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Reprography Looks Forward

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PHOTOCOPYING has recently gained currency in almost all academic and research institutions offices and even in the market places all over Bangladesh. The reason is that it was a spectacular capability of instant facsimile reproduction of any document. Though named 'Photocopying' but the generic term is 'Reprography' which covers a much wider spectrum viz photostat microfilms microprint reflex copy Xerography thermofax diazo etc. This paper attempts to describe some of the popular methods, processes and techniques and activities associated with it.

Historically speaking the need for making copies is probably as old as writing itself. In ancient times the manual process viz the scribe would be used to make copies of books and documents. The mechanical reproduction dates back to the 6th Century BC when in Assyria the text used to be engraved in reverse on the clay cylinders which were rolled over a slab of wet clay to reproduce copies of the text as required. With the passage of times much developments have taken place in this field. To sum up the whole reprographic techniques may broadly be classified into two groups viz (a) Non-photographic and (b) Photographic. Under non-photographic group again there are two methods (i) Manual and (ii) Mechanical. Manual techniques include (a) Manual transcriptions using the simplest equipment viz pen and ink, paper; (b) type writer both for making copies preparing stencils for duplicating machines and producing photographable originals for off set printing (better by using electric type writer); (c) Flexowriter — an electric type writer with added units — the punch and the reader; (d) Cold type composition and (e) Carbon paper. The mechanical techniques in-

clude (a) Stencil duplicating process; (b) Offset duplicating process and (c) Hectographic processes.

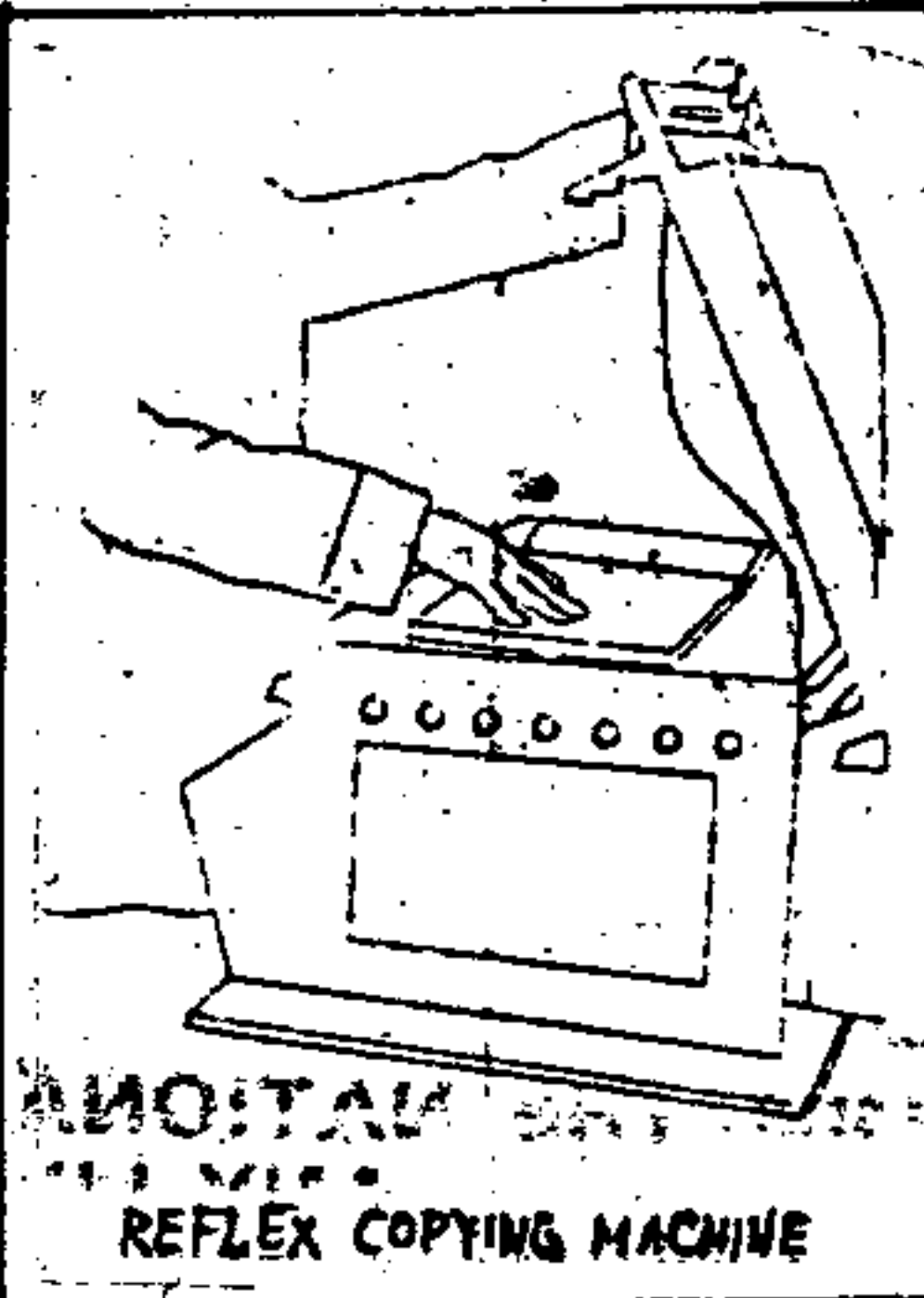
Photographic (reprographic) techniques involve two steps. (i) Exposure to the original document and (ii) development of image into a readable copy. There are three methods of exposures which are generally used for making photocopies. These are (a) Direct contact method, (b) Contact reflex method and (c) Optical method.

Direct contact method requires the object to be copied as the translucent and the text is on its one side only. Difficulty is that the book is not printed on translucent papers and on one side of the papers. To overcome this difficulty (b) Contact reflex method was developed. It involves two steps. The first gives the negative in which both image and tone are reversed and the second gives the right reading positives of the original. The exposure as well as development process is to be taken twice. To do the job a box with a glass top on which the document to be copied is placed and there is a source of light at the bottom for exposure. To ensure proper contact with the page of document and the photosensitive material padded tops inflated air cushions or inverted roof-tops are provided.

PHOTOGRAPH

However on serious limitation of the contact reflex method is that the area where photographic paper is not in perfect contact with the original de-

velops as 'out of focus'. To overcome this difficulty (c) the optical method was developed. In this method, a camera is used to photograph the original through a lens to a sensitive film or paper or plate which is processed to serve as intermediary. The copy can be had from this in-



termediary either by contact or projection printing. This avoids out of focus problem and enables to increase or decrease the size of the image. In the optical photocopying if the image is directly produced paper in the readable form it is

called the direct method. In photostat as in the Electrotax process the direct method is used. In xerography also exposure is taken by optical method. Here, however, instead of using a photo-sensitive paper or film an electrostatically charged selenium plate or drum is used to serve as 'Master'. The image from this 'Master' is transferred to an ordinary paper. In contrast to optical method there is also projection method suitable for producing readable text from microforms. Here the enlarged image from the transparent or translucent text is projected through a lens on to a sheet of photo-sensitive paper. The source of light remains behind the original and not in front as in the case of optical method. The microform readers are also based on this principle.

DEVELOPMENT

Ever since the photostat machine was introduced in 1910 many development processes were introduced and abandoned. These include (a) Silver halide process (b) Stabilization process (c) Autoposition process (d) Gelatin-Dye transfer process and (e) Blue printing. During the World War I (f) Diazo processes were developed. The year 1950 saw the commercial introduction of (g) Diffusion Transfer Reversal (DIR) process (h) Thermofax and (i) Xerography. The Varifax was introduced in 1952 (k) Kalvar in 1955 (l) Electrolytic in 1957 (m) Thermal Diazo and (n) Dual Spectrum in 1963 followed. See Page 9

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lowed by (o) Adherography and (p) Dry silver both in 1964. However all these processes have seen a sharp decline by xerography a dry electrostatic process suitable both for loose sheets and bound volumes. Xerography was discovered in 1935 by Chester Carlson of U.S.A. The Battelle Memorial Institute purchased it from Carlson in 1944 and licensed it to the Haloid Corporation of Rochester (now Xerox Corporation). The equipment is also being manufactured in UK under the name of Rank Xerox since 1957. Competing with Xerox there are other brands of photocopying machines such as Canon, Toshiba, Nashua, UBX, Ricoh, Sany, KIP 3M, Minolta, Mita, Sharp, Rex, Rotary and so on. Regrettably modern advertising tends to suggest that almost every machine processes a separate process having special features not found in other machines. This may create some confusion though the method of reproduction via electrostatic process is more or less the same. An invisible electrostatic latent image is made on the surface of a revolving photosensitive drum made of selenium or cadmium. Black particles of toner (may be dry or suspended in liquid dispersant) are attracted to the latent image to develop it. The toner particles are then transferred to a piece of plain paper and fixed permanently, charging exposing cascading transfer fusing and clearing of the drum are completely automatic and the whole is extremely rapid. Competition however is on other fronts. Every manufacturer is keen in improving the handling and performance of their products by using the latest scientific innovations. Current development of Zoom lens for example allows one to readjust copy size from 65% per cent to 115% to suit a variety of applications. Likewise replacement of lenses by fibre optics has eradicated the optical crack problems, fungus growth and noise, and has helped to keep the focal length constant. Application of transistorised switch or integrated circuit has burnt many mal-function routines of mechanical switch and has made the performance speedier at present 42 to 50 copies per minute. All these spectacular developments have made their operations so simpler and the end products so rapid and cheaper that one Western Observer had to admit 'Photocopying was suddenly taken out of the dark room and the hands of trained technicians and placed in well-lit offices where clerical personnel without any knowledge of photographic process were soon making reproduction of documents in seconds at cost measured in pennies instead of dollars.'

Reprography also includes microforms viz (i) Microfilm (ii) Microfiche (iii) Microcard and (iv) Microprint and Microlex. Sir David Brewster a Scottish physicist in 1857 saw a great prospect in sending the secret message after reducing them

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into microscopic size. During World War II, microfilming was done exclusively for both preservation of important documents and sending secret messages. The commonly used microforms mentioned earlier are described in brief.

Microfilm : It is a micro-transparency on cellulose acetate film in the form of a roll of different lengths and of widths of 16mm 35mm 70mm and 105 mm. Of these microfilm strips of 22.5 cm length and of width of 35 mm are preferably used in libraries. Microfilm gives bright image and can be conveniently used for making a paper enlargement. It however cannot be read by naked eye and so it requires a microfilm reader.

Microfiche : Like microfilm it is also a micro-transparency but in sheet form having a number of rows of images. Available sizes are 75 x 125 mm 90 x 120 mm 105 x 145 mm 105 x 150 mm. The title of the publication including the bibliographical details is given in readable form on the top of the microfiche to help locating the desired items.

Microcard : It is photographically produced micro-opaque in 7.5 x 12.5 cm size. The microcard like a microfiche is easy to identify and handle. However the projected image is not as bright as of microfilm or microfiche. Because micro-cards are opaque and there is much loss of light with the result in the loss of sharpness and clarity.

Microprint : (Readex) Readex microprint is a registered trademark of Microprint Corporation of New York for photolithographically produced microdocuments by a special process. Each microprint contains 100 pages of text arranged in rows of ten both vertically and horizontally. Content printed across the top and be read with naked eyes. Reading equipment is similar to the micro-card reader. The still another micro-form is Microlex. It is similar to Microprint with the difference that it contains 200 pages of text printed on both sides of a 16.5 x 21.5 cm size.

PROSPECTS

Photocopies and microforms have great potentialities for the libraries and library users in Bangladesh. Most of our libraries have poor collection of books and journals. These deficiencies can to a great extent be minimised through photocopies and microforms which will help bring within reach of even the smallest libraries copies of journals, small manuscripts and other documents, the originals of which have been long out of print and not available or are too expensive for the library to acquire. More over these methods can be extensively used for the preservation of manuscripts, fragile news papers and rare reading materials which otherwise would decay and be lost forever. To-day back sets of journals (even some of the current journals) rare and out of print books are also available in micro-forms at a cheaper rate. Microforms save storage space from 70 to 80 per cent less than the books. Their impact on library cooperation both at national and international level is also tremendous. In the

through the country. Some of our universities and research institutions have also installed photocopying units which are found beneficial to the students and research workers for their studies and research work.

Photocopying machines, accessories and chemicals including toners can be imported at 50 per cent less than the market price provided there is exemption of all sorts of taxes on these by our Government. Most of our academic and research institutions have poor library budgets. As actual users it is therefore urged upon our Government to issue cash Import Licences to our academic and research institutions for the import of reprographic equipment and accessories free from all sorts of taxes under the UNESCO agreement. This will pave the way of healthy growth of higher education and research in our country.