

**Editor's note:** This article was contributed by the experts at SigmaTEK Systems, LLC.

# Top 10 Software Functions for Automating Fabrication

*Software's impact will increase exponentially as more fabricators use it to bridge applications and automate complex, manually intensive processes.*

**C**ompanies are looking inward to scrutinize their tools, processes and practices in an effort to accelerate production while eliminating waste and unnecessary costs. New software technologies are available today to automate processes, integrate applications and bridge interoperability gaps. Companies not fully leveraging such tools are losing ground every day. Here are the 10 most important software functions for competing in today's sheet metal fabricating industry:

## 1 CAD Import

Reworking CAD models because of the inability to import geometry not only adds time to a job but opens the door to the risk of introducing errors or altering design intent. Fortunately, software is available to pull models directly into downstream manufacturing applications, removing the burden from engineering departments to push out data in special formats such as IGES, DXF, STEP, and so on. Robust CAD/CAM nesting software reads native CAD files, recognizes material thickness, and arranges the part on a corresponding sheet, simulating NC code and initiating cutting.

## 2 Quoting

Before bidding a job, costs must be forecasted. The costing engine within nesting software examines all variables to determine costs associated with material usage, man hours, machine cutting time, and so on. More sophisticated nesting

software goes so far as to consider when a machine will slow its cutting process for certain maneuvers, such as corner ramping with laser and waterjet or cutting high-quality bolt holes with plasma, generating the most accurate forecast.

## 3 Work Orders

Automated Work Order management maintains organization, reduces errors, lowers paper use and storage, and provides a simplified task list for programmers or operators. Additionally, the software provides information on a job's status: completed, in progress, overdue. Work orders may be grouped according to date, material type or customer.

One of the biggest benefits of automation stems from an ability to mix orders. Combining work orders gives nesting greater latitude in placing parts. This saves cutting time while maximizing material yield as sheets are not limited to parts of one specific job. Scrap rate reduction of 5-20 percent is not uncommon.

## 4 Color Off-Load

The inherent risk of mixing work orders is the potential for confusion when unloading and sorting parts into the jobs to which they belong. Color Off-Load provides a color-coded job display on the machine's controller, so the operator can easily see which parts correspond to which job. At the same time, the operator is alerted to any parts that may have cut-quality issues. Poor quality parts are rejected and automatically rescheduled for future cutting.

## 5 Bending

Sometimes, no matter how it might look as a model, a part may be “unmanufacturable.” This may result from a machine’s physical limitation, a lack of proper tooling, a design flaw in the model or any number of factors. In the case of a press brake, the bending areas of the part may be inaccessible to the machine so they cannot be folded as intended.

A software bending program will unfold the part for flat nesting and consider all possible folding solutions. This allows bending issues to be immediately known. If the model is valid, the operator can then choose the desired bend sequence. Additionally, the software creates a report with instructions and bending details.

## 6 Automatic Nesting

This application automatically determines the best strategy to optimize part cutting. Advanced software algorithms generate and examine multiple part orientation scenarios to determine how best to nest parts for maximum yield and minimal cut time, while making programming relatively simple. Importantly, the program should still allow user intervention as needed.

## 7 Nesting for Cutting

Any shop with multiple fabrication machines—or a desire to add machines in the future—should have a single nesting software capable of driving all fabrication machines regardless of type or brand. This eliminates costs and limitations associated with multiple machine-specific nesting packages. Programs that come pre-loaded on machines are limited to that particular machine and are generally lightweight in both sophistication and functionality. Conversely, a robust and flexible nesting solution reduces cost, allows a single programmer to work across all machines, and maximizes machine performance.

## 8 Remnants

Where there is cutting there are remnants, and each piece of material that ends up in the scrap bin is money wasted. Software can catalog and recall the inventoried

remnants best suited for a pending job, based on nest, grade, thickness and volume, ensuring more complete yield.

## 9 Transaction Management

From updating inventory, creating work orders, and communication between the shop floor and management, Transaction Management software creates a lean manufacturing operation. The software bridges nesting and material requirement planning systems, order entry or other management software. Because MRP software usually resides on large, centralized servers or mainframes and nesting software is normally installed on workstations, Transaction Management software manages their interaction.

## 10 Manufacturing Resource Planning

MRP manages virtually all business and manufacturing processes. The MRP software generally tracks the job from costing and quoting, through the ordering process, scheduling work on the shop floor, planning work outside of CNC cutting, purchasing raw materials and other production items, and ultimately invoicing the customer. A modular MRP architecture allows selection of needed capabilities and the ability to grow the system along with the business.

Software is the fuel powering sheet metal fabrication. Its future impact will increase exponentially, bridging applications and automating complex, manually intensive and incompatible processes, resulting in sustained improvements to productivity and ultimately the bottom line. ■

*SigmaTEK Systems LLC, Cincinnati, offers SigmaNEST, an automated nesting and NC programming CAD/CAM software system that supports a wide range of processing equipment, and SimTrans, a Transaction Management program. For more information, visit [www.sigmanest.com](http://www.sigmanest.com).*