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HOW TO RAISE THE LEVEL OF EFFICIENCY IN PULP AND PAPER MILLS IN DEVELOPING COUNTRIES 1/

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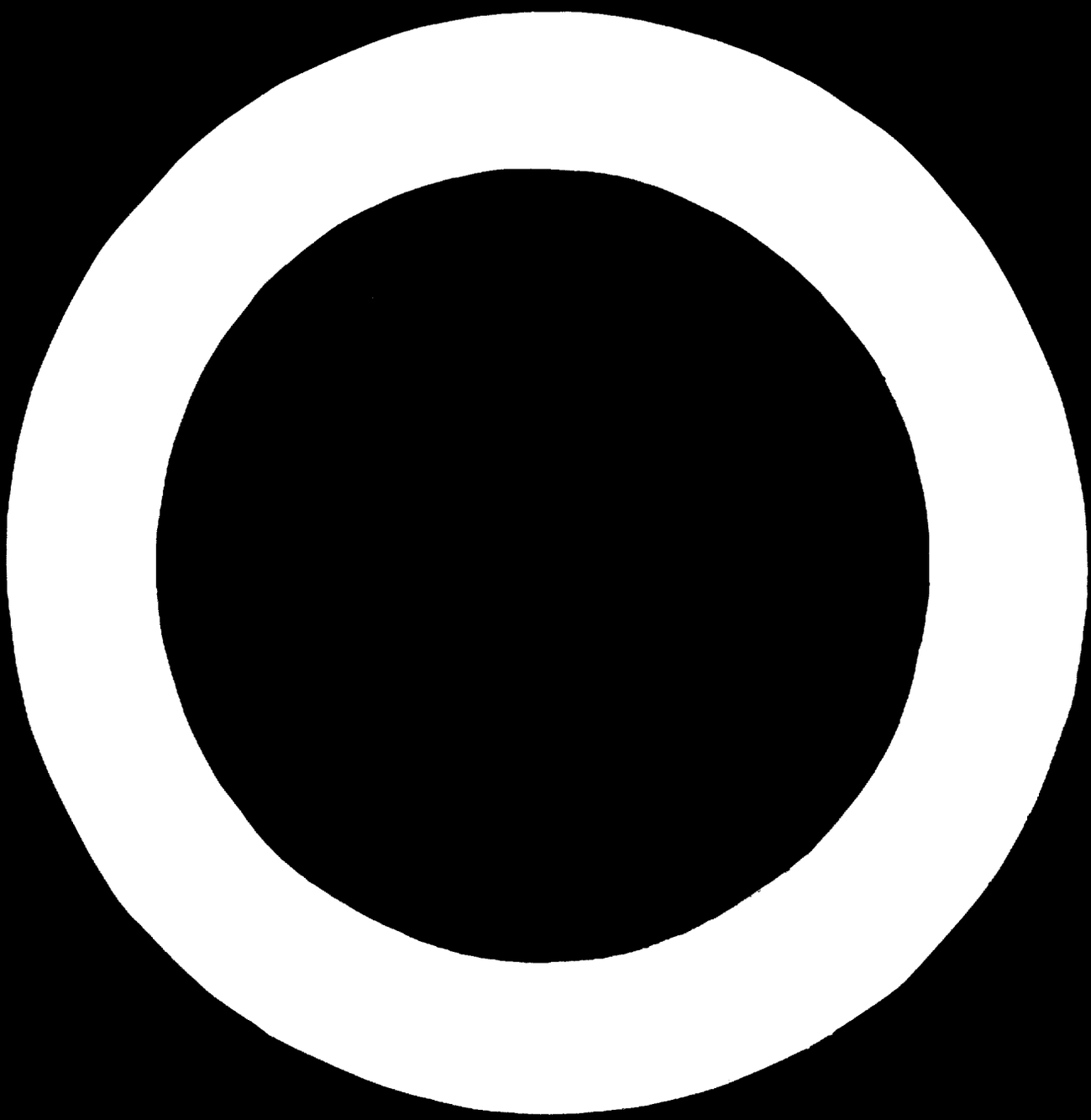

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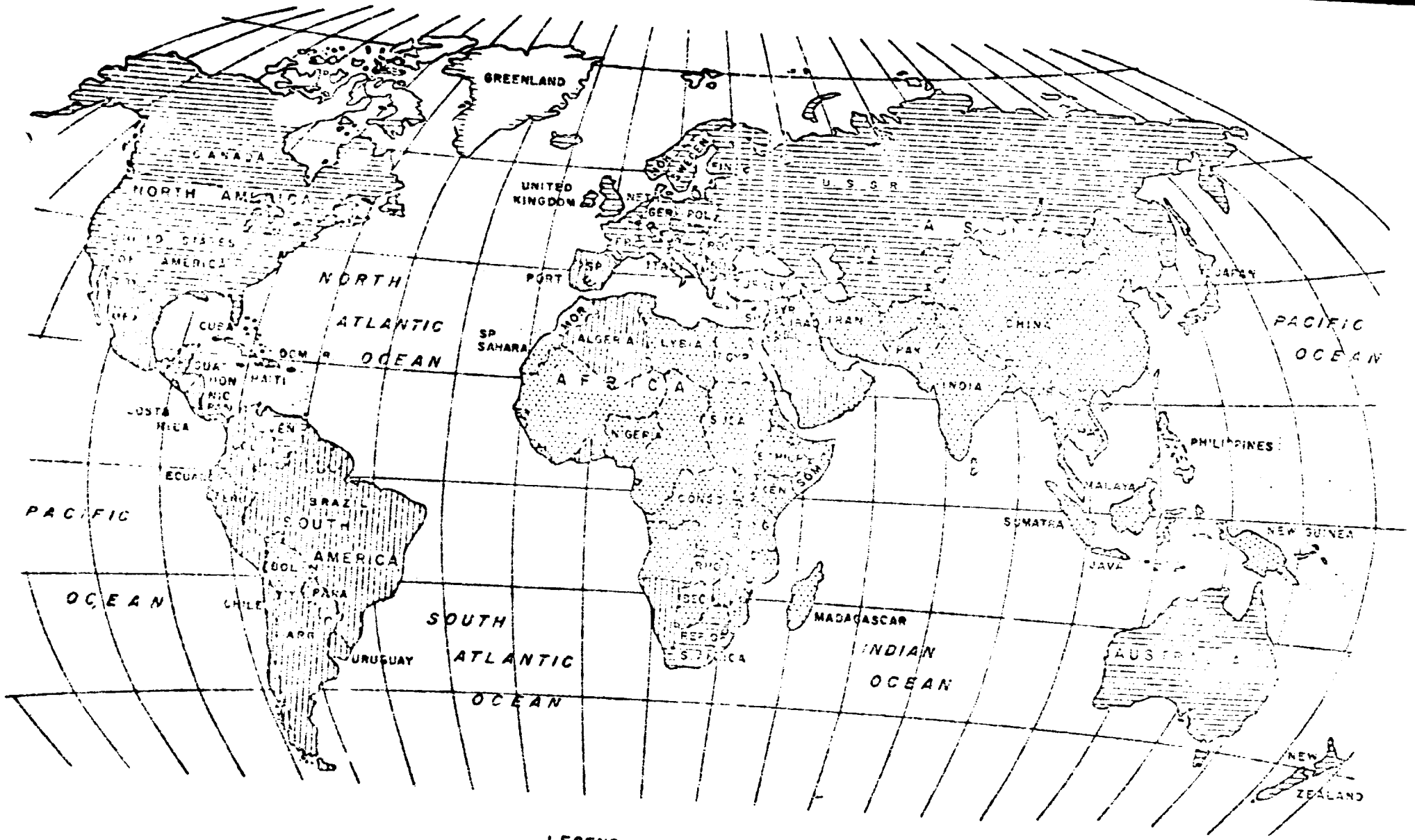


Figure 1 - Map Showing Develcping Countries

INTRODUCTION

Among certain of the North American Indian coastal tribes who lived along the west coast of North America, it was the custom to display wealth by holding a "potlatch". This was a feast to which everyone within reach was invited. During the festivities, all the possessions of the host were given away to the guests, this made the host rich in the esteem of his guests but temporarily destitute in goods and possessions. Almost everyone not an American Indian living at that time found the custom strange and incomprehensible, but of course, it was not strange to those that practised it. And so it is to those among us that practice different customs to-day.

The custom of the "potlatch" seems economically unsound in modern society but in the context of the primitive economy of the time and region it provided a means of distributing relative wealth.

In order to discuss the raising of efficiency levels in pulp and paper mills in developing countries it is essential to consider the subject in the light of the customs of such countries.

There is no clear-cut short route to the correction of low efficiencies where they exist. The purpose of this paper therefore is to present suggestions based on experience whereby solutions may be found.

This paper represents the latest of several contributions which have been presented by Sandwell over the last fifteen years at international meetings held to discuss various aspects of the pulp and paper industry.

The observations and suggestions contained herein are based on extensive experience gained in start-up, operation and training of operational and management personnel at mills in Chile, Mexico, North America, Pakistan and Portugal.

EFFICIENCY MEASUREMENT

Objectives of Industrialisation

Efficiency is usually measured against the objectives of the industrial development concerned. Whereas there are many ways of defining these objectives, those which concern governments are generally determined by a need to provide its people with more goods than has previously been possible. If such objective is realized, and goods are available which they could not have before and are not deprived of other essential goods, then the enterprise will have attained a measure of efficiency which may be acceptable to Government and the people.

The pulp and paper industry has been particularly attractive to the Governments of developing countries as a medium through which this type of objective can be met, because of the significance op paper in the whole national productive process. Paper is the basis for literacy and literacy facilitates communication. If there is to be an improvement in the economy of an under-developed country, paper is likely to be a major force which initiates the growth. Because of its power at the base of the economy, its development is frequently heavily subsidized or protected by tariffs. Efficiency or lack of efficiency may well be related to the size of the subsidy or the degree of protection afforded.

The ultimate objective of the under-developed or the developing country is to reach a point at which these labels no longer apply and the status of being classed as "developed" is attained. This will be the case when its

products not only provide serviceable goods where there were none before, but also, when these can compete in world markets if economic conditions permit.

Cost as a Measure of Efficiency

If the costs of manufacturing and selling pulp and paper in the developing countries are compared with established costs in the developed countries, it is found that there are three major components of the total cost which almost always bear the same relationship to one another. These are tabulated as follows:

Item	Percent of Total Cost
Raw Materials	25 - 30
Manufacturing	40 - 50
Transportation	25 - 30

Moreover, it is also found that, although there is frequently a very much larger input of labour in terms of manhours per ton in the developing countries, wages are generally so much lower that the cost of labour in money does not vary substantially from country to country.

A program to raise levels of efficiency need not, therefore, as many have advocated, be directed exclusively at reducing labour costs, but must be directed towards all of the cost components tabulated above.

Raw Materials Costs

Pulpwood, or other fibre sources and chemicals make up the largest component of raw materials costs. Fibre sources may comprise indigenous woods, agricultural residues, bamboo, bagasse, or imported processed fibres. Chemicals, similarly, may be manufactured locally or imported. Generally to compete in world markets, fibre costs must be comparable with those available to manufacturers who already serve those markets. Any special disadvantages in cost, (imported fibres, for example) must be offset by a corresponding advantage in some other cost component. When raw material costs constitute too great a proportion of the total manufacturing cost, either they are being wasted through inefficient processing methods or low efficiency of production at the supply source.

Manufacturing Costs

Manufacturing costs, which normally account for approximately half of the total cost of production, present the greatest opportunity for improvement in efficiency levels. The components of manufacturing cost and their round-number values are approximately as follows:

Item	Percent of Total Cost
Power/Steam	6
Manufacturing and Maintenance Materials	7
Manufacturing and Maintenance Labour	8
Administration Expenses and Taxes other than Income Tax	9

It is significant that the only components of manufacturing costs which vary to even a minor extent with the rate of production are power and steam - all the other components represent costs which are time-related rather than production-related. Major contributions to the reduction of manufacturing costs can be made by increasing the rate of production; the higher the production rate, the lower the corresponding money value of the unit cost. Needless to say the first step in increasing production rate, is generally to attempt to make better use of existing plant and equipment.

Transportation Costs

Transportation costs are usually the product of the distance of the market from the source of the commodity and it is probably safe to say that few manufacturers selling the world markets succeed in exploiting to the fullest possible extent opportunities for negotiating the most favourable transportation costs. However, in the developing countries, where transportation facilities are frequently limited, fewer such opportunities are likely to present themselves.

A basic problem for less efficient mills is that high production costs tend to limit the range within which, because of the transportation cost factor, products can be sold competitively. Reducing costs at the mill widens the range of markets and at the same time opens up possibilities for negotiating more favourable transportation charges.

Quality, Reliability of Mill Products

No discussion concerning the possibilities of competition in world markets would be complete without reference to product quality and reliability of deliveries. Quality of product is related both to technical skill and to efficiency of operation. Reliability of delivery is often the only factor by which a customer decides between two suppliers whose quality and cost are reasonably similar. In fact, reliability of deliveries frequently outweigh cost because the customer is able to maintain a low, but safe level of inventory, and avoid having capital locked up in stock.

Summary

Any discussion concerning efficiency levels requires consideration of the subject in its broadest sense and in relation to a specific objective. Under certain conditions an acceptable objective might be the provision of goods otherwise unobtainable without simultaneously withdrawing goods already available.

Efficiency is related to the cost of producing the product. In the pulp and paper industry the components of cost can be broadly broken down into the three major segments, raw materials, conversion and transportation.

If the cost of raw materials is significantly greater than 30 percent, improvement in efficiency may frequently be achieved by improvements at the source of supply, or by better utilization (recovery) of fibre in the mill. Manufacturing costs offer the greatest potential for improvement, since the unit costs will decrease in direct proportion to any increase in production, and efforts should consequently be directed first at achieving maximum possible production levels with existing manpower and equipment. Improvement in the costs of transportation is generally dependent upon having first achieved effective fibre and manufacturing costs, quality and reliability of delivery. Only after these have been achieved and stabilized can markets be selected to the best advantage.

CULTURAL CONSIDERATIONS

The "Potlatch" Effect

The custom of the "potlatch" was treated superficially in the introduction, sufficiently only to make the point that it was incomprehensible to us, although it made sense to those that practiced it.

The coastal peoples in the Pacific Northwest of the American continent had no need for acquiring material possessions other than to enhance either their self-esteem or the esteem of their fellows. There was enough for everyone to live on, they built communal houses, shared food with one another, made their own clothing and weapons. A family having divested itself of its possessions at a "potlatch" would acquire as guests, the equivalent at other potlatches so that the end result, in terms of possessions at least, was that everyone ended up approximately equal.

The objective of those who held "potlatches" was to gain esteem and they achieved this. The custom which at first appears incomprehensible becomes relatively easy to understand when viewed in this light. Let us examine briefly some apparent conflicts in customs between the developed and underdeveloped countries, bearing in mind that actions taken to improve efficiency levels may have to be taken with the aid of people with differing customs and traditions.

Social Stratification

The developing countries are generally characterized by a much smaller middle class than exists in the more highly developed countries. There tends to be a small proportion of rich, and a large proportion of poor. These at or near the bottom of the social scale characteristically work at manual labour, and those with manual or other skills tend to rise slightly above this level. Since there are few outlets for application of such skills they are generally in short supply. Generations of unskilled people with a strong tradition of unskilled work may have tended to reduce the ability of later generations to acquire new mechanical skills, even when the demand for new skills expands.

Those at the top of the social scale are either born to that estate with a tradition of leadership, or they have achieved it on the basis of their skill in manipulating the destinies of people. This group is generally better educated than the remainder, a fact which tends to set its members still further apart from their social inferiors. Although by and large this group is comprised of able people - many of whom are outstanding - a substantial number, because of their evident superiority in the social scale, tend also to regard themselves as superior in all things and to think of themselves as being more able than they really are. They will undertake activities for which they are not fitted and which they consequently perform with less skill than is conducive to efficiency.

On the other side of the scale there are those who are extremely able at the discipline in which they have been trained but who, because of their sense of superiority refuse to use their special knowledge and skill unless they can do so from a position of leadership. These conditions result in mismanagement, in unacceptable levels of efficiency, and in the wasting of valuable skills and talents.

The dearth of suitable skills at the lower end of the social scale can be corrected by careful selection of those with the potential to develop new skills and thereafter by training.

Selection and training is, of course, the answer to problems arising out of the conditions that exist in the upper levels of society, but who is to do the selection? Emphasis must be placed on accomplishment rather than status as the measurement of ability.

Nationalism

Along with the growing sense of nationalism among peoples of the developing countries, there is a corresponding growth in the sense of individual worth and a growing self-confidence. When this tendency is viewed in conjunction with the lack of skills in the mechanics and technology of modern industry, it is evident that other difficulties are likely to be encountered in the acquisition of new skills.

When a new enterprise is started in a developing country the most direct means of acquiring skills is generally to employ non-nationals in the expectation that while they are providing the skills that are needed, the nationals will learn from them. In practice the hired foreigner will possess the needed skills, but generally he is incapable of teaching, or is rarely given the proper opportunity to teach even if he does know how. Those expected to learn see the ease with which the foreigner performs his skills and often disliking him for his lack of effort to do what it is believed he is supposed to do - teach-and for his indifference to their beliefs and customs, they frequently assume, in their new self-confidence, that they can do as well themselves.

It should not be assumed that the foregoing remarks apply only to operating and mechanical skills - they apply equally, if not more so to management skills, the talent for which is harder to detect and harder still, to select.

It must be clearly understood that these remarks are critical in the sense that they are not motivated by feeling of superiority. They are motivated by the necessity of demonstrating that the social and cultural influences in a developing country must be recognized and that the problems of low operating and production efficiencies must be overcome within the framework of its society and culture, and not within the framework of the society and culture of the more favoured nations.

Language

The skills and technical knowledge necessary for improvements in efficiency have to be transmitted from those that possess them to those who do not, and the means of communication depends upon an understanding of the language in which the communication takes place. If this seems to imply that the necessary skills and knowledge are possessed only by members of the more favoured nations, this is not necessarily the case, for not infrequently the language of the upper levels of society is incomprehensible to members of the lower class. Moreover each industry has its technical vocabulary and jargon. The words comprising these have not only to be learned, but their meanings have to be understood.

The average morphological table lists about 150 distinctively different languages in the world and it is probable that these in turn can be subdivided into thousands of distinct dialects. Perhaps somewhere between 20 and 30 different languages serve most the world's needs, but even this is a formidable number. Obviously any exercise in communication to improve efficiency in any specific pulp and paper mill in a developing country must be preceded by a program to ensure that a viable means of communication exists.

Religion

Religious practices and mores are likely to have an influence upon the methods adopted and adapted to improve efficiency. Due consideration needs to be given to these as failure to recognize fundamental differences in outlook based on these factors will present significant barriers to effective communication and mutual understanding.

SKILLS

Nature and Degree

Any program to improve efficiency will depend for its success upon the extent to which existing kinds and degrees of skill are evaluated and upon the steps taken to correct deficiencies.

Skill can be defined as "Practical knowledge in combination with ability, cleverness and experience in arts or crafts". In the context of this discussion this definition may be further qualified as management skill, technical skill or manual skill, particularly mechanical skill. In the following paragraphs these skills are discussed as they relate to the problem of improving levels of efficiency.

Management Skills

A skillful manager is likely to possess the following attributes:

- ability to assign, define and delegate responsibilities so that no part of an enterprise is without someone having designated responsibility for it, and no activity is assigned to more than one individual,

- a knowledge of the technical and business aspects of the enterprise sufficient to enable him to detect and correct improper practices and to set attainable goals or targets for performance,
- ability to suitably influence the attitudes of people or otherwise motivate them to achieve the targets set.

A high degree of skill in management generally only occurs when a manager has acquired these attributes over a significant period of time; he may have acquired them through any one of several differing combinations of experience occurring in different sequences. These experiences will usually include:

- a technical education, not necessarily in the technology of the specific industry,
- formal or informal training or coaching (perhaps even extensive reading) in the management sciences,
- leadership experience in a low-level management environment; as a supervisor for example.
- social experience in human relations.

Individuals with a combination of such attributes and experience are probably quite rare in the developing countries. When there is a lack of managers possessing all the attributes necessary, steps must be taken to train them. Such steps must be dynamic, the outcome of specific analyses of shortfalls and design of corrective programs for the individuals selected for training.

It is important to recognise that "education" in a formal sense is only one of the requirements for an effective manager, and it is not necessarily the most important one. The development of a cadre of skilled management personnel depends first upon selecting those with the capacity to acquire the necessary skills - without this, effective managers cannot be developed.

Technical Skills

Traditional technical skills are acquired through formal education and are enhanced by practical experience and application. High technical skills result from long exposure to education or experience or both. To be effective

in industry, those possessing technical skills must also possess analytical diagnostic and creative skills; these can rarely be acquired through formal education alone but are the outcome either of an inherent mental outlook or of long experience.

Technical skills must be considered to include not only the technology of the pulp and paper industry - its physics and chemistry - but skills in such disciplines as mechanical and electrical engineering.

Some of the skills required by the industry have a basis in art rather than technology; paper making is, to some extent, one of these.

Technical skills sufficient to enable an enterprise to compete in world markets are apt to be rare in the developing countries and, as in the case of management skills, where they are in short supply a dynamic program to provide them is required.

Manual Skills

Probably the most significant manual skills in short supply in the developing countries are the mechanical, electrical and similar skills required to keep complex modern machinery running at capacity. It has been noted previously that the greatest contribution that can be made, as a rule, to the reduction in manufacturing costs is to increase production rates. Usually the first step in bringing about the necessary increase is to ensure that all plant capacity is used for the longest possible period of time and is not out of service because of operating error or mechanical breakdown.

Difficulties in providing these skills from local sources are considerable. Not only must the traditions non-mechanical labour be overcome, but the educational background of candidates for mechanical training is likely to slow down the process appreciably in comparison with the more highly developed countries; the language of the trade alone is a barrier. Candidates for training in mechanical skills in the more highly developed countries enter their training with a relatively higher educational level and invariably with higher literacy than in the under-developed countries; even then an

apprenticeship period in the chosen trade generally lasts five years. In the modern pulp and paper mill, mechanical tradesmen often outnumber operating personnel. Serious deficiencies in mechanical skills can only be overcome by using non-nationals if immediate benefit is to result. However, cultural differences, language and costs may well make the employment of foreigners uneconomical and some compromise may therefore be necessary.

Skill Acquisition

There are many barriers to the acquisition of skills in some developing countries, at the root of these is mostly the social and cultural structure. To risk the dangers of generalization and at the same time to put the matter bluntly, those having the benefit of education frequently think they know all that needs to be known, and the uneducated are slow to learn and think they learn much faster than they actually do. Among the lesser-educated there often appears to be either a lesser aptitude for, or a tradition against learning. To overcome such problems requires a high degree of experience and skill in training.

A SUGGESTED PROGRAM FOR ACTION

Review of the Problem

A program to improve the level of efficiency of pulp and paper manufacture in a developing country first requires that the operating economics of the particular mill under study be compared with known standards for a similar operation, so that attention may be concentrated on those aspects of the operation where differences appear to exist. Each of these aspects must then be examined in detail to identify those which show the greatest opportunity for improvement, so that work on these is given priority.

Whereas in many instances there will be technical and mechanical process deficiencies, it will commonly be found that improving the effectiveness with which people do their jobs is the first step to be taken to bring about improvement in production efficiency. Means of accomplishing this will include replacement of some personnel, transfer of others from one job to another and an extensive program of training. All levels of the organization are likely

to be affected and the process of bringing about the changes that are necessary must be carefully planned so that there is a minimum of cultural conflict and that social stratification, family unity, national and individual pride, language and religion are taken into consideration.

Organization and Management

A business enterprise depends for its success upon ORGANIZATION, SYSTEM and CAPABILITY. ORGANIZATION refers to the chain of command by which the total responsibility for the enterprise is delegated downwards by the chief executive to personnel who understand and are capable of discharging their individual responsibilities. SYSTEM refers to the policies and procedures of the company, the specifications used to define what the company does. CAPABILITY needs no definition.

It has already been indicated that the responsibilities of each individual within an organization must be so defined that no activity or task can remain undone which contributes to achieving the objectives of the enterprise. Responsibilities must be assigned logically to those capable of discharging them and so that there is no duplication. Authority must be compatible with responsibility, and each individual must know to whom he is accountable and for what, and who is accountable to him. A sign of a good organization will be organization charts and job descriptions which are understood and used, although the converse is not necessarily true; the existence of such charts and descriptions is not necessarily evidence that an organization is efficient.

System is manifested by evidence that the activities of a company are carried out in accordance with a plan such that whenever there is a relationship between one activity and another, the means of effecting the relationship has been prescribed, is simple and is easy to carry out.

Without capability to discharge the responsibilities assigned or to operate a prescribed system an organization will be less than efficient and will not achieve its objectives.

In any program to improve efficiency the evaluation of an organization, its system and its capability must go hand in hand with identification of those specific aspects of the operation capable of improvement and the ranking of these in order of their impact on profitability. Such an evaluation and identification constitutes an audit. Without such an audit a specific plan of action cannot be developed.

Planning

No task should be undertaken without planning and usually the amount of planning required is in direct relation to the size of the task and the degree of success to be achieved. An example of the relationship between planning and accomplishment is to be seen in the space programs developed by the U.S.A. and the U.S.S.R., in which the ratio of time spent on planning to the time spent in executing the plan has probably been greater than in any other undertaking in history. Despite the amount of planning, there have been tragic and costly failures. It seems reasonable to suppose that less planning would have resulted in more failures and vice versa.

The first step in planning is to establish the objective and isolate the facts bearing upon it. This is the audit, referred to previously. The next steps are as follows:

- list all possible factors and actions which could result in achieving the objective,
- evaluate the possible factors and actions, select those with the greatest potential for success and establish priorities and targets,
- assign responsibilities for carrying out the actions indicated,
- initiate action,
- review progress in relation to targets set and modify as necessary.

The Objectives

During the introductory paragraphs of this paper various alternative objectives were identified, these were:

- to increase levels of efficiency to the point where pulp and paper are available without depriving the country of essential goods previously available,

- to increase efficiency in the manner just stated and further, to eliminate subsidies,
- to make the product competitive in outside markets if conditions are suitable.

Whichever objective is chosen - and in some instances all three may be established in succession - it is necessary first to identify it in quantitative terms. What must the mill net price be and what must the cost components be?

Collect the Facts

If it is necessary to express the objective of a program in such quantitative terms as identification of what the mill net price must be, the process of collecting the facts must be directed towards determining what can be achieved. This is a task which requires a measure of knowledge and skill often not available within experienced companies even in developed countries. This is, in fact, a job for the professional consultant. The consultant brings to the job not only a broad base of knowledge and experience to make an accurate determination, but also the necessary objectivity. The consultant can also provide experienced personnel to work exclusively on the problem at hand, leaving the members of the organization being studied free to pursue their day-to-day activities in running the enterprise. In addition because of his more ready access to accurate information about what is going on in other parts of the world, he is able to identify specific areas in which improvements in efficiency can be made, as well as those where no improvement is possible.

Most of the opportunities for improvement will be manifested by differences in cost - of manufacturing, materials, administration and transportation - between the enterprise under study and those customary elsewhere in the industry. At the root of these will be the performance of individuals who either do not possess sufficient skills to perform efficiently, are not applying the skills which they have, or for whom attainable targets have not been set but for which they are held accountable. A part of the fact-finding

process is to establish an inventory of skills together with a list of those which are lacking, and another part is to determine the increase in profit likely to result if the objectives are met.

Such a collection of facts constitutes the basis for designing a program of improvement, and for a decision as to how far it is economical to proceed.

Develop and Evaluate Alternative Courses of Action

Once needs have been identified, specifically those needs showing promise of being met, it is possible to determine whether or not the objectives of the program can be met in whole or in part, to estimate the profit that would result from meeting those objectives, and to design a program which focusses attention only on those areas capable of improvement. As mentioned previously, improvement is most likely to be brought about by a change in the performance of people. Some of those involved may need to be reassigned to responsibilities corresponding with their capabilities and this may mean upward or downward transfers. Some may need special training to acquire the skills for objectives to be met. In any event there are certain to be a number of courses of action which can be taken. In order to find the most economical solution to the problem, all alternatives need to be examined and evaluated so as to ensure that those most likely to bring about success are selected. In selecting actions entailing re-assignment of responsibility and programs or personnel development or training, the importance of the social and cultural considerations referred to in the previous chapter cannot be over-emphasised.

Work Program

The completion of the fact finding and evaluation stages of the program described in the foregoing will result in the establishment of specifications for the task ahead. These specifications will not only establish targets for achievement but will indicate the course required to achieve them and provide a basis for estimating the cost. Targets will need to be specified in tangible terms so that performance can be measured against them. For example, if product specifications do not exist, a target might be, not only the preparation of written product specifications, but also written testing

procedures for comparing product characteristics with the specifications and written manufacturing procedures directed towards ensuring that the product will be made within specification limits.

If the streamlining of systems and procedures will contribute to improved efficiency, responsibility must be assigned for the design of new systems and guidelines established for what these are to accomplish.

If physical changes to plant and equipment are needed, these must be identified, their cost estimated and expenditure justified upon the basis of the increase in profit projected.

The conduct of an audit, the preparation of a work program, the design of new systems and the determination for the need for physical change generally requires the type of skill and knowledge that can best be provided by the professional consultant. A reasonable estimate of the time required to make an audit and develop a work program would be six months.

As has been indicated earlier, implementation of the work program is likely to require that more effort be expended upon training than on any other aspect. For this reason, the next section is devoted to a discussion of training.

DESIGN OF A TRAINING PROGRAM

General

In considering the design of a training program having as its objective re-assignment of responsibilities, the acquisition of new skills and the attainment of specific performance objectives, an excellent guide is provided by the chapter on training programs contained in the manual on "The Use of Consultants in Developing Countries" published by UNIDO in 1968. This chapter describes a program wherein those undergoing training participate in deciding what training is needed and in determining the course of action necessary to meet those needs. The role of the consultant is to act as the prime mover to keep the program going and to coordinate its various parts. This is "on-the-job" training in its broadest possible sense and consequently involves minimum interference with productive activity and minimum cost.

It must be recognized that improvement as the result of training is necessarily slow because of the normal human resistance to change. It is particularly important therefore to be sure that training programs are relevant to their objectives and that they are designed and selected to meet the specific objectives determined during the fact-finding phase. The techniques of training are generally little understood and it is a common error to bring inadequate forces with inadequate skills to bear upon the problem. The design and conduct of a training program is the task for a specialist with a proven record of past performance if there is to be any reasonable assurance of success.

Whom to Train

The audit phase of the improvement program will have identified training needs which may involve all levels in the organization, or only the lower echelons.

Training will almost certainly include management and supervisory skills, procedural skills, technical skills and manual (mechanical) skills. However, whether or not the top echelons of the organization appear sufficiently competent not to acquire additional training, it is unlikely that any major program will be successful unless management take part in such a way that their participation is known to all. A mechanic who is trained by his foreman is likely to be more satisfactory to that foreman than a mechanic trained by someone else. By the same token a supervisor trained by his own supervisor is likely to be a better supervisor than he would be if trained by someone else.

Within the organization, therefore, the top levels of management must participate in the program at the very least to the extent of contributing to its design and supporting it with their authority and enthusiasm.

Where non-nationals are involved in training at any level it must be ensured that they are competent in the techniques of training and that they learn something of the language and customs of the country.

Training at the Management Level

The involvement of top management in the design of a total training program necessitates the employment of a professional management counsellor who is capable of identifying management weaknesses and of assisting with their correction.

Considerable time is taken up during the early stages of such a program because it consists primarily of establishing an over-all mill-wide training program design. Subsequently, if coaching of management becomes necessary, the best results are obtained by short concentrations of effort at relatively long intervals, (a month to six weeks perhaps) spread over an appreciable period of time.

A large part of the coaching activity is usually related to the setting of goals and targets for subordinates and the establishment of procedures for ensuring that these goals will be met. If members of the top management group can benefit from special instruction in such topics as communications, training techniques, problem solving and the like, these may be obtained by attendance at formal courses and seminars provided by Universities or professional associations. Alternatively if there is a sufficient requirement for such training with an organization; specialists in these fields are available who can provide in-plant training, often at much less cost and with less disruption to operations than if training is undertaken away from home.

Supervisory Training

Apart from specialised courses to meet specific needs, probably the most valuable form of training for supervisors results from participation in identifying and describing their own responsibilities and in setting goals and targets for those that work under their supervision. The best instructor for this type of training is likely to be an individual's own supervisor, who will have the opportunity of comparing the job descriptions and targets which have been prepared with those prepared for himself.

All that is required to keep such a program in operation and effective is some general supervision by a management counsellor, whose principal function is to ensure that work is actually performed as required by the program and that it is not allowed to wither and die from inertia.

Procedural Training

Procedural training should be carried out by those who have designed the procedures. All that is necessary is to ensure that the trainers are armed with appropriate techniques and that there is a specific program established with targets for completion and the means for the measurement of results.

Technical and Mechanical Skills

Technical and mechanical skills are probably best learned by the application or some modification of the traditional apprenticeship system. This requires that each trainee accomplish a wide variety of tasks, each of which is preceded, and perhaps accompanied, by specific instruction in how to perform it. To carry out such a program on a broad scale requires the establishment of an organization - almost certainly several people, some of whom would have other duties - responsible for seeing the program through.

The Training Organization

To initiate a training program embracing all the types of activity described in the foregoing in a pulp and paper mill employing five or six hundred people would probably require initially a full-time staff of several specialists under a Training Director, these would diminish as the program progressed. In extreme cases such a program might be spread over two to three years. In advance of the in-plant program these specialists would have to undergo special training themselves; in the language of the country and in its customs and culture.

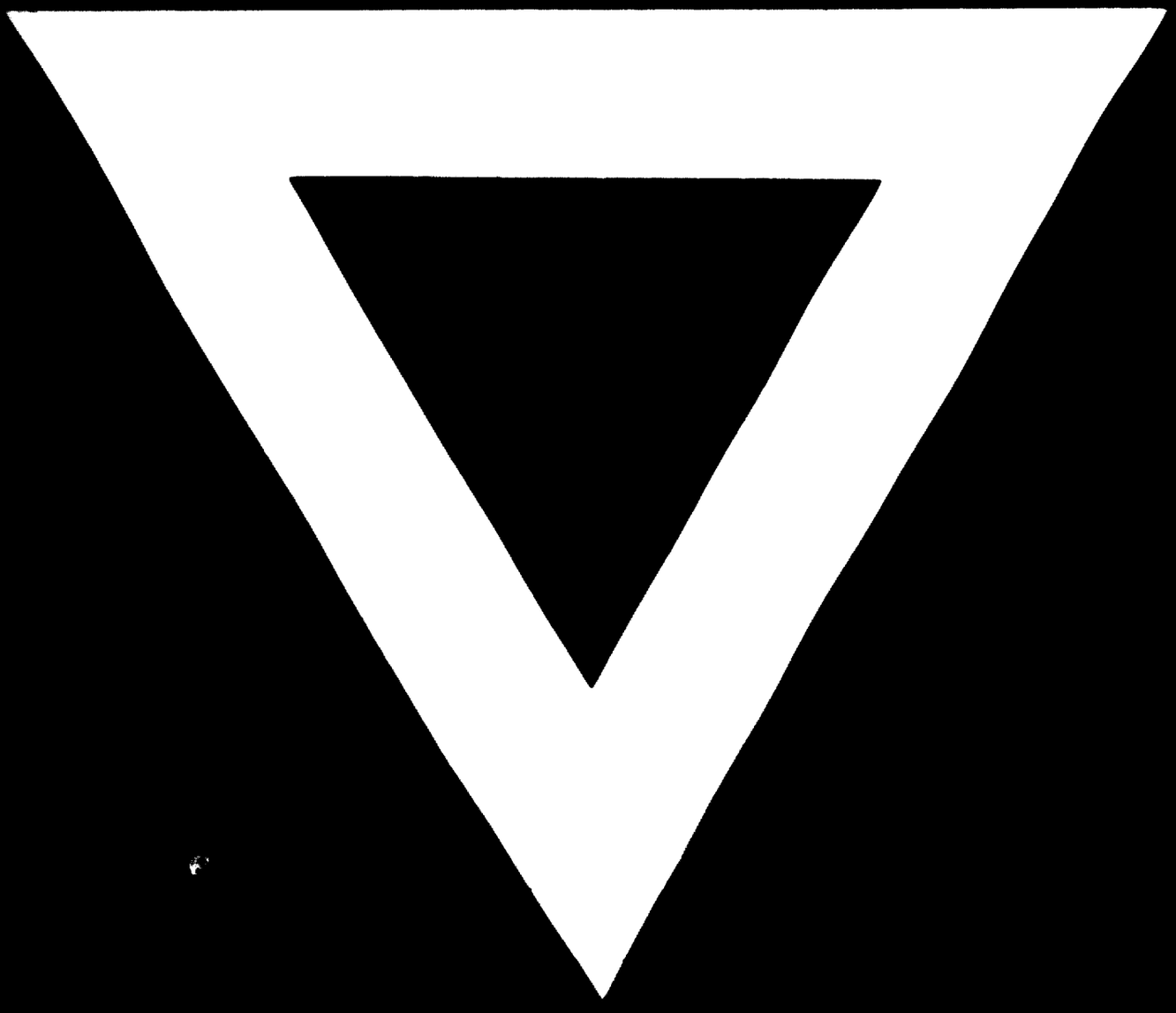
SUMMARY AND CONCLUSIONS

A program to improve the levels of efficiency in pulp and paper mills in developing countries requires an audit of existing conditions, the development of a work program based upon the audit and is followed by action to implement

the work program. Skilled assistance is likely to be required for all three phases of the program if success is to be achieved. Implementation of such a program is likely to entail guidance and training at all levels of the organization, spread over a period of time.

All the main phases of the program must be carried out by experienced personnel who not only have a sound technical background in the industry, but who have also been provided with an appreciation of the national and cultural environment within which the industry operates. This applies equally to those who undertake the audit, develop the work program and implement it by an extended program of guidance and training.

An audit of the type described will reveal the extent to which a program of improvement will increase profit. The work program will make it possible to determine the cost of implementation and the investment necessary to generate the necessary increase in profit. If the return on investment is sufficient, the program can be undertaken. If it is not, new targets or a scaled down program may have to be developed until an economical solution is found.



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