

The Art of Bending

Chuck Ross

Most of today's metal-rolling houses got their start years ago, fabricating small parts. Some others began as blacksmithing operations. For the last decade or so, though, these generally small-scale operations have been seeing new interest in their services coming from the architectural design community. Architecturally exposed structural steel (AESS) has become more popular as a design element, and structural-steel fabricators have been turning to the metal-rolling houses to create the curvilinear steel elements now being specified in increasing quantities.

VISUAL DISTINCTION

"Owners want their buildings to be distinctive," says George Wendt, president of Chicago Rolled Metal Products. "The architects and engineers respond by designing with curved shapes that add excitement. The rolling houses respond with improved products."

These improved products include both heavier and lighter hollow structural sections bent to tighter radii with less distortion. In the past, when steel was used for structural sections such as bow trusses, it was generally unexposed. In those situations, a small amount of distortion might have been acceptable as long as structural integrity was not compromised. That is no longer the case with AESS, says David Marks, president of Marks Metal Technology, based in Clackamas, OR. Aesthetics have joined structural integrity as a finished-product requirement.

"Architects have become aware that exposed structural steel can be very pleasing to the eye," he says, "not only providing support to the structure."

A NEW ART FORM

This growing emphasis on visual as well as structural integrity is increas-



Image courtesy Max Weiss Company, Inc.

ing the perception rolling houses have of themselves as craftsmen. The attention to detail their work requires sets them a step above a basic commodity fabricator, rolling-house managers say.

"To roll and shape steel is more of an art form," says Ed Libby, president of Bellwood, IL-based Oakley Steel. "To be able to curve steel with consistency takes a lot of experience—you can't just punch a button and have a piece come out a certain size and shape. We're a job shop, so every job that comes through is a custom design."

It's the methods used to achieve consistency across a range of sizes and shapes that sets rolling houses apart from one another, these managers say. Because these facilities have grown from a range of backgrounds, they've developed their own methods to meet customers' specifications—even when using the same equipment to do so.

"There are probably three manufacturers of profile rolling equipment," says Marks. "Everyone has a variety of machines from those manufacturers. The creativity and innovation of each individual rolling house—that's where the uniquenesses have come about."

Compression is the biggest challenge in the steel-bending business,

especially when working with new, larger tubes, rolled to tighter radii and in increasingly complex curves. Compression during the bending process can cause distortion in the finished product. "It's sort of like bending a straw," Wendt says. "It doesn't want to bend, it wants to kink."

To create a counterbalancing state of tension on the tube, some facilities fill the tube with sand or water and others use mandibles inside the tube. In this way, the section acts more like a solid bar than a hollow tube. Some rolling houses incorporate heat into their processes, while others use only cold-rolling approaches. Again, the method selected is generally based on a shop's individual expertise.

FLEXIBLE STANDARDS

Despite the growing popularity of AESS, rolling-house managers say some misperceptions still exist among architects and engineers regarding their products.

"There are two concerns we have to address," Wendt says. "I think they fear this is very expensive, and it's not. And I think people are afraid of structural concerns, and that's seldom a problem. We've rolled thousands of pieces of steel and hundreds of fabrications and we've become comfortable working with these curved sections."

Some see the development of standards for AESS as a way to ease designers' concerns. Standards could create a common platform for specifications while allowing leeway for individual fabricators' unique approaches.

"The intent is to set some guidelines for AESS that has some elements that are curved," explains Marks, one standards proponent. "To set standards of expectations, realizing that there's more than one way to get from Point A to Point B."

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