PRESS LOADING WITH VACUUM

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Fig. 1

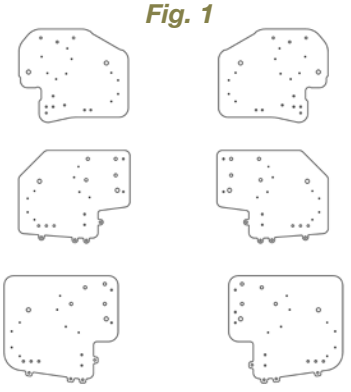

Fig. 2

Steel stamping, as it is commonly referred to, is the process of taking a flat piece of steel through a variety of inline presses to eventually form a finished part such as an automotive body panel or other pressed metal part. The method of transfer employed in taking the panels from one press to the other is normally done with vacuum. The typical end of arm tool used is similar to the type shown in *Fig. 1*, which consists of an extruded aluminum frame with various brackets holding vacuum cups, each connected to an individual vacuum venturi (compressed air powered). If the panel being handled is always the same shape and form, then this method of vacuum tool is adequate in being able to consistently pick and place the part accurately. However, if the part being handled changes shape and size frequently, then a more universal approach is required.

Fig. 2 shows a CAD drawing with an arrangement of different aluminum plates that have to be handled by a single vacuum tool. The biggest problem is the infinite arrangement of through holes, which change in both size and position depending on the part. To use a typical vacuum cup arrangement, as shown in *Fig. 1*, would require continuous operator adjustment which, depending on the size of batch run, could be extremely time consuming. Therefore, Vacuforce was called upon to develop a solution for this application to offer maximum productivity with one single vacuum tool.

The Squid system *(Fig. 3)* was built and employed in this particular application. This particular Squid tool consists of 25 Ø40mm vacuum cups that are all connected to the same vacuum source. However, the vacuum cups in *Fig. 4*, a CAD overlay of the Squid on a random part, are not all covered. Therefore, in a traditional vacuum cup tool, these cups would "leak" and the remaining cups would not be able to achieve vacuum (unless the vacuum pump was enormous) and be able to compensate for the leak. However, The Squid employs a self-closing valve *(Fig. 5)*, which in fluid power minds is a velocity fuse. If the valve experiences a vacuum flow because a cup was leaking or even damaged, the valve closes, isolating that particular cup from The Squid system, enabling full vacuum force on the remaining cups.

This method of cup isolation enables the integrator/user to be unconcerned as to what cups are covered and what cups are not by the product being handled. It also enables the vacuum source to be smaller than if the system had to compensate for vacuum leaks. The self-closing valve (SCV) requires as little as 0.5 cfm to close and as it is adjustable, it can be used on porous surfaces or very large diameter cups that have a larger internal volume.

This application requires very little other hardware. A manual application instead of the usual robotic installation employed an H frame pneumatic lifter and an external compressed air powered venturi for providing vacuum to two Squid systems in this tandem operation. The operator placed The Squid on the plates, turned on the vacuum venturi and lifted the parts into the press and then repeated the operation in reverse by picking up the pieces after the press operation without any concern as to the shape of the part or the number or position of the through holes.

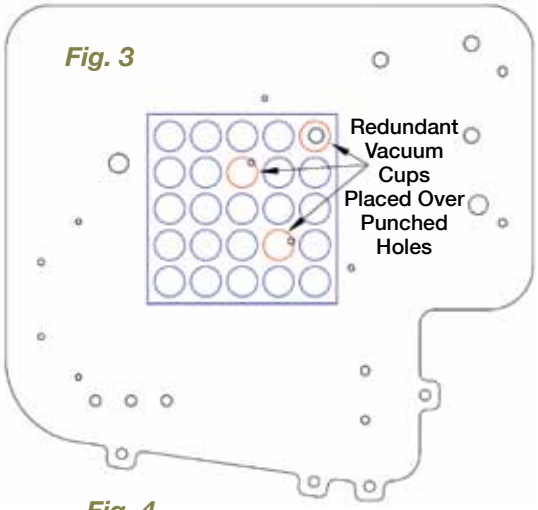

Fig. 3

Fig. 4

The testing of this application can be viewed at http://www.youtube.com/user/Vacuforce.

This article is intended as a general guide and as with any industrial application involving machinery choice, independent professional advice should be sought to ensure correct selection and installation.

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