

March 2005

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Grunau Co. LEARNS LEAN

Page 14

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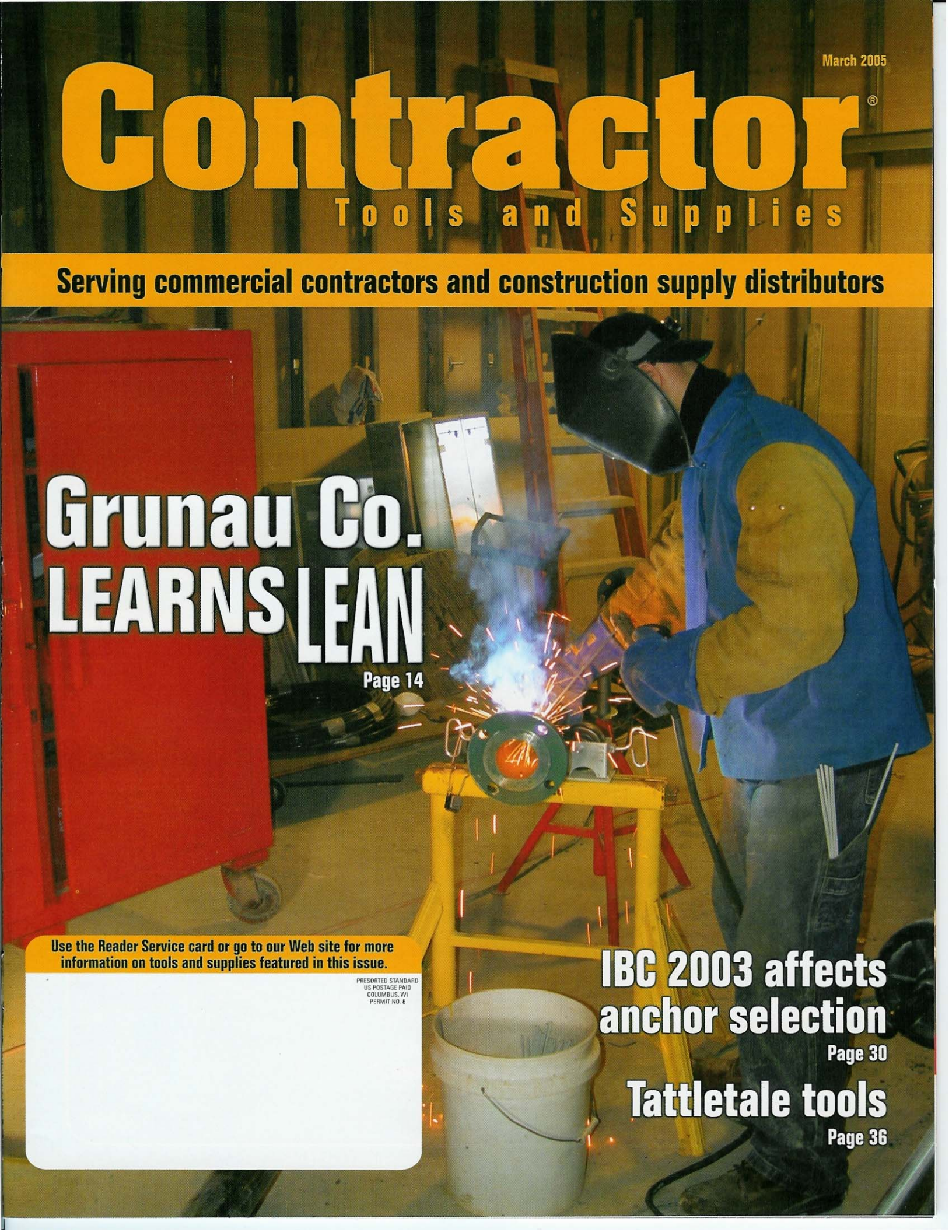
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IBC 2003 affects anchor selection

Page 30

Tattletale tools

Page 36



Grunau Company takes lessons learned in manufacturing and adapts them to the mechanical trades.

“Lean” construction

By Clair D. Urbain

Lean manufacturing is all the rage in plants across the country. In an extremely competitive environment, streamlining plant processes and eliminating waste are battle cries for survival.

Construction is also competitive, but there hasn't been the rush to apply similar lean principles to achieve greater productivity and quality, and Ted Angelo has set out to change that at Grunau Co., a Milwaukee, Wisconsin-based mechanical trades contractor.

Angelo was turned on to lean construction concepts a few years ago after hearing about it at an association meeting. In less than two years, the tools he has learned and shared with others in the company have resulted in dramatic changes in how they tackle work.

The new way of working has yielded at least \$59,000 in tool cost savings in the toolroom in one year; an on-the-jobsite vendor stocking program has reduced parts costs by \$45,000 in six months; and changes in weld and sheet metal shop work flows have yielded up to 20 percent savings.

“This does not even include the savings from faster order filling, increased utilization of tools and other improvements in productivity,” says Angelo, Grunau's executive vice president.

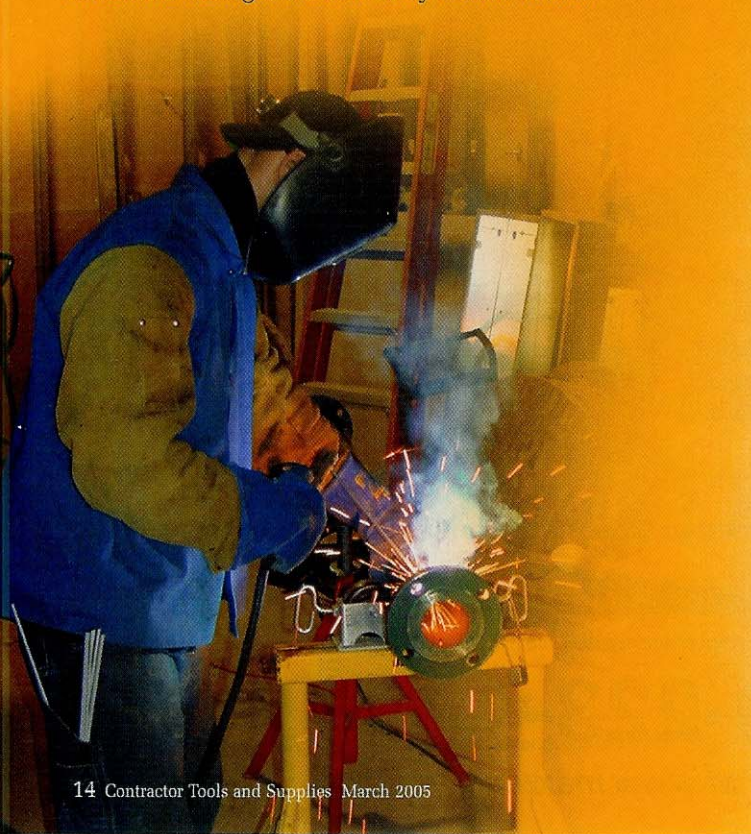
“I have had people say, ‘Lean concepts won't work in construction. Every job is different.’ I reply, ‘How many soldered joints do we do on a typical job? Tens of thousands? Do we do each one of them differently?’ It's really about best practices and continuous improvement and that's how we look at lean construction,” says Angelo.

Train the trainer

To become versed in lean concepts, Angelo attended a Milwaukee School of Engineering Lean Manufacturing certificate program where he rubbed elbows with people from companies adopting lean practices. He also attended training offered through the Lean Construction Institute and read many books on the subject. The company also hired a consultant to help steer the effort.

“Management commitment is important. We train every employee in the benefits and practices of lean construction. When you have 500 employees, that is a huge commitment. We think it is worth it,” he says.

Above: Grunau assembles ductwork in its prefab shop and trucks it to the job. The higher transportation cost is much less than the cost of labor assembling the sheet metal into ductwork onsite.



Photos: Clair Urbain, Grunau Co.



The 5 S concept (see sidebar on page 16) is one of several tools Grunau's lean team uses to improve processes. In training its cross-functional lean team, the group decided to reorganize the toolroom as its first project in September 2003. Since then, the team has tackled many other projects and Angelo hopes to

have worked through the list of 60-plus projects by 2008.

"We selected the toolroom as our first project because it would have a great impact on the company from a business standpoint and have a 'wow' factor," he says.

The toolroom and warehouse were the dumping ground for tools and supplies coming back from jobsites. The toolroom supervisor was in charge of organizing the material so it could go to other jobs. Without a structure or system, it was difficult.

The 12-person cross-functional team applied 5 S principles to the toolroom. The team looked at the inventory of parts and realized that once parts came back to the shop, it was highly unlikely they would ever get back out on a job. "We would spend more time looking for the item than what the item was worth," says Angelo.

A healthy housecleaning and a switch to bin-fill arrangements with distributors on jobsites resulted in the company eliminating half of the racking in the warehouse.

Tool organization was driven by the number of footsteps it takes to fill an order. "The team counted the steps it took the toolroom supervisor to fill an order. Starting off with 525 footsteps, they reorganized everything to reduce footsteps to 252. We believe that footsteps equal time which equals money," Angelo says.

The toolroom, once a general area, is now set up supermarket style with racks plainly marked for dedicated tool storage. The whole area was clad in white metal for better light reflection and bins were painted white inside and out to make bin and shelf contents easier to see. Every cubby and shelf space has an easy-to-read label.

The team revisited the toolroom process in September 2004, and fine-tuned it even more.

continued on page 16

Ted Angelo leads the Grunau Co. on its lean construction journey. Next to him is a quote he often uses to further the 5 S cause in the company; the first lean team has stenciled it on a large shop door in the toolroom.

A five-day blitz turned the Grunau toolroom around. Everything has a labeled location and unused tools and inventory were eliminated. This is a model of the 5 S process.



A local distributor keeps bins full of everyday components workers need. Across 20 jobs, every box is set up the same and when the job is over, the distributor takes back what's left over, so excess inventory stays out of the toolroom.



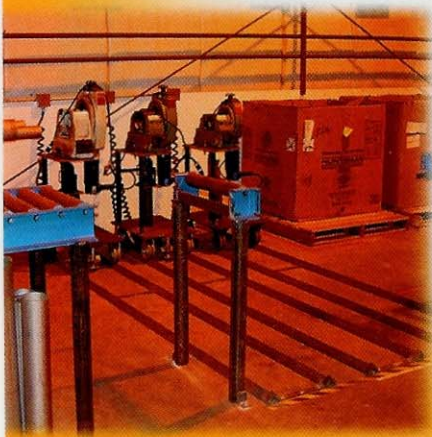
A place for everything, everything in its place. Tools and even the cart have reserved spots. The clipboard contains a daily checklist for upkeep.



**"Once a task has begun
Be it great or be it small
Do it well or not at all"**

Ted Angelo, Grunau Co.





Prefabbed pipe sections are loaded and sent to jobsites on carts, eliminating banding and unbanding tasks.

Pipe cutters ride on channel rails for fast, easy positioning for work. Note the signs: Labeling is a very important part of the 5 S concept.

Job supply carts specially made for specific trades such as this sprinkler cart make parts easy to access and resupply.

“Lean and 5 S isn’t about getting it 100 percent right the first time. It is about continuous improvement. We conduct monthly audits of processes and post the results. It’s the final and critical step in the 5 S process to assure it is sustained,” he says.

The team has also reworked the welding and sheet metal shops for greater flexibility. For example, rolling stands for pipe cutters and threaders stand like sentinels along the wall of the shop, ready to be rolled into place on tracks made of inverted channel iron. All tool storage areas are marked clearly and are stored in that place.

On the jobsite

The lean team also develops lean practices for the jobsite. Any area or activity is fair game.

Any lean proposal is circulated in the company. “We have apprentices, foremen and service technicians look at what we are thinking of doing to get their perspective. Fresh eyes see things that those closest to the project may miss,” says Shane Schilcher, piping superintendent.

Gerry Gelhaar, one of Grunau’s general foreman, is a 30-year veteran of construction and sees the benefits of standardizing procedures. The lean practices on the jobsite reflect activities on other Grunau jobsites:

Last Planner: “We use a system called the Last Planner. It’s a philosophy that no one knows better about what it will take to do a job than the workers doing it. It takes a six-week look into the future and once a week, we review the steps and number and type of workers required to complete those steps,” says Gelhaar. “It’s all tracked on an Excel spreadsheet that I update weekly and share with all parties involved with this job,” he says.

Schilcher says the Last Planner concept helps him see where the pipe fitters and sheet metal workers are working and allows him to look for coming bottlenecks on the project.

“Other contractors use other pro-

grams and methods to manage work, and sometimes their work interferes with ours. We can’t control that. But if we can do a better job of managing the work we can control, we will be more efficient,” he says.

Bin-fill agreement with a distributor: The bin-fill arrangement instituted on jobsites sets up a kanban system with minimum and maximum quantities. A tool and supply distributor restocks the cabinets every week. From job to job, the cabinets are stocked in the same order so workers transferring from one job to another don’t have to learn a new scheme. When the job is finished, the cabinets go back to the distributor, and Grunau

continued on page 18

Elements of 5 S

The 5 S concept originated in Japan, and this is a rough English translation of what the 5 S concept signifies. These are the steps that Grunau Co. took to make over its toolroom, prefab areas, warehouse, storage yard and toolboxes.

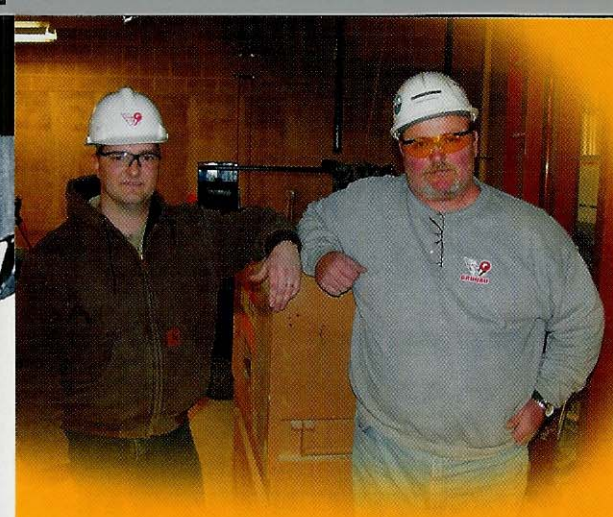
Sort: Sort from the workplace what is needed from what is not needed. General criteria: If it wasn’t used in the last 30 days or will not be needed in the next 30 days, store it away from the worksite. Grunau uses a red tag to signify items that must be removed.

Straighten/Set in order: Find a place for everything and put everything in its place. Mark and label everything so it can be easily found and put away.

Sweep/Shine: Clean the area and the equipment. Use a “ceiling down” strategy. Paint if necessary and develop strategies to prevent items from getting dirty.

Schedule/Standardize: Standardize the use of the first three steps of the 5 S process by developing checklists (work instructions) for all areas. Checklists should include a picture of what the area should look like.

Sustain: Make the first four steps of the 5 S process a part of company culture. Use an audit team to evaluate and grade the 5 S implementation throughout the plant.



Shane Schilcher (left) and Gerry Gelhaar use the Last Planner concept to organize workflow on the jobsite. It helps them understand what's coming, what needs to be done, and when.

only pays for the parts consumed on the job.

"We don't need an apprentice or foreman ordering parts for each trade. It's all ordered the same way and the parts are all here, and workers just take what they need for the job. In exchange for giving one distributor the business, we don't have to deal with ordering and stocking and can be more productive on the job," says Gelhaar.

For greatest efficiency, supervisors review tool and supply consumption after every job and continue to streamline the inventory. "For example, we only buy 6" bolts and cut them down to the length as needed. This saves room in the cabinet and makes stocking easier," says Schilcher.

Trades toolbox: The latest project underway is developing a two- or three-man trades tool box that is standard issue for every jobsite. In it, tools are sorted by type and trade and stored in a labeled spot in the toolbox. Any

A standard toolbox layout for a two-man work crew is under development. This concept will be routed to many employees for their input before implementation.

Two-man toolbox



Grunau worker can open the box and find a needed tool quickly (see illustration).

"It's still in the design phase and we are circulating the concept for input. We'll put it together, find out how it really works, then fine-tune it," says Schilcher.

Job supply carts: Grunau has assembled some job-specific carts. For example, it built wheeled carts that neatly hold fittings for fire sprinkler installation. The parts are easy to find, access and review for restocking.

Stop the band: In the past, prefabricators would band prefabricated pipe before shipping it to the jobsite. Now, prefabricators place the pipe on 6' wheeled tree racks that are rolled onto a truck for shipping. "Transportation is a bit more expensive, but the huge reduction in onsite labor makes more sense because we aren't banding and unbanding pipe anymore," says Angelo.

Worker acceptance

Some naysayers believe that lean construction is the flavor of the month, soon to be replaced by another management fad. Not so with lean construction at Grunau. In fact, workers embrace the concept.

"Workers like it because they can get their tools quickly. It also makes them feel more professional because the contractor is doing something to make their job easier, not harder," Gelhaar says.

"It all adds up to a winning team concept. If workers can get the information, tools and parts so they can do their job, they feel better about the job they're doing and appreciate it," Gelhaar says. ❑

Secrets to Grunau's success

Ted Angelo shares key points needed to successfully adopt lean concepts in any organization:

Understand it. Angelo suggests reading, attending conferences and talking with others instituting lean practices.

Commit to an outside consultant. It costs money, but an expert in lean techniques can help others understand it, knows where pitfalls and resistance may lay, and can lead the company through the all-important first projects that make the biggest impact on the company from buy-in and money-saving standpoints.

Commit to the process. This must come from the top and filter throughout the organization. "We struggled at first, but then ended up training everyone. We found that if we didn't, the rumors would fly. Do everything to show commitment to the process," says Angelo. Keeping the process highly visible in the organization also shows commitment and respect for the teams' efforts.

Create a passion for the process. It's a tremendous challenge to lead change in an organization. Rely on respected authorities in the organization to help carry the concept.

Embrace change. Understand that even processes transformed by lean events can be improved. Tackle them again to make them even better.

Keep it simple. It's really all about common sense. When transforming processes, find the simplest, and often least expensive way to make changes.

Keep it going! Angelo says this is the most difficult part of the process. Audit the process regularly and post audit results to show progress or deviations to the process.