A black and white photograph of a factory floor. In the foreground, a worker is bent over, working on a long, narrow assembly line. The line is filled with various components, possibly parts of a machine or vehicle. In the background, other workers are visible, some standing and some working at the line. The lighting is dramatic, with strong highlights and deep shadows, creating a sense of a busy industrial environment.

# Training for

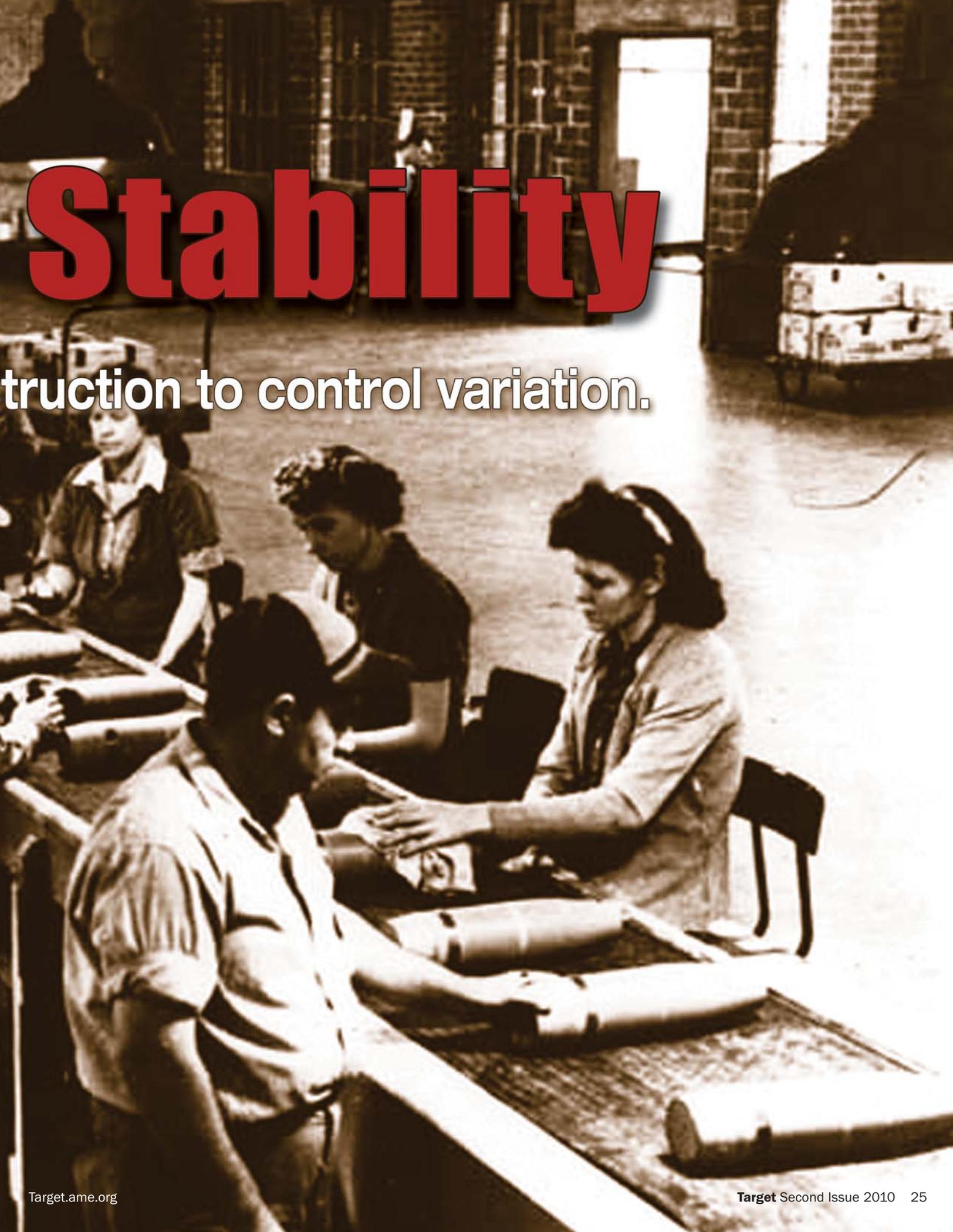
## Lean companies are using TWI Job Ins

Tonya Vinas

**W**hile Training Within Industry (TWI) is not a requirement of using lean management, the World War II-era training method is being used to further basic lean principles in a variety of settings. For example, businesses and other groups are using TWI to stabilize production, distribution, quality, workforce demographics, and even training itself.

Stability, or the “smoothing” of activity or process, is a requirement of lean management. It is a prerequisite to improving a process and encourages ongoing efficiency and waste reduction. But many organizations struggle to achieve stability in a variety of areas. Circumstances outside of a business’s control such as demographics, materials supply, or seasonal demand cause instability — which can increase labor, quality, and other costs.

Many large companies — including adidas Group, O.C. Tanner, and Northrop Grumman Shipbuilding — use TWI to achieve stability. Here are their stories.



# Stability

struction to control variation.



## In Brief

TWI is being used by companies such as adidas Group, O.C. Tanner, and Northrop Grumman Shipbuilding to control variation, a key to process stability in a lean operation.

## SLD of adidas Group: Lower Training Costs, Better Performance

Demand for the customized league apparel that adidas Group manufactures can be as topsy-turvy as the last few minutes of a tied Super Bowl game. The SLD division of adidas manufactures licensed apparel for the NFL, the NBA, the MLB, the NHL, the NCAA, and other major sports leagues that collectively have millions of players, employees, and fans who wear uniforms, hats, shoes, and other team-themed apparel. While the sheer size and popularity of professional sports gives some guarantee of overall demand, and seasonal schedules give some predictability to that demand, adidas considers its Indianapolis, IN packaging and distribution facility to be an “exception-driven” business because

of highly variable demand.

For example, 35 percent of demand comes in the third quarter, when outbound volume doubles compared with units processed in the first quarter. Packing is a complex operation. Orders vary widely by type of item (shirts, pants, etc.), league, team, and even player. Fulfilling demand requires drastic swings in headcount, increasing more than 60 percent over two months in some departments. This requires hundreds of seasonal employees, who are trained and work full time until demand drops. The training system adidas was using was costly and ineffective, said Darcy Montgomery, director of outbound operations.

“We were training for three or four weeks per individual, and we were experiencing inconsistent training, poor performance, and poor quality,”

Montgomery said. “Also, the ten to 15 top performers were training during peak periods, which reduced our capacity.”

The distribution center’s leadership decided to implement TWI in two areas, a packing area called Value-Added Services (VAS), and a picking area known as Forward Pick (FWP). Each area had its own challenges.

## VAS Challenges

- Requires advanced job skills for new hires
- Long training period
- Multiple tasks to learn
- Computer skills required
- Each order is different depending upon retail customer requirements
- Possible exceptions on every order
- Large department
- Knowledge of sports leagues, colors, and logos needed.

## FWP Challenges

- Some advanced job functions
- Exceptions
- Language barriers
- Fluctuating workflow
- Physically demanding.

As many companies do, adidas “modified” the basic TWI methods to fit its unique needs. For example, the company used training binders to hold Job Instruction sheets, reference materials (on sports teams, colors, etc.), and other basic but essential information. They also created a day-to-day training plan based on an evaluation of what to teach when.

“We didn’t want to overwhelm the worker by giving them more than they could handle at one time,” said Sarah Kerkof, senior manager of VAS. “We had identified this as a problem with earlier training ... The binders made training simple and consistent, plus new hires felt there was a plan in place for their success.”

According to performance data, TWI made a significant difference at the distribution facility (see Figure 1), and the company is expanding the training model to three more areas this year.

## TWI Overview

A private industry/government initiative created TWI in the 1940s to quickly train unskilled workers to manufacture weapons and other goods needed for World War II. Important elements of TWI include identifying the most basic steps of a job; documenting those steps on one-page Job Breakdown Sheets for trainers; training trainers (who are operators, not professional trainers) on how to instruct others using the Job Breakdown Sheets; and then training one-on-one, hands-one, one step at a time — requiring those being trained to master each step before moving on to the next. This is called Job Instruction. TWI also includes programs called Job Relations, which focuses on building positive employee relations; and Job Methods, which focuses on process improvement. TWI can include safety and problem-solving efforts as well.

For more information:

- Read *Toyota Talent* by Jeffery Liker and David Meier.
- Contact the Training Within Industry Institute at [www.twi-institute.org](http://www.twi-institute.org).
- Attend the TWI Summit May 11-12, 2010, [www.twisummit.com](http://www.twisummit.com)
- Join the TWI Community of Practice (CoP) launched by AME and APQC in conjunction with the TWI Summit; contact Susan Chandler, email [schandler@ame.org](mailto:schandler@ame.org)



Improvements After TWI		
	VAS change 2007/2008 (25-week period)	FWP change 2007/2008 (25-week period)
Training hours/cost	-51%	-76%
Cost per headcount increase	-58%	-58%
Performance (vs. a labor standard)	From 81.9% to 84%	From 78.9% to 84.6%
Turnover	-6%	-50%

### adidas' Lessons Learned Regarding Workforce Stabilization

- Create a separate area for new hire transitions.
- Alternate trainers weekly (to prevent burnout).
- Keep training groups to eight new hires or fewer.
- Reevaluate training timeline regularly.
- Create a “quick reference guide” for new hires.
- Use a touch screening process to make sure new hires can fulfill job duties.
- Ramp up capacity slowly to allow for learning curve.
- Strictly monitor training and progress of all new hires.
- Improve communication between HR and training team.
- Create a cross-training plan for new hires.

**Figure 1.** Results and “lessons learned” reported by adidas.

### O.C. Tanner: Speeding Up Responsiveness to Changing Demand

O.C. Tanner partners with companies all over the globe to recognize people who do great work. The business of manufacturing personalized corporate gifts to show this appreciation changed when companies began transforming the way they honored employee achievement at the end of the 20th century. Instead of clients placing predictable, annual orders for gold watches and other gifts to reward long-time employees or those retiring, clients started ordering smaller batches of items to recognize outstanding individual or team performances — orders that were unpredictable and had shorter order-to-delivery cycles. Meanwhile, O.C. Tanner’s workforce had become more diverse over the years (employees speak more than 50

languages). Training was largely driven by tribal knowledge rather than consistent and documented standards.

With cycle times shrinking for the roughly three million items shipped annually, the company recognized in 2005 that it needed to take action in response to changing customer demand, and it focused on training. Michael Cordon, O.C. Tanner training manager, said the company chose to use TWI because it supported earlier research that identified trust and appreciation as key drivers to engaging employees. TWI supports these and other elements that drive engagement because of its one-on-one methodology, hands-on practices, and reliance on team training.

TWI training began in the company’s inlay department, which is responsible for personalizing gifts (anything from jewelry to bicycles) with clients’ corporate symbols. Inlay was a

bottleneck because of the time it took to personalize each item, and the craftsman-like skills the process requires.

TWI led to dramatic improvement in the inlay department: Average training time dropped from 120 hours to 20.9 hours. This validated the company’s choice of TWI as a replacement for mentor-based training. The company has trained 300 of its manufacturing employees and has created a standardized, cost-effective, and widely supported training program that supports its goals of speed, quality, and flexibility.

TWI is unlike traditional training programs in that it emphasizes the transfer of knowledge from one person to one person — as opposed to group training or even modern “self-training” via online programs, videos, etc. TWI sees each job and each person as unique. Although this approach makes TWI effective, it presents challenges to companies: Allow enough time for learning, be flexible, and review constantly to make adjustments. Cordon explained that with TWI, training becomes everyone’s responsibility, and so training itself is an ongoing learning process.

Unique aspects of O.C. Tanner’s TWI program include:

- Job Breakdown Sheets (Figure 2) include exercises that operators perform for ergonomic health; jargon/terminology that is unique to each job; and notes to the instructor that the sheets are for instruction and are not to be shown to the student.
- TWI recommends that training take place where the work occurs, but this didn’t work in O.C. Tanner’s environment. “We wanted a non-pressure environment,” Cordon said. “We didn’t want the pressure of production to affect training, but we also wanted training to be visible.” Eighty percent of training takes place in a team setting and 20 percent takes place on the production line. Trainers monitor performance



closely and provide additional training if needed.

- To avoid waste in the training process, O.C. Tanner created a training matrix for employees and a training-request process that documents the skills that each employee has trained in and when those skills were used last. It also requires the applicant to explain why they want to be trained and confirms that they've discussed their desire with a supervisor.
- Trainers meet weekly; training takes place on every shift; and ongoing cross-training occurs. To become a trainer, operators undergo 12 hours of training in TWI, view a video about TWI, and read the book *Toyota Talent* by Jeffery Liker and David Meier.

## Northrop Grumman Shipbuilding: Transferring Knowledge and Efficiency to a New Generation

Northrop Grumman Shipbuilding in Newport News, VA recently started using TWI on a limited basis, but the program has been so well received that the company sees TWI as a way to address a looming threat to many industries: massive retirements of highly-skilled workers. The company expects to hire thousands of new employees in the next 18 months to replace long-time skilled workers who are retiring. The shipbuilding operation also faces challenges that are familiar to any heavy-industry producer: pricing pressure, variability in workload demand, and changing products and product lines.

These challenges prompted managers to investigate TWI as a solution when they learned of it through the lean process improvement community. Ironically, the ability to implement and train in small bites was appealing because of the complexity and skills-requirements of shipbuilding jobs. For example, one welding procedure alone has more than 700 pages

## Creating a Job Instruction Sheet

*How O.C. Tanner creates Job Breakdown Sheets:*

1. Process owner (person doing the job), writes down the most basic steps of the process.
2. The process owner reviews the draft with others who are experts at the job and revises accordingly.
3. The Job Breakdown Sheet is tested by having a person who is unfamiliar with the job follow the instructions to perform the job. If there is confusion, the sheet is revised until the instructions are clear.
4. The Job Breakdown Sheet is reviewed to ensure compliance with ISO standards.
5. The process owner updates the training plan.
6. The job is now an official part of Job Instruction, and trainers must give training. (This prevents slippage back to "tribal knowledge transfer.")

**Figure 2.** Job Breakdown Sheets used by O.C. Tanner include exercises that operators perform for ergonomic health; jargon/terminology that is unique to each job; and notes to the instructor that the sheets are for instruction and are not to be shown to the student.

information and instructions. Despite this documentation, a lot of valuable knowledge was transferred on the job. Forty-two percent of the shipyard's 40,000 employees have 20 years or more of service, and most of those employees are older than 35. Meanwhile, 25 percent of employees are younger than 35 and have less than five years of tenure. This poses dual challenges: capturing the exiting knowledge, and training new employees in a way that not only transfers the knowledge but protects high levels of efficiency achieved through years of lean process improvement.

"I work with people whose great-grandfather worked here," said Rob Hogan, director of process excellence. "That can be a great thing in terms of knowledge, but it can also be a barrier to change."

Hogan stresses that Newport News (as the shipyard is called) is in the early stages of TWI. But reception from those employees in pilot programs has been so great that leaders are confident TWI will be an important part of meeting production and

performance goals going forward. For example, in surveys of employees in the TWI pilots, Hogan received comments such as, "The only thing I didn't like was that I didn't get this training from the start of my job as a foreman," and, "TWI makes you think deeply about your job." Many of the employees admitted to being skeptical until going through the training.

So far, Newport News has trained 30 employees in Job Instruction and Job Methods. Six of these people are working as trainers, training in groups of eight in production jobs. Plans are to expand the training next to facility maintenance and steel trades. Hogan plans to integrate TWI into lean efforts, making it a critical component.

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