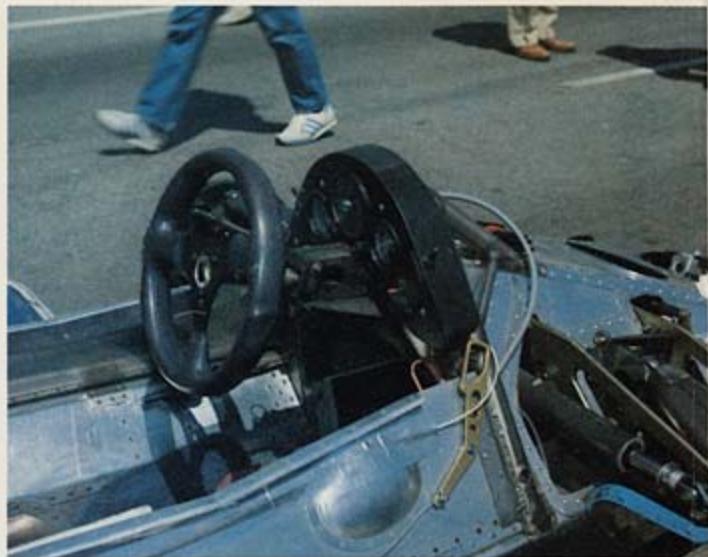
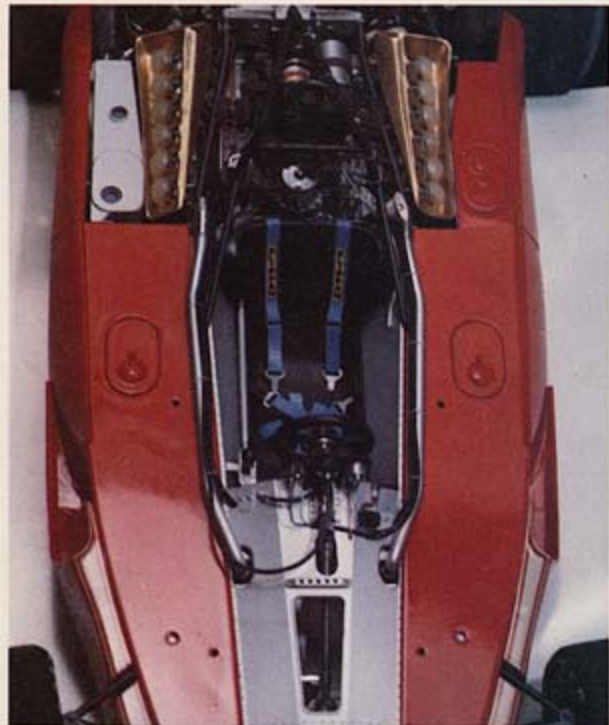




The following article appeared in this issue of [FineScale Modeler](#).
Limited back issues are available [here](#).



Matra

It's difficult to obtain close-up photos of Grand Prix race cars, so these shots should be a godsend to modelers. Paul took all of the photos at the Long Beach Grand Prix.

FORMULA 1

race car cockpit detailing



The techniques are every bit as applicable to aircraft

BY PAUL BUDZIK



(Above and top left) Scratchbuilt six-point harnesses add to the realism of the author's 1/12 scale models of Grand Prix race cars.

Tyrrell



Matra



Williams

IT'S TRUE that your model will first be judged on the quality of its assembly, finish, and markings. All the details in the world won't help if you have spoiled the overall effect with bad paint and decals. However, if you've reached the point where you can assemble and paint reasonably well, there's nothing more satisfying than scratchbuilding detail parts that will really dress up your model.

This is especially true for the cockpits of 1/12 scale race cars. For one, most of the kits now available are excellent, so you start with a good foundation. For another, the models are large enough that the details can be seen and appreciated. Third, I'm fascinated by a race car's cockpit because it is the driver's workplace; an accurately detailed model cockpit provides an observer

with a close-up view of a seldom-seen but often fantasized about area.

Research. Ideally, you should begin with close-up photos of the full-size car you're modeling. Unfortunately, as far as Formula 1 cars are concerned, this may be difficult because U. S. Grand Prix race organizers are not very sympathetic to the modeler. In the past, \$100 bought limited access to the pits at the Long Beach Grand Prix but even that option is no longer available. In many cases, therefore, you'll have to trust the accuracy of the kit manufacturer's research — I highly recommend Tamiya's 1/12 scale kits.

However, photos of instruments, seat

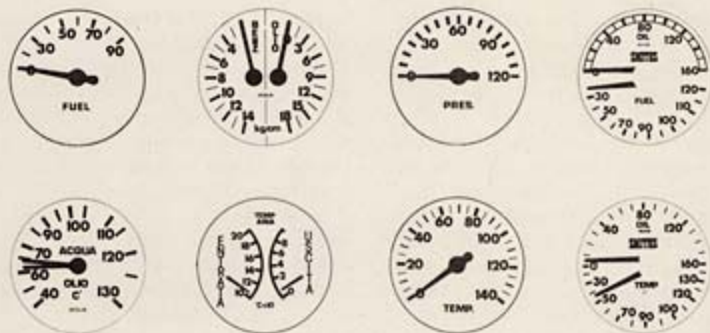
Fig. 1. The Willans six-point harness is a favorite with race car drivers. Similar harnesses are used in aerobatic aircraft.



Renault



Lotus



The original art has been reduced about 50 percent and this PMT can now be further reduced photographically to produce the final negative film containing the scale faces.

FIG. 9 GAUGE FACES ON A PMT

this eye to the lap belt with a small piece of the same kind of cloth tape used for the lap belts, Fig. 4. The lap belts lock into the quick-release by means of metal tangs, Figs. 5 and 6. (The left buckle is left free when the driver is not present, but the quick-release is usually left attached to the right lap belt.) I make the tangs out of aluminum cut from soft drink cans. This metal cuts easily with scissors and can then be filed to the exact shape required.

The shoulder belts come next. They are made of cloth tape 2 scale inches wide and are slightly more complicated than the lap belts because each contains a tension adjustment loop or buckle. The upper portion of each shoulder belt usually carries a manufacturer's name; I make the names from dry-transfer lettering. The upper end of the lower portion of each belt passes through the tension adjustment loop or buckle and has a tang on the other end which locks into the quick-release. (The tangs on the shoulder belts are slightly smaller than those on the lap belt.)

Tension adjustment loops are easily made from .018" stainless steel wire

bent into a square "8," Fig. 7. Complete the job by soldering the wire ends and filing the top surface flat. Then cut a small piece of tape to represent the reinforcement sewn into each shoulder belt just below the tension adjustment loop and pass the lower end of each shoulder belt through its tang, Fig. 8.

Crotch straps are easy. I generally cut two pieces of tape 1 1/4 scale inches wide. They come from either the front edge of the seat or a slot cut in the seat. I do not make loops in the ends of the straps as this interferes with the way they lie on the seat.

The last item in the harness is the quick-release. I used to make these by laminating 2 1/2 scale inch discs of .040" styrene, then filing the plastic to shape. This worked well, but I've since prepared rubber molds so that I can make quick-releases using a lost-wax casting technique, Fig. 5. (I also use lost-wax castings for complex shoulder belt tension buckles.) Make the lever that releases all of the belts from styrene rod filed to shape or cast it along with the rest of the quick-release.

Modeling gauges. I have never been happy with dial faces made from decals.



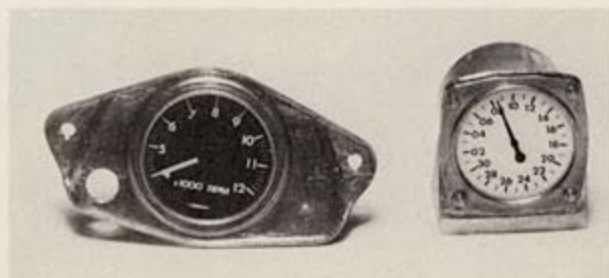
FIG. 10 BEZEL WITH INSIDE AND OUTSIDE SHOULDERS

The printing usually is not sharp enough for my taste and coating the decals with clear finishes to simulate glass covers isn't convincing — the finish is too irregular. I have found that making dial faces from photographic negatives and mounting them in scratchbuilt bezels produces excellent results.

With this technique you first draw a much-oversized dial face on paper and then shrink it down through photography to a negative of the correct scale. The negative becomes the dial face.

You must first decide how large you want your finished dial. Then scale up your artwork to an even multiple of the dimension so that you have a comfortable size to work in. Many professional artists prefer to work "two-up"; that is, their original is twice the size of the final art, but you may feel more comfortable with original art three or even four sizes up. Work on a good grade of white drawing paper with a permanent black ink. You may find dry-transfer lettering and lines a big help. Make sure you keep your lines thick enough and leave enough space between letters. I'll explain why this is important a little later on.

Take your inked drawing to a local photostat house (look in the Yellow Pages under "Copying and duplicating services"). Ask the camera operator for



(Left) Fig. 11. The dial faces are ready to be cut out and installed in these scratchbuilt mounts. (Above) Fig. 12. These gauges are ready for installation in a turbocharged Renault. Although aircraft usually have more instruments than race cars, the same techniques can be used to superdetail airplane cockpits.



Meet Paul Budzik

Married, with one son, 30-year-old Paul Budzik is a dentist in Fresno, California. He's been a modelbuilder since the age of four or five, and over the years has become quite expert at miniature machine work and making lost-wax castings, many of which he uses in his 1/12 scale race car models. His other hobbies include photography and O scale model railroading.

a line negative however many times smaller than the multiple you enlarged your artwork by.

If your original is very large, the photographer may have to go through two steps to shrink your drawings the desired amount. He will do this by making an intermediate photostat (which he may call a PMT, a photomechanical transfer) that will be partially reduced. When he shoots his final negative, he will take it down the rest of the way. I have found it economical to have a number of PMTs made; I paste these up into one large sheet containing enough dials for several cars. The photographer can then use this sheet to make

the final negative. Figure 9 contains eight gauge faces from a PMT: You can have these reduced to whatever scale you need for your model.

When the photographer shoots the final negative, he'll try to reproduce every line on the original. He does this by changing the exposure time. The length of the exposure changes the thickness of the lines in the final negative. If you used some extremely fine lines on your original, then, as he attempts to hold those lines, the other lines will become wider and the letters may start to blend together. The same will happen if you spaced the letters too closely.

If you spaced the lines correctly and chose proper line weights, you'll now have a black negative with clear areas for the numbers and indicators. If you want white dial faces and black numbers ask the photographer for a "film positive."

The next step is to paint the sheet on the emulsion (dull) side so that the numbers and indicators appear white or whatever color they should be. If you have a redline indicator or colored numbers, use a fine brush and carefully paint those areas. I then spray white lacquer over the entire back of the sheet. When the lacquer has dried, cut out individual dial faces.

Bezels. For maximum realism, I almost always mount dial faces behind brass or plexiglass bezels made on a lathe. I turn a ring of the desired diameter with an inside and outside shoulder, Fig. 10. The inside shoulder supports the dial face while the outside shoulder locates the dial face in its mount. Here's my procedure: I chuck a piece of rod stock and drill a hole in the end the size of the dial face. I then de-

velop the inside shoulder using a tool ground for inside turning. After this, I remove the end of the rod with a cutoff tool. I then turn down the end of the rod and press fit the cutoff portion onto the rod. In this way, I can finish the face of the bezel and develop the outside shoulder. I am now ready to glue or solder the bezel to its mount, which I've made from brass or plexiglass.

The next step is to turn a piece of clear plexiglass and press fit this into the back of the bezel; it supports the dial face and forms the rest of the gauge. Drill holes in the back of the plexiglass to accept any wire connections that will be visible on the completed model. Figures 11 and 12 of unassembled and assembled gauges should convince you that the photographic approach produces convincing scale instruments.

Other details. If the bodywork around the driver on your model is removable, you may want to include all sorts of additional details — switches, fuse box, and wiring harnesses are some of the possibilities. Most of the front suspension may be exposed when the bodywork is removed. In that case, pay special attention to spring and coil damper units, brake piping, and the rigging to the adjustable roll bar if there is one.

Other details include an oxygen bottle and its hose, Fig. 2, and the fire extinguishing system. (In case of fire, the driver, protected by a fireproof suit, breathes oxygen through the hose, while the fire extinguisher floods the cockpit with Halon gas.)

I also like to make operating universal joints for the steering system, Fig. 13. I machine these from aluminum and brass. Finally, if the pedals are visible, I hook up the appropriate cables.

As you've seen, superdetailing a race car cockpit doesn't require exotic tools or materials. It does call for patience and close attention to detail, but the results are worth every hour put into the project. **FSM**

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- Nye, Doug, *The Grand Prix Tyrrells: the Jackie Stewart Cars 1970-73*, Macmillan, London, 1975.
- Nye, Doug, *Theme Lotus: 21 Years of Grand Prix and Indianapolis Cars*, Motor Racing Publications, London, 1978.
- You may also want to check out an annual publication, *Autocourse: the Review of International Motor Sport*, published by Haymarket Press Ltd., 5 Winsley Street, London W1, to see if it has information on your car's equipment.
- The catalogs of mail-order racing equipment firms also contain numerous photos; one such catalog (\$2.50) is published by Auto World, 710 North Keyser, Scranton, PA 18508.



Fig. 13. Paul says that the universal joints in this 1/12 scale brass and aluminum steering assembly work perfectly, with no slop or binding.



Matra

È difficile procurarsi primi piani delle auto da Gran Premio, pertanto queste fotografie dovrebbero essere di vero aiuto per i modellisti. Paul le ha scattate tutte al Gran Premio di Long Beach.

FORMULA 1

Come dettagliare l'abitacolo di un'auto da corsa



Queste tecniche sono in tutto e per tutto applicabili agli aerei



(In alto) L'autocostruzione delle cinture di sicurezza a sei attacchi ha migliorato il realismo dei bolidi realizzati dall'autore.

Tyrrell



Matra



Williams

TESTO E FOTO:
PAUL BUDZIK

È risaputo che i modelli vengono giudicati principalmente in base alla qualità del loro montaggio, delle rifiniture ed al modo in cui sono applicate le decals. Tutti i dettagli del mondo non saranno d'aiuto se l'effetto complessivo risulta compromesso da vernici o decalcomanie scadenti. Tuttavia, per chi è in grado di montare e colorare un modello discretamente bene, niente è più soddisfacente dell'autocostruzione dei dettagli capaci di rendere lo stesso realmente superiore. Ciò vale soprattutto per gli abitacoli delle auto da corsa in scala 1/12: per prima cosa, la maggior parte dei kits dispo-

ribili attualmente sono ottimi, e pertanto costituiscono una buona base di partenza. Secondo, i modelli sono grandi abbastanza perché i dettagli possano essere visti ed apprezzati. Terzo, l'abitacolo delle auto da corsa, essendo la parte dove opera il pilota, esercita un fascino veramente particolare, pertanto l'abitacolo di un modello accuratamente dettagliato offre l'opportunità di scoprire tutto un apparato che, per essere poco visibile, si immagina spesso con molta fantasia.

La ricerca. L'ideale sarebbe partire dallo studio delle foto ravvicinate della macchina autentica che si vuole riprodurre. Sfortunatamente, per quanto riguarda le auto di Formula 1, que-

Fig. 1. L'imbragatura a sei punti della Williams è una delle preferite dai piloti di auto da corsa.



Renault



Lotus