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**QUALITY MANAGEMENT IN THE PULP & PAPER INDUSTRY
IN DEVELOPING COUNTRIES**

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Introduction

Quality, in general, is a highly neglected subject in pulp and paper manufacturing industry in most of the developing countries. While in some cases, the absence of quality management borders to sheer indifference, in many others it is mainly due to limitations imposed by pulping raw materials and technological constraints faced by the industry. Such aspects are discussed here, highlighting the need for increased attention on introduction of quality management as an essential part of manufacturing so that the pulp and paper industry is fully prepared not only to face foreign competition but is able to satisfy the local consumers.

Quality -present trends.

If we take a sheet of paper or board manufactured in a developing country and compare it with similar grade from an industrially advanced country, a mere visual examination will show that the former is much inferior in quality. This situation continues to be prevalent since ages, inspite of the fact that in the recent past there has been a spectacular development in the industrial field due to overall economic progress and that the pulp and paper industry has also undergone a big expansion on account of growing demand for cultural and industrial paper and board.

With growing contacts with outside world and consumer in every developing country is getting increasingly conscious of quality. The technological needs of the modern printing and packaging industry today also compels the paper industry to improve the product quality. While so far a consumer was satisfied if a sheet of paper was white and had a good glazed surface, he now, has become fully aware of the importance of many other physical characteristics.

Although a good degree of realization on the importance and necessity of quality improvement through effective quality management exists and that most of the countries have formulated their own national standards or have adopted standards set by International Standards Organisation, but still it is found that bulk of the production does not conform to the required standards. This state of affairs is rather alarming as with tightening up of the standards and narrowing down of the tolerance limits through improved quality management systems and in line process control, elsewhere, the paper industry in developing countries will be left far behind to face demaging consequences.

The factors responsible for the poor quality of products can be categorised in two distinct groups. The first relates to the attitude and interest of the industry itself and the extent to which it can manage to market their products without much difficulty. The other group consists of the factors which are entirely beyond the control of the industry and which need extra efforts and cost to achieve improvements. These factors are briefly elaborated below.

Industry attitude.

Pulp and paper industry in most of the developing countries is of recent origin and has taken a long time to establish itself but for the last few decades, its growth has been at a much faster rate than in the developed countries. Notwith standing such development, there always remains a big gap between the demand and supply from local sources. This phenomenon of short supply coupled with restrictions on import under fiscal protections provided by the respective Governments, the local industry has been in a position to sell whatever quality it can produce and offer to the market. Customers do complain and show dissatisfaction but are forced to make compromises and use whatever quality is available.

This does not necessarily imply that the industry intentionally lacks interest in marketing products with better standards. In fact the restraining factor for them, to some extent, is the cost which comes in the way because improving of the quality involves additional expenditure for the product, which either has to be born by the manufacturer or passed on to the consumer.

Raw material limitations.

Quality of paper or board is determined by the quality of pulp used which ultimately depends on the quality of pulping raw material. Softwood, the so-called conventional raw material, having long fibres, gives the best quality of pulp with optimum strength properties and therefore produces the best quality paper. Such conventional wood species are available only in the fortunate developed countries while the developing countries have to be content with non-woody materials like bamboo, bagasse, cereal straws, reeds, wild grasses and tropical mixed hard woods.

All the non-woody raw materials in the first instance, have the common disadvantage of giving short fibred pulp and therefore produce a sheet with lower physical strength. Among the deficiencies which are more pronounced comparing to pulp from softwood are,

- i) poor tensile and tear strength,
- ii) low burst factor,
- iii) low fibre bonding in case of multiplies,
- iv) uneven contour of the surface.
- v) poor surface strength with lower pick test,
- vi) slow running on machine and
- vii) low brightness

These weaker points do influence the ultimate quality of paper and board and therefore in most cases 10 to 50% imported softwood pulp has to be blended to strike a balance in achieving a reasonable quality.

Further neither one type of grass or straw nor one single species of hardwood is available in sizeable quantities to a pulp mill of an average capacity. Most of the mills in developing countries have not only to procure their full requirements from larger distances, at higher costs but have to use varied types of wood and grasses. In some mills, a combination of five to six different types of raw materials is used and the blend has to be changed frequently at short intervals. This obviously affects the quality and makes it difficult to maintain a uniform standard for the product.

If a sheet made out of such 'inferior' raw materials is to be used for further processing like coating, it presents numerous problems and lot of adjustments are needed for smooth running on the coating machine. The coating formulations also need modification using higher doses of pigments and adhesives to cover up the handicaps, thereby resulting in increased production cost. Since the industry has no other way but to depend entirely on short fibred non-woody raw materials as well as hard wood, it becomes imperative that efforts are made to find new avenues for exploitation of the natural qualities of such raw materials to maximum possible extent.

Technological handicaps.

The other significant handicaps for the developing countries are their technological backwardness. A number of the mills are still using the same equipment, machinery and technology used 50 to 60 years ago. Even those mills which have come up lately during last 20/25 years also did not adopt improved technology in pulping, bleaching paper making and converting and instead had been content, in general with buying second hand machines having age ranging from 40 to 50 years.

Transfer of technology in the field of pulp and paper industry has been too slow comparing to various other industries and the recent advance made in pulping, bleaching and paper making techniques are still beyond the reach of the countries under discussion. If the out moded processing systems continue for long and a break through in changing over to new technologies is not forthcoming within a reasonable period, then the survival of the industry itself will be in danger as the consumer will not find it manageable to use low quality products at higher costs.

Admittedly, it is not so easy to adopt new technology over night as there are numerous unsurmountable hurdles in the way. The first one is the size and capacity of a paper mill, since the new process and control system can be applied only on faster machines with large production capacity. The feasibility of large scale and small scale pulp and paper mills is still a controversial issue as both alternatives have their own merits and demerits. In any case, presently the larger number of the mills in developing countries is of small scale with capacities ranging from 20 tons to 50 tons per day and therefore their modernisation chances are comparative remote.

Another reason for difficulty in application of new technology relates to pure economics. High technology also needs high investment which an entrepreneur in under-developed countries cannot afford due to limited financial resources. The situation thus presents a dilemma as to being content with the old and obsolete technology and continue to fall behind the line or take the courage to remove the hurdles and join in the main flow of the stream of new and improved technologies.

Conclusions.

The pulp and paper industry in the developing countries must give a serious thought to finding of ways and means to get out of the vicious circle of under development and bring about a revolution on process improvements and change of attitude to quality. It is no doubt an uphill task due to various constraints discussed above, nevertheless, a beginning has to be made by identifying the problems and charting out a workable plan. If no action is taken, then circumstances in future will force to do so. Some of the steps which need attention can be summarised as below:-

1. Older plants should be rebuilt and modernised to make them more efficient and economic.
2. New processing techniques for pulping, bleaching, stock preparation and paper making should be introduced in stages and in every field standardization and control should be pursued.
3. Research and development activities should be intensified and directed on development of pulping and bleaching processes using hard wood, bagasse, straw and grasses with a view to economise in the use of chemicals and energy and obtaining of higher pulp yields and improved physical properties of the fibres.
4. The research should also be organised towards developing of capabilities to adopt and adjust the foreign technology to suit local raw materials and working conditions.
5. Alongwith R&D organisations, each mill itself should devote some of their time and finances towards process and quality improvement.

Before concluding, it can be rightly said that while appropriate technology is an essential tool in broadening the base of pulp and paper industry in order to meet the growing demand by exploding local population, it is also equally important to bring in advanced technology and matching quality management in this field both through evolution and acquisition.