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Polaris Harnesses AIDA's NST

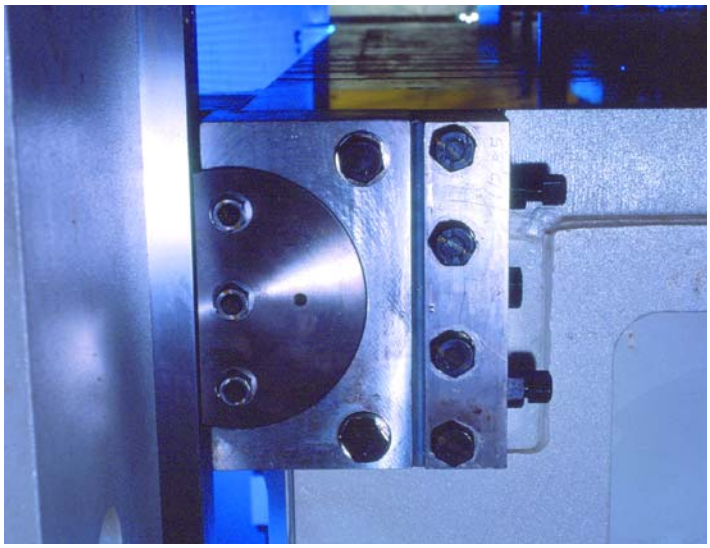
AIDA'S New Tie-Rod Straightside NST Series Press Technology is put to work to produce a mix of conventional and highly cosmetic parts

For almost 50 years, Polaris Industries Inc. has led the industry with its production of groundbreaking recreational and commercial-grade utility vehicles and equipment. Today the company's advanced engineering and design expertise produces innovative products that capture $1.5 billion in sales worldwide. When the original equipment manufacturer's (OEM) Wisconsin plant needed a new stamping press to produce a mix of conventional and highly cosmetic parts, Polaris selected another expert in advanced engineering and design — AIDA and its new tie-rod straightside NST series press.

"We needed a press that could produce a variety of stampings ranging from high volume, thick progressive die parts to large, lower volume, highly cosmetic pieces," said Jason Nelson, manufacturing engineer for the Polaris manufacturing plant based in Osceola, Wisconsin. The plant is part of the Polaris conglomerate which has engineering, manufacturing and distribution facilities across the Midwest, and wholly-owned subsidiaries in Canada, Australia, New Zealand, France and Great Britain "The press also had to meet specific size and performance requirements," Nelson explained. "After reviewing the products we wanted to produce with AIDA's local distributor TCR Inc., we found that AIDA's NST 660-ton press provided us with the most flexible, cost effective solution."

AIDA installed the NST and TCR supplied and integrated the necessary auxiliary equipment in February 2002. As a stand alone work center, the NST was put to work producing parts for Polaris snowmobiles and all terrain vehicles (ATV). Materials range from cosmetic aluminum to high yield strength steel. Material can run as wide as 60 inches with thicknesses ranging from .060 inches to .187 inches. The NST runs three eight-hour shifts, five days a week. "One of our challenges was to find a general-purpose press that had wide-spaced connections because we run a lot of off-center loads," said Nelson. "We ran a lead test and were somewhat surprised by the results."

Loading the NST with a die, a lead wire was placed in a groove on all four stop blocks of the die. After cycling the press, the thickness of the lead wire was measured on all four corners to determine the amount of slide tilting. "We found that out of the 30 presses we own, nine of which are straightsides,



The NST features pre-loaded roller slide guiding, a design item typically found on more expensive presses, for improved die life and part quality.

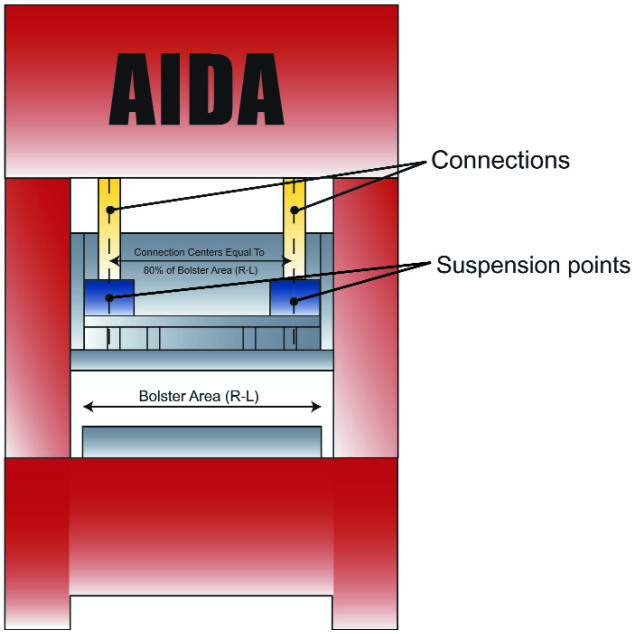


Fig. 1 Slide Suspension
The NST's wide-spaced connections and pre-loaded, roller slide guide system deliver dynamic slide parallelism for improved part accuracy.

the AIDA NST, loaded or unloaded, was the only press to consistently deliver the exact same measurement on all four stop blocks," Nelson said.

The NST' s perfect performance during the lead test was the result of its wide-spaced connections and pre-loaded, roller slide guide system which keeps the slide parallel throughout a loaded condition. ***(See Figure 1)*** Following the initial lead test with an empty die and a second test with a loaded die, press operator Mike Wulf found the NST easy to re-adjust. "On other presses we operate, we typically have to make several adjustments to return the press to the original measurements obtained during the initial lead test," he said. "On the NST, we make just one small adjustment to return the press to its original measurements."

Part quality also improved according to Wulf. "The rigidity of the press and its low clearance helps to minimize elongation during parts production," he said. AIDA helps customers improve part accuracy by limiting elongation with more preload structure and larger diameter, pre-stressed tie-rods.

Polaris, which primarily runs off-center draw tooling for its routine work, discovered that in addition to improved parts, the NST's dynamic slide parallelism allowed the company to run parts with less tonnage. Parts that typically require 610 tons on conventional presses at Polaris, are now being produced on the NST with just 500 tons. The effects of off-center loading were further minimized by the NST's ball type slide design which uses a spherical ball seat with a load carrying area more than twice that of a conventional wrist pin configuration.

"We found that the AIDA NST, loaded or unloaded, was the only press to consistently deliver the exact same measurement on all four stop blocks"

Jason Nelson, Manufacturing Engineer, Polaris Industries, Inc.

(See Figure 2). Able to provide a reverse load capacity twice that of the industry standard, the ball design's larger load carrying area dramatically reduces wear and maintenance on the suspension point components in compression, tension and off-center loading conditions. "This feature helped us eliminate the need to buy a bigger press or make expensive tooling modifications," Nelson said.

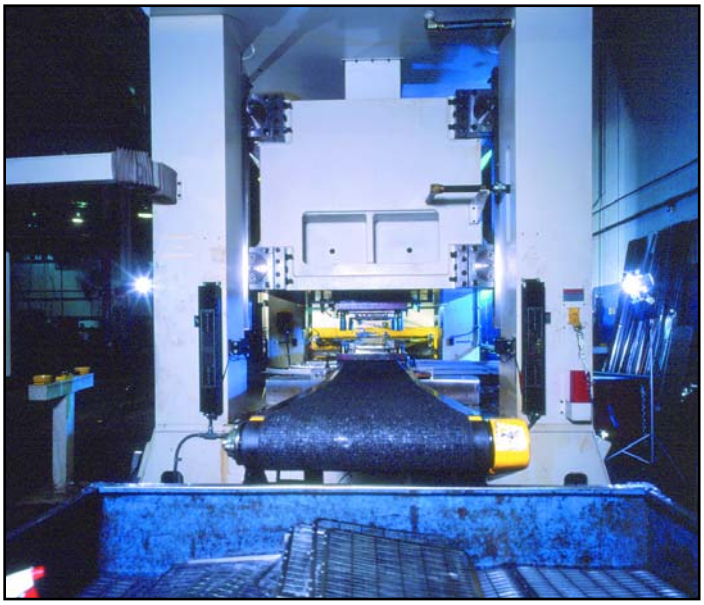
In addition to off-center loads, Polaris runs jobs that require highly cosmetic aluminum material. "It was not uncommon for us to experience a certain amount of parts rejection due to gib oil contamination," Nelson explained. "Because the NST's slide guides are lube free, there's no chance of oil contaminating the parts." The NST also helped Polaris minimize the occurrence of pulled slugs. With high slide tilting, slugs can sometimes be pulled up through the die once the material is pierced instead of falling through. "We used to have a problem with pulled slugs," Nelson said. "Once we began running jobs on the NST, we experienced a dramatic reduction in pulled slugs."

Fig. 2 Ball Socket Connection
NST's ball type slide design uses a spherical ball seat with a load carrying area more than twice that of a conventional wrist pin configuration. The ball design's larger load carrying area dramatically reduces wear and maintenance on the suspension point components in compression, tension and off-center loading conditions.

As a flexible solution, AIDA's NST not only met the OEM's rigid performance requirements but was also customized to meet the facility's special size parameters. The NST's large window allowed Polaris to run material up to 60 inches wide and easily remove parts. The press also had to fit under a 19 1/2 foot ceiling girder. The NST's unique stepped crown design and the absence of a flywheel at the top of the crown made this possible. Built with four self-contained counter balance cylinders, the NST also eliminates the need for surge tanks which makes the press a good choice for shorter ceilings. In addition, the potential for leaks is eliminated along with assembly costs and additional rigging time.

Equipped with AIDA's unique Hydraulic Overload Protection system (HOLP) which operates 7 to 10 times faster than other systems currently available on the market ***(See Figure 3)***, the NST also came outfitted with a specially tailored control system. "Our operators were familiar with the Omni Link 5000 control and we had an existing pressroom network compatible with this control," said Nelson. "AIDA was not only able to provide us with the control we needed, but they were willing to accommodate a special layout for us that required the control to be suspended from the press while the main panel is some 15 feet from the press."

For Polaris, flexibility and performance are two important keys to the manufacturing facility's capability to effectively meet production demands. By teaming with AIDA's advanced press technology, Polaris has the tools it needs to provide its assembly plants with high quality parts for the recreational and work vehicles and equipment that consumers have come to depend on.



The NST's pre-loaded roller slide guiding delivers improved die life and part quality while wide side openings make it easy for operators to run material and remove parts.

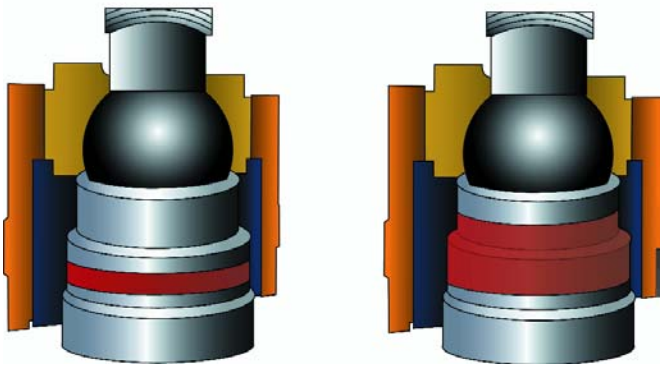


Fig. 2 HOLP

The advanced design of AIDA's HOLP helps protect die and press components (View A). When an overload occurs, an oil-filled chamber collapses (View B), triggering AIDA's oil escape system that responds in just 7 to 10 milliseconds.

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. Recent examples include the NST and NSU straightside presses specifically designed to meet the needs of utility and general purpose work at price-points that are cost effective. In addition to continually introducing new press technology, 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, straight side, 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 facilities in the United States, United Kingdom, Malaysia and Japan. With more than 1300 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.

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