Study of Wastage Optimization for Plastic Cards (with ATM) on Sheet Fed Offset Printing Machine
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Abstract:
Offset printing is a commonly used printing technique in which the inked image is transposed from a shell to a rubber blanket, then to the printing surface. When employed in combination with the lithographic process, which is founded on the repulsion of oil and water, the offset technique employs a flat image carrier on which the image to be printed obtains ink from ink rollers, while the non-printing area attracts a water-based film called "fountain solution", retaining the non-printing areas ink-free. The advanced "web" process runs a large spool of paper through a large press machine in several pieces, typically for several meters, which then prints continuously as the newspaper is run through.

Index Terms: offset printing, substrate, lithographic.

I. INTRODUCTION

A printing method in which there are two blanket cylinders per color through which a sheet of paper is blown over and printed on both positions. Cover-to-blanket presses are considered a perfecting press because they print on both sides of the piece of paper at the same time. Since the blanket-to-blanket press has two blanket cylinders per color, making it possible to print on both sides of a piece of paper, there is no impression cylinder. The opposite blanket cylinders act as an impression cylinder to each other when print production occurs. This method is most used on offset presses designed for envelope printing. There are also two plate cylinders per color on the jam.

a) Cover-to-steel - A printing method similar to a sheet offset press; except that the plate and cylinder presses are rather accurate. Actual squeeze between plate and blanket cylinder is optimal at 0.005"; as is the squeeze or pressure between the blanket cylinder and the substrate. Cover-to-steel presses are considered single-color presses. In parliamentary law to print the reverse side, the web is turned over between printing units by way of turning bars. The method can be applied to print business forms, computer letters and direct mail ad

b) Variable-size-printing - A printing operation that uses removable printing units, inserts, or cassettes for one-sided and blanket-to-blanket two-sided printing.

c) Keyless offset - A printing operation that is founded on the concept of using fresh ink for each revolution by getting rid of residual inks on the inking drum after each rotation. It is desirable for printing papers;

d) Dry offset process - A printing operation which utilizes a metal backed photopolymer relief plate, similar to a letterpress plate, but, unlike letterpress printing where the ink is transported immediately from the home base to the substrate, in dry offset printing the ink is transported to a rubber blanket before being transported to the substratum. This method is applied for printing molded rigid plastic buckets, baths, cups and flowerpots.

SHEET-FED-OFFSET
Sheet-fed refers to single sheets of paper or rolls being fed into a press via a suction bar that hooks and drops each sheet into position. A lithographic ("litho" for short) press uses principles of lithography to apply ink to a printing plate, as explained previously. Sheet-fed litho is commonly practiced for printing of short-run magazines, pamphlets, letter headings, and general commercial (jobbing) printing. In sheet-fed offset, "the printing is carried away on single sheets of composition as they are fed to the press one at a time". Sheet-fed presses use mechanical registration to relate each sheet to one another to ensure that they are regurgitated with the same imagery in the same spot on every sheet running through the crush.

a) Perfecting press - A perfecting press, as well recognized as a duplex press, is one that can print on both positions of the paper at the same time. Web and sheet-fed offset presses are similar in that many of them can also print on both positions of the paper in one pass, making it softer and quicker to print duplex.

b) Offset duplicators - Small offset lithographic presses that are used for fast, good quality reproduction of one-color and two-color copies in sizes up to 12" by 18". Offset duplicators are made for fast and quick printing jobs; printing up to 12,000 impressions per hour. They are capable to print business forms, letterheads, labels, bulletins, postcards, envelopes, brochures, reports, and sales literature.

c) Feeder system - The feeder system is responsible for making sure paper runs through the press correctly. This is where the substrate is loaded and then the system is correctly set up to the certain specifications of the substrate to the pressure.

d) Printing–inking system - The Printing Unit consists of many different organizations. The dampening system is utilized to apply the dampening solution to the plates with water rollers. The inking system uses rollers to deliver ink to the plate and blanket cylinders to be transported to the substratum. The
plate cylinder is where the plates containing all of the images are mounted. Finally the blanket and printing cylinders are used to transmit the image to the substrate running through the crush.

e) Delivery system - The delivery system is the final destination in the printing process while the paper passes through the crush. At one time the paper reaches delivery; it is stacked for the ink to cure in a right way. This is the step in which sheets are inspected to make certain they take in proper ink density and registration.

f) Slur - Production or impact of double image in printing is known as a slur.

OFFSET PRINTING IN PLASTIC CARD
• The role of the traditional method of offset printing, still delivers many other advantages, especially true when printing PVC plastic cards;
• Larger Runs – Offset printing is the pure and cheaper solution for bigger print runs
• Variety of Color – Offset printing delivers awesome results for any full color (CMYK) business
• Cost – With offset printing, the more you print, the more the cost per card is cut back
• Fonts and Ink – Offset printing is designed to adjust very well with heavy ink as well as with extremely small fonts However, offset printing involves a much higher minimum amount and the anticipated turnaround time will also be longer. Getting all this into consideration, the next decision to make is what type of charge card you want your cards printed on, because this will likewise produce a very big difference on what type of printing process you are able to apply. And even the card features you need will also attain a world of conflict. For instance, if you want a variable data printed on each card, like a different barcode or a number unique to each card, then you will have to operate with digital printing, the only alternative that can really offer variable printing from card to card. While offset printing – although doable – even so holds a bunch of limitations when printing variable information. Apparently, as you can probably understand, picking out what type of printing process is best suited for your task, comes down to so many factors, and that’s why you should employ a professional printing company for the best solutions, and always make sure to consult your printing provider before deciding along the best suitable printing method for your next great project.

PLASTIC SMART CARD
A bright card, check card, or integrated circuit card (ICC), is a credit card sized card with an embedded integrated circuit. Smart cards are typically constructed of plastic. Many smart cards include a form of metal contacts to electrically connect to the internal chip. Others are contactless, and some are both. Smart cards can provide personal identification, certification, data warehousing, and application processing. Applications include identification, financial, mobile phones (SIM), public transit, computer protection, schools, and health care. Smart cards may offer strong security authentication for individual sign-on (SSO) within organizations. Various countries have deployed smart cards throughout their populations.

DESIGN PLASTIC SMART CARD
A plastic smart card may have the following generic characteristics:
• Dimensions similar to those of a credit card. ID-1 of the ISO/IEC 7810 standard defines cards as nominally 85.60 by 53.98 millimeters (3.37 × 2.13 in). Another popular size is ID-000, which is nominally 25 by 15 millimeters (0.98 in × 0.59 in) (commonly used in SIM cards). Both are 0.76 millimeters (0.030 in) deep.
• Contains a tamper-resistant security system (for example a secure crypto processor and a secure file system) and provides security services (e.g., protects in-memory data).
• Managed by an administration system, which securely interchanges information and configuration settings with the circuit board, controlling card blacklisting and application-data updates.
• Communicates with external services through card-reading devices, such as ticket readers, ATMs, DIP reader, and so on.
• Smart cards are typically constructed of plastic, generally polyvinyl chloride, but sometimes polyethylene-terephthalate-based polyesters, acrylonitrile butadiene styrene or polycarbonate

CONTACT SMART CARDS
A smart-card pin out. VCC: Power supply. RST: Reset signal, used to reset the card's communications. CLK: Provides the card with a clock signal, from which data communications timing is derived. GND: Ground (reference voltage). VPP: ISO/IEC 7816-3:1997 designated this as a programming voltage: an input to a higher voltage to program persistent memory (e.g., EEPROM). ISO/IEC 7816-3:2006 designates it SPU, for either standard or proprietary function, as input and/or production. I/O: Serial input and output (half-duplex). C4, C8: The two remaining contacts are AUX1 and AUX2 respectively, and are used for USB interfaces and other functions. Contact smart cards deliver a contact area of roughly 1 square cm (0.16 sq in), comprising several gold-plated contact pads. These pads provide electrical connectivity when inserted into a reader, which is utilized as a communications medium between the smart card and a host (e.g., a computer, a point of sale terminal) or a mobile phone. The cards do not contain batteries; power is provided by the card reader.

STANDARD SPECIFY
• Physical shape and features,
• Electrical connector positions and patterns,
• Electrical characteristics,
• Communications protocols, including commands sent to and responses from the circuit board,
• Basic functionality.

Because the chips in financial cards are the same as those used in subscriber identity modules (SIMs) in mobile phones, programmed differently and embedded in a different musical composition of PVC, chip manufacturers are building to the more demanding GSM/3G standards. Thus, for instance, although the EMV standard allows a check card to draw 50 MA from its terminal, cards are normally well below the telephone industry's 6 man limit. This leaves smaller and cheaper financial card terminals

CONTACTLESS SMART CARDS
Contactless smart cards communicate with and are powered by the reader through RF induction technology (at data rates of 106–848 bit/s). These cards require only proximity to an antenna to pass on. Like smart cards with contacts, contactless cards do not possess an inner power source. Rather, they use an inductor to capture more or less of the incident radio-frequency interrogation signal, rectify it, and practice it to power the card's electronics. Contactless smart media can be made with
PVC, paper/card and PET finish to meet different performance, price and strength demands.

**Hybrids**
A hybrid smart card, which clearly indicates the antenna connected to the main chip. Hybrid cards implement contactless and contact interfaces on a single circuit board with dedicated modules/storage and processing.

**Dual-interface**
Dual-interface cards implement contactless and contact interfaces on a single circuit board with some shared memory and processing. An example is Porto's multi-application transport card, called Andante, which utilizes a scrap with both contact and contactless interfaces.

**USB**
The CCID (Chip Card Interface Device) is a USB protocol that allows a smart card to be linked to a computer, using a standard USB interface. This allows the smartcard to be employed as a security token for authentication and data encryption such as Bit locker. CCID devices typically look like a standard USB dongle and may contain a SIM card inside the USB dongle.

**APPLICATION**

**Financial**
Financial Smart cards serve as credit or ATM cards, fuel cards, mobile phone SIMs, and authorization cards for pay TV, household utility pre-payment, cards, high-security identification and admission badges, and public transport and public phone payment cards. Smart cards may also be employed as electronic wallets. The smart card chip can be "loaded" with funds to pay parking meters, vending machines or merchants. Cryptographic protocols protect the exchange of money between the smart card and the motorcar. No link to a bank is needed. The holder of the card may use it even if not the proprietor.

**These are the best known payment cards (classic plastic card):**
- Visa: Visa Contactless, Quick VSDC, "qVSDC", Visa Wave, MSD, pays Wave
- MasterCard: Pay Pass Mag stripe, Pay Pass M Chip
- American Express: Express Pay
- Discover: Zip
- Union pay: Quick Pass

Rollouts started in 2005 in the U.S., Asia and Europe followed in 2006. Contactless (non-PIN) transactions cover a payment range of ~$5–50. There is an ISO/IEC 14443 Pay Pass implementation. More or less, but not all Pay Pass implementations conform to EMV. Non-EMV cards work like magnetic stripe cards. This is common in the U.S. (Pay Pass Magstripe and Visa MSD). The cards do not obtain or preserve the bill balance. All payment goes past without a PIN, usually in off-line mode. The surety of such a transaction is no greater than with a magnetic stripe card transaction. EMV cards can have either contact or contactless interfaces. They act as if they were a normal EMV card with a touch interface. Via the contactless interface they work pretty differently, in that the card commands enabled improved features such as lower power and shorter transaction times.

**SIM**
The subscriber identity modules used in mobile-phone systems are brought down-size smart cards, using otherwise identical technologies

**Identification**
Smart-cards can authenticate an identity. Sometimes they engage a public key infrastructure (PKI). The card stores an encrypted digital certificate issued from the PKI provider along with other relevant data. Cases include the U.S. Department of Defense (DoD) Common Access Card (CAC), and other cards used by other regimes for their citizens. If they include biometric identification data, cards can provide superior two- or three-factor authentication. Smart cards are not always privacy-enhancing, because the field may carry incriminating information on the scorecard. Contactless smart cards that can be read from within a wallet or even a garment simplify authentication; however, criminals may access information from these cards. Cryptographic smart cards are often applied for single sign-on. Most advanced smart cards include specialized cryptographic hardware that uses algorithms such as RSA and Digital Signature Algorithm (DSA). Today's cryptographic smart cards generate key pairs on board, to obviate the risk from holding more than one copy of the key (since by design there usually isn't a means to extract private keys from a smart card). Such smart cards are primarily applied for digital signatures and strong identification.

**Public transit**

Smart cards, used as transit passes, and integrated ticketing are used by many public transportation operators. Card users may also take in small purchases using the cards. Some operators put up points for usage, exchanged at retailers or for other benefits. Examples include Singapore's CEPAS, Ontario's Presto card, Hong Kong's Octopus Card, London's Oyster Card, Dublin's Leap card, Québec's OPUS card, San Francisco's Clipper card, Auckland's AT Hop, Brisbane's go card, Perth's Smart Rider, Sydney's Opal card. Nevertheless, those present a privacy risk because they permit the mass transit operator (and the regime) to cover an individual's movement. In Finland, for example, the Data Protection Ombudsman prohibited the transport operator Helsinki Metropolitan Area Council (YTV) from piling up such data, despite YTV's argument that the card owner has the right to a list of trips paid with the circuit board.

**Computer security**
Mozilla's Firefox web browser can use smart cards to store credentials for use in secure web shopping. Some disk encryption schemes, such as Microsoft's Bit Locker, can use smart cards to securely hold encryption keys, and also to add another layer of encryption to critical portions of the fixed disk. Smart cards are likewise utilized for single sign-on to log on to computers.

**Schools**
Smart cards are being offered to scholars at some schools and colleges.

**Uses include:**
- Tracking student attendance
- As an electronic purse, to pay for items at canteens, vending machines, wash facilities, etc.
- Tracking and monitoring food choices at the canteen, to assist the student maintain a sizable die
- Tracking loans from the school library
- Access control for access to restricted buildings, dorm rooms, and other installations. This prerequisite may be applied at all times (such as in a laboratory containing valuable equipment), or just during after-hours periods (such as for an academic building that is open during class times, but
restricted to authorized personnel at night), depending on security needs.

- Access to transit services Healthcare Smart health cards can improve the protection and privacy of patient information, provide a secure carrier for portable medical records, reduce health care fraud, support new processes for portable medical records, provide secure access to emergency medical information, enable compliance with government initiatives (e.g., organ donation) and mandates, and provide the platform to implement other applications as required by the health maintenance system.

Other uses
Smart cards are widely applied to encrypt digital television streams. Video Guard is a specific object lesson of how smart card security worked.

Multiple-use systems
The Malaysian government promotes my card as a single arrangement for all smart-card applications. My card started as identity cards carried by all citizens and resident non-citizens. Applications available now include identity, travel documents, driver’s permit, health information, an electronic wallet, ATM bank-card, public toll-route and transit payments, and public key encryption infrastructure. The personal information in the MYKAD card can be read using special APDU commands.

Security
Smart cards have been advertised as suitable for personal identifying tasks, because they are directed to be tamper resistant. The chip usually implements some cryptographic algorithm. There are, nevertheless, various methods for recovering some of the algorithm’s internal state. Differential power analysis involves assessing the exact time and electric current required for certain encryption or decryption operations. This can deduce the on-chip private key used by public key algorithms such as RSA. Some implementations of symmetric ciphers can be vulnerable to timing or power attacks as easily. Smart cards can be physically disassembled by using acid, abrasives, solvents, or some other technique to get unrestricted access to the on-board microprocessor. Although such techniques may require a risk of permanent impairment to the chip, they permit much more detailed info.

BENEFITS
The benefits of fresh cards are immediately referred to the mass of data and applications that are programmed for use along a scorecard. A single contact/contactless smart card can be programmed with multiple banking credentials, medical entitlement, driver’s license/public transport entitlement, loyalty programs and club memberships to make but a few. Multi-factor and proximity authentication can and has been embedded into smart cards to increase the surety of all services on the card. For instance, a smart card can be programmed to only allow a contactless transaction if it is also within range of some other gimmick like a uniquely paired mobile phone. This can significantly increase the surety of the smart card Governments and regional government agencies save money because of improved security, more dependable information and cut processing costs. These savings help reduce public budgets or enhance public services. Thither are many models in the UK, many using a common open LASSeO specification. People have better protection and more convenience with using smart cards that perform multiple services. For instance, they simply need to replace one card if their wallet is misplaced or stolen. The information stored along a card can reduce duplication, and even offer emergency medical information.

ADVANTAGES
The first main advantage of smart cards is their flexibility. Smart cards have multiple parts which simultaneously can be an ID, a credit card, a stored-value cash card, and a repository of personal data such as telephone numbers or medical history. The circuit board can be easily replaced if lost, and, the requirement for a PIN (or other figure of protection) provides additional protection from unauthorized access to information by others. At the inaugural attempt to use it illicitly, the card would be deactivated by the card reader itself. The second main advantage is protection. Smart cards can be electronic key rings, giving the bearer the ability to access data and physical places without the need for online links. They are encryption devices, so that the user can write in code and decrypt data without relying on unknown, and therefore potentially untrustworthy, appliances such as ATMs. Smart cards are really flexible in providing authentication at different stage of the bearer and the twin Lastly, with the information about the user that smart cards can bring home the bacon to the other parties, they are useful devices for customizing products and services.

Other general benefits of smart cards are:
- Portability
- Increasing data storage capacity
- Reliability that is almost unaffected by electrical and magnetic studies.

SMART CARD AND ELECTRONICS COMMERCE
Smart cards can be used in electronic commerce, over the Internet, though the business model applied in current electronic commerce applications still cannot utilize the full voltage of the electronic medium. An advantage of smart cards for electronic commerce is their use customizes services. For instance, in order for the service supplier to deliver the customized service, the user may need to provide each supplier with their profile, a boring and time-consuming activity. A smart card can take a non-encrypted profile of the carrier, so that the user can receive customized services even without previous contacts with the provider.

DISADVANTAGES
A false smart-card, with two 8-bit CMOS microcontrollers, used in the nineties to decode the signals of Sky Television. The plastic or paper card in which the bit is embedded is fairly elastic. The bigger the chip, the higher the probability that normal use could damage it.Cards are frequently packed in wallets or pockets, a harsh environment for a chip and antenna in contactless cards. PVC cards can break or snap off if bent/flexed excessively. Nevertheless, for large banking systems, failure-management costs can be more than set off by fraud reduction. The production, use and disposal of PVC plastic is known to be more harmful to the environment than other credit cards. Alternative materials, including chlorine free plastics and paper are available for some smart applications. If the account holder’s computer hosts malware, the smart card security model may be discontinued. Malware can override the communication (both input via keyboard and output via application screen) between the user and the application.
Browser malware (e.g., the Trojan Silent banker) could change a transaction, unnoticed by the user. Banks like Fortis and Belfius in Belgium and Rabo bank ("random reader") in the Netherlands combine a bright card with an unconnected card reader to avoid this trouble. The client puts down a challenge received from the bank's website, a PIN and the transaction amount into the reader. The reader returns an 8-digit signature. This signature is manually inserted into the personal computer and affirmed by the bank, preventing point-of-sale-malware from changing the transaction total. Smart cards have also been the objectives of security attacks. These approaches range from physical intrusion of the card's electronics, to non-invasive attacks that exploit weaknesses in the card's software or hardware. The common destination is to expose private encryption keys and then record and manipulate secure data such as the funds. In one case an attacker develops a non-invasive attack for a particular smart card model, he or she is typically able to perform the attack on other cards of that model in seconds, often using equipment that can be masked as a normal card reader. While manufacturers may get new card models with additional information security, it may be costly or inconvenient for users to upgrade vulnerable systems. Tamper-evident and audit features in a smart card system help manage the risks of compromised cards. Another problem is the lack of standards for functionality and security. To come up to this problem, the Berlin Group launched the ERIDANE Project to propose "a new functional and security framework for smart-card based Point of Interaction (POI) equipment".

II. MODEL DESCRIPTION

Helmut Erhard (et al.) explains a printing device for printing plastic cards utilizes a printing and inking unit which is confirmed in a pivot able frame, in cooperation with a counter-pressure cylinder to print individual cards in one or more streams of cards. The pivot frame can be pivoted to separate the rubber blanket support cylinder from the return-pressure cylinder so that the rubber covers on both cylinders can be accessed.

Thomas S. Carlson (et al.) explains a piece of paper stock for preparing mailers, including die-cut identification cards which may be printed with a laser printer. The sheet stock includes a laser printable plastic adhered to a portion of the sheet stock. That portion is die-cut to define one or more identical cards. The rest of the sheet stock includes a second layer of paper adhered thereto which allows the sheet stock to feed through a laser printer feed tray. Instead, the paper is indentied to take into account for the added thickness of the adhesive and plastic layers.

Jachin Wang (et al.) shows a method of manufacturing a plastic card contains the steps of providing a sheet of lenticular lens material; coating the back side of the lens material with a vinyl resin base; printing the cover side of the lens material with a composite lithographic image; coating the back side of the lens material with an adhesive such that it can adhere to a sheet of plastic which serves as the cover of the plastic card; and laminating the sheets together.

Christopher Robert Cox (et al.) shows a carrier sheet with an integrated card and preferably, but not entirely, a magnetic strip card is drawn. The site contains printed information which is in part card information printed at a predetermined position along a front face of a carrier sheet in a card region thereof, and oriented to be disposed along an outer surface of the front and a rear card panel of the circuit board to be constituted. The method of fabrication and a method of employment is also described herein.

John L. Lyszczarz (et al.) explains an improved credit card having a clear, unbroken metalized surface with printed graphics thereon, which is scratch resistant and a method of making the same are disclosed. The method involves heat transferring a metalized foil to a first surface of a plastic substrate, silk-screen printing over the metalized foil with ultraviolet curable ink, drying the ink with ultraviolet light and over laminating the printed foil with a clear polyester film coated with a high temperature-activated adhesive or coating it with an ultraviolet curable varnish which is heated by applying UV light to the coating.

Masaaki Okazaki (et al.) describes a plastic card provided with a magnetic stripe, which is really hard to fake or alter and, even though subjected to forgery or alteration, enables the forgery or alteration to be easily detected in appearance. The first magnetic recording layer and the second magnetic recording layer are such that one of the magnetic recording layers has a coercive force at least twice as high as the other magnetic layer and a Curie point at least 100° C. below the other magnetic layer and, when the magnetic recording layers are heated at a temperature in the range of from the lower Curie point to 30° C. below the lower Curie point, they become substantially identical to each other in saturation writing current value.

Ellen Lasch (et al.) shows the present invention pertains to a process for producing an opaque, transparent or translucent transaction card having multiple features, such as a holographic foil, integrated circuit chip, silver magnetic stripe with text along the magnetic stripe, opacity gradient, an invisible optically recognizable compound, a translucent signature field such that the signature on the back of the scorecard is visible from the forepart of the card and an active thru date on the forepart of the circuit board. The invisible optically recognizable compound is an infrared ink and/or moving picture, which can be found by a sensor found in an ATM Or card assembly line

Keith R. Leighton (et al.) explains plastic smart card, such as a circuit board causing a radio frequency identification (RFID) proximity function, including at least one electronic element embedded therein, and a physical contact card function and the hot lamination process for the fabrication of this dual function smart card and other plastic cards including a micro-chip embedded therein. The procedure results in a card having a preferred overall thickness in the orbit of 0.028 inches to 0.032 inches with a surface suited for receiving dye sublimation printing—the variation in card thickness across the surface should not surpass 0.0005 inches.

Nick E. Cannistras (et al.) describes method of fabricating a plastic card, including the steps of printing on the rear surface thereof, laminating a sheet of clear plastic to the rear surface while simultaneously polishing the front surface, laminating a metal layer to the front surface of the sheet of plastic, and
applying a protective coating of a mixture of amino coumarin dye and clear liquid polyvinyl chloride to the surface by a silk screen process to thereby protect the metal layer against wear and abrasion.

Kevin Cowie (et al.) explains method of and system for manufacturing discrete printed laminated plastic products from sheet stock by employing the steps of providing a programmed computer, creating a master template that defines the position and other attributes of the graphics and/or text to be printed on the plastic products, inputting into the computer information concerning the type of product, information to be printed, and entering the information concerning the master template into the computer.

Christopher Robert Cox (et al.) shows a carrier sheet with an integrated card and preferably, but not entirely, a magnetic strip card is drawn. The site contains printed information which is in part card information printed at a predetermined position along a front face of a carrier sheet in a card region thereof, and oriented to be disposed along an outer surface of the front and a rear card panel of the circuit board to be constituted. The method of fabrication and a method of employment is also described herein. According to the experimental results, the most critical factors affecting the print features were interpreted to be the viscosity and surface tension of the ink, and interfacial tension. The spreading coefficients of the diluted inks were below zero on both the PET and BOPP films, indicating that spreading hardly occurs spontaneously, and thus limited spreading may be associated with a shear-induced flow of ink. Among tested machine factors, the printing speed did not significantly affect the uniformity and chromaticity of the image on the PET web as observed under microscopy or spectrometry. On the other hand, those on the BOPP film were found to heavily depend upon roller speed and thus dwell time. This difference was attributed to low spreadability of the ink due to capillary immobilization effect on the porous BOPP surface. In addition, the increasing groove size (dot%) resulted in a higher chromaticity due to a larger contact area between ink and substrate. Especially in the case of BOPP, the chromaticity of the printed image increased linearly with increasing dot%. It should be also noted that the images printed on BOPP exhibited enormously higher chromaticity and thickness compared with those on PET at the same dilution and machine factors. The large difference in ink transfer efficiency between the BOPP and PET substrates may be explained partly by the difference in interfacial tension and absorption of the BOPP substrate. The authors present the feasibility of sheet fed direct gravure printing for ultrathin, organic semiconductor films on ITO coated glass. Printing with chrome plated gravure cylinders is often believed to require flexible substrates to promote fluid transfer to the substrate. However, the results demonstrate a stable process for the small-molecule Spiro-MeOTAD dissolved in toluene on rigid substrates. The authors obtained layer thicknesses in the range of 5–100 nm. They identified certain boundaries for gravure cell size yielding printed films with thickness of 10–15 nm with good homogeneity suitable for organic light emitting diodes or organic photovoltaics. For gravure cells smaller or larger than the optimal range, the printed layer is afflicted with dot- or ribblinglike structures. The authors show that the latter may result from nip-induced Saffman–Taylor instabilities rather than spinodal dewetting or Marangoni effects. Finally, electrical characterization of a completed stack (PEDOT:PSS electrode) give evidence for integrity of the printed semiconductor layers. This experimental study of forward gravure coating on unsupported web considers the effects of operating variables on air entrainment, ribbing instabilities and the thickness of the film formed. The data show that this coating method can yield very thin films of thickness of order of 15–20% at most of the equivalent cell depth of a gravure roller. Air free and non-ribbed stable uniform films can however only be obtained in a narrow window of operating conditions at very low substrate capillary number ($Ca_{\sim}0.02$) equivalent to substrate speeds typically less than 20 m/min. The paper draws a similarity with flow features observed with smooth forward roll coating and slide coating. It is shown that the onset of ribbing and the flux distribution between the gravure roller and the substrate at the exit of the nip obey approximately the same rules as in smooth forward roll coating, whereas the onset of air entrainment actually corresponds to a low-flow limit of coatability similar to that observed in slide coating. Organic rectifier diodes operating at 10 MHz made using roll-to-roll compatible mass printing processes to define patterns and deposit inks are reported. The diodes consist of a layer of poly (triarylamine) sand wiched between layers of silver and copper. No high resolution prepatternning of any surfaces was performed, thus the entire process could be carried out on large-scale roll-to-roll production lines. The organic diode based rectifier circuit generates a DC output voltage of approximately 2.7 V at 10 MHz, using an input signal with zero-to-peak voltage amplitude of 10 V. The result demonstrates the possibility of printed organic diodes for RFID applications. One of the challenges in printed electronics is the capacity to print a high resolution electrode. However, it is difficult to gain control over fidelity of microscale line-width of printed patterns especially in roll-to-roll (R2R) gravure printing process. Here, we report a simple solution based on the wettability of ink on the substrate to prevent a widening effect of printed patterns thereby enhancing the precision.

The widening effect was found to be affected by intrinsic (ink wetting behavior, cell geometry) and extrinsic (nip pressure, printing speed) conditions. Analysis was conducted to figure out an effect of surface tension of ink and surface energy of substrate on the printed pattern width via contact angle. For a given cell volume, the width of printed patterns decreased with increasing contact angle. The experimental method was used to determine the optimal extrinsic condition and unstable region border. Finally, we identified three ink setting regions of widening, un-widening and unstable region. The experimental data showed a good agreement with expected results based on the established analytical approach. This result could be used as an important practical guideline to be applied in R2R gravure printing process with high resolution.
III. CONCLUSION

This research focuses on wastage optimization for plastic cards (with (ATM) Automated Teller Machine) on sheet fed offset printing Industry & to maintain the Quality at various stages to increase productivity at Syscom Corporation Ltd. Noida. In all cases when Checklist get adopted no. of wastage goes down from 7-8 % to 4-5 % on Heidelberg SM 52-6-H, 5-6 % to 2-3 % on Heidelberg SM 52-5& 5-6% TO 2-3% on Heidelberg SM 52-6-H5printing machines. The Overall result is depends upon the behaviour & Quality of substrate during Production. To implement the suggestions properly we generate a check list in form of table to check the different factors before all jobs to be handled on sheet fed offset printing machines. And the check points help to reduce the wastage of plastic cards (with (ATM) Automated Teller Machine) along with optimum consumption of plastic substrate. The study may be concluded in a manner that if all suggestion were implemented in matter o f practice on sheet fed offset printing machines will goes down along with increase in production &reduce wastages of substrate and also it helps to increase Profit.

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IV. REFERENCES


[5]. https://en.wikipedia.org/wiki/Smart_card

[6]. Printing device for printing plastic cards, by - Helmut Erhard, Georg Schneider, 30/08/1994

[7]. Foil laminate credit card and method of producing foil laminate credit card with double-sided printing, by - dennis e. Jaynes, 02/11/2000


[10]. Integrated plasticized card in a paper carrier and method of manufacture, by - Christopher Robert Cox, Thomas MacDonald, Thomas Carrigan, William Dale Ritchie, 2000-10-10


[12]. Plastic card provided with magnetic stripe, by - Masaaki Okazaki, Yoshiki Šasaki, Koji Kitami, 1993-02-02

[14]. Hot lamination process for the manufacture of a combination contact/contactless smart card, by - Keith R. Leighton, 1995-10-17


[16]. Hot lamination process for the manufacture of a combination contact/contactless smart card and product resulting therefrom, by - Keith Leighton, 1995-10-17


[18]. Integrated plasticized card in a paper carrier and method of manufacture, by - Christopher Robert Cox, Thomas MacDonald, Thomas Carrigan, William Dale Ritchie, 2000-10-10