

Contact: Steven Tetreault
Rollfab Metal Building Products
602-275-1676

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Rollfab Metal Building Products
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CHOOSING AND USING “DESIGNER” METAL ROOFING PANELS

by Steven Tetreault*

Picture these scenarios: A commercial client calls to tell you that he wants the look of a copper verdigris roof for a new project... but his budget can't handle the high cost of copper. Another client calls looking for an unusual profile that you can't find in the standard product lines offered by your panel manufacturing sources. Or, a client asks if you can order and install an S-shaped canopy made of curved metal panels.

Would you know how to advise your customers in these situations? The fact is, in recent years, the metal roofing market has grown quite sophisticated, with many more choices available to contractors, architects and building owners. This article will attempt to update you on some of the latest trends in metal roofing, focusing especially on specialty or “designer” panels. The purpose will be to familiarize you with some of the new types of products now available and the processes that make them possible... so that you'll be able to answer the above questions, and more.

In past decades, metal roofing panels were used primarily on metal buildings and rural structures. Though highly functional and low in cost, these panels (mostly corrugated profiles) perpetuated the belief that metal roofing was a low-end product reserved for industrial and agricultural projects.

Today's “designer” panels are a whole different story. Because of their excellent aesthetics, these panels are ideal for commercial and residential applications where corrugated roofing would not have been an option. The result: Your clients can enjoy the high performance and life cycle cost benefits of metal with no compromise in aesthetics.

Fabricating Techniques

Most roofing panels are fabricated using **roll forming** equipment. In this process, sheet metal coil is fed through a machine where it passes under a series of precision rollers that determine the shape of the profile. Every profile requires a different series of rollers; so if a customer wanted to deviate from a standard profile, the cost would usually be prohibitive.

Press forming machinery uses top and bottom dies that stamp the sheet metal coil into the desired profile. A system of programmable stops allows the operator to produce the desired angle bend. Using press forming, many different shapes can be made with a single die by simply adjusting the stops. This technique results in greater design flexibility with no need to change tooling.

Advanced **finishing** techniques have also contributed to the growth of designer panels. Today's standard paint coatings offer low maintenance, excellent durability, and a wide palette of colors. In addition, new techniques have made it possible to achieve special design effects. For example, two-toned paint patterns have a "marbled" appearance that lends a richer, more textured look than a standard paint finish for high-end projects. A two-toned pattern is used on the celebrated new Bellagio hotel in Las Vegas, where it simulates the look of copper verdigris using much less costly galvanized steel. The pattern was first created as a painting, which was later replicated with computer imaging techniques and transferred to the machine that would cut the roll. The coil coater then manipulated the pattern on-line until they achieved the desired texture and finish characteristics. Without advanced technologies, printed patterns like this would not be viable.

Metal curving techniques have become popular for creating attractively curved roofs, mansards, fascias, canopies and more. Probably the most versatile technique is **crimp-curving**, which was introduced to this country in the mid-1980s. Crimp-curving may be used to shape panels into virtually any radius or angle without marring the panel finish, and it is suited to a wide range of profiles from $\frac{3}{4}$ " to 4" deep in 18-26 GA metal. Crimp-curving can actually double the load factor of steel panels, creating lightweight yet rigid components that require minimal structural support. The technique may also be used to produce mitered corners and multiple-radius curves – including the "S-shaped" canopy mentioned at the beginning of this story.

Stretch-forming is another curving technique that is used on a more limited basis. The stretch-forming equipment pulls the panel around a custom jig or form and stretches it into shape. It provides an alternative in situations where crimp-curving is not viable – for example, when there is a need to bend very deep-ribbed panels. Unlike crimp-curving, the stretching process will decrease the strength of the metal, so a heavier substrate (18-20 GA) is required.

Choosing a Standard Profile

Due to all these advances, for most projects you need look no further than the standard product offerings of today's metal component manufacturers. Before you order a custom panel, check out the following "standard" specialty metal roofing panels:

- Extra-deep profiles (panels with a depth of more than three inches) may be selected to create interesting architectural relief effects. Deep-ribbed panels are particularly suited to large-scale industrial or commercial jobs, where their high strength and long-span capabilities make it possible to reduce structural costs. The deep panel ribs are highly aesthetic and may be varied to create different light and shadow effects.

One project recently used a pan and batten roofing system with panel depth of 11 inches! The result was dramatic, to say the least.

- Exposed fastener panels that simulate the look of more costly concealed fastener systems are also available. Their vertical ribs mimic the look of standing seam or batten seam roofing, while simplifying installation and saving money.
- Special modifications can be made to standard panels with no need for special tooling, using press forming machinery as described above. For example, the manufacturer can vary the width of the reveal and/or the top pan to the specifier's dimensional requirements, creating shadow lines in almost any location on the panel surface. Profiles may be symmetrical or asymmetrical, and ribs may be fabricated in virtually any angle desired. This high degree of flexibility offers greater freedom and control in new construction projects. It can also allow you to reconstruct difficult-to-match panels for retrofit or renovation jobs.
- Tile facsimile panels are designed to combine the high performance of metal with the popular look of clay tile, at just a fraction of the weight. They can therefore be used for residential and commercial projects where tile appearance is desired but weight is a concern. For best performance, look for a system with long-length panels that install vertically from eave to ridge and are secured with screw fasteners. A system with this design will typically offer the fastest installation and greatest wind resistance. Similar products are also available to simulate the look of shingles or shakes.
- Duotone and other high-tech paint finishes can sometimes be used to mimic the look of more expensive substrates or to give panels a textured appearance, as noted earlier.

Going Custom

After all is said and done, if you still decide to go the custom route, be sure to allow ample lead time for design and fabrication of your special panels. Here are some specific considerations to keep in mind:

- How much material will be needed? Most panels are made from coil stock in modules 36", 42" or 48" wide. Panels should be planned with these modules in mind to minimize costly "drop" or waste (the amount of unused coil that will have to be scrapped). The amount of material required by the panel will also affect cost. A deep profile with heavy ribbing will use more metal per square foot than a shallow, flush-faced panel.
- What substrate will be used? The industry standards – galvanized or zinc aluminum coated steel – are the most economical choices, while special materials such as stainless steel or copper will carry a cost premium.
- How complex is the panel design? This may affect cost in other areas, too. A modified panel produced with an existing die will cost less than one requiring special

tooling. A complex design with multiple ribs and angles may be more time-consuming to fabricate than a simpler profile.

- What type of finish will be best? Review the requirements of the project, including climate and environmental conditions, usage, roof slope, etc. Can a standard color be used? Special colors involve a longer lead time (typically 4-8 weeks) and will usually carry minimum order requirements. Should a protective film be applied to protect panels during installation?
- What other fabrication processes will be required? For example, crimp-curving of panels will carry an additional service charge. However, for many applications – such as self-supporting covers or roof decks – the curved panels can actually save money in labor and materials by reducing the amount of structural support needed and allowing you to use a lighter gauge of metal.
- What about code considerations? If the panel is to be used structurally, it must meet load-bearing requirements. If an UL-90 rated panel is modified in any way, its rating will be invalidated. If panels are to be installed over a wood deck, fire codes may be a concern, so check first. Span requirements are generally not a problem.
- What are the panel manufacturer's capabilities? When sourcing custom panels, inquire about the supplier's expertise in this area. Be sure to ask:
 - What types of materials, paint finishes and colors are offered?
 - What are the limitations on panel depths, widths and lengths?
 - What tooling is currently available?
 - Is engineering support available (including calculations and shop drawings)?
 - For curved panels, what type of curving process is used? Again, is technical support available for these applications?

Specialty or “designer” metal panels are not for every application. But it's a good idea to keep informed of the latest developments and understand how to choose and use these new profiles – whether standard or customized. By doing so, you have an opportunity to expand your product base, make inroads into the profitable high end market, and differentiate yourself from competitors.

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Steven Tetreault is general sales manager for Rollfab Metal Products, Phoenix, AZ., a manufacturer of metal roofing panels. The author can be reached at (602) 275-1676; email info@rollfabmetal.com; web sit at www.rollfabmetal.com