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System Solution

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Meeting the Challenges of Total System Integration

In meeting a recent challenge for one such customer, increased material width and capacity was required to address upcoming production demands, and based on the variables such as press tonnage, press window widths and material handling capabilities already in place, 84" was identified as the ideal width to gear up for. In addition, multi-stage tooling requirements further qualified the need for a large bed area. As if the task wasn't daunting enough, certain production processes would require transfer capabilities within the press from station to station. Since press-to-press transfer operations were common to this customer, integrating in-die transfer capability within the new processing system was a logical step toward increased production.

The foundation of the process started with a USI Clearing 2000 ton press, and a completely updated and replaced electrical control, drawing on the knowledge and capabilities of the customer's personnel. The press control now incorporates die protection with load monitoring and programmable I/O capabilities, providing real-time feedback for controlling the timing functions within the tooling and other in-die monitoring tasks.

Second, an in-press transfer system was installed to address the transfer needs, the controls of which were integrated with the press control, utilizing touch screen programming and visual reference for station-to-station progress during actual production.

In this type of application, the initial stations in the tool are considered progressive punching stations, whereby the material is advanced through the stations by the feed system. Once the stamping is parted from the coil, the transfer mechanism picks up the advancing responsibility and carries the part through the transfer stations of tool.

In meeting the coil processing demands, ROWE Machinery, a division of Formtek located in Clinton, ME was chosen to supply an automated 84" wide coil handling system to be used with a 2000-ton Clearing transfer press. The system had to be flexible throughout a broad range of material processing capacities and be operator friendly. The customer processes material from .020" to .165" thickness with yields up to 95,000 PSI and widths ranging from 24" to 84".

Maximizing Flexibility and Performance

To offer maximum flexibility in the design and application of the customer's tooling and transfer press operations, ROWE provided a model HD-DOM-402-484, four-roll servo feed with a high performance control. The four 4" diameter matte chrome finish feed rolls provide twice the contact area with half the roll pressure to prevent slippage and marking when processing critical surface materials while five sets of backups prevent any roll deflection and provide the required roll pressure to process the heavy high yield material applications. An automatic lubrication system was provided to ensure all the critical grease points within the servo feed get greased automatically with a Trabon pump and timer ensuring lasting equipment performance. Powered adjustable edge guides allow the operator to control material position within the feed from a single point of adjustment. Anti back-up rolls on the entry of the servo feed prevent loss of material into the looping pit should the feed experience a loss of power or air pressure. An adjustable height cabinet base with powered height and clamping feature allows the operator the ability to adjust the pass line height of the feed +/- 6" with push button control. The entire feed unit is mounted on a rail system and has powered lateral travel capability to clear press and allow for blank feeding of transfer operations. In

order to provide closer timing of the feeding function to the tooling, Rowe's Speedmatic software was supplied. The Speedmatic system utilizes resolver-based profiling of the feed speed to actual press speed, allowing the feed system to back up the feed progression based on press movement. Profiling of the feed speed has allowed precise control of the material progression through the tool, particularly into the last progressive station where the stamping is parted out.

According to Matt Watson of Formtek, Maine, **“Operating in a conventional fire-and-feed mode requires the stroke-per-minute output to be timed such as to allow the transfer ample opportunity to clear the stamping up out of the last progressive station without being run into by the next stamping being progressed by the feed. By utilizing the Speedmatic function, the speed is profiled to follow right behind the transfer to allow an increase in production of nearly 20%.”**



ROWE HD-DOM-402-484 Four-Roll Servo Feed

Both intricate progressive dies and blanks are run in the 2000-ton Clearing press. Because of the blank fed operations which require a destacker to be brought into position, the feed has to move out of the way. A conventional line with independent servo feed and straightener were selected. With this style of equipment a looping pit was required. **Model HPTD84 threading tables** were provided to span the looping pit. The tables are double sided which when elevated cover the looping pit and allow material to be jogged from the straightener into the feed hands-free. When retracted, they form a barrier that blocks the looping pit to prevent personnel from getting too close to the material and point of possible injury. The positioning of the tables is all pushbutton controlled.

A model C6-4-64 heavy duty precision power driven stock straightener designed for pull off operation was supplied to flatten the wide range of material processed by the customer. The machine has four 6" diameter matte chrome pinch rolls. The rolls are hydraulically opened for thread-up and when closed allow the straightener to pull material from a non-powered stock



ROWE HPTD84 Threading Tables
(shown elevated for thread-up)

reel. Seven smooth chrome straightening rolls, 4" in diameter, ensure flat product when processing materials which range from .020" – .165". The 4" diameter straightening rolls were backed up in five places to prevent deflection when running the thicker high yield materials while allowing smaller diameter rolls with closer center distances for superior ability to flatten the thin material. An angular head starts material into the loop sooner and conserves floor space. Powered adjustable edge guides allow the operator to control material position within the straightener from a single point of adjustment. A modulating drive system with ultrasonic loop control allows adequate slack material to be maintained within the looping area for the various feed lengths processed through the system. An automatic lubrication system ensures all the critical grease points within the straightener get greased automatically with a Trabon pump and timer ensuring lasting equipment performance. An automated powered straightener head with auto head adjustment feature allows the straightener to adjust roll settings based on the coil O.D. As the coil depletes the roll settings compensate for the changes in coil set from full O.D. to I.D. of the coil.



ROWE HDPT-84 Hold-Down-Peeler Threader System

Ensuring Operator Safety

One key factor in the selection of the equipment was operator safety. Primary in the ease and safety of thread up of material in the system was a coordinated model **HDPT-84 hold-down-peeler system** comprised of an extensive series of features. Some are incorporated into the stock reel, some into the straightener, and others bridge the gap between units to facilitate the threading of material. These features allow the operator to thread the system hands free



ROWE Debender Unit

FEATURES:

- **A hold-down arm**, mounted to the straightener and extending to the centerline of the coil, is raised and lowered by two large bore air cylinders and has a polyurethane covered rider roll for stock protection and extra threading traction.
- **A rugged motor drive to the rider roll** helps direct the outer wrap of material toward the straightener when the reel is inched.
- **A pneumatically raised and lowered peeler table**, mounted to the entry end of the straightener, helps guide material from the reel at the appropriate angle for various coil diameters.
- **An air extendible peeler blade**, mounted within the peeler table, can be positioned directly under the lead edge of coils fully guiding material during the threading process.
- **A coil end debender system** which opens hydraulically wide enough to accept material is held in place while the bender leaves bend the material up or down (operator selectable) and prepares it for threading. This unit can also be used on the tail end of the coil.
- **Powered thread-up** pinch rolls are diamond knurled for maximum material traction and open wide to allow easy material passage when threading and during run mode.

Automated Controls

Solenoid operated valving with pushbutton controls and Rowe's "**Auto Ready**" function moves all threading features to a neutral position in preparation for automatic operation. **A full diagnostic touch screen** operator interface utilizes a multicolor display and input panel. Interface provides complete operator prompting of threading procedures, maintenance schedule, service points for the entire system, and in-depth diagnostic fault messages with recommended remedies. The touch screen also allows the operator to program in the material thickness and with this information the control automatically adjusts the powered straightener head to the proper position to remove coil set.

In addition, the system uses Rowe's "**Total System Control (TSC)**" package that is centered around a touch screen station at the feed. The TSC allows job parameters to be stored and recalled for not only the normal feed length, batch count, and speed parameters of the feed, but also allows material specifications to be stored. Once recalled from the system's 200-job memory, these parameters automatically set feed length, speed, straightener roll position and edge guides position to material width on both the feed and the straightener. As an added feature, these functions can be overridden by the operator to address particular needs of specific setups.

Efficient Coil Loading and Payoff

A model 50084-H-DSJ non-powered stock reel with 50,000 lbs. capacity was supplied to support the steel coils. The reel has an I.D. range of 19 \hat{i} -24.5 \hat{i} and a O.D. capacity of 72 \hat{i} . It also has a variable tension ultrasonic controlled brake system. As the coil depletes an ultrasonic sensor sees a reduction in coil O.D. and adjusts the brake automatically. This gives constant brake tension for smooth processing of coils from full O.D. to coil depletion. This is essential in processing thin critical fin-



ROWE 50084-H-DSJ Non-Powered Stock Reel

ished material. A secondary floor mounted hold down arm with powered rider roll provides for safe processing of the high yield material applications. Coil staging and positioning on the mandrel is accomplished with a **model BGY-H-50-24 traveling coil loading car**. Coils weighing up to 50,000 lbs. are easily loaded on the stock reel. The car uses a common track system with the stock reel and is hydraulically powered and controlled with a remote jog operator pendant. The coil car has a 24" lift capacity and anti tip arms which allow a wide range of coil widths and outside diameters to be processed. The coil car is also supplied with an automatic down and out feature to prevent the car from being inadvertently left under the stock reel and causing potential damage or operator safety hazard. When the auto-ready function of system is energized, the car automatically drops and clears stock reel.

ROWE worked very closely with the customer to ensure optimum performance of the equipment to meet application requirements. The system also had to be easy to operate, flexible and most of all dependable. As with all ROWE equipment this system was supplied with an all inclusive 2-year warranty.



ROWE's 85,000 SQ.FT. Facility in Clinton, Maine

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