All In the Family

One Nesting System Provides Full Flexibility

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In the metal working industry, manufacturers often rely on steel service centers to provide raw materials and cut precision parts as well. A manufacturing facility produces parts used to assemble the final product sold by that business. Literally, to manufacture means to make or process a raw material into a finished product, especially by means of a large-scale industrial operation. In contrast, a service center produces parts for other businesses. Originally, steel service centers were primarily suppliers of raw stock to manufacturers.

More recently, steel service centers add value by providing cutting services for their customers.

A manufacturer is concerned with distinctly different production issues versus a steel service center. The differences between these two types of production facilities were never more readily apparent than when we took a behind the scenes look at two companies located in Louisville, Mississippi. Taylor Machine Works Inc., a manufacturing facility, was established by W.A. Taylor, Sr. in 1927. Taylor first introduced the “Loggers Dream,” a tool used to enhance effective timber harvest capabilities of individuals and small logging crews.

Since the introduction of the “Loggers Dream”, the Taylor product line of “Big Red” machines has grown to include lift trucks in capacities of 6,000 to 120,000 pounds; intermodal equipment to handle empty and laden containers and trailers; cushion-tired trucks in capacities of 20,000 to 75,000 pounds and other specialized industrial truck applications, such as reach stackers and rubber tired gantry cranes.

Taylor “Big Red” trucks can be found working around the world in concrete, metals, marina, intermodal, stevedoring, forest products, transportation and general materials handling applications.

Temtco Steel Inc., a steel service center was established in 1974 by W.A. “Bill” Taylor, Jr.

and the Taylor family, owners of Taylor Machine Works Inc. Temtco is proud of the reputation it has established with its customers and is now recognized as the largest distributor of quenched and tempered steel in the nation.

Temtco Steel also provides other services such as plasmatic or flame cutting capabilities. Temtco specializes in precision parts and custom machining and fabrication and offers manufacturing and assembly capabilities.

The Logistics

Taylor Machine Works has a total part library of 80,000 to 100,000 parts. Of these, about 15,000 active parts are used in their flat pattern cutting work centers. A CADAM/Catia CAD package is used in their engineering department to design the parts. Orders are downloaded with the help of an in-house developed MRP system to two computerized nesting work centers. The nesting software, TruNEST III, is a complete manufacturing management system. It takes the download from the MRP system and automatically schedules the orders, the oldest order being nested first. The scheduling system in the nesting software provides another level of control for the business system. It has the ability to take into account when an operator is out sick or a machine tool is down and being repaired, something the infinite capacity of an MRP system ignores.

One nesting station drives four ESAB machine tools that have four gas and one plasma torch each. Another nesting station drives two Whitney punch/plasma machine tools. One of the Whitney machines has an automatic tool changer while the other is manual.

Taylor uses the TruNEST III nesting software to mix the job orders and use remnants first when possible. Every attempt is made to use all four torches and incorporate automatic torch spacing which is supported by the machine tool and the nesting station. Minimum Pierce Logic, an option in TruNEST, is used to reduce the consumables and increase the throughput. The nest rarely has to be regenerated. Hot parts are continually requested by customers who need a repair or replacement. These hot parts are easily added on the fly and cut.

Each of the ESAB machines has two tables to provide load and unload capability at the same time. Taylor cuts their own parts on material that ranges from 20 gauge to 6 inch plate, with about 30 plates nested at each work center per day. The machines cut about 20 hours per day. It is important to note that because Taylor Machine Works is a manufacturing facility, the company does not make anything they do not need. This also means no appreciable inventory is kept. Taylor Machine Works maintains a backlog of about one week in duration.

A bar code entry system is used for data collection and reporting back to the MRP system from the nesting information collected on the production floor. This allows for a labor charge-out to occur and an inventory update for ordering replenishments.

Taylor Machine Works is driven by their downstream operations. That is, they will decide which products need to be produced first and in what time frame. This allows control over which orders get mixed to help increase material efficiency.

In contrast to Taylor Machine Works, Temtco Steel, a steel service center, cuts parts for other companies and is driven by their customer needs. They can mix orders, but they need to adhere to the customer’s orders and deadlines, which limits this capability.

Temtco Steel has no separate engineering department to draw the same consistent design of parts. On a typical day, Temtco may get several different types of parts to nest and cut from several different customers. They may come in the form of CAD files on disk or by e-mail, or even sketches on paper. These require design or clean up and attributing to achieve the final result. AutoCad 2000 is used for this process. Temtco does maintain a part library of about 2,000 parts in their TruNEST III nesting system. These parts are used for repeat customers who need a repair, replacement or reorder. This repeat business accounts for 75% of Temtco's total business.

The input of parts and their quantities is constantly changing and does not lend itself well to any type of MRP system. The parts are manually entered into the system. Job orders are mixed to nest the parts of a common material together and achieve the highest efficiency possible. The nesting system contains a universal translator that helps import different types of CAD files.

If the part design is fairly basic, then the customer's order is quoted prior to the nesting process. Otherwise, a nest will be produced first. Then the estimated cutting time, overhead and labor costs reported in TruNEST III are sent back to sales to more effectively quote the job. Efficiency is always rated over time, although hot parts are continually added to the system for cutting.

Often, they will request to cut the balance of the plate not used with the same parts. Temtco Steel customers often order a large quantity of the same part and therefore a special "part packing" high volume nesting logic is used in contrast to Taylor, who is more apt to use the random mix of part quantity logic within TruNEST. Minimum Pierce Logic is also used with Temtco to reduce consumables and increase throughput. Cutting parts makes up about 70% of Temtco Steel's total business.

Temtco will always re-nest in an attempt to achieve an even higher efficiency. This is because Temtco is less dependent on what happens downstream than Taylor Machine Works, which is more concerned with balancing material efficiency and production costs. The normal backlog of Temtco Steel is about three weeks.

Because the nesting software supports the use of multiple work directories, Temtco segregates the work by customer. The two nesting stations drive two ESAB machine tools that have four gas torches and one plasma each. These machines do not support automatic torch spacing, but emphasis is always given to nests with four torches, unless a two-torch nest becomes more efficient.

Although Temtco Steel's machines do not have dual beds, they have one 70-foot bed. This setup not only allows for a load and unload capability similar to Taylor's, but also allows for the ability to cut extra long parts. This is important when trying to service many different types of customer requirements. Temtco's machine tools cut 16 hours per day.

The variety of work coming in also requires Temtco to inventory about 10 different types of steel from 10 gauge to 6 inch plate. Although part cutting is a majority of Temtco Steel's business, machining, fabrication and assembly capabilities are also offered.
