The Exciting Future for Cellular Profiles

About a year ago I decided to leave the large building products company where I had worked for 15 years to start a consulting practice. During that time, I had been involved in the development, manufacturing, and marketing of PVC and polystyrene profiles and especially in the extrusion of cellular products. These products were a high-density foam with the resins expanded approximately 2 to 8 times, depending upon the product. My friends told me that there were certain to be many lean days in a consulting practice with an emphasis on foamed extrusions. Indeed, the markets for foamed extrusions appear at present to be limited and the principal manufacturers have more idle machine time than they would care to talk about.

Why should this be the case? Have the opportunities for cellular extrusions been exhausted with the molding products (picture frames and architectural trim) that constitute the lion's share of the cellular extrusions that are being sold? Surely the large companies that manufacture cellular profiles would have uncovered all the opportunities already! Obviously, I don't think so. In fact, my work over the past year leaves me more convinced than ever that high density cellular extrusions have a bright future.

Cellular profile extrusion has come a long way from the day in 1971 when Goodyear ran a full page ad in the Wall Street Journal which touted the benefits of cellular PVC profiles as a replacement for wood. As luck would have it, the advertisement appeared when wood architectural trim was in its hard-to-get/expensive phase, and the aftermath of the ad was a frenzy of activity on the part of compound producers to get their cellular compounds to market, and a similar rush by building products manufacturers to get into the market with their extruded trim. While many of the compounds left a bit to be desired and the products were poorly designed, these profiles were cheaper than wood shapes they were meant to replace — but not for long. Wood architectural trim behaves as most commodities, with wild swings in price and availability. With the next dip in the price cycle, wood moldings gained back much of the market share that had been lost to the upstart plastic material. Why? Because the cellular PVC products had only a temporary advantage of price and availability. Once these benefits were reduced by the swing in the commodity cycle, the demand for the PVC extrusions dropped like a rock. There were other advantages over wood products, but these were not explained sufficiently to overcome the reluctance of the consumer to use something new while the old product was satisfactory and available for about the same price. However, there were some disadvantages that were all too apparent: softness, poor dimensional control, hollow backs that made some profiles difficult to install.

These deficiencies have all been overcome. Indeed, new developments have added advantages that will make high density cellular products important in the future. These developments can be used to create a multitude of products to solve your customers' problems and to create profitable new lines.

1. Resins: in the dark ages rigid PVC was the only resin that was used for high density foam products. Now polystyrene, ABS, polyethylene, polypropylene, flexible PVC and others can be foamed successfully.

2. Surface Hardness: Techniques are now available to form a hard surface on cellular extrusions. The Celuka process, co-extrusion, and extrusion lamination are all available to create a hard, dense surface on a highly foamed substrate, producing tough, light-weight parts.

3. Full Profiles: improved die technology and refinements in cooling and sizing techniques have made it possible to make wide, thick profiles with elaborate contours.

4. Specific Gravity Control: Improved foaming agents and new processes for making foamed profiles have made it practical to control specific gravity over a broad range. This, with the surface hardness and profile technology mentioned above pro vide excellent opportunities for new products.

5. Woodlike Appearance: The unique process developed by Sekisui in Japan creates a product that has been mistaken for wood by many people.

6. Dimensional Control: Improved sizing techniques, especially in the Celuka process, give outstanding dimensional control.

7. Decorating Options: Many cellular products are relatively easy to decorate by painting, offset printing with wood grains, laminating, embossing, and veneering to create beautiful products that are moisture resistant and light weight.

8. Size and Shape: New sizing and cooling techniques permit elaborate shapes up to several feet wide.

9. Special Properties: Special properties can be created by adding fillers, UV absorbers, flame retardants, and smoke suppressants.

High density cellular extrusions are versatile materials. They can be made hard or soft, brittle or ductile. They are light in weight, durable and easy to maintain, moisture resistant, insulating, and can be decorated in a variety of ways. They provide material savings and great flexibility in size, shape and design. They have many wood-like characteristics, but termites hate them.

What products do these advantages suggest? You can probably think of more of them than I can. You can probably think of more advantages, too.

The point is that we have only scratched the surface of the products that can be made from high density foam extrusions. The large companies that are in the business now will develop additional products, but will by no means exhaust all the possibilities. The future is wide open!

- C.O. Yoder

See also:

- Extrusion of thermoplastic foam
- Precision profile extrusion
- Profile die for PVC and HIPS
- PVC testing
- Structural changes in PVC due to extrusion
- Twin screw extruders design and operating characteristics

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