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AIDA
Dayton Technologies Corp.

AIDA's ServoForming Technology - Redefining Metalforming

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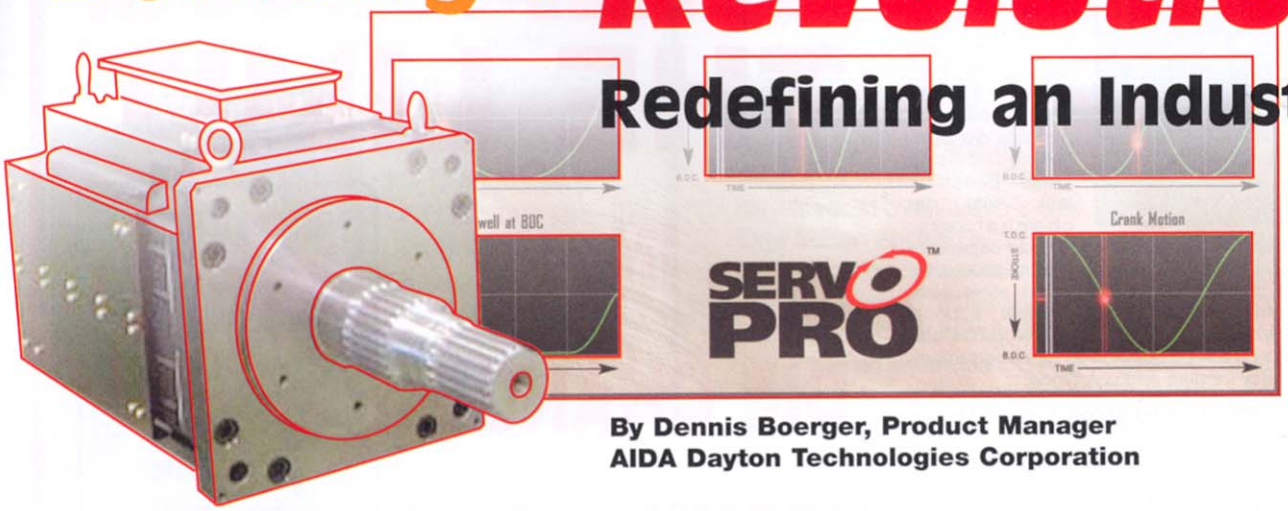
Defining a Revolution

Redefining an Industry



By Dennis Boerger, Product Manager
AIDA Dayton Technologies Corporation

In today's lean economy, stampers are looking for production solutions that can help them stay competitive while making the most of their capital equipment investments. In the past, new press technology has typically been restricted to specific job parameters or industry applications. AIDA's ServoForming™ with ServoPro™ technology has crossed those boundaries and is changing the face of traditional metalforming by allowing stampers to literally dial-in stroke, velocity and dwell profile for any job– all on just one press.

AIDA defines ServoForming as the use of a digital servo motor and controller in a metalforming application. The digital motor and controller provide superior control over every aspect of the forming operation, giving users unequalled flexibility to match their press movements to their application requirements.

Unlike other designs on the market, the key component of AIDA's ServoPro is its proprietary high torque, low RPM servo motor. ***See Figure 1*** Developed and manufactured by AIDA, the ServoPro motor eliminates the need for complex and weak "ball-screw" mechanisms and other linkage or reducer systems required by off-the-shelf high RPM, low torque servo motors.

Figure 1

The ServoPro high torque, low RPM motor was developed and manufactured by AIDA specifically for mechanical presses performing general presswork .

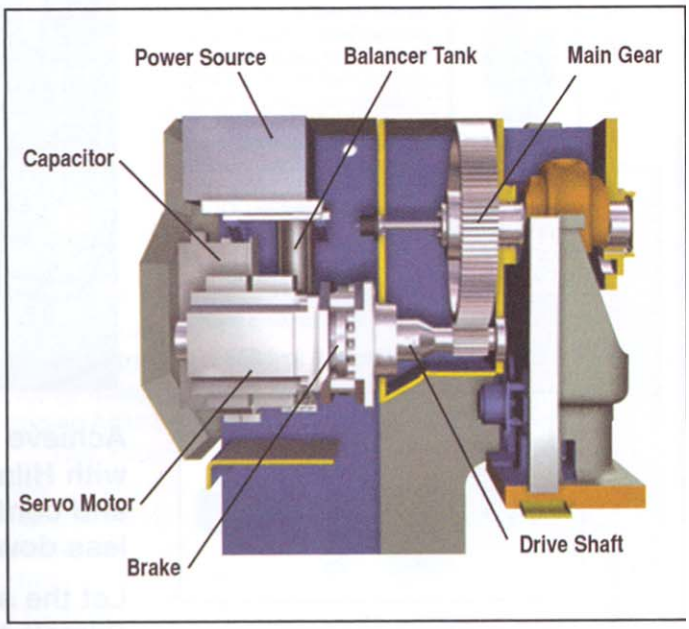


Figure 2
The unique direct drive system allows presses equipped with AIDA ServoPro technology to utilize AIDA's die-life and productivity-enhancing technology advances .

The AIDA ServoPro technology uses the same basic press structures that are found in the press builder's standard gap and straightside presses. The low deflection characteristics and small over-all clearances that make AIDA presses function so well are still there, only the flywheel, clutch and main motor have been replaced with the high capacity ServoPro motor. ***See Figure 2***

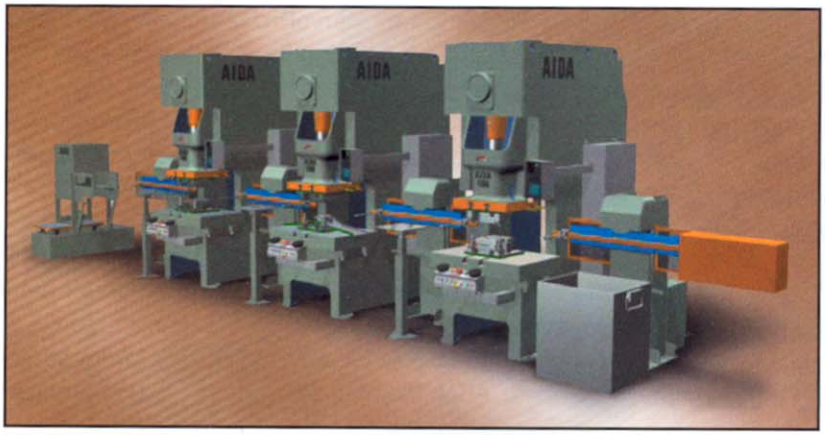


Figure 3 —
ServoPro's complete programmability increases production and maximizes overall cycle time by allowing stampers to optimize each individual press operation in an automated application.

With ServoPro stampers have the ability to run a multi-press transfer line in continuous mode. ***See Figure 3*** When compared to a conventional press line that operates in automatic single stroke mode, the ServoPro continuous mode can deliver productivity rates up to 50 percent higher. Specifically designed for general presswork, AIDA's ServoPro is equipped with a fully programmable slide motion and adjustable stroke length for an infinite number of combinations. These features make it possible for a stamper to turn one press into multiple machines – eliminating the need to purchase a variety of presses to perform different manufacturing processes.

The number of ways stampers can program in and combine stroke, velocity and dwell profiles is unlimited. A few examples of potential combinations include crank motion as well as slowing speed at the top of the stroke for automation, pendulum motion for shorter stroke and increased speed. In a blanking operation, stampers have the capability of reducing slide velocity at the material contact point nearly eliminating shock and vibration. Dwell at any point in the stroke and knuckle motion are also options. The result is higher productivity, better component quality, longer die life and increased flexibility. ***See Figure 4***

Offering the same maximum stroke length and torque rating as a conventional mechanical press – ServoPro gives stampers the ability to use full torque from low speed for greater part accuracy and longer die life. Its capacitors store energy in the non-working portion of the stroke making power consumption comparable to or less than that of a standard mechanical press. This means no increase in operating cost.

To understand the impact AIDA's ServoForming technology will have on the industry, it's important to take a brief look at some of the steps that led up to this significant development.

Industry Challenges

Manufacturers have known for a number of years that having the **ability to adjust** the operating speed and stroke length and alter the slide motion of a mechanical press would enhance operations. And while such adjustments were possible, it wasn't cost effective due to the very rigid design platform upon which the mechanical press drive is based. Over time, some adjustable features became available on mechanical presses. Speed adjustment is now standard on most new machines. Link and knuckle drive systems provide modified slide motions in a limited capacity.

A second industry challenge was the **type of servo motor available at the time.**

Early generations of servo technology used high speed, low torque servo motors which were originally developed for the plastic injection molding industry. While suitable for embossing or blanking, the servo motor's limited torque and energy capability severely curtailed its use in forming applications. These restrictions made the servo motor impractical for normal presswork.

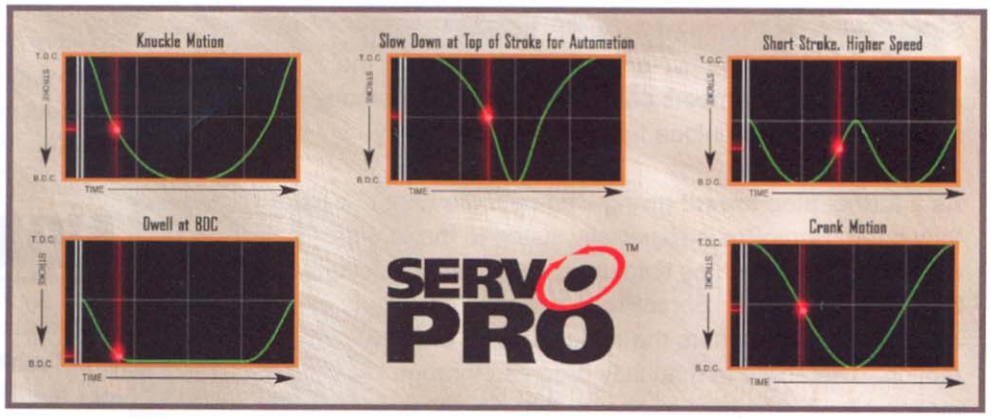


Figure 4 —
Stampers can dial-in stroke, velocity and dwell profile for any job in an unlimited number of combinations—all on just one press .

AIDA was prompted to develop a servo driven press with significant flexibility and durability for the general presswork market. The four-year project, begun in 1999, produced ServoForming with ServoPro and was introduced in Japan in 2002 and the US market in 2003. The ServoPro units placed in Japanese plants are already delivering increased efficiency and flexibility to customers in the appliance, automotive and technology industries.

Stampers who want to know if ServoPro is the right technology for their stamping operations can use several criteria to make that determination. The user should first decide if the ability to adjust the stroke length and operating speed would optimize a variety of jobs. The stamper can evaluate whether the ability to program slide motion would improve part quality and increase productivity and if there are jobs that would benefit from having the slide dwell during the working part of the stroke. The stamper should look at whether or not manufacturing processes would benefit from optimizing the relationship between the press stroke and the cycling of automation to increase output. Finally, the stamper needs to decide if a programmable slide motion would benefit the use of high strength steels or exotic materials, in-die tapping or assembly operations. If the stamper can answer yes to one or more of the items on this basic checklist, then the job is a candidate for ServoPro technology.

In addition to developing these evaluation questions, AIDA has also provided stampers with key technical resources through its website that can help provide a better understanding of ServoPro technology. By visiting AIDA at www.aida-america.com , stampers can request a white paper detailing critical aspects of ServoForming and ServoPro. In AIDA's newsroom, the latest Pressing Matters newsletter is devoted to ServoPro. Under the product section, stampers can view animations demonstrating ServoPro's unique functions and versatility.

As a further step toward giving stampers the capabilities they need, ServoPro is especially suited to the forming of exotic materials such as titanium-magnesium alloys and high-strength steels. ServoPro is available on a variety of AIDA presses and offers the added feature of hand crank motion. The ability to manually progress through the slide motion allows stampers to ensure that die setup and synchronization of ancillary equipment is correct prior to a production run. In addition to helping protect expensive tooling, stampers can use this feature to reduce the potential for production of bad parts.

AIDA's ServoForming with ServoPro represents the first fundamental change the forming industry has seen in presses during the last 30 years. For stampers, ServoPro means the capability to build the quality and production rate advantages necessary for survival in today's competitive environment.

AIDA is a leading pioneer in the metalforming industry with over 85 years of innovation. Devoting five percent or more of its consolidated sales to research and development, AIDA continues to take strides that set it apart from other press builders. AIDA maintains a strong global presence with a local customer service approach that is supported by one of the metalforming industry's largest networks of manufacturing and sales organizations in the world. AIDA offers a full range of presses from 30 to 4000 tons, including gap, straightside, progressive die, high-speed, transfer and cold forming presses as well as press automation and total turnkey packages. AIDA worldwide boasts 1.5 million square feet of manufacturing space including manufacturing facilities in the United States, Malaysia, China and Japan. With more than 1200 employees and a press manufacturing capacity exceeding 2000 presses per year, AIDA is, in units produced, one of the largest press manufacturers in the world.

The AIDA plant in Dayton, Ohio— one of the world's most advanced press manufacturing facilities.

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