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NEW DEVELOPMENTS IN PRESS SLIDE GUIDE SYSTEMS

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The function of the slide guide system in a metal forming press is to ensure the alignment of the punch and die during the cutting, bending, drawing, coining, extruding, etc. which is being performed on the metal as the die closes. Only the press guiding system can accomplish this feat. Die guide posts and bushings are meant to be used during construction, maintenance and setting of the die. They are not of sufficient size to act as the primary guiding system for a stamping operation and will soon need replacement if not supported by a good press slide guiding system.

Press slide guide systems have experienced incremental improvements over the last 75 to 100 years. Beginning with molten babbit being poured between the slide and press columns and operating without lubrication then progressing to "V" type and 45 degree gibs **(see Figure #1)** with grease lubrication. Next came the 6 and 8 point square guides with grease or lost oil lubrication and finally the addition of high volume re-circulating oil **(see Figure #2 and #3)**.

V-TYPE GIBBING

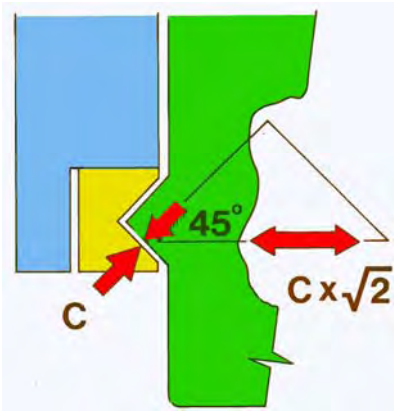

Figure #1

6 POINT SLIDE GUIDE

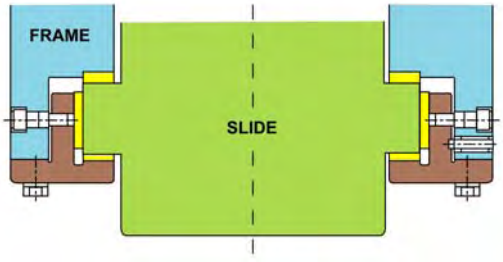

Figure #2

8 POINT SLIDE GUIDE

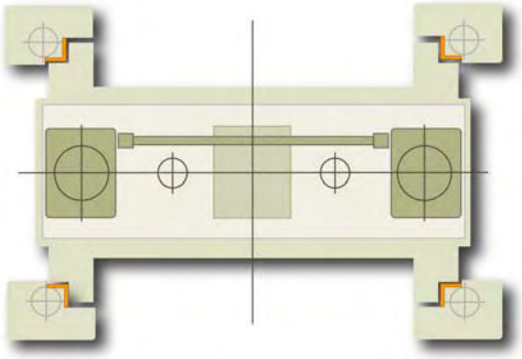

Figure #3

The common thread that winds through each of these improvements is the need to more accurately guide the press slide through the entire stroke. The continual improvement in slide guiding allows for tighter tolerances in the manufacture of dies that produce ever more complex stampings with better accuracy and higher quality. Another benefit of improved press slide guides is a reduction in die maintenance and significant increases in die life.

Historically, press slide guide systems have always improved as the demands for higher quality, increased part complexity and material toughness in metal stampings have increased. This trend continues today and the results can be seen in the following innovating guide systems.

Lube Free Zero-Clearance Roller Bearing Slide Guides

A recent advancement in slide guiding for standard straight side presses has been the introduction of lube free, zero-clearance, roller bearings into the slide guide system.

Historically, lube free roller slide guide technology and its' advantages, have belonged exclusively to high-speed presses to meet a specific process requirement. High-speed presses are largely used to run very thin materials, a manufacturing process that requires the press to control small punch to die clearances. Lube free roller slide guides provide zero-clearance for accurate guiding of the press slide which minimizes the amount of punch and die chipping that can occur during production.

Manufacturing demands have begun to emerge for a press that could produce a mix of conventional and highly cosmetic parts without the part contamination sometimes associated with oil film slide guides. But the technology didn't exist. Lube free roller slide guides were traditionally not a design feature of the standard straight side press, the primary choice for this type of multi-purpose work.

Though more expensive to produce than a standard oil film slide guide, one supplier saw potential in taking a system used for slide guide requirements in high speed presses and adapting it for other uses.

Following nearly 24 months of research and development and talking with manufacturers about production needs, AIDA-America designed and built a large tie-rod straight side press series with lube free, zero-clearance, roller bearing slide guides as a standard feature **(see figures #4 and #5)**.

The initial development of lube free, zero-clearance, roller bearing slide guides for standard straight side presses was done to address growing requirements in the appliance industry.

Increased production of parts from cosmetic materials like brushed and polished aluminum and stainless steel and pre-coated material dictated there be no press lube contamination of the die space. Since roller slide guides are lube free, the potential for press oil contamination of a part is eliminated. In addition, drip pots used to catch oil from a standard oil film guide system, can be removed along with the potential for contamination of the press lubricant by die oil that may splash into the drip pots during manufacturing processes. Eliminating the drip pots also improves die pace access.

Figure #4

Figure #5

This development of a lube-free slide guide - different from high-speed standard slide guide technology - employs a proprietary roller bearing mount with the ability to swivel. This capability helps the roller maintain contact with the guide surface on the column during off-center load situations **(see Figure #6)**.

Increases in operations like in-die tapping and hardware insertion in the die have led to use of larger dies and more transfer die applications. With zero-clearance, the dry slide guide improves slide guiding and its "zero-clearance" characteristic provides immediate resistance to any lateral slide movement caused by off-center loads. Standard oil film bearings typically allow some degree of lateral movement, the amount of which depends on how much clearance there is.

Lube free, zero-clearance, roller bearing slide guides now make it possible for manufacturers to use a straight side press to produce a variety of stampings from high volume, thick progressive die parts to larger, lower volume, high cosmetic pieces. And since these slide guides are lube free, there's no chance of oil contaminating the parts.

Since its introduction in 2001, the tie-rod straight side press with its unique lube free roller bearing slide guides has established itself in the appliance industry and found acceptance in a number of other markets including automotive, lighting, HVAC, furniture, hardware and farm and garden machinery.

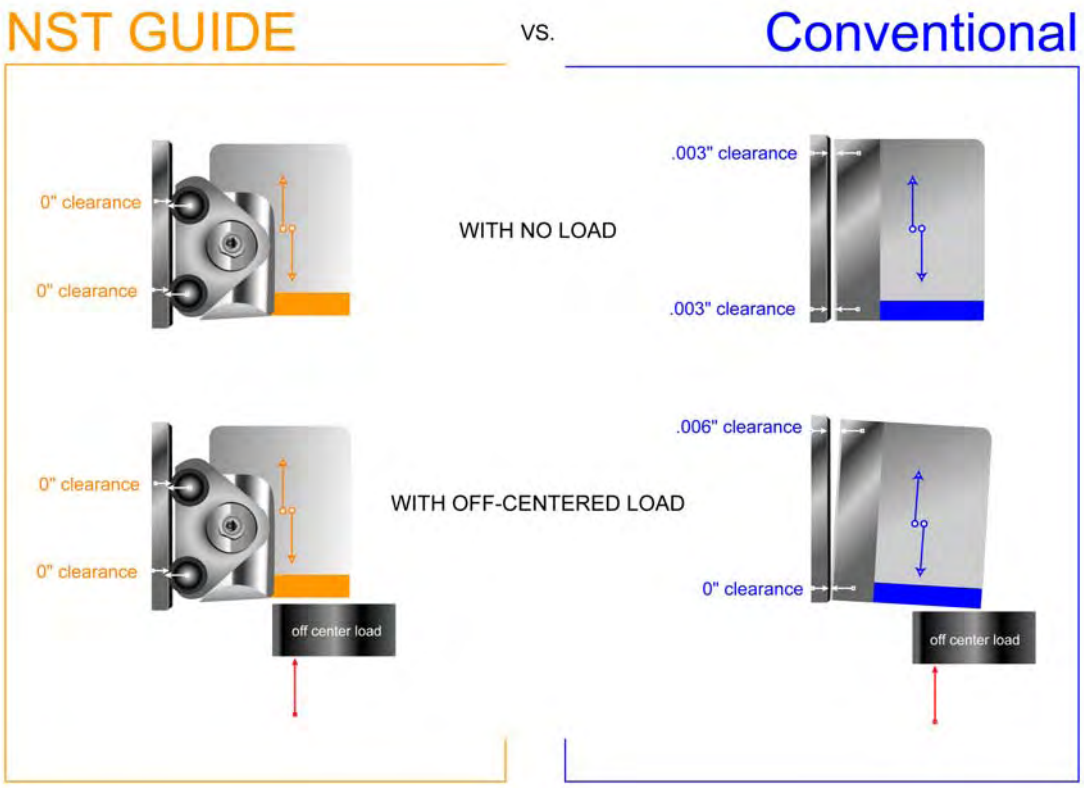

Figure #6

Preloaded, Zero-Clearance Slide Guides With Oil Lubrication

The latest development in precision slide guiding is the pre-loaded, zero clearance slide guide system with high-pressure oil lubrication. As with all other improvements in slide guiding, this system was developed to meet the increasing demands for more press accuracy. The result is a press that is more accurate than a die set because of this "ULTIMATE" slide guide.

Slide tipping caused by high off-center die loads, slide shimmy caused by shock at the point of contact between the punch and material and snap-through at the time the material fractures are some of the biggest problems in a stamping operation. The adoption of the "ULTIMATE" slide guide addresses all three of these issues.

The guides consist of spherical shoes operating against flat guide ways attached to a massive frame structure **(see Figure #7)**. The press slide is very tall which enables the guide points to be spaced far apart providing extremely long slide guides. The surfaces of the mating components are made of materials that possess natural lubricity. Oil is then forced between these pre-loaded surfaces. This combination of pre-load and oil lubrication not only makes the slide guide very stiff but also provides long life with little or no wear.

Summary

The production of complex parts from stronger or cosmetically enhanced materials at ever increasing speeds is a trend that will not be reversed. Press slide guide systems will continue to get better because of the metal stamping industry's demands for greater part accuracy and improved die life. Today, with the introduction of innovative improvements in the area of slide guides, the press may be the most accurate piece in a metal stamping system.

9 POINT SLIDE GUIDE

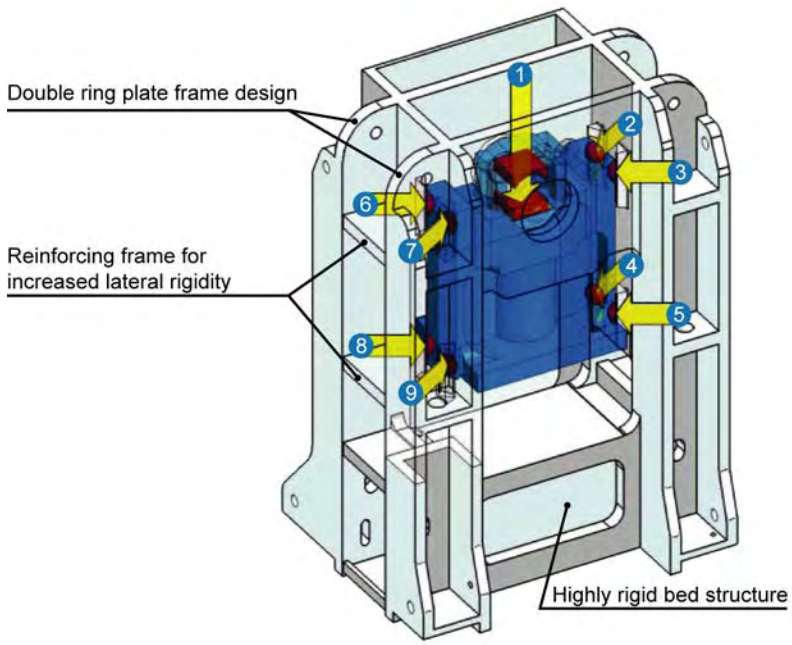

Figure #7