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**Die design
software
brings dies
to life**

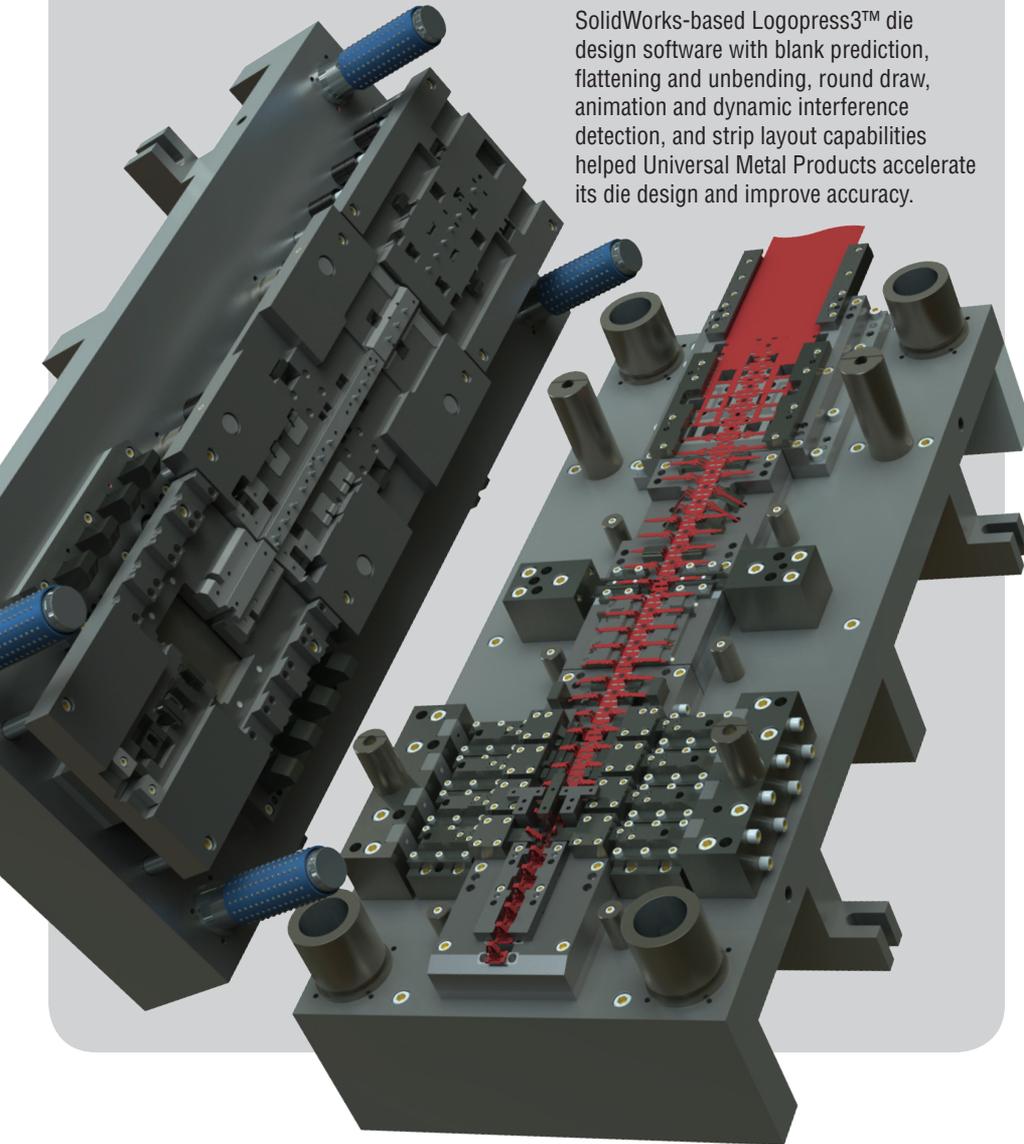


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Stamper reduces reliance on appliance with 3-D die design software

Designs complex dies nimbler, quicker

SolidWorks-based Logopress3™ die design software with blank prediction, flattening and unbending, round draw, animation and dynamic interference detection, and strip layout capabilities helped Universal Metal Products accelerate its die design and improve accuracy.



By Kate Bachman, Editor

Universal Metal Products, Wickliffe, Ohio, is a full-service stamping house, performing design, build, and production on 67 four-slide and multislide presses and 54 progressive-die stamping presses. Tonnages range from 60 to 600. The stamper also performs oil and temper heat treating, phosphating, and painting. The \$50-plus-million-annual-sales manufacturer has 260 employees in its three divisions at four facilities—three in Ohio and one in McAllen, Texas. All three Universal manufacturing locations are ISO 9001-, TS16949-, and ISO 14001-compliant.

The company started as a family-owned four-slide shop in 1947, making small components for the appliance industry, including the giants Whirlpool, Electrolux, and GE.

With a heavy reliance on the then-booming appliance segment, the company grew into a \$6.8 million company. Until the early 1980s, there were 15 to 30 domestic appliance manufacturers, according to *Reference for Business* (www.referenceforbusiness.com). However, right about the time that the new owner and president, Scott Seaholm, purchased the company in 1987, the appliance industry underwent sea changes, including a massive consolidation that continues today. In fact, just a few months ago, GE announced it was selling off its appliance division to Electrolux.

Universal had reached a point at which it needed to diversify its manufacturing footprint and target market segments by expanding beyond the appliance industry.

“What really got us going was we recognized early on that we had about as much work in the appliance industry using four-slides as we could get,” said Universal Metal Products Executive Vice President Ken Bateman. In 1990 company leadership perceived an opportunity to diversify by growing into the medium to larger presswork, Bateman said. To grow there, they needed a bigger, better toolbox.

“So as we started growing, we saw that the accuracy of the quoting and tooling processes to stamp larger materials with bigger dies became very important. The quotation process and a successful part launch begin with an accurate tool design,” Bateman said.

Design accuracy is critical to the rest of stamping production, Bateman said. “That’s the difference between getting work and not getting work.”

“So we started looking at systems that would help us.”

Hard Challenges Lead to New Software

One of the most significant tools that Universal Metal Products needed was 3-D die design software. The design team acquired SolidWorks-based Logopress3™ die design software from Accurate Die Design, Inc. The die design software includes blank prediction, flattening and unbending, round draw, dynamic interference detection and animation, and strip layout capabilities.

“Our three full-time designers had been fairly busy turning out a couple of tools per month,” explained Jim Harsa, chief designer. “As we got into new markets and the volume of work increased, the need for speed and talented designers increased.”

The designers had been working in AutoCAD® for years, he said. “But we hadn’t really gone into a true 3-D die design system, with all the opportunities to do blank development, check clearances, and stress analysis,” Harsa said.

Using Logopress3, the design team

was able to turn out significantly more tools per month. “We still were able to keep up with the high volume of work and be much more accurate while maintaining the same number of designers,” Harsa said. “The speed of the design was a major factor in helping to achieve that benchmark.”

Accuracy is no less critical than speed. “Automotive requires zero defects, so we’ve gone to a lot of sensing and automation to improve the quality of tools produced and the speed of the inspection process,” Bateman said.

Quoting. Harsa said that the software has improved the quality and quantity of quoting dramatically. “We can see everything that we’re doing. We’re more accurate. We can show the part in detail.” He said that after receiving prints, the design team creates a strip layout to see how it wants to design the part, what size press is best to run it in, how much material they’ll use, and what the cost of finishing and packaging applications will be. “We’ll include that in the quote. Much of the work is done by Logopress3.”

Strip Layout. “Since I actually can design the strip during the initial quoting process, I can also determine exactly how many stations we’re going to need and how large the die is going to be. I know the tonnage required of the die, and whether or not we’re capable of running it in our current manufacturing footprint,” Harsa said.

Blank Prediction. Bateman said that the software allows the team to be very accurate in predicting blank weight, calling that the most important thing to watch for. “The metal composition of a part is normally the predominant contributing factor to its cost buildup. When you run hundreds, thousands, and millions of parts, any material savings is consid-

ered a win/win for both Universal and our customer,” he said.

Stress Analysis. Once a customer accepts the company’s quote, the design team uses some of the software’s finer capabilities to perform a more extensive analysis of the forming and bending.

That’s when the team begins to examine stress analysis during forming, Harsa said. The software has a complete set of formulas for high-strength, low-alloy (HSLA) steel. “We can actually find out where the stresses are, where the thinning of the material comes in, where the strain is. We’ll refine the tolerances, and adjust them. We then go back to the customer to let them know that we’ll have an issue in this corner because the radius is too small, or with this type of material, and can clearly demonstrate that to them within the software,” Harsa said.

Dynamic Interference Detection, Animation. Harsa said that he really likes the interference detection module, which allows designers to see an animation of the tools running in the press on the screen.

“That’s where I really love this software. You can view the strip coming through the die in each station, where anything is going to interfere, and what you need for clearance. It’s very accurate.”

Diversified Today

Bateman said that the company no longer relies as heavily on the appliance segment. “We’ve expanded into the other target market segments, including transportation, both automotive and truck, as well as industrial, which can include mining, construction, communication, and commercial applications. Quite honestly, these are all viable markets with North American manufacturing very much in

“The software has improved the quality and quantity of quoting dramatically.”

—Jim Harsa, Universal Metal Products.



Figure 1

Thanks to Logopress3, Universal Metal Products designers and engineers can design seemingly impossible, acrobatic stampings like these quickly and accurately.

Harsa said that he really likes the interference detection module, which allows designers to see an animation of the tools running in the press on the screen.



Figure 2

Universal Metal Products stamps products for many industries including automotive, appliance and trucking, just to name a few.

full swing.”

Universal’s diversification is evidenced by its widely varying products (see **Figure 2**). The manufacturer stamps clips and clamps used in sophisticated air bag, seat belt, suspension, braking, and interior and exterior automotive applications. For the appliance segment, the company stamps production components and assemblies, including hinges; doorstops; wire harness clips and clamps; dishwasher door latches; structural frame members; and components across all types for cooking, refrigeration, dishwashing, laundry, and small-appliance applications.

Trucking applications include clutch, transmission, mirror, and exhaust components. Heavy-duty retaining clips for bits used to scarify roads and cut concrete and retaining clips for bits to cut cold seams and grind stone also can be found in the company’s mining segment product offerings.

“Appliance was a large percentage of our sales,” Bateman said. “With Logopress3, we were able to get into other markets and more evenly balance out our participation in appliance, transportation, and industrial target markets. We’re basically just one big job shop in the stamping industry.”

The diversification strategy has paid off. Since 1968 the company has expanded its initial 40,000-sq.-ft. facility

three times in the current location, and its sales have grown nearly tenfold.

The stamper has 32 toolmakers working a 10-hour shift, and a 12-hour shift in the toolroom. Three tooling designers support the toolmakers. “We’re pretty much working seven days a week on tool design and tool build right now, and our wires [wire-EDM machines] are running 24/7,” Bateman said.

“We’re doing five times the volume of work now compared to the early 2000s, with the same number of designers.”

—Ken Bateman, Universal Metal Products

Time Savings + Accuracy = Increased Competitiveness

Bateman said that the 3-D die design software has made the company much more competitive. “It’s opened up the volume of work that we can quote. It’s saved a lot of time in setup and debugging the tools. It’s helped there immensely, and it’s fair to say that compared to the early 2000s, we’re doing five times the

volume of work now with the same number of designers.”

That increased quoting and design efficiency combined with the ability to be more competitive really saved the day when the going got rough.

“In 2007 when the recession hit, we found that a lot of companies were going out of business, but the need for the stamping work was still there. While we had a couple of flat years just like everybody else, our diversified customer portfolio and broad-line manufacturing footprint enabled us to weather the storm. Our business grew steadily after 2008,” Bateman said.

“I believe the Logopress3 die design software does give us an edge over competitors, if they’re still doing their drawings in AutoCAD and calculating everything manually. If we have a model, we can unfold the blank and do a strip for a quote in an hour,” Harsa said. “If we had to go into AutoCAD to do it manually, we couldn’t come close to that.”⁵⁷

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