The Mirov after nine years of hard work.

Much time and effort was spent creating all the opening panels.

cars had been created that were good enough to fool the cameras.

After seeing the adverts on television and becoming curious, I first saw one of the cars in the flesh at the Royal Norfolk Showground, and fell in love with the shape. Knowing of its kit car origins, I had a good look and realised it had potential to be a great build project. The cars featured in TV adverts and various shows around the country for nearly five years before they were deemed surplus to requirements, and one was put up for auction. I eventually managed to buy the other one, which was languishing in a Norwich Union private car park, with a view to putting it on the road after a three year build. This proved a bit optimistic ...

Once installed in my workshop, the most important part of any new car project was carried out; the ritual sit in the driver's seat (accompanying engine noises optional). After a record lap of Silverstone it was time to take stock of what I had bought.

The only opening panels on the car were two flimsy, ill-fitting gull wing 'doors' with fixed plastic windows. Each was single skinned only and attached to the roof by one domestic door butt hinge held by a couple of wood screws. The doors were removed before they fell off on their own.

Inside, the complete centre tunnel had been cut out to fit some mock-up, medium density, fibreboard (MDF) seats, and there were no front or rear bulkheads to speak of. The original inner M6 GTR sill was not directly attached to the outer Mirov sill panel, the garage floor being clearly visible through the large gap between them; looking around the door apertures it was clear that the front and rear wings were similarly not attached.

It was obvious that the body could not be removed from the chassis at this stage without collapsing. In order to build a roadgoing car the entire structure required major consolidation.

The creation of a structurally sound working body with doors and opening panels, etc, was undoubtedly the major part of this build as this took up seven of the eventual nine years of the project. Halfway through the build the British government introduced the Single Vehicle Approval (SVA) test, which examines all aspects of amateur vehicle construction – from structural integrity to seat belt positioning and exhaust emissions – before registration for the road can be obtained. The Mirov had to be built with these exacting standards in mind, so an SVA test manual was obtained as soon as possible to ensure compliance.

The aim of the project was to end up with a unique, fast car to be enjoyed on high days and holidays. A mid-mounted, 2.7 litre Renault V6 was fitted to ensure lively performance, and many practical touches – such as a small boot, electric windows, and effective weather sealing on the gull wing doors – combined to make the end product easy to live with and a joy to drive.

The finished car looks very similar to the original as bought, which belies the immense amount of work that went into the project. Some of the more interesting techniques and solutions developed during build are detailed in this book. Firstly, a few basic fibreglass techniques are covered, along with a selection of tools that proved very useful. Chapters 2, 3 and 4 detail all the major alterations carried out to make the body shell road legal, with chapter 5 dedicated entirely to the manufacture of the gull wing doors. Chapter 6 deals with systems, such as the exhaust and twin fuel tanks, and finishes with a small

Chapter 3

Central body unit

The main strength of the original UVA M6 GTR car, on which the Mirov is based, was achieved by uniting a structural fibreglass body unit with a fairly simple chassis that combined to form a very strong assembly. Unfortunately, when the Mirov was created, the centre body was chopped about so much, the main structural element of the design was lost. The sills were removed along with the centre tunnel and most of the rear bulkhead to leave one rather floppy car. To replace the missing bits and unite all of the original UVA parts with the Mirov panels, many different techniques have been used to help form a major new structural part of the final design.

The UVA chassis at the heart of the Mirov has only four 37mm (1½in) square chassis rails, running at floor level and linking front and rear halves, so a stiff body section is vital. With work of this nature, all of the joins in the fibreglass have to be scrupulously clean to ensure good strong bonds, and this was achieved by thorough cleaning with acetone on tack-free rags prior to any work being carried out.

After reinstating the sills, bulkheads and tunnel to ensure the body/chassis unit was as stiff as possible, new mounting points were added along both floor pans to increase the original 13 points to 33. Large steel plates with welded-on nuts were welded to the four longitudinal chassis rails to allow holes to be drilled through the floor to take M12 bolts.

Apart from the structural side, there were many details to attend

To make the central body tub every panel had to be modified in some way, much of it being made from scratch.

manufacture of a slimline number plate light.

The fibreglass techniques used for this work are similar to those employed for the front and centre body sections, and further show how they can be adapted to suit different situations.

1. RETURN FLANGES

The construction of return lips using fibreglass sheet is covered in other chapters, but this section illustrates another method that forms and bonds a return flange to a panel in one operation. As well as stiffening panels the addition of return flanges or lips along an edge provides an excellent means of attachment, and this was the case with the rear valance panels of the Mirov. As mentioned, the rear panels had to be firmly fixed to the car to provide a sound means of attachment for the proposed hinges.

The original mouldings had the smallest of flanges, which contributed nothing to their sturdiness or security. To increase the size of the return lips the small existing lips were feathered, and each panel was stood and supported at the correct angle on a waxed melamine-covered board placed on the floor of the workshop. The top edge of the upper panel was stepped down in the middle, so blocks of wood had to be stacked to support a piece of waxed board at the required height; this way, the two outer flanges and centre stepped one were created simultaneously to produce three horizontal returns at two different levels. About six layers of CSM and resin were then laid on the board and up the back of each panel, which bonded and created the new return flanges in one operation.

When cured, each panel was turned over and the process repeated for the other edges. To accept the valance panels, horizontal mating flanges were moulded onto the lower edge of each rear wing in a similar manner, using waxed boards clamped to the car and supported with blocks of wood. With the return flanges complete, these were trimmed to the required shape and width before the panels were clamped together on the car to allow drilling of fixing holes. Numerous nuts, bolts and large penny washers – to spread the fixing load – were then used to assemble the reworked rear end.

The sheer size of the rear clamshell demanded substantial internal bracing in the form of partitions and box sections.

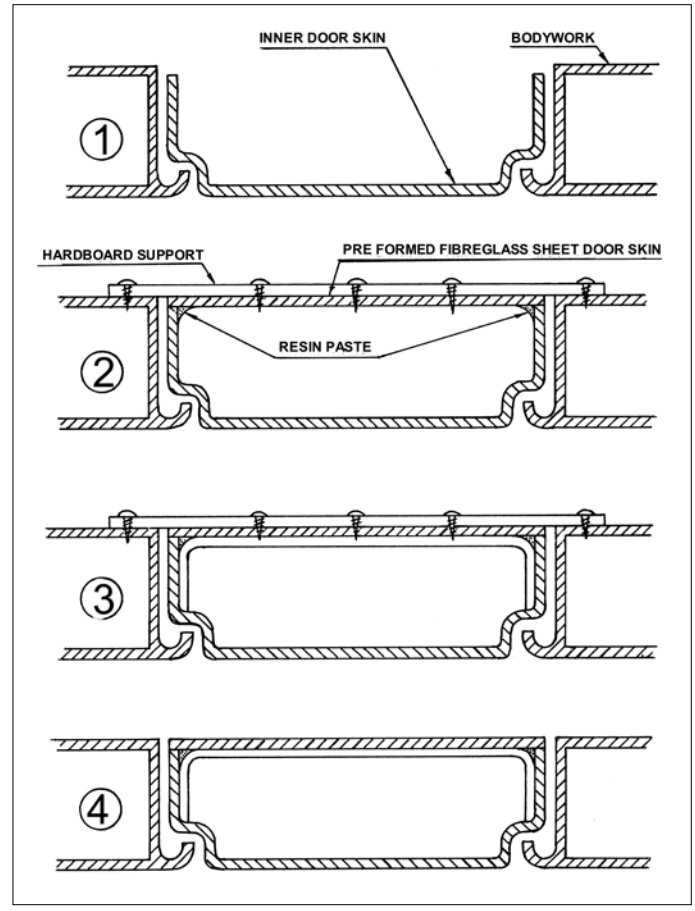
The rear panel cut and hinged open for the first time. Note the wooden bracing across the window aperture, a legacy of the car's mock-up nature.

2. FLARING THE REAR WINGS

As mentioned previously, the Mirov had originally been built in a rush as a mock-up, so little attention had been paid to symmetry. When the rear suspension was fitted it was found that the right-hand tyre pressed hard up against the wraparound rear wing. Upon investigation, it was found that the top of the wing looked similar to

The hardboard has been removed to reveal the new door skin, which follows the complex shape of the side of the car.

The completed door skin.



A series of sectional diagrams through a door moulding, showing the process of forming a new door skin. 1) The inner door skin is trimmed to slightly below the level of the surrounding bodywork. 2) Pre-formed fibreglass sheet is held in place with hardboard across the door and bonded with resin paste. 3) The initial bond is augmented with layers of CSM and resin inside the door. 4) The hardboard is removed and the screw holes filled to reveal the new door skin.

result admired. The lowest section had acquired a subtle twist that ensured it blended in with the scallop feature of the surrounding bodywork.

The only thing left to do was tidy up the joins between all the various sections of fibreglass. The top join with the incorrect radius profile was sanded back hard and the two panel edges feathered before a bridging piece of cardboard was taped inside. The outer surface was formed with mat and resin before the inside was tackled after removing the card support. The outer face was finished with gel coat resin to allow it to be sanded smooth to the correct profile.

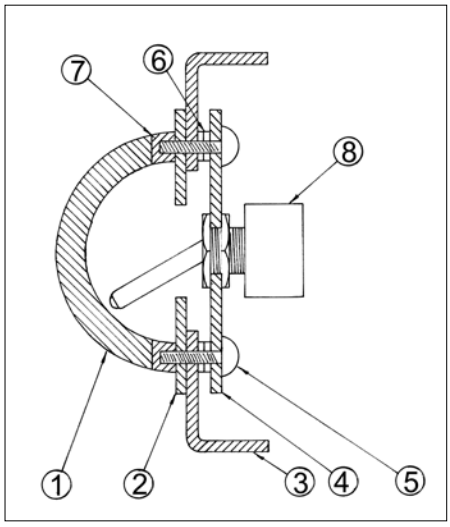
The only attention required at the centre and lower joins was grinding out some small areas and filling with gel coat to lose the join after sanding.

3. DETAILING

The main carcass of each door was complete but there was much work to do before they could be described as finished. As the initial moulds had been only temporary affairs, there was a lot of remedial surface work to be done, especially the areas that had been moulded onto brown parcel tape. When the tape was applied every effort was made to keep the surface as smooth as possible, but wrinkles were inevitable and the resulting small irregularities required hours of rectification.

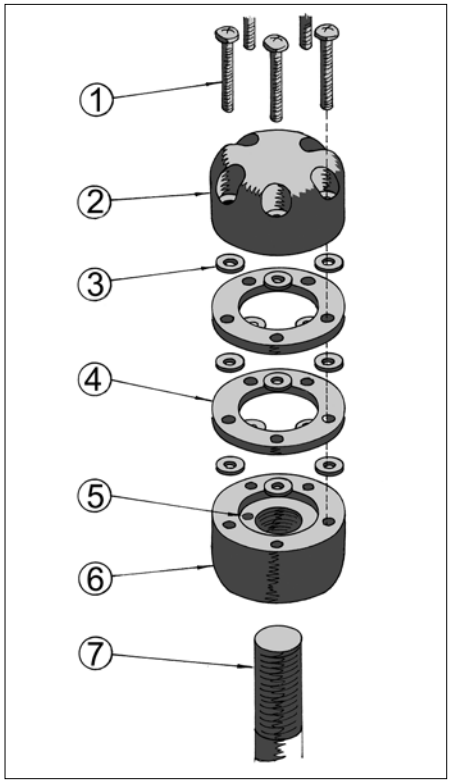
To assist progress several shaped wooden sanding blocks were made to suit different locations, and these sometimes had the abrasive paper stapled to them because it was tricky to hold it in place with the fingers. This much work could probably be considered quite a drawback to the temporary mould technique, but for one-off panels it is ideal. When the finished shape and detail are impossible to predict, this step-by-step method is eminently suitable. Any additions and alterations needed are easily accommodated and there are no large fibreglass mould assemblies to manufacture and store.

Without permanent moulds future

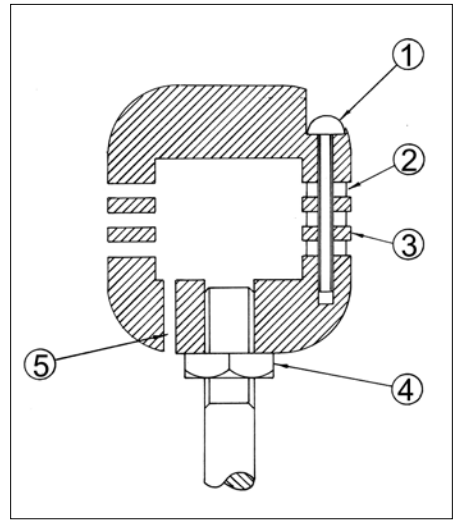


A cross-section of the switch panel installation showing the same features as the previous diagram assembled with spacing washers (6), rivnut inserts (7), and one of the switches (8).

The finished illuminated panel assembly.



An exploded diagram showing the gear knob construction. The fixing screws (1) pass through the top (2), spacing washers (3) and rings (4) to screw into the base (6). The complete assembly then screws onto the gear lever (7). Note the hole (5) for the power supply wire.



A cross-section of the gear knob assembly showing how the screws (1) pass through the spacing washers (2) and rings (3). The power supply wire hole (5) is located close to the locknut (4) which secures the knob to the lever.

An illuminated gear knob may be a bit over the top. Power supply and earth wires are hidden under the suede gaiter.

up, along with a circle of light around the base of each switch, which looks very stylish and was well worth the effort.

6.2. Illuminated gear knob

This could probably be viewed as a bit over the top, but it is this sort of detail that lifts a home-built interior into a different league – and it's quite easy to make. The entire assembly was made from four pieces of turned aluminium, the base drilled and threaded to screw onto the gearstick. The power supply wire, from the lighting circuit, was fed up through a small hole drilled next to this. Five setscrews recessed into the top held it onto the base, the two parts separated by two aluminium rings and spacer washers to form slots for three green Light Emitting Diodes (LEDs) to