THERE IS NO SUCH THING as a truly typical styrene scratchbuilding project. Building models from scratch is something you learn slowly by doing, rather than by sitting down and taking lessons.

For that reason, our final chapter consists of a couple of sidebars on advanced modeling techniques and several scratchbuilding case studies. By watching as experienced modelers tackle the challenges inherent in wildly different subjects, you can gain insight to be applied to your own projects.

With one significant exception, these projects employ styrene to represent metal surfaces, which is one of styrene’s strong suites. Just as important, though, is a principle mentioned in the very first chapter of this book: Don’t hesitate to combine styrene with other materials when it will make for a better model.

One example of this principle in action is delicate (and therefore, easily damaged) assemblies. Hand grabs and railings figure prominently in the projects in this chapter, and you’ll find that the modeler often substitutes brass or other metal wire for styrene where the parts will be vulnerable.

Happy modeling – with styrene!

Chapter 10

Scratchbuilding Projects and Techniques

Al Kalbfleisch built most of this Union Pacific coaling tower from basswood, but made the supporting structure and staircases from styrene. He turned to brass wire, however, to fabricate the delicate handrails on the HO (1/87 scale) model. The inset photo shows how he used clear styrene to make gusset plates with embossed rivet detail.
STYRENE SCRIBING TECHNIQUES

by David Merriman

Often a model requires creation of special tools. Here, an SSBN 640-class missile submarine (its hull and sail are fiberglass; the superstructure is vacuum-formed styrene sheet) is being scribed using a special template.

Scribed grooves in the surface of the styrene superstructure represent the 16 identical missile hatches on this model. Photo A shows me using a simple plastic scribing template as I engrave a hatch line. The template has additional openings for scribing line lockers, reversible cleats, and main ballast tank vents.

Curved scribing templates

Forming scribing templates for compound curves like the bow section of this submarine can be done by using the model as a plug to shape heated plastic. It works here because the fiberglass hull can withstand the heat — I would not attempt this if the hull were styrene!

In B, a square of .020˝ styrene has been tacked to a plywood backing piece with a round hole. After heating over a hot plate, the plastic was pushed onto the sub’s nose, and the circular cutout assured a tight, faithful impression of the bow contour.

The locations of the square torpedo tube shutter doors were laid out on the now-cone-shaped template, and the square holes opened with drills and files, checking the dimensions frequently.

Mounted on the bow, C, the scribing template is ready for use. The scribing tool is dragged with light pressure over the surface of the model, controlled by the edges of the cutout. Succeeding passes are made with increasing pressure until the engraved line is of the desired depth, D.

Round jeweler’s files make excellent blanks for forming scribing tools. I shape the tool to a point, then, holding the point at a right angle against a sharpening stone, slightly grind off the tip, producing a microscopic flat.

Make the scriber from high carbon steel if the job entails working fiberglass, acrylic, or some other tough plastic.

Fixing mistakes

To fix slips or tool marks I remove the template and smear automotive filler putty over the entire scribed portion of the model. Quickly, the scriber is run freehand with light pressure through all the engraved lines to chase out the still-wet putty.

What putty remains on the model will have filled the imperfections. When dry, the puttied area is wet sanded with 400-grit paper, and the scriber is run again to chase out sanding dust in the engraved lines. The area is given a light spray coat of primer and inspected. Putty is reapplied to remaining flaws and the process repeated.

Here’s another custom heat-formed scribing template taped atop the sail of a submarine model, E. From left to right: 400-grit wet-or-dry sandpaper, file, jewelers file, X-acto knife, pencil, and scriber (a sharpened file point mounted in a pin vise). Most of these tools were used to open and shape the scribing template cutouts.
VACUUM-FORMING SIMPLE
PARTS AND CANOPIES

by Pat Hawkey

One of styrene’s greatest assets is its pliability. This is especially true when heated. Heat-softened styrene can be pulled over shapes or sucked into cavities to reproduce almost any shape, including complex curves.

Back in the early ‘60s Mattel introduced the Vac-U-Form machine. Sold as a toy, it provided youngsters with a hand-operated vacuum pump, heating element, styrene sheets, and molds to make their own plastic toys. Like most hobbyists, I found mine at a church rummage sale long after the animal was extinct and paid about 50 cents for it. Thousands of them were made, and they still surface on the yard-sale circuit.

Landing gear doors

I made master forms for a pair of “fast-pack” landing gear doors for a 1/48 scale DC-3 from 2-part epoxy putty, A. This material cures to a granite-like consistency, impervious to the heat of the plastic that will be drawn over it.

The master on the right is upside down, showing a .030˝ spacer that will keep the master slightly elevated. This ensures a sharp bottom edge where the heated plastic will be sucked into the gap between the master and the vacuum platform.

To make the duplicates, I loaded my trusty old Mattel Vac-U-Form machine, B, with a 3” x 3-5/8” sheet of .020˝ plastic. The heating element has done its job and the plastic is shiny, sagging, and ready to go.

The thickness of the plastic you start with will not be the thickness of your finished part. As the heated sheet is stretched over the master it thins over the high spots. A good rule of thumb is to decide ahead of time how thick and rigid you want your finished part to be and select styrene .010˝ thicker.

The clamp assembly is quickly flipped over to the vacuum platform, the suction handle is given a couple good pumps, and if you don’t have any air leaks, here’s what you get. C. (A close look will reveal the door on the right is flat while the door on the left is on edge. Being more focused on taking pictures than obtaining good parts, I forgot to secure the masters to the vacuum platform with a dab of white glue to keep them from shifting.)

The reverse side of the cooled sheet has the two masters firmly entrapped in the styrene, D. I roughly cut the doors free with scissors, then trimmed off the remaining excess with a new No.11 blade, E. It’s easy to slip the point of your blade between the new part and the master and trim by just riding that line.

A few swipes with an emery board or a sanding stick to finish the cleanup, and I have a good pair of doors, F. Photo G shows where they ended up.

Vac-forming replacement canopies

Like many model plane builders, I wanted a Mattel machine to make replacement canopies. I believed that getting my hands on a Vac-U-Form would simply and quickly turn modeling night into day. Not quite. Here’s what I’ve learned about making canopies through trial and error — and lots of wasted clear plastic.

1. Clear styrene does not work.

Instead of softening and sagging when it’s heated, clear styrene shrinks and pulls itself out of the holding clamp. Acetate and Butyrate sheet work, but I’ve had bubbles form in both as they heat up. Don’t know why — something about moisture absorption, I suspect. There’s also Polycarbonate and Vivak you can experiment with. All these materials are soft