Too Many Dies for QDC?

No Need to Worry

Concerned that quick die change (QDC) is too complex and costly due to the number and variety of dies in your shop? Here's some equipment that will ease your worries.

BY THOMAS F. TINETTI

A raised rolling bolster retrofitted onto a press is an excellent method for optimizing die-exchange times.

Too often I meet with potential customers interested in quick die change (QDC) yet are overwhelmed by the prospect of modifying the ever-increasing number of active dies run in their presses. Typically these companies have a variety of mid-sized presses—50 to 800 tons. Compounding the problem: Any particular die may be run in two or more presses. Die sizes vary dramatically, there is no die standardization, there are multiple press manufacturers, dies are owned by the end customer, etc. Implementing QDC is quickly dismissed as being too complicated and too costly.

But do not fall into this trap. QDC is a valuable tool for fighting demands from customers and from foreign competition for lower-cost and higher-quality parts. Described in this article are two simple, affordable alternatives that companies with "too many tools" should consider: common plates and raised rolling bolsters. They are valuable components in a QDC plan that brings considerable production increases and cost savings.

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Common Plates

Common Plates provide a simple means to consolidate multiple die sizes in a particular press. Rather than installing a subplate on each die, only two common plates are needed for each of the targeted presses—one sits in the press with the working die while the other stages the next die to be run in production. Guide and locating features designed into the plates ensure precise positioning of the die in the press. Keyways, pins or holes are used to ensure that dies position correctly onto the common plate.

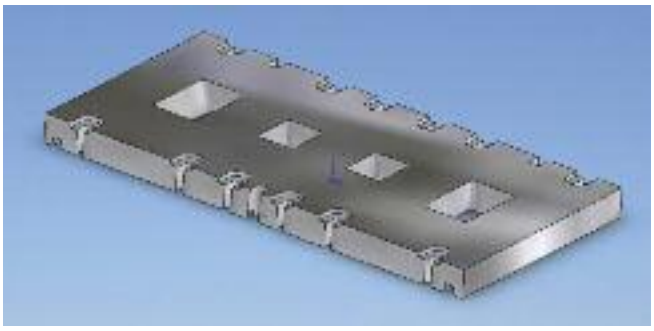
On smaller dies, strategically placed threaded holes can be used to mount the dies to the common plates. For

larger dies, T-slots can be machined into the common plates and used to secure the dies. Common plates generally are designed with the same front-to-back and right-to-left dimensions as the bolster; their depth depends on tool weight and maximum footprint.

Common plates allow for the new die to be mounted and staged near the press so that when a production run completes, the dies can be exchanged rapidly. In this scenario, die mounting and preparation occurs away from the press, in the plant's toolroom for instance, and the new die sits close to the press when a production run using the previous die completes. The old die, upon removal from the press, temporarily stores in the immediate area of the press while the new die is retrieved, placed into the press and positioned using the locating features.

Standardization is the key in any QDC system and the use of common plates is a viable strategy toward standardization of existing dies. The common plate allows for use of die lifters to ease the movement of dies into and out of the press, and bolster extensions to ensure that dies are easily accessible and kept away from damage-susceptible components such as light curtains and scrap conveyors. Also, hydraulic clamping becomes more worthwhile because fixed clamping can be used to secure a common plate in position, eliminating the need for an operator to remove and reposition the clamps during each die-exchange sequence. For larger, heavier dies, specialized equipment such as die carts, T-tables and staging tables can be employed, saving additional production minutes.

The biggest pitfall with the common plate: It occupies some of the press' shut height. This requires that spacers or parallels, used under the die to attain the correct shut height, be machined to shorter lengths. Does this mean that all of the dies must be modified? The answer is, "No." Generally speaking, 80 percent of production occurs with 20 percent of the dies, so stampers should concentrate efforts on the biggest runners, those dies that remain in production most often. Doing so will reap significant productivity benefits.



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Raised Rolling Bolsters

Another method for optimizing die-exchange times: Retrofit a raised rolling bolster onto a press. As the name implies, a raised rolling bolster is similar to the rolling bolsters used for years on large-bed presses for QDC. The bolster literally lifts off of the press bed and moves out from under the press ram so that the installed die is readily accessible. This method proves particularly effective if the press area houses an overhead crane.

A complete system includes hydraulic roller bars to lift the bolster off of the press bed; an actuator to move the bolster into and out of the press; a set of heavy-duty bolster extensions to support the bolster when it is out of the press; and a set of clamps to lock the bolster on the press bed during production.

Typically, the bolster must be machined to accommodate the roller bars, and in some cases, machining of the clamps also is required. Again, locating features—keyways, pins or holes—should be employed to assure quick and accurate positioning of the die onto the bolster. The die can be secured to the bolster using traditional methods, but hydraulic clamps are a faster alternative. This method provides minimal impact to the shut height, limited only to the lift height of the hydraulic roller bars. And no die modifications are necessary, save the locating features discussed above, which in many cases already exist.

Of course, the key is to have the new die prepped and staged at the press before the existing die's production run completes. If using an overhead crane, install a set of die lift straps or chains to ready the new die for transport. If using a forklift, clear an area for staging the new die and for temporary storage of the die currently completing production. Both areas should allow easy access for the forklift.

As an added benefit, the raised rolling bolster can function as a die-maintenance tool. If the die in production requires immediate repair, the raised rolling bolster can move the lower shoe out of the press, optimizing access to the lower die shoe and enhancing access to the upper die shoe mounted on the ram. In many cases, maintenance personnel can solve the die issue in a few minutes and place the die back into production, a far better alternative than performing an unscheduled die exchange.

Adopt an Entire QDC Strategy

The equipment described here should be a part of a larger QDC strategy that must be embraced by everyone from the press operator to the company president. When it comes down to it there are two types of presses: ones that make you money and ones that cost you money. A press shut down for die change costs the company money in lost opportunity, changeover labor, etc. It only stands to reason that minimizing die-exchange down time increases productivity and profits. For example; a time savings of 30 to 60 min. per 40-hour shift represents 6.25 to 12.5 percent of shift production time.

Productivity increases are the most obvious, but not the only, benefit of QDC. Other advantages include: reduced inventory levels, reduced floor-space requirements, deferred or avoided capital expenditures for additional equipment, improved product quality, etc. Never believe that there are too many dies for QDC. The process brings too many benefits to ignore. **MF**