

# Rolls-Royce Owners' Club of Australia Library

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*Jeanne Eve and John Matheson with SVF159 in Peking to Paris trim. Photo by Eloise Matheson.*

## Preparing a Phantom V for the Peking to Paris Motor Challenge

*By John Matheson, 1997*

There were several challenges in preparing the Phantom V for a long-distance motor rally. They included doubtful roads, high altitude driving and low octane fuel. We were told by the rally organism that we would need at least eight-inch road clearance for creek crossings in Nepal and for broken roads in Tibet. We would need strengthened suspension for the corrugated roads in Western China and we would need to prepare the car for 70 octane unleaded, the only petrol that would be available in China and Tibet. All of these parameters produced their own difficulties, and we have set about a programme over two years to try and deal with these problems.

Our own criteria were that the car should be altered as little as possible and should be left in a state so that it could be returned to pristine condition at the end of the rally. We have no intention of seeing this car destroyed or even damaged. All of the modifications made to the car are reversible but some of the modifications have so improved the car that they will not be altered, and I will come to this later on.



Being a former Vice-Regal car, SVF159 is equipped with three detachable flag-masts — one behind the Spirit of Ecstasy and one on each front wing. Here the Australian, Chinese and French flags are displayed.

### The Engine

Fortunately, this is a 6.2 litre V-8 engine of good design with high quality parts. It already has hardened valve seats and high-quality component pistons so the problems with pre-ignition and poor-quality fuel would be less in this car than other makes of lesser breed. This car has only done 72,000 miles and there is no evidence of any mechanical dysfunction in the car and therefore a decision was made that no modifications would be made internally to the mechanical structures, and we would go au naturel from that point of view. This particular car was supplied with the so-called colonial kit and thus the engine compression ratio is 8:1 and not 9:1 as in the home market Phantom V. This has made some of the adaptations for a low octane fuel easier. The rally organism had recommended a maximum compression ratio of 7.5:1 but we have decided to run with the 8:1 compression ratio unaltered. Even though it is possible to change the head gaskets and lower the compression ratio we felt that this might produce more harm than good in the end. The only modifications we have carried out to the engine is to put a fuel catalyst on the end of the fuel line in the hope that this will speed the ignition of the fuel by polarising the fuel and giving us less preignition. Whether these devices work or not is doubtful. This particular one is the best recommended one and contains a tube with five different metals in it. It is supposed to release a little bit of copper into the fuel and to polarise the fuel line. Certainly, when we put the device in there was an instant drop in the CO<sub>2</sub> exhaust compression reading so it may be having some effect. The other method of catering to the poor fuel condition is that we will take fuel octane enhancers with us. This again only goes part of the way to solving the problem and provides about half the effect of tetraethyl lead. From the point of view of this car with its low revving engine and hardened valve seats the issue for us is more of low octane rather than my worry about damage to valve seats. We will be carrying with us larger needles for the two S.U. carburettors so that when we go to high altitudes we can change the needles to make the fuel leaner to overcome the problem of lack of oxygen. In this trip we will climb into heights

of over 17,000 feet where the atmospheric pressure drops to 44% and both the passengers and the car will have trouble breathing.

It was thought prudent to change the radiator core. In addition to these two auxiliary electric fans were put on the front of it to provide extra cooling. One of the problems of high altitude would be boil-off of coolant and rupture of the cooling system. All new radiator hoses have been fitted in association with the new radiator core.

*A guard under the front of the car protects the sump and the vulnerable power steering ram.*



The standard oil has been replaced in the engine and we are using synthetic oil of 15/50 grade. This is to cut down friction and to improve petrol consumption for the long distances we have to travel between petrol stops. Hopefully it will also reduce engine wear. As far as I can judge it has improved fuel consumption. No other modifications to the engine have been made other than me learning how to tune the carburettors to run leanly and to retard the engine, something we will have to do as we climb to the higher altitudes.

### **Tyres**

Light truck radial tyres have been fitted, and the alignment has been altered to suit. This has improved the ride of the car, and they are also quieter than the original MW-ply tyres.

### **Gearbox**

Apart from cleaning up the gearbox we have done nothing other than put synthetic oils in the box to reduce friction. This not only helps fuel consumption but will reduce wear and in particular will reduce the tendency of the oil to overheat when climbing up into Tibet.

Fortunately, the car already has an oil cooler. It was designed as a processional vehicle and thus has demands to keep the oil cool. If one had not been fitted, we would have put one on.

### **Differential**

Differential oils can boil on climbing long hills and at high altitudes. We have catered for this by putting synthetic oil in the differential. The differential also has a guard on it for rock impaction, and this also tends to cause overheating. So, the synthetic oils, I believe, are essential. The low friction of these oils prevents heat buildup.

## Undercarriage

The car has been modified to cater for bad road conditions. Three skid plates have been placed under the car. One for the front of the engine particularly to protect the very vulnerable steering ram which sticks out under the front bumper. The skid plate in the front has been curved up in front of the bumper to provide a nudge bar and also to protect the steering ram and the chrome bumper. A second skid plate has been fitted on the gearbox and sump and a small third one has been placed on the differential. The front suspension was modified by putting spacers under the coil springs to lift the car about 1 cm and to match the rear of the car. The rear was modified by fitting a supplementary spring leaf. This is a full-length leaf spring. Thus, there are now two leaf springs on each side carrying the weight onto the shackles. This also had the effect of lifting the rear of the car about 1 cm. Apart from giving extra ground clearance this has improved the handling of the car enormously. It no longer wallows and accepts going around corners. The exhaust system was then taken off the car completely and a new exhaust system built. This has been made in stainless steel and is recessed into the chassis. There is no underhung exposure for the exhaust system so that it cannot be pulled off by rocks when the car bottoms in gutters.

A nudge bar has been placed in the back of the car. This has been discreetly set just underneath and behind the rear bumper, allowing an exit angle for the car so if the car does bottom coming out of creeks it will hit this bar and not the bumper and so will not pull the bumper out. This will also serve as a nudge bar to allow the car to be pushed out of creeks if it gets stuck.

## Fuel System

Cars are required to have a cruising range of 350 miles. With its fuel consumption between 8 and 11 miles per gallon and a fuel capacity of some 20 gallons, this was not obtainable. It was therefore decided to add an extra fuel tank in the left-hand side of the boot. This sits in very nicely and provides us with another 11 gallons of fuel. We now carry a total of 33 gallons. With the various engine modifications, we now can do well over 350 miles under ideal cruising conditions. The auxiliary fuel tank pumps into the main fuel tank. The fuel delivery system has been modified. A slightly more powerful fuel pump from a Silver Shadow has been installed. In front of this we have put a water separator. The extra power of the fuel pump allows fuel to be pushed through the water separator. The water separator is required because in Asia fuel is often contaminated with water. The original fuel filter has also been retained thus giving a double system. With the modifications to the tuning, the catalyst on

*The standard 105 litre fuel tank is supplemented by an additional tank fitted into the left-hand side of the boot. Note the rear 'nudge-bar'.*





the fuel line and the synthetic oils in the car the vehicle is now capable of returning 13 miles per gallon under good conditions.

### Interior of the Car

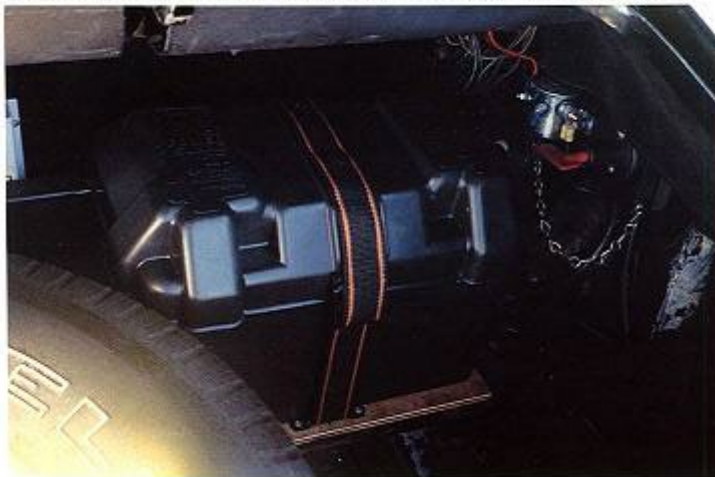
Virtually no modifications have been made to the interior of the car. It has been left *au naturel*. The boot has been modified. In addition to the auxiliary fuel tank, it now has a second battery with an isolator switch between the batteries. The batteries have been set up so that both will charge but with a relay to make sure that they do not



Electronic trip-meter and auxiliary fuel supply switch under the fascia.

overcharge. New Apollo batteries with 625 CCA power have been fitted to give adequate cranking power. The cover on the floor of the boot has been removed to allow the insertion of a second spare tyre with tie down bolt eyes to secure it. This has left a rather cluttered boot but will be adequate for a workshop for the trip. Our luggage will be carried in soft bags in front of the rear seat. Under the air conditioning outlet in the front of the car are two new devices. One is a switch for the auxiliary petrol tank, hidden fairly well from view, and the other more prominently displayed is an odometer. This has been attached into the speedometer cable at the gearbox and gives us trip distance readings which are now accurately calibrated as well as average speeds and intermediate trip distances. This device is really essential for navigating to keep us on the straight

The additional battery is fitted into a sturdy box installed in the boot for additional cranking power. The false floor of the boot has been removed to allow the insertion of a second spare tyre.



and narrow. All of the notes of the navigation will be given in kilometres, and our speedometer is in miles so this device is necessary. A second horn button has been added for the navigator to use. The horn has been boosted with two additional horns and operating them also turns on the high beam headlights.

## Oxygen

There will be quite a steep climb into the Tibetan plateau and a very high chance of mountain sickness during this trip and therefore we fitted two oxygen bottles to the car. These lie just in front of the front seats and are connected to a pulse regulator to allow the navigator and driver to take breaths of oxygen when necessary, during the trip. It will be necessary for us to preoxygenate ourselves before any activity such as car servicing or tyre changing.

On this journey there will be no support vehicles, and we have to be self-sufficient. We have catered to this by changing most of the wearing parts in the car but in addition are taking spares with us. Fortunately, I have a Continental Touring Kit with the car and that will come with us and will be supplemented by spare radiator hoses, spare nuts for the wheels, fan belts and a collection of other bits and pieces that are likely to give way including spare needles for the carburettors, points, rotors and distributor cap. All the hoses in the car have been replaced and some of the hose connections that go to the power steering box near the manifold have been insulated to prevent them burning.

This car is now well prepared, and we hope to make the trip of 10,000 miles between Pads and Peking without any need for anything other than routine servicing. I would like to acknowledge the expertise of John Vawser is preparing this car. He has done most of the real work. The has been supplemented by help from Pew Muir at Bond Rollbars. He did the undercarriage work.

*A 'nudge-bar' is fitted all of the rear bumper, and a kangaroo provides instant recognition of the country of origin.*



When the car returns to Australia it is intended to put it back to its pristine state. This will involve the removal of the skid plates under the car, the removal of the oxygen bottles and the restoration of the boot back to its original state. However, there are some modifications that will remain with the car. I will not remove the extra leaf from the rear springs. This has improved the performance of the car so enormously that I regard it as a safety issue to leave it place. I will also leave the long-range fuel tank in the car as the fuel capacity of the car is quite inadequate. The water separator will also remain in the car as a reasonable accessory for engine protection but the other things such as the oxygen bottles will all be removed.

In fact, shortly after the car returns to Australia it will be indistinguishable from any other Vice Regal Phantom V one can see driving down the road.



*The specially-made flags of the various countries being traversed.*