

Tips on Servo-Feed Selection



With the seemingly infinite variety in types and sizes of coil-handling devices, how do you know which equipment best suits your application? By breaking apart the functions of coil-handling equipment and applying your company's needs, a path through the maze of options and choices becomes clear.

BY MARK BOURQUE

Uncoiling, straightening and feeding are the three basic functions performed by a coil-handling system. A reel, cradle or pallet decoiler may perform the uncoiling function. A powered straightener, pull-through straightener or a straightener-feeder can perform straightening to remove coil set. Coil feeding, which moves

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material into the die to precise lengths at a predetermined rate, can be performed by servo-driven roll feeds.

Other coil-handling products and added equipment features enhance material loading, threading and removal procedures. They include loading cars or ramps, turnstiles, cropping shears, threading tables and threader-peeler systems.

But the feeder is most critical in the selection of coil-handling equipment. Metalformers typically identify and define the feed first, since it must position the material accurately, consis-

tently and at precisely controlled rates.

Start by determining the type of feed best suited to the application. Required production rates (feed lengths vs. strokes/min.), material finish and condition, and required changeover time between jobs being processed all play important roles in the feed-selection process. Technical advances in manufacturing resulting in competitive pricing, along with increased demands in stamping accuracy and production flexibility, have made the electronic servo-driven roll feed the unit of choice in many recent applications.

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A combination straightener-feeder with motorized stock reel, as shown here, provides double the grip force as a servo feed/pull-through straightener combination.

Due to its inherent ability to store detailed job information, setup time with a servo-driven feed is virtually reduced to the time it takes to recall that information from memory. Unique programmed patterns can be tailored to meet the most demanding production criteria. And the feeds offer programmable outputs to control gagged tooling, punching or notching stations. Servo-control programming capability provides the end user with flexibility in the design and application of tooling.

Pick from Three Styles

Servo feeds come in three basic styles: feed with pull-through straightener; servo-driven straightener-feeder combination; and conventional independent servo feed with a separate powered straightener. Each has its application in today's metalforming shop.

The primary benefit of a servo feed with pull-through straightener is cost. Metalformers can save up to 10 percent in purchase price by investing in these units compared to a straightener-feeder, and up to 20 percent compared to a conventional line.

Stamping operations looking to upgrade their facility by replacing an older air feed/pull-through straightener will need only to replace the feeder. The existing powered payout—motorized stock reel or powered cradle—can continue to supply material to the new servo feed/pull-through straightener or servo-driven straightener-feeder.

Space considerations also favor the servo feed/pull-through and servo-driven straightener-feeder. Because these setups straighten the material at the entrance to the press, the installation does not require a looping pit. Both types of feeder will require approximately one-third less floor space than a conventional line equipped with an inde-



pendent servo feed and straightener.

When considering adding a pull-through straightener to a servo-driven roll feed, the servo feed must have sufficient pulling power and gripping force to position the material precisely to length at required production rates while also providing the power to straighten the material. To maintain sufficient surface-area contact on the material to avoid slippage in the feed, the metalformer may have to sacrifice some speed or live with a reduction in the amount of straightening possible.

For tough jobs that require a higher degree of straightening, the servo-driven straightener-feeder gets the call. Typically, these units come equipped with entrance and exit feed rolls with a precision straightener mounted between them. The entrance feed rolls thread the material in the machine, and then assist the exit feed rolls in accurately positioning the material. With two sets of feed rolls, the straightener-feeder provides twice as much grip force as the servo feed/pull-through straightener combination. In some tough applications, all of the straightening rolls may be powered, reducing material slippage and ensuring an accurate part length.

The conventional servo-feed line, which requires an independent straightener, finds use for progressive-die tooling. The top feed roll of the servo feed

easily lifts for pilot-pin registration by the press tooling. This also allows for proper material tracking. Servo feeds with pull-

through straighteners and servo-driven straightener-feeders also can be used with progressive tooling, but they should be fitted with a straightener-roll release along with feed-roll release to help ensure acceptable performance.

One Piece in the Productivity Puzzle

The speed of all feeding applications typically will be dictated, and limited, by other equipment in the pressroom. Speeds normally are dictated by the ability of the press and servo feed to process the material. Factors such as part removal after stamping, material conditions such as camber and the material flatness required to successfully run material through a stamping die also effect production output. The conventional line that utilizes an independent servo feed and straightener with a looping pit can compensate for most of the factors that hinder production output.

Material tracking due to camber in the material does not cause the downtime sometimes inherent in straightener-feeder or servo feed with pull-through combinations. Production output of 150 to 300 ft./min. with a conventional line is not uncommon, while an output of 75 ft./min. would be exceptional for a combination unit.

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Is a conventional coil-handling system with independent servo feed right for your press-line applications? Consider factors such as production rates, material protection and straightness requirements.

Those Unsightly Stop Marks

When material stops between rolls, particularly the staggered rolls in a straightener, a series of straight lines is apt to be imprinted across the surface. Metalformers refer to these as stop marks, set marks or witness marks. Using a pull-through straightener, the material will stop in the straightener with every feed stroke so that these marks may appear throughout the coil run, corresponding quite directly to the roll spacing and feed length.

When straightening material with sensitive or critical surface-finish requirements, metalformers turn to an independent servo feed and power-driven straightener. The powered straightener, independently driven and free-standing, typically is controlled with a loop-control device that monitors the

material in the loop area and regulates the output speed of the straightener for synchronization with related equipment. To avoid stop marks, the metalformer can adjust a powered straightener to minimize stopping, or can set it up with a creep speed for nearly continuous running.

In most cases, an ultrasonic loop control modulates the straightener speed or material output for smooth flow of material throughout the

straightening process. The ultrasonic loop control is a transducer-based unit that typically mounts with the transducer located in the center of the loop area, directly over the material. The control rapidly emits sound waves that travel down to the material and bounce back to the transducer. As the material rises in the loop area, the loop control senses the material movement and sends a reference voltage to the straightener drive, causing it to accelerate.

Final Thoughts

Once a metalformer decides it needs straightening on a line, the choice of feed will begin to dictate the choice of straightener. A roll feed will almost always mean a powered straightener. From there, factors such as production rates, material protection and straightness requirements will narrow down the selection.

For choices that could go either way, the economy of the pull-through straightening approach can't be overlooked, which makes it popular for many uncomplicated coil-handling applications and prevalent in shorter run, job-shop stamping operations. For stamping tough, springy high-strength materials or where floor space comes at a premium, the servo-driven straightener-feeder gets the call. And, for high-production stamping where versatility and production are the key factors, the conventional line with independent servo feed and independent straightener reigns supreme. MF

