Case History

Achieving huge productivity gains through "off-press proofing"

Proofing in the flexographic printing industry has been an evolutionary process driven by the advancement of proofer technology. Early proofing devices consisted of a wire wound rod that worked well for reviewing color but did not correlate to the flexographic press. In response, a flexographic hand proofer was introduced consisting of an anilox roll, doctor blade, and a built-in mechanism to control nip pressure as shown in Illustration I. The advantage offered by these devices was that the drawdown was produced using a true anilox process, giving the converter a better indication of ink lay- down characteristics. These devices, in combination with the availability of low cost spectrophotometers, had a significant impact on the industry, providing a means to achieve more precise color measurements. There were limitations however, to these early devices related to the inability of the operator to control speed or pressure during the drawdown process. This problem was exacerbated when the drawdowns were done at different locations.

Illustration I

The industry responded with the introduction of automated mechanical proofing devices (Illustrations II and III). These devices utilized a mechanical arm to pull down a hand proofing device onto a substrate, while controlling pressure and speed. They offered some improvement over hand-held proofing but tended to have insufficient and inconsistent speed and pressure. In a test conducted by the NPIRI Task Force on color proofing, they found that color variations could definitely be minimized by using mechanical ink applicators. Their tests validated that commonly used hand-held anilox proofing devices had inherently higher Delta E variances (0.3 - 1.49) than were experienced with mechanical proofers (0.2 - 0.83). They also reported a much higher degree of variability between drawdowns when using hand-held proofers.

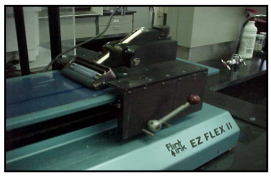

Illustration II

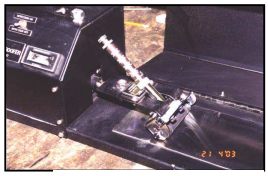

Illustration III

To address the problems associated with these early mechanical proofing devices, Integrity Engineering developed a new "impression roll driven" technology that more closely emulates the flexographic press (see Illustration IV). This air driven device provides accurate, reproducible pressure control (± 2%) and speed control (±1%). Testing has revealed that this proofing technology has finally caught up to the presses. Knowing the viscosity of the ink, (i.e. 15 -18 seconds in a #3 zahn cup), and the speed of the press, we have demonstrated the ability to do reliable "off-press proofing" on the Perfect Proofer™ . The effect of this technology can greatly reduce press set-up and unscheduled downtime, resulting in improved savings, productivity and profits.

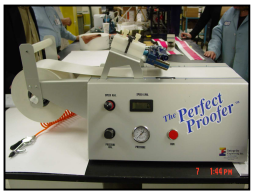

Illustration IV

Validating the premise that the Perfect Proofer could reliably proof inks off-press, several studies were conducted by independent converters, each having the common objective of correlating the Perfect Proofer to their flexographic presses. Each converter set out to determine the proofing system's accuracy, reproducibility, consistency from proofer to proofer, and capabilities to mass produce swatches that would correlate to their flexo presses. The results are shown in Table I below.

Table I – Independent Converter Laboratory Evaluations of Proofers

Study	Situation	Test	Results
Converter A	Large converter has many plants throughout the country; requires light, standard and dark proofs for each job to be printed on a variety of substrates	A number of proofs were made by hand proofing method; same inks were used to produce proofs on the Perfect Proofer; equal number of swatches were produced and timed, and color consistency was determined using a spectrodensitometer.	By adjusting proofer speed and pressure, consistency for light, standard and dark was excellent: ❖ Hand proofer DE range was 0.49 - 1.54, with an average of 0.99 ❖ Perfect Proofer DE range was 0.10 - 0.57, with an average DE of 0.22 ❖ 30% time savings using the Perfect Proofer
Converter B	Normally produces color swatches with gravure proofer for consistency and good looks; problem is that it does not represent the achievable color off a flexo press	Proofs were made using a hand proofer, mechanical pull-down proofer and the Perfect Proofer; an equal number of proofs were made with each to evaluate consistency and overall lay characteristics	❖ Hand proofer DE range was 0.17 - 2.48, with an average DE of 1.04 ❖ Mechanical pull-down system had a DE range of 0.18 -1.98, with an average DE of 0.65 ❖ Perfect Proofer had a DE range of 0.13 - 0.65, with an average DE of 0.57 ❖ Perfect Proofer gave better representation than gravure proof ❖ Easy to clean up ❖ "Best looking proofs ever made"
Converter C	**Converter was interested in determining their ability to reproduce consistent results in multiple locations and with multiple proofers**	**Multiple operators produced multiple proofs with two different Perfect Proofers; each Perfect Proofer used a doctor bladed hand-proofer with duplicate nominal-banded anilox rollers**	❖ Colorimetric reading differences were found to be insignificant from print to print, and from proofer to proofer ❖ There were no differences documented between operators

Achieving Productivity Gains Through "Off-Press Proofing"

Industry studies have concluded that an average of 10% of total unscheduled press downtime is attributed to ink toning. By correlating the proofer speed, pressure and anilox roller to a given flexo printing station, the Perfect Proofer can and will accurately reproduce what that station will print. This allows the converter to see exactly what the color will be before it goes to press. Barring poor clean-up or other non-ink related conditions, there will be only minimal unscheduled color adjustment necessary on press. Supporting the capability of this system to provide measurable productivity gains and waste reduction, three geographically dispersed converters conducted studies to assess and measure efficiencies achieved through "off-press proofing" with the Perfect Proofer. The results are show in Table II below.

Table II – Converter Studies Validating "Off-Press Proofing" Benefits
(Productivity Gains and Waste Savings)

Label Converter	Situation	Results
Converter A	Converter operates with two standard anilox rollers and two paper substrates; they correlated the Perfect Proofer to each flexo print station and have done all color proofing in the ink room vs. on press	❖ Unscheduled downtime has been reduced to a minimum ❖ Productivity (available press time) is up 28% and increasing ❖ Material waste plant-wide is down 26%
Converter B	Converter operates three presses and numerous anilox rollers and substrates; all color proofing is done in the ink room rather than on press as it was before they purchased the Perfect Proofer	❖ Noted 100% consistency in proofer results vs. presses ❖ After more than one year of doing their color proofing on the Perfect Proofer vs. the press, they are saving fifteen minutes per color of unscheduled toning downtime; savings calculations are huge (i.e. 3 color job, 3 jobs/day, 251 working days/year, annual savings of $282,375)
Converter C	**Running two presses, three shifts per day; began doing all color proofing in the lab one year ago to free up additional press ti**me	❖ Increased production run time by 18.75 hours per month, or 225 hours/year ❖ Consumables savings of $2,178.75/year

The new "impression roll technology" used on the Perfect Proofer has been proven. Incorporating this technology into your plant requires some homework, but the results are well worth the effort. The increased productivity (available press time), reduced material waste, and increased profitability will more than offset the cost and effort of correlating this system to your presses.