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FINDING NEW AND BETTER WAYS TO MAKE QUALITY PAY

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Another White Paper in a series from the manroland, Inc. Print Technology Center

In the world of print production, the term "quality" conveys multiple meanings. Books have been written on what quality is, on ways to measure it, control it and improve it. Print buyers have identified key things that they look for (both positive and negative) in a quality job. Numerous tools are used to monitor aspects of quality at virtually every production step. Some print operations have entire departments dedicated to ensuring output quality.

Yet, at the end of the day, "the eyes have it": The client looks at and signs off on a proof, accepts the job — or doesn't. Regardless of data pointing to perfection, if the client says "too much red" ... it has too much red.

In short, "quality" is perceptual, conditional and subjective.

Achieving it, however, need not be. Given specific standards, meeting them can be a highly objective undertaking, with predictable results. And most print shops routinely employ various means to control, monitor and measure output in order to ensure rapid client acceptance.

But today's business environment calls for more than delivering jobs that meet ever-tighter specs. Doing so in less time, with less effort and waste is crucial in order for print shops to survive, much less thrive.

The good news is that steps to improve quality can also save time, material and more, while generating dollars-and-cents returns. Although a multitude of items and issues impact the final printed sheet, the press, as the central figure in the printing process, offers unmatched potential to alleviate issues elsewhere and to deliver the payback printers need.

In this White Paper, we look at ways to turn quality into a moneymaking tool, as we ...

- Provide an overview of variables contributing to quality
- Touch on key accepted quality standards and methods
- Focus on the print production process and the press in relation to other items
- Point out press features that can significantly increase quality payback
- Cover emerging, broader quality system developments to improve overall operational performance

In new places, new ways ... now's the time to find more "quality ROI" for your shop.

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Putting pressure on the press: little things can add up big to deliver Quality ROI.

Press runs grow shorter. Turnaround times get tighter. Client demands get tougher. And prepping a second proof — much less rerunning a job — is the last thing you want to do.

Nevertheless, satisfying your client's perception of quality in accepting a job is the name of the game. Whatever it takes.

Many times, a bit of variation gets by with an OK. Or a little tweaking for a new proof will suffice. Then there are times when a hickey is missed in sheet-pulls and you spend extra time and effort sorting through a portion of the run — or decide to discard the entire section of a sheet for a particular job. Or worse.

Chances are, you already employ various means to avoid such problems. And most of the time, they work.

Consistency breeds consistency: procedures and standards point the way.

Establishing standards and procedures designed to achieve quality and consistency is, of course, a must.

We see more and more printers turning to standards developed by the International Organization for Standardization — aka ISO — specifically ISO 12647, which defines print process quality standards and focuses on pinpointing causes of problems.

ISO certification enhances your quality "street cred" with customers and the industry in general, and indicates that you have established specific procedures for monitoring, measuring and ensuring the quality of output, day in and day out.

"Fast turnaround and shorter runs — it takes speed and efficiency with output quality."

"Press flexibility and waste saving features are critical with shorter runs and higher end, more upscale work."

You may, as many printers do, employ other standards to achieve the same goal. The important thing is to have standards and effective systems and procedures in-place — and to let your customers know what they are, engaging them in the quality process by, for openers, encouraging them to provide precise and measurable specifications for each job coming into your shop.

It's a long road from initial Estimate to final Invoice, however, with many steps, processes and potential pitfalls along the way. (See "Full Circle Job Cycle" illustration, p. 9.) Regardless of standards, a multitude of items and issues can impact the quality of the final printed sheet.

Quality problem? Let the finger-pointing begin.

Not only that, most "quality problems" don't become apparent until you're printing. And the find-and-fix process often begins with "educated guesses" that may or may not be on-target.

- It's the ink. Viscosity? Adhesion? A "bad batch"?
- Paper's too moist/too dry? Porosity? Compression?
- Plate issues. Ink transfer? Dot gain or loss?
- Fountain solution's the culprit: We've seen, for instance, where solution "specs" were the same but it came from a new supplier. It took lab analysis by the ink maker to detect the difference — and correct it with a slightly altered, more compatible ink formulation.

The observed quality problem helps narrow the search for its cause. But there are usually several possibilities which (as noted above) can take time to decipher and may defy a quick, easy fix.

Multiple variables. Control is the key.

This is nothing new, of course. Beginning with the invention of the first wooden press with movable metal type by Johannes Gutenberg in 1440 until today, a plethora of variables has always impacted the printing process. Although the evolution of printing presses and related technologies has eliminated or dramatically diminished many of these variables, those that remain make achieving "consistent quality" a daunting task, to say the least.

The illustration on the following page ("The Challenge") outlines more than half a dozen categories of variables that

impact quality on every job. Most involve "supplies" such as plates, paper, ink and the like, all of which can greatly affect output quality.

Establishing standards for your suppliers and their products, in fact, is a key part of your quality management effort. Are your suppliers ISO certified? Do their 4-color process inks, for example, conform to ISO 2846-1 standards? Assessing the grade level of supplies along with relative price is critical not only from a quality standpoint but in terms of bottom line returns.

Among all variables, however, the "human" element is the most difficult to control. Numerous physical attributes and mental aptitudes as well as training affect results. What's more, unlike machines, people get tired, may "feel good" (or bad) or be influenced (albeit unknowingly) by many factors that can vary from day to day, hour to hour or even from one minute to the next — ultimately influencing what they "see."

That's why "eyeballing" by even the most experienced operators is not reliable. And it can't top precisely objective by-the-numbers readouts from digital measuring devices.

This also highlights an obvious point: you can't control something you can't measure. And that's where numerous tools come into play.

While hand-held devices may suffice in some situations, the best solution is automated monitoring, measuring and other quality-enhancing systems integrated into your pressroom equipment. Which brings us to the press itself.

It all comes together on the Press: best-positioned for 'conflict resolution.'

The biggest category of variables arrives with the "printing process," when everything comes together on the press. Here's where the rubber meets the road, so to speak, and the job gets done right. Or not.

Various press features or operational adjustments, in fact, can compensate for certain shortcomings in other items — at least partially, if not fully. While improving quality and consistency, a number of these are also ROI-generating features — saving time, reducing waste, increasing throughput and efficiency.

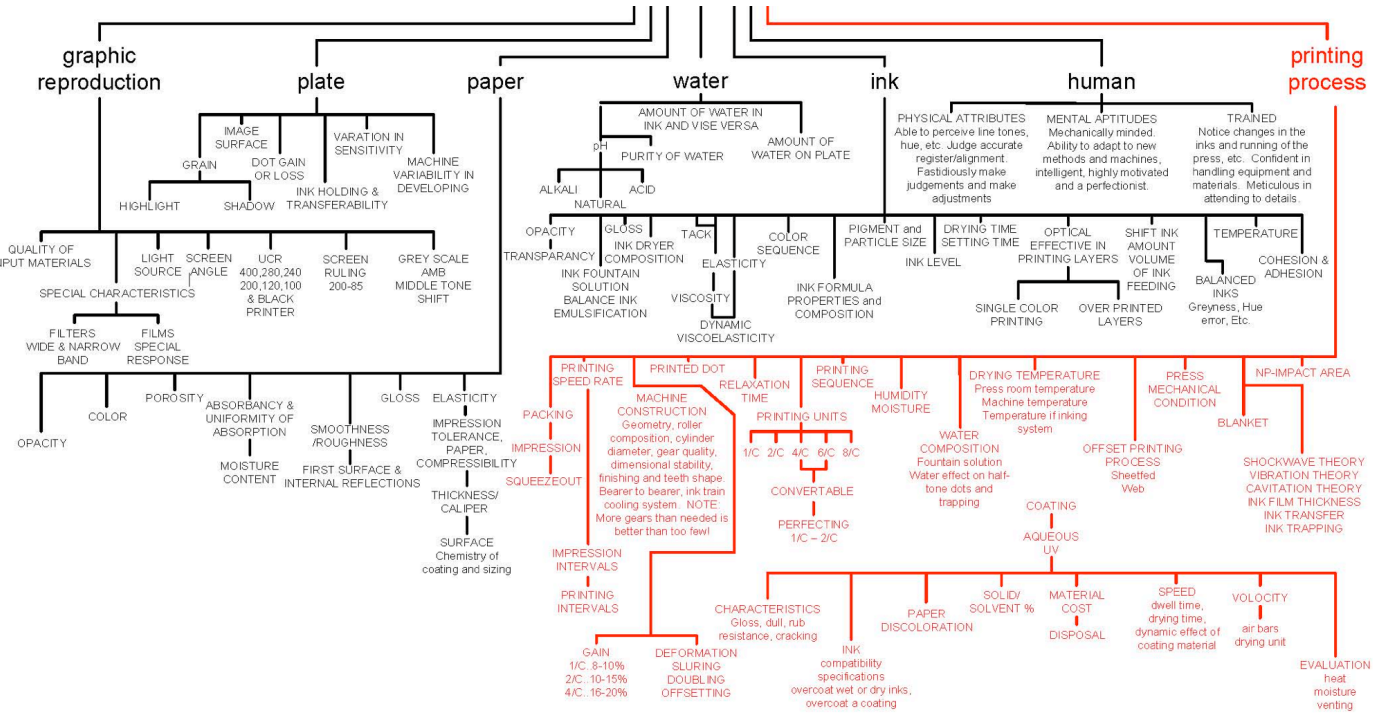
Typically the two biggest questions regarding the press are "how good is its registration" and "how well does it hold color" throughout the press run? Automated assistance with everything from makeready to defect detection can also contribute significantly to Quality ROI.

Several "front end" options found on newer presses (which also may be retrofittable on machines with "open technology" systems that enable such upgrades) include:

- Prepress link for CIP-4/JDF which enables precise job information to be communicated directly from prepress

The Challenge

Variables Affecting Quality of Color Reproduction



Seven categories of factors in this outline — each with multiple sub-factors — all impact the quality of color reproduction in one or more ways. Interaction among them at different steps and stages multiplies the complexity as well as the difficulty of control ... and the resulting quality of output.

to press. This also links with post-press operations; and JDF (Job Definition Format) workflow details provide other benefits, too (see below).

• Closed-Loop inking helps ensure color accuracy and consistency.

• So-called quick-start automated sequencing gets the press on-color, producing saleable sheets more quickly, with little or no operator involvement.

• Off-line makeready systems can prep the press for the next job while the current job runs; a big time-saver.

• JDF & JMF (Job Message Format) links enable automated, up-to-the-minute MIS job status reporting.

Complete job data storage capability is a major plus, too, not only to duplicate client-accepted quality on repeat orders, but also to accelerate prep for similar-but-slightly-different projects.

Again, if your current press doesn't have or can't accommodate upgrades to these features, put "open system technology" as a must-have when you look for your next new press.

> "We can match anything. Automated features let us print lower cost substrates — even recycled board — and still produce high quality work."

First things first, however. Let's begin at the beginning.

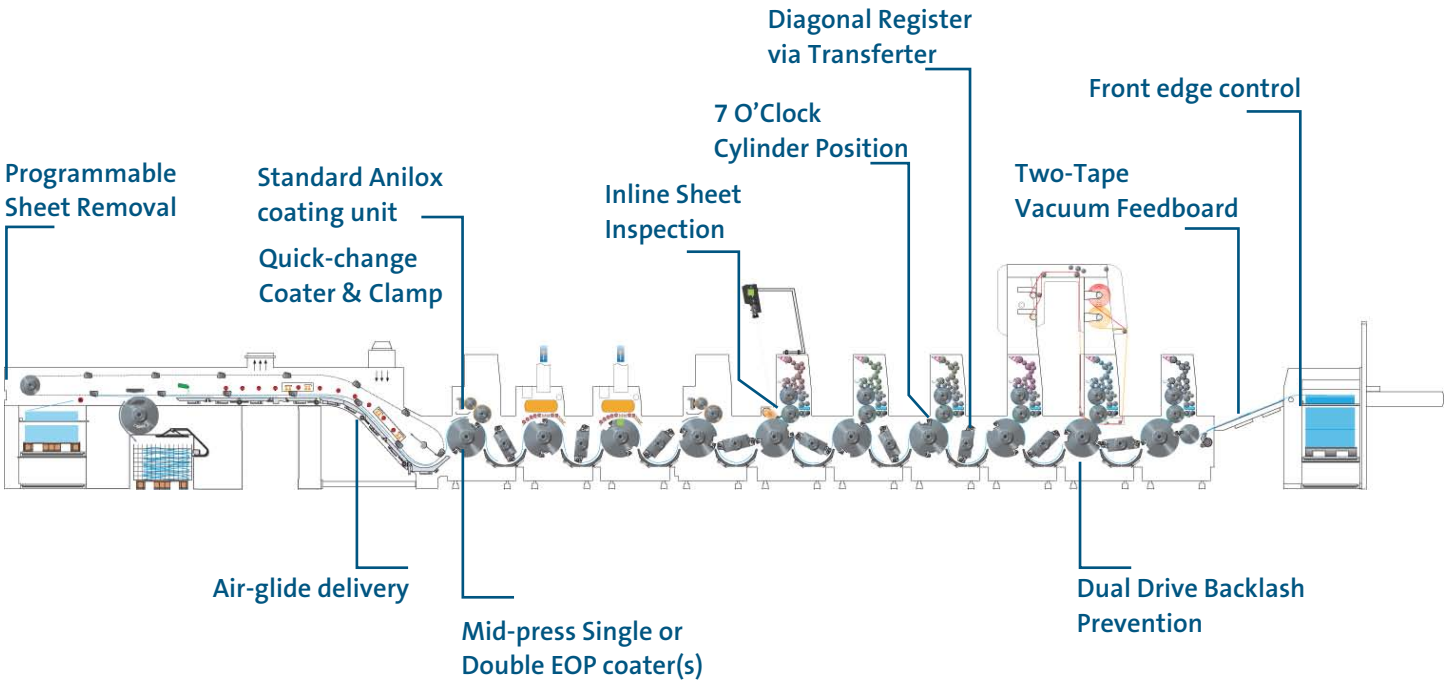
Building-in quality output from the ground, up.

Set aside for a moment the many advanced, automated technologies — the "bells 'n whistles," if you will — that are typically top-of-mind in discussions of quality. Start with the design and construction of the hardware itself, right down to the sources and types of materials used.

Conforming to recognized quality-manufacturing standards is important. (See "ISO: The Standard in Standard Setting.") ISO 9000-2000 certification, for one, means that the manufacturer can trace its processes all the way to the raw materials used. Some press makers are vertically integrated, with their own foundries mixing their own composition of materials — which provides ultimate quality control, right from the start.

The advantage is that the manufacturer can better optimize materials for high strength based on design parameters for a given part. Sturdy construction promotes machine stability (some presses have 4-inch side frames!). The right material mix ensures that the machine is strong enough to keep cylinders and bearings in line — vital for solid registration and color control —

End-to-End Integrated Quality Control



Some of the key quality-enhancing items on today's more-advanced presses improve registration, color fidelity, detect and correct defects, and in other ways help speed production, reduce waste and transform time savings into bottom line returns.

from Day One and for years to come.

Speaking of cylinders, high chromium content adds to rigidity, stability and prevents corrosion while increasing cylinder life, too. Don't settle for less.

In short, basic construction differences among presses come into play before numerous high-tech automated systems do — and, in fact, can impact their performance.

Check out design differences, too. For example, some presses are engineered with a dual drive system that eliminates backlash from gears when speeding up or slowing down the press — thus ensuring precise registration, nonstop.

Of course, virtually all presses since the 1990s incorporate the 7-o'clock cylinder position, which ensures that each sheet is fully printed on each unit before it's transferred to the next.

Operating features that add up and up and up.

Although many presses and press features contribute to quality in one or more ways, some have a more significant affect on primary quality issues such as Registration, Color Consistency & Control — and, importantly, can provide a higher degree of control which will continue to deliver for you.

Getting your press up-to-speed and on-color quicker with less waste is one thing. Backlash between gears when either increasing or reducing speed can cause sheet inconsistencies and registration problems, unless the press is equipped with a dual drive system to eliminate the backlash. And, while press speed may be consistent on long, high-speed runs, temperatures are not; machine and inking system temperature control is critical for maintaining consistent quality output from first sheet to last.

After all, the more your press does for you, the more you can focus on improving other factors that impact output quality — paper, inks, supplies; operator training, too.

It goes without saying (but we will anyway) that you can't overlook the basics. Making sure that press and prepress conditions are stable and repeatable calls for regular maintenance, proper calibration, and constant attention to blankets, packing, impression settings,

ISO: The Standard in Standard-Setting

The International Organization for Standardization program (ISO*), founded over 60 years ago in 1947, has published more than 17,500 international standards relating to quality in manufacturing. Based in Geneva, Switzerland, its network of institutes spans 159 countries.

As in the pressroom, standards such as ISO 9001 focus on establishing and maintaining a Quality Management System (QMS) ... consistent practices designed to help ensure that everything is done "right the first time." The ISO 9000:2000 and ISO 9000:2008 series introduce eight QMS standards that provide a framework to help senior management guide their organizations' continuous improvement efforts.

Manufacturers must follow a stringent process in order to achieve recognition for any ISO standards. Standards that can significantly impact the manufacturing of your press include:

- ISO 9000:2000 – which covers all areas and press components, and all press models. Certification means that the manufacturer documents and can trace its processes all the way back to the raw materials. They also are able to anticipate any drifts from specifications and resolve them before they becomes problems.
- ISO 14001:2005 – Environmental Management System standard, which ensures compliance with various legislative requirements.
- ISO 12647 – which defines print process quality standards, and focuses on finding the "root cause" of problems — the critical first step in order to take corrective action. There are separate, specific ISO 12647 Certification standards for each type of press — sheetfed presses, web, gravure ... you name it.

Find out if the manufacturer of any press you're considering has achieved ISO recognition for meeting all of these standards.

Press features relating to ISO 12647 in particular, can play key roles in anticipating, pinpointing and either avoiding or correcting print-run problems on a daily basis — and make a major difference in your Quality ROI. Certifying your own print operation can strengthen your quality position with customers.

** ISO comes from the Greek word "isos," which means "equal."*

dampening solution and the rest ... as well as plate imaging and developing.

That said, let's look more closely at some key press items that can boost Quality ROI relating to ...

- Registration issues
- Color Consistency/Color Control
- Defect Detection & Correction

Automated assistance via so-called quick-change and various sequenced systems are an integral part of these technologies.

Features that zero-in on Registration

For openers, there's front edge control to align each sheet coming from the feeder.

- On most presses, this is done on the separator head, with a very short dwell time as the sheet's being pulled off the pile and sent into the forwarding suckers.

The best systems use two vacuum feeder tapes which can independently speed up or slow down (up to 65% sheet slowdown) to more carefully align the sheet. What's more, this takes place along the full length of the sheet feeder board, providing much more dwell time so the sheet can, in effect, "relax" and become more precisely aligned at the head stops. This, of course, improves the odds of perfect registration, right from the start.

> "It's a complete job storage and closed-loop color system. A year from now, it can pull up the same settings and run that job again. Consistency is there, regardless of who's running the press."

From startup to the end of the run, as you increase or decrease press speed, dual drive engineering (as we noted earlier) on some presses eliminates backlash from gears which affects registration. Many press makers contend that dual drive adds unnecessary expense to the machine. But users who are finicky about precise registration will detect movement with these presses and notice the difference.

- "Fit adjustment" on some newer presses enables the operator to line up five colors, for example, on-the-fly right from the console during makeready — instead of having to go out to each unit.

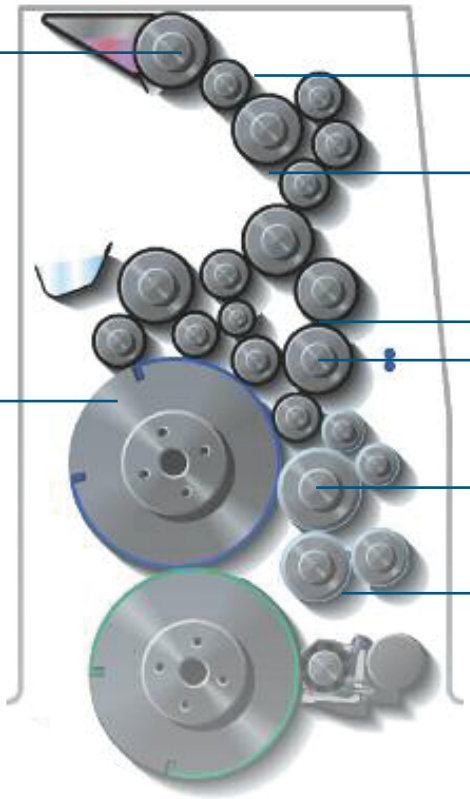
Time savings: about an hour. Per job.

Focusing on Color Consistency/Control

Remember when we mentioned how "iffy" eyeballing is versus digital readouts?

- The best Step One for ensuring right-on color is to have customers provide "by the numbers" specifications for their brand-specific, special or even routine 4-color process jobs. Provided your system

New-Generation Color Control



The latest systems integrate functional features and technologies to speed job setup, startup, throughput and changeover, while also boosting quality and consistency throughout the run.

permits, you can simply dial-in the specs and be virtually "there" before the first sheet comes off the feeder board.

Matching the proof and, ultimately, the printed sheet becomes virtually a "given."

Advanced prepress-to-press technology delivers exact ink pre-settings to computer-controlled inking systems to further ensure that each job is on-color, like, now.

When it comes to startup and getting on-color fast, some machines offer "auto-production" — where pressing a single button initiates a properly sequenced series of half a dozen functions. It's the quickest way to produce saleable sheets, saving lots of time and waste, job after job.

Fast-acting, automated color change systems are a boon to many shops, also saving minutes many times a day, as well as many wasted sheets.

• Closed Loop Color control ensures that your print production maintains gray balance consistently from start-to-finish on each run — even as speeds get higher, temperatures go up and other factors threaten to shift throughput off-spec. These systems virtually lock-in consistent gray balance, providing nonstop measurement and automated adjustments with little or no operator involvement.

Remember, too, that some older machines with "open system" design will enable you to upgrade to this or other modern color control-assisting technologies.

• Does your press have a speed-compensating dampener? In order to maintain consistent color when you speed up or slow down the press, it's important to keep the speed of the dampener in synch.

Coating Consistency is a big issue, too, for many print operations. And there's no better way to consistently meter fluid to the sheet than with a standard anilox coating unit. Metering capacity is much more variable with two-roll systems on older machines; fluctuations result in uneven film thickness, reducing finished-sheet quality.

Can you spot a hickey at 15,000 sph? This camera can. Not only that, it can instantly alert the operator at the console and, if the press is equipped with a direct, programmable Delta dampener, he can simply press a button and fix the problem in seconds!

• If you frequently switch types of coatings, metallic inks and the like, a so-called quick-change coater can enable you to change in, say, 2 minutes instead of 15. And a quick-change clamp can knock a 10-12 minute task down to 5.

Defect Detection & Correction

Nothing's perfect, however. On any given job at any given time, defects can pop up. The secret is to be able to detect them almost instantly, identify what they are and to fix them with as little substrate waste and time loss as possible.

"We're retrofitting the workflow integration system and remote service capabilities on our other press."

• In-line inspection via cameras on some newer presses puts an eagle eye on every sheet, and immediately alerts the operator at the console when a defect is spotted (a hickey, for example; or a smashed blanket).

The "inspector" will flag the sheet and pinpoint the print unit where it occurred.

"Hickey removal on-the-fly" is what some pressmen call it, using this type of defect as an example: and a direct, programmable Delta dampener makes it work. Once alerted by the "inspector," the operator can simply push a button on the console — and the hickey is gone in seconds vs. the traditional stop and go to fix the problem.

Of course, operator review of sheet pulls continually provides a viable means of monitoring quality. And presses with programmable sheet removal capability make sure that the task is consistently done. Set it to pull every 20th sheet and this technology delivers, like clockwork.

Leveraging one client "OK" throughout the run.

The most-advanced press systems enable you to program-in exact specs from the client-approved sheet. This data is then used to monitor every subsequent sheet throughout the run. Even better, color regulation software corrects deviations from the OK'd sheet (solid ink density, for example, or halftone density) by opening and closing ink slides based on gray balance — all at the touch of a button.

For end-to-end quality and consistency, it's tough to beat technology like this.

Test your press; compare with others.

With or without some of the above features, ultimately the question is "How well does your press stack up?"

ISO defines test methods along with criteria to determine if, for example, ink color falls with within specified ranges, or dot gain is acceptable.

Use these guidelines to see how well your press maintains registration and color consistency through a range of speeds. Test, for instance, at 5000 sph, or 13,000 ... Benchmark parameters are spelled out.

You could also run the same test with competitive presses — a wise move if and when you're considering replacing or adding a new machine.

From Estimate to Invoice: more press-provided Quality ROI features.

Before your press gets into the act, however, as well as through post-press finishing, warehousing and/or distribution stages, advanced systems can help keep projects moving quickly and smoothly.

Keeping your own Customer Service Representatives up-to-speed and, through them, clients informed of job status not only is a good idea; it also helps speed up the total project process, getting jobs printed and out the door.

Here's where JDF (Job Definition Format) and JMF (Job Message Format) links come into play. They allow you to report and accurately analyze run lengths, makeready times, waste and more.

Linked to a central MIS system, they deliver the latest data on work in-progress. For example, a report could tell you that "I'm at 80,000 in this 100,000 run. I've taken two hours of makeready, one hour of downtime, two hours for maintenance ..." You get the idea.

Press systems with JDF/JMF are ready to take Estimate-to-Invoice to the next level. Some industry leaders say this is "where the future of managing print shops is headed." And they're probably quite right.

Quality ROI: making the dollars make sense.

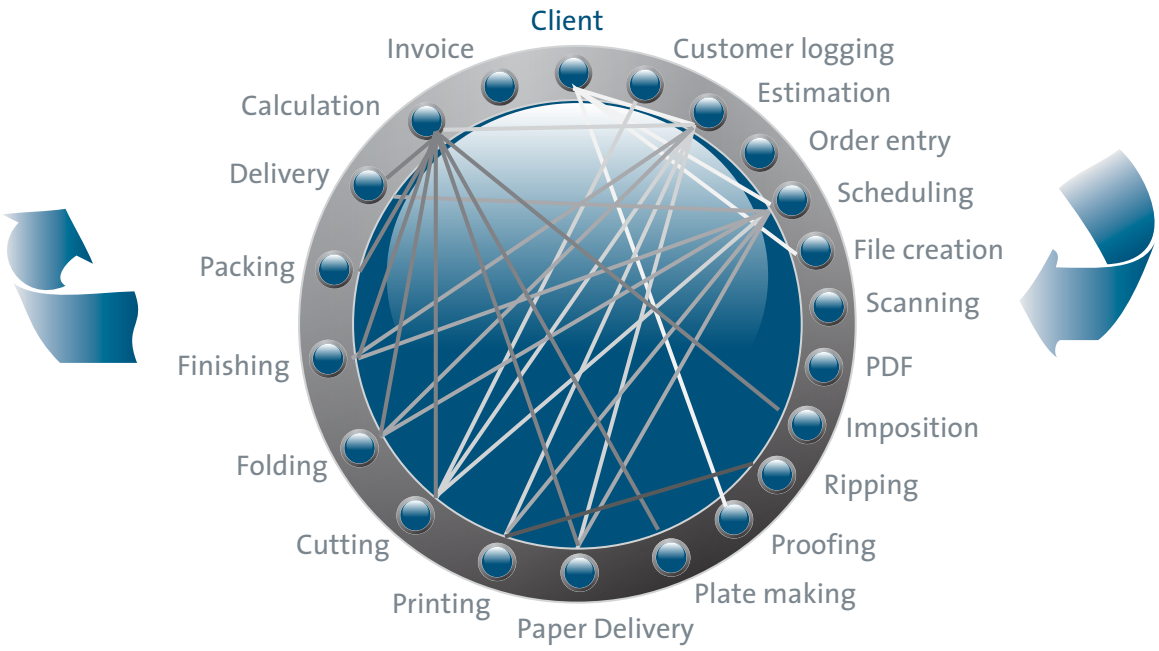
Establish quality standards and procedures ... involve customers in the process ... adopt the most advanced control systems and tools — all are important steps in turning "quality" from a nebulous, subjective claim into an objective customer-signoff process.

Those quality-enhancing options that concurrently shorten makereadies, speed startups, reduce waste, detect-and-correct problems that do arise (and they will) with little or no loss in productive time — those options merit priority attention in any operation.

The press is where you find most of these Quality ROI tools. It's where minutes saved can quickly add up to hours, day after day and job after job. It's where getting up-to-speed and on-color within a couple of hundred sheets instead of 600 – 800 – 1000 leads to dollars on the plus side, too.

Put it all together in a continuous improvement program, and you're positioned to make quality pay. In faster, hassle-free customer acceptance. And on your bottom line.

Full Circle Job Cycle



It's a long road from Estimate to Invoice, and keeping customer service people in the loop with up-to-the-minute info is easy when presses are equipped with JDF (Job Definition Format) and JMF (Job Message Format) links that communicate to a central MIS system.

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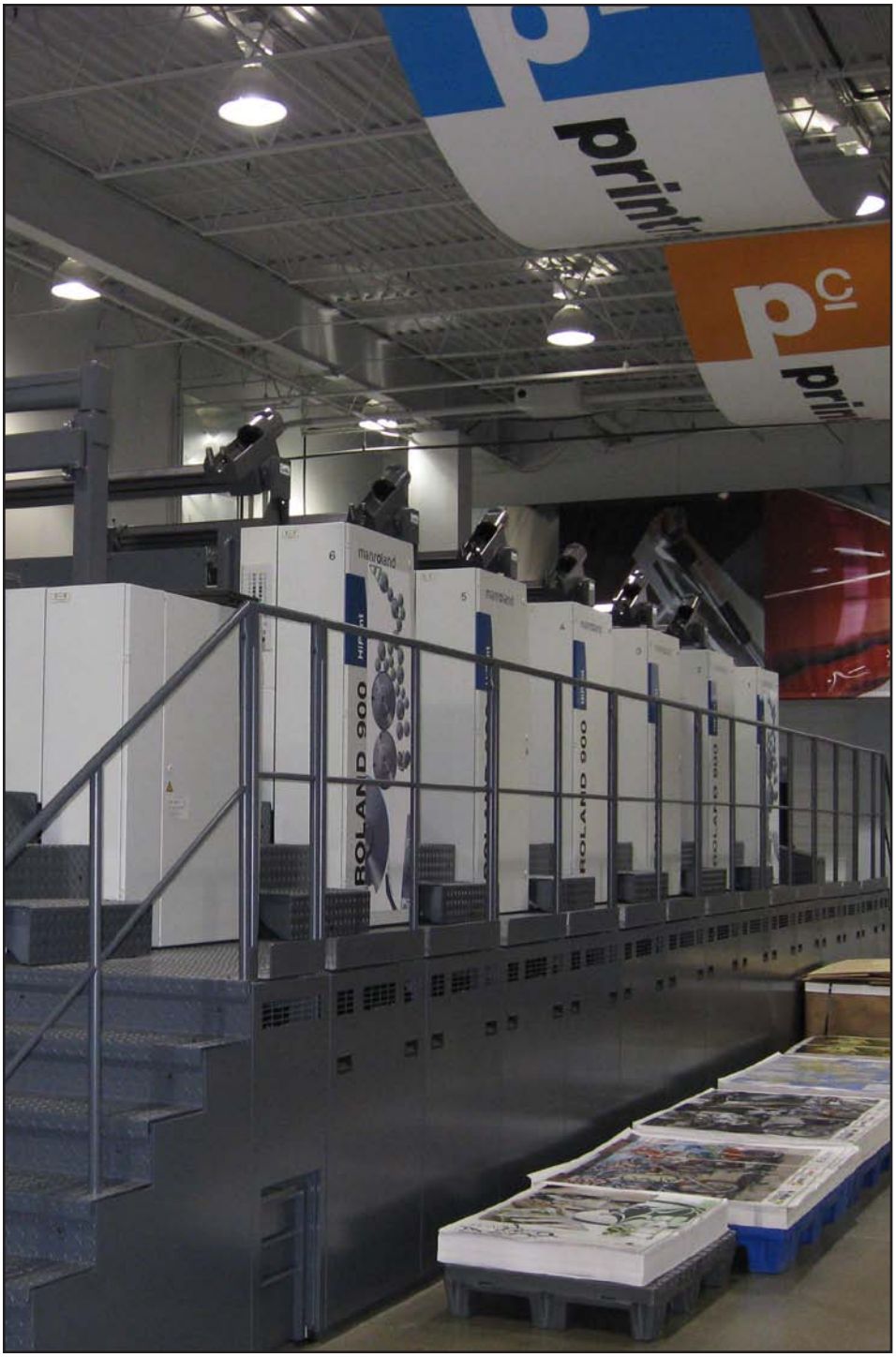
The Print Technology Center



Located at manroland U.S. headquarters in Westmont, Illinois, the Print Technology Center serves as a focal point for addressing customer-specific as well as industry issues. At any given time, a combination of press owners and operators, industry experts, engineers, field sales and technical specialists may be exchanging viewpoints along with data and information, while advancing new ideas and practical recommendations for meeting both current and perceived future challenges.

On-site presses may be used to test and/or verify concepts and suggestions. The Center also functions as a demo site, frequented by prospective and current customers.

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