

Technical Paper
On
CHANGING FACES OF THE PRINTING INDUSTRY

By

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INTRODUCTION TO PRINTING:

Printing is supposed to be the most innovative invention of mankind amongst all inventions which has helped in transforming humans to build the modern society we are living in today. In fact Printing can be also termed as the mother of all inventions and technologies because Printing helped to secure knowledge by printing all documents and spreading them to masses and also secured the technology and knowledge for the future. Printing has been used to transfer not only itself but it has also helped in transferring knowledge to the people through centuries and thereby helped in developing all modern technologies that we are using today. The development of modern society is solely the product of transferring knowledge & creating systems like printed currency which helped in creating systems/policies to actually run the world.

DEFINATION OF PRINTING:

Any script or creative that is transferred and replicated onto any flexible or rigid surface for mass production can be termed as "PRINTING".

BRIEF HISTORY OF PRINTING:

Printing is known to have been invented by Johannes Gutenberg a German Goldsmith in the 15th century. He is known to have invented the first mechanical printing press through which any manuscript can be mass produced through printing. The first book known to have been printed by him was The BIBLE. Wooden types or fonts were used to print the first publication.

IMPORTANCE OF PRINTING:

It is said that printing is not just *TECHNOLOGY* it is also an *ART* but we need to go beyond this statement and say that Printing is a part of our daily lives.

Printing has integrated so very well into our daily lives that we have almost forgotten the importance of printing and just imagine that we drink water and breathe oxygen without realising the importance of both but just imagine for an instance that if at any point of time we have a situation when we are short of water or oxygen we are made to realise the importance of both in our daily lives but unfortunately PRINTING has never adapted itself in such a way that in spite of being so important it has never tried to prove its importance.

ROLE OF PRINTING IN BUILDING THE MODERN SOCIETY:

The printing which is believed to have started in the 15th century has gradually transformed itself into the modern printing facilities which has not only revolutionised itself but has also helped in transforming the globe into the today's modern world. The knowledge and technology developed through the years by various scientist, inventors and technocrats have been printed and secured in **hard copies** over the years and passed to the masses so that the readers may be able to understand technology and thereby helped in improving the knowledge by enhancing the existing technology by sharing their experimental experiences through these **hard copies** so that the existing technologies may be taken further to next level without going through the initial phases again. The customary which was started by mankind to write the research papers before it was lost or misused and thereby printing them so that their research may be understood and enhanced later by others helped in developing our planet into a modern society.

PRINTING ADAPTED AS THE MODERN EXCHANGE SYSTEM OF THE WORLD:

From the initial period when the early humans tried to create systems through which the human society may be governed and various exchange systems were created by mankind which included gold and other precious gems, metal coins etc. These were used as universal exchange systems to buy all the articles, food or property etc. in exchange with these coins. As times changed and with the improvement of printing to such an extent that it was adapted to print the existing currencies throughout the world and also accepted as the universal exchange system throughout the globe. Printing was and is being used to print currency worldwide because printing has helped in the mass production of currency within short time span which is nearly impossible to replicate by other sources except by the origins of the currencies and most essential part was that printing was the most cost effective solution, high life cycle and easy to carry which made it undoubtedly unanimous for the world to accept the printed currencies as the modern exchange system throughout the world.

TYPES OF PRINTING:

The printing tree since its evolution has never stopped the innovations of itself and therefore it too has grown better and better through the centuries. Printing can be classified into two simple categories:

- A. Direct Printing:** The ink is transferred from metal or wooden types which is a mirror image of creative directly to the substrate or paper.
- B. Indirect Printing :** The ink is transferred to another surface and mirror image of the creative is produced which is then used to print onto any substrate or paper.

There are following four basic categories of printmaking:

- A. Relief:** The wooden, metal, rubber, polymer types are used to print image directly to paper or other substrate. The image here is above the surface of plate and ink is retained by the raised portion which puts the image on paper or substrate. This process is used in Letterpress printing & Flexo printing.

- B. Intaglio :** This process uses an engraved or etched plate in which the image is below the surface is filled with ink wiped clean and then the ink left is used to print. This process is used in Rotogravure printing.
- C. Lithography :** This printing process involves indirect printing process where ink is applied on plate where image and plate are at same height and since ink and oil do not mix with each other so the ink is deposited only on the image area of the plate which is transferred to the special rubber blanket in mirror image which then prints on paper or substrate. This process is commonly used in offset printing.
- D. Screen printing:** This process uses a cloth or fabric to generate image photographically and then the ink is poured and pressed by squeeze from one end to other and the ink is passed to the paper or substrate through the pores of the cloth.

As times passed the tree of the Printing grew and new branches were introduced to the printing over the years :

- A. Digital Printing :** This form of printing is most popular and most growing type of printing which has revolutionised the world by providing customised printing capabilities. There are two types of digital processes or toners used in digital printing. Image is transferred to paper or other substrate using dry or wet tonner using digital heads and the image is transferred to these heads through a software via a computer. The digital printing or devices can be classified into following categories.
 - 1. Inkjet printing
 - 2. Laser printing
 - 3. Nanographic printing
- B. 3D Printing :** This process of printing is obtained by printing a three dimensional image from a printer using a computer aided programme and various materials are used to print or produce articles in 3D without moulds or forging. A special ink is created with polymers, metals etc. which can be transferred from the special printing head and deposit the content one over another to create the image & shape exactly as per the design.

- C. Printed Electronics:** This printing process is used to create various low cost, flexible electronic articles like organic & inorganic semiconductors, metallic conductors, nano particles, LED, RFID, printed circuit boards and many more. This process uses various types of inks suited for a specific task to create an electronic device through printing.

Printing is indeed the only industry which may be considered as the ancillary of all the industries of the world. We just cannot run any industry without the involvement of printing with it. If we consider the number of innovations that can be done and achieved reasonably in any industry then Printing Industry will certainly be on the top of the chart. Printing Industry is considered to be the second biggest industry after automobile industry in terms of revenue and employment generation.

Standardization in the Field of Printing Machinery:

Standardization in the field of Printing Machinery has been a long drawn programme beginning right from late fifties till present day. Bureau of Indian Standards the National Standards Body of India has been in the forefront by formulating more than 15 Indian Standards on Printing Machinery which assure minimum safety requirements and quality products which are appropriate for Indian Climatic Conditions. Printing Machinery Sectional Committee, MED 25 is the technical committee responsible for formulation of Indian Standards on Printing Machinery and out of 15 Standards formulated 9 Standards are adoption of ISO and the rest are indigenous Standards which are at par with the International Standards and ensure best Indian engineering abilities & manufacturing qualities. All the Indian Standards on Printing Machinery are voluntary in nature and it is felt that there needs to be better coordination amongst the users to incorporate the Standards in their day to day affair.

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