Riley Restorer

A magazine for Riley restoration enthusiasts in Australia April 2023

No Web address yet

Editorial

The cover photo features a recently restored Riley taken by the son of a friend who visited the National Exhibition Centre in Birmingham for the Classic car and renovation show in Birmingham, UK. The Riley has only just been restored.

Alex Alfonso was kind enough to lend me his Riley 9 Mk 3 handbrake adjuster turnbuckle to copy. A 5/16th BSF left hand tap and die was purchased for the job and they arrived last week so all the linkages on Harold—the Mk 3 are now complete. The address of the tap and die company is with the picture of the turnbuckle in the magazine. Thank you Alex.

Those of you who were happy to share your email address are listed in the recipients list at the head of the email that this magazine is attached to. If you need to borrow a part or are seeking advice on any Riley it is suggested that you email everyone on the list or target a member who has the same model of Riley as you have. You may be more likely to get what you are looking for.

The Editor appreciates receiving articles by the 21st of the month

Office	name	Contact details
Chairman	Wayne Powrie	wayneapow@gmail.com 0418 373 104
Editor	Philip Wyllie	philip.w.wyllie@gmail.com Mob: 0400 049 493
Treasurer	Doreen Wheeler	doreen.w.wheeler@gmail.com Mob: 0400 049 493
Secretary	Philip Wyllie	philip.w.wyllie@gmail.com Mob: 0400 049 493
Web coordinator	Marshall Homes	marshall.holmes@outlook.com.au

Contents

April Activities

Sunday 16th Garage Run to Mel and Colleen Carey's home, 7 Voyages Drive, Banksia Beach (Bribie Island). Meet at the service station on the Bribie road. They have graciously offered to provide morning tea.

Mel and Colleen have a Riley sprite special. They also have the antecedents of the Fiat

The meeting will be followed by lunch at the Bribie Island RSL

Sunday 23rd 11 am. Monthly Meeting at 74 Treehaven Way, Maleny. Meeting begins at 11 am followed by a BBQ lunch.

Above: The Riley 9 Mk 3 hand brake turn buckle.

The BSF left hand taps and dies can be obtained from Tracy tools at

info@tracytools.com

They supply tools to the manufacturing industry

Disassembly of a SV gearbox

The gearbox came with many parts that had been loosely fitted back onto the chassis. As you can see from the first picture, the SV gearbox was bolted to the chassis as was the engine without any rubber or other mountings. There are three fixing bolts that locate the gearbox to the chassis.

Above: The box on my workshop bench

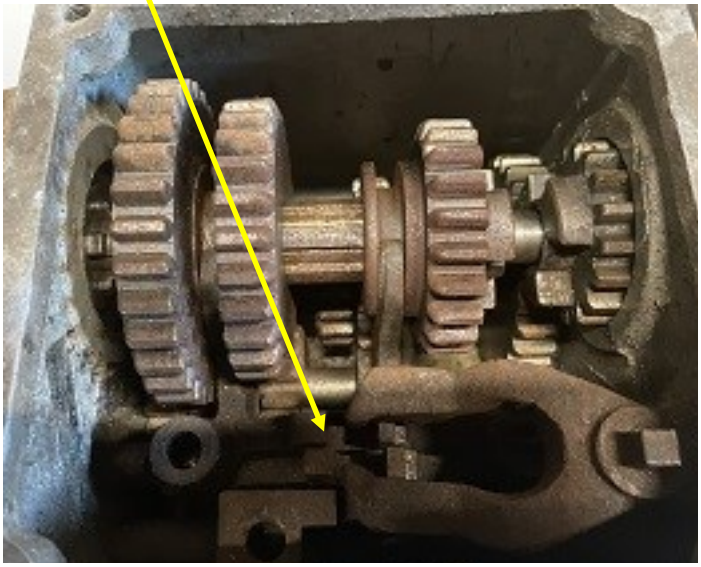
On Kurt Shultz' SV, the gearbox casing was broken on the side where there are two fixing points. On mine they are all broken. His solution is rather brilliant. First, the gearbox casing has been cut along the base (outside of the box itself). He has had another base made and the box and the base are overlapped and bolted together using four bolts on the top and three on the side. The meeting point is almost flawless and a hard act to follow but repairing my gearbox will be my first goal. Much thought went into the idea of making new support sides to the box and bolting them together like Kurt's but ultimately it was decided that welding was going to produce a stronger and a more permanent fix.

Above: Kurt's gear box

So, the first step was to disassemble the box. Unfortunately, this is more easily said than done. The output shaft had no nut on the threaded end and the tri-fingered web had been partially or perhaps fully withdrawn and replaced halfway along the spline. There it had remained for a long time. It was stuck fast. Since the gearbox wouldn't fit into a shop

press, a fairly large triangular legged puller was fitted, copious lubricant was squirted into the spline and the puller was tightened onto the end of the output shaft. The picture amply demonstrates the result. It was left under tension over night just in case the pressure would cause the three fingered web to let go of the spline. Next morning the puller was checked, and it appeared that there was a millimetre of movement of the web on the spline so the puller was tightened and a distinct movement was noticed so the puller was cranked over until the web came off. A joyous moment for me and a reminder about the need for patience with Rileys rather than the employment of a larger hammer.

The selector fingers were found to be very close fitting. The rod that held them in place was removed but they could not be juggled free. The split pin, spring and ball bearing was removed from the top selector finger but still there was insufficient gap to release it. The other two fingers were juggled and after some time (and luck) the top finger came free and then the other two.



The end nuts on the lay shaft were removed and the end of the layshaft could be pushed back from its bearing.

Above: The layshaft being removed

This allowed more room to work on the gears. The bearing at the rear of the shaft began to loosen and this was removed but the rear portion of the gear cluster could not be withdrawn from the front half. More shuffling. Then the front bearing moved and it was possible to prise it off the end of the gear cluster shaft. The gears began to free on the shaft and after some time the gears could be moved forwards and backwards with the use of my hands. The shafts should separate. They do on the Riley 9 and post war RMs but the SV gear cluster refused to separate. More shuffling.

Then it happened. The two parts came apart and it was possible to remove the rear section through the box and then the front half could be removed as well. That concluded three hours of shuffling.

The new front half of the gear cluster was compared with the one taken out of the box and there was the answer to my problem. The female opening on the front half of the gear cluster had worn so a previous custodian had machined it out and fitted a brass bush into it to take up the slack. Sadly the brass bush had distorted and would not release the male end of the rear gear cluster.

Above: The bottom gear is the one purchased through Kurt. You can see that the brass bush is damaged in the top gear making it difficult to remove.

The box and all of the working parts were cleaned in petrol and then washed with soap and water and after that an aluminium welder was telephoned and asked if he was interested in welding new fixing points into the gearbox skin. The decision to weld instead of cut and shut a new section into the box supports was taken after considerable thought.

Below: a repaired fixing point

True, Kurt's solution was clever and neat but was it strong enough to withstand the fatigue of use? I simply do not know. Not being an engineer with copious knowledge about the stress factors and the strength of bolted on parts rather than welded new sections I decided to go for what I thought to be the safe option.

The fixing points had been replaced with welded sections previously and they had broken again. The cause of the fatigue had never been addressed. The box had never been cushioned on rubber supports as Kurt had done with his SV. So, it was decided to weld new sections onto the box and make a gearbox cradle with engine support rubbers from a Land Rover mark 1. The box was delivered to the welder and he said it would be ready in a fortnight so I await with anticipation.

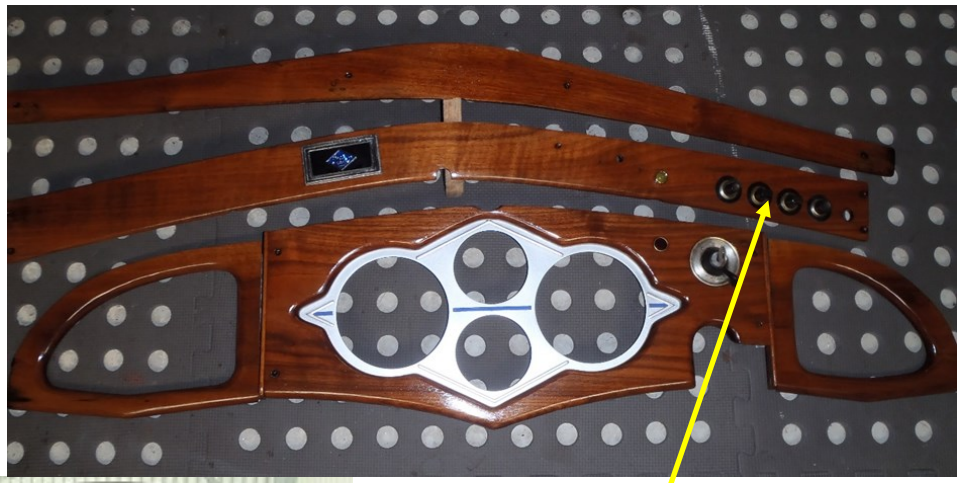
Prologue: The welder still has the box after three weeks so the rebuild story will have to wait until next month

Big 4 Adelphi dash and door cards By Cliff Goodman

I read with interest the recent article on your trip to Victoria with special interest in the Adelphi. Unfortunately, it is different to my car and wonder if it is an earlier 1 ½ litre or 6 cylinder model.

(*Editor: It is the earlier 1 1/2 litre Adelphi. According to book number NZ78—NZ Riley club library, the Adelphi body was fitted to a 4, 6 or 8 cylinder engine chassis. Below is pictured the Adelphi dash seen in Victoria)*

As you can see from the picture above my dashboard is very different and has the blue streak across the centre.



Apart from the ignition/light switch the other switches along with the ash tray are on the upper section.

Also, my door cards are completely different although in a very poor condition.

The dividing line between the upper leather and lower carpet corresponds with the inside floor pan so the carpet is not visible when the door is closed.

On my Big 4 Adelphi (Blue streak) The outer section is well padded to give a cushion like shape and feel whereas the inner section is attached directly to the plywood after the decorative seams have been created. All the upper coverings are in leather.

(Below are pictured the door cards seen on the Adelphi in Victoria)

The outer section is well padded to give a cushion like shape and feel whereas the inner section is attached directly to the plywood after the decorative seams have been created. All the upper coverings are in leather.

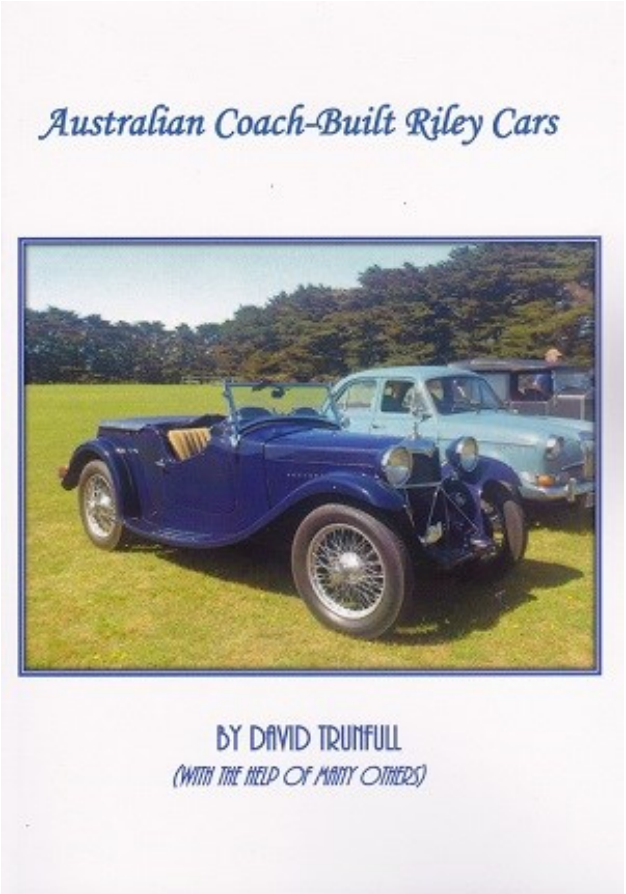
As my car didn't have any boot furnishings I would be very interested in any photos that you have for the Adelphi that you viewed. I would say that there should be a central flap in the floor covering for access to the battery box cover and side closure panels but what, if anything, hides the back of the back seat?

Currently 4x4 (inch) Rosewood is unavailable for purchase. Believe it or not, it is needed for cant rails. Although a skinny framing piece when finished it has complex curves – that is it curves in a bow from the ends upwards and outwards to the 'B' pillar. So one cant rail is the equivalent of a 1 1\2 meter 4X4 post.

Above: One on the left a 3X3 Queensland Mountain Ash post for an 'A' pillar and on the right a Rosewood 4 X4 post for a cant rail. It doesn't seem fair that the skinny piece gets the most timber doesn't it?

Last week a visit to Tony, a specialist timber miller revealed that a request made 3 months ago had not been forgotten but not filled. He showed me a tree that had been cut open and residing in it was an extensive family of timber borers. Tony called it chook shed timber. Apparently chooks have a taste for borers and when bored by these little creatures the timber becomes of second level quality. He asked if there was another species that I was interested in and just at that time Jim Runciman sent me an article written by John Merton on coach building. John Merton says that the 'desirable properties for a framing timber are strength, resilience/recovery, toughness, flexibility, and impact resistance'. The timber traditionally used, since Roman times he said in European coachbuilding 'is Ash (Fraxinus excelsior)'. This is the timber used by English coachbuilders and is often found in Rileys. The species is widely spread throughout Europe including the British Isles. Reading the article prompted me to consider what other species of timber could be used for cant rails.

European Ash seasons with little distortion, is easily shaped but it has significant flaws in its mechanical properties. Although light and hard, good in its impact resilience, it is susceptible to rupture (and end splitting), low in crushing strength and very susceptible to rot. in or out of the ground. By Australian standards, in regard to rot, it is a class 4 timber or about the same as radiata pine.



Above: (Bottom right of page 8) pictured is the front page of David Trunfull's remarkable book on Australian Coach built Rileys.

You can find it in the NZ Riley Car club's library: Publication NZ172: This is the link to the Library page.
https://sites.google.com/view/the-riley-cars-online-library/home

In Australia before World War 11 there was a significant coachbuilding trade the length and breadth of the country, mainly using locally-sourced indigenous hardwoods. Most cars including Rileys were locally bodied on an imported chassis. Hence the term 'Australian bodied Rileys'.

Some years ago imported timbers were used in framing Rileys in my workshop because of their superior rot resistance and flexibility. These timbers were light and hard but they have become too expensive and too difficult to source. Albert, the drophead was built in this timber.

Below: Even the facia timber was imported for Albert

So what follows are some mechanical properties of locally sourced timber that have excellent coachbuilding properties..

Species	Density	Modulus of rupture	Modulus of elasticity	Maximum crushing strength	Impact resistance	Hardness
Radiata pine	480	76	9.1	41	-	2.8
Tassy Oak	680	110	16	63	20	4.9
Ash silver	680	103	13	56	16	5.3
Rosewood	650	122	15	43	7.5	7.1
Spotted gum	950	150	23	75	24	11
Coach-wood	620	100	14	48	12	4.6

The Tassie Oak that is available in most hardware stores is most likely Victorian Mountain Ash. Silver Ash grows in NSW and in Queensland mountain areas and is very hard. Rosewood has various marketing names including Flooded Gum, Rose Gum. Coachwood is the only non-Eucalypt in the list and it is from NSW.

Australian timbers are classed into 4 durability grades, Class 1 is the most suitable for coachbuilding, untreated, in the ground or under water, class 2 and 3 timbers are suitable for outdoor use, while class 4 timbers are classified "non-durable". Most Australian timbers are in classes 2 or 3. Tasmanian oak is classified as class 3 or 4 depending on the least durable timber in the particular mix, while coachwood is classified class 4. European ash is far less durable than any of these timbers, and rates at the bottom end of class 4. I have used Rosewood for its availability, flexibility and hardness for roof timbers and sills and Queensland Mountain Ash for 'A' pillars. Recently Spotted Gum has become more available and from the chart you can see it is in the bottom end of class 1 but is much harder on cutting tools.

All of the joints in Rileys built in my workshop are pre-drilled and screwed. Stainless steel or phosphor bronze screws are sourced from wooden boat fixing suppliers. Bronze silicon nails are used and are also sourced from the wooden boat industry. Brass screws easily break but I use slotted brass screws at the base of the 'A' pillars for their looks. Mild steel or zinc or cadmium plated screws break down quickly because of the acid content in the timber and generally are hard to get out or break down in the timber. A copper naphthalene based product is available from the wooden boat fixing suppliers for extending the life of the timber but it is quite toxic. I prefer to use a boatbuilders paint as I have aspirations to continue living.

To summarise, Radiata pine and European Ash have a durability rating of a low 4, Coachwood rates as a 4 as does Tassie Oak. Rosewood and Queensland Mountain Ash rates as a 2 and Spotted Gum rates at the high end of 2 but it is hard to work and hard on tools.

Below: Nails and screws used in coachbuilding in my workshop.

Mechanical Fuel Pump Problems by Jim Runciman

I ran into a problem which I had not experienced before during the recommissioning of our '37 Falcon which we had hoped to take to the breakfast at the Floreat Café.

I was at the point where I had connected everything, primed the internal lubricating system to a point where I had seen oil pressure on the gauge so I attempted to prime the carburettors with the lower lever on the fuel pump (same as RMA and RME) however the pump was not working.

A quick test with compressed air showed the line from the tank was not blocked so off with the pump and I fitted a new kit to the pump, this comprises the valves, a new diaphragm and gaskets. I decided to test the pump before refitting to the car and it still didn't work. The pump was not drawing fuel in and holding it which his indicative of a valve problem. Richard Creed had told me there were problems with replacement valves which come with the pump kits today.

Above: the fuel pump in the Runciman's 12/4 Falcon

A quick call to Mike Wadsworth resulted in an offer of replacement pumps and used spares. I decided to try his used valves firstly and using two used valves immediately solved the problem. This is evidence of the great network which exits within the club which is invaluable particularly when we are experiencing problems.

Of interest is that the phenolic valve plate which is the moveable part of the valve is about a millimetre smaller on the current replacement units.

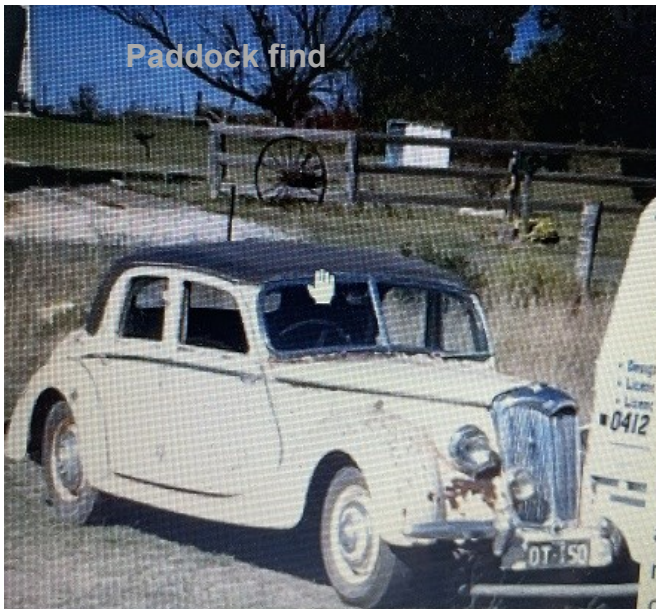
If you carry a spare fuel pump kit for long journeys it might be worthwhile checking if the valves in the kit are of the pattern which did not work for me

Above, the faulty valve is brand new.

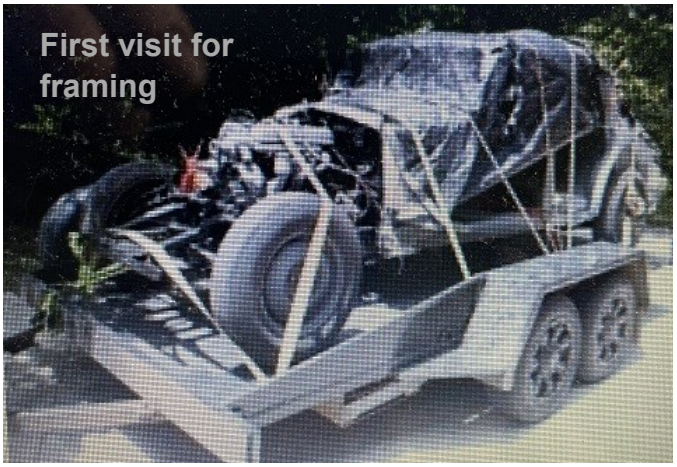
Note the difference in diameter of the circular valve plates which is the black circular item just below the valve casing

The great escape

This RMB was sighted in a Queensland paddock. His future custodian noticed him as he was driving by and liked the look of him. An inquiry was made, some money was exchanged and he was loaded on a trailer and taken home. A familiar and quite ordinary story, you might think. Well that was where ordinary became the extraordinary. The Riley had fallen into the right hands as the custodian is a builder and his father is a mechanic.



The engine and gearbox were restored. The chassis and body were sandblasted and given an undercoat of paint. The tool box and battery box was replaced and the scuttle was patched. There was not much left of the timber frame and to expediate the Riley's recovery he was sent to me for reframing and after 6 weeks he was returned home. The body was then prepared for paint with a spray putty that was applied all over the body and then blocked back to a smooth finish. Unfortunately, that was where the restoration stopped. Work became busy. Certain family issues needed to be addressed and the Riley languished in the garage. It was then that the custodian asked if I could give the Riley accommodation for a while as the custodian had to move into a new home and move the Riley from the garage where he was being restored.



The plan was to keep all of the bits together so the Riley was loaded on a trailer with all of the disassembled parts packed into the cockpit and boot. But then, on the day of the proposed transportation - as happens in Queensland - there was a 'weather event'. A cyclone had come down the coast, a very heavy rain depression arrived on the southeast coast. I remember telephoning the custodian to suggest that he avoid Cunninghams Gap. Too late. In a flood of rain the Ute and trailer were washed down the highway to the Lockyer Valley. After a few hours, the vehicles arrived in heavy rain. It was dangerous to unload as everything was soaked. I wanted to wait for the rain to subside. The custodian had other plans for the afternoon. While I watched from the dry of the garage, the custodian removed his shirt and dived out into the deluge and disembarked the Riley singlehandedly. I wasn't being mean, just sensible. At the end of the event the custodian was invited to take a hot shower and get dry and then he drove off to another appointment in the continuing deluge. I shake my head at youth.

Below: The outcomes of thin undercoat after a drenching—the chassis rust.

And under the glove compartment

And on the roof

The Riley was partially unloaded and left to dry. It took 6 weeks to dry off as the humidity didn't drop below 70 % for the next weeks. That was enough time for mould and surface rust to appear everywhere except where the outside of the body had been prepared for paint. Unfortunately only the thinnest undercoat had been applied to the chassis and body. The floor panels, perforated roof, the interior of the tub and the scuttle was all rust coloured. The parts that could rust didn't disappoint. That represented a lot of work lost to the elements. I agreed to seal the body, arrange for the seats and door cards to be upholstered and put the vinyl roof on. It was all about getting another Riley back onto the road.

The rear seat base, the footwell assembly and the front floor panels needed to be removed to treat the rust. The rust was cleaned off the chassis as was some remains of grease and dirt and the chassis was painted with a KBS product called *Rustseal*. The pedals, handbrake and timber facia on the glove compartment were removed. After that the slow process of removing the surface rust from the interior of the boot, spare wheel well, interior and exterior surfaces of the roof, the spaces around the driver's pedals and passenger side of the scuttle and tool and battery box were cleaned. The external panels were taped and covered with paper and after that the bare surfaces were etch primed and painted a gloss black including the interior surface of the spare wheel well and roof.

Above: Boot floor and roof finished

After a few days the tape and paper were removed from the Riley. That was a good moment as it meant that the body was back to the condition that it was in prior to the wetting it received on the way to Maleny.

After that the areas that had been prepared for paint were cleaned of grime and dust.

The body was then smoothed with 800 grade

wet and dry. This activity picked up some small scratches and minor imperfections in the spray putty. These were repaired then the areas painted black were covered with paper and taped. The paint chosen was a cream acrylic and this was applied during the balance of the day. One of the issues with acrylic paint is that the humidity level needs to be below 60% but that is the minimum, a more comfortable humidity level is around 40% on a warm day. That is not often experienced in South eastern Queensland and often a good painting day is followed by a rainy day. So painting in acrylics is a bit of a trick.

Above: The tub painted

Tear down of an RMC

De-nailing is a slow and tedious activity but fairly essential if you want the sills, door jambs and scuttle to come apart intact. There are perhaps a thousand nails in an average RMC – no kidding. They are usually an inch long and if you are lucky they have rusted away. If not, a petite sharp nosed cold chisel can be used to raise the head and a round nosed de-nailer tool can be used to extract them. Not all nails are cooperative so some of the heads pop off during surgery. But after scouring the joints for nails an LPG torch is used to melt the lead and the sharp nosed cold chisel or a screw driver that you don't mind destroying can be used to lever the door jamb from the sill. In this RMCs case there was a fair bit of bog overlaying the joints and filling in the airgaps caused by the jambs rotting away to nothing. There was no timber left in the lower parts of the RMC so no nail extraction was necessary. However there was a new section of sill bronzed into the passenger side and on the driver's side a corner piece had been welded into the door jamb at the 'B' pillar to steady it as the timber had rotted away.

(Just a little aside; have you ever wondered what quality of timber was used to build these Rileys? And have you wondered what kind of protection was given to the timber against the elements? The answer to the first question is anything that Nuffield could lay their hands on. It was post war and although I originally thought it was all English Ash, it is not true. I have even found some interesting Eucalypt timber in an RMB. The answer to the second question is none. There was no protective oils or paint to seal the timber – not even on the ends, there is only a thin piece of calico cloth

Scuttle skin removed

When de-nailing was thought to be complete the scuttle was shuffled backwards, and forwards and a few elusive nails came to light. These were removed and the scuttle came off intact. The RMC scuttle is the same as other RMs but it is also different from them. The first obvious difference is that the sills are welded to the scuttle. They come off as one piece. The other obvious thing is the shape. It is very different. But the technology is the same. There is the timber frame. There is the hundreds of nails. There is the lead wiping. There is the failure to consider the crazy 21st century people who want to restore their Rileys and have denailed, melting off the lead joints, and most importantly re- producing the complex shapes that make up the timber frame. It was very inconsiderate of Nuffield to not consider the following generations of enthusiasts. But I should not be critical. Nobody wants to restore a 21st century bubble car. On the other hand, Rileys have retained their glamour and I have no doubt will continue to do so long after the current custodians have passed away.

Above: The scuttle with the 'A' pillar sort of intact

When the scuttle skin was freed attention was paid to the tub. Apart from extracting the other half of the thousand nails and screws there was the innovations made by the previous custodian. Not having the timber tools or skills required, an aluminium surround was thoughtfully and skilfully made to imitate the shape of the timber that was originally used to fix the rear of the hood. It was fixed into place with large aluminium pop rivets, necessitating a number of drilled holes into the timber below the scuttle ridge. It took a little while to dis-assemble but that done then attention was given to the rubber seal around the boot lid. This also was an innovative reproduction. The rubber was fixed into position with a steel strip and this was fixed into the tub with screws that had rusted away into immovable oxidised spears. After some experimentation it was found that they could be removed with the nail extractor tool. Like the scuttle, the tub was shuffled backwards and forwards and once again a few nails came to light that needed to be removed and then the tub skin came free.

I have never seen the prototype aluminium skinned roadster but after that a steel skinned roadster was built that had the distinctive tabs around the top edge of the tub. It is like that of the RMB and the rear corners and timber framed rear window are screwed to them. This specimen appears to be the last of the roadster evolutions and it was built with a timber edge around the top of the tub to anchor the hood. A couple of years ago I made one of these for Ian Henderson who is a member of the RMCQ. I still have some pictures of it. But having torn down the roadster to its inner structure some photos were taken of the remains of the timber frame. They may be of interest to you.

The door cards were removed after that and so was the timber frame for the boot lid and the tear down was complete.

Above: Sandblasted battery box

Above: One of the door jambs has extra steel welded into it to compensate for the lack of timber

The next step for this roady was sandblasting and a sealing paint prior to lots of welding new sections into the inner frames and the skins. At the time of publishing this article the metal parts have been returned from the sandblaster and the entertaining task of patching has begun.

Opposite: the base of the tub after sandblasting

Notice the heavier ‘A’ pillar and the large rib timber that the boot hinges are attached to. The replacements will be painted with a water based sealer, then painted with marine varnish and then covered again with an oil based paint. The timber ends will be soaked in the sealer paint.

Above: The large rib timber assembly. It goes over the top of the Riley in front of the boot

A last comment about the original timber frame. No two are exactly the same. I am sure that you are surprised about this, but it is true. Different teams of tradies put these Rileys together and of particular interest on this Riley is the driver’s side ‘A’ pillar. It was fitted a little too far forward on the chassis and to compensate a piece of three ply was nailed on to the back edge to bulk out the door jamb. They say a picture is worth a thousand words.

The final step in the tear down was removing the timber from the inner frame. The scuttle skin was off and the tub skin was off. The work was commenced starting from the rear. The timbers that ran along the sides from the top timber of the quarter panel through the side of the boot lid and down to the bottom of the tub were unscrewed, de-nailed and removed. After that the same thing was done on the passenger side and the rib above the boot lid was taken off. That left the inner steel frame sitting on the chassis.

Above: They say beauty is in the eye of the beholder—this frame is beautiful.

At the front end the nose timbers are very similar to other RMs. The nuts were cut through the centre with a narrow cutting off disk and this removed as one piece. The timbers that run along the top of the scuttle in the cockpit were next. To facilitate this a Dremel cut off blade was used to open the screw driver slots and they were removed with a large screw driver. This came off easily. The ‘A’ pillars were next and then the side timbers. The facia timbers almost fell off the scuttle when the bolts that retain the two rods to the radiator were removed. A pair of welding gloves were loaned to be bride and she helped me to lift off the inner steel scuttle frame and the inner steel frame for the tub.

QUEENSLAND BEARINGS & INDUSTRIAL SUPPLIES

Make yourself known, show your club ID or magazine when in the shop.

Contact Us

Call Brian

Phone 07 3265 3622

Fax 07 3465 7077

Email: sales@queenslandbearings.com.au

Website: www.queenslandbearings.com.au

Address: 2/260 Zillmere Road
Zillmere. Brisbane Qld 4034

Postal: PO Box 185
ZILLMERE Qld 4034

For Hard to Get Bearings

also

Oil seals, Chains & Sprocket and Vee Belts etc.

RHP bearings

Koyo

HYATT®
Div. General Bearing Corporation

Oil Seals
Seagull

TIMKEN

K.C.M.®
Japanese Roller Chain

inox®

NACHI

RMB gearbox – an easy rebuild – maybe.

A fellow Riley enthusiast asked if I would check his gearbox before he fitted it into his Riley. He had been working on the restoration for about a year by that time. No worries I said. But things being what they are it took a few months before I got to it.

Don't believe everything that is written in the workshop manual. True, the procedure is always correct. But disassembly is not always as easy as is described. Nuffield gearboxes are very robust but after 70 years they have years of caked on grime. The heated oil, the grime and the sludge in many boxes glues everything into position or makes removal from their working position difficult. The Nuffield boxes can be very difficult to disassemble, and patience and gentle persuasion is necessary. Sometimes the gear selector assemblies are difficult to free from the selector rods. The layshaft can be difficult to push through the box because of sticky grime. The bearings can seem impossible to move and CRC or equivalent can be a necessary solvent to break down the built up grime. But it can be done. In the case of the gearbox on my workbench everything that could be difficult was.

Above: a cleaned and rebuild gearbox

I am so glad that years ago a gearbox sump plug was bored out, threaded and a threaded post made to support a box when being worked on. The same has been done for the Riley 9 box but it has only been used once where the RM post has been used 6 times. A flat plate had a tube welded to it and the post fits neatly into the tube allowing the box to be rotated as it is disassembled and re-assembled.

Above: The post is threaded into an RM sump plug and the tube the post fits into is welded to a plate that sits on the bench.

Another tool that has made life much easier is a dummy layshaft. It has been employed an equal amount of times without incident. In this particular case it was no different. The dummy shaft pushed out the layshaft from the box without any issue. But like most layshafts in RMs it was worn past its life.

Grime had built up between the working parts of the selector rods and the gear box casing. Copious amounts of CRC was used to soften the glue but they did come out. The reverse assembly gear was next to come out and then attention was paid to the gear cluster. It didn't want to move. Despite a serious amount of CRC it was still obstinate. Taping on the other end of the gear cluster made no difference. A brass drift against the outer base of the roller bearing made a tiny difference but it was negligible. After a little time out the drift was utilised again with a smidgen of movement. More CRC was employed and after an hour of taping enough bearing emerged to expose a gap behind the circlip. This allowed a pair of screw drivers to be employed to prise the bearing forward. After that tools that had curved ends made to remove hub caps were employed and after a mammoth two hours the bearing came free.

Above: The gear cluster

It would be nice to say that the bearing on the other end of the gear cluster was easier, but it wasn't. It required equal tenacity to remove it. But eventually the two parts of the gear cluster were lifted out of the box. The lay cluster came out easily. Then the needle bearings were measured, surprisingly they were all 3/16th in diameter – negligible wear. The thrust bearings were equally intact.

After that all of the parts were cleaned. It amazes me the amount a crud (a technical word for built up sediment) that builds up in the bottom of a gearbox, but it does. This was cleaned out with petrol, then washed out with water and then cleaned again with fresh fuel. The components were all cleaned of built up grime and that was the end of the first day,

Re-assembly started out with much less fuss. The lay cluster was refitted with needle bearings and thrust bearings and lowered into the box. The larger part of the gear cluster was lowered into the box with great care to not allow any springs and ball bearings to escape from second gear and the smaller end piece was refitted with needle bearings and the two halves fitted together. The bearings were then pushed into place with a lot of oil to facilitate their movement, but it was difficult to get the bearings into place. That done the box was turned upside down so that the thrust bearings on the lay cluster would fall into position. That is what they usually did on previous rebuilds and in this case the same was expected, but it did not happen. The lay shaft refused to fall into position. After much fiddling it did approximate the correct position but the gear cluster jammed. After much more fiddling it was decided to dis-assemble and retry. By the middle of the afternoon the assembly was refitted and the dear cluster worked in unison with the lay cluster and all was well with the world.

Layshaft

The selector shafts fitted easily since all of the crud had been removed and then the end cover fitted with its speedometer gear, the end piece fitted up without difficulty and a top cover was fitted to seal off the unit from dust. Happy days.