Interplex

Tech Bulletin

Precision Cold Forging Progressive Stamping Enables Cost Effective Production of Complex Parts

Overview

Both Cold Forging and Precision Stamping are proven technologies used in the fabrication of parts for a wide range of industries. Many of our previous Tech Bulletins have detailed the benefits of each technology, and in several cases, these processes are thought of as an either-or choice.

This Tech Bulletin provides insights into how combining these technologies in a process known as Precision Cold Forging Progressive Stamping can provide significant synergies and additional benefits for the cost-effective production of complex parts that cannot easily be created by either technique alone.

What is Cold Forging?

As detailed in other Interplex Tech Bulletins, Cold Forging is essentially an impact forming process in which billets of raw material are compressed and reformed into a part's desired shape. Cold Forging offers the key benefits of lower costs, rapid high-volume throughput, high part strength, and very efficient material utilization. This, in comparison to processes like machining that remove significant amounts of raw material rather than simply reforming all the material into the desired shape.

Figure 1 – Cold Forged Automotive Seat Belt Gear

What is Precision Stamping?

Precision Stamping is another proven technology that uses a press and die to form sheet metal, blanks or coil material into desired shapes. Variations of the stamping process can effectively yield several different output results including bending, embossing, flanging, coining, etc.

Figure 2 – Precision Stamped Busbar

Like Cold Forging, Precision Stamping typically offers high material utilization with minimal waste and can also deliver high-volume production results. Automation-friendly stamping processes can accept a variety of inputs and can be effectively configured as either single-step or multi-step operations, in which several different stamping operations are sequenced to create complex, multi-featured parts.

Complementary Integration of Two Proven Technologies

While Cold Forging and Precision Stamping can be effectively deployed as standalone processes with excellent results for specific part manufacturing applications, they often can be even more powerful when combined to sequence the outputs from Cold Forging into complementary Precision Stamping operations.

Typically, the integrated Cold Forging Progressive Stamping process starts with Cold Forged net-shape parts which feed into one or more Precision Stamping operations to create additional features and/or complex configurations. This tightly integrated set of compatible processes can be optimized for high-volume and cost-effectiveness, as compared to other non-complementary secondary processes such as machining, welding, etc.

Both Cold Forging and Precision Stamping use presses and dies to form parts, but the cost, size and footprint of the machines for different processes can differ significantly. For example, creating very large and/or complex-featured parts solely by Cold Forging can require exponentially large and expensive presses. If these machines are underutilized, vendors are likely to amortize a larger portion of their cost into the parts produced for customers. In contrast, stamping presses of all sizes tend to offer a high level of flexibility for handling complex features and can therefore maintain high utilization rates while handling a wide range of applications.

Precision Cold Forging Progressive Stamping is a unique multi-technology approach that adds value by bringing together the process knowledge, equipment, production methods and applications-focused design expertise needed to blend these processes for optimal results.

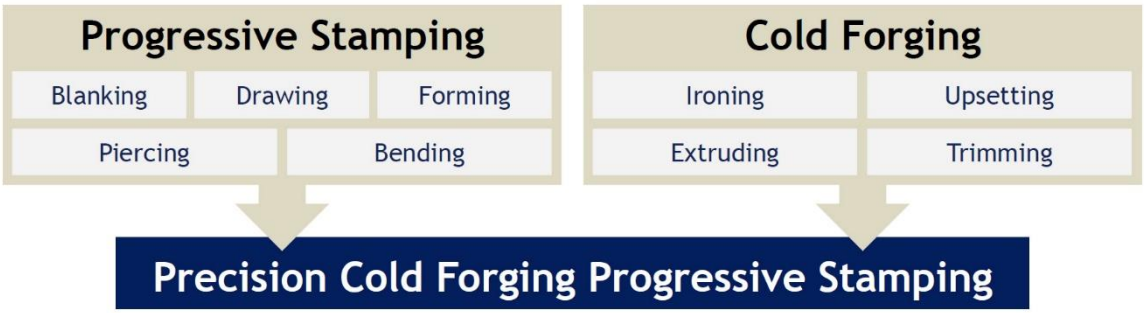

Figure 3 – Precision Cold Forging Progressive Stamping Leverages a Blend of Complementary Processes

Examples of Precision Cold Forging Progressive Stamping Parts

Generally, Precision Cold Forging Progressive Stamping offers an ideal solution for cost-effective, high-volume production of parts with multiple complex features, especially when the features need to be implemented in three dimensional designs.

The following pictures depict some examples of finished Precision Cold Forging Progressive Stamped parts and the materials they are made of:

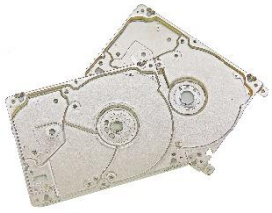

Figure 4 – Hard Disk Drive (HDD) Bases (SPCD Cold Rolled Steel)

Figure 5 – Yoke Plate for HDD Voice Coil Motor Actuator (SPCC Cold Rolled Steel)

Figure 6 – HDD Disk Separator Plate (5052 Aluminum Alloy)

Figure 7 – HDD Disk Clamp (6061 Aluminum Alloy)

Figure 8 – HDD Optical Pickup Yoke (SPCC Cold Rolled Steel)

Figure 9 – Power Tool Cap (6061 Aluminum Alloy)

Figure 10 – Automotive Seat Belt Component (16MnCr5 Alloy Steel)

Figure 11 – Earphone Support Plate (SPCC Cold Rolled Steel)

Figure 12 – Mining Bit (15B37H Medium Carbon Steel)

Summary

By combining these two proven, flexible, cost-effective processes, Precision Cold Forging Progressive Stamping provides a seamless, multi-step, automation-friendly methodology for creating complex 3D parts across a range of industries. The integrated process is optimized for part designs that include a wide variety of features and require high strength, with complementary and compatible process steps to eliminate inefficient secondary operations, while maximizing high-volume output and low-cost per part.

Key benefits of Precision Cold Forging Progressive Stamping include:

- Significant cost savings
- Stable, high-strength parts
- Closer tolerances, sharper corners/edges, better flatness
- Shorter manufacturing lead times
- High material utilization
- High throughput
- Efficient machine utilization
- Highly adaptable manufacturing processes

For more information, visit our Precision Cold Forging Progressive Stamping, Cold Forging, and Precision Stamping websites, or drop us an email at communications@interplex.com.