Rollforming

The entry end of this rollforming line contains a prenotching press (at left) to produce variable hole patterns in the strip. That necessitates gag dies near the press feeds and a modulating drive on the straightener (center) to feed the loop.

Demands More from Coil Handling

The long feed lengths, and the starting and stopping due to inline operations prior to rollforming, make careful attention to coil handling a must.

BY LOUIS A. KREN, SENIOR EDITOR

Plain and simple, rollforming is a different animal. The process strays from typical stamping as it demands long feed lengths and often an excessive amount of starts and stops as a variety of notching, punching and other tasks occupy the line prior to the actual rollforming process. All of this demands much from coil-handling equipment on the entry end, according to Jack Pennuto Jr. of Formtek, Inc., Cleveland, OH, a supplier of rollforming equipment including feeds and even entire lines.

Programmable Servo Feeds Ideal

Programmable servo feeds enable precise starts and stops as well as the varying, and sometimes exceedingly long, feed lengths.

"Servo feeds offer the ability to turn on and off features within an overall prepunching, prenotching die—air-actuated gagging features, for example—to allow programming of a pattern along a longer-length product," Pennuto explains. "To do that, the servo feeds require output signals to activate and deactivate air cylinders or manifolds."

The ideal rollforming line also would require either a straightener for a heavier-gauge product or powered uncoiler for lighter-gauge products, both with variable-speed or modulated drives to speed up and slow down to match large variations in feed length.

And of course, feed systems designed with rollforming in mind do not limit users with regard to product length.

Longer than Traditional Stamping Lines

Rollforming lines occupy more floor space than typical stamping lines owing to multiple roll stands used to form long products, with cutoff equipment at the end of the line adding to length. Entry-end equipment on rollforming lines also are longer than their stamping brethren, especially where prenotching and other processes occur prior to rollforming.

"A line may contain an uncoiler and straightener with a material loop leading to the servo feeder," Pennuto explains. "In a rollforming line with a prenotching station for instance, it is necessary to place another material loop between the prenotching press and the rollformer. Why? Though the rollformer forms product at a relatively constant speed, strip travels at varied speeds into and out of the straightener and through the prenotching press, so both of those areas need slack to enable constant strip speed down the line. That translates to a longer line footprint."

Required strip slack may necessitate a pit to provide a significant material loop, more than an above-floor loop can provide.

Coil-handling equipment may offer other features to meet the unique requirements of rollforming. For example,

envision an architectural wall product, where profiles may be similar but widths vary. Then suppose that the product requires prepunching and strip-edge justification. The ideal servo feeder in this scenario can traverse inboard and outboard, explains Pennuto, to maintain a centerline on the servo feeder while performing edge justification on the tooling. And high line speeds, characteristic of some rollforming applications, may necessitate a wedge-type uncoiler to best control coil expansion by providing constant force throughout the expansion range.

Custom Rollformer Heeds Entry-End Advice

One rollforming company, Ferret Custom Roll Forming, Inc., Elkhart, IN, crams all sorts of work into its lines prior to rollforming, and employs many of the entry-end features described above.

Formed in 1981, Ferret opened up as a rollformer of stainless-steel frames for commercial and industrial mirrors. The company, under the leadership of president and CEO Scott McMeekan, who purchased Ferret from his father in 2006, now serves the appliance market and also supplies parts for food-service, recreational-vehicle, commercial-furniture, retail-display and marine customers.

Ferret, with 22 employees, runs 16 rollforming lines on one shift, some dedicated to specific products and others serving as workhorses.

"We are a smaller company, but in rollforming you can do quite a bit with that-sized workforce," offers McMeekan.

All About Value-Added

Value-added is a way of life at Ferret, which means packing as much work as possible onto the rollforming line to eliminate costly and time-consuming secondary operations on stand-alone machinery.

"We try to accomplish as much value-added work as we can at the entry end of our rollforming lines," McMeekan says. "So with prenotching we like to use servo feeds, and also employ servo feeds for dies with gags."

Ferret outfitted its lines with equipment from Formtek companies, including Dahlstrom and Yoder line equipment from Formtek Metal Forming, Inc., Warrensville Heights, OH, and Servo-Matic servo feeds from Formtek Maine, Clinton, ME. Materials rollformed at Ferret include hot-rolled, cold-rolled, galvanized and stainless steels as well as aluminum and pre-painted alloys in widths from 1 to 30 in., and in thicknesses from 0.019 to 0.205 in.

"We have one prenotch die supplied by Hill Engineering, Carol Stream, IL (another Formtek company) with 10 different gags that produces an amazing amount of varying hole patterns for a store fixturing part," says McMeekan. "The ability to create those holes before forming the part makes rollforming unique because following cutoff at the exit end we have a finished part. The servo feeds are key to that. The ability to preset a number of feed lengths, to handle multiple hits and control the gags of the prenotch die has been invaluable. The more we can accomplish from a value-added standpoint in the entry end with holes or forming before the actual rollforming, the better. We drive costs down, and that is the name of the game."

Note the length of this rollforming line, arising from the need for material loops and the use of inline processing equipment prior to the actual rollforming operation.

How Prenotching Affects Coil Handling

Using his own company's experiences, McMeekan points out how different prenotch operations can affect the type of entry-end equipment required.

"A standard application, without varying patterns and employing a flying prenotch die—set on rails and pulled along by the material as it punches, then opening up and releasing from the material—typically would not need a powered uncoiler," he explains. "The rollformer itself pulls the material off of the uncoiler, through the prenotching operation and into the roll stands.

"Contrast that with a servo-fed application that may employ a straightener between the uncoiler and a stationary prenotch die," he continues. "You may have an accumulating pit for this prenotch die because it is stationary. The servo feed will pull material through a preprogrammed length, so in this instance a powered uncoiler is needed to allow for slack in the line. Once the servo feed pulls the material through, the prenotch die does its work—perhaps multiple hits based on gags—then opens up and the servo feed again pulls the next programmed strip length through. On the exit end of the servo feed, and again before the rollformer, another accumulation pit allows the rollformer to continue at high speeds without overtensioning the strip or pulling material through punches." **MF**