Printing Qualities of Paper : Paper Makers' and Printers' Responsibilities

MR V. S. KRISHNAMURTY* It is the joint responsibility of Paper Makers and Printers to make the Paper good for Printing—Paper Markets' to impart and the Printers to preserve the Qualities. Quality control measures and relative tests at the manufacturing stage and as well as at the Printing stage arc suggested. Necessity for close liaison between the paper makers and printer is emphasised and few suggestions were offered in this direction.

The properties required of printing papers are generally known to paper-makers and printers. Certain qualities are inherent in all papers and certain others are specially imparted for specific purposes. Very high standards are required in maintaining these qualities in proper proportions not only by the paper-maker during manufacture, packing and transhipment, but also by the printer in keeping these qualities without being altered by improper storing and other conditions which will create difficulties in printing. In this talk, I wish to stress on the responsibilities of Indian papermakers and printers in this regard, methods to be adopted by them in preventing the defects in papers and making them fit for printing.

It has been computed that there are over 400 variables in paper manufacture. It is therefore not surprising that despite exacting specifications and careful routine control tests, an undesirable degree of variation occurs in practice, imparting different qualities and properties to the finished paper than that intended. There are other factors, too, outside the control of the paper-maker that largely affect the properties of the finished paper, after it moves from the paper mill.

The printers know these facts, or supposed to know, but it is a matter of surprise that relatively very few paper users fully appreciate its properties, its versatility, or its inherent limitations and the reasons why it may fail to behave in its accustomed way or in the manner expected of it. It is necessary to fully educate the printers and paper-users on these points and the Indian paper-makers must deem it their duty to take up this public relations work in greater sincerity in their own interest, if not in the interest of printers, their largest customers.

Qualities related to purpose :

When we talk of printing qualities of paper, it should be remembered that quality is always related to purpose. For instance, a well-made opaque antique wove' paper of good bulk would possess all the qualities required of an excellent bookwork but it would be completely unsuitable for a six-colour litho-work. Even in one grade of paper, special qualities may be required sometimes when the paper is destined for some special usage or intended for some unusual purpose. It is therefore important in such cases that the printer shall provide the paper-maker with as much information as possible about the use to which the paper is to be put. Conversely, it would be wise and desirable for the paper-maker to provide as much information as possible regarding the specific printing qualities imparted to each grade of paper he makes and to what purpose each can be put to use best by the printer. In this connection, I would like to mention that certain names used by Indian paper-makers such as Map-litho, Supercalendered Account-book paper, etc. do not conform to standard usage and have no bearing to the end use of the respective papers. Such wrong usage can lead to a lot of confusion.

While the qualities may vary for papers of different grades and for papers of one grade made

*Head of section in Printing Technology, Regional School of Printing-Madras. Paper presented in IPPTA Seminar-March '68

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for a specific end use, consistency in quality in one delivery is the greatest important requirement of all. It was possible in the early days of paper making for the paper-maker to inspect individually sheet by sheet, sort out and supply any quantity of paper with consistent quality in all the finished sheets. But the speed of modern paper and board making is such that individual inspection of sheets is virtually impossible and consistency in quality cannot be absolutely achieved.

Quality Control Measures :

Quality control in paper manufacture in the past few years has so advanced that many of the faults in paper making once considered inherent can be eliminated to-day or reduced considerably. Thus increasing reliance is being placed on quality control to produce a paper of consistent quality and thereby reduce the necessity for sorting individual sheets of paper. Considerable progress has also been made in the use of beta-ray gauges for moisture and substance control on the paper-making machine and in the installation of electronic scanners for detecting faults such as holes, lumps and bumps. In addition to these instruments, a new devise, called profiler, is now used to assist in the automatic regulation of finish, bulk and opacity, a feat once considered impossible except by the closest manual inspection. I do not know how far the paper-makers in India have made progress in adopting these quality control measures in their mills. It need not be stressed that every paisa spent on this project will repay dividends several times its worth. I would suggest to them to give wide publicity to such of the measures they take to reduce the burden of the printer.

Paper and Press-room Problems :

In considering quality and fitness of purpose of any particular grade of paper or board, the first question that arises is how will it perform the work for which it is intended? In other words, how far will it reduce the press-room problems of a printer in printing a job? It is these problems which bring the printer and paper-maker closer and it is here both have common ground and speak a common language. These problems primarily relate to the properties a paper possesses or should possess, qualities that influence printability. These properties are capable of measurement, many of them to a high

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degree of precision, by the use of various testing instruments and devices.

The most important paper qualities that influence printability are : smoothness, compressibility, absorbency, surface strength (i.e. picking and fluffing), acidity of pH value. Dimensional stability and optical properties (i.e. opacity, colour and gloss). The requirements with regard to these qualities differ for different processes. Some of them are common to all processes, some specific to one. Even in the case of common facors, the accent will vary from grade to grade. The printer should have a clear idea of the properties required of a paper for a specific process or a job. He should know which physical properties of a paper require to be measured and what tests are to be carried to select a paper most suited to the job. In fact, paper selection cannot be placed on a proper footing except through the application of proper testing methods; it is the only way in which the printer and the papermaker can speak a common language. It should be emphasised, however, that the tests must be carried out correctly in a laboratory maintaining constant temperature and humidity-about 65°F and 65% relative humidity-or misleading results will be obtained, which will cause more confusion than no testing at all.

Tests necessary for Printers :

As a result of ceaseless research in this direction, a large number of paper tests are available to-day and it is possible now for the pinter to set up his own paper testing department. Is it necessary for a printer to carry out all the available paper tests? No, it is not necessary. For example, such well-established strength tests like tensile strength, burst, folding endurance, etc. are not of great importance to the printer for evaluating printability or printing qualities of paper. This is because these properties generally do not in practice affect the behaviour of the paper on the printing machine. There is also no necessity for the printer to know the composition of a paper since this is usually of no direct interest to the printer. He should only know how a particular paper will perform in a given set of conditions. So long it performs that way, it does not matter to the printer from what or how the paper is made. It should also be appreciated that some properties are mutually incompatible-if one quality is required in a larger degree in a paper, then another quality may not be attainable or must be sacrificed

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Assessment of Printability:

Of all property measurements of paper, printability has been the most elusive one in the past to evaluate with any reasonable degree of accuracy. The most conclusive test, so far as the printer is concerned, is its behaviour on the press. Concisely expressed, "printability represents that blending of the several properties of paper which in association with its physical condition, determines its behaviour on the printing press."

For modern high speed machines with fast automatic sheet feeds the primary requisites of paper are : consistency in quality, dimensional statibility and flatness combined with the ability to receive an acceptable ink impression. Printability will also be gauged by the paper's resistance to fluffing, picking and freedom from any condition affecting the correct functioning of the ink-in particular the effect of paper on drying rate of ink.

While there are a number of instruments and methods available for testing the paper qualities, mention must be made of two equipments which are of particular interest to the printer and which are more useful for testing the printing qualities or printability of paper. They are : The PATRA Test Bench and the IGT Printability Tester.

Two Printability Testing Devices :

The PATRA Test Bench, primarily devised for printers, consists of a number of instruments and apparatuses for the examination of printing inks, transparencies, blocks, plates, printing defects, and printing qualities of papers and boards. For paper testing it is furnished with apparatuses for estimating the following properties: substance, caliper, visual smoothness, surface oil absorption, pH values, surface strength, opacity, starch and mechanical wood content and folding characteristics.

The IGT Printability Tester is an instrument by the use of which it is possible to assess the printability of any given quality of paper with a fair degree of accuracy. Tests are carried out on the paper to be used for a job by utilising small amounts of ink at predetermined printing pressures with the ink film thickness, cylinder covering and printing speed which can be kept constant or quickly changed to suit requirements. Such tests take only short time and may be used to determine pick resistance or surface hardness, print density, degree of ink penetration, the surface smoothness of the sample, minimum set-off times and wet-on-wet printing values. Besides these, the Tester is also able to evaluate other properties such as varnishability, picking properties of ink, as well as the screen required for the blocks to used on the given paper.

Some Misconceptions :

While talking about printability tests and printing qualities of paper, it is not out of place to mention here that there are many fallacies which prevail on both sides, the paper-makers and printers. As an example, there has been lot of talk about temperature control and relative humidity but there are more misconceptions and confused thoughts about these than clear understanding. The papermaker has to fully inform the printer about these two subjects concerning every grade of paper he makes. pH is another factor which is all too often blamed for problems unconnected with acidity or alkalinity of paper. A low pH paper can cause retarded ink drying in litho printing, but very often it is blamed for defects like inferior printing quality, dusting, fluffing, picking and even mis-register troubles. None of these faults can be attributed to a papers pH value. There is much scope for discussion on such points so that the misconceptions prevailing on both sides can be removed, and an understanding reached as to the responsibilities of each in reducing the printing difficulties in the pressroom.

Need for closer understanding :

Indian paper-makers and printers still depend to a great extent on imported machinery and equipment for attaining excellence in their respective products. Tremendous progress has been made in recent years in the design and construction of these machinery and they have become more complicated and more sophisticated, electrically and electronically controlled throughout. But with regard to the raw materials, only indigenous materials have to be used and there is much complaint that proper and quality raw materials are not available in sufficient quantities to produce good quality paper in spite of improved equipment being used.

To the printer, paper is the most important

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raw material representing on the average over a quarter of the costs of printing. While defects and troubles in a press room can arise due to various factors, paper can be the cause of most of the troubles. To the Indian printing equipped with imported modern high speed automatic printing machines, the poorly produced Indian paper has been the cause of much press-room headache and friction with his customers. The ultimate user of paper is only the print-buyer, printer's customer, and it is the printer who has to bear all the brunt due to the paper's defects and faults. He acts as a buffer between the paper-maker and paper user. He has to bear any loss due to wastage, reprints, etc. caused by paper defects. These and other problems, common to the printer and paper-maker, can be solved only if both meet frequently, understand the nature of each other's problems and by frank discussion find ways and means of overcoming the troubles.

A few suggestions :

I would like to take this opportunity to offer a few suggestions in this regard for the consideration of IPPTA:

(1) Every paper-maker must employ a printing technologist as a liaison officer—one who has undergone a Diploma course in Printing Technology and possesses a few years of press experience. The Paper-maker should maintain a printing press and conduct tests of all papers he makes under production conditions and find out in what way the paper can be put to use with the least working problems. He must inform the printers about these facts fully and clearly through specially prepared literature.

(2) The Regional Schools of Printing can be put to better use by establishing laboratories there for conducting printability tests as they are ideally suited for such work. The IPPTA and AIFMA can put their heads together and examine how they can assist in establishing such laboratories, and making them useful to the industry.

(3) The distributors in the major cities should employ printing technologists as sales technicians after giving them in-plant training in paper-mills. They will gather first-hand information from prin-

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ters regarding the defects or troubles created by the paper supplied to them, conduct tests in the laboratory. The results will be reported back to the printers, othering necessary suggestions. If it is found that the delect is due to the paper, arrangements must be made to improve it in future and the printers informed of this fact. Acceptance of the defect by the paper-maker and the efforts taken to rectify them in future can only enhance his reputation.

In this connection, I would like to mention that printing technologists are now being increasingly employed by machinery manufacturers and dealers, ink makers, advertising agencies and publishing houses on the sales side as their technical knowledge of printing helps to increase the value of their work greatly and they act as real liaison officers between the supplier and user.

(4) The paper-maker should organise conducted tours of paper mills for the benefit of masterprinters and printing teachers. After seeing firsthand all the problems you face and the efforts you take in making a paper, the printer will perhaps think twice before criticizing you next time any trouble arises in his press room. He will, on closer examination of a problem, come to realize that paper is not responsible for all his troubles. Paper, more often, proves to be a victim rather than a culprit. To the teaching staff of printing schools, the first-hand knowledge gained by the visit to the paper mills will be of great help in improving their teaching and ultimately the future printing technologist will be a greater use to the printer and papermaker.

(5) There should be more such seminars at different places and greater publicity given to the outcome of such seminars. It is very important that there is a follow-up to all these seminars, to examine 'the feasibility of the suggestions offered and to give effect to them wherever practicable. A regular body can be established for the four or five major Cities to look after this follow-up work. There is' also urgent need for the preparation of technical literature on printing qualities of paper and printers' problems concerning paper.

I fervently hope that there will be more opportunities for the paper-makers and printers to come closer for solving all our technical problems in a common endeavour.