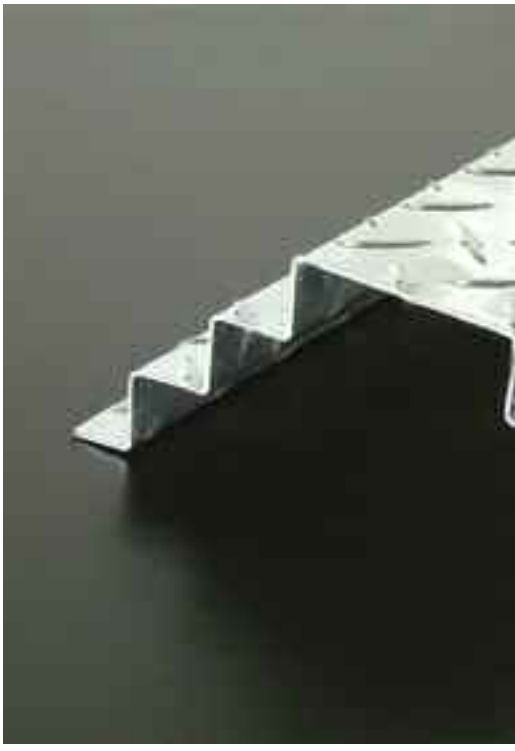
Controlling Forming Costs in Challenging Times

In these challenging times, making the right decisions is no longer important, it is critical! Today's metal fabricators are under more pressure to produce parts better, faster and cheaper than at any time in recent history. They are facing not only increased domestic competition but, because of globalization, they are confronted with significant competitive challenges from the world market as well. Compounding this with unprecedented increase in material, energy and operating costs, fabricators must operate at optimal efficiency if they intend to survive.

Operating a press brake department at optimal efficiency requires the utilization of the most cost-effective tooling, the most efficient forming methods, and the elimination of as many downstream costs as possible.

Selecting the Right Tooling for the Job

Selecting the most cost-effective tooling is often more difficult than it sounds. It requires the careful consideration of factors such as part geometry and tolerance, press brake accuracy and tonnage capacity, production volume, and whether or not a special tool is required. Many tooling suppliers will insist that precision ground tooling is always the best option. Unfortunately, this statement frequently is made because precision ground tooling is the only option they have available. While some applications are well suited to air forming with precision ground tooling, other tight tolerance parts may require



bottom bending or even coining.

While it is true that air forming tends to be the most versatile forming method, it requires both extremely accurate, and extremely expensive, machines and tooling. The reason for this is quite simple. When air forming, any uncompensated variation in material thickness, spring back, tensile strength or ram position will adversely affect angular consistency. For example, when air forming 16 GA. material over a ½" vee die, a combined variance of material thickness, ram position and tooling accuracy of .0025" will cause a bend error of 1°. Therefore, it is easy to understand why air forming is not always the best solution. If the decision is made to bottom bend, using less expensive conventional or precision-planed tooling is usually a great way to control costs. There is no need to spend 300% or 400% more for a precision ground tool when special configuration tools typically are designed for bottom bending.

When determining whether or not to use a special tool, one must consider production volume, tooling cost and machine capacity. Assuming that the press brake has adequate tonnage, investing in a multiple form special tool is usually a wise decision. For example, utilizing a hat channel die instead of standard punch and die will in-

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crease the throughput rate by 400% or more. With a productivity gain such as this, it is easy to see how investing in a special tool can result in significant increases in profitability. Once the potential increase in the production rate has been determined, it is quite simple to compare the cost of the special tool to the cost savings that would be realized through increased productivity.

Determining the Optimal Forming Method

Another area to be reviewed for potential cost savings is that of forming methods. When examining forming methods, it is important to consider ways to minimize downtime (set-up and handling time) and maximize throughput rates. There are many options available to help minimize set-up time. While some of these options are extremely expensive, others are quite inexpensive.

The key to determining which system, if any, to use is, once again, to compare the cost of the option to the potential savings. For most shops, spending a small fortune on hydraulic clamping and precision ground tooling would be a costly error. Unless the

savings realized through reduction in setup time outweighs the cost of the system rather quickly, the investment should not be made. Of course, the company's management best makes the decision regarding the acceptable period for the return on investment.

There are ways to minimize setup time that involve no additional cost. Scheduling production so as to group like material types and thicknesses is one way. Another way is to utilize tools such as the ROLLA-V dies, which are designed to form a wide variety of material types, thicknesses and angles with a single tool.

As discussed earlier, throughput rates can be maximized by utilizing multiple-form, single-hit tools such as hat channel dies. Other types of special tools also can be used to increase productivity. For example, by eliminating whip-up, rotary benders reduce operator fatigue. In certain applications, such as flanging large panels, eliminating the movement of the panel could enable a single operator to form parts that would have required two operators if standard tools were used. Furthermore, eliminating whip up usually results in lower scrap rates because the potential for back bending is eliminated along with the movement.

Another effective means of increasing throughput is gang forming. Gang forming is the practice of forming multiple parts in a single hit and is, therefore, best suited for small parts. In order to facilitate gang forming, tool sets can be equipped with full-length back gages and spring loaded front pushers. The operator simply retracts the front pusher and loads the blanks. Once the operator releases the pusher, the blanks are held firmly in place against the built-in back gage. This practice is not only

highly productive but is often much safer, since the operator's hands are clear of the die space when forming is initiated.

Lastly, parts should be formed in a single handling and setup whenever it is economically feasible to do so. To achieve this goal, it is sometimes necessary to purchase tool sets with matched shut heights. These are readily available in all quality grades from conventional planed tools to precision ground tools. Once again, as long as the cost savings resulting from the increased productivity outweighs the costs of the matched shut height tools, they should be used.

Eliminating Downstream Costs

When we consider total-forming costs, we must always consider the cost of secondary operations, especially when they are made necessary due to the limitations of traditional "V" die forming. Since secondary operations not only add cost, but also consume resources that could otherwise be deployed in profit-generating activities, they must be eliminated whenever possible. Utilizing the ROLLA-V forming technology is the best way to achieve that goal.

ROLLA-V dies are capable of forming parts that would be impossible to achieve over traditional vee dies. Whether the problem is related to flange length, the distortion of holes or slots in the bend area, or die marking, the ROLLA-V's unique forming action provides the solution. Prior to bending, the work piece is placed on top of the ROLLA-V. When the upper tool contacts the part, it is held firmly in place on the forming surface of the rotors. As bending pressure is applied, the rotors turn, pushing the work piece up and causing it to be formed around the punch tip. This unique forming action allows the ROLLA-V to consistently form parts with short or tapered flanges and materials with irregular thicknesses such as thread plate or perforated material. Since the work piece is supported from the underside during forming, the "weakened" areas of the part containing the holes or slots cannot bend prematurely. Instead, they are forced to remain on plane with the solid portions of the part. This not only eliminates the distortion of the cutout features but also the need for post-form machining.

Finally, because the bending pressure is distributed over a wide surface area, and there is little or no relative movement between the work piece and the rotors, die marking is usually not a problem. This can eliminate the need to purchase vinyl coated material or use time-consuming die cover films when forming.

Conclusion

Operating any business in challenging times requires innovative methods and equipment. By carefully examining each facet of your press brake operations, significant improvement can be made. Instead of doing things the way "they have always been done," it is important to challenge the status quo. In times like these, significant cost savings and productivity increases can make the difference between success and failure. ❑

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