TAGA 2003 Montreal
Call for Papers

April 6–9, 2003
Hotel Omni Mont-Royal
Montreal, Quebec, Canada

At the highly successful Asheville TAGA 2002 Annual Technical Conference more than 200 attendees heard exciting reports on applications of printing technologies to production of microelectronic mechanical devices (MEMs). They learned How to Find the Sweet Spot on the Press. Presentations were given on diverse aspects of color modeling and color management. Good solid information on advanced engineering concepts in printing was presented. The attendees also enjoyed invigorating discussions on wide-ranging topics in the tutorials, focus groups and open forums. Finally, the TAGA ATC provides one of the best venues for good, old-fashioned networking among colleagues in the printing community.

For the 2003 Annual Technical Conference, TAGA goes to the Hotel Omni Mont Royal in Montreal, Canada, April 6–9, 2003. This site provides a great opportunity to interact in the home of some of the largest printing and paper companies in the world. The Annual Technical Conference will be divided into tutorials, discussion groups, and topic tracks. The topic tracks will include:

PRESSROOM OPERATIONS AND TECHNOLOGIES
As a follow-up to last year’s highly successful How to find the Sweet Spot on the Press, there will be a conference-long track dedicated to pressroom operations and technologies. Sessions within this track will focus on pressroom operations including ink, paper, and fountain solution interactions; plate technologies; advances in stochastic screening and its application; current press problems and related studies; and pressroom automation initiatives, including JDF-Job Messaging Format applications.

ADVANCED ENGINEERING TRACK
We plan to expand the advanced engineering track to encompass several sessions. In addition to new front-end design software, new materials, techniques and applications, we will have sessions that also focus on advancements in packaging materials and technologies (such as applications of Radio Frequency Identification (RFID) and “smart packing”); printable display technologies; and OFET.

COLOR MANAGEMENT TRACK
This year’s color management track will focus on end-to-end color management from image capture to final print. Topics will include soft proofing, front-end software, color modeling, color calibration techniques, and recent developments in the standards arena including new standard color characterization data sets and their application.

DIGITAL PRINTING TRACK
This new track will provide a focus on digital presses, including hybrid digital printing and large-format color digital printing. Topics will include digital press design, digital printing workflows, customization tools and techniques, and much more.

PEER REVIEW TRACK
We will expand the “Peer Review Track” taking the best papers from the Journal of Graphics Technology.

(We encourage submission of papers to the journal for this session. For more information on submitting papers to the Journal of Graphic Technology, please see the paper submission guidelines at www.taga.org.)

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PRESIDENT'S MESSAGE
TAGA President Bruce Blom, MeadWestvaco Corp.

The 2002 TAGA Proceedings is in production and will be mailed to all TAGA members in good standing in early September, so if you haven’t yet sent in your 2002 dues payment, the time is now or you will not receive this collection of excellent technical papers from the Asheville conference.

Since the Asheville ATC, work has been continuing on implementing some new TAGA member benefits. I have noticed some lively discussions on the new TAGAPressOps forum (see article on page 7 of this newsletter), and the TAGAMicroTech@printplanet.com forum is now up and running. Unlike the TAGAPressOps@printplanet.com forum, this forum is private and only open to TAGA members and microtechnology specialists. There are over 50 members of this specialized forum, with an approximate 50/50 split between graphic arts folks and microtechnology specialists. Participation is also very global in nature, and topics include printable displays, organic field emitting transistor production on modified conventional presses, radio frequency Identification and more. If you are interested in joining the forum, please write to TAGAOfc@aol.com.

Plan to join us for the 11th International Printing and Graphic Arts Conference (IPGAC) in Bordeaux, France on October 1–3, which is organized by the French Technical Association for the Paper Industry (ATIP), co-sponsored by the Technical Association of the Pulp and Paper Industry (TAPPI), the Pulp and Paper Association of Canada (PAPTAC), the French and Swedish Research Association (AFSR), and TAGA, in partnership with Centre Technique du Papier (CTP). The conference theme is Printing with Ink/Toner on Paper in an Electronic Communication Media Society. You can find the complete program and registration form for the conference on the TAGA web site http://www.taga.org. Many interesting presentations are scheduled as well as some great social events, including sampling some of the best wines in the world.

Just after IPGAC, TAGA will host a one-day meeting of the TAGAMicroTech forum members during GraphExpo on October 7th in Chicago. Companies specializing in micro and nano technologies such as printable electronics and displays will be providing technology briefings in the morning, followed in the afternoon with breakout discussions focusing on partnerships and joint studies between graphic arts and microtechnology companies. The meeting is open to all TAGA members. If you’re interested in attending the meeting, please contact TAGAOfc@aol.com for more details.

Looking toward our next Annual Technical Conference in Montreal (April 6–9, 2003), we are fortunate to have Mr. André Dion, Director of the Institut des Communications Graphiques du Québec as our Local Conference Chairman. A great technical program is being planned by TAGA Vice President of Technical Papers, Dr. Richard Goodman of Kodak Polychrome Graphics and his committee. Be sure to check out the topics we are planning in the Call for Papers article on the first page this newsletter. If you have a paper that you think would be of interest, please send your abstract and contact information to TAGAOfc@aol.com by October 31st.

I look forward to seeing you at one or more of the upcoming TAGA programs.
TAGAPressOps is a hit!
by James E. Harvey, Director of Program Development, TAGA

At TAGA Asheville 2002, and in the last edition of the TAGA Newsletter, we announced the creation of the TAGAPressOps@printable.com forum. As of the writing of this article, there are 256 members of TAGA-PressOps, and the number is continually growing!

A partnership between TAGA and Printable Technologies, TAGAPressOps is an online forum where TAGA members and the general printing public can pose questions, make suggestions, and discuss issues related to press operations, press management, and press technologies. You can sign-up for this free service at www.printplanet.com at anytime. Some of the discussions to date include:

- Drying problems—including suggestions for speeding up ink oxidation.
- In-house research capabilities of printers—do printers need to do in-house research to gain a competitive advantage, and if so, how extensive should such operations be?
- Ink density vs. dot gain—including a discussion about the consistency of ink between “cans” and colors as well as predictability.
- Ink water balance and density variations on press—including a discussion of the relationship between blanket/plate pressure and ink/water balance.
- Paper color variation
- Press operating procedures—including a discussion of consistency, calibration, and press speeds.
- Problems with press profiling and proofing—including a discussion of test methods.
- Quoting dot gain—a discussion about the meaning of dot gain and underlying assumptions.
- Recommendations that would help a printer move towards a more predictable manufacturing process—including a discussion of ink feed problems and solutions.
- The cause of ink piling when printing very small dots/stochastic screening
- What paper characteristics are central and valuable to press management?

If you’re like me, you probably get a ton of email messages each day. With the TAGAPressOps@printplanet.com forum you have three main options; you can receive each email message directly, or you can choose a convenient daily digest that wraps each day’s messages into a single message, or you can choose web-only access. You choose the level of participation that fits your needs and busy schedule.

If you decide to join today and are interested in some of the topics that have already been discussed at TAGAPressOps@printplanet.com, you can also browse through archived messages at www.printplanet.com once you’ve logged into the TAGAPressOps forum section.

For decades the TAGA Proceedings have been an invaluable technical reference for the printing community. Now with TAGAPressOps@printplanet.com, you have an equally valuable reference for posting technical and operating questions and getting valuable suggestions, solutions, and answers to your questions from your peers. If you are not yet a member of TAGAPressOps@printplanet.com, sign up today!

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We are looking for papers on all of the above topics, as well as other current research and technology papers for general sessions. The conference will also include focus group discussions on color management and color modeling technologies, including new soft proofing ideas, as well as pressroom topics and problem solving.

FOUR TUTORIALS BEING SCHEDULED:
- Dennis Jaynes, Director of Quality Control, Safety, Security, & Training at Jet Litho-color, Inc., will teach a tutorial on how to determine a tone curve correction when printing on a new substrate based upon line screen and paper surface characteristics.
- Dr. Abhay Sharma, Associate Professor, Department of Paper and Printing Science at Western Michigan University will provide a color management tutorial.
- We are looking for two additional tutorials and your suggestions are invited.

If you are interested in submitting an abstract or participating in any of the topic tracks, please contact Dr. Richard Goodman at goodmann@sunchem.com or Jim Harvey at jharvey@media4theworld.com. All abstracts are due not later than October 31, 2002 and should be sent via email to TAGAOpc@aol.com. Abstracts should not be longer than 200 words and must include the authors’ names and contact information, as well as the name of the person who will be presenting the paper at the conference. All selected papers are due in final edited electronic form by March 5, 2003. (Instructions will be provided to accepted authors.) TAGA looks forward to an exceptionally exciting 2003 Annual Technical Conference, in Montreal.
produced better results than the 3-color version. He is generally credited with being the first person to use a black printer for process color work (Lilien, 1985). Today’s practices confirm Le Blon’s findings, but what are the underlying reasons for the black printer?

The primary reasons for using a black printer are to combat the influences that additivity failure, substrate characteristics and undesirable spectral absorptions have upon the 3-color print.

Additivity failure occurs when the sum of the component optical densities fails to equal the measured density of the physical combination of the components in question. The theoretical blue filter density of a typical yellow, magenta and cyan combination might be, for example, 1.80 whereas the actual density might be only 1.40. The addition of a black printer may subsequently boost the density to around 2.00.

The characteristics of the substrate exert a powerful influence upon the quality of the printed image (MacPhee and Lind, 1994). Such lower grade substrates as newsprint gain a disproportionate (compared with high grade substrates) increase in printed image quality when a black printer is used. A maximum 3-color density of 0.90 (87.4% reflection) on newsprint may increase to 1.20 (93.7% reflection) when a black is added. The 6.3% drop in reflection due to the addition of black in the cited example compares favorably to the 2.2% drop that might be expected from the typical 1.50 to 2.00 density increase that would occur with higher grade substrates when black is added to a 3-color print.

The unwanted spectral absorptions of the yellow, magenta and cyan inks will, if overprinted in full strength, produce a 3-color solid that is brown rather than black. A compensatory reduction in yellow and magenta to produce a neutral (“gray balance”) will have the undesirable consequence of reducing maximum shadow density. The use of a black printer will restore neutrality and maximize density in the darker tonal values. For maximum impact, however, it is important to print black last in the printing sequence. The chromatic colors are not perfectly transparent; therefore, they will cause a color cast in darker tones if they overprint black. Yellow inks, in particular, will impart a yellowish sheen to what should be dark, neutral tonal areas if they overprint black.

PRINTING THE BLACK

Adding black to a 3-color image does have drawbacks: the most serious concerns the ink transfer and setting aspects of wet-on-wet printing. Underrapping, or incomplete ink transfer, occurs when transferring wet ink to still-wet previously printed ink films. Such related problems as ink film mottle and backtrap can also accompany poor ink transfer.

Four wet ink films are more difficult to set or dry than three ink films. The thicker total ink deposit that characterizes four color printing is more susceptible to guide wheel marking, setoff, blocking and streaking. Higher temperatures are required to set web printing, which, in turn, can lead to blistering, cracking and other physical damage. In the case of sheet fed printing, excessive anti-setoff spray powder may be required when additional wet ink films are used.

The other major problem encountered when printing black is moiré. Three color printing allows an ideal 30-degree separation between screen angles. The use of the fourth color forces compromises that sometimes cause moiré patterns. The required 30 degree separation maintained between the darker black, cyan and magenta inks places the lighter yellow printer 15 degrees away from both cyan and magenta. This placement sometimes causes noticeable moiré patterns between yellow and magenta and/or yellow and cyan.

ACCOMMODATING THE BLACK PRINTER

The problems associated with overprinting four wet films of ink have been addressed by restricting the percentage dot values in the darkest tonal areas. The first specifications for wet-on-wet letterpress magazine printing, for example, restricted total 4-color percentage dot values to 240 percent. Coverage would be 400 percent if all four colors were each printed solid, or at 100 percent tonal value.

Area coverage is restricted via the application of under color removal (UCR) or gray component replacement (GCR) techniques at the image processing stage of prepress. In fact, however, reducing area coverage on the printing plates does not mean that the printed area coverage is similarly reduced. A previous column (Color Printing Dynamics) established a theoretical framework for the workings of UCR and GCR: the reduced area coverage allows the ink to spread (“dot gain”) during printing, thus reducing ink film thickness. Thinner ink films set faster.

UCR and GCR techniques have been used since the early 1900s. The first masking patent, which was granted to Ernst Albert in 1899, addressed UCR concerns. In the early days of photomechanical color reproduction, however, UCR and GCR were commonly applied by manual etching techniques. Letterpress printing, which dominated process color printing until the 1950s, was especially concerned with UCR techniques because this process applied relatively thick ink films to substrates. Furthermore, letterpress printing plates (photoengravings), for a variety of physical reasons, often carried a halftone dot in most tonal areas for all colors. The presence of a dot of black in all tonal areas meant that the “gray component” represented by any given black value had to be removed from the corresponding yellow, magenta and cyan values. Scanner correction circuits greatly simplified this process: an excellent example of 1951 GCR appears opposite page 92 of that year’s Penrose Annual.

The thin ink films of offset lithography, and the dry-between-the-colors approach of gravure, meant that UCR and GCR techniques were less critical to successful 4-color work via these processes than was the case for letterpress. UCR specifications were, however, established during the early 1970s for the increasingly important web offset printing process. Similar specifications were set for GCR once the process was “discovered” again in the 1980s. Full scale black printers for these processes could always be completely avoided by using...
The goal of TPM, Total Productivity Maintenance, is to maximize equipment uptime and minimize waste of time, labor, and equipment failure. In short productivity is the goal. Single minute exchange of dies (SMED) was the result of a study by Toyota in which they looked at increasing equipment availability. This is being applied to printing as the “pit stop strategy”, so changeover time between producing good copy is minimize. This increase in availability has a direct influence on productivity. At Comprint held in spring 2002 in Lisbon, Portugal, both Donnelly and Polestar agreed that they didn’t need faster presses for them to run for more than their 50% of available time.

As presses become faster, when they are down they are losing more money than ever before. While everyone has focused on rapid changeover and better planning, maintenance has been neglected. In other European manufacturing industries, maintenance is 5% of the total manufacturing turnover, the equivalent of the GDP of Holland. There are also around 2 million people in 350,000 companies who are dedicated to maintenance. Failure/breakdown isn’t just the sudden lack of function (i.e., it doesn’t work), but it can also be the lack of meeting specifications or the inability to perform at rate speed. For example, if the performance of a press deteriorates so it can’t hold register or has large color variations, this loss of function is a form of failure. A well-planned maintenance strategy can improve performance and quality.

There is a third type of failure, hidden failures, which only become apparent when something goes wrong. This normally is associated with alarm or stand-by systems. For these a maintenance strategy must be based on routine inspection and checking, or else the first that the plant is aware of the failure is when they are required to operate, usually in an emergency.

Maintenance strategies can be of four types: Breakdown, preventative, condition-based, and pro-active. Breakdown strategies are simply reactive: you work until there is a catastrophic failure. Preventative strategies use scheduled and periodic maintenance in an attempt to minimize failures. Condition-based strategies respond to indicators such as noise or unusual vibrations that are an indication of a pending failure. Pro-active strategy involves ongoing periodic checks in an attempt to eliminate catastrophic or unnecessary maintenance altogether.

People used to believe that all equipment had an age-based failure rate, which means that over time equipment wears and eventual it fails. This looks like a “bathtub” curve, after a high initial installation failure rate (e.g., burn out failure), there is a long period of minimal failure risk, and then finally wear-out failure. Unfortunately, in a study of civil aircraft only 11% of components showed age related failure. The majority of equipment, following a period of “infant mortality,” risk tended to be constant for a long time, and the constant rate was found to be 14%. Overall, 89% of components on civil aircraft have non-age related failures and routine maintenance (which re-starts a period of infant mortality) can increase the cost of maintenance, which supports the age-old maxim, “if it ain’t broke, don’t fix it.”

As there are no health, safety and environmental effects, and the replacement is readily available and does not take too long to repair, a breakdown strategy may be most cost effective. For instance, light bulbs are usually best replaced upon break down as opposed to on schedule, and the cost of setting up a measurement system doesn’t prove out from an ROI perspective. This is not true when a component failure takes down a whole production line or in a plant where there is a high cost due to the lack of availability, the cost of stocking spares, and the cost of having a breakdown maintenance crew always available.

Preventive maintenance works on the minimum time to failure. This assumes the component suffers an age related failure, which is not true for most components. It also means components are changed before they wear out, so that you are scrapping perfectly good materials and components that still had service life left in them.

Condition monitoring relies on the ability to identify patterns that indicate that a device or a component is beginning to fail so you can respond to the pending failure before it becomes catastrophic. In order to implement condition monitoring, you need detection and diagnostic systems. You need to establish what the normal range of operating conditions are, so you can identify abnormal behavior. You also need to know what to do about changes in condition. Cumulative sum techniques, originally devised for SPC, can help to raise trends from the statistical noise by plotting the difference compared to the normal conditions. Small changes in condition and rate of change of condition become apparent even when they are quite small. Condition monitoring comes in four flavors:

1. Performance monitoring
2. Vibration monitoring
3. Visual [including thermography (heat) and sensual monitoring]
4. Lubricant monitoring (condition, chemical composition, and wear elements.)

Performance monitoring looks to monitor things such as power consumption. It could also be integrated with statistical process control, monitoring print variability, register, etc. to detect deteriorating press performance.

Could TPM Improve Your Bottom Line?
by Tim Claypole, Welsh Centre for Printing and Coating, University of Wales Swansea
New technologies have enabled creators of print materials to design ever more sophisticated and beautiful pieces. However, the printer who has to translate these designs to printed matter often has quite a challenge to satisfy the customer. That is because often the designer is not aware of the constraints of printing: most especially changes in color gamut, but also design elements crossing the “gutters”, font variations, and the whole issue of format differences from creators to printer inputs. With the decline in “trade shops” and growth in “desk top” creation, the number of people who “input” has increased dramatically compounding the problem: there’s so many more people to educate. Now, that is where the new manual, Designer’s Prepress Companion*, comes in. Recently published by NAPL it seeks to provide to the creators guidance on how to insure their work can be satisfactorily printed. The Designer’s Prepress Companion provides a very down-to-earth guide to designers on print. From some of the chapter headings you can appreciate the breadth and relevance of the topics:

- Chapter 2: Offset Lithography: Printing with Chemistry
- Chapter 3: Letterpress & Flexography: Printing under Pressure
- Chapter 7: Thinking about Color before You Start the Job
- Chapter 9: Layout and Imposition: Creating Printable Layouts
- Chapter 12: Getting from Pixel to a Halftone Dot
- Chapter 16: Do’s and Don’ts of Typography
- Chapter 26: What to Ask Your Printer and Why to Ask It

The tone is very informal, but easy to follow. There is a somewhat eclectic mix of sophistication levels, that is, some commentary almost assumes no knowledge by the reader for the basics (for example, what is lithography) while at same time tackling subtle questions of computer font design. But the style is almost conversational and takes one through the entire gamut of issues of designing jobs for printing without overwhelming one with the sense of huge complexity. Figures and charts are used profusely and support the text while helping one to understand the issues described. Overall, the Designer’s Prepress Companion is a well-constructed manual. It is a valuable addition which should help bridge that huge perceived gap between the creators of print copy and the printers who have to try to translate that creative vision with real-world equipment whose limitations have hitherto been under-appreciated by the creators. Printers should ensure that all creators read it first. Bravo NAPL!

I think it is a nice adjunct to the outreach by TAGA to the creative side of printing. Bravo to TAGA for helping to inform and offer to distribute it to the print community at a discounted price of $22.95 (Non-member price: $29.95).

*Jessica Berlin, Christina Kim and Jennifer Talcott (with Frank Romano), Designer’s Prepress Companion, NAPL, 2002. Price is for TAGA member, single volume purchases: $22.95.

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U.S. members: Please call 1-800-642-6275 and use option #3. Members outside the US: Please e-mail your order to abeli@napl.org. Mention Source Code (PUBRSP1018) to receive the special discounted member price of $22.95.

ABOUT THE AUTHORS:
Jessica Berlin received both a BFA in Photographic Illustration and an MS in Graphic Arts Publishing from the Rochester Institute of Technology. She has worked in the Creative Design Department at Fossil and is currently a prepress manager at Hasbro Inc. Jessica continues to work in graphic design and photography as a freelance artist.

Christina Kim worked as a graphic designer for three years before getting her MS in Graphic Arts Publishing from the Rochester Institute of Technology. While working as in-house designer for Flower City Printing, she continues her work as a freelance designer, photographer, illustrator, and web designer. She received a Fine Arts degree from Hampshire College.

Jennifer Talcott received her BA degree in Communication Studies from the State University of New York College at Cortland and an MS from the Rochester Institute of Technology, where she studied Graphic Arts Publishing.

Frank J. Romano is a professor at the School of Print Media, Rochester Institute of Technology. He envisioned this publication and worked with the team of authors.

ABOUT NAPL:
Chartered in 1933, the National Association for Printing Leadership is a not-for-profit trade association representing the $88 billion commercial printing industry. NAPL’s mission is “To enable the printing community to profit from change” through a full range of management and educational services to its membership, including conferences, seminars, periodicals, books, consulting, and economic information.
Color Concepts: The Black Printer

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the lighter “skeleton” black plates that carried halftone dots only in medium to dark tones.

In order to ensure that dark tonal areas were not unduly weakened by the use of GCR, image processing systems allowed operators to add back colors to dark tonal areas. This process is called under color addition or UCA.

Moiré is the other issue requiring that an adjustment be made for the presence of the black printer. The black plate screen angle is sometimes switched with either cyan or magenta to minimize yellow-related moiré. Another strategy designed to minimize yellow’s interference with cyan or magenta is to screen the yellow with a 10 percent finer screen than the other colors. A combination of stochastic and regular screens has also been used as a moiré reduction strategy.

Indeed, this combination-screen strategy dates from the early days of halftone color printing. A stochastic-like metzograph screen was sometimes used for the black printer in order that the yellow, magenta and cyan printers could be produced via conventional screens separated by the optimal 30 degree angles (Burch, 1910). The fine detail metzograph (or the similar stochastic) screen typically required a greater compensation for dot gain than that applied to the accompanying conventionally screened chromatic colors.

THE QUALITY CONTRIBUTION

The use of a black printer increases the density range of the reproduction, which, in turn, improves tone reproduction (particularly shadow detail) and image sharpness. It is interesting to note that the best process color letterpress of the 1960s is rarely bettered by today’s litho printing. The thicker letterpress ink films produced greater contrast, higher color saturation and sharper images. Similarly, today’s duotone black (pioneered by Tom Morgan of Litho-Krome) litho reproductions exhibit much better black and white work tone reproduction and sharpness than is possible with standard one-black litho printing.

The variability aspect of color reproduction quality may be reduced by the use of full-scale black and GCR techniques. Moiré may also be reduced by the use of this strategy. The neutrality of shadow and near-shadow tones will almost always be improved by increasing the black in these areas.

Once the black plate is introduced into the color reproduction process, a vast number of options are created for reproducing most colors. This flexibility provides the printing industry the freedom to balance quality and productivity issues in such a manner that makes it unsurpassed as a means of producing high quality reproductions at low cost.

FOR FURTHER INFORMATION


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Could TPM Improve Your Bottom Line?

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All things that turn or have shock loadings vibrate. These types of measurements are applied on a press to shafts and gears. By monitoring vibration at various frequencies you can determine several conditions such as misalignment, looseness, imbalance, gear damage, and oil whirl. All of these have a frequency signature, which can be related to the rotational speed of the components. In interpreting the vibration output you are looking for the characteristic prime frequency and the shape of the frequency distribution. For instance a misalignment will produce a spike in vibration while looseness process a difference cyclic frequency signature.

If a shaft has a bearing sleeve and one of the bearings develops a pit, the pitted bearing will make a knock on cycle and it will also begin to become hotter due to the friction created by the pit, and both of these conditions are predictors of future failure. This also means that you need to know the bearing sleeve’s normal “sound” and thermal image or temperature.

Lubricants form a fluid liquid between loaded surfaces. This means that it has a temperature, it carries away loose material, and it bears a pressure. These properties can also be profiled and monitored through measurement. The lubricant can be measured directly (ex. pressure gauges), or indirectly by looking at things such as oil samples or filters. Spectrographic oil analysis can measure the amount of microscopic traces of materials. Each component in a system has a material composition; hence, if traces of materials in the lubricants increase then the component that is beginning to fail can be identified, even when the oil services a multitude of bearings and gears.

As bearing surfaces wear they shed small particles of metal into the oil. These can be collected in filters, oil samples or with magnetic plugs. Fine metal particles are a natural occurrence in lubricating oil. However, when they change size and more importantly shape, then they become indicative of different modes and times to failure. Previously interpreting these relied on expert interpretation of particle geometry through a microscope. However, a system, “Syclops”, is being developed for the Royal Air Force (RAF) that uses image processing and a computer based “expert” system to consistently analyze and interpret the metal particles in the oil. This is part of “The War on Wear.” The U.S. Navy estimated that its return on investment over the cost of oil monitoring programs is 178%.

As printing presses get more expensive and faster, downtime caused by a poor maintenance strategy is an avoidable bottom line cost. Any printer can benefit from the application of a maintenance programme, whether it is a simple “pre parade” inspection of the press before running through to the most sophisticated detection systems. Fitting an expensive system is not a guarantee of success, in fact quite frequently it is the opposite. Undoubtedly, those who ultimately succeed in implementing a cost-effective maintenance strategy are those who have taken the time to know their presses and the cost of downtime.
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