Software Steps Up to the Tube
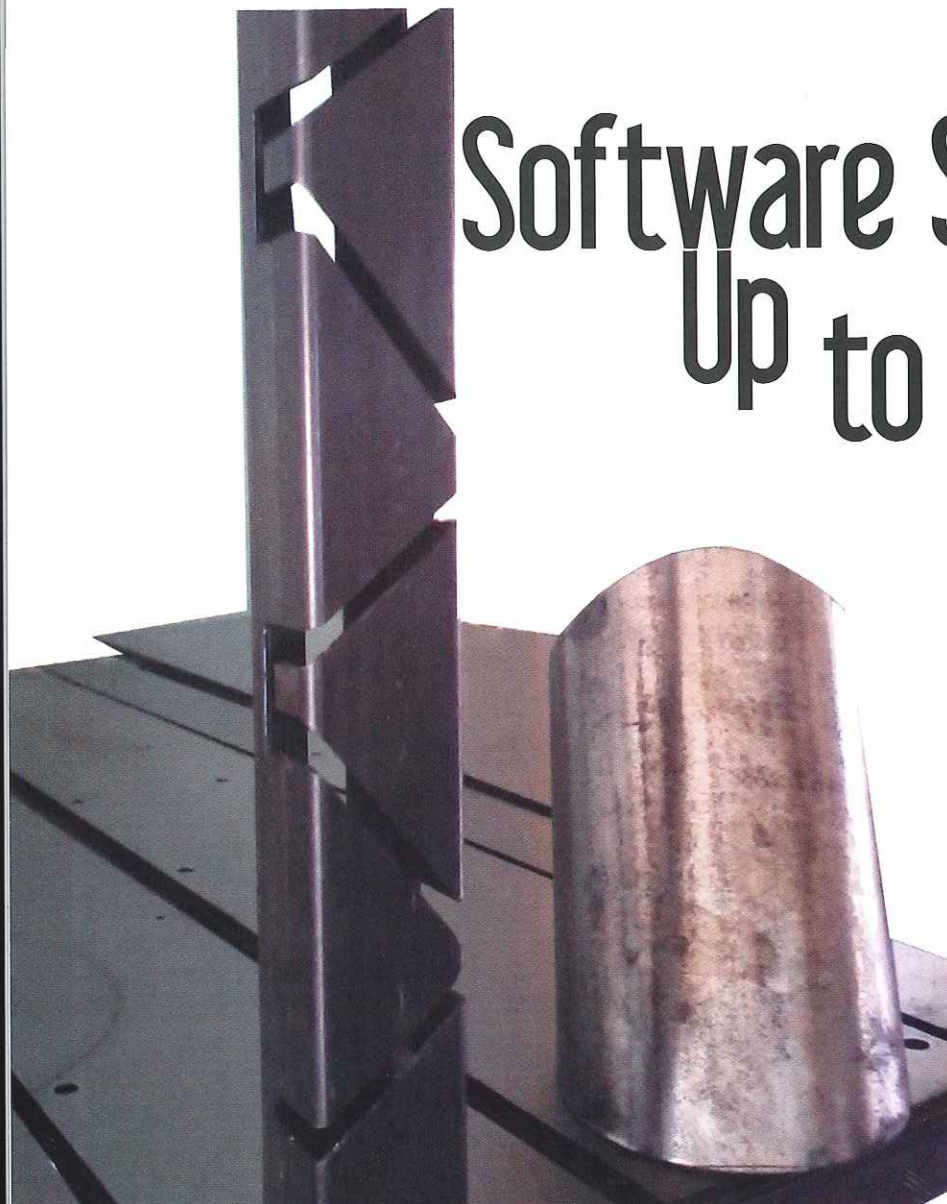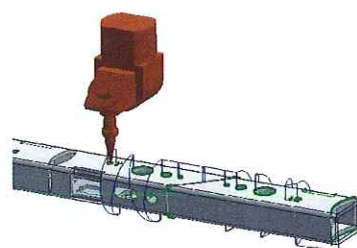
Technology brings common-line cutting, nesting, and ease of use to dedicated tube cutting equipment

Tube and pipe software brings efficiencies to cutting simple and complex components and integrates with shop software to streamline order entry, material selection, and shop reports. Photo courtesy of SigmaTEK Systems LLC.

By Sue Roberts, Associate Editor

Software companies have an excellent history of stepping up to the plate, literally, to help fabricators get the most parts out of flat material in the most time-effective, most profitable manner. Switch from 2-D to 3-D and those same companies are doing it again. The technical developments that increase quality and productivity when working with flats bring the same advantages to tube and pipe,

whether round, square, rectangular, or triangular. Structural shapes qualify for the benefits, too. Automation has stepped up to the tube.

Tube and pipe cutting software can offer virtually the same advantages as its sheet and plate counterparts without unrolling to create the programs. Touchscreens and intuitive programming are making it easy to control cutting speeds and feeds, torch heights, piercing techniques, lead-ins, and other parameters. Programming tasks that used to take two

or three hours are being completed in half the time.

Toolpaths can be generated with one click to create complex 5-axis features, miter cuts, bevels, and lengths. CAD/CAM programs communicate with other platforms to eliminate redrawing and writing G code. Part design profiles are visualized on-screen, and the software adjusts cutting information based on the number of axes and characteristics of the specific machine before creating the NC code. Libraries built into the software make it easy to adjust part parameters on an existing program or to start from scratch.

One click can generate a tool path with automatic detection of model, orientation, cuts, and marking. Illustration courtesy of SigmaTEK Systems LLC.

Different machining technologies, such as bridges, microjoints, and cutting qualities, can be managed manually, semiautomatically, or completely automatically.

Estimating, work order integration, inventory tracking, and options for generating myriad shop reports reduce noncutting time involvement.

All this can be worked into production flow for small parts like micro-stints cut on a precision laser or components cut from 0.5-in. pipe by dual-headed plasma equipment. Production is increased, capabilities are expanded, material waste is reduced, and hands-on programming is, in many cases, halved.

Building up to Tube

Laser tables with rotary axis options provided some fabricators with tube cutting programming experience before they chose to invest in equipment dedicated to cutting shapes. The table option typically would accommodate one part at a time and required writing a single part program within software best used for sheet and plate. The program operator would create a precut blank, cut it, remove the finished part, and repeat.

Efficiency takes over with the dedicated equipment and software. A full stick is loaded into the equipment and positioned for autofeed, features are cut, the completed part is separated from the stick, it automatically indexes, and the process repeats. Production is faster for long runs or short batches. Easy-to-use software reduces the time needed to write programs for new parts and keep production flowing from dedicated tube equipment.

The biggest challenge when changing from 2-D to 3-D programming is adding Z-axis and rotational thinking to the familiar X- and Y-axis approach. Collision avoidance also is a concern that crops up in the 3-D world.

Software advancements, however, can make the transition basically seamless.
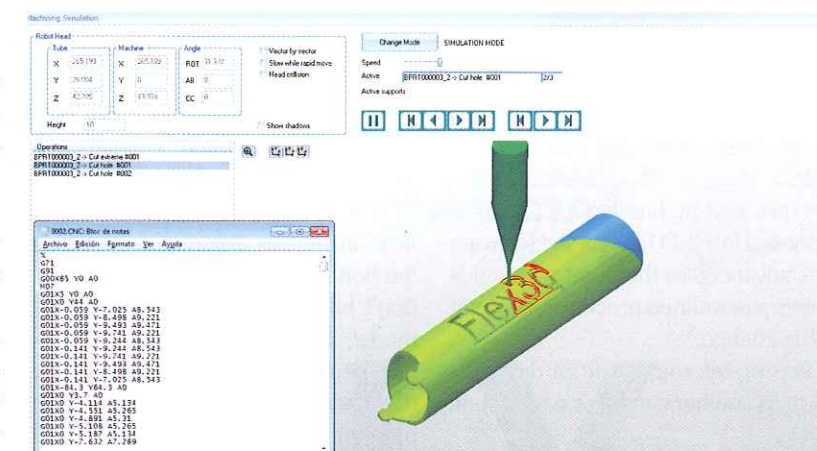
Interactive simulation shows step-by-step cutting and allows forward, rewind, pause, and restart for reviewing or adjusting a tube and pipe cutting program. Illustration courtesy of Lantek Systems.

"When a company invests in a tube cutting machine, it takes a little adjustment to switch from 2-D to 3-D, but it is a short learning curve," said Bob Berkshire, channel manager at Lantek Systems Inc., Mason, Ohio.

"Programmers or operators need to begin thinking in a 3-D mindset. They are going to be used to working with DXF files, but they will be dealing with IGES and SAT files on the 3-D side. They may have been exposed to

working with an AutoCAD® program, but now they move into something like SolidWorks®, so there is a change on the design side and also the CAM side.

"They will be handed a 3-D file as opposed to a 2-D file, but the software has advanced to the point where it is a very streamlined process, so it is not a big change."

Passing information from one platform to another can be as easy as one click.

Choosing Tube Cutting Software
Ask the right questions to get the right software fit.

Bob Berkshire, channel manager at Lantek Systems Inc., Mason, Ohio, recommends asking:
- Does the software have the capacity to create part geometry?
- What file formats can it import?
- Can it nest parts and confront miter cuts to save material?
- Can it provide weld prep bevels for heavier-walled tube?
- Is the programming process intuitive and streamlined?
- Does it provide 3-D simulation and collision avoidance?

Brad Stropes, sales manager for SigmaTEK Systems LLC, Cincinnati, Ohio, added:
- Can the software track remnants of stock on the floor?
- Does it automatically program—break out a program by material type and thickness—and autonest a SolidWorks® assembly?
- Does it offer work order integration for an ERP/MRP system?

Brad Stropes, sales manager-3D products, SigmaTEK Systems LLC, Cincinnati, Ohio, said, "With software like ours, you don't have to have a secondary product to take a drawing to another platform and redraw it. SigmaTUBE® can use the na-

tive geometry to create the tool path. It eliminates manually applying the G code to every entity. Once the program has been written, changes can be made easily.

"A nice feature is the 4-axis modification. It can automatically adjust the bottom swarf cut so programmers don't have to go in and change the model. Since the software is applying the NC code, it can change the diameter of a hole by adjusting the program itself. And some tricky things

Tube Cutting Savings
Common-line cutting and part nesting have transitioned from software developed for flats to save cutting

time and get the most from hollow materials. Based on part geometry, the software calculates the best part combinations to be cut from in-stock material, including remnant inventory.

"Say you have a chamfered edge on the tube," said Berkshire. "Flex3d® Tube and similar software packages will rotate the parts program so the chamfered edges butt up against each other to save on material. Once the part features are programmed, the fabricator can nest the parts on existing inventory. The software will generate the cutting path on the tube to optimize the sequencing, minimizing movement and cutting time and checking for collisions."

Lead-ins are applied automatically for cutouts. Tube and pipe welds are detected so cuts and large features can be positioned to avoid interfering with the integrity of a seam.

Stropes said, "Sometimes when manufacturers purchase a tube laser, they feel confined to purchasing the same brand software. By purchasing a third-party software, the program can be applied to machines from multiple manufacturers. It allows the purchase of different machines without introducing another programming package to the operations mix, adds options, and can save money." ❦

can be done when it comes to right angle meeting right angle."

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