from the engine up through the grate of the mesh and then is trapped inside

the insulated bubble wrap lid. The sausage rolls are wrapped in Alfoil to protect them from the possibility of dirt or the likelihood of absorbing any of the surrounding smells.

To try and ascertain how hot it gets in the 'oven' I fed the temperature sensor from an indoor/outdoor thermometer into the 'oven' and it quickly rose to and surpassed 70°C (the upper limit of the thermometer). I have since made another two 'ovens' for other D-Max's owners and they are equally as happy with them. We do not leave the oven in situ when not in use, in the unlikely event that it may interfere with the airflow around the engine, especially on a very hot day. Maybe it should be offered as an optional extra by Isuzu or better still as a standard



accessory and unique selling feature of the vehicle!

I haven't tried it as yet but I am sure that two or three pies or pasties similarly wrapped in Alfoil could also be heated up in the 'oven'. What about hot garlic bread, a roast chicken, a small leg of lamb...?

Window flyscreens



As you can see from the first photo above the stick on flyscreen (using hook and loop) for the windows in my pop-top are made from 2/3rds flyscreen and 1/3rd clear window plastic. The beauty of this arrangement is that in cold climates or during rain the window can be left up to 1/3rd open (second photo) allowing a considerable amount of daylight in but keeping out rain and or cold drafts.

In warm climates, especially balmy nights, the window(s) can be fully opened to allow in the cooler wafting breezes but still keep out the unwanted flying visitors. This idea has proven to be very successful in practise.

2nd Battery 80amp circuit breaker/isolators – Anderson Plug

Yeah, I know you've seen dual battery setups before. This is a little different, in that I can totally isolate my second battery (Optima – Blue top) should I need to provide power to jump start another vehicle. It's not that easy to see in the adjacent photo with all the black 'spaghetti' going every which way, but I will try and make it clearer.

Below the Optima battery is the standard vehicle battery (black top). To the right of the standard battery is a Redarc Dual Battery Isolator Solenoid (mostly hidden under the two red insulating boots). Above this is an 80 amp circuit breaker/isolator (little red button on top) and above that a second 80 amp circuit breaker/isolator (with a little red button on top). Above the breakers and to the right of the blue top battery is the yellow cap of the windshield washer bottle (absolutely nothing to do with this electrical circuit). Immediately to the right of the yellow cap is the black dust cover on the top of a 175 amp Anderson Plug. Ok, got all that, clear as mud...?



So how does it work? Under normal conditions, whilst the engine is running the alternator charges up the main battery, everything else is isolated by the Redarc Dual Battery Isolator Solenoid. Once the main battery is charged up to 13.7 volts the Redarc unit automatically switches the second battery into the circuit and both batteries continue to be charged until they reach the output voltage of the alternator. On switching off the engine and once the main battery voltage drops below 12.7 volts the Redarc again isolates the two batteries and their individual circuits.

Now back to jump starting another vehicle. Should this be required I press the red button on the lower 80 amp circuit breaker/isolator, this completely isolates the main battery and all of its circuits from the Redarc Dual Battery Isolator Solenoid and the second battery. By then pressing the red button on the second 80 amp circuit breaker/isolator the second battery is isolated from all of its circuits in the back of the vehicle, Engle,

LED lights, etc. This leaves the second battery completely isolated from everything except the Anderson Plug. I have a 2.5m heavy duty dual cable with an Anderson plug on one end and two crocodile clips on the other, which is used as the jumper cable across to the other vehicle. Jump starting another vehicle like this completely eliminates any problems that might upset the computer of either vehicle and protects the main battery voltage from dropping below that required to start my own vehicle.

Even if you don't use any of these ideas on your vehicle I hope it has inspired you to come up with some of your own. Maybe we can convince 'Western 4W DRIVER' to have a section each issue with 2 or 3 reader modifications/additions. Let Nick (the editor) know if you think this would be a good idea. I still have a few more ideas I could include in a future edition and will have to start compiling a new article.

Note: this article was submitted to Western 4WDriver but has as yet not been included in any Editions.