PRINTONE

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PRINTONE

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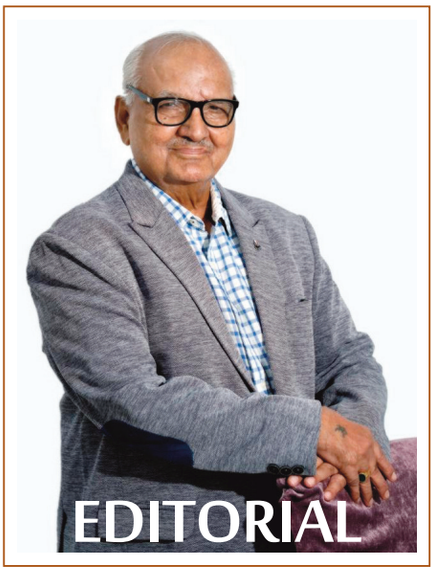

EDITORIAL

Greetings dear readers!

First of all, each one of us at Popli Graphics would like to thank you for the overwhelming response to our 1st issue of PRINTONE. Your feedback and your kind words have given us lot of encouragement to do better!

Today, our industry is going through tough times. On one hand we see demand coming back... while on the other hand we're seeing the prices of nearly all raw materials skyrocketng. This post-Covid affect on everybody's supply chain is literally jeopardising growth.

At this time, we at Popli Graphics would like to offer several affordable solutions to each of our customers to minimise the effect of this supply chain disruption. With our vast stocks, and with the multiplicity of items that we carry and have access to, I'm sure that we could provide some relief to you.

As far as this issue goes, we've covered a variety of topics and I'm sure that each of you will find something that will interest you.

Also, with the coming of the festive season, I would like to sincerely wish each one of you, both, a very happy and prosperous Diwali, Vishwkarma Diwas, Bhai Dooj and of course, an equally happy Chhath Pooja this year.

And needless to say, I also look forward to your continued feedback and your participation in the next issue of PRINTONE.

Be Happy! Be safe!

PL Popli
Editor-In-Chief

DAK BANGLA

Congratulations on starting this excellent initiative to share knowledge and information through this medium of your magazine: Printone.

Dr. Madhura Parag Mahajan
HOD, Dept. of Printing Eng., PVG's College of Engineering and Technology

Congratulations on a very neat initiative! Well done!!

Amitabh @ Printers Supply Co, Kolkata

Lots of support also came in from

Prasenjit Das Sr. Cluster Manager, MacDermid
Suhas Kulkarni Managing Director, Technology at DKSH

Vaibhav Bhatt @ BD Manager, Insight Print Communications
Hardik Patel @ National Sales Head at Max Speciality Films Ltd
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Prof. Kamal Chopra

Chairperson - World Print and Communication Forum

by Ritu Saini
Staff Writer, Training Platform

Receiving the
'Global Print Leadership Award'
at Chicago, 2013

Do tell us a little about yourself... place of birth, parents' occupation, growing up years, what you studied in college, what was life like when you were growing up?

I was born in 1948 at Jalandhar, Punjab, and my initial schooling, that of primary to Class X, was in Fazilka. My father was a shopkeeper and my mother, a home maker. After completing my matriculation in '64, I joined the Northern Regional Institute of Printing Technology at Allahabad to complete a Diploma in Printing. I also completed my Intermediate in '68 and later graduated from Punjab University in '78. While growing up, I developed an interest in machines and still remain curious about their systems and inner workings.

What was your first job? What were you doing out there? Any (un)pleasant recollections from that first job?

After completing my Diploma in Printing, my first job was to work as a supervisor at a private printing unit at Ludhiana where I worked less than 10 months before joining the Punjab Agricultural University in '70, first as the Press Foreman ('70 to '87) and then as the Press Manager from '87. I opted for voluntary retirement in '96. There was one unpleasant incident, which I think was fortunate, as it allowed me to take a decision to leave the job. I believe that leaving the job {even though it was a government job} helped me to develop myself and serve society. I still attribute my rise to that situation and the fact that I left that job.

How - and how much - has the industry changed in the time that you've been in it? Has there been a 'wow' moment for you?

Change is a law of universe, and I've seen many change in the industry and all the changes were 'wow' moments. When I joined the industry as a student in '64, only letterpress was there, and offset printing was slowly starting to introduce itself. By the end of my studies at NRIPT, offset printing was starting to overcome the letterpress process. And then there was the introduction of DTP. The next revolution was digital offset - printing without plates! Now change takes place almost everyday... there's always something new to notice, something to say 'wow' to. Technological advances are coming moving at such a rapid pace that what one would have thought impossible in the past, is now tomorrow's reality. The pace of change has been so rapid that many of the printers today, I am sure, would be unaware of imagesetters, phototype setters, floppies and so much more... but I remember saying 'wow' when these were introduced.

What has been the biggest change? Has it been manpower, machinery, materials, or the money involved? Has the pace of change also changed?

Over the decades, we've witnessed many transformations; from the early block printing letterpresses, to offset, then digital and today we're looking at printing electronic circuits and printing in 3-D! It's not only that printing has changed pace, it's also that we've changed. Staying ahead is now the new game. We note changes in the system and we readily adopt them to stay ahead. We have to.

Let's take an example. With the introduction of digital photography, Kodak, who were global leaders since 1888 in photographic film and paper, had to declare bankruptcy in the late 1990's. Why? They lingered far too long in accepting, and then transitioning to digital. They emerged from bankruptcy five years later, but only after selling much of their patents to those who were aggressively building brands using cutting edge technology. If this is the harbinger of the future, it's quite possible that within the next decade, much of the world will have to transition much more drastically and keep pace with the rapid advancement in technology.

What do you attribute this 'biggest change' to?

Change is a law of universe and it is the symbol of progress. I see every change as progress. Change is the only constant and with the industry looking at Printing Revolution 4.0, there are going to be a lot of changes coming through.

Which moments of such change do you remember... and why?

I cherish change. There have been some big ones like converting to offset and then there have been some minor ones like the image setter changing to CTP. Its not the change that counts... its the value it brings to the process that I remember the most. That is why I always say, "Those who resist change, will lose: those who

Books that you believe have been integral to your success…

Other than technical books and magazines on printing, some books like '**Men of Steel**' by Vir Sanghvi, '**In the Wonderland of Indian Managers**' by Sharu Rangnekar, '**Dreaming Big**' by Sam Pitroda and '**Bulle Shah**' by Harbhajan Singh inspire me.

Hobbies? Sports?

Printing and printing alone is my business, my hobby, and literally everything for me! Yes, I do watch TV and sometimes do also look at my social media feeds... but only when I'm not thinking about my first love!

Prof. Kamal Chopra
Chairman - WPCF

merely 'print' will always be under pressure. If they don't see the change coming, and they don't synchronise themselves with the changing times, they will fail.

What are the changes that are likely to come about in the next decade or so?

It is difficult to say what type of changes are likely to come about as the sheer pace of technological advance often outstrips the process of thought also. While we've seen major changes in the printing industry, we should be prepared for many more significant changes. If earlier, printing was considered to be an art form, over the years the world of technology has been at times both a welcome and a violent invader. Now it has morphed into an amalgam of art and science - one that needs a huge understanding of chemistry, physics, and even electricals and electronics!

And this is not over yet! Scientists are working to make electricals and electronics much more user friendly and easily adaptable. 3D printing is already becoming common, and we're now looking at the introduction of artificial intelligence and intelligent computing, too.

When did you join your present job? What does this entail?

I currently own and operate Foil Printers, my own unit which is currently based in Ludhiana {Punjab}. It's an interesting story as to how this came about! I was not at all interested in pursuing printing as a business, and no intention to set up a printing press. Foil Printers, at best, happened more by accident than design. I was working at the Punjab Agricultural University printing press at Ludhiana. It so happened that at that point of time, my uncle {had a Masters in Economics, but didn't have a job - was doing some business, but was incurring losses} also wanted to do something better for a living. He met my father, who as per his nature {helpful and sympathetic} empathetically suggested that he set up a printing press at Ludhiana. The idea appealed to my uncle, and my father instructed me to give him a helping hand.

Circumstances that you believe have been integral to your success

First **deserve**, then **desire.**

This is the only mantra for me and I dedicate all my success to these words.

After that, work began. I located and bought a used light platen machine from a local printer and started, with my usual enthusiasm, to tinker with that first acquisition, and made some alternations and additions. Soon enough, the machine was functional... and it was then that we decided to convert the machine to go in for foil stamping - a relatively a new concept at that time - and more so because it was for the first time ever in India that foil stamping was made possible by anybody on a platen machine. This was in 1978... and that is how Foil Printers came into being in '78. Later on, barely four year later, in '82 my uncle decided to quit and then the complete responsibility of running the press came on to my shoulders. As the pressure of work mounted, I also opted for voluntary retirement from the VRS from the Punjab Agricultural University printing press in February '96.

Places you've visited… things that you remember about these visits...

I have visited almost the entire world but I especially like the 'Gutenberg Museum' in Mainz and the 'Printing History Museum' in Beijing.

In 2012, with Hon'ble Sheela Dixit, then the Chief Minister of Delhi

Now, at the ripe age of 43, Foil Printers continues to rule the waves in the print in the industry. I've always been striving for excellence, be it the quality of design or the delivery of the finished product. I long ago made a concious decision not to enter the industry rat-race, and to build and maintain a distinct identity with exceptional satisfaction and customer care as my foundation stone to build further. I've always believed that, 'a good printing tells a great story'.

What does a typical day at the office look like?Tell us about some of the challenges you are currently facing.

Though I go to my office at Foil Printers almost daily, but technically I am not at involved with any kind of business there. The work at the press is being taken care by my sons. one looks at the production side of things while the other one takes care of both marketing and finance. I am involved with my social responsibilities to look for the better opportunities and bright future of the printing industry of India. Now being the President of All India Federation of Master Printers (AIFMP) and Chairman of the World Print & Communication Forum (WPCF), I spend my day in front of computer answering the calls and looking at how the future developments of the industry can be beneficial for all of us. On any given day, I'm routinely in my office around 9.00 am and I'm generally in the office till around till 7:30 p.m.

What are your company's current plans for expansion? What will be the key drivers for such expansion?

Foil Printers is a fully equipped commercial printing unit. A couple of years back we made some investments into new technologies and some advanced technical machines were introduced. We have complete in-house facilities for pre-press, Press and post-press. Now we are looking for smart printing and smart packaging though at present there is no plan of expansion.

How does one train staff beyond certain basics? Are there are institutes/short-term courses for beyond-the-basics you could recommend? Can the industry look forward to having a dedicated institute that caters to the higher-end training requirements of the people

Prof. Kamal Chopra
Chairman - WPCF

who work in the industry?

With the industry having made giant strides in recent times in almost every area of operations - and inventing advanced machinery in terms of the scope, sophistication, technology and speed, training anyone to run these machines is a difficult task these days.

We have more than 36 printing institutes in India, with some of them providing post-graduate education. While these institutes churn out more than 3,500 new print engineering graduates every year to join the industry, we are lacking the infrastructure for both, short term training, and long term skill development. There is a critical shortage of both hard and soft infrastructure of any such systems in India.

Those existing skill development programmes that are present, are long term in nature, and demand high academic qualifications for entry, apart from the fact that they aren't cheap. The average engineer, or even the average press owner can't therefore afford to attend/sponsor long term training programmes.

There is a genuine need for developing skills suitable for this technical-minded industry. This can be a gateway for jobs, especially from amongst the economically backward and less educated youth. As such, a new frame work for skill development for our industry needs to be put in place at the earlies. We have been working on these lines and have very recently signed MoUs with leading universities of the country.

What do you most value in your customers?

Satisfaction! If we can satisfy a customer, that is of value to all of us at Foil Printers. I personally believe that it is essential that all of us should help our customers by communicating effectively with them. There is no limit for your growth when you have a happy customer!

What trends are you seeing worldwide?

Currently, we're all passing through a rough time. Quite a few of us are nervous because we don't know what further challenges the pandemic will bring. From my side, I'd like to stress on five business priorities:

- **Protect employee health**: Several exercises have been deployed in this area, including providing PPE, safe-spacing of employees, sanitising workstations, working in shifts, and enabling work-from-home too. I would urge you to keep on doing this for as long as you can till there is some form of certainity regading the pandemic
- **Control costs and protect cash flow**: Reduce your production expenditure, minimise non-essential costs, delay purchases and payments, and seek government aid, if available.
- **Focus on growth**: The pandemic has seen some companies growing rapidly, prompting other firms to seek similar opportunities in growth areas, such as packaging. But take these steps only after checking the degree of success.

Celebrating India Day
with the Consul General of India
at Shanghai, Print China - 2014

- **Employee support**: A wide range of plans can be put into place... including checking in with employees, understanding their families and their problems and if possible, offering interest-free loans to employees in the case of need.
- **Prevent a temporary separation from becoming permanent**: While asking employees to leave may be inevitable for some of us, do take steps to re-engage employees once you believe that a recovery is on its way.

It's generally believed that the Indian publishing industry follows the markets in the US, UK, and Europe. But are there any interesting trends coming up in Asia and Africa?

Despite the dark news, recent data shows some bright spots! Surveys across the globe indicates that people are once again preferring printed books! Book printing is picking up again in Europe. As per available data, 45% more people bought a printed book last year.

Any printing-related exhibitions you're looking forward to once business and travel opens up?

I visited almost all the important exhibitions like Print at USA, drupa at Germany, AIP and Print China, Print Australia and many more. Once the situation improves, I'd like to attend all and any forthcoming important exhibition anywhere in the world.

How was the experience of having chaired the All-India Federation of Master Printers (AIFMP), India's highest printing federation twice? What do you believe were the highlights of your chairmanship here?

I am proud to be associated with AIFMP - the largest printers' association in the world. At the same time, it is humbling to be responsible for the 250,000 printers of India who are members of the Association.

**Preferred dishes…
with any particular
requirements…**

Boiled Vegetables,

•

Makki ki roti
with sarson ka saag
with lots of butter

•

Stuffed paranthas
with malai

How do you think this will help you in heading the WPCF? What ideas/issues have you shortlisted to get action on from this forum?

It is for the first time ever that a person from Asia was nominated as the Chairman of the World Print and Communication Forum (WPCF). The feeling of being the first Indian to reach this level is unmatchable. I hope this brings more opportunities for Indians at this level. I will try my best to be a good representative from the nation and work sincerely towards the responsibility assigned to me.

Premiaflex Plastics: PACKAGING MOJO WITH DUPONT Cyrel®FAST WORKFLOW

From the Corporate Relations Team at DUPONT

L to R: Anisur Rahman and his team. from Premiaflex Plastics, Bangladesh along with their DuPont Cyrel FAST 2000 TD

Background

Premiaflex Plastics {Bangladesh}, is one of the top packaging convertors in the country and specialises in flexible packaging having brought the first CI flexo press in Bangladesh in 2018.

The company brought in both, the CI flexo pre-press software and the flexo platemaking system. Unlike their gravure presses, where they had outsourced cylinders, for flexo, Premiaflex decided to go for in-house platemaking and chose DuPont as their partner. Premiaflex installed the DuPont™ Cyrel® FAST thermal workflow including Cyrel® EASY plates to eliminate the use of solvents and reduce processing lead time to improve press performance.

Challenge

The COVID-19 pandemic outbreak forced governments to announce use of Covid-secure products such as hand sanitiser and liquid hand wash. The pandemic also forced lockdowns leading to challenges for all the FMCG brands in Bangladesh to urgently start the production of new hygiene products and packaging designs. Subsequent unlocking, too, required use of these secure products, which could allow the workforce to return to work. It meant a surge in demand.

Solution

During lockdown, the surge for printing requirements of new designs came from leading brands such as Unilever, Marico, Dabur, Emami and Cavin Kare among others. Premiaflex had a mix of both rotogravure and CI flexo to handle the new packaging requirements, but the advantages that CI flexo technology offered - production speed, diverse applications and overall cost advantage, particularly the plate costs, made it by far the perfect choice. "CI flexo printing technology provided the packaging industry with ability to respond to requirements for low minimum order requirement (MOQ), shorter lead time and consistent high-quality print results. Our change over time in flexo was one-third the time of gravure," says Rahman.

The other advantage of using CI flexo technology was the lead time to produce printing plates. On average, it took much longer to produce a cylinder for rotogravure printing, while flexo plates could be produced in a jiffy with Cyrel® FAST.

Result

Premiaflex used the DuPont™ Cyrel® FAST thermal system to have its printing plates ready within two hours of design finalisation and then also deliver the first batch of production within 24 hours. In contrast, the traditional gravure printing technology used to required seven to ten days to deliver the cylinder and the first batch of production could take up to 15 days.

While getting consistent, high quality,and precise print results with the thermal workflow, flexo printing also allowed more design runs per day for Premiaflex, enabling control over its production. "Development cost and time for new design is low with the flexo and Cyrel® FAST thermal workflow," says Rahman. He explains, "The fact that Premiaflex works with some of the world's most desirable brands in Bangladesh is also a fortunate position to be in when it comes to supplying new products. The unique capabilities of flexo and DuPont's technology have given us an unparalleled, competitive edge to our customers."

Environmental concerns are growing, and so are regulations to reduce the amount of VOC emissions. DuPont's thermal technology enables a more sustainable platemaking process with the smallest environmental footprint. With flexography, Premiaflex can meet regulatory norms much easier than gravure. Rahman shares that more impressions, which was once the USP of packaging markets is fast changing to more but shorter SKUs and faster responses.

Flexo is allowing the company to accomplish all types of jobs - from the simple to the most complex. "Today, it is not only speed but also 100% productivity that is a priority." "DuPont's support in helping us move gravure jobs into flexo by addressing challenges both in design and in printing has ensured smooth transition and production", he concludes.

Flexible Packages for FMCG products by Premiaflex

DKSH

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Chook our key clients and their products

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MEASUREMENT AND VIEWING CONDITIONS FOR BOTH PROOF AND PRINTS IN THE PRINT INDUSTRY

Prof. Madhura Mahajan

Head of Department at Pune's
PVG's College of Engineering and Technology,
and
G.K. Pate Wani Institute of Management

Where UV light is present in an environment, the human eye can adapt to the additional blue light wavelength emitted by paper enriched with OBA

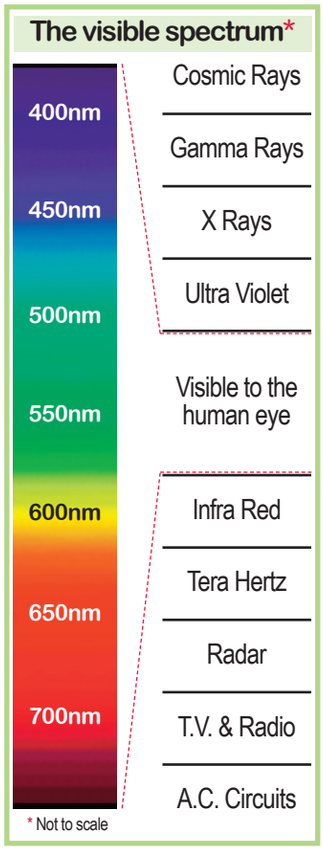
When it comes to using spectrophotometers and the use of optical brightening agents (OBA) in printing and proofing papers, measurement and viewing conditions becomes extremely important.

Two of the most important international standards, ISO 3664:{2009} - Graphic Technology and Photography - Viewing Conditions and that of ISO 13655:{2009} - Graphic Technology - Spectral Measurement and Colourimetric Computation for graphic arts images have provided good assistance in understanding the requirements of the viewing conditions and the measurement conditions. Utilising all these conditions correctly helps in communicating colour in terms of ΔE values, thus helping to minimise the variations.

Introduction to Optical Brightening Agents and Fluorescence

When no agents are added to the pulp, the paper seems yellowish in colour, something which is undesirable to the print and packaging industry. Fluorescent additives which absorb energy in the UV and then emit in the blue region of the visible spectrum also **increase the brightness of paper** because the total amount of the visible light coming back off the **surface is increased**. At the same time the yellowness of a paper is offset by the action of blue light and the uniformity of whiteness is improved. (the figure alongside indicates the visible spectrum showing blue, green and red regions).The brightness depends upon the concentration of fluor (optical brightener) and intensity of the exciting UV source.

However, effective concentration of fluor is limited showing large fluorescent gains initially but reaching a steady level with increasing concentration. Measurement of the fluorescent component of its brightness is made using a direct geometry instrument containing an optional UV absorbing filter. The brightness is first measured with the filter out of the measurement path so that the sum of normal and UV contributions is obtained. The UV absorbing filter is then switched into the path of the incident light allowing only the visible components to pass and fall onto the paper surface; the brightness value will then be lower. Fluorescence is a desirable effect as it makes the paper **appear bluer and brighter**, thus counteracting the yellow hue naturally found in wood fibre papers.



Where UV light is present in an environment, the human eye can adapt to the additional blue light wavelength emitted by the paper enriched with OBA. The human brain in such cases treats it as a bright substrate, as presence of blue light makes the paper brighter. However, measuring instruments such as spectrophotometers will measure the paper bluer than it actually is. In a colour managed workflow, the profiling software actually adjusts for the additional blue by adding an additional yellow to shift the effect coming due to that extra blue. Let us try to understand the various international standards that have actually made things easier for all.

International standard ISO 3664: {2009}
Graphic Technology and Photography
Viewing conditions

This is an international standard for viewing conditions in the graphic arts and photography. It was important that the data taken from measurement instruments provide absolute correlation with what the visual colour appearance was when viewed under lighting conditions in a viewing booth. For this to happen, it was necessary that the light sources used in the measuring instruments be equipped as per the CIE specifications for Illuminants, D50. But earlier (prior to and around 2009) most spectro-densitometers in the market were using incandescent light source (Illuminants A) to make colour measurements. These lamps had very less UV content. Illuminants D50 were the preferred standard for measuring and viewing and lamp manufacturers had to increase the UV content in the lamp to meet this specification.

International standard ISO 13655:{2009}
Graphic technology
Spectral measurement and colourimetric computation for graphic arts images

While measuring with Illuminants A instruments it has been seen that while dealing with enriched OBA printed samples, different measuring instruments do report a variance in the colourimetric values. These

MEASUREMENT AND VIEWING CONDITIONS FOR BOTH PROOF AND PRINTS IN THE PRINT INDUSTRY

were the legacy M0 instruments. In legacy (M0) instruments, the UV component of the illuminants was not specified and was often clearly seen with different makes of instruments, each instrument thus giving a different reading for the same print sample.

Various M factors are given in the standard and have been defined well. The new ISO 13655-defined instrument measurement modes (M factors) are:

Various M factors are given in the standard and have been defined well and the new ISO 13655-defined instrument measurement modes - the M factors - are:

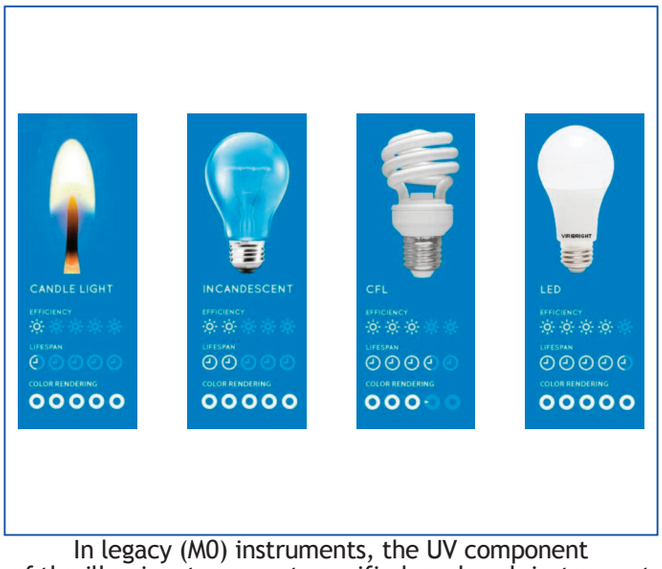
- M0: Legacy Mode {any illumination source, incandescent light source}. The M0 mode does not use UV filters nor any polarising in the process

- M1: D50, UV-included Mode {this is the recommended mode for colour measurement}

- M2: UV-excluded Mode {removes all UV light from the measurement system, below 400-nm}

- M3: Polarising Mode {for measurement of wet press sheets and also metallic inks}

The M0 is known as the 'legacy mode' and has been in use by nearly all old instruments and is available in many established workflows. If OBA enriched printed paper samples and no OBA proofs were tried to match in lighting with lesser UV content, they would appear to be a good match. This match would not be the same however if they were viewed under actual viewing conditions. This problem was substantially solved due to the clear M factors and the new measuring devices which got built as per CIE specification D50 illuminants.



In legacy (M0) instruments, the UV component of the illuminants was not specified, and each instrument gave a different reading for the same print sample.

The M1 proves useful in able to provide a good match between proof and the printed sheet. The M1 condition includes UV and as it also closely approximates the CIE Illuminants D50 light source it thereby covers the full spectrum. ISO 3664 basically states that we should have D50 (M1) in the light booth as well. While implementing both the standards ISO 13655and ISO 3664, user gets a clear idea of the UV illumination in the measuring equipment and the viewing both. It is important that all the members in the print workflow follow the M1 condition.

If effects of fluorescence from the measurement data are to be removed, the M2 measurement condition is used. It cuts the UV emitted from the illuminants with the help of an UV filter to remove the UV energy from the path of the illuminants. Thus, it cuts the effect of OBA.

The M3 measurement condition will incorporate a specification for UV cut and for polarisation as well.

Conclusion:
The use of agreed standards in the print and packaging industry is able to provide the right colour match between proof and press and they also provide how to properly communicate measurements so that colour differences based upon the ΔE values are minimised.

ANALYSIS OF PRINTING PROPERTIES ON AGRICULTURAL WASTE BASED PAPER

by Akshay Ingle

PVG's College of Engineering and Technology,
and
G.K. Pate Wani Institute of Management

Sugarcane is the major player amongst bagasse-based paper made from cotton linters, rice straw, wheat straw, corn stalks, hemp, jute, and even tomato stems!

Sustainability is not a choice, rather it's a necessity! It's a better and more eco-friendly way of living. Everyday efforts are made in every field to make the process more efficient and sustainable. And in a world full of printing and packaging, paper plays a vital role in the social, economic, and environmental development of any country.

The printing industry is the largest collective consumer of paper products and it is estimated that around 43 trillion papers are used for printing annually across the country. As the printing industry keeps continuing to reduce the cost while also improving the quality of paper, an effective measurement of printing quality is very important. Over the past two centuries, wood has always been the primary source of raw material in paper manufacturing. However, wood-based paper carries a significant 'ecological shadow' towards energy consumption, bleaching chemicals, and water used in its production. Aware of these sustainability issues, the paper manufacturers are exploring alternative fibers to provide paper choices for consumers. One of biggest steps towards achieving this sustainable goal has been the introduction of sustainable paper/substrate. This new generation of paper is now being produced from agricultural waste and other tree free alternatives.

Agricultural waste can be a great substitute for existing wood paper, it has all the necessary properties required for the paper making and even high quality paper can be achieved with the addition of some additives and chemicals.

So the question arises here is what is agricultural waste paper and how it could be the next big thing? The residue left over from the harvesting of agricultural crops such as wheat, rice, cotton, flax, and sugarcane is a fibre named bagasse. These fibers, typically treated as a waste product, are considered the most preferable materials to be used for paper production because it makes the most of a waste material and doesn't require dedicated agricultural land. Only about 8 % of global paper and board production is based on agricultural wastes, 92 % of world production depends upon wood, whether soft or hard. Cotton linters, rice straw, wheat straw, sugarcane bagasse, corn stalks, hemp, jute, tomato stem are some of the several other examples of this raw product for this kind of paper.

The Bagasse Cycle

- Sugarcane is harvested and the juice extracted to make raw sugar and molasses and other by-products
- Bagasse is the fibrous sugarcane pulp remaining
- For packaging, the bagasse is processed, dried and pressed into boards/rolls
- Bagasse is then moulded into packaging products
- After use, the bagasse products can be disposed of as food waste and sent for recyling or composting
- Compost is used to enrich soil for the next batch of sugarcane

Sugarcane is the major player here. To learn more about bagasse-origin paper with respect to printability many experiments have been conducted. Bagasse-origin paper is competitive with existing wood-origin paper and can be commercially used for print with the addition of some enhancers and treatment.

So, while paper does get made from agricutural waste, questions arise as to the suitability of this paper for the printing machine and the process of print. Printability, comparisons with commercially available normal paper, problems that it gives... and the solutions, if any.

What are the different factors that affect printability? Printability is the reproduction of the images sharply and correctly without the displacement of ink on the paper. Printability is the interacting result of different paper-related factors in printing process, which also contributes to the full use of the quality potential of the paper in the print process. Parameters for printability are mainly their properties that influence the visual quality of a printed product. Two main properties that affects the print quality are optical properties (colour, brightness, opacity, and gloss) and surface properties (smoothness, porousity, and sizing).

When bagasse-origin paper sheets are compared to normal hardwood and softwood sheets with respect to parameters like ink-transfer, print density, print through and printing smoothness it shows intermediate values.

When bagasse-origin paper sheets were tested for other parameters like optical density, printing unevenness and print gloss, as well as surface roughness and surface resistivity using digital electrophotography printing we found that this type of paper is suitable for achieving

Bagasse-based paper printed with a variety of colours

excellent electrographic digital printing quality in the uncoated paper segments.

Now let's talk about colour. It's one of the most important factors and decides the fate of paper. The colour reproduction capability and process capability of bagasse-origin paper sheets have been evaluated in terms of optical density, print contrast, and color gamut, and we find that the average optical density and print contrast is very much near values of both, normal hardwood and softwood sheets. Even the colour gamut of both sheets were similar, which shows that colour can reproduced on the bagasse-origin paper sheets.

Bagasse-origin paper sheets however face problems in porousity. This can be solved by the use of fillers of high surface area which can fill the inter fiber space and improves the porousity of paper. Also, a dramatic increase in porousity, particularly for bagasse-origin paper sheets can be achieved with calcium carbonate.

A base conclusion from these tests is that bagasse-origin paper sheets are suitable for printing. By maintaining the quality of pre- and post-paper making processes, a reasonably good quality of printing can be achieved. While risk and cost remain the main criteria in the decision making process, these factors are balanced through ambience in the long term. Bagasse-origin paper can become a substitute for the normal paper made from trees. Bagasse-origin paper provides environmental sustainability, and also a sensitive and sustainable management of agricultural waste, thus giving rise to a circular economy.

The potential of bagasse-origin paper as the future of paper industry should be tapped by more research and development.

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