

for Affiliates this month in Center research:

## Lean Manufacturing

This month we take a look at the “lean” mindset in the printing industry. Research conducted through RIT’s Printing Industry Center has established that while both large and small printing establishments view the lean production approach as an important contributor to future profits, smaller printing companies are still lagging in their adoption of a range of lean practices. The report *Lean Manufacturing in Small- and Medium-Sized Printers* (PICRM-2004-04), by Sandra Rothenberg and Frank Cost, substantiates these findings.

Large manufacturing organizations have been achieving productivity improvements for decades using lean production methods. By adopting lean practices, *Industrial Management* magazine reports, companies have been able to reduce waste, reduce inventories (some reducing inventories by 90%), improve quality (a 75% reduction in rework is reported), and reduce lead times (again, by up to 90%!).

But lean printing shops are still not the norm in the printing industry. Instead, it is more common to find printing factories organized with large buffers in front of and behind all of the major manufacturing processes. The workforce is often conditioned to respond to quick changes in the production schedule, reflecting a frequent need to expedite work for customers who have come to rely on the company to make up for shortfalls due to their own poor planning.

Printers are realizing that if they place their prime emphasis on such “service,” and neglect to take a disciplined approach to improving their own manufacturing efficiencies, their businesses will not be sustainable long term. As a result, as previous RIT research has shown, some printers have embarked on lean manufacturing programs intended to systematically improve the efficiencies of their operations.

### What is Lean?

But first, what exactly is lean? Often, lean is thought of simply as a way to reduce buffers. Lean production does focus on what is most commonly thought of as “just-in-time” (JIT) management, or, practices like building close relationships with suppliers, that will enable small-lot production with minimal buffers and ensure a rapid feedback process when problems occur.

But there is more to it. A second element of lean production is the set of work practices it fosters, needed to support the fragile JIT manufacturing system. Work is based on the principle of “kazen,” or continuous improvement. Workers are responsible for identifying and analyzing quality problems found on the production line. “Quality Circles” of employees in various

### Center Spotlight 2005 RIT Isaiah Thomas Award in Publishing

Awarded to

Thomas Curley  
President and CEO,  
Associated Press

April 26, 2005  
3:30 p.m.

Ingle Auditorium  
RIT Campus  
Presented by  
RIT’s School of Print Media

The Isaiah Thomas Award in Publishing, named for one of America’s great patriot printers, recognizes outstanding contributions made to the publishing industry. Curley becomes the 25th recipient of the award.

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### 2004 Research Monographs

[Lean Manufacturing in Small- and Medium-Sized Printers](#)

[Industry Trends in Fulfillment, Finishing and Distribution](#)

[Selling Small and Smart: The Future of the Sustainable Enterprise](#)

[An Investigation Into Printing Industry Trends](#)

[Digital Printing Success Models: Validation Study \(2004\)](#)

New research monographs will be released periodically over the next few months. Stay tuned!

Full information on the research of the Center is available online.

production areas are empowered to offer insights and suggestions to management.

Progressive human resource policies make up a third component of lean production. Highly restrictive worker selection can emphasize aptitude and the ability to work in a cooperative fashion with others. Compensation can be linked to performance. Status barriers between workers and management can be effectively reduced.

### Using Lean to Your Advantage

Both large and small printing establishments can use these lean production practices to their advantage. Our survey shows that, with regard to lean production in particular, there was no difference in how large and small firms reported their own knowledge of it, or the high importance they gave to lean practices for the future profitability of their firms. In terms of actual practice, however, we found that smaller firms reported to be undertaking lean methods to a lesser extent than larger firms.

The larger firms in our survey were significantly more likely to have found productivity improvements through waste reduction than firms with less than 100 employees (our definition of the small- to medium-sized firm). Larger firms tended to measure process waste more often than smaller firms (see Table 1). Employees in larger firms received more structured quality control training (see Table 2).

**Table 1. Measurement of Waste Indicators\***

	Paper Waste	Ink Waste**	Press Productivity**	Value of Inventory**
<b>Employees ≥ 100</b>	3.96	2.94	3.76	2.07
<b>Employees &lt; 100</b>	3.43	2.13	3.26	2.30

\* Scale of 1 = never, 2 = monthly, 3 = weekly, 4 = daily, 5 = per job

\*\* Indicates a significant difference in means.

**Table 2. Training of Employees on Common Lean Practices\***

	Statistical Process Control**	Quality Assurance**	Root-Cause Analysis or Similar**
<b>Employees ≥ 100</b>	1.94	2.48	2.08
<b>Employees &lt; 100</b>	1.51	2.09	1.53

\* Scale of 1 = none, 2 = some, 3 = most, 4 = all

\*\* Indicates a significant difference in means.

As previously mentioned, the just-in-time aspect of the lean system is highly reliant on how firms relate to their suppliers. Lean firms are more likely to have long-term relationships with their suppliers, who provide not just the product but also the service needed for an efficient use of the product. Our survey showed

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The *eReview* is a monthly publication of the Printing Industry Center at RIT for registered Affiliate companies. Articles are also published in the quarterly printed publication *PrintReview*.

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### About the Center

Dedicated to the study of major business environment influences in the printing industry precipitated by new technologies and societal changes, the Printing Industry Center at RIT addresses the concerns of the printing industry through educational outreach and research initiatives.

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that larger firms were more likely to use criteria typical of lean firms, such as trust, flexibility, location, and service, for choosing a supplier (see Table 3).

**Table 3. Criteria for Choosing Suppliers\***

	Trust**	Flexibility**	Location**	Service
<b>Employees ≥ 100</b>	4.84	4.40	3.60	4.40
<b>Employees &lt; 100</b>	4.58	4.10	3.18	4.21

\* Scale of 1-5 with 1 = not important and 5 = very important

\*\* Indicates a significant difference in means.

### Challenges for the Small Printer

We found that small- and medium-sized printers tended to offer a greater diversity of products with more generalized manufacturing facilities. They also are less likely to have the resource base needed to launch and sustain the kind of lean program that will yield significant results. Given these challenges, it is likely that the path smaller printers take to lean will not mimic the path of their larger counterparts. They may need to take a less encompassing approach to improving productivity, focusing on those particular aspects of lean management that are likely to provide the greatest return.

### 2004 Research Monographs:

To read about this research in detail, download the monograph from: <http://print.rit.edu/pubs/picrm200404.pdf>

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