Komori America Corporation Executive White Paper

DRIVING EFFICIENCIES IN YOUR PRINT BUSINESS

For printers large and small, driving efficiencies in their business is essential to success in today's competitive marketplace. This White Paper, brought to you by Komori America, will explore key concepts of lean manufacturing and how they can be applied in your print business to achieve greater efficiencies and, ultimately, positively impact your bottom line.

KOMORI
Kando: Beyond Expectations

KOMORI
Kando: Beyond Expectations

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1 INTRODUCTION

WHY READ THIS WHITE PAPER?

Every commercial print business must look for ways to maintain and improve profitability and expand business opportunities in today's highly competitive environment. With more and more printers bidding for the same business, downward pressures on revenue from price competition is inevitable. While a print business has little control over external market factors, the efficiency of its internal operations is within its control. Increasing efficiency will enable your print business to produce end product faster and at the lowest possible cost, improving profit margins and allowing your company to produce the greatest amount of work possible.

This White Paper will provide practical advice on how your print business can implement well-established lean manufacturing principles to drive increased efficiencies and continual process improvements throughout your print operation. The end result will not only be a safer and more streamlined operation that improves revenues, but also enhanced customer response and satisfaction.

Delivering value to the customer is an important goal for every business organization. While companies typically look toward product innovation and customer service as ways to enhance value, it is also important to consider the internal operational practices, procedures and events that either add to, or subtract from, the ultimate value that the customer receives. Taking a close look at every step in your print business' operational processes, from the time an order is taken until the finished product is delivered, can reveal numerous ways that inefficiencies and waste of all kinds can be eliminated from your workflow.

This White Paper will identify and describe several lean manufacturing systems and methodologies that will help your business take a closer look at your operations. It will examine different ways to think about waste and the value you provide to your customers and will offer practical steps that may help your print business operate more efficiently and continually improve processes. Ultimately, the systems and methods that are right for your business will depend on your context and your organizational culture. However, a firm and lasting company-wide commitment to greater efficiency is sure to advance your organizational goals and help your print business stand out from the crowd.

2 CHALLENGES IN TODAY'S COMMERCIAL PRINT MARKETPLACE

Both challenging and rewarding, today's commercial print marketplace is a dynamic, rapidly evolving landscape. Key market trends that every printer must address in order to achieve continued success include:

Price competition and commoditization

With declining demand for print, increased competition in today's connected world and customers facing diminished budgets in the sluggish economic environment, it comes as no surprise that printing companies are quoting ever lower job prices in order to secure business. The resulting commoditization squeezes and in some cases eliminates profit margins, making it imperative for printers to have a clear and well-executed strategy in order to survive.

Growth of digital media

The internet and the development of the digital era has had a lasting impact on print and print-related media. Numerous magazines and newspapers have suffered declining revenue or gone out of business altogether as audiences grew more comfortable and reliant on real-time online content sources. The swift adoption of smartphones and tablet devices by the public has only accelerated the shift to digital from what was traditionally the realm of print, including advertising, books, catalogs and newspapers.

The print industry is evolving as a result of the rise of digital, but digital is by no means a replacement for print. Packaging, direct mail and marketing collateral are just a few examples of print products that digital cannot replace. Additionally, new ways of combining the benefits of the personal, tangible qualities of print with digital content are arising, such as QR Codes and augmented reality.

The need to innovate with new products and services to develop new markets

The foregoing challenges have been a driving force behind innovation in the print industry, as printers expand their print capabilities and services to gain new customers. More and more, commercial print companies are combining web-based solutions, digital print and traditional offset capabilities to expand their customer base with innovative solutions. More efficient presses capable of producing higher quality work with less waste, specialized UV curing systems, specialty security printing features and value-added hybrid printing are just a few of the ways printers are expanding upon traditional offerings.

3 OPERATIONAL EFFICIENCY: THE KEY ROLE IT PLAYS IN ACHIEVING SUCCESS

To succeed in today's print marketplace, print companies must do everything they can to preserve or expand margins and profitability. In the face of the external pressures discussed above, an internal focus on operational excellence is essential to reduce the cost of production and improve margins.

3.1 What is operational efficiency?

Operational efficiency involves minimizing usage and waste in all forms to maximize resource utilization so that the organization can deliver the highest quality products and services to customers in the most efficient manner.

The goal of operational efficiency is to identify and weed out wasteful processes and resources that do not add value and reduce a print company's profits. Operational efficiency is also concerned with implementing new work processes and the latest technologies that improve quality, productivity and environmental sustainability.

Numerous operational efficiency initiatives over the years have devised tools, procedures and systems designed to generate operational efficiency within organizations. These include the Six Sigma program championed by Jack Welsch, former CEO of GE[1] and the Toyota Production System (TPS) or LEAN approach designed by Kiichiro Toyoda of the Toyota Motors Company.

Rather than adopting one approach or another as a recipe for success, a more practical approach is to become familiar with the systems and tools of several approaches to operational efficiency and identify which show the most promise and offer the best 'fit' for your print business and operations. Differences in business culture, size and market may dictate differences in approach.

3 OPERATIONAL EFFICIENCY: THE KEY ROLE IT PLAYS IN ACHIEVING SUCCESS

3.2 The advantage of being the low cost producer

There is very little that any print business, large or small, can do to control external market forces, such as the economy, prevailing prices or the actions of the competition. Nevertheless, while the market at large may dictate the price required for winning a job, the operating costs required to produce that job are in many respects within the control of your print business. Rather than focusing on winning business by always quoting the lowest bid, which can be an unsustainable strategy, a better approach is to strive to be the low cost producer who is able to finish a new or existing job with the lowest possible operating cost. Being as efficient as possible is the best way to preserve operating margin and profitability as well as ensure that your print business can reach for the largest amount of *profitable* business possible.

3.3 Taking a holistic approach to efficiency in your print business

While this White Paper will discuss numerous tools and systems that can be utilized to help your print business operate more efficiently and at reduced costs, it is important to recognize that striving to maximize operational efficiency requires a company-wide commitment and a company-wide focus. It is not just about what happens on the production floor, but encompasses every aspect of the print business, including the front office, sourcing materials from vendors, teamwork, shipping, etc.

Put another way, achieving operational efficiency "is about developing a framework of innovation, inspiration and teamwork by building a culture of inquiry, questioning, and improvement...It really is about changing people's opinions and values. That is not easy."[2]

Achieving operational improvement involves a shift from a company culture organized around departments and batch production to a culture that prioritizes continual incremental improvement[3] throughout the organization and its workflows. Over time, this new focus will deliver transformational benefits for the organization.

4 LEAN PRODUCTION

4.1 Thinking of your print operations as a value stream

The Toyota Production System emphasizes the elimination of waste and non-value-added activities and materials in the manufacturing environment. In a print operation, waste is typically thought of in terms of inefficient use of paper, ink and other material inputs due to errors such as ink marking, color issues or problems with substrates; however the Toyota or lean approach looks at waste in a much broader way. Starting from the perspective of the customer, waste is defined as anything in the production process that does not add customer value. The value stream consists of all the activities necessary to bring a product from its initial order to delivery to the customer.

In addition to material waste, viewing the print operation as a *value stream* hones in on inefficiencies of all kinds. The Toyota system originally identified seven sources of waste:

- **Transport:** Moving product between processes adds no value. Space should be carefully planned to avoid unnecessary transport, which adds cost, wastes time and risks product damage and personal injury.
- **Inventory:** All component materials, work in process and finished product that is not being processed. Excess inventory increases lead times, consumes floor space, and delays the identification of process problems.[4]
- **Motion:** Similar to transport, motion examines whether people are moving more than is required to perform the processing, which wastes time and risks personal injury.
- **Waiting:** Any delay before the next production step. Typically, more than 95% of a product's life in traditional batch-and-queue manufacturing will be spent waiting to be processed.[5]

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- **Overproduction:** Production ahead of demand. Overproduction creates excessive lead times, results in higher storage costs, and makes it difficult to detect defects.[6]
- **Over-Processing:** Processing beyond the standards required by the customer. Over-processing wastes time and materials and is not compensated for in the product price.
- **Defects:** The product deviates from what the customer has specified. Quality defects result in waste from rework and scrap, quarantining inventory, re-inspecting, rescheduling, and capacity loss.[7]

While not all non-value-added processes can be eliminated in the production environment, identifying them as "waste" helps create a mind-set to root out as many inefficiencies in workflow and processes as possible.

In a printing environment, non-value-added elements may include:

- Washup
- Color matching
- Waiting for stock or ink
- Mounting plates
- Registration
- Press adjustments
- Machine downtime
- Waiting for customers
- Changeover
- Horizontal or vertical preparation
- Meetings
- Finding tools and other materials[8]

4.2 Lean manufacturing in the print business: A case study
Next Day Flyers, Rancho Dominguez, CA

Words like *efficiency*, *quality* and *consistency* define Next Day Flyers (formerly Postcard Press) in Rancho Dominguez, CA. The company entered the web-to-print area just as it was starting to take off—and Next Day Flyers has remained ahead of the curve ever since. President David Handmaker says "what separates us from our competition is consistency—consistency in our print quality, our turnaround time and our customer service."

What allows Next Day Flyers to deliver consistency across their organization is their unique approach to continual improvement. "When I started this company, I had a vision that we could institute lean manufacturing in a printing environment, but I didn't know the steps it would take to get there." Handmaker hired consultants, studied the Toyota manufacturing method, and got his employees excited about process improvement. "Once they saw that the changes and improvements actually had a positive effect on the business, our people bought into the process."

> *"When I started this company, I had a vision that we could institute lean manufacturing...*

Handmaker says the most important part of the process is the company's employees. "You start with hiring the right people. If someone doesn't want to participate in the system, then they wouldn't be a good fit for our company. Continual improvement is one of our core values, so we need to have people who are aligned with the value. That's one of the good things about our culture."

VP of Operations Ben Nouri plays a big role in the Next Day Flyers continual improvement process. An engineer by training, with a strong background in Six Sigma and lean manufacturing, Nouri had no background in the printing industry before joining Next Day Flyers.

Nouri says the company measures everything related to the bottom line. "Everything we do is a process or a procedure. And to make improvements you have to develop action items or you can't make the change." Action items are prioritized at Next Day Flyers by which ones will have the biggest impact.

The continuous improvement process even included the Komori team as Next Day Flyers installed their five-color Lithrone S40 with coater. Komori District Sales Manager, Richard True, was an active participant in the process. "For every press Komori America installs, there is a pre-installation meeting and a manual that outlines the procedure. We met every week to go over the schedule, conduct training and ensure that everything was on track."

With their eye on quality, consistency and always improving the process, the sky seems to be the limit for Next Day Flyers.

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It is a good idea to engage key individuals throughout the value stream in the mapping process, as each may lend a valuable perspective regarding where value is added or waste occurs.

Creating the visual map is an exercise that can help you literally "see" your processes in a new light.

4.3 Value stream mapping

One valuable way to gain an understanding of value-added and non-value-added processes in a production process is with value stream mapping. Essentially, value stream mapping involves drawing a schematic visual representation of the entire production process for a product. The map should identify every action in the production, from order taking to delivery, to determine where value is added and where it is not (waste). Non-value-added activities may include such things as a delay in information flow from the sales department to the production floor, extra inventory, rework, machine downtime, etc. Some non-value-added activities may be a necessary part of the process; others may be unnecessary and can be eliminated.

As James P. Womack and Daniel T. Jones put it in *Lean Thinking*, their seminal book on lean manufacturing:

> *"Just as activities that can't be measured can't be properly managed, the activities necessary to create, order, and produce a specific product which can't be precisely identified, analyzed, and linked together cannot be challenged, improved (or eliminated altogether), and, eventually, perfected. The great majority of management attention has historically gone to managing aggregates—processes, departments, firms—overseeing many products at once. Yet what's really needed is to manage whole value streams for specific goods and services.*[9]

Collecting relevant data as part of the value stream map, such as the amount of time it takes to process orders, obtain inventory, downtime between processes and the like will provide an important benchmark of your operation's current state that improvements in operations can be measured against. Value-added time and non-value-added time can be measured as percentages of the total time. In addition to creating a value stream map for the current state of a process, it is also possible to use value stream mapping to plan a desired future state.

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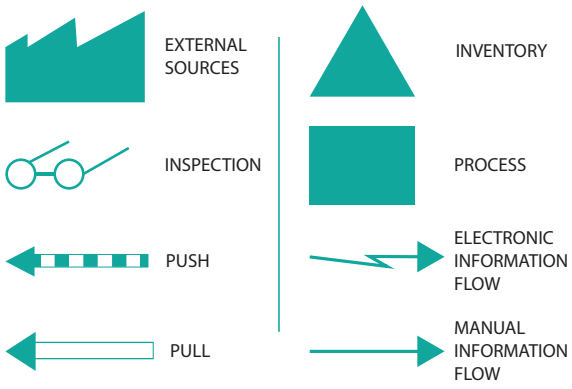
A standardized set of symbols are used to identify components of the process, including:



The nature of many print businesses involves a variety of differing product processes. Value stream mapping is a great way to take a step back to understand what those processes are and how they might be improved. Then, using the additional tools and processes discussed in the remainder of this White Paper, your print business can begin to improve your operational efficiency and reap the resulting financial rewards.

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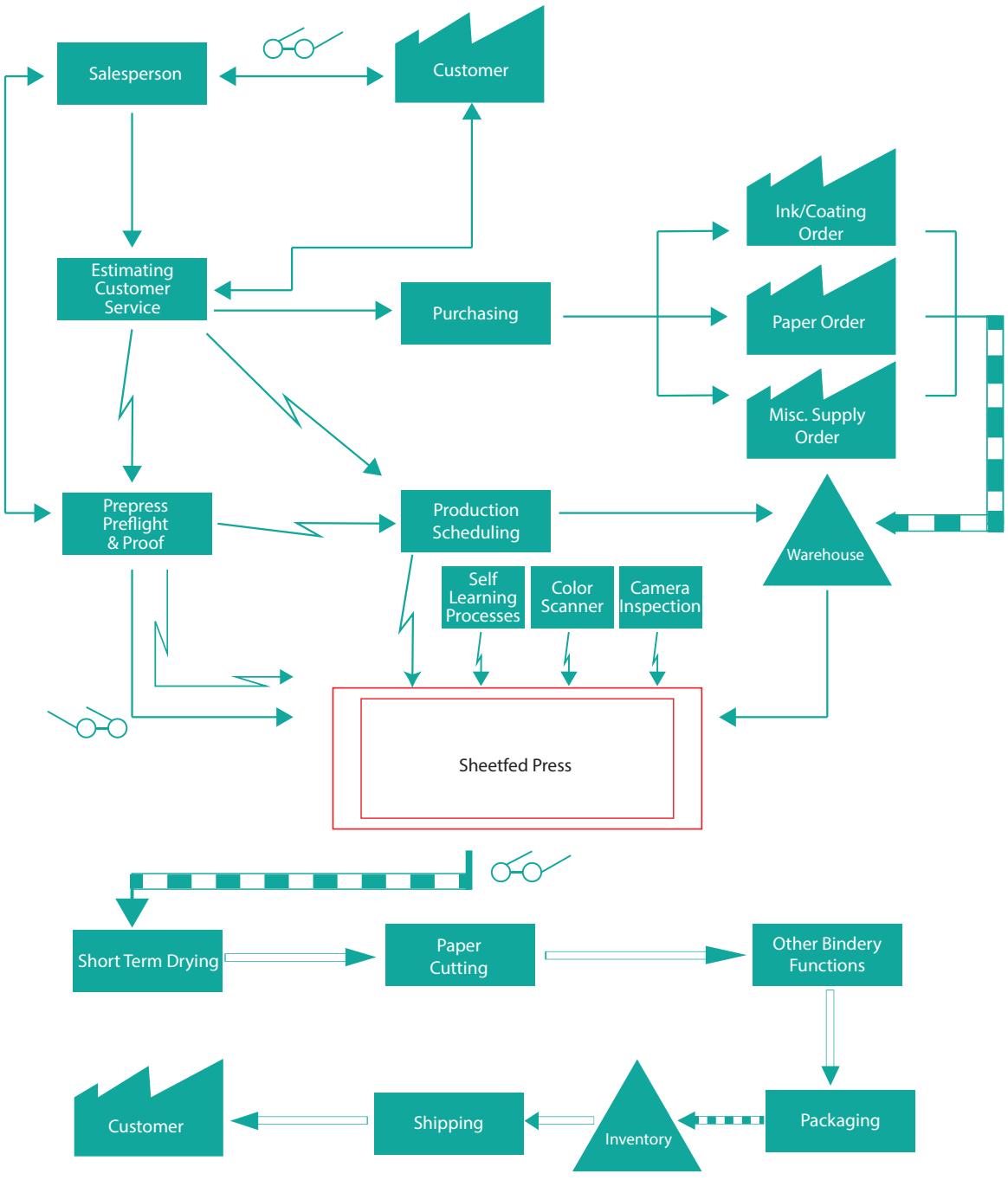
Traditional Commercial Printing Value Stream



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With a *pull* approach, rather than maintaining inventory at the ready "just-in-case" it is needed (which would constitute waste), inventory is provisioned "just-in-time" (JIT) as it is needed to create a product.

4.4 Just-in-time management

As we have seen, the concept of the value stream puts the focus on the customer and the value that they are receiving. Another concept that begins with the customer is *Pull*. In its simplest definition, pull means that no one upstream should produce a good or service until the customer downstream asks for it.[10] In contrast, traditional manufacturing uses a *push* system, producing work-in-process inventory or product before it is requested.

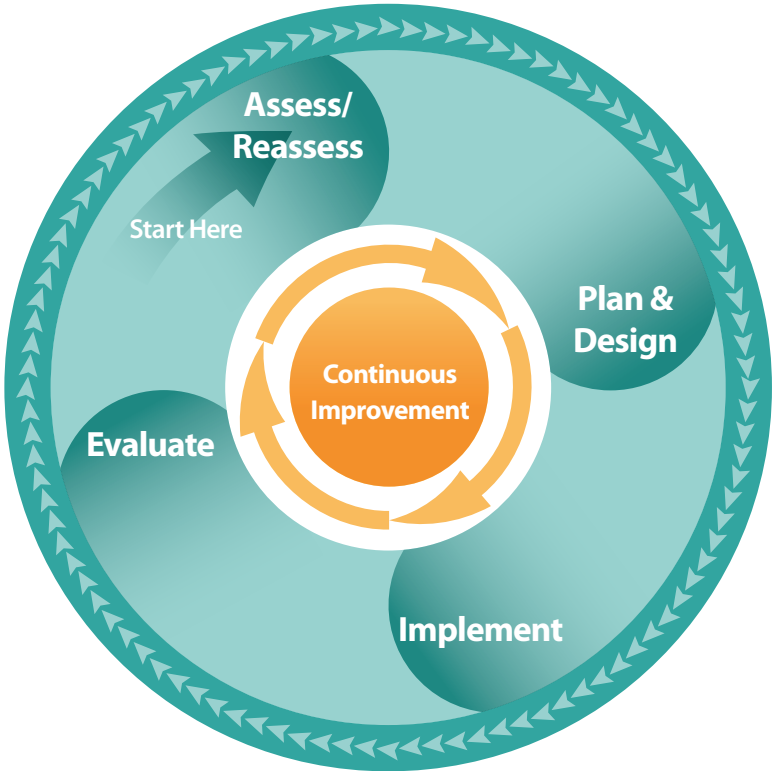
JIT is an ideal state that can only be strived for in practice. It requires a careful and accurate communication and coordination throughout the production workflow concerning job specifications and lead times and relies on a close, partner relationship with supply vendors. However, striving to reduce inventory and safety stock through a JIT approach holds a number of potential benefits, including reducing the risk for:

- Excessive stock orders for new jobs because needed materials were already in inventory
- Delays in production caused by time wasted searching for stock
- Time lost separating damaged stock from good stock
- Problems on press caused by stock in poor condition
- Wasted floor space devoted to unused inventory[11]

An ordering tool commonly known as a "Kanban card" is often used with the JIT inventory system. The Kanban card is simply a ticket that automates the inventory replenishment cycle for items repeatedly used in the production process. For example, a pressroom could have two bins holding supplies of a particular kind of ink. A kanban card identifying the product could be placed at the bottom of the first bin. When the first bin is empty, the kanban card will visually trigger the appropriate personnel to reorder the ink while the second bin is being used. In some manufacturing applications, electronic kanban systems are used.

4.5 Kaizen events

"Kaizen" is the Japanese word for the concept of continual incremental improvement. A "kaizen event" (sometimes called a "blitz") is a technique for applying an intensive, short-term effort to improve part of a value stream. Kaizen events typically involve a diverse group of team members who can offer a variety of insights on a particular issue. A kaizen team may be formed, for example, to analyze a makeready process to identify inefficiencies or to review order-taking processes to determine how they can be improved. Team members collaborate on possible solutions and develop a report outlining recommended actions. Kaizen events typically last one-to-three days. They help drive continual incremental improvement rather than just focusing attention on process improvement when there is a problem. Some printing plants have reported that they have been able to save hundreds of thousands of dollars because of ideas that were implemented because of kaizen events.[12]



Kaizen improvement cycle

Originally associated with 5 Japanese words, in English the five S's typically refer to: Sort, Straighten, Shine, Standardize and Sustain. The following is a look at each S category in greater detail:

4.6 The 5S approach to process improvement

5S is a systematic approach to increasing efficiency by bringing greater order to the work environment. Implementing a 5S system provides structure to help pressroom employees maintain a predictable, safe and clean work area.

Sort

The idea behind Sort is to eliminate from the production area (or other workplace) all items that are not needed to perform daily tasks. Sort involves a close examination of every item in the production area. An objective criterion, such as whether or not an item is used daily, can serve as the decision process for determining whether an item stays or is removed from the work area. Typically, items removed are affixed with a red tag and located together in a designated 5S red tag area in another location for further sorting. There are a number of suppliers that offer 5S red tags for purchase.

A standard red tag should contain the following information at a minimum:

- Work area
- Date tagged
- Reason for tag
- Type of material
- Disposition
- Discarded by
- Discarded date[13]

Typical disposition categories include:

- Never used/junk—throw away
- Used once a year—Keep in long-term storage
- Used less than once a month—store in the warehouse
- Used approximately weekly—store in the process area[14]

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Like a good spring cleaning for a household, the Sort process will create a workplace suitable for efficient operation by reestablishing order in the production area, improving space utilization and reducing waste in the form of motion looking for tools and supplies.

Straighten

Straighten involves neatly arranging and identifying materials and tools that remain in the production area to facilitate efficient use. For Straighten, anything needed for makeready tasks and preventive maintenance activities should able to be accessed within 30 seconds.[15]

Elements of Straighten may include:

- Identifying and labeling locations for all tools and materials
- Painting or taping outlines to identify floor locations for everything from waste bins to pre-makeready sites
- Including arrows showing flow and direction
- Adding lighting and painting walls and ceilings in light colors to create a brighter work area
- Grouping tools on boards, using color-coding and shadow outlines to designate locations
- Placing related items together in central locations
- Creating kanban signal systems[16]

The Straighten process will greatly reduce the inefficiencies associated with excess motion, such as hunting for needed tools and replenishing supplies, and it will make for a safer work environment.

Shine

Under the 5S system, everyone is responsible for cleaning. Creating an environment in which everyone recognizes and accepts this responsibility will require training and the full reinforcement of management. Developing a written cleaning schedule for equipment, tools and the physical work area that requires everyone to log when schedule tasks are completed will help define expectations and ensure that everyone is fulfilling their responsibilities.

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Standardize

A print business implementing the 5S program must Standardize the 5S process, documenting and training employees concerning the cleaning routines. Otherwise, the initiative may lose steam shortly after it is implemented. Visual reminders of cleaning responsibilities should be placed throughout the work area and cleaning instructions should be readily accessible. Adherence to the 5S schedule should be actively monitored.

Sustain

Sustain means to engrain within the company culture a daily commitment to carry out the first 4 S's. Implementing lasting change is never easy. It requires education, training, continual reinforcement and teamwork. Most important, it involves the complete dedication of management to sustain the program and not return to a culture of putting out fires if it is to succeed.[17]

Progress in observing the 5S standards can be tracked by keeping three important questions in mind:

1. What goals will be achieved by starting a 5S program?
2. How will progress be measured?
3. What tools and resources can be used to measure progress and sustain growth?[18]

Developing a commitment throughout the organization to a well-structured 5S program lays the groundwork for the success of other efficiency initiatives.[19] It creates an environment in which inefficiencies and waste can be clearly identified and proactive, continual improvement throughout the organization can be achieved.[20]

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While 100 percent equipment uptime is the ideal, reality in every manufacturing setting falls short of this goal.

4.7 Total Production Maintenance

One obvious objective in seeking to improve efficiency in a print business is to take steps to ensure that every machine in the production process is always able to perform needed tasks so that there is never an interruption in production. This is the goal of Total Production Maintenance (TPM).[21]

By its nature, equipment experiences losses in production efficiency due to such things as breakdowns, job changeover, suboptimal running speeds, jam-ups, quality problems, and similar issues.[22]

TPM categorizes equipment inefficiencies into three general types, each with two possible underlying causes:

1. Loss of equipment availability due to:

(i) Failure and downtime

Equipment failure and downtime can result from the age and quality of the equipment, improper use of the equipment or inadequate maintenance. Downtime can also result from business and administrative issues such as inadequate work or mistakes in production scheduling or inventory orders.

(ii) Makeready

Makeready times can be improved by adopting the Lean process known as SMED.[23] SMED classifies makeready tasks into one of two categories: internal operations or external operations. Internal operations are those tasks that must be completed while the press is not operating and external operations are tasks that can be performed while the press is running. SMED focuses on analyzing all makeready tasks to find ways to shorten the time required to complete them by eliminating steps, re-engineering tasks or shifting existing internal operations to external operations.

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Depending on the press equipment and related technology being used, examples of ways to convert internal processes to external ones may include:

- Prepping and color matching ink prior to a changeover
- Having needed tools organized and close at hand
- Develop makeready teams to divide up tasks for greater efficiency
- Using setup carts prepped ahead of time with all needed supplies and tools[24]

The ultimate goal of SMED is to optimize uptime and productivity for the press equipment.

2. Reduced equipment performance due to:

(i) Idling and minor stops

Idling and minor stops due to malfunctions, improper setup and material imperfections result in both loss of time and waste product. Careful equipment maintenance, ongoing operator training and advanced press technology can all play a role in reducing these stoppages which may seem minor but, when aggregated together over time, result in significant drains on efficiency and productivity.

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(ii) Suboptimal running speed

Running press equipment at less than the manufacturer's recommended equipment speed drains production capacity. Common reasons equipment runs at suboptimal speeds include:

- Product quality issues are experienced at higher speeds
- Ink marking on sheets
- Slow aqueous coating dry
- Insufficient UV cure
- Image fit and register problems
- Difficulty feeding and delivering sheets, etc.
- Paper substrate surface picking
- Waste produced before a defect is corrected
- Equipment mechanical problems
- Material problems
- Difficulty monitoring quality[25]

Proper training on equipment and obtaining advice and resources from the equipment manufacturer can help ensure that press equipment runs effectively and high-quality jobs may be completed at optimum equipment speeds.

3. Reduced output quality due to:

(i) Defects

Defects in final products result in numerous inefficiencies and waste, including the cost of materials and labor, bottlenecks in inspection and production, the cost of handling non-conforming product, the cost of reruns and reduced production capacity.[26]

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(ii) Reduced yield from start-up waste and spoilage

Start-up losses are the loss of time and materials following equipment makeready during the initial production start-up. Numerous adjustments are typically made during this process to ensure a quality production run which often result in waste and spoilage.[27] Training and advanced equipment technology can go a long way to reducing start-up waste and spoilage.

Videotaping your production workflows and reviewing them as a team is a very effective way to identify these kinds of inefficiencies and develop new techniques and methods to eliminate them.

4.8 Overall Equipment Effectiveness

Overall equipment effectiveness (OEE) can be objectively measured by multiplying the percentage of total operating time each one of the three inefficiency types (equipment availability, equipment performance, output quality) is not an issue by the same measurement for the other two types of inefficiency.

For example, if equipment is available 90 percent of the time, equipment is running and at optimal speed 80 percent of the time and there are no defects or start up waste or spoilage 95 percent of the time, the OEE would equal 68.4 percent.

OEE Equation: .90x.80x.95=68.4

Measuring OEE can provide a helpful benchmark for efficiency in your print business. Tracking OEE over time as efficiency improvements are made will show the impact those efforts have on overall efficiency.

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4.9 Press technology and efficiency

Taking advantage of continual improvements in press technology is one important way to achieve significant new efficiencies in your print operation. While a print business may be tempted to think it is saving money by keeping older presses in operation, these presses may actually be causing significant unnecessary costs and waste due to such factors as longer makeready, downtime, part replacement, paper waste, slower throughput, rework and the inability to expand offerings and deliver the highest quality product available.

Some of the time-and cost-saving print technologies available today include:

- Advanced control systems that reduce operator workload with automation and self-learning capabilities that speed up makeready, reduce paper waste, optimize compensation values for environmental variables, control color densities, ink and dampening solution feed rates, plate registration and digital proofing
- High-speed, high-quality perfectors that reduce runtime while eliminating marks and scuffing
- Automatic plate-changing systems with tool-less, highly accurate clamping
- Automatic blanket washing and ink-cleaning systems
- Highly efficient solvent use
- H-UV curing systems for high print quality, reduced turnaround time as well as excellent economic and eco-friendly performance

Incorporating these technologies in your pressroom will improve both efficiency and the quality of your final product.

4.10 Gaining efficiencies with press technology: A Case Study

J.S. McCarthy Printers

J.S. McCarthy Printers, headquartered in Augusta, Maine, is a commercial printer with 175 full-time employees serving the New England and New York areas. The company, founded in 1947, was purchased by Rick Tardiff in 2000.

"Our business model is to be the low-cost producer," said Tardiff. "That doesn't mean selling at the lowest cost, but instead using lean principles to create efficiencies that allow us to take work at whatever the market rate is and still add to our bottom line. We realized early on that the marketplace sets the price, and the only way you are going to make money is to produce that product more efficiently. We are constantly looking for ways to take costs out of every part of our operation. It's the culture of our company."

When it comes to the right press technology to meet the company's efficiency goals, J.S. McCarthy has found a solid partner in Komori. The company purchased its first Komori press in 2007, an 8-color Lithrone S40 perfector (LS840P) with a coater. A second press, an LS840, was added the following year. In December of 2011, the company invested in an 8-color GL40 perfector with double-sided coaters, Komori's new H-UV technology and the new asynchronous platechanging system. Each of these presses has advanced J.S. McCarthy's capabilities and delivered new efficiencies.

> *"When we added our first perfector, that really opened our eyes to what could be gained in efficiencies…*

"We used to have to run an application on one side and then turn the sheet over. Now we can run both sides simultaneously, cutting our time in half." said Tardiff.

The new GL840P with H-UV—where sheets can go from the press directly to bindery—is proving that point again. "Last year we ran 9 million impressions with 4-colors and aqueous coating, turned them over and ran them back through for 4-colors and coat. With the new machine, those 9 million impressions become 4.5 million because we can do both sides simultaneously, making 450 more billable hours available."

The advanced makeready capabilities of the new press are also speeding workflow. The new asynchronous platechanging system is not only faster than previous systems but also employs the use of a benderless clamp, eliminating the need to bend plates and making plate discharge and feeding more efficient. "We are now able to change all eight plates in under a minute and a half," said Tardiff. Additionally, Komori's AI technology, which learns and stores settings, including air and perfecting settings for various kinds of paper, as well as precise ink formulations, is also improving efficiency.

Tardiff sees employee training as a key element in the company's quest for optimized efficiency. "Investing in the right technology is important, but it is equally important to make sure your employees know how to take advantage of that technology and put it to full use. Komori has been a great partner for us by helping us make sure we leverage its advanced technology."

5 LOOKING BEYOND THE PRESSROOM

Lean initiatives do not, and should not, be limited to your pressroom manufacturing processes. The techniques and systems discussed in this White Paper are equally applicable to other critical functions within your print business, including sales, administrative and distribution workflows.

Examples may include:

- Pushing estimating forward in your workflow by equipping the sales team with tablet computers and estimation software so that estimates can be delivered during the sales call, rather than requiring delay to receive input from an estimating department
- Working with supply vendors to develop a just-in-time workflow for needed materials and supplies
- Using value stream mapping and the 5S system to root out waste and inefficiencies in administrative functions, such as inadequate filing systems and time wasted searching for documents, inefficient paper workflows, duplication of work, inadequate forms, lack of standardization for routine tasks, incomplete specifications on job orders, and inadequate training
- Assessing the adequacy of office technology and whether it is being used effectively
- Evaluating how to streamline and reduce shipping costs
- Developing a system for benchmarking and tracking responsiveness to customers

6 CONCLUSION

Developing a culture of continuous incremental improvement will take time and require buy-in and commitment at every level of your organization. However, dedication to the ideas and systems presented in this White Paper, teamwork and learning from the experiences gained by implementing these methods for improving efficiency are sure to pay off. Your business will focus more intently on existing practices, technologies, workflow and training and will find new ways to operate leaner and at lower cost. Ultimately, your customers will benefit as your print business is able to deliver greater value to them at a lower cost.

7 ENDNOTES

[1] Six Sigma involves a set of practices designed to improve manufacturing and other business processes and eliminate defects. The name Six Sigma is derived from a statistical analysis used to measure the quality of product output. The approach involves incorporating efficiency improvement initiatives similar to many of those discussed in this White Paper, as well as developing an internal group of certified experts in efficiency techniques called "champions," "green belts" and "black belts." Additional information on Six Sigma can be found at http://en.wikipedia.org/wiki/Six_Sigma.

[2] Malcolm G. Keif, *What Lean Means for Printers: Reducing Setups and Makereadies* in *Just the Beginning* (hereafter *What Lean Means for Printers*), Plants and Processes www.flexography.org (September 2009), p. 50

[3] In the Toyota Production System, this concept is called *kaizen*.

[4] John Compton, *What is Muda?*, in Management Portfolio March/April 07 as reprinted in Hot Topics, PIA/GATF Center for Lean Practices Lean Manufacturing, Vol. 2 PIA/GATF Press (2008) (hereafter Hot Topics vol. 2), p. 15

[5] *Ibid.*

[6] *Ibid.*

[7] *Ibid.*, p. 16

[8] See, e.g. Kevin Cooper, Malcolm G. Keif, Kenneth L Macro, Jr., *Lean Printing: Pathway to Success* (Hereafter *Lean Printing*) Printing Industries Press (2007), p. 25

[9] James P. Womack and Daniel T. Jones, *Lean Thinking: Banish Waste and Create Wealth in Your Corporation* (Hereafter *Lean Thinking*) Free Press (2003), p. 37

[10] *Ibid.* p. 67

[11] See Tim Dalton, *The Printer's Guide to Waste Reduction*, NAPL (2000), p.138

[12] *Lean Printing,* p. 84

[13] *Ibid.*, p. 33; see also Sudipto Mukherjee, *Management Responsibility Toward 5s as a Continuous Improvement Program* (hereafter *Management Responsibility*), in Management Portfolio July/August 2006 as reprinted in Hot Topics, PIA/GATF Center for Lean Practices Lean Manufacturing, vol. 1 PIA/GATF Press (2007), (hereafter Hot Topics vol. 1), p. 26

[14] Ken Rizzo, *5-S for Printers*, in Management Portfolio (March/April 2007) (hereafter *5-S for Printers*), in Hot Topics vol. 2, p.11

[15] *Ibid.*

[16] *Ibid.*, see also *Management Responsibility*, p. 26

[17] *Management Responsibility*, p. 25-26; *What Lean Means for Printers*, p. 49

[18] *5-S for Printers*, p. 12

[19] *Management Responsibility*, p. 26

[20] A helpful discussion of the 5S approach may also be found in *What Lean Means for Printers*, p. 50-51

[21] *Lean Thinking*, p. 353

[22] Ken Rizzo, *Business Management: Total Production Management* in Management Portfolio (May/June 2007) (hereafter Business Management) as reprinted in Hot Topics vol. 2, p.4

[23] SMED stands for Single Minute Exchange of Dies and was developed by Shigeo Shingo, a consultant for Toyota and other manufacturers. *What Lean Means for Printers*, p. 51

[24] What Lean Means for Printers, p. 52

[25] Ken Rizzo, *Business Management: Total Production Management* in Management Portfolio (May/June 2007), p. 5

[26] *Ibid.*

[27] *Ibid.*, p. 4; *Lean Printing*, p. 63-64