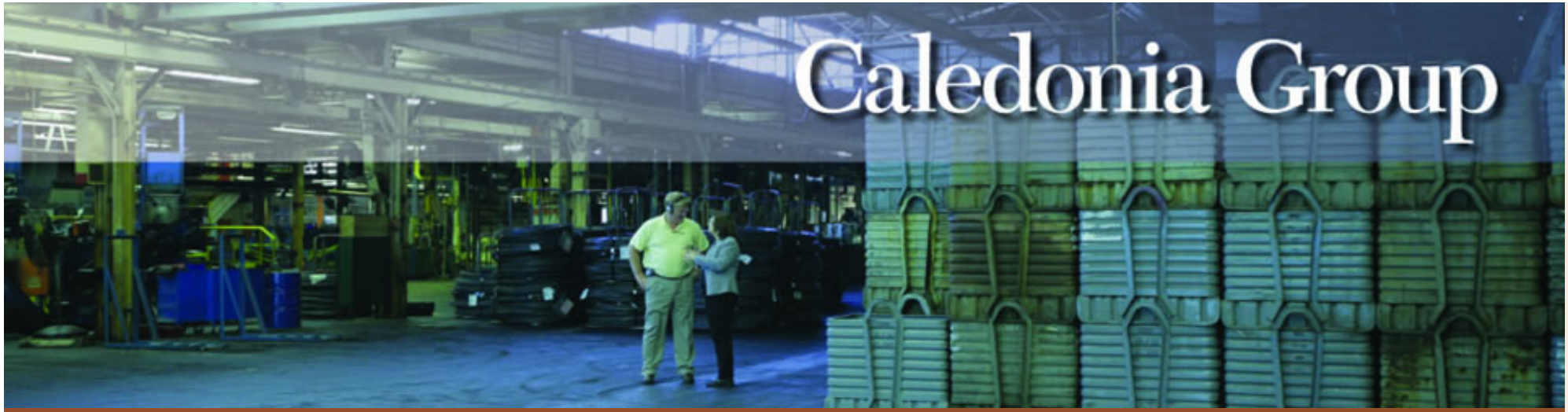


Username:

Password:

Login

Click to download this site as a PDF

Detroit-based **Caledonia Group Inc.** is a consulting firm that works mainly with private equity funds and the management teams at their portfolio companies to dramatically increase EBITDA, reduce capital requirements, mitigate downside risks, and achieve higher exit multiples.

Caledonia engagements are driven by lean principles pioneered by Toyota. Lean addresses performance in all areas of a business and dramatically reduces costs (mainly by eliminating "waste" and establishing self-managed systems) while driving world-class quality and customer satisfaction.

Caledonia was founded in 1991 as Watson & Associates and incorporated as Caledonia Group in 1995. Caledonia's 15 full-time consultants include operating executives with years of experience in implementing lean and financial executives who are experts in lean business systems including costing and IT.

Due diligence. We have completed more than 120 due diligence engagements ranging from a few days at a company with one or two plants to several months at a $1 billion plus company with a number of worldwide locations. Our diligence reports identify cost-saving opportunities and potential risks and are often relied on in providing financing.

Lean implementations. We have completed more than 35 lean implementation engagements in which we provided hands-on assistance to existing management; in some we acted as interim or crisis management. We typically start with a lean transformation that results in a one-time permanent improvement in EBITDA margins of five to ten percentage points or more, followed by ongoing continuous improvement. These results are based on a lean business system that relentlessly strengthens competitiveness and increases cash flow. Improvement plans are metrics rich and establish accountability for both financial results and operations, and systems improvements covering safety, quality, delivery and cost.

Transitions. We have completed more than 25 engagements that address challenging transitions such as consolidating facilities, starting up new plants, launching a product, sourcing abroad,

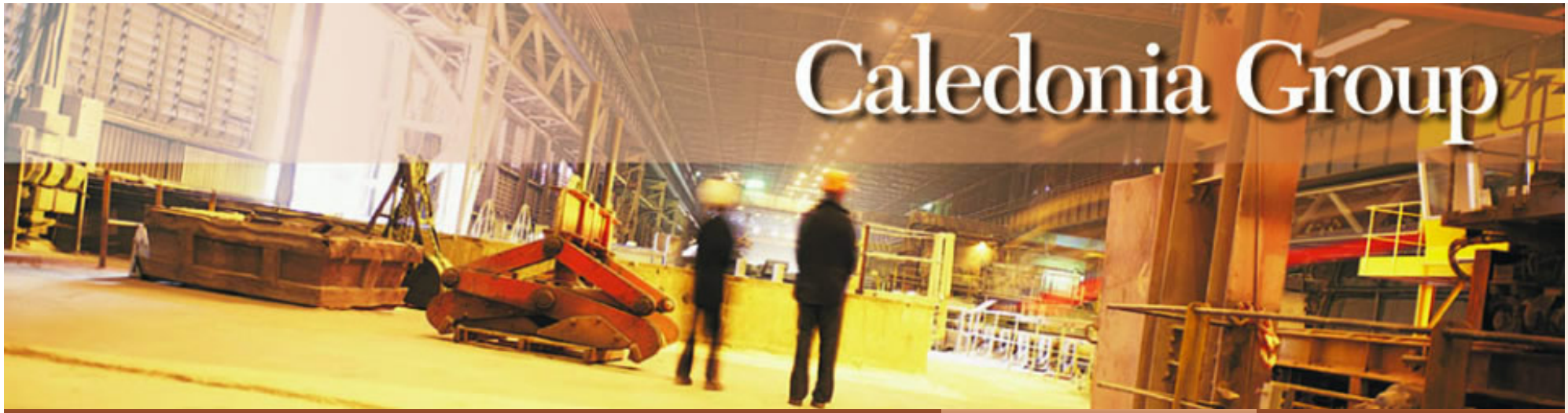
preparing an asset for sale, or evaluating an operation in terms of whether it should be supported, sold, or closed. We exploit lean principles to mitigate potential execution risks and also to achieve step-change improvements.

Caledonia engagements are driven by lean thinking—a comprehensive set of principles, tools, and rules pioneered and refined by Toyota over the last half century. Lean addresses performance in all areas of a business and is appropriate for all types of businesses whether relatively small or large, high or low volume, capital or labor intensive, commodity or mass customization, and whether union or non-union.

Lean thinking spread first to automotive (where it was dubbed "just-in-time"), then to other types of manufacturing, and finally to services. Today, virtually all companies, regardless of the degree to which they embrace lean, tout their commitment to it. The reason is simple. Implementing lean dramatically reduces costs while driving world-class quality and customer satisfaction. In short, the "leaner" a company, the more profitable; if it has a reason to exist, there's no reason not to be world-class.

Caledonia's proprietary lean assessment tools, developed and refined over 15 years, enable us to rank on a scale of 1 (well below average) to 5 (world-class) dozens of discrete activities that make up a company's major operations. Most companies we assess average 2.5, but some activities may be

a 5 while others may be a 1. Using the rankings we can quantify cost-reducing and quality-enhancing improvement opportunities, which existing management can exploit, with or without our assistance.



Chris Gutowski

Managing Principal

Caledonia Group Inc.

18530 Mack Avenue #157

Grosse Pointe Farms, MI 48236

Email: *cgutowski@caledoniagrp.com*

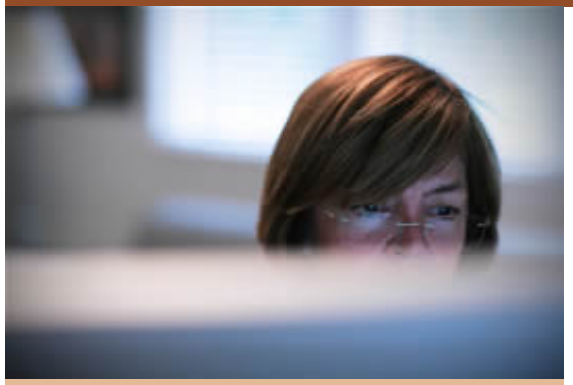
Office: 313.922.0506

Direct: 313.647.5330

Cellular: 313.350.7220

Facsimile: 313.922.0437

Toll Free: 800.922.5003



The New Standard in Operating Turnarounds: Lean Thinking?

The Journal of Corporate Renewal, December 1996

Chapter 11 Alternative:

Using Section 363 to Maximize "Going Concern" Value

The 1996 Bankruptcy Yearbook and Almanac, New Generation Research, Inc., Boston, 1996

The New Financial Capitalists: A Review Essay

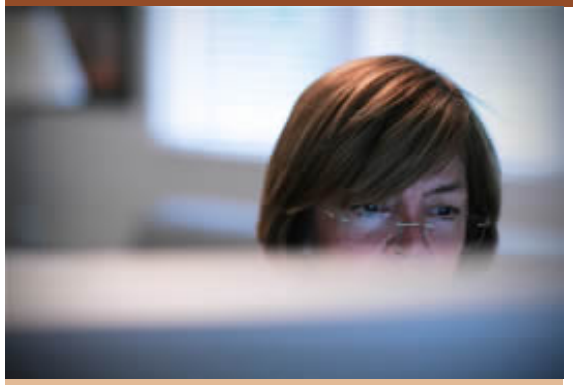
The Journal of Corporate Renewal, February 1999

How Scientific Are Your Management Methods?

The Journal of Corporate Renewal, October 1999

Material Flow Systems Are Key to Manufacturing Turnarounds

The Journal of Corporate Renewal, December 2001



The Journal of Corporate Renewal
Vol 9/No 7 December 1996
Turnaround Management Association

The New Standard in Operating Turnarounds: Lean Thinking?

By J. W. Henry Watson

The company was in crisis. It had mediocre products, poor quality, old capital equipment, too many workers, no cash, and no prospects for external financing. To survive it had to generate cash through cuts in working capital, improve quality, and dramatically increase productivity--all while spending little or nothing on capital equipment. A tall order.

In the book *Lean Thinking*, published by Simon & Schuster, James P. Womack and Daniel T. Jones describe how Taiichi Ohno and Eiji Toyda devised a turnaround strategy for Toyota Motors in the early 1950s that allowed the company to do the things it had to do to survive--and to do them within the constraints it faced. That strategy revolutionized manufacturing and now promises to do the same in services and distribution.

Another Womack and Jones' book also with Daniel Roos, titled The Machine That Changed the World, popularized the term "lean production" to describe The Toyota Production System; lean because it continuously does more and more with less and less. The 1990 book reported on the findings of a $5 million MIT study that examined most of the world's major automobile assembly plants. The study showed the very large advantages accruing to companies that effectively implement lean production methods compared to those (Nissan, for one) who do not. In productivity, for example, the advantage was about two to one. The study's findings have stood up under a barrage of criticism. The book sold more than 400,000 copies and was translated into eleven languages.

I believe that *Lean Thinking*, which buries the notion that lean production is only about making cars, is destined for perhaps even greater success. It makes an effort to apply lean thinking to virtually every aspect of business and to virtually every type of business. An important difference from their 1990 book is the emphasis on implementing lean thinking at so-called "brownfield" sites--by definition a place where turnaround professionals are likely to find most of their clients.

Eliminating Muda

The essence of lean thinking is the optimization of the entire enterprise through the systematic elimination of waste (*muda* in Japanese). In manufacturing, waste includes inventory, scrap and rework, unnecessary motion and waiting, over-capacity and over-production, excessive maintenance, and excessive material handling. This sounds pretty mundane, but it incorporates things such as "one

piece flow," the notion that demand should *pull* supply through the system, and numerous other concepts that are quite alien to mass production's traditional batch-and-queue processing systems.

Implementing lean thinking methods is not easy. Management and workers have a natural resistance to radical new ways of thinking and doing things, especially when the new ways are counter intuitive. Taiichi Ohno of Toyota, the intellectual developer of lean thinking and its most committed (some say ferocious) implementer, is fond of saying: "Common sense is always wrong." Lean methods do defy common sense. (At Caledonia Group, we know clients are beginning to get it when they become angry and outraged.) Implementing lean thinking concepts also requires someone who has done it before. You can't hold a book in one hand and implement lean methods with the other.

The advantages of lean methods, however, can be truly astounding. For this reason, lean thinking concepts deserve serious attention by turnaround managers.

Those familiar with the automotive industry are well aware that lean production launched Toyota on a path of rapid growth and increasing efficiency. Toyota has stayed on that path by continuing to aggressively refine and exploit lean ideas and methods and by encouraging its suppliers to implement lean methods. Today, it is among the most admired companies in the world and arguably the most imitated.

By the early 1980s, Toyota had become so efficient and so resilient to recessions that many other car companies, first in Japan and later in North America, were forced to adopt lean production methods. Ford's turnaround in the early 1980s is attributed in part to effective implementation of some lean methods. When GM, Chrysler, and Porsche found themselves in deep trouble earlier in this decade, they too moved aggressively toward lean production, and today credit it with playing a major role in their spectacular turnarounds. European car companies, recently feeling for the first

time the direct competition from companies using lean methods, are also moving to lean production.

In *Lean Thinking*, Womack and Jones cite an MIT study that found in 1994 that the average U.S. car plant lagged Toyota in productivity by 35%, had twice as many defects per car, and had 69 inventory turns a year, compared to Toyota's 248. (If the Big Three car makers had increased their inventory turns to Toyota's level in 1994, they could have freed up more than $100 billion in working capital.) In the supplier base, the differences are even greater. Toyota's tier one suppliers, for example, have only five defects per million, compared to the U.S. average of 260 defects per million. This information is not as discouraging as it may seem. U.S. performance in 1994 was far better than five years earlier, and the gap has narrowed significantly during the past two years.

Five Turnaround Case Studies

Womack and Jones describe *Lean Thinking* as a how-to manual for implementing lean methods throughout the enterprise and in a wide range of industries. The book includes five detailed case studies with the first three in the U.S.: Pratt and Whitney (jet engines), Wiremold (electrical components); Lancaster Technologies (stretch-wrap systems); Porsche (auto manufacturing) in Germany; and Showa Manufacturing (a job shop that makes boilers) in Japan. These are among the most compelling turnaround cases ever published.

All five companies were in desperate trouble and were transformed into profitable industry leaders, while operating under constraints similar to those faced by Toyota in the early 1950s. Their successful recoveries provide convincing evidence that lean ideas and methods should probably be the centerpiece of operational turnarounds.

Why are lean methods more likely to be considered by troubled companies than by profitable ones? Some years ago, Taiichi Ohno said that companies making even a modest profit never adopt lean

production methods, while "nearly bankrupt companies implement lean production to the fullest, knowing they won't lose much even if it fails." There's simply no getting around the fact that many companies today, like Toyota in the early 1950s, often adopt lean production because all other options for staying in business have simply run out.

What is Lean Thinking?

There is no brief definition of lean methods that quickly illuminates what it encompasses, especially to those with little familiarity with it. Perhaps the lack of a brief definition is one reason it took more than 30 years for lean ideas to be widely adopted outside of Toyota. Womack and Jones condense the key elements for eliminating waste into five concepts: specify value, identify the value stream, flow, pull, and perfection.

1. Specify value

Lean thinking starts with specify ing value. If you don't know what customers value, there is bound to be waste, and the way to find out what customers value is to enter into a dialogue with them. This step is the least controversial but, often results in major advances. For example, Wiremold, a middle market manufacturer of electrical components, found that their customers (electrical contractors) placed a high value on ease of installation and appearance. Their program to design (for the first time) ease of installation and improved appearance into their products soon resulted in a significant competitive advantage.

2. Identify the value stream

Next, one identifies the value stream by mapping out every individual step involved in the process of physical production and order-taking. This step forces management to switch their attention from departments and processes to specific goods and services. It also focuses attention on every step of

the production process instead of just the part handled within a firm. Every action is then categorized by whether it adds value or not. For example, waiting, material handling, wasted motion, transportation, and scrap and rework, add no value. Anything that does not add value is waste. Some waste can be eliminated forthwith. The turnaround at Pratt and Whitney provides an example. Mapping of the value stream revealed that titanium and nickel ingots for its jet engine parts, produced two tiers up the supply chain, were often so large that 90% of the material was wasted in the machining process. Right-sizing the ingots dramatically reduced costs.

3. Flow

Eliminating remaining waste requires improving operations that is achieved using flow, pull, and perfection. Consider flow, also known as synchronous manufacturing. A process flows when all of the essential steps needed to get a job done [are] in steady, continuous flow, with no wasted motions, no interruptions, no batches, and no queues. Flow generally means organizing production in cells that include operations normally distributed across several departments, and operating each step in the process at the same rate. Here, the resistance rises substantially because it means that traditional high technology mass production systems are out, which also means that capital intensity and automation fall. No "lights out" factories here.

Pratt and Whitney provide a wonderful example. The company was grinding turbine blades for its jet engines with an $80 million custom-made German grinding system. The system was ultra high-tech with robotic material handling systems and used virtually no direct labor. In converting to lean production, the system was scrapped and replaced with a much simpler one costing $12 million. Each cell in the new system had eight standard, three-axis grinding machines and two wire EDM machines. Actual processing time rose from three minutes to 75 minutes but work flowed the entire 75 minutes. The space used was cut 60%. Batch size was cut to 1 from 250. Inventory was cut by more

than 99%. Changeover time was reduced to 100 seconds from one day, and all-in grinding costs were halved. The final result: total cycle time was reduced to 75 minutes from 10 days. The inventory reduction paid for the capital investment. Economies of scale were eliminated. The new system was a key element in transforming Pratt & Whitney from among the walking dead to the world's low-cost producer of jet engines. The change exemplifies the concept of radical improvement (*kaikaku* in Japanese)--just what the turnaround manager and the troubled company need.

Lean Thinking makes a real contribution in developing the concept of *kaikaku*. The bulk of the literature on lean methods emphasizes continuous improvement, but the ability to make an initial quantum leap in efficiency and quality is not well articulated. It's the ability to achieve rapid one-time improvements that has increased the relevance of lean thinking in turnaround situations.

The elaborate monuments such as the original grinding system at Pratt that are highly complex and minimize labor input at all costs, are the hardest problems to fix. Many such systems were installed at GM in the 1980s at a reported cost of $50 billion. Most cannot be employed in lean production, and many are being scrapped. The recent disaster at Foxmeyer's new distribution center appears to be in the same vein. In the Foxmeyer case, the start-up was a nightmare and the company turned out to be beyond reorganization.

4. Pull

At its simplest, pull means that no one upstream should produce a good or service until the customer downstream asks for it. When flow has been implemented, each unit in a cell only makes another part when the next unit needs it. No more batches and no more waiting. When coupled with properly implemented flow, lead times are slashed. For years, Toyota has delivered specially ordered cars in a week, compared to an average of at least 70 days for typical U.S. producers. Pull cuts inventory sharply, and results in production that matches demand. The book provides two excellent

mini cases on pull that deal with both distribution and manufacturing in an integrated way.

5. Perfection

The pursuit of perfection (*kaizen* in Japanese) is the final important element in eliminating *muda* or waste. It is a bit less relevant than *kaikaku* (radical improvement) for the turnaround manager because it really becomes important after the crisis has passed. Still, the improvements quickly add up. The book gives an example of a specific part made in a U.S. factory. Seven rounds of *kaizen* efforts during a three-year period increased parts per employee per shift to 600 from 55 while using only half floor space. Capital spending: $1,000. Perfection, however, is not easily achieved. Toyota still has much progress to make and only recently applied lean thinking to its U.S. service parts operation. Sometimes a little encouragement helps. Thus the Big Three now routinely cut supplier prices over the life of a part with the expectation that *kiazen* exercises will keep the supplier profitable.

Smashing Inertia

The book rightly emphasizes the importance of smashing inertia to get started and provides a gripping example at Porsche. Porsche was the most distressed company among the case studies. In 1993, production had fallen to 14,000 units a year from 50,000 a year in 1986. 'When Porsche first began to seriously address its problems in early 1992, its losses were more than 10% of sales and rising fast. The balance sheet was a disaster. If it had been an American firm, it would have been in Chapter 11 and struggiing to get DIP financing. Porsche's German turnaround manager, inspired by the *Machine* book, turned to Japanese experts on lean thinking as the only viable alternative.

On arriving at Porsche in the fall of 1992, the senior Japanese teacher (*sensi* in Japanese) demanded to be taken immediately to the engine assembly plant. On entering this cathedral of

German craft production, he asked loudly, "Where's the factory? This is the warehouse." 'When he was assured that he was indeed in the engine assembly area, he insisted that drastic improvement activity begin immediately. The first step was to get rid of the mountain of inventory. He demanded that the wooden shelves holding the inventory be chopped in half and handed a circular saw to the chairman of Porsche and ordered him to personally saw every shelf in half. The result: in-process inventory was cut to seven days from 28 days.

It's common (though not for turnaround managers!) to be skeptical of the benefits of radical inventory reduction. The benefits do, however, go well beyond reducing working capital and space requirements. Inventory hides problems. Cutting inventory is like draining a lake. All the junk at the bottom becomes visible and can be dealt with.

The great strides Porsche has made since 1992 in implementing lean production methods have indeed brought it back from the dead. Productivity doubled, defects in supplier parts declined by 90%, in-process time for a car shortened to five days from six weeks, and parts inventories were cut 90%. What is more, two new products were developed in three years. Previously, Porsche took seven years to develop a new product. Perhaps most incredible to those who know and love Porsches, the new models are relatively easy to service.

Conclusion

At this point, you may be tempted to say enough fairy tales from another management guru. But claims for originality by the authors of *Machine* and *Lean Thinking* are refreshingly modest. Also, Caledonia Group's direct experience supports the claims made for implementing lean methods. The authors are not the creators of lean thinking, but simply excellent reporters and researchers. (They do consult, but their consulting work is not featured in the book.) The methods they champion have steadily improved for 45 years and now account for a significant and rapidly increasing share of

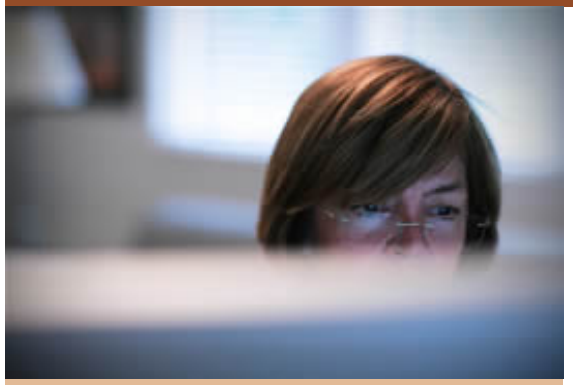
world manufacturing production. Lean thinking is also behind the current logistics revolution in distribution. There is even a trend to implement lean thinking in law firms.

The authors are quite sensitive to guru backlash and are careful to distinguish lean thinking from reengineering, for example. They make a compelling but understated case that reengineering is a botched mutant of lean thinking.

The book, in emphasizing seriously troubled companies to illustrate the improvements that lean methods can achieve, tends to leave the impression that lean methods are adopted only by companies on the brink of collapse. In fact, profitable companies of all sizes are embracing lean thinking. The Big Three, for example, are pushing lean production fairly successfully through their supplier base, even as they continue to improve their own implementation efforts. The book is also some what sketchy on many of the nitty-gritty details of implementing lean methods, particularly in businesses outside the manufacturing sector.

Overall, a careful reading of this book should convince you that lean thinking is not a passing fad. Rather, it is a uniquely powerful tool for improving the balance sheet and bottom line of virtually any business. For a troubled company with a clear reason to exist (that is, it has an asset or product with more value when employed in the business as a going concern than otherwise), lean thinking may provide the key to quickly returning it to viability.

J. W Henry Watson, a management consultant, is a principal of Caledonia Group Inc., a national consulting firm that provides a broad range of corporate recovery services. Mr. Watson, who holds a PhD in economics, was formerly on the faculty of the University of Chicago Graduate School of Business.



NEW GENERATION RESEARCH, Inc.

1996

THE BANKRUPTCY YEARBOOK & ALMANAC

Chapter 11 Alternative: Using Section 363 to Maximize "Going Concern" Value By Selling all the Debtor's Assets Outside a Plan of Reorganization

By Ida L. Walters and Robert W. Kamphuis, Jr.

Introduction

International Research and Development Corporation (IRDC) of Mattawan, Michigan (near Kalamazoo), is one of the world's leading contract research laboratories performing animal safety evaluation studies for drug, chemical and agricultural clients. Established in 1962 by Dr. Francis X. Wazeter, a pharmacologist, IRDC grew quickly and prospered, earning between $3 and $5 million a

year. In 1989 it had a market capitalization of $93 million.

Then its troubles began. Though a publicly held company for two decades, the Wazeter family owned about 25 percent of the 5.6 million shares outstanding, placing it in firm control. The founder's son became chief operating officer in 1990 and president in 1994. The founder remained chairman and CEO. There was, as there often is in these cases, the corporate jet, the Florida condo, the leased German luxury cars, and the generous expense accounts. There was also, in 1990, the skin care products company in California, acquired for $20 million and financed mostly with bank debt. This acquisition was a disaster and the major reason for the company filing for bankruptcy in the fall of 1995.

There were other problems, of course. Serious accounting fraud at the skin care products unit, discovered in early January 1995, affected the results of the previous two years, but how badly wasn't known until spring 199 [sic]. The SEC and FBI began investigations. A turnaround manager was put in charge of operations in early February, but the company was deeply insolvent and being kept afloat by the secured lender whom was owed more than $20 million and fast losing patience. The founder's son was dismissed in late January, the founder in mid-May, and IRDC stock was delisted from NASDAQ on May 31. These events kept the glare of negative publicity focused on the company for months, making reassuring customers and finding a buyer much more difficult.

What makes this case instructive, however, is not the extravagance nor the mistakes and missteps that pushed the company into bankruptcy. Rather, it is the combination of critical elements and strategies that ultimately produced an outcome that was superior to anything that would have been predicted by those close to the situation during the months that IRDC teetered on the brink of collapse. In fact, as more fully described below, the bankruptcy of IRDC was resolved in a way that maximized the "going concern" value of the assets--assets that would have otherwise been virtually worthless, and preserved 300 jobs. As such, the IRDC case provides a model for how an efficient

bankruptcy process should work.

What were the three critical elements and strategies that made a huge, positive difference in the outcome of the IRDC bankruptcy?

1. A set of comprehensive financial projections and analysis that credibly estimated the capital needed to take the company forward and explained why IRDC's balance sheet had deteriorated so rapidly over the previous 18 months. These projections and analysis provided persuasive evidence that IRDC's research business had the potential to make a dramatic recovery.

2. A strategy that involved filing in Delaware under Section 363(b)(1) of the Bankruptcy Code, which maximized the "going concern" value of the assets by allowing the debtor-in-possession to greatly expedite the bankruptcy process. The assets of IRDC's skin care products subsidiary, for example, were sold 21 days after filing; the contract research assets were sold five and half weeks after filing.

3. The fortuitous passing on June 5, 1995 of a new environmental law in Michigan that, among other things, imposed liability for environmental clean up only on those "responsible for an activity" causing the contamination. Prior to this, anyone in the chain of title after contamination occurred was potentially liable. Under the new laws, IRDC's assets could be sold largely free of preexisting environmental liabilities.

The Situation

In 1985 IRDC established a subsidiary, IRAD, in Ft. Myers, Florida, to perform clinical safety evaluation studies of drugs and other compounds on humans. The founder ran IRAD, leaving his son in charge of most of the company's other activities. In 1989 the company acquired Medical Surgical

Specialties, a small supplier of medical devices located in Kalamazoo. Carme, the California skin care products company was acquired, as noted above, in 1990 for $20 million.

Shortly thereafter, Carme's sales fell sharply and the unit continued to perform poorly. In the first place, it was less than brilliant for a company that performs animal safety studies for cosmetic companies, among others, to acquire a company that touts its products as not having been tested on animals. As word of this got around, sales collapsed. Cooking the Carme books by recording non-existent sales began in early 1993 and continued through most of 1994.

In addition, because of the attention lavished on Carme, the contract research business and other subsidiaries were neglected. In the first quarter of 1994 the company began experiencing significant cash flow problems and delayed paying bills to suppliers and others. Some bills weren't paid, triggering lawsuits. Its operating losses in 1994 amounted to more than a quarter of operating revenues. In 1992, the most recent year in which the financial statements of the company are not affected by the accounting fraud, it had operating revenues of $40.2 million.

When turnaround manager Michael Feder, a principal of Stratford Partners in Chicago, took over as acting president in early February, the company was insolvent and customers were deeply concerned. They had made large upfront payments for studies that in many cases had years to run before being completed. Some even threatened to withhold money still owed to offset potential losses if IRDC shut down. The secured lender recognized that IRDC's assets had value only as a going concern, and so bit the bullet and funded the company's cash flow shortfalls.

The turnaround manager immediately took measures to stabilize the situation and calm customers. IRAD, the subsidiary in Florida, was closed, saving the company $75,000 a month. The corporate jet was sold and the fancy company cars sent back. He called on creditors and customers, attended scientific meetings to assure groups of customers and potential customers that the situation was

being stabilized, and sought a buyer for Carme, which the IRDC board, in early February, had agreed to sell. All this contributed to a sharp fall in employee turnover at the contract research business.

It wasn't until early April, however, when financial information for 1994 became available, that Carme could be more aggressively shopped. An investment banking firm was retained to find a buyer. By late April, at the behest of the secured lender, buyers were also being sought for the contract research business and the small medical devices subsidiary. By early summer, the company was in negotiations with a buyer for Carme (which eventually sold for $3.7 million) and prospects for selling the medical devices unit, which had positive cash flow, were considered good.

The real challenge was the contract research business. The company's scientific reputation had remained stellar, despite its financial problems. Given this and the company's earlier history, it was reasonable to assume that, freed of the excessive debt burden and managed properly, it could again be a profitable business. But in the late spring and summer of 1995, IRDC's affairs were such a tangled mess that potential buyers couldn't see their way clear, given the lack of hard information and the uncertainties this caused, to spend money on due diligence. Not even strategic buyers, who presumably knew the business, and several expressed strong interest, could cut through the fog. (One of them subsequently purchased a smaller, less capable contract research laboratory for a price that was more than five times greater than the price ultimately paid for IRDC's contract research assets.)

The fact is, few things compromise the going concern value of a company, or put off potential buyers, more than serious accounting fraud and the pathetic financial systems and controls usually associated with it. Potential buyers were rightly concerned that little reliable information was available for developing credible pro formas and that the recent historical information was tainted. Moreover, millions of dollars had disappeared rapidly--far more than could be ac counted for by IRDC's known financial problems and executive extravagance. What was going on?

Another big uncertainty was potential environmental liabilities. IRDC was on Michigan's list of contaminated sites and the permit for operating its substantial sewage treatment plant, which showed severe maintenance problems, had expired in 1990. No useful information about the extent of environmental contamination was available. As a result, the costs associated with remediation could only be guessed at.

Yet another big uncertainty: whether or when the secured lender (which at the time was in the process of being acquired by a foreign bank) would simply run out of patience and cut its losses. With a host of unsecured creditors and with lawsuits of all sorts mounting, no buyer was likely to consider purchasing the company's assets except out of bankruptcy, normally a lengthy process.

As if all this weren't enough, passing the PETA (People for the Ethical Treatment of Animals) protesters at IRDC's front gate was a forceful reminder that animal testing is a type of business that is politically incorrect. This tended to discourage all but the hardiest potential investors. (It didn't, however, discourage William U. Parfet, former president of Kalamazoo-based The Upjohn Company and great-grandson of Upjohn's founder, nor Gerald Mitchell, former executive vice president and head of research at Upjohn. Parfet and Mitchell are principals of MPI Research LLC, which ultimately acquired IRDC's research assets. Upjohn had long been a customer of IRDC.)

Understanding the Financials

In a first cut at getting a grip on the research business's financial situation, Caledonia Group principal Harry Watson and his team of financial analysts found that IRDC had two additional problems that were compounding the typical problems of an insolvent company. These related strictly to the nature of the contract research business. First, it is the kind of business that depends more than most on the confidence of customers. Animal safety evaluation testing of drugs and other compounds is simply without value unless the studies are completed and strict protocols are followed. Also, it is a business

in which customers pay largely up front, rather than on completion of the contract. This results in a very unusual relationship between cash flow and revenue, as the major expenses related to research contracts are largely concentrated at the end of the study.

This led to the second problem. Cash flow in the contract research business is radically divorced from revenue earnings, the exact opposite of what one finds in virtually all other businesses. This is a business that sucks cash when it shrinks and gushes cash when it grows. There was a further complication. Research studies can last anywhere from a few days to a decade, and the relationship between cash flow and revenue is vastly different for studies of different lengths.

Watson was able to model the various relationships, validate the models by replicating the historical record, and thus demonstrate cash needs going forward. The unaccounted for millions? Actually, it turns out they were expended in liquidating large unbooked liabilities at a time when contracts for new studies (because of IRDC's well publicized and mounting financial problems) were either falling or were too short-term to generate net cash. Not understanding this would play havoc with the traditional turnaround approach because that approach normally takes as a given that shrinking a troubled company generates cash. Yet shrinking IRDC's research business would have greatly worsened the problem rather than improved it. Feder's difficult achievement in growing the company's sales, which were 30 percent higher in the second quarter of 1995 than in fourth quarter of 1994, provided much needed breathing room and helped keep the secured lender from bolting.

Based on his analysis, Watson later develop pro formas that would enable the buyer to fully understand the capital requirements needed to return the company to stability or breakeven, and also to grow it under various scenarios regarding the mix of contract types and lengths.

Expediting the Bankruptcy Process

One option considered for effecting the transfer of the research unit's assets was for IRDC to surrender them to the secured lender who in turn would sell them to the buyer. This had the clear advantage of curtailing the deterioration of the assets that would likely occur during a lengthy bankruptcy process. The main disadvantage, of course, was that the sale would lack the extra legal protection that bankruptcy confers. But neither IRDC's directors, nor the buyer, wanted to expose themselves to greater legal risks.

For these reasons, Section 363(b)(1 of the Bankruptcy Code (here abbreviated S363) was explored. S363 provides that the trustee or debtor-in-possession "after notice and a hearing, may use, sell, or lease, other than in the ordinary course of business, property of the estate." This makes possible a quick, convenient, and economical disposition of assets outside of a reorganization plan.

Bankruptcy judges in Delaware are amenable to expedited S363 sales because such sales tend to maximize the going concern value of insolvent businesses. When a company is collapsing, as IRDC was, every day in limbo worsens the situation, whereas a quick sale maximizes the return to creditors. In an expedited S363 sale, two things get separated: (1) disputes among various creditors' claims, and (2) maximum recovery by creditors as a class. A traditional plan of reorganization, on the other hand, forces these issues to be jointly addressed. In the IRDC case there was little for creditors to dispute, as the lone secured lender, whose claim took precedence, would not recover its entire claim. But even if there had been disputes among creditors, the sale could have gone ahead rapidly, and the courts could have dealt with any disputes in due course and under full judicial review, with all parties having an opportunity to fully pursue their remedies.

S363 sales are underutilized because, outside Delaware, they normally take three to five months. Even in Delaware there are only about half a dozen S363 sales a year. The precedent supporting "expedited" S363 sales was established on appeal of the Abbotts Dairy case, Third Circuit Court, 1991. The model for expedited S363 sales in Delaware was established in 1992 when Days Inn filed for

Chapter 11 with a deal in hand and a first day motion to approve the bidding procedure; all went quickly and smoothly.

With an expedited S363 sale, it is essential that all due diligence is completed prior to filing. In the IRDC case, however, given the substantial uncertainties, there was a real question as to whether devoting resources to due diligence made sense. Mayer Brown & Platt in Chicago, which performed the legal due diligence for the buyer and provided bankruptcy advice, was able to establish early on that major problems were unlikely to arise in the course of legal due diligence. With regard to the many contracts, permits and the like covering the long-term research studies, for example, they were able to quickly determine that these would transfer in a S363 sale.

Qualifying for a S363 sale isn't easy, but for debtors who qualify, the whole process can be over in a few weeks. To qualify, the debtor's assets must be wasting and there must be a consensus of the major parties at interest. Given this, Delaware bankruptcy judges fast-track the process, with the goal of maximizing the going concern value of the assets.

The debtor who files a motion for a S363 sale must be able to demonstrate good faith--no sweetheart deals for existing owners or top management, for example. In the IRDC case, for example, it was a positive that the debtor was being run by a turnaround professional who had no real stake in the outcome one way or another. Also, all parties at interest, including all potential investors who had expressed an interest in, or been approached about, buying the assets, must be properly noticed. As a practical matter, a successful S363 sale in Delaware needs the support of creditors. When this is lacking, the motion for a S363 sale is almost always denied (as it was in the well-known Lomas case).

While there are some similarities between a S363 sale and Chapter 11 prepaks, the fundamental difference is that the prepak is a plan of reorganization, whereas under a S363 sale, all the assets are sold outside a plan of reorganization. In addition, a S363 sale is relatively simple, quicker than the

quickest prepak, generally costs substantially less, and doesn't usually require the same degree of consensus as a successful prepak.

Dealing with Environmental Problems

In virtually every state, including Michigan until very recently, there has been a scheme of strict environmental liability, often coupled with impractical clean-up standards. The result is inequitable burdens on innocent parties, restricted redevelopment of usable, contaminated property, and money wasted on transaction costs and remediation activities that are often of little or no benefit to human health or the environment. The new Michigan law reflects a national movement to reform environmental regulations so as to encourage the use of so-called "brown field" sites.

In particular, environmental liability problems have been a significant deterrent to the swift and efficient reorganization of troubled enterprises. Even in asset sales the environmental liabilities are attached to the real assets being sold, thereby defeating one of the core reasons for Chapter 11 to exist in the first place—to separate liabilities from the assets so that the assets may continue to be used efficiently. Many of the noteworthy bankruptcies of recent years have been extended greatly by the need to provide a way for addressing environmental liabilities for the successor entity in a reorganization or the purchaser in an asset sale.

On June 5, 1995, roughly five weeks before the ultimately successful buyer became interested in the assets of IRDC's contract research business, Michigan's new and path-breaking environmental law became effective. One result is that now clean-ups can be expected to proceed more quickly and at a lower cost, while continuing to assure protection of public health and the environment. Liability is no longer imposed strictly, but only on those responsible for the activity that caused the contamination.

Of course, the environmental laws that created so many intractable problems were not specifically

aimed at bankruptcy. And the solution, which the new Michigan law embodies, isn't either. However, the positive effects of the new Michigan law on bankruptcies are every bit as important as the negative effects of previous environmental laws. The new Michigan law allows assets to be sold largely free of preexisting environmental liabilities, with those responsible for the contamination remaining on the hook. Prior to this, in many cases the inability to cleanse businesses of environmental liabilities had often made reorganization impossible, entrenching underperforming management.

It was key for the buyer to understand the implications of the new environment rules before moving forward, especially given the absence of any meaningful environment audits. Attorneys at Warner Norcross & Judd LLP in Grand Rapids, Michigan were active in the legislative process that led to the new environmental law, and were able to quickly provide the requisite level of comfort that the new laws could be used to great effect in the IRDC transaction. They were also able to quickly establish that IRDC's problems with permits and the like could be cost-effectively resolved.

Closing the Deal

The initial work and insights of Caledonia Group, Warner Norcross, Mayer Brown & Platt and others were able to dispel the fog of uncertainty over IRDC's basic situation and prospects, and make it possible to articulate a clear and cost-effective plan for quickly validating their initial work and insights through a complete due diligence effort. Thus, the Parfet interests were able to proceed with a high degree of confidence that, when completed, full due diligence would support a concern acquisition of IRDC's research assets at a price acceptable to the secured lender. Caledonia Group initiated negotiations with the lender and the price settled on, $6.1 million, was the price paid for these assets at the bankruptcy auction.

Under management by Caledonia Group, full-scale due diligence quickly got underway. This

included comprehensive pro formas, legal and environmental audits, and the like, and an audit of the facility to determine the costs of the improvements needed to satisfy federal and state regulators. When completed, there were no surprises; the final results accorded with expectations. Given that no other potential investors had performed, or were performing due diligence on the research assets, the Parfet interests were confident of prevailing.

On September 26, IRDC, represented by Young, Conaway, Stargatt & Taylor, a Wilmington, Delaware law firm experienced in S363 sales, filed for Chapter 11 with a first day motion for a S363 sale. Everything was in order and the proceedings progressed quickly despite several legal challenges. Motions for temporary restraining orders and injunctions, for example, were filed in various jurisdictions. None were granted. One objecting party who filed in Delaware was given the option of a quick hearing, but was advised by the judge that his chance of succeeding on the merits of his case were slim. The party withdrew.

Conclusion

On November 2, 1995, MPI Research took over IRDC's contract research business. In mid April 1996, as this book goes to press, the business was progressing as expected, and the Village of Mattawan's largest employer and biggest taxpayer looks forward to a prosperous future, its 300 jobs now secure.

The assets of IRDC's contract research business, the skin care products unit, and the medical devices unit (which didn't have a buyer going in) were sold to different buyers at the bankruptcy auction. The proceeds, which totaled about $10 million, enabled the secured lender to recover nearly half of what it was owed, far more than would likely have been recovered under any other alternative.

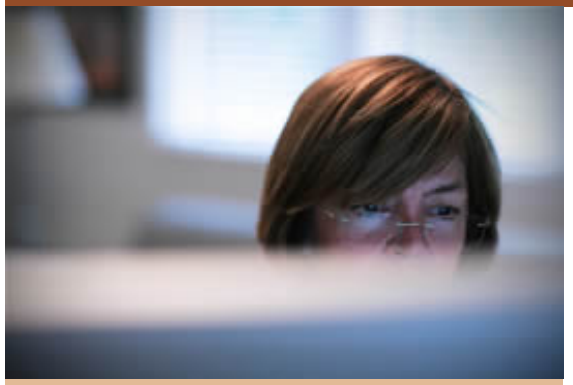
It is often said that expedited S363 sales are relatively common in Delaware because Delaware has a bias toward debtors. We haven't seen any such bias with respect to the S363 sales we're familiar

with. Like IRDC, typical S363 debtors in Delaware, whether owners or managers, are out on the street in three to five weeks, with pockets empty. A S363 sale also keeps professional fees lower, by a wide margin, compared to alternatives.

In fact, the sine qua non of debtor favoritism is the sometimes endless extensions of exclusivity so often granted to Chapter 11 debtors, while creditors are held at bay, often for years. Such practices have been eroding the goals of bankruptcy for some time. Where appropriate, as in the IRDC case, a S363 sale is a powerful tool in advancing bankruptcy's ability to separate the good elements from the bad elements and put the good elements quickly back into productive use.

Ida L. Walters and Robert W. Kamphuis, Jr. are principals of Caledonia Group Inc., a Detroit-based management consulting firm specializing in implementing lean production. Caledonia was the adviser to William U. Parfet, a principal of MPI Research LLC, which acquired the assets of IRDC' s contract research business out of bankruptcy in early November 1995.

The 1996 Bankruptcy Yearbook & Almanac **Pages 333-337**



The Journal of Corporate Renewal
Vol 12/No 2 February 1999
Turnaround Management Association

The New Financial Capitalists: A Review Essay

by Robert W Kamphuis, Jr., Principal, Caledonia Group Inc.

The New Financial Capitalists: Kohlberg Kravis Roberts and the Creation of Corporate Value *by George P. Baker and George David Smith (Cambridge University Press, 1998, 275 pages, $24.95).*

Churchill observed that people have a remarkable ability to stumble upon truth and then to pick themselves up and pass it by. Though founded in 1977, the impact of Kohlberg Kravis and Roberts and the broader LBO phenomenon on American business was already recognized in the early 1980s. "This massive corporate restructuring may simply be a fad, the brainchild of a few enterprising

researchers in 1984. But they added: "However, the empirical findings suggest that these restructuring transactions create significant value for stockholders. Such widespread changes may in fact reflect a major development in the evolution of the corporate form--an evolution toward greater efficiency, toward a corporate structure more effective in generating and storing value for stockholders."

Tracking the History of KKR

More than twenty years have passed since KKR was founded and there's now an ample track record to assess the early promise discerned by research economists. Returns on investment for KKR have been 28.2 percent per annum in gross terms from 1977 through 1997, while KKR's limited partners have realized $22 billion in cash on a total cumulative equity investment of $10.9 billion in 58 companies, with an estimated $18.1 billion still unrealized.

Now, George P. Baker and George David Smith, two business school professors (Harvard and New York University, respectively) have written *The New Financial Capitalists: Kohlberg Kravis and Roberts and the Creation of Corporate Value*. As they see it, the KKR approach has been remarkably consistent throughout the firm's history. In 1983 Henry Kravis summarized it, saying: "Our approach is that we do not know how to run a company. We know that we are very good at financing, we are financially oriented. We know how to control a company and we know when it is getting off course. We know how to set long-range goals for companies and we know how to maximize value in a company."

Baker and Smith conclude that what explains KKR's results is "A carefully nurtured combination of flexible financing, strong management talent, well structured incentives, active board monitoring and constant attention to detail."

For turnaround professionals who, like KKR, are committed to creating long-term value, the KKR model is instructive. This book looks in detail at many individual deals and how they worked out (or didn't--KKR's failures get as much attention as the successes). Generalizing, the genius of KKR and the instructive model for turnaround professionals is the strategic blending of financial structure, operating improvements, incentive alignment and governance.

Financial Structure

Although today there are some 800 LBO funds, KKR more than any other is probably still synonymous with debt financing and highly leveraged transactions. LBO critics anticipated that the short-term gains of debt binges would surely be disgorged, but with some exceptions it didn't turn out that way, at least for KKR. To the contrary, debt was often paid down faster than planned. And therein lay a key to increasing value. Baker and Smith nicely summarize the basic mechanism:

> To see how this works in general terms, imagine an all-equity company that is bought for $100 million. Before the acquisition, this company generates $10 million in cash flows, just enough to give shareholders a 10 percent return. The acquisition is financed with $90 million in debt and $10 million in equity. The company is then able, through improved operations, superior asset utilization and careful capital investment, to increase cash flows from $10 to $20 million per year, *without either increasing or decreasing the value of the assets*. By paying no dividends and by using this $20 million in cash flow strictly for debt service, this company can pay down the $90 million of debt (at an interest rate of 10 percent) in about 6 years. At the end of that period the company would still be worth $100 million but it would now be all equity. In other words, the original $10 million equity investment has been transformed into one worth $100 million, for a 47 percent compound annual rate of return! [p. 60; emphasis in the original.]

As a core principle, conservative forecasts of projected cash flows available to service debt governed the types, levels and terms of a financing; all flexibly arranged to match lender preferences and the characteristics of a specific business within the constraint of the likely ability of that business to meet interest and principal payments. Debt creates opportunities for "transformations" that generate rates of return like those in the example above.

But there's more to success than borrowing, of course. Merton Miller of the University of Chicago was awarded a Nobel Prize in Economics in 1990 for his contributions as the father of modern corporate finance. Miller holds that when isolated from other factors, the mix of debt and equity in a company's capital structure shouldn't affect the company's real value. But, again, there's more. In his Nobel lecture, entitled "Leverage," he said, with characteristic modesty: "The source of the major gains in value achieved in the LBOs of the 1980s lies, in fact, not in our newly recognized field of finance at all, but in that older and long-established field of economics, industrial organizations that the LBO entrepreneurs have achieved substantial real efficiency gains by reconcentrating corporate control and redeploying assets has been amply documented." Thus Miller points us toward the other elements of the KKR approach.

Operating Improvements

For KKR, the real work of a deal begins after closing on the acquisition. A leveraged capital structure involves discipline as well as opportunity. The pressure of debt service forces management to take decisive action on short-term problems. Low-hanging fruit can't be left unharvested. On the other hand, the multi-year process of transforming debt to equity value works against profit-taking myopia. The future can't be plundered for the present. Results depend on the hard work of cost control, standardizing and rationalizing production, effective capital investment programs and the institution of administrative systems and a planning process that support continuous improvement.

Incentive Alignment

Strong management is essential to maximizing value. Further, KKR acts on the truism that people perform in accordance with what they're rewarded for. Suppliers, customers, employees, retirees and the community are among those acknowledged as stakeholders in a company, in addition to the shareholders. To the greatest extent possible, KKR attempts to align these disparate interests. Effectively structured incentives tend to unleash strong performance. Thus, one KKR partner puts the matter baldly: "We make as many people in the company shareholders as we possibly can. If managers are really thinking of the shareholders best interests they will properly balance the concerns of all the constituencies relevant to the company." Through mechanisms such as phantom stock KKR works to create incentives for performance throughout the whole company.

Governance

To tie together financial structure, management considerations and operations in a KKR company, the board is run as the forum in which owners and managers meet to harmonize different perspectives in pursuit of value. Strategy is hammered out in this venue, after which implementation is closely monitored. To link back to an earlier theme, the authors observe that, "The strict discipline of debt allows for no slack, no surprises, no deviance. If a problem lurked, candor was crucial. Under buyout conditions, management became transparent."

The New Financial Capitalists is excellently written, without jargon and with much more substance than a pop business book. Its six chapters can be read independently or selectively according to a reader's interests and available time. As a company history, it's outstanding, in part because it avoids both the congratulatory whitewash and the kiss-and-tell focus on personalities that characterize so much of the genre.

With so much in favor of KKR, Baker and Smith feel compelled to account for the hostility that the firm and LBOs generally have engendered. Insight is drawn from a seminal economist: "Entrepreneurs are, after all, agents of creative destruction, as Joseph Schumpeter so aptly labeled the processes of change that they set in motion; their successes invariably upset existing social arrangements, transferring wealth and power from old to new sectors of the economy."

But there's a somewhat different, better way to look at the role of such entrepreneurs. Baker and Smith open their book with a quote from the same economist, Joseph Schumpeter: "Economic progress, in capitalist society, means turmoil." A technical name for this turmoil is disequilibrium, a phenomenon studied by Theodore Schultz, another of the University of Chicago's great Nobel laureates.

Building on Schumpeter's insight, Schultz recast the role of the entrepreneur. Rather than causing disequilibrium, Schultz saw the entrepreneur as restoring equilibrium when things went wrong. Of course, finding ways to restore equilibrium virtually defines professional life in the turnaround business. Although the urgency of bankruptcy and crisis resolution often limit attention to the immediate and the short-term, the example set by KKR points turnaround professionals toward ways to achieve long-term, sustainable value.

For many situations, however, leverage isn't an answer. KKR itself has looked in a disciplined way for companies with sufficient cash flows to support their basic debt-to-equity transformation strategy. But the general principle of linking financial structure to measures of value creation appropriate to each organization is a universal goal. More broadly, for many troubled companies, leading them toward the kind of incentive-aligned, board-governed, financially tailored structures pioneered by KKR is surely a route to long-term "restored equilibrium." *The New Financial Capitalists* brings these issues to the fore so that, in contrast to the people Churchill observed, we

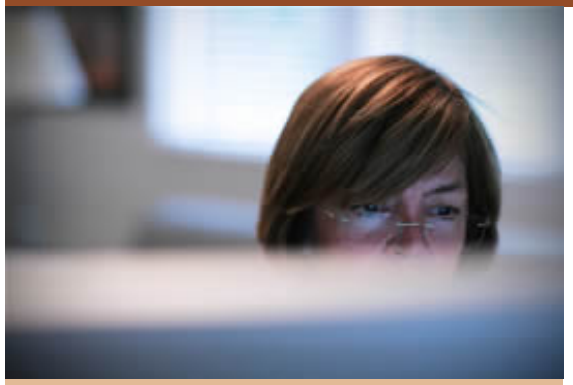
Suggested Further Reading

Hite, Gailen L. and James E. Owers. *The Restructuring of Corporate America: An Overview*. Reprinted in *The Revolution in Corporate Finance*. Edited by Joel M. Stern and Donald H. Chew, Jr. Oxford: Basil Blackwell, Ltd., 1986, pp. 418-427.

Miller, Merton H. *Leverage*. Reprinted in *Merton Miller on Derivatives*. New York: John Wiley & Sons, 1997, pp. 141-150.

Schultz, Theodore W. *Restoring Economic Equilibrium*. Cambridge, Massachusetts: Basil Blackwell, 1990.

Robert Kamphuis is a principal of Caledonia Group Inc. He is an editor of several books on financial markets and regulation, including Modernizing U.S. Securities Regulations with former SEC chief economist Ken Lehn. Caledonia Group Inc., based in Detroit, is a turnaround firm that specializes in assessments, due diligence, operations and strategy of troubled manufacturing and healthcare organizations.



The Journal of Corporate Renewal
Vol 12/No 10 October 1999
Turnaround Management Association
www.turnaround.org

How Scientific Are Your Management Methods?

By J.W. Henry Watson, Principal, Caledonia Group Inc.

Out of fashion for half a century, scientific management is becoming respectable again. Probably because scientific methods are at the heart of the Toyota Production System, a system credited with keeping Toyota the world standard for excellence in manufacturing and service since the early 1970s.

The scientific method also underpins Toyota-like systems known as "synchronous" or "competitive" manufacturing and activity-based management. In a 1990 book, three MIT scholars re-named the Toyota Production System "lean" production. Today, lean production and lean thinking

are the names associated with a particular set of tools and practices, as well as a business operating system and philosophy (pioneered and refined by Toyota over 50 years) that have revolutionized automobile manufacturing worldwide. Lean production moved beyond the automotive industry during the 1990s, and in recent years has moved beyond manufacturing.

There are several reasons why this is of interest to the turnaround industry. One, an increasing number of troubled companies need more than financial management and restructuring. They need to improve operations because their real problems stem from the fact they lag their competitors in reaching world-class benchmarks for efficiency, quality, delivery and cost. Two, in a typical, non-lean operation, lean has a track record of reducing inventory by 30 to 50 percent, reducing lead times by 40 to 75 percent, improving quality by 25 to 50 percent and improving productivity by 30 to 50 percent. Moving to lean is the cheapest and quickest way to achieve a turnaround in operations. And, three, because lean improvements begin immediately and typically reduce capital expenditures and working capital needs (compared to what they otherwise would have been), the initial cost of implementing lean usually pays for itself through reductions in working capital and operating costs.

There is a caveat, however. While implementing a lean system can be relatively cheap and quick (depending on the type and size of operation, 18- to 24-months with major progress achieved in the first six months), change is always a challenge. Owners and senior management need to develop an appreciation of lean and must be committed to transforming the company. Introducing some pieces of a lean system in isolation won't produce sustainable results.

Perspectives on Lean Production

This article reviews two recent publications that contain, from different perspec tives, a wealth of information about lean production and lean thinking.

The first is an article, "Decoding the DNA of the Toyota Production System," by Steven Spear and H. Kent Bower, two Harvard Business School professors. The article appears in the September-October 1999 issue of the *Harvard Business Review*. This article provides a good introductory summary (10 pages) of what a lean system is and how it works. The second is a book, *Manufacturing Ideology: Scientific Management in Twentieth-Century Japan*, by University of Kansas history professor William M. Tsutsui. In the process of developing an unconventional, but interesting, thesis on the genesis of Japanese-style management, Tsutsui provides a rich history of the decades long evolution of the Toyota Production System, including telling glimpses of the single-minded commitment of Toyota's leaders to scientific management.

The Spear and Bowen article is based on an extensive four-year study they undertook of the inner workings of some 40 companies in the U.S., Europe and Japan, some using the Toyota Production System, some not. The companies studied include both process and discrete manufacturers whose products range from prefabricated housing, auto parts, cell phones and computer printers to injection-molded plastics and aluminum extrusions. The authors stress that the key to understanding the Toyota Production System is recognizing that "whenever Toyota defines a specification, it is establishing sets of hypotheses that can then be tested. In other words, it is following the scientific method."

Spear and Bowen capture in four basic rules the tacit body of knowledge that underlies lean production. The first rule governs the way workers do their work, the second governs the way they interact with one another, the third governs how production lines are constructed and the fourth addresses how people learn to improve.

Rule 1. All work shall be highly specified as to content, sequence, timing and outcome.

Requiring that every activity be specified seems simple enough. The authors claim, however, that in

reality most managers don't take this approach to work design and execution, even when they think they do. The problem is that most specifications allow, and even assume, some variation. Before long, there is plenty of scope for a new employee to do the job a little differently than specified, which translates into poorer quality, lower productivity and higher costs. When Rule 1 is rigidly adhered to, workers follow a well-defined sequence of steps when doing a particular job, with the result that it is instantly clear when they deviate. Even complex and infrequent activities, such as training an inexperienced workforce at a new plant, launching a new model, changing over a production line or shifting equipment from one area of a plant to another, are designed according to the rule.

At one plant the authors visited, equipment from one area of the plant was moved to create a new production line in response to changes in demand for certain products. Moving the machinery was broken into 14 separate activities. Each activity was then subdivided and designed as a series of tasks. A specific person was assigned to do each task in a specified sequence. As each of the machines was moved, the way the tasks were actually done was compared with what was expected according to the original design, and discrepancies were immediately signaled.

In demanding that people do their work as a highly specified sequence of steps, Rule 1 forces them to test hypotheses through action. Performing the activity tests the two hypotheses implicit in its design. First, that the person doing the activity is capable of performing it correctly and, second, that performing the activity actually creates the expected outcome. If the activity isn't done in the specified way in the specified time then at least one of these hypotheses is refuted, thereby indicating that the activity needs to be redesigned or the worker needs more training.

Rule 2. Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send requests and receive responses.

Another way of saying this is that every connection must be standardized and direct,

unambiguously specifying the people involved, the form and quantity of goods and services to be provided, the way requests are made by each customer and the expected time in which the requests will be met. This creates a supplier-customer relationship between each person and the individual who is responsible for providing that person with each specific good or service. When a person needs a part, for example, there is no confusion over who will provide it, how the request will be triggered (usually with a kanban card), or what part will be delivered.

Many companies devote substantial resources to coordinating people, but in most plants requests for materials or assistance often take a convoluted route from the line worker to the supplier via an intermediary. Any supervisor can answer any call for help because a specific person has not been assigned. The drawback, as all lean experts recognize, is that when something is everyone's problem it becomes no one's problem.

Under Rule 2, a worker encountering a problem is required to ask for assistance at once and must receive help from the specified person within the worker's cycle time, which could be only 55 seconds. If the prob lem is not resolved within the specified time, the hypothesis in the customer-supplier connection for assistance is immediately challenged. The authors note that this requirement is difficult for managers accustomed to encouraging workers to try to resolve problems on their own before seeking help. But if this happens, problems remain hidden and are neither shared nor resolved company-wide. If workers begin to solve problems themselves and arbitrarily decide which ones to seek help for, problems mount and valuable information about the real causes of the problem may be lost.

Rule 3. The pathway for every product and service must be simple and direct.

When production lines are designed in accordance with Rule 3, goods and services do not flow to the next available person or machine but to a specific person or machine. If for some reason that

person or machine is not available, Toyota will see it as a problem and might require that the line be redesigned. The stipulation that every product flow in a simple, pre-specified path doesn't mean that each path is dedicated to only one particular product, however. Each production line adhering to lean principles typically accommodates many more types of products than its counterpart in a non-lean company.

This rule not only applies to products but to service requests as well. When a worker needs help and if the specified supplier of that help can't provide it, he or she, in turn, has a designated helper. In some lean plants, this pathway for assistance can be several links long, connecting the factory floor worker to the plant manager. By requiring that every pathway be specified, the rule ensures that an experiment will occur each time the path is used.

Rule 4. Any improvement must be made in accordance with the scientific method, under the guidance of a teacher, at the lowest possible level in the organization.

For people to consistently make effective change, they must know how to change and who is responsible for making the changes. Lean production explicitly teaches people how to improve. This rule states the process for making any improvement to production activities, to connections between workers or machines or to pathways. But how do people learn the scientific method? Learn to improve? Spear and Bowen illustrate this by relating their visit to a mattress company. Since 1986 the different types of mattresses produced at this company has grown from 200 to 850, its volume has grown from 160 mattresses a day to 550 and its productivity has doubled.

The authors studied a team of mattress assembly workers who were being taught to improve their problem-solving skills by redesigning their own work. Initially, the workers had been responsible for doing only their own standardized work; they had not been responsible for solving problems. Then the workers were assigned a leader who trained them to frame problems better and to formulate and

test hypotheses. The results were impressive. The team's redesign of the way edging tape is attached to the mattresses reduced the defect rate by 90 percent.

To make changes, people are expected to present the explicit logic of the hypotheses. The improvement effort must also be designed as an experiment with an explicit, clearly articulated, verifiable hypothesis such as: If we make the following specific changes, we expect to achieve this specific outcome. Further, they are expected to question their assumption deeply enough to fully exploit all the improvement opportunities available to them. Teams are taught that how they make changes is as important as what changes they make.

Who does the improvement? Frontline workers make the improvements to their own jobs, and their supervisors provide direction and assistance as teachers. If something is wrong with the way a worker connects with a particular supplier within the immediate assembly area, the two of them make improvements, with the assistance of their common supervisor. When changes are made on a large scale, improvement teams are created consisting of the person directly affected and the person responsible for supervising the pathways involved.

All the rules require that activities, connections and flow paths have built-in tests to signal problems automatically. It is the continual response to problems that makes this seemingly rigid system so flexible and adaptable to changing circumstances.

How Do Workers Learn the Rules?

Managers in lean enterprises don't tell workers and supervisors specifically how to do their work. Rather, they use a teaching and learning approach that allows workers to discover the rules as a conseqnence of solving problems. For example, the supervisor teaching a workshop group or individual the principles of the Rule 1 will go to the work site and observe while asking a series of

questions. How do you do this work? How do you know you are doing this work correctly? How do you know that the outcome is free of defects? What do you do if you have a problem?

This continuing process gives the group or person increasingly deeper insights into the work being done. From many experiences of this sort, workers gradually learn to generalize how to design all activities according to the principles embodied in Rule 1. All the rules are taught in similar Socratic fashion of iterative questioning and problem solving.

Not surprisingly, Spear and Bowen display a little arrogance in spots and also a bit of ignorance here and there. They claim, for example, that the Toyota Production System "grew naturally out of the workings of the company over the past five decades and as a result has never been written down." Moreover, they claim that "Toyota workers often are not able to articulate it." They also state that few enterprises have managed to imitate Toyota successfully because the Toyota Production System is a paradox. (On the one hand, every activity, connection and production flow is rigidly scripted. Yet at the same time, Toyota's operations are enormously flexible and responsive to customer demand.) The paradox disappears, they claim, when the system is properly viewed as a continuous series of controlled experiments.

In fact, there are whole libraries on the Toyota Production System and books galore on other Toyota-like systems. While the article does a good job of summarizing, the same ideas are in the books. About the only thing missing in other work is the focus on scientific management, mainly because it has been controversial, though accurate. Also, lean production (which, recall, is the name a couple of MIT professors gave to the Toyota Production System) has been successfully implemented in scores of companies that I have personal, direct knowledge of. Lean production principles and tools have even been used with great success to achieve dramatic improvements in medical procedures such as open-heart surgery. The "paradox" the authors speak of is taught in industrial engineering courses in schools such as the University of Michigan and MIT--but not as a paradox.

Before getting into the Tsutsui book, a brief word about Frederick Winslow Taylor, the father of scientific management (it's on his tombstone). "One-best-way" Taylor was the world's first management consultant and efficiency expert. His life (he lived from 1856 to 1915) coincided with the Industrial Revolution at its height and he is credited with speeding up the fruits of that revolution more than any person before or since. Management guru Peter Drucker calls Taylor's ideas the most powerful as well as the most lasting contribution America has made to Western thought since the Federalist Papers.

Drucker is referring primarily to Taylor's "time and motion" studies, his work in standardizing tools, parts and shop floor methods and related efforts aimed at gaining production efficiencies. Even his enemies grant that Taylor's work exponentially boosted productivity and quality--and living standards.

But Taylor, a wealthy aristocrat, had his weaknesses. He definitely didn't favor (probably gave little thought to) the kind of employee involvement required for a lean production system to succeed. He tended to segment workers into "brain" and "brawn" groups. His detractors, then and now, accuse him of overworking and enslaving employees, reducing skilled mechanics to common laborers and denying workers a voice. Labor rebelled and trashing scientific management began.

Tsutsui's thesis is that so-called Japanese-style management, widely admired in the West since the 1970s and touted as uniquely Japanese, is little more than Taylorism, "revised" to include quality control circles and worker involvement. (Note: Toyota is the poster child of Japanese-style management; Honda and Nissan, for example, like most of their Western counterparts, have been less successful in implementing lean.) To build his case, Tsutsui painstakingly scrutinizes (decade after decade) the actions and statements of the Toyota Production System's primary architects (Toyota founder Toyoda Kiichiro, Ono Taiichi and Shingo Shigeo) for ways to connect these

"Taylorism" and "Taylorite" ideas. Fortunately he finds plenty and for the reader interested in scientific management and the evolution of the Toyota Production System, the result is a pretty thorough education in both.

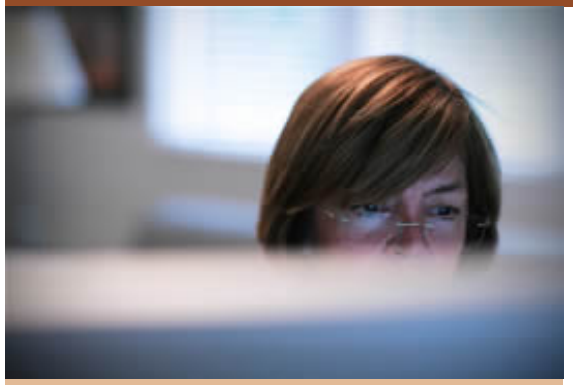
In 1937, for example, Kiichiro established the "flow production system" and the just-in-time concept at Toyota's first automobile plant. This required explicit work standards and strict labor regimes. Tsutsui's comment: "Another Taylorite preoccupation reaffirmed in the Toyota system." Taiichi, he says, "sought to eliminate all unnecessary movements and allow no idle time, for machines or workers. Another quote from Taiichi: "Unless all sources of waste are detected and crushed, success will always be just a dream." And again: Taiichi's "conspicuous success in boosting labor productivity was due to time-and-motion study and layout design, the two Tayorite methodologies most highly developed in Japan." He quotes Shigeo, avowing at that the end of his career: "My thinking is based on Frederick Taylor's analytical philosophy."

My favorite: Despite postwar conditions in Japan's political economy that would have permitted change [from scientific methods], "the logic of Taylorite solutions--most basically, the drive to wring the utmost efficiency out of existing facilities and personnel through incremental change--remained firmly engrained in the consciousness of Japanese managers."

What's most interesting is that Spear and Bowen treat scientific methods as positive and uncontroversial. Tsutsui, on the other hand, adopts a hostile tone toward "Taylorism," but in producing a scholarly work has, probably unwittingly, presented a positive case for scientific management.

Harry Watson is founding principal of Detroit-based Caledonia Group Inc., which specializes in lean assessments and implementations.

October 1999



The Journal of Corporate Renewal
Vol 14/No 12 December 2001
Turnaround Management Association
www.turnaround.org

Material Flow Systems Are Key to Manufacturing Turnarounds

By J.W. Henry Watson, principal, and Charles Standard, senior consultant, Caledonia Group Inc.

In early November, the Federal Reserve lowered the discount rate for the third time since September 11 and the tenth time since the economy began slowing more than a year ago. Because the first nine rate cuts failed to stem the economy's slide, can even Alan Greenspan be betting that the latest move, which puts the rate at its lowest point in 40 years, will do the trick?

Indeed, more than most economic downturns, this one is likely to end as the result of thousands of companies turning around their operations. What will be the basis of successful turnarounds in manufacturing? To paraphrase an old adage, perhaps "what's good for Ford is good for the country."

Under the new leadership of William Ford and the top people he's chosen, the automaker has increased its commitment to implementing the Ford Production System. This is Ford's version of the Toyota Production System, which over the last decade has become known generally as lean manufacturing or lean production.

That Toyota has continued to thrive during the current economic slowdown, racking up higher profits and market share, is a fact that Ford and legions of other companies are unlikely to overlook. In addition, General Motors, which has had greater success in implementing lean thinking, has pulled decisively ahead of Ford in quality and productivity.

Lean manufacturing seeks to minimize unnecessary time, materials and effort throughout the entire value chain, from raw materials to the ultimate customer. It is both a new way of thinking about production and a distinct system of production in its own right. When implemented properly, it can produce astonishing results.

Typically, lean manufacturing reduces inventory by 30 to 50 percent, lead times by 40 to 75 percent and floor space requirements by 30 to 50 percent. At the same time, quality improves by 25 to 50 percent, and productivity increases 30 to 50 percent.

Systematic Implementation

Lean manufacturing is often characterized inaccurately as simply a collection of best practices, and countless books and articles explain how to use commonly known lean techniques. This has expanded the general awareness, practices and potential benefits of lean manufacturing, but it has

also led to piecemeal application of its tools and techniques, which generally provides little or no lasting benefit.

Lean manufacturing is not a new concept. Ford has been trying with various degrees of commitment to implement lean thinking for about 20 years. That the company has not yet succeeded suggests that while the direction is obvious, the path is less so.

A key to finding a successful path is the systematic implementation of all aspects of a lean production system. This requires a commitment from top management down to personnel on the plant floor. However, a commitment by top management and the systematic implementation of all pertinent lean practices are often lacking, especially in turnaround situations. It is easy to slip into a "firefighting" mode, which simply does not create sustainable improvement.

Many companies leave out critical elements of lean thinking. The most glaring omission is often lean materials management, which includes implementing pull systems, both internally and externally. External pull systems should involve both suppliers and customers, and schedules need to be stabilized.

A study by R.R. Fullerton and C.S. McWatters that appeared earlier this year in the *Journal of Operations Management* (Vol. 19) attempted to determine which aspects of lean manufacturing were responsible for business performance improvement at 447 U.S. manufacturers. By analyzing the practices and performance of these companies, the study found that two unique lean practices--just-in-time (JIT) purchasing and pull system implementation--were significantly related to 10 of the 15 performance measures used in the study. Both are key to material flow and production planning.

But corporate renewal professionals might counter that the typical company they see does not have bills of material worthy of the name. The company contends that the bills will be fixed "soon," but

soon never arrives.

The companies that turnaround professionals are called on to help often take physical inventories daily because they don't know what they've made, shipped or scrapped. They think progress on inventory accuracy is getting to 80 percent, day over day. A whole team is devoted to expediting incoming materials to address unanticipated stockouts.

In addition, turnaround professionals often find that material and capacity planning are unreliable because everything changes by mid-morning to deal with screaming customers whose production processes are being shut down by quality spills and late deliveries. Equipment maintenance stopped months ago and uptime charts look like this year's Nasdaq index. Then there are the product launches that someone must have thought would happen magically.

Lean material systems are not only better for supporting world-class companies, but they also yield major benefits rapidly when deployed properly in out-of-control situations--and they do not require huge capital expenditures or massive information systems implementation efforts.

Fundamental Changes

Lean material systems can generally be implemented in phases. Major improvements are soon evident, and the systems change the fundamental way a business works for the better. But where does one start?

As a first step, schedules must be stabilized. One of the primary material management principles of lean thinking is to level schedules. Last-minute schedule changes must be prohibited, and major moves among plants or from one production line to another should not be allowed.

Materials must flow smoothly from the supplier to the customer. Material handling should be

eliminated as much as possible throughout the operation. Schedules should meet shipping plans rather than support large batches, and they should reflect proven capacity, not some illusion of capabilities. Speed of material flow is very important in such a system, and preparing a value stream map is extremely useful in implementing these changes.

At the same time, data must be accurate. This usually means eliminating backflushing, the practice of relieving inventory through bills of material based on finished goods production. Backflushing is often at the root of inventory accuracy problems.

Tracking of work-in-process (WIP) inventory on corporate information systems should be eliminated. In its place a system that uses pull signals to replenish raw materials should be instituted. This should be done in the context of simple blanket purchase orders, and the practice of triple-matching purchase orders, receivers and invoices should be eliminated. Payment should be triggered by receipt of the receiver.

Problem solving teams comprised of people from the floor who actually make the transactions should be established. Every possible step in their usual activities should be eliminated to streamline processes, and the root causes of repeated mistakes should be identified and eliminated.

This floor-based effort usually uncovers numerous setup errors in the information system. The idea that transactions are cheap because they are computer-based must be banished. The probability of success declines exponentially as transaction volume rises--high transaction volumes create an impenetrable information fog.

A company should move aggressively to relieve inventory directly, based on pull system signals, or it should issue materials from controlled stock-keeping locations. Typically this effort reduces the number of transactions on the information system by more than an order of magnitude--by more

than 90 percent. Stockouts will be eliminated as discipline is imposed on a much simpler system.

Doing all of this does not create a simpler system; it creates a fundamentally different system. Traditional material resource planning (MRP), or push materials systems, manage production based on forecasts of production capability and demand, as well as on orders. Production is initiated by the forecast or order and is independent of the situation in the plant. As a result, inventory--and especially WIP--can fluctuate wildly as both production throughput and demand deviate from planned levels.

WIP and finished goods inventories build up in specific areas as a result of forecast errors and production bottlenecks. At the same time, there are spot shortages of WIP in many operations and missed customer deliveries. Equipment is alternatively over loaded and starved, driving costs through the roof.

This is how that all-too-common paradox of inventory bloat accompanied by production problems and declining shipments comes about. This bleak scenario happens whenever there is variability in demand, productive capability or lead time. If one does not get you, another will. Any system that builds to forecast rather than to demand is a system that will fail.

Controlling Inventory

Pull systems are designed to hold raw material, WIP and finished goods inventory stable by adjusting throughput. If the next machine in a process is broken, production should be stopped when a predetermined level of WIP is reached. Reserve capacity should be maintained to support recoveries and to deal with unanticipated downtime or temporary demand increases.

WIP levels should be set to protect against disruptions that occur in manufacturing plants. Some maintain that inventory should be lowered so that weaknesses in the system can be exposed more

easily. But with a passel of furious customers screaming at the door, this approach has limited appeal.

Instead, the flow through the system should be stabilized, the weaknesses identified and eliminated, and then inventory should be lowered. But there is a paradox in this. Inventory falls, often dramatically, as a result of implementing lean materials management, despite the provision of significant inventory to protect against process interruptions. This results from controlling inventory rather than allowing it to be determined by an unstable system.

Because of the stabilizing effects on production flow and other benefits, pull production control is an integral part of an overall lean manufacturing system. It may seem reasonable, therefore, to expect pull systems to be used frequently and implemented early in a lean manufacturing transformation or turnaround situations. However, empirical evidence does not support this.

Pull systems are often among the last lean practices implemented. The authors have encountered more resistance to pull implementations than to any other aspect of lean turnaround efforts. Furthermore, even after pull systems are implemented and create major benefits, most management teams stubbornly attribute the gains to other causes.

A study by B.B. Flynn, S. Sakakibara and R.G. Schroeder, which was published in the *Academy of Management Journal* (Vol. 38, No. 5, 1995), found that pull systems were the least frequently used of 12 essential lean practices. A 1997 study conducted by J.A. Brox and C. Fader and published in the *Journal of Operations Management* (Vol. 15) found that pull systems were used only occasionally, ranking number 14 out of 17 selected lean practices.

A 1999 study by RE. White, J.N. Pearson and J.R. Wilson, which was published in *Management Science* (Vol. 45, No. 1), found that pull system implementation ranked number eight out of 10 common lean practices. A 2000 study by J.L. Callen, C. Fader and I. Krinsky, which was published in

the *International Journal of Production Economics* (Vol. 63), found that pull systems were used less than half the time, even among companies that claimed to have implemented lean practices on a global basis.

Resistance to Pull Systems

Perhaps one reason manufacturing managers are reluctant to implement pull systems is that they lack a good conceptual understanding of what such a system is. Fundamentally, a pull system is a consumption-based replenishment system.

Consider an automatic icemaker, which operates as a pull system. In its steady state, the icemaker has a finite buffer of ice cubes waiting in a tray. Eventually, as ice cubes are consumed, the quantity in the buffer falls below a threshold, a mechanical sensing arm detects this change and more ice cubes are produced to replenish the buffer.

An icemaker that operated on a push principle would work from a forecast that predicted when and how many ice cubes would be consumed throughout the day. The icemaker would then be set up to produce ice cubes according to this schedule. In theory this should work well, but in practice, the system would be inherently inflexible. If ice cube consumption deviated from the predicted pattern for any reason--dinner guests or cold weather, for example--the push system might experience a stockout or an overabundance of ice cubes.

This occurs with some types of enterprise resource planning (ERP) systems in manufacturing companies. The push approach to production control allows stockouts of critical items and production overruns of other items, which disrupt workflows and cause congestion in the factory. Often, highly capable materials managers and production supervisors are forced to develop off-line (pull-type) procedures to work around these dysfunctional systems.

Recently, executives at two of America's largest private equity funds said that failed ERP implementation is the primary reason for poor performance in their portfolio manufacturing companies. Such systems can support pull scheduling and can be major value enhancers when they do so. How to achieve this is beyond the scope of this article.

Another reason for the lack of pull system implementation is that it requires managers to conceive of their operations in a totally new way. The profitability of the overall operation must take precedence over the profitability of individual departments or processes.

For example, if a downstream process produced parts more slowly than normal, perhaps due to a maintenance problem, it would not consume components at the anticipated rate. This means that replenishment signals would arrive at an upstream process less frequently than expected. Fewer replenishment signals would lower production output requirements at the upstream process. This, in turn, would mean less absorbed overhead for the upstream department, and temporary layoffs or underutilized hourly labor would result.

If the upstream process were operating under a push system, it would continue to produce parts at the normal rate, without regard for disruptions in the downstream operation. This would allow the upstream department to achieve its production and financial targets at the expense of increased congestion, excessive accumulation of WIP and longer cycle times. These factors increase production costs.

Adopting pull production control requires managers to look beyond the efficiency of a single process or department and make decisions that are more profitable for the operation as a whole.

Another important reason for the resistance to implementing pull systems in the American manufacturing community is that there is widespread conflicting information about when, how, and

even if such systems should be implemented. For example, some researchers provide a litany of requisite improvements that must be in place before a pull system can be attempted: elimination of waste, improved process design, standardized operations, level production schedules, short setup times, short lead times, a smooth production schedule, small-lot production, low inventory, excellent quality, and a host of others.

These "prerequisites" are excellent general recommendations for operations improvement, and many offer significant benefits in their own right. Nevertheless, there is nothing about any of these improvements that uniquely prepares a factory for pull system implementation. Those who insist on these as precursors to such a system are discouraging manufacturing managers from pursuing pull systems at all.

One benefit from implementing a well-designed pull system is the sharp reduction in stockouts. Without stockouts, production flows are much smoother, and inventory and lead times can be reduced accordingly. These instantaneous benefits of pull system implementation are realized regardless of other operational issues that would otherwise hinder performance.

One of the greatest strengths of pull production control is its robustness and insensitivity to implementation errors and unsatisfied assumptions. Pull systems work well in the presence of variability and uncertainty, and they provide many of the same benefits that are associated with other more general operational improvements. Implementing pull production control can help a manufacturer to realize those benefits while other improvements are pursued at the same time.

Summary

There is nearly universal recognition that lean thinking is a requirement for long-term competitive survival in manufacturing. Indeed, for many companies, skill at lean manufacturing is becoming the

one enduring and sustainable competitive advantage. As a result, any operational turnaround plan that does not make systematic implementation of lean manufacturing a core element is unlikely to succeed in creating stakeholder value.

A successful turnaround begins with a plan for systematic implementation of lean manufacturing across all aspects of operations. The turnaround plan must put immediate emphasis on lean materials flow, including such factors as pull systems, leveling of schedules, and accurate control of inventory, including WIP. A company that follows this plan will see immediate operating improvements.

J.W. Henry (Harry) Watson is the managing principal of Caledonia Group Inc., a Detroit-based management consulting firm that specializes in lean assessments, implementing lean systems, and operating turnarounds.

Charles Standard is a senior consultant at Caledonia Group and the author of Running Today's Factory: A Proven Strategy for Lean Manufacturing, *which won the Shingo Foundation Prize for excellence in manufacturing research in 2000.*

December 2001