Driven to Destack

Automotive metalforming demands robust prepress equipment that can move heavy blanks quickly and accurately. These requirements have propelled an evolution in destacking tables.

BY LOUIS A. KREN, SENIOR EDITOR

Feeding large, fast press lines requires prepress equipment that can keep up with big appetites. That's especially true in the unforgiving high-volume and time-sensitive world of automotive stamping. The need to feed high blank volumes quickly, accurately and safely has spawned an evolution in destacking equipment.

That's the word from Thomas Beach, executive vice president at Handling Specialty, Niagara Falls, NY (headquartered in Grimsby, Ontario, Canada), a supplier of destacking tables and other feed and assembly components to the automotive industry.

The company typically works with prepress-automation integrators such as ABB Body-in-White, Brampton, Ontario, Canada; Schuler Inc., Canton, MI; and High Production Technology, LLC, Napoleon, OH, to place destacking systems in automotive OEM stamping facilities as well as tier plants.

To produce more than 200,000 tons of steel body panels, doors, hoods, roofs and floor panels each year, destined for North American assembly plants, the Buffalo stamping facility of Ford Motor Co. employs a host of manual and automated destacking equipment installed over the past eight years. The systems include Handling Specialty stationary destacking tables for manual and automatic press feeding as well as more recent orders for self-propelled rail-guided carts that transport and lift blanks. Carts like these speak to the charge toward automation for metalformers looking to maximize production on high-volume parts. The cart tables index up as blank stores are depleted, allowing for blank loading at a consistent height. When empty, a cart table then retracts from the system as another preloaded cart moves in, allowing continuous press-line operation.

The cart tables at Ford have capacities from 20,000 to 40,000 lb. in dimensions to 90 by 180 in. to handle various blank sizes. They offer vertical travel of 27 in. and operate at two speeds: faster for entrance into or removal from the system, and slower for final positioning within the destacker. Proximity control limit switches ensure proper travel distances and steel bumpers protect machinery and blanks against harsh pressroom conditions. The bumpers sense contact and can shut down the cart to prevent damage.

To ensure proper blank placement on the tables and carts, Handling Specialty works with system integrators and Ford to design and drill hole templates in table tops for guide-pin insertion.

Faster and Safer

The decade-long trend toward automated destacking for automotive press operations mimics the automation drive in other areas of the pressroom—to increase efficiency, deal with increasingly large and complex blanks, and protect workers.

"Destacking automation becomes necessary when the blank reaches a physical size that makes manual loading prohibitive," explains Beach. "Manual loading in such cases can cause material damage or injuries. Also, automation investment is driven by increased part volumes."

Beach offers a number of benefits associated with automated destacking.

"It brings increased press productivity," he says. "Your press is an expen-

sive capital purchase, so long as it bangs, you are getting your money back. Anything that reduces quiet time in a press shop brings benefits.

"Typically," he continues, "employees prestage fully loaded destacking tables and the destacker picks each blank and feeds it into the press, depleting the currently installed table's supply. The table then lowers itself out of the way and exits while another prestaged destacking table rolls into the destacker and indexes itself to the proper vertical position for automated destacking. This way, the press never stops to wait for blanks. The continuous feed means more throughput, a must for high-volume jobs.

"When machines feed machines, workers remain far away from danger zones," Beach continues, emphasizing the safety aspect of automated destacking. "Here, workers only need to forktruck the blanks onto the destacking tables at a distant staging area. Prestaging away from danger zones allows increased time to properly locate blanks on the tables and check for material damage before blanks enter the press, providing increased quality control."

Self-propelled rail-guided carts, such as those in use at Ford, offer another level of automation and provide for unattended blank feeding. The destacking system communicates directly with the cart, instructing it on when to enter the destacker. Two-speed capability allows extremely accurate positioning within the destacker, important to ensure optimal blank pick up by suction cups on destacker end effectors. Tables designed with properly placed holes for guide pins further aid blank locating.

Other automated capability takes advantage of chain-driven roller systems to deliver blank skids onto destacking tables, increasing efficiency and preventing damage caused by forklifts.

"Blank stacks route to destacking tables via automatic guided vehicles (AGVs) equipped with powered roller conveyors," says Beach, explaining the process. "The conveyor rolls the blank skid off of the AGV and onto the

This destacking cart undergoes testing at an automotive OEM stamping facility. Note the suction-cup array located above the cart. In operation, the cart, loaded with blanks, moves into the line, and the cups grab single blanks from the stack and feed the press automatically. If desired, the empty cart can be rolled back out and another preloaded cart rolled in, ensuring continuous blank supply.

destacking table, negating the need for forklifts."

Keeping Pace with Destacker Automation

Helping drive the innovation in destacking tables is the need to keep pace with advances in destacking systems. These days, such systems reach higher speeds, handle a greater variety of blank weights, sizes and shapes, and feed ever-more sophisticated press equipment. An example can be found in the recent installations of state-of-the-art destackers for an automotive OEM in Michigan. Built by automation turnkey equipment builder and integrator High Production Technology and using Handling Specialty destacking tables, the systems can run to speeds of 17 strokes/min. and feed a press that tops out at 12 strokes/min.

"That is typical as destackers must run faster than the press to maintain cycle speed," explains Cory Richmond of High Production Technology.

To supply motion, the destackers employ linear motors as opposed to timing belts.

"Due to press speed and part size, the parts have to travel quite far during destacking," explains Richmond. "A timing belt allows travel for a certain distance then it must wrap around a pulley and come back. And it can't travel at high speeds back and forth without creating backlash. Linear motors, however, can travel an unlimited distance at much higher speeds and accuracies without backlash."

Those characteristics allow for longer destacking distances, improved productivity due to high-speed operation and improved blank positioning. Another plus, notes Richmond, is the increased weight capacity offered by linear-motor-driven destackers as opposed to their timing-belt counterparts, necessary for transporting heavy blanks.

Technology Transfers to Other Auto Applications

Improvements in destacking tables have benefits that go beyond prepress applications. For example, notes Beach, Handling Specialty has produced transfer and indexing tables for use in powertrain and engine assembly operations and to transfer and stage parts in automotive paint and body-in-white work.

Increasing in popularity among automotive OEMs are skillet conveyors, which employ lifting devices during final automotive trim assembly. Here, car bodies traveling along slow-moving conveyors are raised or lowered by the devices, facilitating assembly work performed by workers of various heights. By placing vehicles or assemblies at optimal heights for trim insertion, the lifters promote higher-quality production while providing an ergonomic environment for line workers. **MF**