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INSIDE:

PLUS:

Dressed For Excellence

INDUSTRYWEEK's 2010 Best Plants winners deliver remarkable manufacturing performance and aim even higher p. 20

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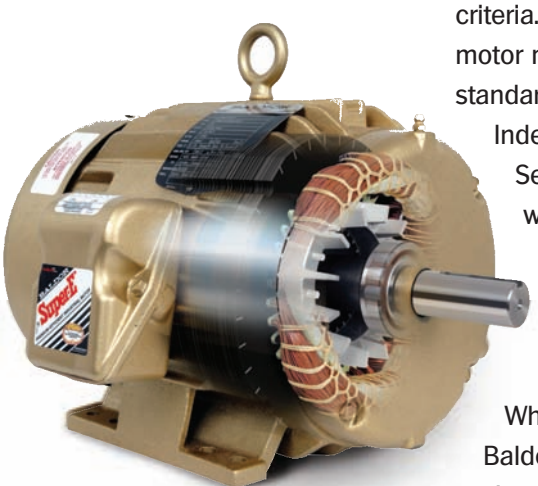

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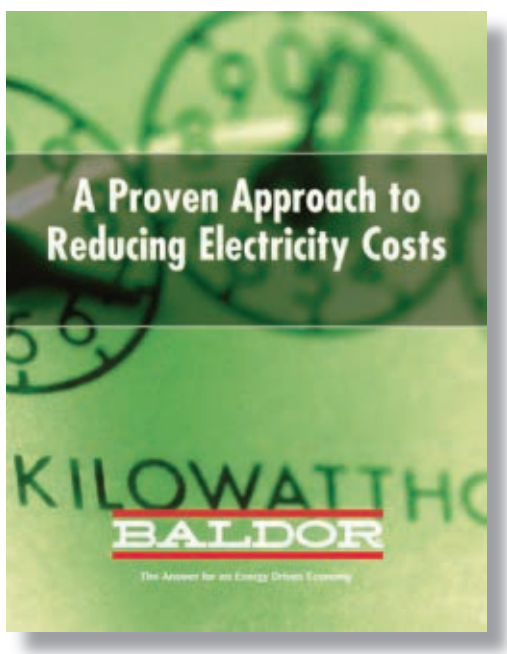

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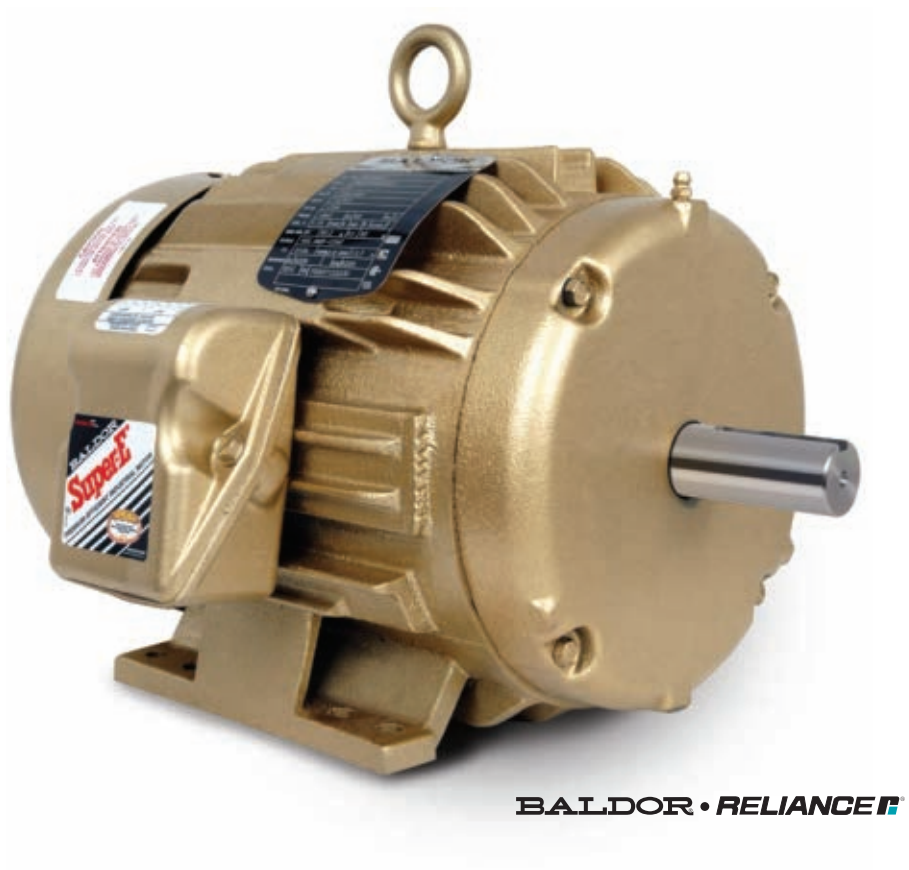

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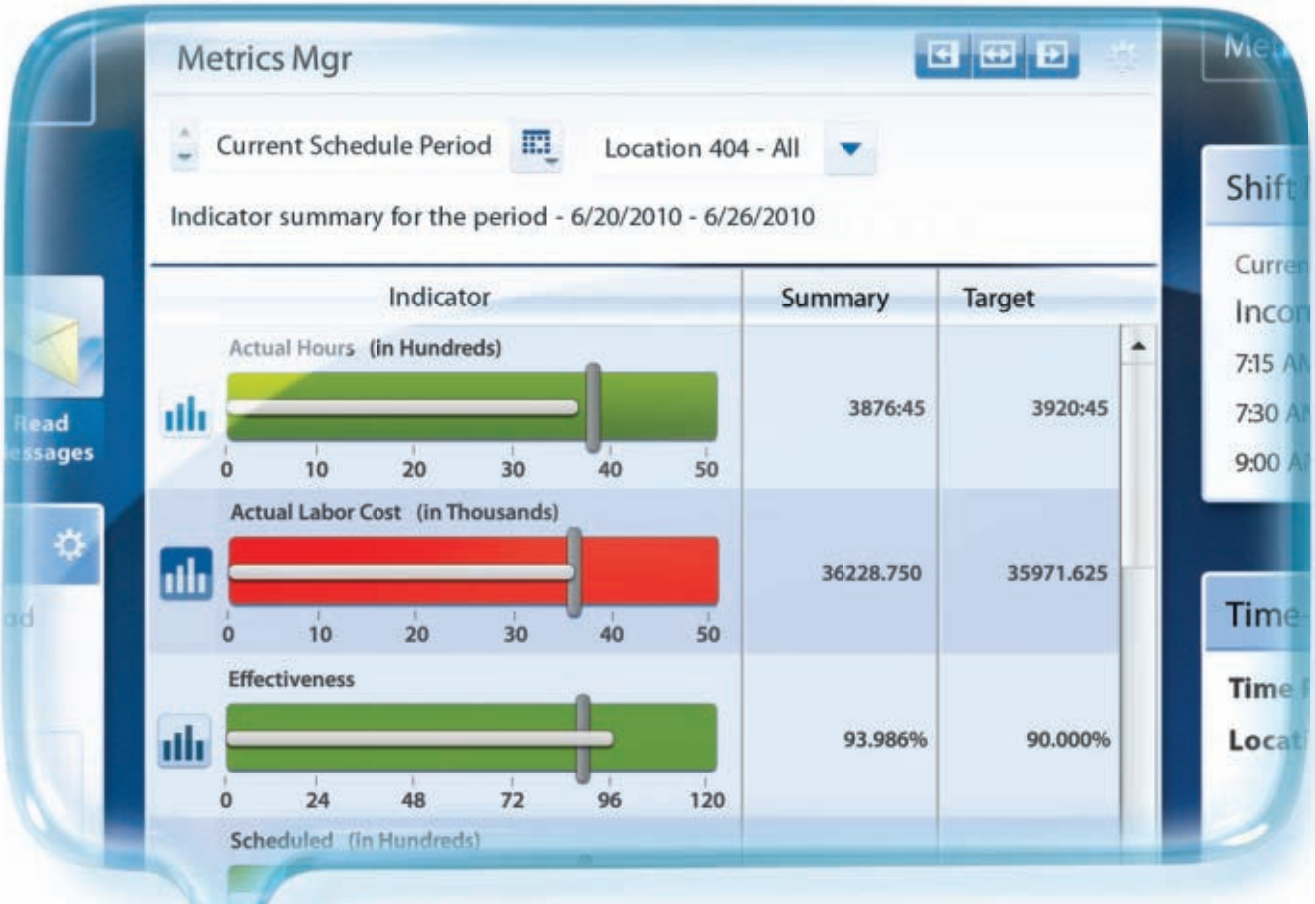

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Online Poll:

How do you rate your company's adoption of lean principles?

IndustryWeek.com readers respond:

15%
We are a lean champion in almost all business areas

56%
We have adopted a lot of lean principles, but still have to improve

21%
We are just getting underway with lean

8%
Lean is not in our plans at this time

You Write The Caption

Congratulations to *IamMHunter*, who has achieved the lofty title of CWE (Caption Writer Extraordinaire). You, too, can earn fame (but, alas, no fortune) by joining in the latest "You Write The Caption" contest, featuring gags from cartoonist Jerry King. Go to www.industryweek.com/cartoons, and let loose your funny bone.

"They said I was a turnip!"

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First Up

Things We Learned in the Storm

Manufacturing success requires relentless pursuit of operational excellence and a committed, engaged work force. IndustryWeek now has two national benchmarking programs to measure and recognize the best-performing manufacturers in each area.

"There are some things you learn best in calm, and some in storm," novelist Willa Cather wrote in "The Song of the Lark." For manufacturers, the economic storm of 2008-09 offered dramatic reinforcement of what most had known for some time—competition is global, relentless, internal and external, and unforgiving. Manufacturing is no place for timid spirits.

There is certainly nothing timid about the 10 facilities we are honoring as our **2010 IW Best Plant winners**. Visit any of these facilities and you will find competitors who are smart, tough, energetic, innovative and driven to succeed. We have enormous respect and admiration for these people who strive every day to make their operations more efficient, productive, safe and profitable. You'll find a profile of each winner in this issue and additional information in our Best Plants coverage on our website.

Even for the best-performing plants in North America (and for that matter, anywhere else in our newly flattened world), there are no guarantees. Labor rates, technology introductions, currency valuations, trade rules and a host of other factors force businesses to be constantly alert to new opportunities. The plant that was in Michigan 20 years ago moved to China 10 years later and may be moving to Vietnam next year.

Proof of the constancy of change was the sad news that Philips Professional Luminaires' plant in Sparta, Tenn., which we honored as a Best Plant just a year ago, would be closing soon. Silvie Casanova, a spokesperson for Philips Lighting, told the Cookeville Times that it was a business decision that had "no reflection on performance at the plant."

But as our Best Plant winners this year will attest, if there are no guarantees in manufacturing, there also is no shortage of opportunities to change, improve and succeed. Take Snap-on Power Tools' Murphy, N.C., plant, which has employed its lean manufacturing prowess to absorb five manufacturing lines from a shuttered plant in 2009 and still has room to take on new work. Or IEC Electronics' Newark, N.Y., plant, which faced closing five years ago but turned new equipment, lean concepts and a focus on product development into a recipe for profitable growth. Or Raytheon's Michael Shaughnessy, who says that the success of continuous-improvement initiatives at the Andover, Mass., facility has led not to a dead end but to an unfolding of more opportunities to achieve significant improvements.

Over the 21 years of the Best Plants competition, hundreds of manufacturers have used this unique benchmarking activity to see if their operations measure up as world-class. For those who do, it offers a satisfying affirmation of a job well-done. And for those who are not named winners, participation often serves as an incentive to pursue further improvement.

For 2011, we have launched a new benchmarking opportunity, **Best Places to Work in Manufacturing**. This assessment, using well-established criteria developed by Best Companies Group, is a two-part process designed to gather detailed data about each participating company. In part one, the employer completes a questionnaire and in part two, employees complete a survey.

The collected information from the two instruments is combined to produce a detailed set of data that showcases the strengths and opportunities of the company. Participating companies receive a free Employer Benchmark Survey. We'll report on the highest-ranked companies in August.

As a manufacturing leader, you know how incredibly important your workplace culture is to the success of your enterprise. Build a team of committed individuals focused on a common purpose and you've gone a long way to unlocking the energy and ideas needed for success. So it is more critical than ever that companies have unbiased, reliable insight into what their employees think about company leadership, communications, work environment, training, supervision and other key issues. Engaging in the Best Places to Work in Manufacturing process can provide you just that visibility.

Best Plants and Best Places to Work in Manufacturing. Take advantage of the insights they provide to help you no matter what weather you're facing.

Editor-in-Chief
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Social Media tools can bring real value to ERP,

IFS expert says.

Facebook, Twitter, LinkedIN … these are more than extremely popular tools for online communication. They have set a new standard for software functionality that managers, workers and even senior executives have become accustomed to. Wikis, instant messaging, IP telephony are now proven tools for interpersonal and organizational communication.

David Andersson

While some business software companies work to integrate their offerings directly with online tools like Twitter or Facebook, we feel the real business benefits will come from enterprise resources planning (ERP) and other enterprise software that mirrors the functionality of these popular online tools.

In the 21st Century, we at IFS believe that enterprise resources planning (ERP) and other enterprise software must include this type of functionality for several reasons.

• A good deal of company business is already being done through social media tools, and these communications are taking place outside of the ERP system and are therefore not recorded in the system of record and are not secure.

• Furthermore, as the industrial workforce shrinks due to retirement of the baby boom generation, capturing their knowledge of your company's processes and equipment will become a vital concern. Social media tools embedded in ERP offer proven technology to pull information out of those with expertise and preserve it for use by others throughout the organization.

• Structuring company information in a dynamic format like a wiki is one way to drive lean improvements in complex front office processes like engineering, supply chain management, project management and even on the shop floor. In the wiki format, a company can document not only their current processes, but how those processes have changed over time – an important requirement for lean.

Wikis, instant messaging, IP telephony and other social media tools built into ERP can help streamline internal and external communication and keep proprietary conversations secure. Several features within the IFS Enterprise Explorer user interface are designed to do just this.

Get Andersson's whitepaper on ERP, Social Media and Enterprise 2.0 at **download.ifsworld.com**, or call **1 888 437 4968.**

READER FEEDBACK

WHERE SHOULD LEAN LEAD?

Many manufacturers who attempt to wrap their arms, and minds, around the concepts that have come to be known as "lean" make the mistake of trying to compartmentalize the philosophy. Unfortunately, Rick Bohan has done exactly the same thing in his article ["Small Manufacturers Need to be Agile, Not Lean," Nov. 2010].

While I fully agree that agility is a powerful byproduct of creating a lean environment and that the benefits he examines for small manufacturers are real and tangible, I strongly disagree with statements like this one: "It's just that the 'lean message' at least as it's been translated and communicated over the past several years, has little applicability to the circumstances of small manufacturers. Small manufacturers (and just about everybody else) have been sold on the idea that lean tools are primarily for cost cutting."

I've been learning and implementing lean for more than 15 years and have never been given the impression that lean tools "are primarily for cost cutting." Mr. Bohan misrepresents the traditional "lean message" as being one of "hoping for 'promised' cuts in payroll, improvements in efficiency and reduced costs elsewhere." Lean's message has always been one of responsiveness to customer needs, identification and elimination of non-value-added activities, and a passionate devotion to employee participation. Everything else is a byproduct, not a promise—including the agility Mr. Bohan is trying to sell.

I think it does a great disservice to manufacturers, large and small, to imply that they can pick and choose from some sort of lean buffet.

Terry Durbin
Continuous Improvement Manager
Winegard Co.
Burlington, Iowa

DIRECT WORDS NEEDED

"A Yellow Light for Technology Behind the Wheel" [Dec. 2010] caught my eye because the notion that "complicated and expensive is better than simple and cheap" has overtaken just about everything and caution is needed. But in the article, the quote "success and continued company growth need to be carefully managed and aligned with technology processes that are focused on the customer" just slaps me upside the head. What does that mean? Complicated and expensive words, so to speak, that obfuscate things. But there's more: The writer suggests that licensing will help fix things. Now you and I both know a license is just a piece of paper that shows you fooled a bureaucrat for a few minutes and gave them money. Or maybe it's you who was fooled. But the point is, if "leaders in industry" can't say what they mean and mean what they say, they will get caught in their own fuzzy language, and licenses, that they believe "test" well. We need people with clear vision and direct words.

Jim Jenkins,
Owner/General Manager
WAGS Radio
Bishopville, S.C.

THE WRONG PATH

Having read your article on manufacturing [First Up: "The Wrong Path," Nov. 2010] I have some direct comments concerning same.

I have been a manufacturer for over 16 years now and have designed my own products, opened a manufacturing plant from scratch, marketed and sold my products in over 43 countries around the world. I think of myself as having some experience, including experience in China. In 1997 I tried to enter the Chinese markets with my products, and at that time the import duties and fees totaled more than 100%. My products at the time sold around the world for $120,000 per unit. Selling into the Chinese market meant having to sustain an end cost of $240,000 per unit. I quickly looked elsewhere.

Today I am trying to re-enter the Chinese market with my products with a sales price of—you guessed it—$120,000, which, adjusted for the last 13 years' inflation, put my product at under $100,000. Now as to the import duty, that has come down a bit to 27% plus 17% VAT plus 6% sales tax for a total of 58%. Sounds doable so far. The Chinese dollar is another part of the equation that if properly adjusted would bring this all in line, but I do not see that happening anytime soon.

My Chinese customers now say "manufacture here," since there will be no import duty. This is the way we have lost so many jobs in the United States. Of course that is a big reason China is doing this. If I was to set up a manufacturing plant, the requirement is I have a Chinese partner who will be 51% owner and I have to give up any rights to the intellectual property in China.

Chinese companies sending product to the U.S. pay almost no import duty and have a petition system in place passed by our congressmen to have their import duties reduced to almost nothing.

Given a level playing field, the U.S. manufacturer can out-compete all others. But given the unlevel field described above, the U.S. manufacturer is in a noncompetitive position, to say the least, and would be at risk of losing its technology and company to the Chinese partners. So we have a big mess to clean up with our trade agreements and Washington bureaucrats who have let this occur.

Frank McClintic
CEO, MaxFlight Corp.
Via the Internet

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THE COMPETITIVE EDGE

■ BY THOMAS J. DUESTERBERG

The Federal Deficit Comes Into Focus

Slashing the federal deficit promises significant benefits for manufacturers.

¶ The start of the new year brings renewed hope that the long-neglected federal deficit will be addressed in a serious way. While this problem may on the surface seem to be a distant concern to manufacturers, making significant progress on it could be surprisingly helpful to them. ¶ The midterm elections of 2010 brought scores of new members to Congress whose primary concern is the growth in federal spending and the burgeoning budget deficit. Soon thereafter the two co-chairs of the president's bipartisan deficit reduction commission released a bold proposal combining cuts in discretionary spending and entitlements, and tax simplification that would lower personal and corporate taxes to achieve a near-balanced budget within five years.

This proposal was followed in rapid-fire order by structurally similar proposals from the Bipartisan Policy Center and long-time budget hawks supported by the Peterson Foundation.

More pertinent, however, to real-world concerns was the decisive new budget of the coalition government in the U.K., which details budget cuts of about 4.5% of gross domestic product, equivalent to about $650 billion in the U.S. economy. If an entrenched European welfare state can cut public employment by nearly 500,000 jobs (equivalent to at least 2.5 million in the United States), reduce welfare and national health care payments, and increase the retirement age, while surviving politically, this should give hope to timid reformers in the United States.

Slashing the Deficit

Perhaps a better example of slashing a crushing national deficit is that of Canada in the 1990s. Laboring under an annual deficit of around 6% of GDP, with 25 cents on every dollar of spending going to debt service, and with its bonds being downgraded by the ratings agencies, Canada undertook a little-known (south of the border at least!) series of radical budget cuts. Its watershed 1995 federal budget cut one-third of payments to the health care plans run by the provinces, slashed the civil service by one-quarter, and instituted a 10% across-the-board cut in other discretionary programs. Two years later, Canada had a balanced budget and operated in surplus until the recent severe recession. Importantly, it reduced federal expenditures by about 6% of GDP (equivalent to about $885 billion in the U.S. economy), while applying some of the savings to reducing its corporate tax rate from 28% to 15% by 2012.

"WHILE DEFICIT REDUCTION is a hard job and will take time, recent real-world examples should give hope to the new reformers setting up shop in Washington."

Manufacturing Benefits

If the example of two industrialized English-speaking nations can be followed in the new political environment in the U.S., it could have important benefits for domestic manufacturing firms. At the macroeconomic level, reducing the deficit from the current 9% of GDP to a more manageable 2% to 3% (or even to a balanced state) would keep interest rates from spiraling upward, lead to a stronger dollar, and ultimately to more stability in our economy. A stable dollar could also be helpful in reducing volatility in commodity prices. Additionally, reducing spending would take pressure off to increase taxes, and hard experience shows that taxing faceless corporations is easier for politicians to justify than it is for personal taxes. If the deficit control measures are as successful as they have been in Canada, then it may even be possible to find the means to reduce corporate taxes, as Erskine Bowles and Alan Simpson of the president's commission have suggested. Economic research consistently shows that the best stimulus to modern economies is through tax reduction and returning resources to the private sector, so such a program should raise growth prospects in the long run.

While deficit reduction is a hard job and will take time, recent real-world examples should give hope to the new reformers setting up shop in Washington. And such efforts certainly merit support from the industrial sector because of the many economic benefits which would ensue.

Dr. Duesterberg is president and CEO of the Manufacturers Alliance/MAPI Inc., an executive education and business research organization in Arlington, Va. (www.mapi.net).

BY STEVE MINTER

LEADERSHIP & STRATEGY

Finding the Business Case for Diversity

A new study shows diversity programs in high-performing organizations are more often anchored in business objectives than lesser performers.

When Mary Ann Downey was researching employee diversity practices during the recession, she heard several major public corporations say they had pulled back on funding for diversity programs. During a crisis, she found, "They didn't want the perception that they were spending money frivolously." That, she says, is a telling indicator of "how far diversity has to come, that it is still perceived by the public and the investment community as a 'nice to have' or 'right thing to do' versus being a true business imperative."

But in "12 Diversity Practices of High-Performing Organizations," Downey and her colleagues at the Institute for Corporate Productivity (i4cp) found that some organizations such as Pelco, ING, Deloitte and Amway are finding a correlation between robust diversity practices and financial success.

For example, high-performing organizations are more likely to build the business case for diversity on the need to reflect their customer base and community demographics. Downey, i4cp's human capital management practice leader, says many companies are finding growth in nontraditional markets, whether outside the United States or in demographic groups that had previously received little attention. Attention to diversity helps companies tap wider pools of talent, reflect the demographics of the communities they serve and market more successfully to these communities.

The i4cp study also found that high-performance companies:

- Place more importance on framing diversity as a business-relevant issue and on creating accountability. Higher performers were almost 26% more likely to do this than lower-performing organizations.
- Are more likely to specifically budget for diversity initiatives. Some 48% of higher performers specifically budget for diversity initiatives, versus only 27% of lower performers.
- Are more likely to assign responsibility for leading and executing the diversity strategy to the executive team. More than a quarter of high-performance organizations reported that the executive team is responsible, while another 24% said the head of human resources is assigned the task.

Downey said it is not untypical to find up and down cycles in diversity programs. For companies that are starting up or re-energizing their efforts, she cautions, remember that "people move slower than dollars do." She recommends companies determine where they want to be in three to five years, rather than focus solely on incremental one-year targets. Then they should consider what they want the business impact to be and how they are going to measure it.

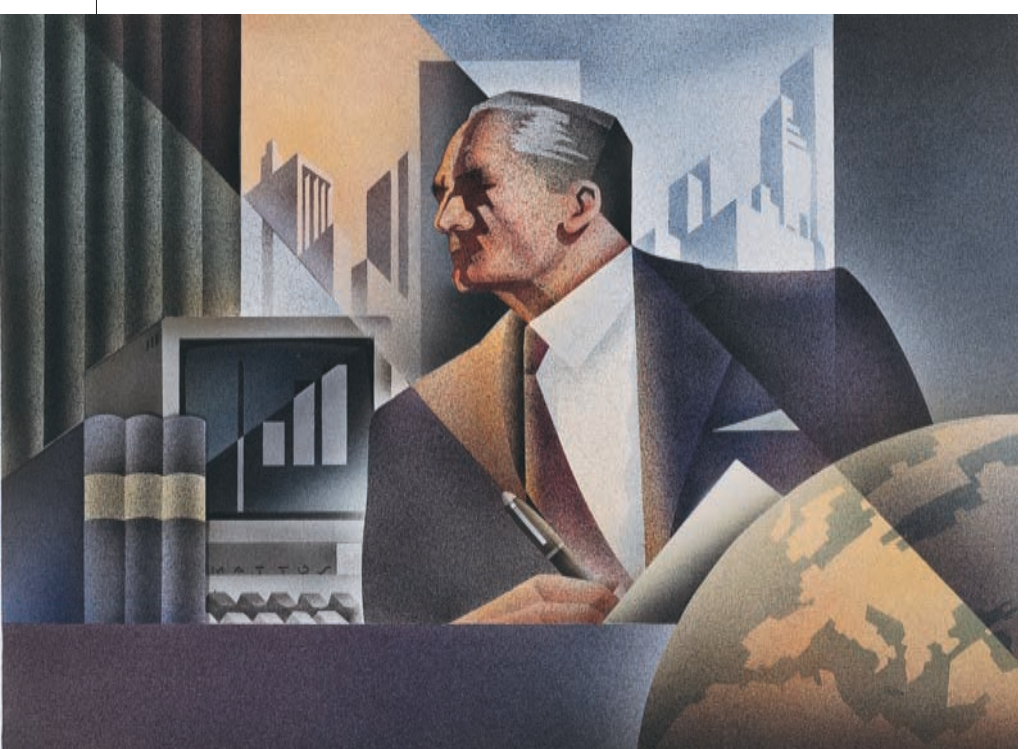
In an increasingly global economy, says Downey, companies should "stop thinking about diversity in the traditional protected-class way and start thinking about it from a global mindset." She notes that manufacturers are increasingly reliant on networks of suppliers rather than vertically integrated operations. That means tapping the talents of a more diverse group to design, produce and deliver products. Her advice: "Think about how someone is different than you are and how that can add to what you are doing and then reward those managers who are more inclusive."

"Think about how someone is different than you are and how that can add to what you are doing and then reward those managers who are more inclusive."

— Mary Ann Downey

10 Key Challenges for CEOs

Chief executive officers must now be chief diplomat, chief talent officer and chief image manager, says a veteran executive recruiter.



Don't expect simpler times for CEOs just because the Great Recession is giving way to the Modest Recovery. Stephen A. Miles, vice chairman of executive recruiting firm Heidrick & Struggles, says CEOs will encounter a "wealth of new challenges" in 2011. Here are his top 10:

Moving from "business case" to "social business case"

As companies weigh entering a new market, Miles says the business case must now be viewed through a new lens: How will this business decision impact the country/region/state/province they are going into? He warns, "It is no longer enough for companies to simply make a good business case or meet the 'legal requirements'; they must make the case to the local stakeholders that this move will benefit the target community, who may have concerns about, for instance, the environmental impact."

Stepping into the role of "ambassador"

"Related to the development above, we are seeing that the CEO must actively engage with politicians and regulators around the world. The CEO must be conversant on policy—be it financial regulation or healthcare reform—that affects his or her company and industry. Policy makers or regulators do not want to speak with delegates, but to the CEO. Given this, the CEO must act as diplomat and build these relationships him- or herself."

Repairing the corporate image problem

The financial crisis has sullied the image of corporations, and CEOs in all industries must work to repair their reputations, Miles says. "One way of doing this is through earnest CSR. Taking corporate social responsibility seriously not only helps to balance out the negative press, but also jibes in particular with the priorities of today's younger employees—another important constituent that companies must consider."

Making the board an ally

"With first Sarbanes-Oxley and then the global financial crisis, corporate boards have stepped in to become more 'executive,' instilling themselves further into the role of scrutinizing and interrogating management," Miles says. CEOs must build a strong relationship with these key stakeholders, keeping them informed about desired initiatives and operating with transparency. Miles says "treating the board as a partner along a strategic path will only help your cause."

Building a global leadership pipeline

Miles says every CEO should have "a robust and 'global' pipeline of talent throughout the organization, especially at the senior-most levels," and discuss multi-year succession regularly at the management and board levels. He points to a recent survey that Heidrick & Struggles conducted with Stanford's Rock Center that found 51% of companies cannot name a CEO immediately if needed and 39% have no internal candidates whatsoever. To that end, CEOs must "encourage their boards to recruit directors with succession expertise and experience, and to help make the all-important issue of succession a top corporate priority," he says.

Grappling with China

Partnerships in China can carry much risk, he warns. "As the joint-venture partners in China begin to learn and then take over the technological developments and processes introduced by their Western partners, these Western companies may be uninvited to the party. Chinese companies, supported by their government, are aggressively acquiring intellectual property, and are increasingly looking to go it alone in competing on the world stage. CEOs must thus be aware that they may be creating competitors if they enter into a JV in China—and manage this risk accordingly."

Understanding shifting employee values

"Managing the demographic changes as baby boomers move into retirement and 'millennials' come up through the ranks is something no CEO should overlook or just delegate to HR. The CEO needs to understand the motivations and values of his or her workforce in order to leverage organizational capabilities," Miles says, adding that the "need for constant real-time feedback and sharing of information is something new."

Operating in a world of social media

"Today's CEO is coming to realize that potentially all of his or her decisions and actions are broadcast in real time on company blogs or on Twitter and Facebook. Miles says CEOs should "embrace and become part of the new media social discourse."

Driving diversity

Miles says it is time to move from a compliance-based approach to diversity to one where we "truly build (and value) diverse companies and boards." Along with the growing business case for diversity, he notes, "A number of countries are taking a legislative view regarding gender diversity on boards (UK and Australia), and are set to begin to mandate the percentage of female directors that must be on boards."

Managing a globally distributed leadership team

"A corollary to a more diverse and more geographically diffuse management team is the complexity of actually managing a team that is so spread out," says Miles. Expatriate programs, in which companies send executives abroad for experience, carry the risk of having those employees scooped up by competitors. Instead, he says, companies are increasingly turning to hiring local teams. They have two distinct advantages: "The local executives may be more likely to stay with the company and they may also be better able to compete with any local competitors who emerge on the market." ⏮

Are You Prepared for BusiLeaks?

Mobile workforces, cloud computing and social networking pose significant threats to IT security.

In the era of WikiLeaks, it's no wonder that business executives are feeling less secure about their organizations' data. A recent study by Ernst & Young found that 60% of those polled perceive increased risk from the use of social networking, cloud computing and personal mobile devices at work.

"Organizations are operating in a world that requires borderless security," warns Bernie Wedge, an IT risk practice leader at Ernst & Young. "Information access by employees using mobile devices, or items that are maintained and accessed by customers, vendors or other business partners, are considered outside traditional borders. Therefore, companies must think about security beyond their employees, data centers and firewalls."

The study found organizations recognize the risks that come with emerging technology trends and are taking steps to protect information with stronger security programs. Half of the senior executives surveyed said they expect to spend more on data leakage/data loss prevention efforts over the next year. Still, facing continuing economic pressures, companies also want to reduce their overall IT spend and are looking to cloud computing services as a solution. The risk associated with cloud computing include data leakage; 52% of executives identified it as the largest associated risk. Some 39% cite the lost visibility of company data as an increased risk of cloud-based computing.

Information security is shifting from a technology-only approach to one that includes technology and people, the study shows. All employees have a role in information security and organizations need to clearly communicate their responsibilities. People and organizations "outside the borders of the traditional corporate environment play a role in helping to achieve information security objectives, but can also pose a risk to protecting your information," says Jose Granado, an information security expert at Ernst & Young. "A comprehensive IT risk management program must focus on people, processes and technology to address information throughout its lifecycle, wherever it resides." ⏮

■ BY JILL JUSKO

FACILITIES & OPERATIONS

Management at a Glance

Visual management drives better conversation and improved leadership.

BOSTON WHALER

A Boston Whaler team meets in front of its communications board, which highlights a limited number of metrics and information to help the work force focus on the most important issues. Boston Whaler's boards include data on safety, quality, delivery, cost, process and morale.

"Stop production so that production never has to stop" is a Toyota proverb. The front end of the saying refers to production operators having a responsibility to stop a production line if they see a defect or believe that something abnormal is occurring. The latter end of the proverb refers to the end goal of these stops: to root out the cause of the defects, remove them and continually improve the process so that stopping the line no longer is necessary because defects no longer are occurring.

Kevin Kelsey has developed a corollary with regard to visual management: "Always communicate so you never have to talk." Visual management, explains the continuous improvement manager at boat manufacturer Boston Whaler, is all about communicating visually, from simple tape on the floor to indicate where equipment or material should be staged, to kanban systems, to color coded bins, to display boards that show constantly updated metrics. Give a material handler visual signals to indicate when and where to stage material, for example, and "an operator never has to stop working because he's out of material," Kelsey provides as an example. The alternative may be 30 minutes or so of unproductive time spent as an operator flags down a supervisor to flag down a material handler to get the material where it needs to be. That kind of conversation is waste.

While visual management helps the entire work force do its job better, it truly is a process for managers to understand, at

a glance, what is going on and to lead more effectively, Kelsey says. "It is about understanding the normal versus the abnormal. Normal is operating the way we want it to operate," he says.

Visual management is particularly powerful when used in combination with MBWA, or management by walking around, he says. (MBWA emphasizes the practice of managing by going to the work area directly and interacting with the work force to better understand and react to what is happening, as opposed to managing from a distance, or from behind a desk.) For example, where visual signals indicate that production lines are operating as they should, a plant manager or other leader can provide positive feedback and quickly move along. Stop by a communication board that shows abnormal conditions, however, and "that immediate feedback allows us to take action when we need to take action." In some instances, the issues challenging production lines can be management-created errors of commission or omission. Those issues become more quickly apparent if plant leaders walk the plant floor and in combination with the appropriate visual signals. "It's a great way to understand what's going on," Kelsey notes. It's also the least wasteful way to lead.

The continuous improvement manager points out that plant managers routinely visiting the plant floor and reviewing communication boards, and engaging with operators or value-stream managers, is visual management in and of itself. It says to the plant floor workers that the managers care about quality, effort and improvement. ⏮

Editor's Note: Kelsey will co-present a session on visual management at IndustryWeek's 2011 Best Plants Conference, April 4-6, in Atlanta.

How to Choose a **Black Belt** Project

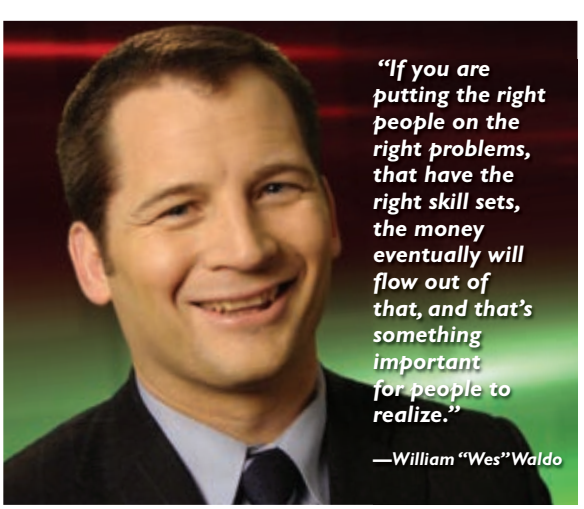
If the selection process is all about the dollars, then it's all wrong.

There exists a concept that cost savings is the measure that must be met for a project to qualify as a Six Sigma green belt project or a Six Sigma black belt project.

That concept is wrong, says William "Wes" Waldo, COO of consulting firm BMGI, who shared his observation during a recent online training event "Performance Metrics: How to Select Them, Adjust Them, and Tie Them Into Your Strategy."(The event is archived on the IW website.) Waldo shared his objection first by outlining a typical conversation surrounding the selection of a black belt project: The conversation begins with a black belt project proposal, which likely is met with the question, "How much is the project worth?" Told that it is worth $50,000, the response becomes, "That can't possibly be your project. All black belt projects must be worth at least $300,000. That's what makes it a black belt project."

Where did that $300,000 figure (or similarly high figure) come from? It dates back to the measurement system that existed when Six Sigma programs first launched, explains Waldo. The programs often were kicked off in engineering-driven organizations, which looked at the typical allocated cost of an engineer, recognizing all the training necessary to turn that person into a dedicated black belt. The organization then determined it required at least a 3x return on that engineer's time, for example, and calculated that cost. Carrying out its calculations further, the organization determined a black belt could complete two projects per year, therefore requiring each project be worth $300,000 for a total of $600,000 per year in cost savings.

"So they backed into the math," Waldo points out. "That's a very activity-driven approach and what we look at are results."



Aren't the numbers the results? No, says the BMGI chief operating officer. The conversation should be about matching the skill necessary to the problem. "So, if I have a problem that requires a ton of linear regression and a DOE [design of experiments] and all these types of analyses that clearly are the skill set of a black belt or a master black belt, then I should assign them to that regardless of the dollar amount, especially if I don't have a million dollar project sitting out there," he says. "What we want to do is match skill on problem as opposed to dollar amounts, which is a fictitious type of program management metric that's out there.

"If you are putting the right people on the right problems, that have the right skill sets, the money eventually will flow out of that, and that's something important for people to realize." ⏮

1,000,000

ISO 9001 Certifications Surpass 1 Million

More than 28,000 certifications to the international quality management standard have been issued in the United States.

If your manufacturing plant or company is ISO 9001 certified, you are one in a million. Or more accurately, you are one in more than a million, according to recently released figures.

ISO 9001, the family of standards for quality management, reached a milestone in 2009. The cumulative number of certifications issued for these global standards surpassed the 1 million mark in 2009, an 8% increase in ISO 9001 certificates.

Approximately 1.1 million certifications had been issued in 178 countries and economies by year's end 2009, according to the International Organization for Standardization, the Geneva-based organization that develops and publishes international standards. It is comprised of the national standards institutes of 163 countries.

The organization recently released its 2009 ISO survey highlights, which include data not only for ISO 9001, but also for additional families of standards.

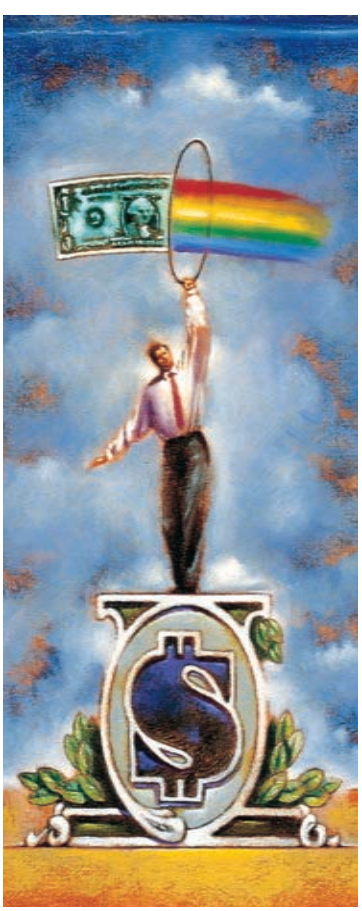
Controversy surrounds the ISO 9001 standard. Critics point out that certification doesn't guarantee a quality end product; it simply guarantees that the formal business processes outlined by the standard are being followed. Nevertheless, in the introduction to its annual highlights, ISO noted that the 8% increase in ISO 9001 certifications in 2009, which followed a 3% increase in 2008, "confirms the importance of ISO 9001 in the global supply chains and as the pioneering model on which subsequent management system standards have been built and flourish."

Annual growth in certifications in 2009 was greatest in the Far East, which increased by 12%. North America, on the other hand, experienced a 12% decline in its annual growth in 2009, following growth of 1% in the previous year.

With 28,935, the United States ranked No. 9 among the top 10 countries for ISO 9001 certificates in 2009.

Quality Pros' Salaries Edge Up

Manufacturing professionals with a quality focus enjoyed a boost to their salaries in 2010, according to the American Society of Quality. The overall average salary for U.S. full-time quality professionals in 2010 is $85,289, according to the 24th annual salary survey conducted by Quality Progress, ASQ's monthly publication. That salary is up from $83,442 in 2009 and $81,064 in 2008. The survey, which collected 5,348 responses from professionals in the United States and Canada, also indicates the value of Six Sigma training to salary levels. U.S. quality professionals with master black belt training earned a premium of greater than $20,000 compared with professionals who had black belt training only.



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EXCELLENCE THRIVES

INDUSTRYWEEK's 2010 Best Plants winners deliver remarkable manufacturing performances and aim even higher.

INDUSTRYWEEK's 21st annual salute to the best plants in North America illustrates one undeniable fact: Excellence in North American manufacturing continues to thrive.

From Mexico to Canada and representing five different U.S. states, the 10 manufacturing facilities that comprise the 2010 class of INDUSTRYWEEK's Best Plants winners demonstrate the rewards that accrue to manufacturers who strive for perfection and never relax their efforts to improve.

Their paths to operational excellence are varied. Newark, N.Y.'s IEC Electronics Corp., for example, recognized that it needed to evolve to survive, scrapping an old business model and embracing a new one developed in response to changing market dynamics. As a result it is succeeding in an industry that has moved largely overseas. Batesville Casket Co.'s Vicksburg, Miss., operations, on the other hand, continues to pursue the processes that earned it a 2007 IW Best Plants award. It hasn't stopped there, however. "Optimizing" is an often-heard word around the plant these days as the facility focuses on getting more and better yields from the lumber that comprises its primary raw material.

These are but two examples from 10 INDUSTRYWEEK Best Plants winners that are succeeding in a manufacturing environment that continues to challenge even the strong. These facilities are increasing their competitiveness by addressing challenges on all fronts and recognizing that operational excellence is a team game. Smart leaders willing to listen and learn; an engaged work force desiring to help their workplace improve; and supplier and customer participation—all contribute to driving excellence within a plant and beyond. Contributing as well is a focus on employee training and the prudent introduction of production and information technologies to help the work force do their jobs more quickly, more safely and with greater precision.

The annual INDUSTRYWEEK Best Plants competition evaluates manufacturing facilities in multiple categories, recognizing that operational excellence is not delivering good quality at the expense of on-time delivery. Neither is it meeting productivity goals at the expense of worker safety, or by working harder but not smarter. It is a comprehensive focus on excellence in all areas, with an unstoppable focus on improvements that will further increase competitiveness and enhance customer satisfaction.

The following pages contain the stories of INDUSTRYWEEK's 2010 Best Plants winners. Be prepared to gain new insights and ideas to improve your own manufacturing operations. Indeed, IW's Best Plants winners from today and yesterday are not strangers to gaining good ideas from other manufacturers both within and outside of their own industries. You can also read more about the 2010 winners online at www.industryweek.com. The online versions contain additional Web-exclusive best practices.

How They Made the Top 10

INDUSTRYWEEK began accepting application requests for the 2010 Best Plants awards late last year. A panel of IW editors reviewed the completed applications, which reported management practices and plant performance in such areas as quality, customer and supplier relations, employee involvement, productivity, cost containment, manufacturing flexibility and responsiveness, inventory management, environmental and safety performance, and market results.

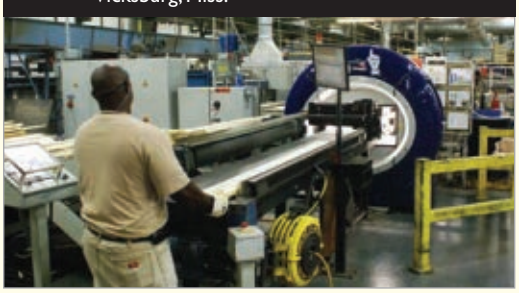
Selection of the winners from a list of 20 finalists was aided by a team of outside experts: Sherrie Ford, principal, Change Partners LLC; Robert Hall, a founding member of the Association for Manufacturing Excellence; Kenneth J. McGuire of the Management Excellence Action Coalition; and Larry Fast, president of Pathways to Manufacturing Excellence. Their evaluations, along with additional information provided by the finalists, were considered in the final stage of judging. The selections did not become final until site visits by IW editors to validate the performance data and management practices reported in the applications.

THE WINNERS

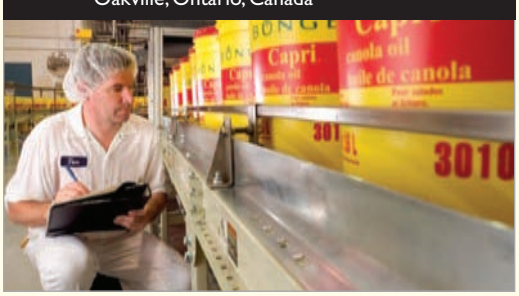
▼ American Axle & Manufacturing-Three Rivers Manufacturing Facility, Three Rivers, Mich.

▼ Avery Dennison Office Products de Mexico S. de R.L. de C.V., Tijuana, Baja California, Mexico

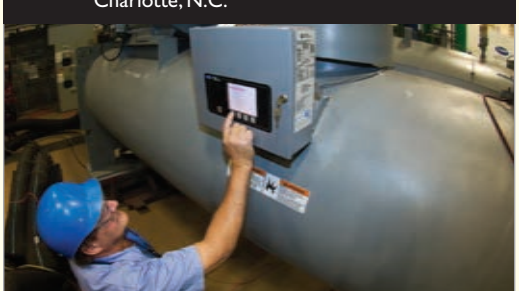
▼ Batesville Casket Co.-Vicksburg Operations Vicksburg, Miss.



▼ Bunge Oakville Oakville, Ontario, Canada

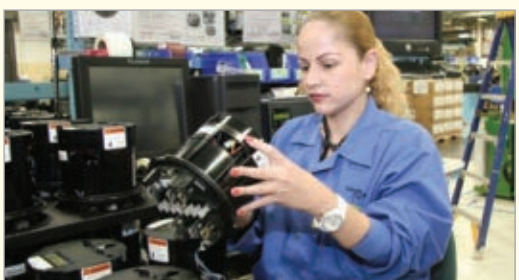


▼ Carrier Charlotte Chiller Operations Charlotte, N.C.



▲ General Cable Franklin Plant Franklin, Mass.

▲ IEC Electronics Corp. Newark, N.Y.



▲ Landis+Gyr Reynosa, Tamaulipas, Mexico

▲ Raytheon Integrated Air Defense Center Andover, Mass.

▲ Snap-on Power Tools Murphy, N.C.

Continuous Improvement E-Newsletter

To read more about 2010's 10 winning factories, subscribe to our free Continuous Improvement newsletter, which features best practices from the 2010 Best Plants winners. Sign up online at www.industryweek.com/newsletters.aspx.

Meet the Winners in Atlanta

Representatives of the 2010 winners will present their stories at the annual IW Best Plants conference, scheduled for April 4-6, 2011, in Atlanta. Look for continuing updates on the IW Best Plants conference website, www.iwbestplants.com.

Applications for 2011 Competition

INDUSTRYWEEK is accepting application requests for the 2011 IW Best Plants competition. Manufacturing facilities in the United States, Canada and Mexico are eligible. To request an application, fill out the online form on the IW Best Plants competition site (www.industryweek.com/BestPlantsProgram).

Driving Home the Benefits of Productivity

World-class manufacturing systems and employee involvement enable AAM's Three Rivers plant to win new business. ■ BY STEVE MINTER

AMERICAN AXLE & MANUFACTURING

A supermarket approach allows market attendants to pick the right parts to make an axle in an efficient manner.

In 2008, AAM's Three Rivers Manufacturing Facility endured a bitter 97-day strike. Finally, the UAW's Local 2093 decided to separate itself from the national union's pattern bargaining agreement and agreed on a new contract that substantially reduced the plant's labor costs. That "landmark" agreement, says plant manager Greg Yezback, "allowed us to insource a tremendous amount of work over the last two years." In fact, the plant has transferred in 24 salaried employees from other AAM facilities and hired 352 new hourly associates.

When Three Rivers and four other plants were purchased from General Motors in 1994, AAM CEO Richard Dauch immediately set the expectation that AAM would become a world-class manufacturing organization. In 1994, the Three Rivers plant had a customer reject rate (PPM) of 570. Dauch told the facility the bar was being set at 25 PPM. "He took the approach of setting stretch goals and challenging the organization to meet goals that maybe we didn't think we were capable of meeting at the time," Yezback recalls. But by 2000, the rate had been slashed to 22. Today, it is zero.

The Three Rivers facility is a leader in implementing AAM's continuous-improvement system, called the Lean Manufacturing System. The system is focused on safety, quality, delivery and cost. Managers use value-stream maps to optimize an entire value stream rather than simply individual processes. The plant employs lean steering committee meetings to review and update the value-stream maps and ensure appropriate progress is being made on key initiatives. Standardized work is used extensively by production workers and management. The plant employs a host of other continuous-improvement tools, including level schedules, pull systems, tugger routes, 5S and standardized work-audit systems.

All the more remarkable, plant quality has improved dramatically while the facility has taken on new business. In 1994, the plant only produced driveshafts. In 2002, the plant began building rear axles. "Through our agreement with the UAW, we were able to bring that axle out of Mexico and build it here at a profit," Yezback notes. In 2004, the plant brought in a second axle. In July 2010, the plant began producing a front axle. Now, the plant produces all the products that go into a chassis. Moreover, it has added products for commercial vehicles to its existing truck and SUV business.

Plant management is quick to credit the workforce with being receptive to new ideas and to doing what it takes to win new business. Employees average 40 hours of training a year and are increasingly cross-trained to provide flexibility in job assignments. The plants frequently use team-based A3 problem-solving initiatives. While all salaried employees have been assigned an A3 project, Yezback says, he wants hourly associates to begin using this tool. "Our vision is we will have an hourly workforce that can use an A3 problem-solving tool to make their operation better. They can decide what their biggest problem is and how they can solve it."

Despite the plant's continuous-improvement progress, Yezback rates it as a 3 or 4 on a scale of 10. "We are constantly learning," he says. "I don't think that's a bad thing. It makes us focus."

› At A Glance

American Axle & Manufacturing —Three Rivers Manufacturing Facility
Three Rivers, Mich.

- Employees: 560
- Total Square Footage: 730,946
- Primary Product/Market: Automotive driveline products
- Start-Up Date: 1994
- Achievements:

Installed 93 new pieces of equipment without increasing the number of skilled tradesmen; received a zero-defect PPM quality rating from main customer for 24 months; productivity as value-added per employee increased 115% over past three years

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Opening Room for Growth

Avery Dennison's Tijuana plant gains significant volume by freeing floor space through lean planning. ■ BY JONATHAN KATZ

CONCEPCION MALDONADO

From left: Operators Erika Guzmán, Gloria Cabello and Sandy Pérez manufacture Avery Dennison label packets.

There's probably enough open space at the Avery Dennison Office Products de Mexico plant in Tijuana to play a football game. Upon entering the plant, actual manufacturing activity seems so distant a pair of binoculars might be necessary. But plant leaders say the empty area is a sign of progress.

That's because through value-stream mapping and lean initiatives, the organization was able to free 310,000 square feet of space in the 524,000-square-foot plant over a six-year period. By 2011 the effort is expected to bring the plant's share of Avery Dennison's North American office products production to 66% from just 15% in 2004.

The plant received a boost in 2008 when the company's Fontana, Calif., distribution center closed and relocated to the Tijuana operations. The plant consolidated what occupied 400,000 square feet in Fontana into 230,000 square feet, says Key Fujimura, the plant's continuous improvement leader. Then, on Oct. 20, 2010, the plant received more good news when Avery Dennison announced it would move its Ciudad Juarez printed media and dividers operations to Tijuana. The transition is expected to be completed in the fall.

The plant first began releasing space in 2004. At the time, the facility was cluttered with machines, inventory pallets and material, says plant manager Arnoldo Pena. Plant leaders began opening space by eliminating inefficient older equipment and improving existing machines, moving to continuous-flow production from batch processing and reconfiguring lines into U-shaped cells. In 2009, the area where the plant produces three-ringed binders cut its footprint in half with a reconfigured cell design, Pena says.

All plant personnel are expected to keep a close eye on performance and improvement opportunities through various group activities. One of the more significant events comes in September when the school year begins and the company's peak season ends.

The plant takes part in five-day, high-level value-stream mapping events called SWOT, short for strengths, weaknesses, opportunities and threats. The events comprise cross-functional work teams from different departments that create the operation's road map for future success, or "shikumi." The shikumis are then used to develop an A3 plan, or business strategy for the following year. "Everybody has input into what went wrong and what went right," says Hector Marquez, operations manager. "So this is a process that's been dynamic and adjusts to current needs."

On the plant floor, one of the more innovative employee-generated ideas came from line worker Azucena Robles, who operates the machines that apply labels to the company's famous Glue Stic brand. Previously, when the feeder ran out of labels, Robles would have to stop the machine for five minutes as many as 30 times per day to refill the labels to prevent blank Glue Stic rolls from moving down the line. Robles suggested that the plant install a machine that shoots compressed air to push the blank rolls off the line into a box, saving the line from frequent delays.

Such a high level of employee involvement should come in handy next fall when product complexity is expected to double and the number of stock-keeping units will jump to 4,000 from 1,800.

› At A Glance

Avery Dennison Office Products de Mexico S. de R.L. de C.V
Tijuana Baja California, Mexico

- Employees: 797, nonunion
- Total Square Footage: 523,845
- Primary Product/Market: office products
- Start-Up Date: 1999
- Achievements:

Over five years, reclaimed 310,000 square feet of plant-floor space through lean initiatives; 98% first-pass yield; nearly $6 million in documented improvement projects in 2009

Quality In, Waste Out

Process control and advanced technology help Batesville Casket's Vicksburg operations deliver consistent quality and improved yields. ■ BY JILL JUSKO

Working with lumber is a challenging business. By its very nature, every board is unique and thus it immediately tests any manufacturer's efforts to reduce variability. Additionally, a characteristic of the unfinished wood is that it always is trying to adjust to its environment.

"It's completely adaptive, and that's a bad thing," says Danny Hudson, quality assurance manager at Batesville Casket Co.-Vicksburg (Miss.) Operations. In short, slight environmental influences, such as fluctuations in humidity, can change the material even after processing, often in transit, complicating efforts to maintain quality.

Nevertheless, Batesville's Vicksburg facility does it—maintain quality, that is. Its success at doing so is imperative, for this plant annually processes more than 18 million board feet of lumber to deliver wood component parts to assembly operations at sister plants in Mexico and the United States.

BATESVILLE CASKET CO.

Batesville Casket associate Joe Harris feeds the optimization scanner, which determines the optimal yield for every board it processes.

The facility's attention to quality begins outside, in the lumber yard, where qualified vendors deliver "green" lumber, which is product that has not yet been dried. There, Vicksburg lumber inspectors evaluate each board to assure it meets standards set by the National Hardwood Lumber Association. Lumber that passes inspection moves into Vicksburg's state-of-the-art drying facility.

Alesia Mathes, drying systems group leader, describes the processes that occur before the milling operations as the "front line defense" for the plant. Additional defenses against quality defects include layered process audits, which were introduced early in 2010.

Batesville conducts layered process audits along the plant's entire production process, from the lumber yard through to the shipping dock. The audits perform two functions: to assure that process parameters are being maintained as well as to answer the question, "How do we make this process better?" Approximately 195 audits are conducted per month.

"If you control the elements of the process, you control the output," Hudson says.

Batesville's Vicksburg plant remains as engaged in improving its operations as it was in 2007, when the facility first won an IndustryWeek Best Plants award. And greater use of data is helping it to better prioritize projects, says plant manager Russell Johnson.

Vicksburg has worked to "optimize" the yield of each board passing through its plant. (Optimizing the yield refers to achieving the maximum usable product from each board.) In 2007 the plant added scanning technology in several locations as well as new optimizing saws that use information from scanners to make cuts that provide the best yield from each board. It takes the technology just seven seconds to determine how to achieve the best yield for a board.

The introduction of new equipment was simply the beginning of the optimization effort. "We're still on the vertical part of [the learning curve]" with the new technology, says engineering manager Keith Pittman. In addition, the plant is comprehensively challenging the strategy used to process lumber for best yields. For example, the plant recently launched a project to reduce its re-rip inventory (a byproduct of wood cutting), which both freed up floor space and reduced material handling.

› At A Glance

Batesville Casket Co.
Vicksburg Operations,
Vicksburg, Miss.

- Employees: 177, union
- Total Square Footage: 197,816
- Primary Product/Market: wood component parts for caskets
- Start-Up Date: 1975
- Achievements:

55% reduction in cost of quality since 2006; 76% reduction in OSHA-recordable injury and illness cases in past three years; 2007 IndustryWeek Best Plants winner.

A Well-Oiled Machine

A focus on the customer forms a solid foundation for Bunge Oakville's continuous-improvement efforts. ■ BY STEVE MINTER

MARK GREEN

The Bunge Oakville plant employs a rigorous inspection regimen to ensure food safety and customer satisfaction.

Every day, a rabbi visits Bunge's Oakville, Ontario, plant to make sure there is no cross-contamination between the facility's kosher and non-kosher product lines. While a little divine intervention would be welcomed at many manufacturers these days, it's not the source of this plant's success. That falls to plant manager Rolf Mantei and his team's focus on customer service, high quality standards and careful attention to production and inventory management.

The Oakville facility packages edible oil products on eight packaging lines. Edible oils are delivered in bulk liquid form to the plant from Bunge's Hamilton, Ontario, crushing and refinery plant and other suppliers. At the plant, they are stored outside in temperature-controlled storage tanks. When the plant is ready to process them, they are pumped into the facility through filters to the filling equipment. Bunge uses three packaging lines with seven different package formats ranging from a 3-liter jug to 1,000-kg totes. Shortening products are pumped into the facility but then chilled and plasticized, a process that converts them from liquid to a finished shortening product.

As consumers have become educated about the health risks of trans fats, the market has moved away from solid shortenings to liquid oils, and there has been a sharp increase in the demand for canola oil. Some 50% of the plant's production now centers around high-oleic canola, alternative oil blends and shortenings.

Customer focus is critical to the success of Bunge Oakville. Customers expect Bunge Oakville to deliver products with a 48-hour lead time, so most of the plant's items are made-to-inventory rather than made-to-order. That's no small task, given that the plant produces and handles 245 SKUs.

While Bunge Oakville has shifted to healthier oil products, that hasn't meant the plant could relax its efforts to be a low-cost provider. In fact, competition has become more intense, encouraging efforts to improve productivity. The plant regularly holds kaizen events. In 2009, for example, the plant held five kaizens dealing with issues ranging from equipment OEE to sales and operations.

To help ensure customer satisfaction, the plant has a robust program for customer complaint investigations and corrective actions. Plant officials have held kaizens with suppliers to improve packaging. The plant also has instituted a quarterly meeting with its two primary packaging suppliers. The meetings have helped the organizations understand each other's operations and enhanced communications.

Plant officials have targeted constant improvements in overall equipment effectiveness. From January 2009 to June 2010, OEE improved 72%. The plant has installed OEE displays that provide real-time information on machine operations. "Whenever a machine stops for any reason, it goes into alarm and a reason code is entered," says Carm Cafagna, production supervisor. "We look back to those reason codes to determine where downtime occurs and address those issues." Bunge Oakville takes a "safety-first" approach in its operations that has resulted in more than 12 years without a lost-time injury. So fittingly, a safety message and a tally of days without a recordable incident are posted at the top of the OEE displays.

› At A Glance

Bunge Oakville
Oakville, Ontario, Canada

- Employees: 49, nonunion
- Total Square Footage: 98,000
- Primary Product/Market: packaged edible oils and shortening
- Start-Up Date: 1993
- Achievements:

First Canadian food plant to be both ISO 9001 and Canadian Food Inspection Agency HACCP registered; more than 12 years without a lost-time incident; Kaizen events resulted in $1.02 million in cost savings over past year

A Winning Formula

An emphasis on supplier collaboration, process capability and employee engagement is helping Carrier Charlotte triumph in the "war on cost." ■ BY JOSH CABLE

"Relentless" is a word that Mark Goodman uses frequently when he talks about Carrier's Charlotte, N.C., Chiller Operations. The high-energy plant manager applies the adjective to the facility's quest to achieve "world-class quality," safety excellence and other operational objectives, but his intensity goes up several notches when the topic is the plant's "relentless war on cost."

"We have a bit of a chip on our shoulder, because the operation was unprofitable and had so many issues for so long," Goodman says. "We're just relentless about putting that in the past and about driving value for our customers, creating a safe working environment and taking cost out."

Considering the facility's past, the intensity is understandable. In the mid 2000s, the plant was struggling with key metrics such as on-time delivery, quality, employee satisfaction and environmental health and safety compliance, and facing serious cost issues.

CARRIER CHARLOTTE CHILLER OPERATIONS

Lab technician Dan Miller performs a final certification test on an Evergreen 19XR water-cooled chiller.

Fast-forward to 2011. The Charlotte facility has made dramatic strides in every operational area and on every key metric, highlighted by a 242% increase in plant-level profitability, a 56% reduction in the customer reject rate over the past three years and a 99% on-time delivery rate.

Carrier Charlotte in 2009 launched nine new products, all of which were introduced at a minimum of 20% lower manufacturing cost than their predecessors. For the new Puron R-410A refrigerant product line, introduced in July 2009, the plant leveraged lean-at-launch principles and design-for-manufacturability guidelines to consolidate three assembly lines into one—freeing up 10,000 square feet of floor space.

In its all-out effort to win the war on cost, the plant has leaned heavily on the "Speed" formula. The formula emphasizes three operational strategies: supplier reliability; capability, reliability and repeatability of processes; and an engaged, highly skilled workforce. The plant implements the formula in a number of ways:

- In an effort to establish quality, delivery and cost-reduction targets and favorable payment terms, Carrier Charlotte seeks long-term agreements with suppliers. Every top-tier supplier receives a monthly scorecard highlighting their quality and delivery performance. A team of Carrier engineers helps suppliers boost efficiency in their operations by conducting component-teardown analysis, training and kaizen events for them.
- The facility ensures process capability and repeatability—no easy task when more than 75% of its orders are built to customer spec—through strategies such as standard work instructions, material presentation, poka yoke, value-stream mapping and critical component-verification technology.
- Carrier Charlotte fosters employee engagement through monthly plantwide meetings, "Lunch with Goody" focus groups and cross-functional plant-improvement teams that meet monthly with plant leadership to discuss improvement projects and opportunities. Improvement suggestions submitted by employees in 2009 generated $2.25 million in cost savings.

"If we need to spend money, we spend it. But our first choice is always to use creativity over capital," Goodman says. "And it's amazing when you get a couple hundred people focused on that, the power that can bring to the table."

› At A Glance

Carrier Charlotte
Chiller Operations
Charlotte, N.C.

- Employees: 224, non-union
- Total Square Footage: 310,000
- Primary Product/Market: Heavy-duty commercial chillers
- Start-Up Date: 1999
- Achievements:

Achieved LEED for Existing Buildings certification in 2009; 95% of supplier orders delivered on time; reduced customer reject rate by 56% during past three years; ISO 9001:2008 certification (five years with zero ISO non-conformances)

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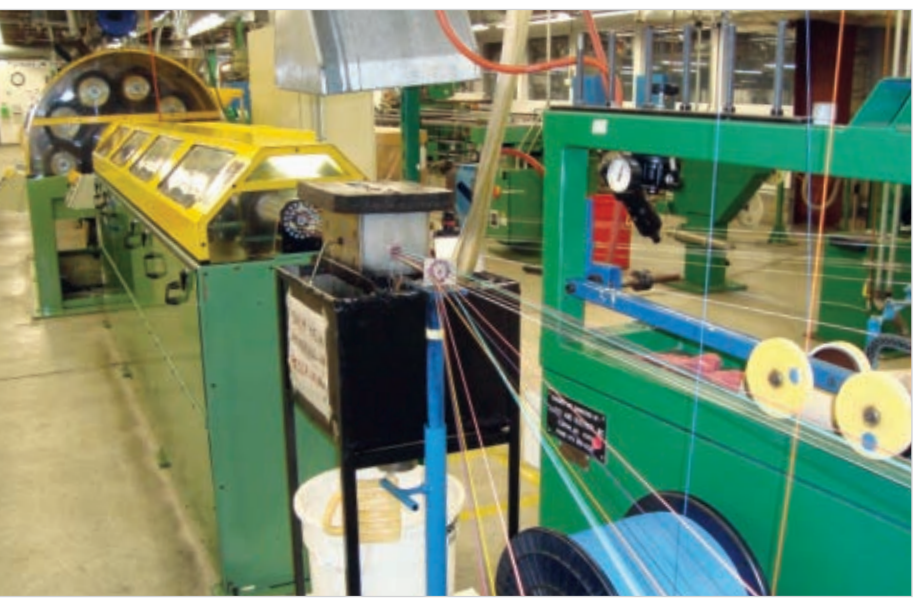
Creating a Quality Culture

With materials representing 77% of costs, General Cable Franklin takes a creative approach to understanding the key drivers that cause defects. ■ BY PETER ALPERN



IW/PETER ALPERN

Fiber products are cabled, served and jacketed in one operation on this line at General Cable's Franklin, Mass., facility.

Imagine a gyroscope the size of a midsize sedan spinning and whirling, winding together dozens of wires into a single cable, rolling it off the line into a cable running into infinity.

Some of these cables are for data communication, others for control panels and industrial equipment, or for high-end military applications.

Each year, more than a half-billion feet of wire and cable is manufactured at General Cable's Franklin, Mass., facility, in more than 2,000 different varieties. Despite that volume and product range, less than 1% of the wire and cable produced turns out to be defective.

"One of the things that's helped drive the improvement has been understanding what's critical to quality and what's critical to the process and how those two elements interrelate," says quality manager Rob Johnson.

Since 2005, Franklin General Cable's work-order delivery has improved to 97% from 66%, while product quality, as measured using defects per million units, has improved to 6,959 from 15,700. Through the end of November, for instance, Franklin General Cable's DPMU for 2010 was 286, which equates to 99.95%, a significant achievement in control and quality. Out of an estimated 50 million feet of cable produced in August, only 150 feet was scrapped.

Three years ago, in an effort to better understand the key factors that undermine quality and cause defects, Franklin General Cable began using Pareto analysis tools, which provide a more creative approach to studying complex problems.

The Pareto reports were then distilled into more concentrated control charts and placed in highly visible areas at each workstation. The charts give operators step-by-step instructions for key issues that may arise. A sign in the datacom cell, for instance, details the critical quality issues related to diameter, what to watch for in using a micrometer for all measurements, and three common issues associated with the cell, along with appropriate reaction steps.

"They're like CliffsNotes," says Jim Clark, plant manager at Franklin General Cable. "They allow our operators to better understand the issues we're seeing and what they can do when these issues crop up."

Quality issues are a focal point for every manufacturer. But at Franklin General Cable, dips in quality have acute financial ramifications, as materials represent 77% of the plant's costs.

"Material is like gold for us," says Clark.

For all the specialized military cables produced in Franklin, nearly a third of its total production goes toward data communication. More than a dozen manufacturers in North America also make data communication cables, along with looming competitors out of the Far East.

"Essentially, cable is a commodity," says Johnson. "In order to compete with them, performance quality and cost is the key. Our whole process is lean and built for quality and getting all the variances out of the process."

The plant's efforts in continuous improvement operate under the theme, "Create Your Own Destiny." Plant leaders have transitioned toward a flexible workforce, one that can shift between several operations and is increasingly self-directed and empowered to stimulate ideas.

› At A Glance

General Cable Franklin Plant
Franklin, Mass.

› Employees: 153, nonunion
› Total Square Footage: 158,000
› Primary Product/Market: electronic/data communications/fiber-optic cables
› Start-Up Date: 1990
› Achievements:
Product quality, as measured using defects per million units, has improved to 6,959 from 15,700 since 2005; no lost time due to injuries since 2008; work-order delivery has improved to 97% from 66% since 2006

IEC Plant Rises From the Dead

Almost out for the count, circuit-board assembly operation reinvents itself.

BY JONATHAN KATZ

John Biuso says he will occasionally show employees video clips of a Kodak manufacturing plant in Rochester, N.Y., being demolished. As a former Kodak employee, Biuso points out that he knows firsthand what can happen to a plant if it doesn't evolve.

Today, Biuso is the process improvement manager at the IEC Electronics Corp. circuit-board assembly plant in Newark, N.Y. Like the nearby Kodak plant in Biuso's video, IEC's Newark operation was once in danger of imploding, too. The Rochester-area plant struggled to remain viable as low-cost countries took over production of the motherboards IEC once produced for personal computers.

In 2005 the facility found itself in the unenviable position of starting over or shutting down. The company chose the former with the goal of diversifying its product portfolio and establishing lean manufacturing and Six Sigma processes.

IW/JONATHAN KATZ

IEC manufacturing operator Kevin Best controls an automated component placement machine. The machine is part of more than $2 million in new-equipment investments in the past three years that have dramatically improved efficiency on the plant floor.

At A Glance

IEC Electronics Corp.
Newark, N.Y.

- Employees: 330, nonunion
- Total Square Footage: 235,573
- Primary Product/Market: printed circuit boards and assemblies
- Start-Up Date: 1966
- Achievements:

Reduced in-plant defect rate 65% over three years; 143% total unit plant volume increase between 2007 and 2010; 441% profitability increase during the past three years (includes some impact from other plants)

The contract manufacturer moved to a high-mix, low-volume model of primarily build-to-order printed circuit boards for growing industries, including medical device and aerospace and defense manufacturing. "It was do or die at this plant if we didn't diversify," Biuso recalls. Over the five-year transition period, IEC's companywide sales, led by the Newark plant, increased 500%.

The plant's resurgence can be attributed to capital upgrades that reduced machine changeover times, a move from batch manufacturing to one-piece flow and a renewed focus on product development and in-house capabilities not easily replicated by competitors.

IEC invested $2 million in new automated assembly equipment that cut setup time in half over a three-year period. A row of feeders similar to film reels deliver tiny circuit board components seated in carrier tape into the robotic machine that assembles the boards. Previously, line workers changed feeders individually to replenish parts, a process that took approximately one hour, Biuso says. The new equipment allows the plant to swap out entire feeder racks that are kept at lineside. The changeover process now takes approximately five minutes.

Lines are located in different "focus factories" dedicated to specific market segments. One area that's helped the plant secure new orders is its prototyping line. IEC separated the prototyping line from other focus factories to prevent production slowdowns in those areas, says Mark Talmadge, director of new product introduction. A "new product introduction ambassador" will hand-deliver the prototype and answer any questions the customer might have, he says. This helps build relationships with IEC customers.

Another capability that plant managers tout as a competitive advantage is the facility's materials analysis lab. The plant employs two people with PhDs who conduct destructive analysis on defects that aren't easily identified rather than sending the product to an outside lab. The process provides the plant with more intimate knowledge of customer problems and allows for a quicker response time, Biuso says.

By incorporating such innovative capabilities into its operations, the IEC plant has positioned itself for future growth and given hope to a regional workforce that's too familiar with the perils of stagnation.

Smart Decisions

Landis+Gyr pursues high-volume production excellence with a keen focus on developing the best people and processes. ■ BY JILL JUSKO

LANDIS+GYR

Consuelo Denise Guzman conducts a meter audit, one of multiple quality checks employed at Landis+Gyr.

A lot of smart activity occurs at Landis+Gyr's manufacturing operation in Reynosa, Mexico, beginning with the product it makes. Located just over the border from McAllen, Texas, the 100,000-square-foot facility produces electricity meters primarily for residential but also for commercial and industrial use. They largely are "smart" meters that record consumption and communicate the information back to the utility or consumer. Certain versions provide utilities with the ability to remotely disconnect or limit service.

"Smart" is also how the facility operates. At the top, annual strategic planning drives the plant's goals as well as the action plans required to meet those goals. Formal progress reviews assure that well-laid plans do not go astray or get ignored. "You give people tools and a vision to make [improvement] happen, and it will happen," says Aubrey Williams, vice president of operations.

Landis+Gyr's manufacturing strategy is to employ lean principles such as one-piece flow and flexible production cells to meet or exceed customers' requirements. Primarily a high-volume tabletop assembly operation, Landis+Gyr's attention to quality is readily apparent in its neat, brightly lit factory where banners suspended from the ceiling share word of new orders. Production lines are dotted with automated poka-yoke (mistake-proofing) processes that prevent product from moving to the next station unless components are correctly positioned. Additionally, quality alert buttons are embedded along the production lines. When they observe potential defects, operators can and do stop a line by pressing one of the buttons, which also draws immediate action from a team of trouble-shooters. The Reynosa operation also has a formal Six Sigma program.

Landis+Gyr, which is certified to the ISO 9001:2008 quality management standard, extends its quality concentration beyond its four walls to suppliers. The facility forges strategic partnerships with major suppliers to jointly improve cost, lead time and quality. For example, in 2010 engineers from the facility have been engaged in a Six Sigma project with a supplier, aimed at reducing defects and improving processes related to repair and rework.

Within its four walls, Landis+Gyr smartly recognizes that its pursuit of excellence is driven by a motivated, prepared work force. To that end, the facility provides significant training to assure the plant is populated with personnel who can ably tackle high-volume production demands. In the past four years, the plant has increased shipments by 133%.

Midlevel manager training is one example of Landis+Gyr's work force efforts. Employees who show potential for higher-level positions are nominated to the training by their supervisors. The training spans six months and is taught by senior management, who present lessons in their areas of expertise. Among the lessons taught by Williams is "It's Okay to Be the Boss," which shares lessons from a book by the same name. Approximately 70 employees have completed the training in the past four years.

Ultimately the plant's aim is to be the smart meter integrator of choice. As a result, complacency has no home at Landis+Gyr. The manufacturer remains tightly focused on improving its products, processes and costs. "We are always moving forward, constantly willing to improve [and] try new things," says Armando Benavides, residential operations manager.

› At A Glance

Landis+Gyr
Reynosa, Tamaulipas, Mexico

- Employees: 667, union
- Total Square Footage: 100,000
- Primary Products/Market: residential electricity meters
- Start-Up Date: 1997
- Achievements:

99% finished product first-pass yield for Focus AL meter; 90% reduction in OSHA-recordable injury and illness cases in past three years; 22% manufacturing cycle time reduction on two production lines in past three years

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Charting a New Course

Now into the seventh year of its lean journey, Raytheon is targeting the beginning of product lifecycle. ■ BY PETER ALPERN

It's only 11 a.m., but the roar of a crowd emanating from Raytheon Integrated Air Defense Center's Andover, Mass., cafeteria is unmistakable. It sounds more like overtime of an NBA game than late-morning in a manufacturing facility.

Upon closer inspection, all the commotion derives from a pep session for a team of two dozen operators that has pitched ideas on how to improve its department workflow. The team competes against 135 other groups at Raytheon's Andover facility. And make no mistake, the competition here is fierce.

That emotional stake is the very essence of how Raytheon Andover was able to not just overcome the potential shuttering of its doors a decade ago, but ultimately rebound to become one of the most advanced production centers for defense systems in the U.S.

Since 2007, Raytheon Andover has seen productivity improvements of 6%. One of its largest programs, the Patriot Missile, has had 100% on-time delivery over the past two years and registered a 0% customer reject rate since 2005. In 2009 alone, Raytheon's continuous-improvement campaign resulted in the reduction of manufacturing floor space requirements by 45,000 square feet.

Seven years into its continuous-improvement journey, Raytheon has refined its processes and engaged its workforce. Now the leadership team finds itself in a position many advanced CI companies do, which is to forge the next evolution of lean.

"When we started this journey, I had no idea how long a journey it was going to be," says Michael Shaughnessy, senior director of operations at Raytheon's Andover facility. "There's still so much opportunity to be gained. Today, I have more to do in the next six months in improving how we run this operation than I did three or four years ago. That's unexpected."

Shaughnessy says Raytheon has cultivated relationships throughout its supply chain to focus on continuous improvement. The company has begun discussing with suppliers new ways to reduce cost, make products more affordable and improve quality.

Raytheon has recently undertaken several intriguing long-term CI projects. Two years ago, for instance, it instituted an interdependent approach to supplier management, creating communications elements within project lifecycle to spur faster flow and responsiveness to the customer from engineering, operations, supply chain and quality.

It has also begun a collaborative scheduling project to align the disconnects between the MRP (manufacturing) and ADT (engineering) systems, which schedule from opposite points of view—manufacturing from the back end and engineering from the front end. Raytheon instituted a virtual business system to track all engineering, supply chain and operations progress when a program is brought into production, ensuring visibility and management of detailed milestones all the way to the supplier level.

But the real opportunity, Shaughnessy says, is to implement continuous improvement at the beginning of the product lifecycle, not during production. To do that, he says, requires "shifting resources, be it operations, engineering or supply chain, to the front end of the process versus the latter end where we are today. That's gradually happening each year."

RAYTHEON INTEGRATED AIR DEFENSE CENTER

A worker at Raytheon Integrated Air Defense Center's Andover, Mass., facility performs a precision hand solder to a circuit in the circuit card assembly department. The department has achieved a 50% reduction in changeover time over the past three years.

At A Glance

Raytheon Integrated Air Defense Center
Andover, Mass.

- Employees: 4,223, union
- Total Square Footage: 1.7 million
- Primary Product/Market: Patriot Missile Defense Systems
- Start-Up Date: 1970
- Achievements: 6% productivity improvement since 2007; reduced manufacturing floor space by 45,000 square feet in 2009; 20% reduction in standard order-to-delivery lead time for missiles since 2007

Staying Power

How do you create an 'enduring manufacturing footprint' in a hard-hit North Carolina town? The lean way, of course. ■ BY JOSH CABLE

SNAP-ON POWER TOOLS

A material handler enters newly built parts into a database, which will create a bar-coded inventory ticket for the parts.

Nestled in the Appalachian Mountains, the small town of Murphy, N.C., seems right out of a Norman Rockwell painting. But with the exodus of textile mills and other manufacturing plants in recent decades, Murphy's economy hasn't been a picture of small-town utopia.

That's why Snap-on Power Tools, which occupies a former Levi Strauss plant that shut down in the late 1990s, has a clear vision for its Murphy operations: to "create an enduring manufacturing footprint" in the sleepy town of 1,600 people.

"This area has seen a lot of jobs come and go," explains Todd Rowe, RCI manager for the plant. "So we wanted this facility to be here many years into the future."

With that goal in mind, Snap-on's vision statement describes the plant as a "world-class manufacturing facility specializing in producing a broad range of power tools in relatively low individual volumes."

"We want to be really good at what Asia doesn't want to do," Rowe explains.

The Murphy facility subscribes to lean principles with an almost religious zeal. Since 2003, lean—or "rapid continuous improvement" (RCI) in Snap-on's corporate lexicon—has been the plant's core operational strategy. The plant formed an RCI department in 2004; its nine employees facilitate the plant's lean activities.

Walking the factory floor is a study in lean concepts in action. For example, a redesign of the plant layout vastly improved the flow in the machining area, where dedicated cells organized by component families have replaced a convoluted configuration of process departments. A supermarket with kanban replenishment tags, located between the machining and assembly areas, has replaced the MRP approach to scheduling the production of machined parts.

Visual cues abound at the plant. To ensure that the factory stays clean, older equipment in the machining area is painted white to make dirt conspicuous, while machine guards are painted yellow. Fluids for the machines are stored in color-coded containers.

The plant's andon systems provide cell-by-cell updates of stock-outs, equipment problems and other issues, ensuring that workers don't have to leave their cells to get supplies or flag down maintenance personnel.

The facility's overall lean strategy has three components: benchmarking and training (the plant credits the help of Shingijutsu USA for some of its biggest breakthroughs); linking processes (through material presentation, kanban signals and other lean principles); and optimizing processes (through one-piece flow, setup reduction, total productive maintenance, standardized work and other continuous-improvement concepts).

A good indicator that the plant is on track with its goal of long-term viability: In 2009, the Snap-on Power Tools division shuttered a 68,000-square foot plant in Natick, Mass., and moved its five assembly lines and 38 machine tools to Murphy. Even with these operations, plant manager Brian Spikes estimates that the Murphy plant has freed up 12,000 square feet of space for future assignments—and the plant makes it plain as day by leaving that space open.

"When people from corporate visit, their first question to us is: 'What goes here?'" Spikes says. "We tell them, 'Whatever you want to put here.' We keep reducing our footprint to prove we're a good plant and a profitable plant for them."

› At A Glance

Snap-on Power Tools
Murphy, N.C.

- Employees: 223, nonunion
- Total Square Footage: 168,000
- Primary Product/Market: Professional and industrial power tools
- Start-Up Date: 2002
- Achievements:

Reduced order-to-delivery lead time by 55% over past three years; 96% first-pass yield for all finished products; OSHA SHARP site; winner of silver-level North Carolina Shingo Prize for Operational Excellence in 2007

Getting IT Right:

With many manufacturing firms playing catch-up on IT spending, it is more

■ BY DOUG B. SCHROCK, JOSH COLE AND JEFF A. SHAFFER

Information technology has the reputation of being a "black box"—an area where computers mystically perform tasks that only a handful of executives understand. But IT also can become a black hole into which millions of dollars can disappear, without much to show for the investment, if companies don't link technology to business performance. ¶ According to a recent study, "Technology Issues for Financial Executives," by the Financial Executives Research Foundation, many executives are dissatisfied with how their organizations use information technology to improve business performance. • Only 7% of the survey respondents said they had made substantial progress with their top information need in the past year.

• About 70% of the surveyed financial officers said they believe their current level of information integrity is negatively affecting their organization's ability to achieve its business objectives.

• Perhaps most revealing, about 40% of the responding financial officers reported unknown, low or even negative returns on their IT investments.

To minimize problems, companies need to follow an objective, performance-based methodology for developing an appropriate IT strategy, making sound IT investment decisions and then executing and managing the chosen initiative in a way that relates these steps directly to organizational performance measures, including both financial and nonfinancial metrics.

Concerns About IT Effectiveness

Many executives question the value they are receiving for their level of investment in IT—and whether that investment truly aligns with the strategic direction of their company. Management asks: Are we overspending? Underspending? Spending on the right initiatives? The answer is that companies just don't know.

Despite the misgivings they may have about IT, most businesses expect to continue making significant IT investments in the near future. When hundreds of manufacturing industry executives were surveyed by IndustryWeek and Crowe Horwath LLP ("The Future of Manufacturing 2009," Nov. 2009), 70% said they expected to increase their IT investments during the coming three years.

Why are financial executives resigned to spending more on IT while achieving less? In many cases, executives recognize the problems but simply might not recognize the potential impact IT investment could have on solving those problems. For example, they may not link a business-intelligence investment to potentially increased sales. Or they may develop inflated expectations for sales increases that are unrealistic, given a scope of implementation that is limited or misaligned.

The challenge can be especially acute in companies where the executives who make IT decisions are managing multiple initiatives at once and do not have adequate time or resources to analyze IT initiatives thoroughly. As a result, they may fail to fully understand how deeply rooted IT is to overall business performance.

Compared with other investments that companies make, the benefits of investing in IT are typically not as clear-cut. Investments in product development and marketing, for example, create a tangible awareness among employees and customers—people can see what they're getting for the investment. IT investments, on the other hand, may be less visible to the organization, and the payback may be less evident, leading management to question the value of IT investments.

This point of view is especially true in today's challenging economic climate, where companies that might have deferred making IT investments over the past several years now find themselves playing catch-up. Given the need to make up for lost time, the spotlight today is on making the right decision.

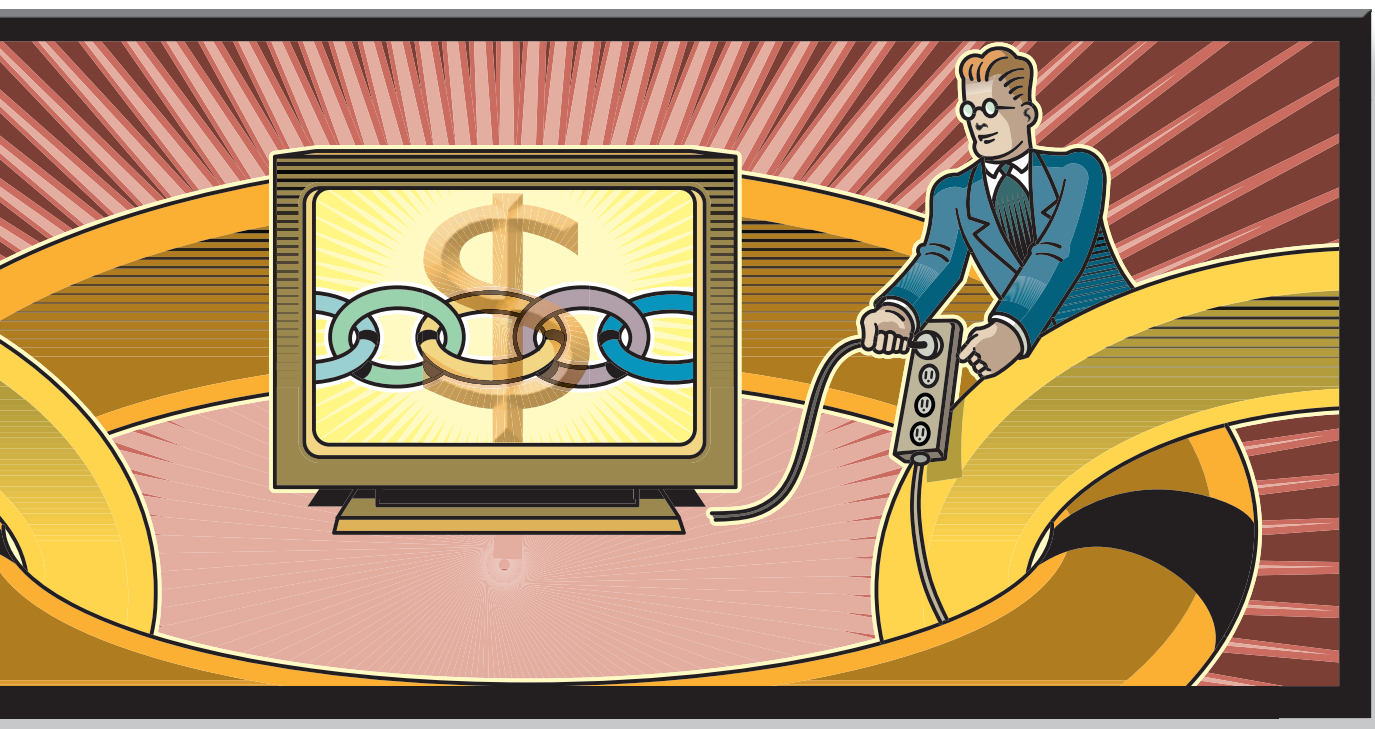
The IT Struggle

If it is so important to invest wisely in IT, why do so many companies struggle with IT issues? This situation can result from a number of ongoing challenges, including:

• Poor communication between nontechnical business leaders and those in charge of the IT effort;

How to Plan, Manage and Deliver on Technology's Promise

important than ever to link these investments to business performance.



- A lack of common references, priorities and expectations;
- Internal biases or inaccurate perceptions of technology providers, based on outdated history or word-of-mouth impressions; and
- Limits on funding for IT priorities, mismatching expectations in terms of real results from IT investments. In short, IT is expected to "do more with less."

Recently, a manufacturer of consumer products conducted an investigation into its own struggles with IT. Although the company, which sells to large retail chains as well as through other channels, had invested in an enterprise resource planning system, it still took too long to bring products to market, reconcile inventory and close the books. The investigation revealed that despite the significant investment in advanced technology, 95% of the company's business was being run through manual processes and spreadsheets. In this case, old habits die hard.

A number of warning signs can disclose potential problems with IT strategy, prioritization, implementation and management. Some of the more common indicators include the following:

1. There is a lack of proper evaluating and planning for IT investments.

2. Poor implementation destabilizes the ability to transact with customers.

3. Complex IT decisions are made more on the salesperson's strength than the technology fit.

4. IT spending is considerable, but the business sees little or no measurable improvement.

5. Upgrades to the IT platform do not produce new benefits or capabilities but merely do what the old systems did.

6. Compliance still depends on manual detective-type financial controls rather than automated preventive systems.

7. Spending on noncore and costly items, such as internal data centers, does not consider innovative alternatives, such as outsourcing or virtualization.

8. Financials must be restated on a regular basis

9. The organization is not reacting to IT trends, such as social networking and mobile applications.

Many of the items in this list highlight the often unseen cost of poor IT planning and management. Beyond the significant price of the technology itself is the often greater cost that comes from failing to achieve the expected results. These costs include internal inefficiencies, poor information to support management decisions, reduced financial

performance and a frustrating customer experience.

Critical Business Triggers

A number of significant business events often add urgency and importance to IT decisions.

Leadership changes. Organizations require different management skills at different stages of their lifecycle. The new chief financial officer who comes on board after an initial public offering, with a mandate to help the company grow, may or may not have the experience required for oversight of the IT function. If not, the company could be in for a difficult period of adjustment.

Cost-reduction initiatives. Reducing costs has become a way of life for many organizations. In many cases, technology may actually help reduce organizational costs or help improve flagging revenues. When cutting is applied to the IT investment category, a refined prioritization mechanism is important when choosing between alternatives. Technology can enable a reduced labor force to be more productive, allowing organizations to accomplish greater performance measures with equal or lower fixed costs.

Mergers and acquisitions. Business combinations also present challenges to IT. There is a window of time—typically, three to six months following a merger—where organizations are more receptive to change. The ability to capitalize on this receptivity and initiate that change is important. Otherwise, companies lose momentum and a tendency to resist change settles in.

Carve-outs. The type of merger or acquisition can also impact the strength of the trigger. When companies sell a portion of their business to another organization, they typically oversimplify and overestimate what it is really going to cost the buyer to take on that new challenge. Such carve-outs are very complex and costly. Businesses that don't participate regularly in carve-outs often find them difficult to implement.

Changing business models. One of the most widespread triggers in this age of global sourcing is the changing business model. Companies that used to manufacture products now become importers and distributors when they outsource production abroad. They transform themselves from local manufacturing organizations into international sales and marketing organizations. Instead of operating IT systems focused on the purchase, delivery and assembly of raw materials or components, they need systems that can help them forecast demand for products made halfway around the world that won't be shipped for six months or more.

Linking IT to Business Performance

A formal, structured approach that links IT investment to business performance can help companies avoid many of these problems by providing a focus to the investment that is often missing. Such an approach typically spans four broad stages: assessment, evaluation, implementation and sustainability.

Assessment. Assessment explores and analyzes business systems, security, spending, integrations, hardware, communications, personnel, policies and procedures, and intellectual property. An IT assessment is designed to uncover hidden risks and opportunities, and communicate complex issues in a format that is accessible and actionable by management. For example, an assessment may reveal that a manufacturer is using the wrong software tools for planning and forecasting, or that manual spreadsheets are not integrated into the distribution system. With an assessment as a foundation, it is possible to create a plan that links IT investment to strategic growth.

Evaluation. Evaluation encompasses the selection and implementation of IT systems to support the business. IT systems represent a significant investment—frequently seven figures or more—and the cost of making an incorrect decision is high, so companies reach out to "experts" for advice. Sometimes, these experts include vendors with a vested interest in the outcome. While vendors may have a lot of technical knowledge about IT systems, they are no substitute for independent advisers.

Implementation. Once a company has made a decision to go with a specific system, the next step is to install the hardware and software—a job that is easier said than done. In many companies, implementation of a major IT system is not an everyday event and certainly not a core competency for many manufacturers and distributors. Bringing in professionals who install systems for a living improves chances for success.

Sustainability. After new systems are up and running, companies need to monitor them to make sure they continue to deliver the expected level of performance. How much attention a company pays to each of its systems depends upon the value those systems deliver. For example, an enterprise resource planning system may keep production humming on a daily basis, but a planning and forecasting system that adds efficiency to the supply chain can change bottom-line profitability.

Cover the Basics, Too

Taking a structured approach to IT investment can help companies sidestep many problems and improve both the effectiveness and the efficiency of their technology systems. But even the most rigorous approach to planning can go awry if companies fail to take care of the most basic requirements.

Several years ago, a midsize manufacturing company in Southern California embarked upon an initiative to align its IT systems more closely with its business performance. Business was good, and the company wanted to do what it could to help ensure future growth.

One day, when the project team was meeting with its outside IT advisers, the building started to shake and the fluorescent lights started to flicker. Everyone in the meeting looked at one another and thought the same thing: earthquake.

The people in the conference room got up from their seats and started to hurry out of the building. But before the IT managers could flee to safety, they had to run into the computer room, load all of the back-up tapes from their mainframe into a walker basket, and wheel the cart outside. That was their disaster-recovery plan.

It doesn't take living on a fault line to realize that managing IT investment requires a heavy dose of common sense. A company can have the most robust plan in the world, but if it doesn't also cover its basic needs, that plan won't be worth the paper on which it is written. IW

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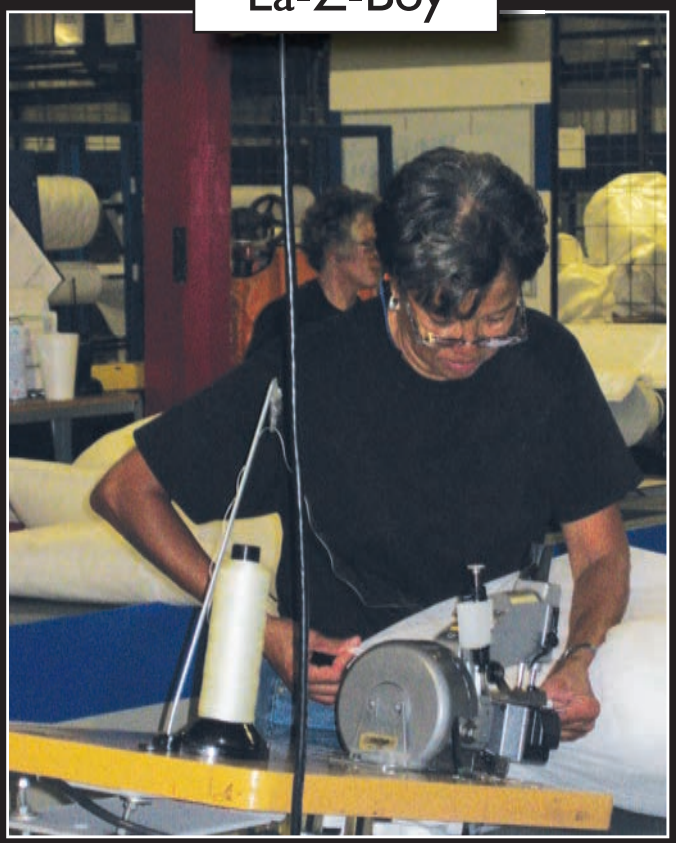
Manufacturing Excellence in America

La-Z-Boy



Above: La-Z-Boy's Dayton, Tenn., facility features 30 cells in total. Its report-out board details for its cell members production, safety, continuous improvement and quality metrics, updated daily.

At right: La-Z-Boy's fiber blowing machine stuffs material into 6,000 cushions each day, which then have to be sewn shut. Nearly 96% of the material is yielded from each trailer. What isn't is later sold back to the contractor and recycled.

INDUSTRYWEEK Excellence in Action tour attendees saw first-hand how sneakers, boats and reclining chairs are assembled. The tours, which took place from late October through early November, provided a glimpse into the production process for three established brands. The first tour took place on Oct. 19 at Correct Craft Inc.'s Nautique plant in Orlando, Fla. Correct Craft utilizes one-piece flow through its manufacturing processes of gel coating, lamination and assembly for boat construction. Next stop was in Dayton, Tenn., on Oct. 27 at La-Z-Boy's plant where the company makes its famous reclining chairs. The plant transformed from traditional batch-and-queue furniture manufacturing to a lean custom-order facility. The final Excellence in Action tour took place Nov. 3 in Lawrence, Mass., at the New Balance Athletic Footwear plant. New Balance is the last remaining athletic footwear manufacturer in the United States. The facility produces footwear cut to box. The plant assembles shoes using imported uppers and soles.

Left: Construction of custom seats and cushions at Correct Craft's Nautique plant in Orlando, Fla.

Nautique

A partially completed custom boat deck awaits the final assembly process at Correct Craft's Nautique plant in Orlando, Fla.

New Balance's Lawrence, Mass., plant produces approximately 1.2 million pairs of shoes per year utilizing lean tools such as kanban, TPM and 5S.

New Balance

The Lawrence plant is one of five New Balance facilities located in New England.

BALANCING PRODUCT COST AND INNOVATION

HOW MANUFACTURING LEADERS ARE MAKING COST MANAGEMENT PART OF THE FABRIC OF A COMPANY'S OPERATIONS AND INNOVATION EFFORTS.

■ BY ROBERT S. FORREST AND VENKATESH IYER

Product costs comprise 60% to 80% of a typical manufacturer's total cost structure. And if that isn't daunting enough, the global economy continues to roil; raw material, labor and transportation prices are tougher than ever to predict; and low-cost competitors seem to appear constantly—and not just in emerging markets.

However, the cost-management headache is even bigger than that, since most manufacturers are also pressed to develop products that can be rapidly and inexpensively tailored to changing (and increasingly local) customer expectations. This ability to mass-customize is vital but expensive, which is why leadership in manufacturing often stems from a company's ability to balance product cost and innovation.

Unfortunately, few organizations have been able to raise innovation levels without upping costs. The main reason, we believe, is that a natural byproduct of increased innovation is complexity, and complexity is innately expensive. Thus the more companies strive to build upon an existing innovation, the more product complexity increases and the more costs remain high. This is why a formal, institutionalized approach to managing total (end-to-end) product costs is so important. This article looks briefly at the key elements of such a capability.

Juggling Complexity, Volatility, Agility and Cost

Seeking to contain or reduce costs, most companies don functional lenses: They focus on things such as (the cost of) product development, sourcing, logistics, manufacturing and so forth. But without a complete, product-lifecycle view, larger opportunities to really control costs remain elusive. And of course, combining cost-reduction efforts with innovation initiatives frequently makes things even more unwieldy.

Another cost-versus-innovation problem is the product development process. Engineers often find it easier to create altogether-new designs rather than deal with the bureaucratic muddles needed to ensure that design changes are compatible with existing products. Of course, new designs create costs that quickly become "sticky," and these costs can seldom be reined in through de-contenting, value analysis or supplier negotiations.

A third (closely related) problem is that designers and engineers incorporate varying levels of input from manufacturing, depending on a product's launch timing, design feasibility, level of design risk and other variables. As a result, the metrics used to determine an initiative's impact seldom account for costs in a comprehensive way. For example, although one additional part number or product variant might seem to have a negligible impact, the cumulative effect is widely felt—with added cost and complexity "bull-whipped" across the supply chain.

What's clearly missing from the above scenarios is a focus on making cost management part of the fabric of a company's operations and innovation efforts. Following are several emerging practices that can help make this happen.

Complexity Reduction

The mission here is to cut costs by creating products that are simpler (and therefore less expensive) to design, upgrade, manufacture, store, transport and service. Complexity-reduction programs also benefit companies by streamlining the planning/forecasting function and bringing new economies to the transition from one product design to a next-generation design. A complexity-reduction initiative's two principal components are:

- Lean configuration—minimizing the complexity of current offerings at the design stage.
- Design interface management—provisioning parts to enable "bolt-on" options and attachments. A company might, for example, provide wiring harnesses for a "navigation" option, even if this was not ordered by the customer.

The value of complexity-reduction initiatives is extensive: reduced direct material and capital equipment costs; fewer suppliers; less need for safety stocks and spares; and lower supplier management costs. Additional cost reductions may appear in the form of added flexibility, such as the opportunity to smoothly upscale or downscale engineering staff based on demand levels. Longer manufacturing runs also may result, since (as noted in the next section) less complexity often makes it possible to develop a single base product from which multiple variants are produced at a later date. Plus, less complexity makes it easier to share designs across divisions and with business partners, thus increasing compliance and encouraging commonality and reuse.

A consumer durables manufacturer launched a three-year initiative to reduce product costs by lowering product complexity. Part counts fell by 40% to 70%; inventory dropped 20% to 30%; and lead times went down 10% to 25%—all of which contributed to more than $260 million in product cost savings.

Product Modularity

Modularity—creating a common base product to which variations can be added quickly—is complexity reduction's first cousin. It also is the heart of mass customization and improved product availability, as well as a major source of end-to-end cost reductions. Moreover, product modularity initiatives can increase a company's responsiveness to customer demands, simplify operations ranging from sourcing to service management, and help engineering organizations innovate more rapidly and effectively (e.g., by creating a single, revolutionary "base product").

The key to modularity's effectiveness is fewer everything: parts, product versions, suppliers, inventory, engineering changes, service complexity and manual interventions. There may even be less "order grief," with fulfillment staff finding it easier to decide if options selected by a given customer are compatible with one another. A company's ability to forecast and predict customer demand also can be enhanced by modularity because demand aggregation is forestalled.

How much to push the modularity envelope depends largely on the type of product, since not all items can or should be modularized to the same extent. Products with the following characteristics are often the best candidates:

- High annual volumes with myriad product variants serving a wide variety of applications and/or usage profiles.
- Clear existence of a "dominant design."
- Customer expectations that include short lead times and off-the-shelf availability of products and spare parts.

A commercial vehicle manufacturer set out to reduce product costs by increasing modularity—making a cab module that would work with multiple bus body styles. Part numbers subsequently dropped from 800 to 250; required assembly hours fell by up to 60%; and manufacturing costs per vehicle decreased by 8% to 24%.

Collaboration and Cultural Change

End-to-end initiatives such as complexity reduction and modularity are complemented by shifts in an organization's core beliefs. Among engineers, that could mean rethinking the relationship between price, quality, durability and the customer's willingness to pay (what, for example, are the cost ramifications of "world-class" versus "good enough" designs?). Insourcing, collaboration and culture change might focus on new kinds of supplier relationships, such as joint forecasting, design partnerships, quality-improvement cooperatives and vendor-managed inventory programs. And across the company, new segmentation initiatives might be adopted that relate manufacturing cost decisions to the parsing of market characteristics, geographies, product categories and, of course, customer type, loyalty, longevity and a willingness to pay for a spectrum of product features. Hard decisions also may need to be made about locating and utilizing manufacturing plants and global design and distribution centers.

Cost Management for the "New Normal"

Product innovations are constantly being introduced, so business complexity will inevitably increase too. This is clearly the "new normal" for manufacturers. However, product and manufacturing costs do not have to increase correspondingly. The key, to paraphrase Albert Einstein, is that "everything should be kept as simple as possible, but not simpler." To make this happen, fundamental but worthwhile changes may be needed, accompanied by basic changes in perspective. And of these perceptual changes, the most important may be viewing product and innovation costs not as the sum of bill-of-material liabilities, but as the sum of all costs accrued from concept development to end of life.

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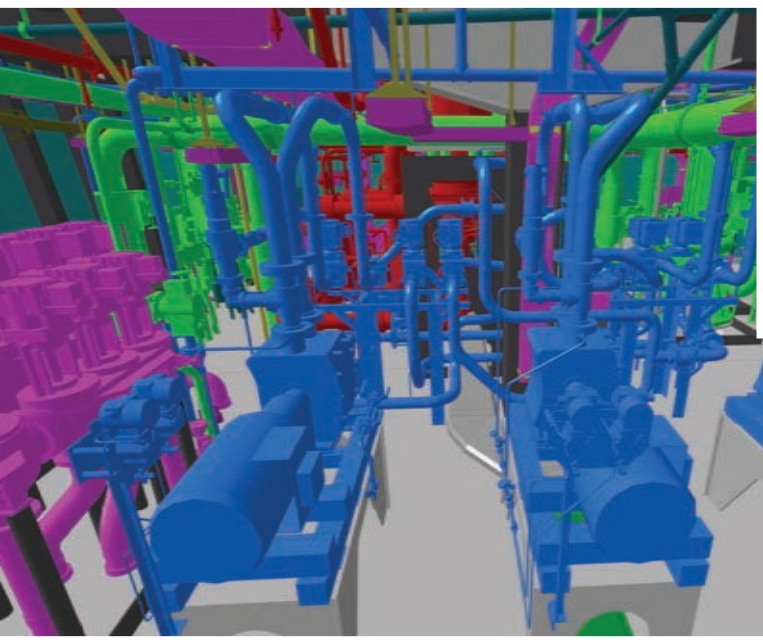
BY PETER ALPERN



NORTHROP GRUMMAN

A virtual image of the Gerald R. Ford Navy aircraft carrier's pump room using Catia software from Dassault Systemes.

NORTHROP GRUMMAN

The Gerald R. Ford (CVN 78) aircraft carrier, which is the Navy's first aircraft carrier to be completely designed using a 3-D product model, will be made from more than 3 million parts.

Breaking Down Manufacturing Walls with 3-D Simulation

Virtualization allows engineers to view their products from concept to design, testing and manufacturability, all at once.

Nissan North America's next-generation minivan, the 2012 NV, might have looked great in the design stage. But to truly understand how it would play out in the physical world, engineers climbed into a 3-D virtual universe and simulated passengers of various sexes, heights and weights climbing in and out of their seats from a variety of angles repeatedly.

Nissan has employed 3-D simulation for a variety of its design processes, from studying a user loading then unloading a bag of golf clubs, groceries or a surfboard to the ergonomic placement of its key dashboard engine indicators, using virtualization to study its designs from multiple perspectives and make changes accordingly.

There's long been a wall that separates the points of view of those that design products and those that mass produce them, but it's a line that has begun to blur in the digital world. Virtualization has been a powerful conduit of this shift, allowing engineers to consider their products from concept to design, testing and manufacturability.

"When you're designing something, it's essentially thousands of small decisions, any one of which can cost you money and time," says Dave Pierson, senior design engineer for MAGNET—The Manufacturing Advocacy & Growth Network, a consulting group that offers design and technology services to small and midsized manufacturers. "Anything that can help you realize those mistakes faster and allow you to correct them sooner in the process is extremely valuable."

Northrop Grumman has taken 3-D simulation onto a mass scale, using Dassault Systemes' Catia software to develop a detailed design for the Gerald R. Ford (CVN 78) Navy aircraft carrier, which meant breaking the ship down into over 400 different design zones and more than 3 million parts.

The CVN 78 was the Navy's first aircraft carrier to be completely designed using a 3-D product model, according to Michael Shawcross, vice president of aircraft carrier construction programs at Northrop Grumman.

The CVN 78's product model included the definition of the ship's

geometry and technical definition of the ship's parts, including the procurement, planning and manufacturing data.

"It helps us to forecast parts earlier in the design process," says Shawcross. "When you develop a design for multiple disciplines, involving hundreds of systems being designed into the same space, you have to sequence all of those and have a hierarchy of priority. Doing it in a product model, the computer lines it all up."

The software helped identify areas of overlap where, for example, piping layout might have interfered with maintenance criteria.

Still, there are some limitations to 3-D simulation. Nissan North America, for instance, only uses it on a fraction of its virtual manufacturing processes. While there are a large number of tools available today, such as gloves a user will put on his or her hands that will provide haptic feedback in the design of surfaces and objects, the technology is still not ready for primary design deployment, according to Kurt Beyerchen, Nissan North America's senior manager of human engineering.

"It's still not the same as touching and feeling, say, where the temperature control knob is on a vehicle," says Beyerchen. "I don't know if that will ever be resolved."

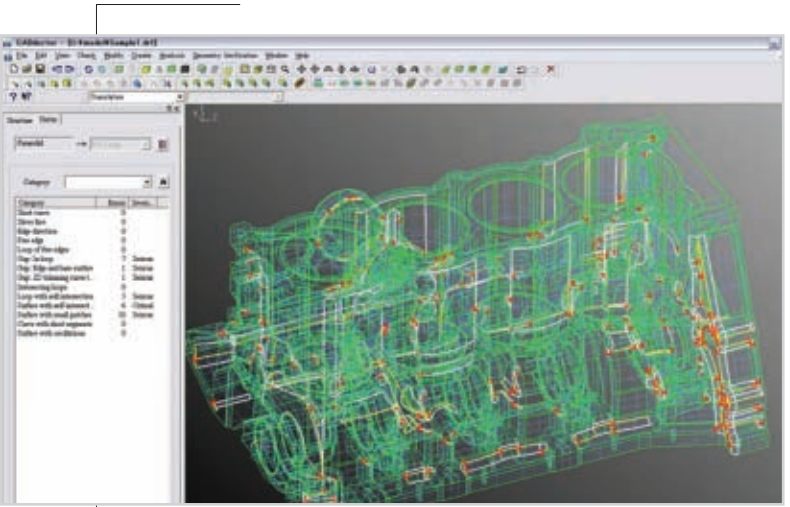
Instead, Beyerchen anticipates that instead of virtual reality, more designers will move to what he calls "augmented reality," which combines the 3-D viewing experience with actual objects. As an example, he says, designers could create a foam shape of a designed dashboard, which would then be overlaid with "some of the photo-realistic rendering capability that some of the non-3-D software provides." He adds, "I think that's where the future is going."

For whatever its limitations, MAGNET's Pierson says he is using 3-D simulation on everything from testing candy bar production equipment to the thermal analysis on new forms of grocery packaging to studying the center of gravity on a mechanism as it accelerates and decelerates.

"What I try to explain to my people is I'd like you to fail as much as possible and fail as quickly as possible," says Pierson. "A designer might be making 3,500 different small decisions during the designing of a product. If there are going to be errors, I want them early in the process, when they're cheap to correct, not later." ⏮

Lost (and Found) in Translation

Parker Hannifin uses design data translator tool to address interoperability issues across its multiple divisions and ERP systems.



ELYSIUM

Parker Hannifin uses Elysium's CADFeature10.0, a design data translator tool, so a wide range of users and departments, spread across multiple systems, can open files and ensure the designs and geometries are accurate.

Just as global corporations manage a heterogeneous work force spread across great distances, they also have to negotiate disparate engineering and enterprise systems.

Consider what Parker Hannifin faces. The diversified manufacturer is spread into 135 divisions, eight of which are in aerospace alone, according to Bob Deragisch, engineering services manager for the aerospace group. Those eight divisions use six different ERP systems and 185 disparate engineering tools.

In other words, creating a consistent, repeatable workflow is a mind-boggling challenge. While Deragisch emphasizes there is no single formula to address the litany of interoperability issues that global manufacturers are dealing with today, one major step he instituted is adopting a new suite of interoperability software as a means of ensuring data quality.

Data quality has long been an issue for global manufacturers. Assemblies, as well as parts, will often lose bits of information during each translation. While many Tier 1 suppliers might share the same CAD software, many more of its customers might not share the same release, causing slight variations in a design, according to Deragisch.

Parker Hannifin recently adopted CADFeature10.0, Elysium's newest feature-based design data translator tool. When transferring design data to customers and suppliers, the aerospace group will use the software so anyone can receive models in the type, version and release of CAD system that the organization prefers.

"It allows our engineers to design the original model as required with all the functionality of our own CAD system,"

says Deragisch. "Then, before we send our geometry to customers or suppliers, we employ CADFeature to get the data to the point where they can best utilize it if their system is at a lower revision than our standard."

Translation isn't the only issue manufacturers face. It's merely the first step. More manufacturers are requiring independent validation that the translation of their designs from one program (or version) to another is accurate.

Consider how the role of a supplier has changed. For decades, a supplier might have provided its products to just one company. But as supply chain diversity has increased, a Tier 2 company might be supplying dozens of customers, which means providing multiple CAD support, according to Ken Tashiro, Elysium's chief operating officer.

"If you're providing a machined part, you're relying on automated software processes like 3-D analysis and prototyping that minimize your time to deliver a product," says Tashiro. "But in order to do that, you need perfect data".

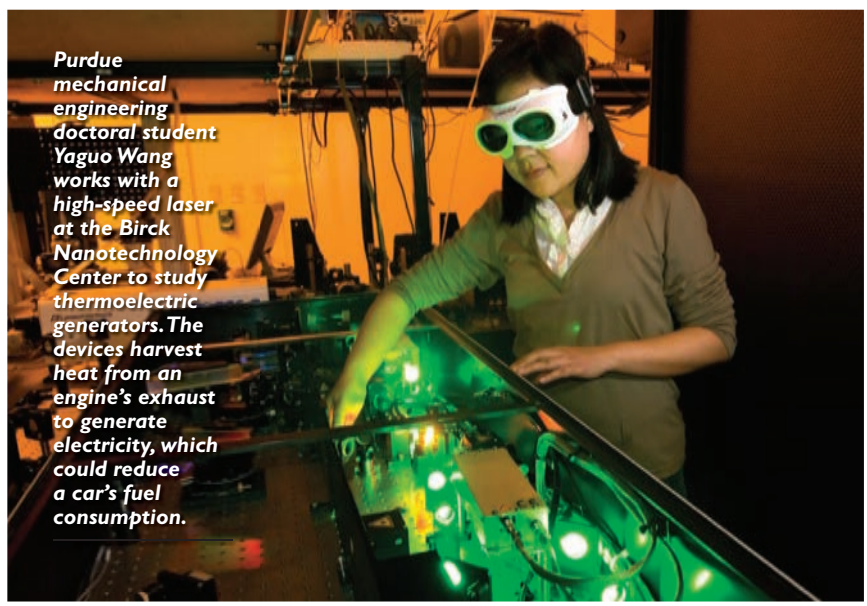
Parker Hannifin will use CADFeature to translate a design saved in one version of its Catia software and have it automatically validate the process.

"Each version of the CAD tool may use different mathematical representations to define geometry, and they have to be exact within a certain tolerance," says Deragisch. "I look at that tolerance as being our manufacturing tolerance. So the CAD translation needs to be within those decimal points of accuracy. There is very little room for error."

At a time when multiple systems, versions and divisions can create an interoperability mess for far-flung operations, automating the conversion process can eliminate human error, applying rules for converting features and mating constraints. ⏮

Technology Would Power Cars with Auto Exhaust

Developed by GM and Purdue University, system harvests heat from engine exhaust to generate electricity.



Purdue mechanical engineering doctoral student Yaguo Wang works with a high-speed laser at the Birck Nanotechnology Center to study thermoelectric generators. The devices harvest heat from an engine's exhaust to generate electricity, which could reduce a car's fuel consumption.

PURDUE UNIVERSITY

What if the very emissions developers are working so feverishly to diminish could be the fuel that powers tomorrow's automobiles?

Purdue University researchers are working with General Motors to create a system that essentially consumes its own exhaust, converting heat from emissions into electricity, thereby improving fuel economy by reducing the engine's workload.

The enabling technology would be next-generation thermoelectric generators, which produce an electric current when a difference between temperatures emerges, enough to charge batteries and power a car's electrical systems. In January, the team will begin testing a prototype behind a car's catalytic converter, where it will consume heat from exhaust gases that can approach 1,300 degrees.

Researchers are hoping the initial prototype will reduce the vehicle's fuel consumption by 5%, while more advanced systems that work at higher temperatures could make sharper reductions of 10% in the future, according to Purdue engineering professor Xianfan Xu.

The technology is contingent on unique metals that can withstand a massive differential in temperature, where one side facing hot gases stays hot, while the other side must stay cool. "The material is hot on the side facing the exhaust gases and cool on the other side, and this difference must be maintained to continually generate a current," said Xu, who is leading the research and has been collaborating with General Motors on thermoelectric research for nearly a decade.

Researchers at GM are using a thermoelectric material called skutterudite, a mineral made of cobalt, arsenide, nickel or iron that is mixed with rare-earth elements, such as lanthanum, caesium, neodymium and erbium to reduce the thermal conductivity of the skutterudite.

The work is being funded with $1.4 million from the National Science Foundation and the Department of Energy.

Thermoelectric technology wouldn't just be limited to solving challenges with cars. Xu says it could also be used to harness waste heat in homes and power manufacturing facilities. ⏮

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■ BY DAVE BLANCHARD

SUPPLY CHAIN & LOGISTICS

Marketing Could Be Your Demand Chain's Weakest Link

Marketing executives admit they don't always understand their role within the demand chain cycle.

Manufacturing managers have long harbored the suspicion that the marketing department didn't exactly see eye-to-eye with them on the importance of supply chain management. Now comes evidence that marketers do indeed have a blind spot when it comes to demand planning.

According to a recent study by the Chief Marketing Officer Council, marketers tend to focus on strategy, creative development and campaign execution. Effective demand-chain provisioning, on the other hand, tends to be an afterthought if it's thought of at all.

Many marketing executives admit they have never assessed demand chain performance, nor given it high priority within the marketing operational mix, the study reveals. Not surprisingly, then, 80% of respondents to the survey say their organizations are not efficient or effective enough in provisioning all of the demand chain. What's more, 20% admit their demand chain is underperforming or in need of improvement.

"Marketing tends to be preoccupied with staying on track with individual tactical executions or traditional marketing fundamentals like lead generation, campaign execution and content or creative development," says Donovan Neale-May, executive director of the CMO Council. "However, today's demand chain requires a new mix of digital, direct and retail distribution, fulfillment, measurement and tracking capabilities to maximize customer contact, conversion and interaction."

As the report points out, one of the main problems is that marketers don't necessarily understand their actual role in the demand-chain cycle. For instance, only 18% agree with the statement that "specifying and leading the development of the right products and services for the market" is marketing's main function on the demand side of the business.

While 56% of marketers are focused on campaign design, development and execution, only 16% are looking to production, warehousing, inventory management or delivery as critical elements within the supply chain. In addition, just 2% say they are looking to optimize the actual delivery, fulfillment or distribution of their critical marketing materials.

One area that potentially holds an immediate opportunity for improvement and value creation is specific to vendor selection or management. Nearly half of respondents view demand-chain procurement and fulfillment as a compilation of individual vendors, asking each vendor to bid on individual elements of the demand chain. Only 7% of market-

ers view the demand chain as an area for consolidation and rationalization to gain more control and efficiency. As nearly 60% of respondents plan on introducing a more disciplined approach to marketing execution systems, vendor visibility is likely an ideal place to begin demand-chain transformation.

The top five challenges to driving demand-chain performance in 2011 are:

- having the right budget or resources (43% of responses)
- determining where and how to impact the business (42%)
- adding new skills and talent (39%)
- tracking results and outcomes from contributions (37%)
- understanding all areas of expense and value creation (25%).

10 Behaviors
Manufacturers Should Avoid

Let go of the old assumptions when choosing technology solutions.

Thanks to the recession and the current recovery-that-doesn't-feel-like-a-recovery, some manufacturers are discovering that their future success will hinge on reinventing themselves as a lowest-cost producer. That transformation will have to be made, though, without compromising quality or utility.

According to Mark Sutcliffe, president of CDC Software's CDC Factory product line, manufacturers need to let go of old assumptions and take a different approach to their performance improvement initiatives, particularly when it comes to technology. One of the keys is to focus on taking action that will impact real costs every day. He offers 10 tips to achieving more immediate results.

1: Don't Lose Sight of the End Goal

"The goal is to become the lowest-cost producer in the sector," Sutcliffe notes. "It is not to capture all data from the plant." He points to studies suggesting that in as many as eight out of 10 initiatives, managers are focusing too much on the new tool or technology instead of on the goal.

Mark Sutcliffe

2: Don't Waste a Crisis

At the risk of sounding too much like Rahm Emanuel, President Obama's former chief of staff ("You never want a serious crisis to go to waste"), Sutcliffe urges manufacturing leaders to craft a decisive action plan for specific cost improvements, given that the current climate of economic uncertainty offers an ideal opportunity to drive change. "Organizational resistance is low, and the workforce is more willing to change daily work practices," he points out.

3: Don't Assume All Answers Come from the Executive Suite

As much as it might pain them to admit it, senior-level managers are not the be-all and end-all of manufactur-

ing performance gains. As Sutcliffe observes, "the real daily performance dials in today's plants are moved by the workers, not by upper management. Manufacturers that focus attention and technology on factory-floor workers to improve their individual performance will see transformational results."

4: Don't Take Current Factory Metrics at Face Value

Most plant managers exaggerate their efficiency, often by as much as 10%, Sutcliffe notes. Their metric calculations are often flawed or too focused on the plant rather than on the operational causes of performance loss or waste. "Yet management continues to set the bar for improvement against a spurious starting position," he says, which obscures the potential for true improvements.

5: Don't Assume Data Leads to Improvement

In some cases, Sutcliffe states, data-collection software tools can lead to a state of "analysis paralysis" as managers seek to get complete data for the entire plant. What's needed is a framework that empowers the workforce to resolve problems in real time.

6: Don't Assume that Improvement Centers Only on Plant and Equipment

Rather than focusing on equipment, manufacturers should focus their continuous-improvement initiatives on people and processes. Sutcliffe recommends implementing disciplined day-to-day review points, adhering to procedures and offer basic skills coaching, reinforcement and real-time feedback on the factory floor.

7: Don't Avoid People Issues Because of Perceived Difficulty

Real, sustainable change can only happen, Sutcliffe says, in a manufacturing environment where operators and supervisors have real-time visibility into production performance, reduced administrative burden and a structure that allows them to contribute their own ideas and turn them into actions.

8: Don't Do a Trial; Do the Project (or Don't Bother)

"With any performance improvement initiative, momentum is key, and quick wins provide the fuel needed to gain that momentum early on," he says. "Early successes ensure that the organization's focus remains fixed on the true objectives—to lower operating costs." Once you start, he adds, there should be no going back. "Your confidence will be felt by all the stakeholders and the project is already on its way to success."

9: Don't Build Your Own Technology

Considering that Sutcliffe's company is a vendor of packaged solutions, not surprisingly he recommends that manufacturers look for packaged solutions specifically designed for their industry verticals, rather than attempting to design and build their own systems.

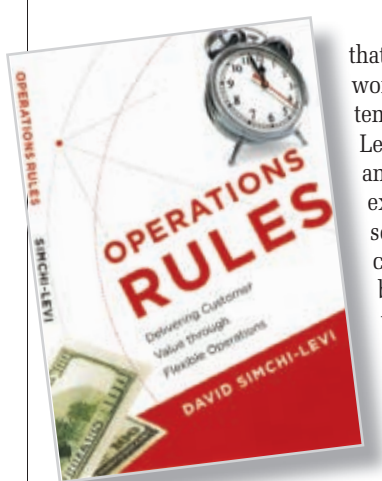
10: Don't Assume That Major Improvements Take Years. Think 90 Days.

"Don't assume that transformational improvements can't be achieved in the short run," he notes. Results can occur in a relatively short time if you focus on technology that supports continuous improvement practices. ⏮

Bookshelf

Operations Rules: Delivering Customer Value through Flexible Operations

■ By David Simchi-Levi, The MIT Press, 2010, 239 pages, $29.95



Is corporate social responsibility just another way of saying "I gave at the office," allowing companies the ability to write off charitable donations in the name of burnishing their reputations? Is it possible that a manufacturer can actually do well by doing good?

Not only is it possible, but that concept forms one of the essential "operations rules" that serve as the framework for this book, written by David Simchi-Levi, an MIT professor and supply chain expert: Corporate social responsibility can create tangible business opportunities and value. The author offers several examples, such as Fonterra, Coca-Cola and Nestle, where companies were able to not only improve the environment while streamlining their supply chains, but also to create value for themselves.

The book also sets out to emphasize the importance of lean-manufacturing principles to achieve system, process and product-design flexibility. Either by design or by default, the book attempts to rehabilitate Toyota's somewhat battered reputation as the world's leading proponent of lean (the automaker's recall problems were old news at the time of publication, yet the book makes no mention of Toyota's quality issues). It looks specifically at how Toyota has achieved flexibility through worker cross-training, and shows how luxury car maker Lamborghini has similarly used the Toyota Production System to reduce inventory by 50%.

The book also offers some ideas on how companies can cope with oil-price fluctuations, suggesting that a flexible manufacturing strategy can help reduce the increase in transportation costs. Economic uncertainty on a global scale, the author notes, requires a shift in thinking toward more regional supply chain activities. ⏮

CAMPBELL SOUP CO.

IW 50 PROFILE: CAMPBELL SOUP CO.

■ BY JONATHAN KATZ

Campbell Soup Cooking Up a New Recipe?

CEO-in-waiting seeks to infuse new energy into iconic brands.

¶ In July, Denise Morrison will take over as CEO of Campbell Soup Co. with the task of trying to reinvigorate sluggish sales in the company's soups category. The current executive vice president and COO says Camden, N.J.-based Campbell plans to grow its brands through a combination of more healthy food and beverage offerings, global expansion and the use of technology to woo younger consumers.

CAMPBELL SOUP CO.

Future Campbell Soup CEO Denise Morrison plans to "accelerate the rate of innovation" at the company.

While "innovation" isn't a term typically associated with the food-processing industry, Morrison says it's key to the company's future success. As an example, she cites Campbell's development of an iPhone application that provides consumers with its Campbell Kitchen recipes. The company's marketing team devised the plan as a way to appeal to technologically savvy, millennial-generation consumers, Morrison says.

Campbell also continues its push toward healthier products by offering more reduced-sodium soups and more flavor varieties for its V8 juices, Morrison says. But the expanded product lines and promotional activities haven't energized sales for all segments the way the company had expected. Campbell cut its annual sales forecast in November because promotional spending did not result in anticipated soup volume gains, current President and CEO Douglas Conant said. U.S. soup sales in the first quarter declined 5%.

The weak soup sales were somewhat surprising as more consumers sought affordable stay-at-home options during the recession, says Edward Jones analyst Jack Russo. "There's a strong value proposition in soups," Russo says. "People are eating more meals at home and trying not to spend as much, but the category has been weak now for three winters in a row, and I really don't have an answer as to why that is. I'm not sure they do, either."

Morrison will succeed Conant when he retires on July 31. Morrison joined Campbell Soup in 2003 and served as president of the company's North America soup, sauces and beverages division before taking over as COO in September. In her new role, Morrison says she plans to "accelerate the rate of innovation" at the company.

In the meantime, Morrison says she's busy connecting with leaders in the company's other business segments, such as the Pepperidge Farm snacks division. That should flow rather seamlessly, according to Campbell's Chief Strategy Officer Irene Chang-Britt, who has worked with Morrison for nearly 10 years, first at Kraft and now at Campbell.

"Denise is a team builder. Always has been," said Chang-Britt in an e-mail. "What makes Denise an effective leader and what will serve her well as COO and eventually CEO is that she puts the right people in the right positions, challenges them and then trusts them to deliver."

Morrison says she's a believer in cross-functional teamwork. That philosophy extends to the plant floor, where Morrison says productivity is the key to fueling future growth. Each plant has "direction-setting" teams that involve representatives from various plant functions, including hourly employees and management. "These teams, in a very disciplined way, spend time every day and have a collaborative forum to come up with the best ideas to address any issues or opportunities," Morrison says.

The plants also are active in benchmarking initiatives with other operations from various industries, Morrison says. For example, the company looks to DuPont for safety best practices and Procter & Gamble for total delivered cost, says Morrison, who worked for nine years in a plant during the 1980s at Nestle USA.

Online:

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BY JOSH CABLE

Sustainable from Start to Finish

Anomatic strives to make the aluminum anodizing process a shining example of green manufacturing.

Mark Ormiston looks at cell phones, iPods, beverage bottles, cookware and cosmetics in a different light than most of us do. Ormiston, the director of environmental sustainability for Newark, Ohio-based Anomatic Corp., sees these items as opportunities for green manufacturing—and is leading his company's efforts to make that vision a reality. ¶ Anomatic makes anodized aluminum packaging, which is found in a variety of consumer, medical and industrial products. Through the anodizing process, an oxide coating is formed on aluminum, giving it a corrosive-resistant, decorative finish and other properties. The company, which has 750 employees worldwide, says it anodizes more than 1 billion aluminum parts each year.

Mark Ormiston

"Aluminum really wouldn't have the penetration in our daily lives if not for anodizing," says Ormiston. "It's such a soft metal, it's easily scratched and it doesn't look very nice in its native state."

The "Green Finish"

Anodized aluminum is 100% recyclable. With customers increasingly demanding greener products and manufacturing practices, Anomatic plays that to its advantage, emphasizing in its marketing that anodized aluminum is known as the "green finish" in the packaging industry.

But the company takes that several steps further, declaring that its goal is to be "the most sustainable anodized aluminum packaging company in the world." From talking with Ormiston, it's clear that the company's philosophy—that "manufacturing at the expense of the environment is not acceptable"—is more than just a business strategy.

"[Sustainability is] really a global responsibility, and it's all-encompassing," Ormiston says. "In our particular market, we have to have the consumers and the corporate community and the government all working toward the same goal, or we're not going to get much done."

This past June, Ormiston created the company's Sustainability and Environmental Operations Group. The cross-functional team is tasked with implementing Anomatic's sustainability plan, which aims to "reduce energy, waste, water and air pollution while significantly increasing the ability to recycle and reuse materials," according to the company. The group's mission includes helping suppliers and customers develop recycling strategies for anodized aluminum, Ormiston notes.

Sustainability Targets

Anomatic has been working toward targets in each area of its sustainability plan through investments in new equipment and practices, such as air-scrubber technology that removes more than 98% of nitrogen oxides (a byproduct of the polishing process) and an advanced recycling system that enables the company to recycle and reuse up to 40% of its process water. Through R&D and collaboration with one of its major suppliers, Anomatic in 2009 introduced a new aluminum alloy called 9030, which is guaranteed to contain a minimum of 20% postconsumer recycled content.

One of Anomatic's biggest green breakthroughs, Ormiston says, is its closed-cycle vapor degreasing system. Implemented in late 2009, the system uses a non-ozone-depleting hydrofluorocarbon fluid to clean stamping oil from the components prior to anodizing. Because the fluid is far more environmentally friendly than past-generation cleaning solvents, Anomatic is able to extract, filter and reuse up to 90% of the oil. Since the solvent is constantly being regenerated in a closed cycle, the new system uses about 90% less energy than the previous water-based cleaning process.

While the company has made strides in achieving its sustainability objectives, Ormiston says the biggest challenge will be to keep the momentum going—and that falls on his group's shoulders. The group will have some powerful tools at its disposal. Anomatic has been incorporating sustainability goals into kaizen events, 5S and other continuous-improvement activities since it began its lean journey about two years ago, Ormiston notes; utilizing lean principles is part of the group's charter.

"If [sustainability is] part of the continuous-improvement process and if we're using the same principles, a lot of times when people think continuous improvement, they think about sustainability at the same time," he says. "Had we not operated with lean principles, if we had a different methodology to how we went about attacking problems, you might have somebody say, 'Am I supposed to do it the lean way or am I supposed to do it the sustainable way?' Really there's only one way. So I think it makes it a little simpler for everybody to work."

CONSIDER THIS

■ BY THOMAS R. KRAUSE

Last Year's Disasters Changed the Safety Dynamic: Do You Have a Safety Strategy for 2011?

True operational integrity remains uncommon across industry, but these steps can form the basis for a new standard of safety performance.

¶ The doubts and questions from 2010 linger with us. What caused the explosion, the cave-in, the leak? Most importantly, could these disasters happen to us in 2011? ¶ CEOs and their operations leaders increasingly confront uncertain answers. The key to prevention lies in whether corporate leaders see the imperative of continuously improving their safety culture—that deep-down core value that employees across the organization share for safety—and have the vision and will to make an improved culture a reality. Or, will they address the matter with narrowly defined memos, directives and programs, and an unspoken bias that "it can't happen here?" The difference in approach will determine whether companies in various industries work through 2011 with confidence in sound safety systems or with lingering anxiety instead.

Leaders in industries such as oil and gas, mining, chemicals, utilities and transportation will benefit from understanding the implications of the unprecedented events of 2010. In the aftermath of the BP spill, the Massey mine tragedy in West Virginia, the PG&E explosion in San Bruno, Calif., and the Chilean miner entrapment, the stakes are high; safety systems and cultures that are subject to occasional failure are simply unacceptable.

Most safety technology systems are effective most of the time. But true operational integrity, i.e. operating systems and cultures that produce uniformly safe and reliable behaviors and outcomes, remains uncommon across industry.

The unpredictability in many industries presents a problem and an opportunity for C-suite visionaries and their management and operations teams. All must be dedicated to setting and meeting a new standard. To enhance safety, executives and their teams should:

Make safety a CEO-level issue. Traditionally, safety efforts have required support or sponsorship from senior leaders. While BP CEO Tony Hayward was a supporter of safety improvement, his commitment did not translate into an effective vision and personal safety ethic. Explained and implemented correctly, these attributes establish safety as a value, which is the basis of a strong safety culture. Paul O'Neill delivered this kind of personal engagement at Alcoa; Paul Anderson at Duke Energy; and Sean O'Keefe at NASA after the Columbia explosion.

Radically accelerate the safety improvement process. Organizations tend to filter innovative safety ideas slowly to the top by analyzing, rethinking and subjecting them to budget constraints, slow reviews and continual revisions. The result is frequent delay or outright rejection. In this type of culture, safety improvements are considered along with other organizational initiatives and ranked according to "strategic" priority. While this practice is suitable for most aspects of organizational performance,

REUTERS

Recent events such as the collapse of the Chilean mine that trapped 33 miners demonstrate the need for continuously improving safety cultures.

safety cannot be an on-again, off-again priority. Treating it as such for a quarter or a year generates a culture of mediocrity and increases exposure to catastrophe.

Stop the surveys and start assessing leading indicators. Most organizations have clean, visible outcome metrics for safety performance. But these measures—including injury rates and related data—are lagging indicators. Safety visionaries know that leading indicators are needed to assess exposures before accidents happen. Many organizations use surveys as a proxy for measuring culture, but they make matters worse if they are not supported by valid methodology and do not generate actionable data. Leading indicators such as the frequency of safety observations and feedback, and the amount of time it takes for a safety issue to be addressed, are better day-to-day measures. Near-misses, when received in the C-suite as an opportunity to improve rather than simply bad news that could have been worse except for a twist of fate, can lead to significant improvement in downstream outcomes.

Develop a comprehensive safety strategy, with short- and long-term objectives, immediate action plans and specific accountabilities. In industry, safety management is often embodied in programs or engineered in fits and starts, like firefighting. While discrete programs are preferable to firefighting, neither approach assures sustainable operational integrity.

Instead, an overarching strategy is needed that addresses the gaps between the current safety state and the desired state. Strategic programs and processes then should be aligned to address the gaps, with action plans for both the short and long term. Specific accountabilities and outcomes then can be defined in measurable terms and tracked.

The way to safety excellence has been well established by leading organizations such as Alcoa, Exxon Mobil and DuPont. Many times, a catastrophic event serves as the impetus for improvement. At Exxon, for example, the Valdez incident triggered a learning process that led to the realization that safety and operational integrity are essentially the same thing. More than 100 years ago, an accident that killed members of the DuPont family catalyzed a safety culture that endures. In other cases, fortunately, leadership sees safety excellence as a business advantage and an employee-motivation and -retention strategy, as demonstrated by Alcoa's former CEO, O'Neill.

The BP Deepwater Horizon incident and the other tragic events of 2010 should trigger leadership vision and long-term drive for safety and operational excellence in 2011 and beyond. The time for learning, reflection and action is now; the time for just hoping "it can't happen here" has long passed.

Thomas R. Krause is co-founder and chairman of the board of BST, a safety performance consulting firm based in Ojai, Calif., whose clients include hundreds of manufacturers worldwide, major oil companies, NASA and patient-safety-focused health care organizations.

AD INDEX

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THE LAST WORD

Supercomputing

"The United States cannot afford to take a back seat in computer technology to the Chinese, or to anyone else."

— Eric Isaacs, director, Argonne National Laboratory on China building the world's fastest supercomputer

Three Simple Words

"We don't want to be a nation that simply buys and consumes products from other countries. We want to create and sell products all over the world that are stamped with three simple words: 'Made In America.' That's our goal."

— President Barack Obama, speaking at Forsyth Technical Community College in Winston-Salem, N.C.

Lead by Listening

"Our traditional idea of a leader is someone with superhuman vision and will ... someone who sees the future, points to the horizon and charges ahead—either compelling or inspiring others to follow. But given the complex reality of a global system of systems, this model no longer seems appropriate.

Much more, we will have to lead by listening—by attending to what these multifaceted ecosystems are telling us. We need to influence, not dictate. A reality as dynamic and complex as this must be approached with humility, and with an intent to serve, rather than to dominate. And we will need management systems that are architected for inclusion, collaboration and transparency." *— Samuel Palmisano, CEO, IBM, speaking at SmarterCities Forum in Santiago, Chile*

Eastern Promise

"Who in their right mind in the businesses that we're in is going to opt out of the world's biggest economy? I'm not going to let that happen on my watch."

—John Rice, vice chairman, General Electric Corp. speaking about China at the Ernst & Young Strategic Growth Forum 2010 in Palm Desert, Calif.

Free Trade

"The U.S.-Korea FTA is a critical step forward—it provides an important opportunity for American companies and workers to compete in the increasingly important Asian market, and levels the playing field for American businesses competing with those in Europe," *— Evan Greenberg, chairman and CEO, ACE Limited*

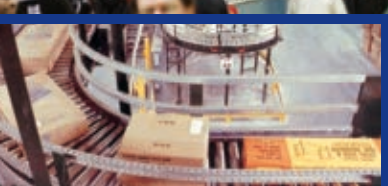
Permanent Temps?

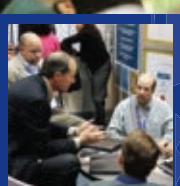
"It is not uncommon to rely on temporary talent during difficult economic times. However, this economic cycle has resulted in a more dramatic and permanent increase in contracted labor. I do not see the current levels of temporary talent decreasing in the near future." *— Adam Lawrence, head of Global Sourcing, SAP*

Flight Risk

"By squeezing resources tighter in response to the near-term downturn, companies risk losing passionate employees. These individuals will play a critical role in sustaining the extreme performance improvement required for firms to survive and succeed beyond the recovery. Unfortunately, as the recovery picks up steam, these very employees are likely to be the most at risk for fleeing for better employment platforms."

— John Hagel, co-chairman, Deloitte Center for the Edge





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