ISSN 2229-5518

Securing Skill Set Of Security Printing Sector

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Abstract— In security printing sector to produce products i.e. bank notes, demand draft, cheques, stamps etc. Offset printing and Intaglio printing are commonly used. Along with printing processes some finishing operations like trimming, embossing, numbering etc. are also included to add special value to product. There different configurations of machines which can be used for different sizes, no. of colors, speed with input paper in form of sheet or roll form. To work on security product, the printing engineering or technician must be competent knowledge of process, operations, raw material handling, finishing, quality checking and controlling in context of security printing sector. It is common practice in Industry to assign interdepartmental works to different technician without detailing of required professional outcomes from product. This process results in unprofessional practices, challenges for execution of targets, compromises on safety aspects of working conditions and economical losses production. To avoid these conditions, in this document we will discuss different competencies and evaluation of individual to achieve them to perform duties in Security Printing Sector.

Index Terms— Technical skills of man power, Intaglio and offset Printing Process, Locomotor Skills, Analitical and Inspectional Skills

1 Printing Processes in Security priting Sector[2,4,7,8]

INTAGLIO PRINTING - The term intaglio is derived from the Italian word antiglare, meaning to engrave, carve, or cut. The term refers to a printing method that uses an engrav-ing that is incised, scratched, or etched in a hard material, such as a steel plate. The engraved impressions are filled with ink after which the plate is wiped clean with a system of rollers to remove excess ink from the surface of the plate. Subsequently, the plate is brought into direct contact with the paper substrate under enormous pressure (tens of tons per linear inch) so that the paper is pressed into the recesses of the plate. As the substrate is pulled from the plate, capillary attraction and surface tension forces act to pull the ink from the recesses in the plate to form a raised print-ing pattern on the substrate. This process locally deforms the substrate virtually per-manently. The deformation is referred to as embossing. This way a tactile relief is formed, unique to the intaglio printing process, and brought about by the sum of the ink thickness and the paper embossing.

The printing pressure squeezes the intaglio ink partly outside the perimeter of the recessed image elements, along the paper fibers, to form feathered structures, although this feathering is less pronounced in intaglio printed with modern Orlof printing machines. This feathering is typical for intaglio printing on paper and fails completely on polymers because of absence of substrate fibers. Observing of intaglio feathering generally requires magnifying glass or sometimes microscope. With the development of electronic stylus, plate engraving no longer entirely relies on the expert handcraft of a master engraver but is raised into the digital realm of computer design and high precision computer-steered plate engraving. Because of its unique characteristic, intaglio printing is often considered the prime printing technique for valuable document. Modern intaglio printing presses allows the printing of several colours in one printing pass, in perfect register and extremely fine details down to line of 15 um width.

Offset Printing - In offset printing, the inked image is transferred from the printing plate onto an intermediate collecting rubber cylinder and subsequently conveyed or offset from this intermediate cylinder to the substrate. Because the ink is offset to the substrate via an intermediate rubber cylinder with a smooth surface, the substrate is neither embossed nor impressed. Offset, therefore, is a planographic printing technique, which produces very thin and flat ink coverage of the substrate. This is contrary to intaglio printing (recessed ink receptors in printing plate) and letterpress printing (raised ink receptors on printing plate), by which the ink is conveyed directly from the printing plate to the substrate forming a raised or indented print.

Offset printing can be divided into wet offset and dry offset, according to the physical properties of the printing plate surface. Modern offset printing techniques, both wet and dry, allow the printing of multiple color designs in perfect register into line offset and screen offset, according to the way the separate image design elements are composed.o modify the running headings, select View | Header and Footer. Click inside the text box to type the name of the journal the article is being submitted to and the manuscript identification number. Click the forward arrow in the pop-up tool bar to modify the header or footer on subsequent pages.

2 Skill Sets for Prinitng Technician [1,3,5,9,10,11]

On technical ground of printing processes, there are different machine manufactures who provide different configurations of machine but working principal and sequences of operations remain same for any size, speed or other forwarding operations. To counter these working configurations there are few skill sets or competencies those are target while selecting technical individual for production operations. The competencies are divided as per different segments which deal with machine operations, process technical knowledge, science of processes, mechanical characteristics of material and processed product, quality checking and controlling of product and ethical professional practices on production work place. The following segments will discuss competencies for different skill levels as ;

2.1 Loco Motor Skill Final Stage

Locomotors Skill sets with Operational superiorities for press configurations and work processes that are typically used within a printing establishment are ;

1. Awareness about mechanical safety requirements when working with printing press equipment
2. Knowledge of Describing a job jacket/ticket
3. Creating a job jacket/ticket using an instructor specified print job
4. Identify the basic systems and parts of press – Feeder, Printing Unit, Delivery Unit
5. Describing the paper path of a sheetfed /webfed press
6. Identify common maximum sheet sizes of sheetfed /webfed presses
7. Controlling common speeds (impressions per hour) of sheetfed and webfed presses
8. Woking on the advantages and disadvantages of a web fed press versus a sheetfed press
9. Evaluate printed samples produced on a webfed and sheetfed press
10. Describing perfecting and compare the features of a perfecting press versus non- perfecting press
11. Identify components of a printing unit in machine manual illustrations – Inking System, Dampening System, Printing Units, Inline Units, Quality Control Tools and Delivery Section
12. Describing the operation of printing press from feeding, through the printing unit, to delivery.
13. Controlling printing for the imaging process of digital printing versus offset printing
14. Operating automation tools are being employed on an offset press – Plate changing unit, Ink presenting
15. Working in team for roles and responsibilities of pressroom personnel – Pressroom supervisor, Helper, Production manager

2.2 Analitical Skills

Paper - The types of paper that are used on printing press are extensive. In the printing industry paper is often referred to as a substrate. The use and handling of paper must be managed correctly to ensure satisfactory printing operations. The following competencies discuss the physical characteristics of paper and the importance of proper handling during the print run.

1. Identify characteristics of paper – Weight, Finish, Thickness, Brightness, Opacity, Grain Directions, watermark
2. How grain direction will affect the running of a press, folding, scoring, and binding
3. Identify specialty substrates as Carbonless paper, Pressure Sensitive, Gummed Label, Plastic based Substrate, Metal Foils
4. Explain the importance of paper conditioning and describe potential problems that can be created by poor paper conditioning prior to running the press
5. Describe workflow steps required in printing a process color job on coated versus uncoated paper
6. Evaluate the quality of printed jobs - Color, Register etc.

Ink - Ink is an essential component of printing process. Printing ink is provided a wide variety of choices and prices. Proper use and selection of ink on press is an important ingredient of a successful print job. For that following skills should be checked as :

1. Type of inks used on press for particular substrate - Oil-based, Polymer-based, Soya-based
2. Identify process and spot color areas for print job
3. The procedure for mixing and testing custom colored inks
4. Causes of ink problems and possible solutions
5. Type of coatings –Aqueous, Ultraviolet cured, Solvent Base

Make Ready and First Print Out Put -

Make ready is the process of setting up a printing press to print a job including changing plates, changing paper, setting the paper path, achieving a proper ink and water balance, and registration. Newer presses have features that automate setup that was traditionally done manually. For that following skills should be checked as :

1. Analyse a job ticket for printing instructions -Number of colors, Imposition style (Sheet wise, Work-and-turn, Work-and-tumble), Quantity, Type of paper, checking of folding dummy, Registration, Trim, Bleed, Fold
2. Settings of ink roller, dampener roller, and cylinder pressure settings on a press
3. The operational procedures, controls, and adjustments for each system (feeding, printing, delivery, speciality drying units as per type of ink) on press
4. Printing step of a multi-color job that contains register marks and color bars with accurate registration and monitored ink density
5. Wash-up techniques for the inking system (including a color wash), dampening system, and cylinders

2.3 Quality Control Copyright Form

Quality Checking and Controlling Skills - There are a variety of factors that can lead to printing errors or inconsistencies. As the press run progresses, sample sheets are pulled and analysed with measurement devices to verify the printing is within specifications. The following points describe the tools and procedures to measure press sheets to obtain satisfactory printing quality which should be mastered by print technician;

1. The use and control print of color bars for quality control, functions of optical measurement tools used for quality control as Densitometer, Spectrophotometer, press console system
2. The knowledge of print industry specifications, profiles-Web Offset Publications (SWOP), Specifications for Newsprint Advertising Production (SNAP), General Require-

ments for Applications in Commercial Offset Lithography (GRACol)

3 Generalised skills[1,5,6]

The printing press is a precise machine with many moving parts. The proper operation of the press requires periodic maintenance to adhere to manufacturers specifications. Most of the maintenance is performed by the press operator. The following define the types of maintenance that is required for proper operation of the offset press which should be mastered by print technician;

1. The procedures for daily, weekly, and monthly maintenance on a press and recording
2. The process of roller care and maintenance of inking and dampening systems

The use of math and measurement skills is critical in a wide range of job functions within the graphic communications industry. Because of the many units of measurement only used in the graphic communications industry, it is important to be able to work with them. The math and measurement application like calculations of fraction, decimal, finding ration or proportions, these skills necessary for successful employment within the graphic communications industry

4 Conclusion

The present literature as a base for scrutiny of human resources at entry level in security printing sector will sucessfully give understanding of skill lvels of personal and can project individuals performance and growth in challenging conditionas. Security Printing Press is top level infrastructure providing world class quality products with high ethical and commercial value, Press performs the operations on international standards to serve across the globe, so it is benificail to have investigation and examination systems for print personals wthose who going to handle Security Prinitning Document jobs.

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