Transfer Technology Systems
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Why Use A Transfer System?
Today’s manufacturing trends particularly in the automotive industry, require metalformers to produce complex parts from thinner yet stronger materials. To meet this requirement modern press builders have designed transfer technology capable of stamping very complex parts. These systems are flexible, allowing metalformers to manipulate the part during production and reducing material waste when compared to progressive die, coil-fed applications. In addition to dedicated transfer presses, straightside presses and gap frame presses can be used as transfer systems.

Deciding Which Transfer System To Use
Deciding on which transfer system is appropriate depends on two basic criteria; part complexity and production volume. It is also important to find a press builder that can act as a single source for the press, the automation, the ancillary equipment, the integration services, the installation, the runoff and the post-installation support.

Transfer Presses
Transfer presses are most commonly used for large complex parts or just-in-time-manufacturing demands which require production of a maximum number of parts in a limited time frame. Transfer presses are also used for the production of complete assemblies.

When selecting a transfer press, there are a number of elements to consider. A transfer press should have the capability to eliminate production problems so that it is not necessary to stop the press (Figure 1). Equally important is the capability to enhance the work ratio and increase unit/time productivity by reducing the time it takes to change the die. Certain press features can also help achieve these objectives.

A blank feeding device can increase productivity by sensing and correcting double-blank misfeeds and reloading the blank feeder without requiring the operator to stop the press. The blank feeding device should be able to automatically discharge extra blanks when a double-blank is detected. Blank hold devices allow blanks to be automatically held while the next blank stacker is changed eliminating the need for the operator to stop the press when the supply of blanks is low. A data bank formula device can also raise productivity by making it possible to perform die changes more quickly.

Figure 1- A transfer press should have the capability to eliminate production problems so the operator does not have to stop the press.
If a transfer press lacks a servo transfer mechanism, the press will not have the ability to change the motion profile for the transfer pitch, the transfer bar clamp motion and the lift motion. A transfer press equipped with an electronic servo transfer mechanism can deliver increased production speeds and greater efficiency because all three profiles can be adjusted and retimed for each part or each job to achieve optimal operating speed. In addition, once job programs have been written, they can be stored in the job memory eliminating the need to constantly reprogram the press.

Crank and link motion options for transfer presses add flexibility by making it possible for the press to meet unique part production requirements. A straight crank drive can provide the additional transfer time needed to move parts across the die to the next station. Link motion can improve part quality by reducing punch velocity and holding pressure on the workpiece longer. For a detailed explanation of link motion see AIDA Tech, Volume 3, *The Use of Link Motion on Mechanical Presses*.

Wider suspension point spacing increases the off-center load bearing capacity contributing to flexibility in the design and layout of dies. Resistance to slide tipping – caused by off-center loads – is also increased to help maintain dynamic accuracy during stroking. Longitudinal and transverse movement can be minimized with an eight-point square slide guide. A synchronized transfer drive can provide uninterrupted production by eliminating frequent machine stop pages.

**Straightside Presses**

When considering an automated press system – whether the focus is progressive-die operations which use coil feeders, or transfer-die operations which use transfer feeds – the press of choice is generally a straightside. Double crank straightside presses (can range from 300 to 3000 tons and more) are used to produce massive parts requiring corresponding stroke lengths. When used in a tandem line, automation can deliver improved productivity as parts move from press to press (Figure 2).

In a two or more press system, the straightside can be run individually or, when extra tooling is required, as a single large transfer press by initiating the intermediate stage between the presses and running them in a continuous, synchronized operation (Figure 3).
Transfer system programming can optimize the acceleration/deceleration curves for maximum productivity and strokes per minute. A free programmable dimension in 3-axes capability (transfer pitch, clamp pitch and lift pitch) can increase flexibility.

High rigidity and low bed deflection are essential to part quality and accuracy. Other press features should include link motion and a wet clutch and brake for nearly maintenance-free operation.

Straightside unitized frame presses (usually 200 to 400 tons) can be used for multi purpose applications. When used as a transfer unit, two presses can provide up to 12 tooling stations with material feeding left to right through both presses. When used individually, the first press feeds left to right with up to six tooling stations. The second press can stamp a different part feeding material right to left with up to six tooling stations. This combination can provide more tonnage capacity without the capital equipment costs of a dedicated transfer system.

Gap Frame Presses
A gap frame press transfer system also offers flexibility with an investment cost of one-third of a dedicated transfer press system. There are a number of factors to examine to determine if a gap press is a suitable choice. Parts produced from very thin material usually require an accuracy not available in most gap presses. Because material width is limited by the front-to-back area of the gap’s bed area, parts requiring very thick materials can quickly exceed the tonnage capacity of a gap press.

Large parts and high tonnage blanking operations are not good candidates for a gap press. Drawn parts typically can not exceed four inches. A narrow front-to-back bed area limits the size of the die that can be used. Part volume requirements may dictate operating speeds that exceed what is available on a gap press. Parts with strict tolerance requirements may not be suitable for a gap press either.

However, many stampings produced in progressive or transfer dies can be...
successfully run on a gap press line.  
(Figure 4). The advantages of a gap frame transfer system can help determine if this choice is appropriate.  
Higher material yields are possible because blanks are used. Gap transfer presses do not require one end of the product to be consistently connected to the coil during the forming process.  
This feature delivers greater freedom when handling complex forming operations. Because the part is conveyed in mid-air between stations without touching the dies, die structure is simpler and less expensive.

With the ability to connect as many gap presses as needed, the transfer system provides the capability to handle a wide range of stampings (Figure 5). Yet the physical size of the presses is small, making the line suitable for factories with low ceilings. The system does not require large accessory equipment or a pit, making press layout easy to change. Transportation and rigging costs are minimal. For accurate parts and extended tool life, a gap press must offer an extremely rigid frame, low bearing clearance and small angular deflection.

**Summary**

Transfer systems can offer solutions to companies who encounter changing industry requirements. Depending upon budget restrictions and part needs, there are several options available. Selecting the appropriate system can allow flexibility to perform additional jobs.