



BMC-Leyland Australia Heritage Group Inc.

www.bmclaheritage.org.au

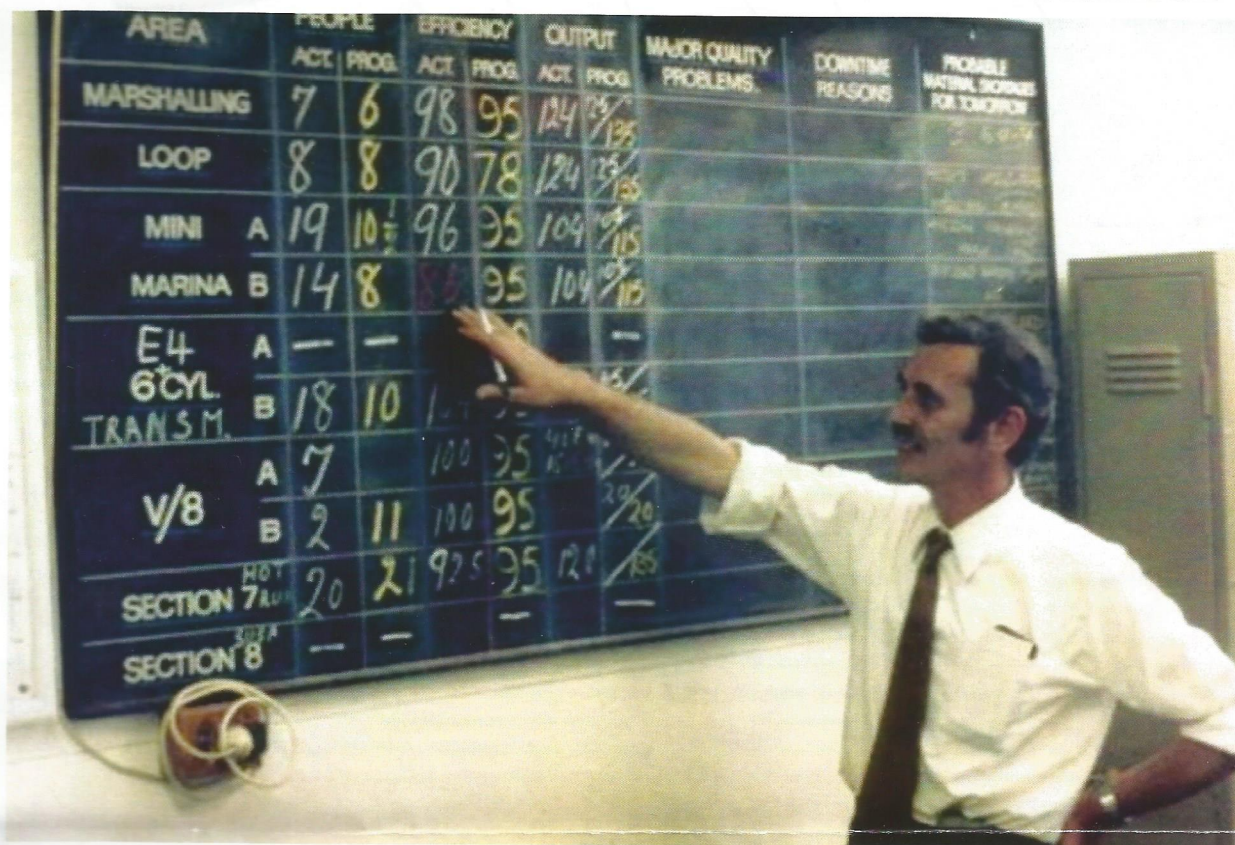
A non-profit association of some hundreds of former employees and interested persons whose mission is to preserve the heritage of BMC-Leyland Australia and its associated companies as a significant part of Australia's automotive manufacturing history.

Issue Number 59

NEWSLETTER October 2015

Focus on JRA's PMC 160 Commuter Bus

Read the summary of Terry McDermott's Presentation at the Group's September Luncheon Reunion inside



Above: Rod Downs provided this photo of foreman John Horney pointing at a RED entry on the "Production Performance" board for Power Unit Assembly in the Unit Plant at VP. Such negative exceptions were reviewed in routine meetings to identify "Causal Factors" and corrective action taken. Read the detailed report inside.

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Editor's Comment

At the P76 40th anniversary celebration dinner in Canberra in June 2013, I spoke about the almost complete absence of any computer assistance in either that product or its manufacture. One example I gave was about the product itself. I said:

"Looking firstly at the product:

- As P76 was being designed, man landed on the moon in a craft with the computing power of an early PC;*
- Later, the space shuttle flew with computers having half a million lines of code;*
- Today's airliners have 5 to 6 million lines of computer code; and*
- Today's top level luxury cars have nearly 100 millions lines of computer code.*
- P76 and cars of its day had not one line of code."*

Similar developments have occurred in all aspects of the design, drafting, analysis and manufacturing phases of vehicle manufacture since the early 1970s.

As an indication of the starting point of computer aided drafting (CAD), I witnessed the first trials of the technology applied to smoothing body skin surfaces at Pressed Steel in UK in 1973.

At last month's luncheon reunion Terry McDermott showed us how far CAD and CAE had progressed by the mid 1980s when he was applying them to the engineering of JRA's commuter bus - the PMC160.

A summary of his presentation - a valuable contribution to the history of our companies is on page 3

President's Report

The September Reunion Lunch was a great success with 93 attendees - after 10 late cancellations. Tony Cripps spoke on the 50th anniversary of the Austin 1800 and Terry McDermott gave a most interesting presentation on Bus development - see the detailed coverage later in this newsletter. The Group's new reference book, BMC-Leyland Australia Vehicle Reference, was launched and 21 copies were sold on the day.

This year Kay de Luca had arranged for a larger room providing space for members to mingle before lunch. The full table service meal made the day less rushed. The function was held on a Saturday which allowed several first-time members to attend. Your committee intends to retain these changes for 2016 and would welcome members' comments.

Will Hagon was his usual mellifluous self as MC and conducted an amusing auction at the end of the function. There was even a brief celebration of Barry Anderson's 80th and Kay De Luca's 70th - with a cake

supplied by Kay. As always, Roger arranged a terrific roof top display of some of the company's products.

Speaking of the cars, there have been two recent TV commercials featuring BMC/Leyland products which you may have seen. One features a red Mini Moke on a newspaper paper run while the other, a Tooheys' commercial, has a P76 Targa Florio. If you haven't seen the Tooheys' advert you will find it here: www.youtube.com/watch?v=o-umyq76gJM. If that is not enough on the British TV show, The Classic Car Show (shown locally on SBS), there is a segment in which they talk about classics and their value. In a recent episode they featured the English Mini 1275GT but the background vision used was the Australian TV commercial featuring a Mini driving around the Bathurst circuit. That commercial is here: www.youtube.com/watch?v=mnwVhKKkZg4.

As this is the last newsletter of the year let me take this opportunity to wish you and your family a safe and happy Christmas and New Year.

Greg Kean, President

The Fulford Diary - Part 4

It's Tuesday the 19th December, 1963, and only a few days until Christmas, but Reg Fulford is hard at work at Longbridge looking into the hydrolastic suspension for ADO16.

The Tecalemit pump is causing Reg some concern. Reg says *"The Tecalamit unit looks very expensive and the old homemade BMC one very crude and not fool proof. Our little country dealers don't like having to buy expensive new equipment like this, but they will have to have it. Maybe we can design a cheap version. Don't fully understand how it all works yet"*.

Reg reports: *"Discussed various problems with the Research section. I can't quite see how suspension faults can easily be detected and analysed. These people are extremely confident that there won't be any production variations to cause them trouble in the field. There is no method of testing the valving when the displacer is assembled and no thought has been given to detecting imperfect valve operation in an assembled and sealed displacer. I still can't see how an inspector on the line or even a dealer will notice even if the valve is not working at all until the customer complains about poor ride - if he ever does"*.

It so happened that Cyril Hodgkins was in hospital at this time and as a result, no one could tell Reg exactly what valve setting had been selected for production. Reg's notes are very clear here and it is worth quoting verbatim.

"So far as I can determine, there have not been many different rubber combinations tried as the displacers are extremely difficult to make experimentally. I didn't seem to be able to make much progress in this direction.

One of the design requirements is that the front and rear displacers are interchangeable for service reasons. The original design was also made so that dry cones could be resorted to at the last moment if great difficulties were experienced with the hydroelastic. This has gone by the board, but there is still a prototype ADO16 fitted with dry cones under a cover in the corner.

Work is being done at the moment on a hydroelastic suspension on ADO15. No sign of ADO17 anywhere."

This is Christmas 1963, and the Austin 1800 (ADO17) is due for release in August 1964 - but it surprised Reg that there was no sign of the car in the suspension section at this time.

As far as the effect of the interconnected front and rear displacers, Reg doesn't appear to be very impressed. "Interaction front to rear is influenced mainly by pipe size. Numerous sizes tried and 7/16 bore finally selected. I'm not too sure just what effect this has, but presumably alters the flatness at low speeds. Numerous curves of pressures on either side of the valve plate and wheel displacements both front and rear have been recorded simultaneously on a time base of $6 \frac{1}{2}'' = 1$ sec were taken with electronic equipment with the car running over various bumps at speeds from 10 to 40 mph. No one seems to understand them very well, but a couple of points were noticeable. At speeds after about 20 mph there doesn't seem to be any increase in pressure in the rear displacer corresponding with increase in pressure in the front one (i.e. no interconnection). Rear displacer pressure does not rise till the rear wheel rises. It would appear from this that the interconnection only occurs at the low wheel displacer speed - from the curves it looked like up to 1 or 2 cycles per sec. At 3 cps there did not appear to be any interconnection. I suppose this is desirable anyway."

By the last working day of the year, Thursday the 21st, Reg has collected a full set of Design Criticisms and is working through which ones have been addressed and written off. He says, "It looks as if our next job will be to go through all of these outstanding DC's with the designers and get them to provide an answer, then take this to Jack Whitehead and get his approval to write it off. This will be the only way to clarify the position on outstanding

problems. Jack Whitehead pointed out that we should also go carefully through the closed DC's as in many cases the Design Section have accepted conditions which may be unsatisfactory for us. If we can get these DC's brought up to date, they will be an extremely valuable reference to take home."

Reg has a week's break, but is back on the job again Thursday the 28th December and we will pick up the story next issue when he investigates the muffler and radiator for ADO16.

Tony Cripps

Terry McDermott on JRA's PMC160

Terry McDermott worked with our companies for 20 years from 1970. With the Car Division until 1976 he was then Group Engineer - Leyland Trucks until 1983. He then took on the PMC160 project - an all new "Urban Commuter" bus body to suit a wide range of bus chassis - in 1984.

New computer design facilities using Finite Element Analysis (FEA) and Computer Aided Design (CAD) were installed at PMC Sydney and computer links established to JRA's facilities at other geographic locations.



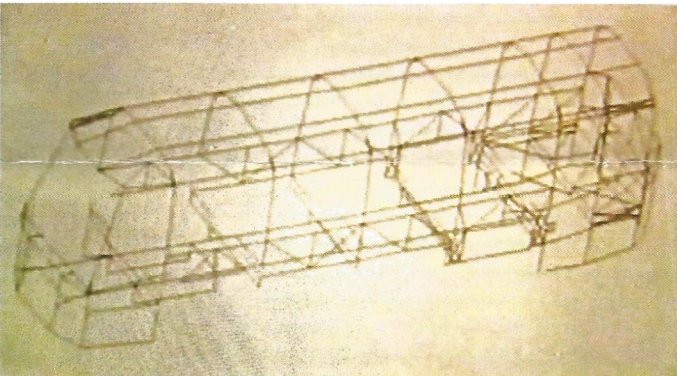
The first prototype was built at PMC Sydney, Denning managed the test program and PMC Adelaide built the first production bodies.

The object of the program covering 1984 to 1990, and expenditure of \$10 million (\$87 million today) was to use innovative design and manufacturing to achieve a mass reduction of 160 kg (hence the project name), increased structure life and world first compliance with new roll-over standards. This latter was prompted by two very serious bus crashes in NSW around that time.

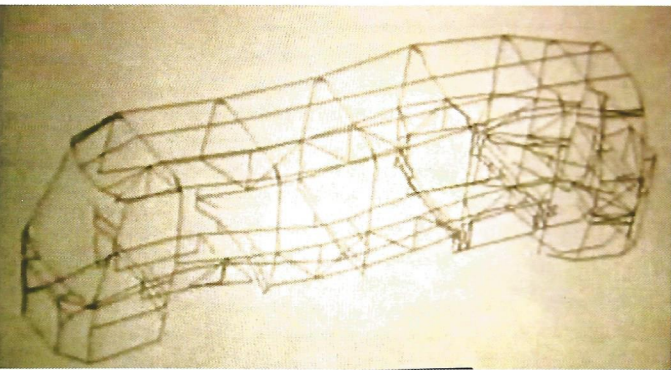
The 3-D CAD software by Computervision was used for much of the design, including the development of the world first plastic bumper for a commercial vehicle - the largest RIM moulded polyurethane component at the time. The technology was first used on passenger cars - Peugeot 505 and XD Falcon.



Above: A tenth scale model was built and passed to other plants to keep all divisions informed.



Above and below: Images from the FEA structural model in unloaded and loaded configurations. The non-linear program allows stress levels to be assessed numerically and deflections to be displayed visually.



Other advances were computer controlled tube bending for the one piece body hoops - significantly stronger - and the elimination of rivets to secure the external panels - giving vastly superior corrosion resistance and smooth external surfaces.

The bonded construction for the external panels is also vastly stronger than traditional riveting but was new territory in the 1980s. PMC spent 18 months developing and proving the technology in the laboratory before building the first prototype. That PMC160s are still operating over 30 years later shows that all these advances were well executed.



Above and below: Accelerated structural testing was conducted around Bourke in NSW over a 17 week period with 63000 km of testing at maximum weight. The test vehicle and a reference vehicle were run in parallel, both being instrumented with transducers and 14 channel FM recorder. With subsequent testing, a total of 300,000 km were logged.



When the road test program was complete, the prototype was subjected to a roll-over test in accordance with the then proposed ADR 59. The following photographs are three frames from the records of that test.



Above and over page: Three images of the PMC160 bus roll-over test to Australian Design Rule (ADR) 59. The lower image over page shows the bus post test.



The PMC160 was the first bus in the world to be homologated to any roll-over standard. That the windscreen is still in place is testimony to structural strength of the body with its bonded construction.

Barry Anderson - from Terry Mcdermott's Data

"Production Performance Board - Unit Plant"

Prompted by the photo of the "Production Control Board" in the July 2015 Newsletter, Rod Downs unearthed the colour photo on Page 1 and provided the following background.

The "Areas": Performance was measured daily in:

- **Marshalling:** Roller track where stores materials were selected for each power unit & placed in baskets then sequenced to feed into the assembly lines to meet up with the required engine/transmission unit;
- **Loop:** Area at the end in the assembly lines where power unit were spray painted then items such as carburettors, distributors, coils etc were fitted before passing through to the Hot Run for testing;
- **Mini, Marina, E4 & E6, Transmission & V8:** The assembly lines for the different types of power units produced; and
- **Sections 7 & 8** were the Hot Run and Suspension assembly respectively.

"People": No of workers - actual vs required.

"Efficiency": Achieved and Target figures.

"Output": Actual vs Program:

"Major Quality Problems", "Downtime Reasons" & "Probable Material Shortages for Tomorrow": All used to identify problems that required attention.

Rod writes: "In Production Management you are only as good as today's production figures. Valid reasons for lost production are soon forgotten, so I learnt the value of a "graphic" display to show the effect of conditions such as No Materials, or Plant Breakdown etc., on production output. This high-lights the immediate action needed and the issues to be eliminated in the future.

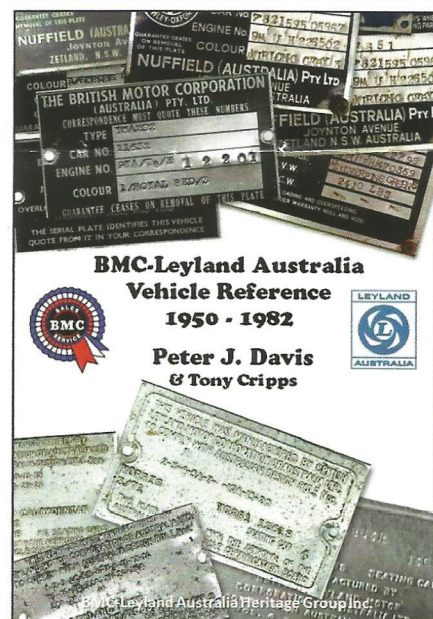
Graphs of this data showed trends and anomalies. The peaks & troughs were very pronounced, dramatic really, & my notations against the troughs were very effective, and saved me many a time.!!!"

Rod also wrote of the introduction of "Worker Participation" program to mirror what Volvo were doing in Sweden. His plant - the Engine, Transmission & Suspension Assembly Plant within the Unit Plant was selected as the test site for Victoria Park.

The program was controversial but worked well for Rod. The board shown in the page 1 photo was one outcome. Figures were originally calculated weekly by Work Study but the program changes - with daily meetings - encouraged leading hands to show their sections' figures on a board in the factory for all to see. This resulted in completion between sections, improved efficiency & morale.

This subject is potentially a future story in itself.

New Reference Book from Peter Davis



Refer text overpage

This new Heritage Group book, released at the 2015 September luncheon reunion is the result of many years of research by Peter Davis, former Administration Manager - Product Engineering and presents the best available data for the identification of BMC-Leyland Passenger Vehicles and Derivatives manufactured at the Victoria Park and Enfield plants between 1950 to 1982. While primarily a reference book, concerned with identification codes for information stamped into identification and compliance plates, it also presents a historical summary of all the models produced, and a cross reference to the power units fitted to the vehicles throughout the years.

Over the past two years, the Group's archivist, Tony Cripps has turned Peter's voluminous hand-written notes into a hard cover publication. The book provides an excellent record of the products and answers a need for information by owners and car clubs.

40 sale copies were initially printed and the launch saw 21 being sold. 7 remain for sale and a second print run will probably be made. *Tony Cripps*

Vehicle Emissions Testing at Victoria Park

Readers may remember a report in the October 2010 issue about the ex-Leyland Vehicle Emissions Laboratory. With the current furore around the situation with VW, it is perhaps timely to remember the expertise that used to exist at Victoria Park.

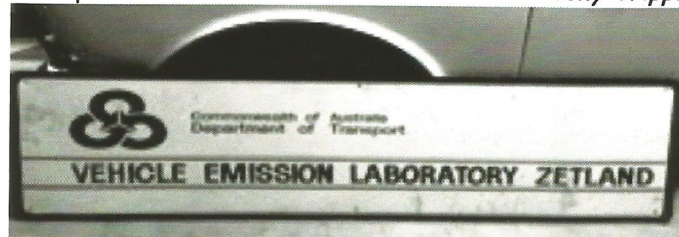
The control of pollution from motor vehicles rose to prominence in the United States in the early 1970's. Much of Australia's Australian Design Rules in this area (in particular ADR27A etc) and those that followed in the late 70's and onwards) were modeled closely on the standards developed by the Americans.

Leyland had a fully equipped emissions laboratory at Waterloo. This was Asset 17, adjacent to the Experimental yard. Just before closure of the VP factory, a new emissions laboratory was set up at Engineering Services at Moorebank to handle the increased activity in this area.

After the closure, both laboratories (VP and Moorebank) continued in operation although it was not widely known that the VP laboratory was still going because ownership of it passed to the Commonwealth Department of Transport. Ken Haw (ex VP Experimental Engineer) must have convinced the Department that the Waterloo laboratory was still viable and he left Leyland and carried on with hired technical staff from a newly-formed consultancy firm, EmTech & Associated, headed by

Mike Kimberlee who operated from an office in Liverpool.

Tony Cripps



Above: A sign in the VP emissions lab in the late 1970s

2015 AGM

The 2015 AGM was held on 13 August 2015 at the Ryde Eastwood Leagues Club. All existing office bearers and committee members offered themselves for re-election and, there being no other nominations, all were re-elected. The secretary reported that current financial member numbers were 114 individual and 13 car club. Income to 30 June 2015 was \$14675.70 with expenses \$12049.80.

October 2015 Committee Meeting

This meeting was held on 15 Oct. Minutes include:

- A member has requested a digital copy of a large batch of material that the Group has lodged with the city of Sydney Archives. The committee reviewed the implications of this request and determined that the Group's policy for the release of copies of archival material will, from now on, be:

"Archived Material:

Group archival material is stored in the public domain via the City of Sydney Archives. This material may be accessed from that organization by the public and used at their own risk.

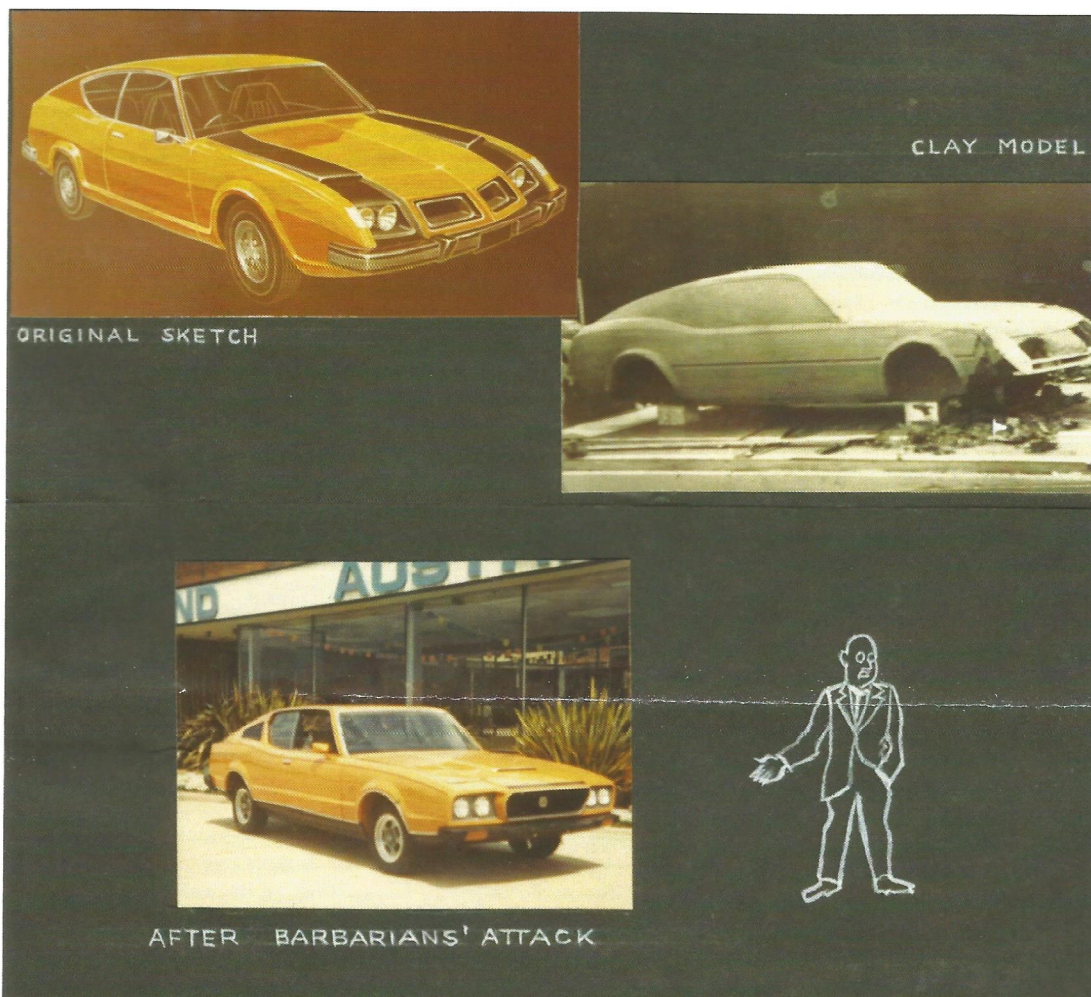
Selected imaged archive material is available on the Group's web site for members' use and enjoyment for non-profit purposes. Copies of these images may be downloaded by members.

In no circumstances may any material that might be able to be used for the manufacture of components be released directly to any parties."

- Chris Rogers has donated a shield that was awarded at Victoria Park on a monthly basis to company departments on a performance basis. The committee is yet to decide its future and members' suggestions would be welcome.

Leyland Force 7 - A Designers Comment

The archive project has unearthed these small photos and sketches on the page opposite. It is not clear whether they were prepared by Romand Rodbergh or Markello (Mark) Cassarchis but it reflects one designer's opinion of another's work.



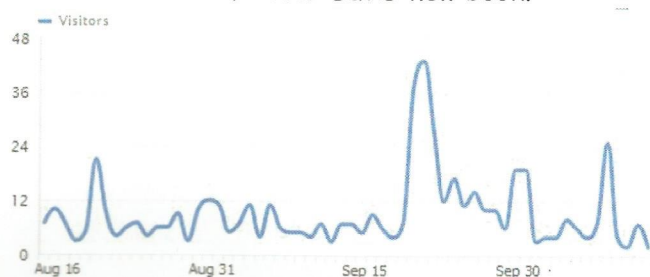
Left Upper: The designer's ideas in both sketch and partially complete clay model forms.

Left Lower: A photo of the production design in its final form.

If any reader can shed light on the origins of these images, please contact the editor.

Website Visitor Numbers

Below is the latest record of daily visitor numbers for August to mid October 2015. The peak coincided with the release of Peter Davis' new book.



Heritage Group Merchandise.

Our expanding range of merchandise is available wherever the Group meets or holds a display stand and by mail. For sales and enquiries, contact Roger Foy (02) 9449 1524, email rogerfoy1@bigpond.com

Heritage Group DVDs. Our DVDs present three of BMC-Ls promo films - "The Carmakers", "Horses to Horsepower", and "Austin Freeway Around Australia in 9½ Days" -the latter two films incorporated in one DVD. **Member Price:** \$20 each + postage \$3.

Original Heritage Group CD. This CD, first sold in 2003 - and at its 3rd imprint, has Powerpoint Presentations, many images and reports and stories about the Group. **Member Price:** \$20 + postage.

"Building Cars in Australia" Book: Of the run of 1050 copies, 30 books are left. Some of these, signed by the book team are now available. **Member Price:** \$40 each (unsigned), \$45 (signed) + postage.

"P76 - The Inside Story" Book (2nd Edit).

"Anyone who owns a P76 or is interested in the P76 should read this book....."-Tony De Luca. **Member Price:** \$20; + postage

BMC-Leyland Australia - Vehicle Reference 1950 - 1982

This definitive reference book for vehicle identification. 7 copies in stock. List Price \$85, **Member Price:** \$45 (limit 1 per member) + postage.

Upcoming Events

4 December 2015: Doncaster Reunion, Doncaster Hotel Kensington from 4 PM

21 January 2016: BMCLAHG Committee Meeting

31 January 2016: Newsletter #60 in Post

14 April 2016: BMCLAHG Committee Meeting

15 May 2016: National Motoring Heritage Day: Sydney Harbour National Park Georges Hts; Museum of Fire Penrith & Berry South Coast; & Motor Life Museum Kembla Grange.

Motor Sport Update -Spring 2015

I've often been asked from which country it would be best to buy and import an MG, Triumph or any other British sports car or saloon. My answer has always been, right here in Australia. Only when some rare model is sought is it worth looking elsewhere.

I'm astonished at the prices original cars are commanding in the UK and in most cases those cars are riddled with rust. For this reason British Heritage began producing, in UK, complete bodies and chassis - originally MGB's but then Minis, Triumphs and hard to get panels for Jaguars. These reproductions are of good - virtually hand made on original tooling etc. But how does this affect original cars now being sort after worldwide? There is an abundance of original cars here now, with the low Australian dollar, some Australian classic car dealers are exporting home market cars back overseas.

The market for competition cars is even more interesting. How do you value, for instance, ex/works Mini Cooper which has been rebodied several times?

Strict Confederation of Australian Motor Sport rules against rebirthing competition cars require that Group A - Bathurst cars raced in the second half of the 1980's - retain their original shell (being monocoque that includes and body and platform). But many of these cars were abandoned (with the introduction of V8 Supercar category) and were stored awaiting eligibility for historic racing - many suffering corrosion throughout the shell. Choosing to use a donor shell in these cases might be the right thing for safety reasons, but the car with the original shell is always going to be the most valuable.

As far as I know, only one ex-Abingdon works Mini Cooper remained in our region well after the car was competitive. However, it was written off in a rally in New Zealand and rebodied, as were so many of the ex-Abingdon works cars in the UK. When this car went up for sale there was very little interest here but it was snapped up by an enthusiast in the UK.

It seems the most important item on an original car is the chassis plate. In our new Heritage Group book released here in September, author Peter Davis has recorded, with photos, the amazing amount of research he has carried out on identification and compliance plates for BMC/Leyland cars produced in this country. This I find fascinating.

With competition cars in Australia, another important item is the CAMS log book supplied to all cars racing in this country. It is really astounding that these log books don't exist in Europe and the UK, so

there is no record of events in which a competition car competed if raced outside these shores. Also, as no record of engine numbers and specifications are kept, the competitor turns up at a race meeting with a manual of the regulations and scrutineering check the cars conformity, and off they go.

One downside of the internet has been the loss of advertisements for cars in the newspapers. Since I was very young I used to scour Saturdays Sydney Morning Herald and cut out advertisements for interesting cars. While there were virtually no restored cars for sale back then, what a plethora of interesting cars were available. A 1950s example:

Jaguar 3.8 Saloon. Carmen red duco, wire wheels . One owner. 2700 genuine miles. Disc brakes and overdrive, adjustable shocks, special full factory D-Type motor with triple D45DC03 Weber carbs, air horns, close ratio gearbox and lock diff and spare diff and axles. Two complete exhaust systems . Factory racing clutch . 5 new racing tyres cost 150 pounds and six RS5. Velvet seat covers, safety belts and host of other spares. Timed at 134.34 mph but could do 140 mph. Just fully reconditioned throughout and sold with new car warranty. Without doubt the fastest 3.8 in Australia. The car is docile and could be used for normal road use Standing quarter 15.68. PRICE 3500 Pounds. Will trade

Ron Hodgson Strathfield Motors. Phone UJ8000.

Rob Harrison.

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