Strategies of Cost Reduction in Pulp & Paper Industry

BANTHIA K.M.*

The fortunes of the pulp and paper industry in the country have of late been reversed. After years of virtual prosperity, it now faces a severe financial crisis. Papers which were commanding premium are lying stacked up in godowns, Ordinary qualities of paper and paper boards are not finding proper market even at below production cost.

While profit margin of a few efficiently-managed units has declined to an all time low, a large number of other units are just able to manage only the break even. For the rest, the jolt has been so severe that even their very survival is in jeopardy.

If these units are still in production, it is either because of some external pressure or because of the hope of demand reviving at slightly remunerative prices in not too distant a future. But, as far as their present working economy is concerned, they are as good as closed.

A number of explanations can be given as to why such a situation has come, and if it is not too hard a hit, the responsibility of such a situation falls squarely both on the Government and the Industry,

The Government which has the monopoly of practically all the basic inputs required by the industry has failed to supply adequate quantity of these inputs and hold their price-line within reasonable limits. On the other hand, during the boom period when the industry's profits were more than fair, most of the units became too extravagant in spending.

With the downward trend in prices, the industries should have reduced their expenses, but for one reason or the other, they have not been able to do so. As a result of this, their losses are accumulating and plans for future development are being shelved into cold storage.

That conventional raw materials for the industry will fall short of demand was apparent from atleast a decade, if not more. But except for drawing blue prints for man made forests to meet the growing demand of forest resources, nothing tangible has been done on the practical front The slogan of using unconventional raw materials like agricultural residues to replace the forest-based raw materials worsened the situation. Hardly any one went into the depth of technological problems that the industry will face by these slogans.

Energy's costs were not only going up but it was becoming scarce Consumers world over started discarding high energy consuming gadgets and equipment. Energy conservation measures were given top priority on all fronts.

Saving the environment from air, water and solids pollution was recognised by one and all. Manufacturing processes responsible for high pollution were slowly discarded by adopting better and more efficient systems.

While we on one side were talking of adopting and absorbing newer technologies, on the other hand imported out-dated inefficient machines and equipments discarded by the developed countries were allowed. A lot of these machines and equipment are very much in the country now, but what is their working economy. How many of them are sustaining by themselves, and how many are dependent on fiscal concessions provided by the Goverment is an open secret.

However, what has been done cannot be reversed. We have to live with whatever we have and in the interest of national economy, systems will have to be devised to get the best out of it. There is hardly any

*Vice President & Manager
The Sirpur Paper Mills Ltd.

use of talking about highly developed instrumentation, modernisation and computerised control of various operations and processes when the bulk of paper making equipments in the country are three to four decades old.

The Goverenment has its own commitments to the society. Its policies are governed by many factors, wioh may or may not be of liking to the industry. However, the Government cannot remain a silent spectator. Its commitment to the society for improving the living standards cannot be fulfilled unless the country's economy is boosted up, and this cannot be done only by enacting laws and legislations. It is for the Governmment to see that the country's national resources, of which it is the guardian are properly utilised, and the value added to transform these resources to consumer products is properly rewarded. Even then the whole task of making the industry cost efficient falls on the industry itself.

For the industry, the only way to get out of this crisis is 'COST REDUCTION'. What, however, cannot be predicted before hand is up to what extent this discipline will reduce the manufacturing cost, not can any guarantee be given as to how much return would it mean on invested capital. Despite these uncertainties, cost reduction is the only way to bring the industry out of this mess.

The essential pre-requisite for this is that the cost reduction is adopted without prejudice and as an integral part of industrial policy. One should not forget that the paper industry is one of those few industries which uses different types of commodities in bulk. Small savings in these commodities immediately reflect on the total cost of production The need of the day, therefore, is to develop an atmosphere of cost reduction in the industry not only in its own interest, but in the interest of the nation and society as a whole.

Unfortunately, the cost reduction is always misunderstood as the top management's directive to subordinates to save. Its results are always interpreted in terms of higher profitability or better dividends to shareholders. It is because of this lack of understanding that cost reduction programmes do not get the required support from the middle management and the workmen. Failures of cost reduction programmes introduced in unplanned manner are not uncommon

WHAT IS COST REDUCTION :

Cost reduction is that discipline which aims at maximum productivity with minimum expenses and negligible waste. The common understanding that only the non-productive activity is a waste is not correct. In fact, even that productive activity which does produce economically is also waste. However, this does not mean that with cost reduction discipline, productive activities will be controlled to a considerable extent.

Expenditure on every activity, whether productive or non-productive, adds to the cost. To reduce costs, expenditures have to be controlled and how the expenditures can be controlled without affecting the productivity is a part of cost reduction discipline.

Cost reduction is neither technical not commercial. It is a discipline which starts with a slogan "There is always a better way of doing it". It is a continuous function which not only influences the present but also the future of an organisation. It is that discipline which considers no condition as permanent. It suspects and challenges even the standard operational costs, and continues to lay more and more stress on present and future without any consideration for the past

For cost reduction every system or process that does not contribute to efficiency and economy needs alteration. Every equipment that has an alternative to perform job more economically is junk. Every paisa spent directly or indirectly that does not add to the profitability is extravagance and national waste.

Cost reduction is not wedded to investment alone Its impact on society, national economy and country as a whole is much more than on capital. Return on investment can be improved by other methods like

a) increased sales on constant prices.

b increased prices on constant sales, and or

c) by adulteration,

But these steps will hardly be beneficial to the society By applying cost reduction discipline, return on investments of course would increase due to decreased expenses on inputs. Even the wastages will become productive and the consumer would get the goods at cheaper rates. In other words, cost reduction is that vital activity which by controlling wasteful practices directly influences the economy of the industry.

Quite often, cost reduction discipline is misunderstood as cost control function. But in fact, both of them are independent. While the cost control function tries to keep the manufacturing costs within pre-determined limits, cost reduction aims at continuously pushing them down. Cost control is a budgetary function circling round the standard costs, while cost reduction challenges even the standards. Cost control procedures are enforced as management directives, but the cost reduction is promoted as a state of mind, bringing in as many spheres in its fold as possible. Cost control is a static function, while cost reduction is a continuous attempt to get the best results at lowest possible costs under existing conditions and environments.

For cost reduction, every activity, howsoever much productive it is, has an element of waste in it. These wastes are either visible or hidden. While visible wastes can be controlled by management's directive and vigilance, hidden wastes are difficult to locate and control. Cost accounting systems do help in pointing these wastes, but for locating hidden wastes, a different approach is needed. This approach is to be tailor-made for every industry and situation, and needs an enlightened, dynamic and firm management.

PRELIMINARY CONSIDERATIONS :

Directly or indirectly, every industry realises the importance of cost reduction, but due to lack of proper understanding, its dividends are rarely realised. Organisations having high profits ignore this activity for fear of unnecessary work load. Those with high break-even points take such hasty and irrational steps that the very purpose of this activity is lost.

Industries lose enormous amounts every year due to wastes. Even in the best managed units, many such systems and processes exist which hardly contribute anything to its profitability. These systems and processes exits either because of personal, organisational and some other unknown reasons or because they have been continuing from the past In some organisations, these systems and processes have been developed.

For cost reduction discipline, both these situations are equally dangerous. No doubt, cost reduction is always accomplished by changing things, but to change just for change's sake achieves nothing Every change should be weighed against the return and after the desired level of efficiency is reached, further cnanges should be dropped.

Whether the industry is big, or small, cost reduction is equally important for its economy. There is no thumb-rule for the applications of this discipline. Principles of cost reduction have to be tailor-made to suit the prevailing conditions.

One should not forget that cost reduction discipline always flows from the top and hardly seeps from below and unless an unqualified support is given to it by the top management, it will never bear fruits

Before the cost reduction programme is initiated, the management should prepare itself to review its own policies to create an atmosphere of mutual trust, confidence and goodwill amongst the middle management, supervisors and the workmen. The management should try to correct all such procedures and practices which is deterimental to the above cause.

It will not be out of place to mention here that every change in accustomed ways of doing things invites resistance and hence, such programmes should always be tackled with tact and diplomacy by top management. Such programmes can never yield results by raising voices against people or by executive directives Vanity and whims have no place in cost reduction discipline. It has to be promoted as a state of mind by carefully planned policies

The first and foremost requirement for providing stability to the skeleton of cost reduction discipline is a clear-cut policy decision by the mnagement. It is only after the policy decision is taken that an effective programme can be chalked out to introduce cost reduction discipline. Not only that, but scope and objectives should also be clearly defined. If it is not done, the programme may arouse certain resistance due to which the cost reduction programme with whatsoever best intentions inroduced, will die in infancy.

OBSTACLES :

Lucrative results promised by cost reduction cannot be attained without surmounting certain obstacles. These obstacles are placed both by the labour and the management. Whenever there is a talk of cost reduction, the first reaction of the labour is to distrub the management's motive.

It is interpreted as a reduction in job opportunities and incomes and from that fear the resistance starts. As such, unless the labour is psychologically convinced, it will resist every change and show lack of interest.

Indian industries are labour-intensive. Due to lack of training and education, the labour, at times, deliberately put restriction on output and controls as a defensive measure. These obstacles become all the more prominent if the management's actions are not reinforced with some incentives and welfare activities, promising the employees a reasonable share from the savings.

It will, therefore, be essential to take the labour into confidence and solicit its cooperation. The labour will have to be assured that changes would neither reduce their job opportunities nor their pay packets.

The obstacles put forth by the middle management are no less serious than those from the labour. New activities taken up under cost reduction discipline, like any other activity, will put some extra demand on executive time, specially when suitable personnel is not available. This inevitably will increase work load on the existiug executives.

The analysis and probes into the existing systems and processes can create a fear of exposure in their minds. Accustomed to working in water-tight compartments, executives hardly relish the advice of some one else from outside to reduce costs The resistance on their part, thus is sometimes natural. Executives will therefore have to be assured that the discipline is not initiated to expose their incapabilities.

Tendency to play safe may also come in the way of introducing cost reduction discipline. For an activity which challenges the accustomed ways of doing things, risks are essential. These risks, with whatever good intentions and sincerity are taken, can sometimes upset the existing conditions, demanding extra energy and patience. The top management should, therefore, prepare itself for such situations.

Tc prove management's own bonafides top management should take lead by eliminating unnecessary works and simplifying the administrative systems wherever possible. The management should boldly accept and correct its own wasteful activities to set an example for the subordinates. To foster competitive spirit, incentives should be assured to those giving results.

Sometimes, in spite of management's best intentions, some quarters continue to resist the introduction of cost reduction discipline and to win their confidence becomes difficult. Under such circumstances, if the cost reduction discipline is to be saved from becoming a legend, the management will have to be firm and ruthless towards such obstacles.

INTRODUCING COST REDUCTION DISCIPLINE :

Before introducing cost reduction discipline, the top management should clearly define the scope, the objectives, structure of the organisation and the authority for cost reduction. The financial position should be reviewed to see whether enough finances are available, if so required.

i) THE SCOPE :

Depending upon the available facilities, suitable manpower and the external agency's help, it is to be clarified whether the discipline will be applied to all the areas or to some selected processes and items of expenditure.

ii) THE OBJECTIVE :

Whether the discipline is to quickly correct the fall in profits or to ensure sustained overall economy in manufacturing costs – quick correction in fall of profits is possible only if some extra-ordinary expenses have crept in within the immediate past. For organisations that have fallen in low profitability due to changes in manufacturing pattern or market demands, only that discipline will be useful which will ensure overall economy. The results from such a discipline will be slow but steady.

iii) THE ORGANISATION :

The structure of the organisation will depend upon the blue print of the programme for cost reduction discipline conceived by the top management. Whether the organisation will be formed from within the industry or some consultant who will be entrusted with the job, a clear decision on this issue is of utmost importance.

While the organisation from within will have the benefit of understanding the problems early, its opinion is likely to get biased due to personal loyalty and undue influence. The consultants' opinion on the other

hand will be unbiased, backed up with expertise and experience. Their assessment will be more realistic. The executives selected from within will not be able to devote their full time because of many other commitments The consultants, on the other hand, will work whole time giving results faster.

iv) THE AUTHORITY :

No activity can progress unless the powers and limitations of the organisation performing that activity are clearly defined The management, should therefore, decide whether the organisation will be academic, advisory or executive and whether their findings will be implemented after suitable modifications, or they will only be preparing the blue print for some one else to accept or reject.

Organisations formed from within, usually get into trouble because of confusing definition of their authority. Management's reluctance to define the authority for cost reduction can result in serious damage even to the existing systems, discipline and working.

v) COST FOR COST REDUCTION :

Cost for cost reduction is not self-contradictory. Cost reduction means maximum productivity with minimum costs and wastes. But it cannot tolerate bringing down the production or quality to reduce expenses. As such, to reduce expenses at one point, some extra expenses may have to be increased at the other point.

If an equipment has to be saved from corrosion, money will have to be spent for giving anti-corrosive treatment. If the scrap is to be salvaged, money will have to be provided for salvaging operation. In some cases, rewards and incentives will have to be given to those giving results.

Even after deciding, formulating and clarifying the policy, the top management's function will not be over. It will have to keep itself abreast of all the changes that are taking place. To measure the savings against expenditure, publicising the results to secure greater enthusiasm, setting up targets and giving credit where it is due, are some of the functions with the top management will have always to remain associated.

The cost reduction discipline for a paper mills is no different than that for any other industry. Based on the principles explained above, an effective programme for cost reduction can be initiated in any mill.

To start with, say one ac tivity which can yield quick results can be taken in hand, Successful results of cost reduction in that activity will not only boost the morale and confidence in workers and supervisors, but will also reduce suspicion on management's intentions. Better team spirit will then be generated for future attacks.

THE SCOPE :

Considering that the cost reduction discipline is to be applied to all the areas of a pulp and paper mill, the activities can be divided in three broad based groups.

i) Administrative systems
ii) Manufacturing Processes, and
iii) Inventories.

Administrative systems include :

a) all types of reports,
b) filing and recording system of all the technical and commercial functions, and
c) personnel management functions.

Manufacturing processes will include.

a) All-in plant process and maintenance activities, and
b) labour supervisor complement for all activities under (a).

Inventories will cover :

a) All puchase functions.
b) all inventory stock functions, and
c) utilisation and disposal of scrap.

However, if enough man-power and financial support are not available to take all the activities under cost reduction simultaneously, only the selected few can be taken up, to start with.

THE OBJECTIVE :

It will always be profitable to introduce cost reduction in all the activities with the object of ensuring sustained economy in overall production cost and improvement in quality. Future projections and development plans should be kept in view to avoid duplications. The trend of technological developments should be taken as basic guidelines for all attacks. The objectives can be listed as under.

i) To reduce paper work by eliminating unnecessary non-productive reports, records and non-productive reports and files etc.

ii) To rectify such policies of management which are responsible for man-power wastage.

iii) To alter the processes, if required, to get maximum return from the inputs.

iv) To reduce fuel loss by recovering and re-utilising the heat loss through various processes.

v) To gradually replace high energy consuming equipment by energy efficient equipment

vi) To use polluting waste for useful purposes.

Scores of such items can be listed and those giving quick results are arranged priority-wise.

THE ORGANISATION :

The strength of the organisation will depend upon the scope and the objects to be attained. In case the management opts to take up cost reduction from within it should form one or more number of committees for each group of activities, depending upon the extent and nature of programme. Each group committee should be headed by a senior executive, preferably an experienced one in the line of action. Selection of this senior executive is of utmost importance as wrong selection will create confusion and the whole programme will become a source of criticism.

Administrative systems committee should preferably be headed by a senior management executive.

Manufacturing process committee should be headed by Production Manager or an equivalent executive from the technical side.

Inventories committees should be headed by the Materials Manager.

These committee will have four functions :

i) Survey of areas of attack
ii) analysis of systems and processes
iii) strategy of attack and implementation and
iv) budgetary assessment of result.

While the first three functions will be looked after by respective group committees, for the last one, separate committee will be required to assess the results on the basis of data fed by the group committees. This committees will be headed by a cost accountant and well function for all the three group committees.

THE AUTHORITY :

Once, group committees with proper and well-defined authorisation are instituted, it may appear that there will be no need of further authorisation to implement the cost reduction discipline. This will be a wrong presumption, because the authorty and power for normal executive functions are governed by different disciplines. The cost reduction group committee will hardly be able to achieve any results unless it is empowered to :

i) have access to all types of reporting systems, filling and recording procedures management's policy towards employees and all such other administrative functions.

ii) get into depth of all the processes, process variables,

iii) collect all cost accounting data leading to calculation of cost of production.

iv) collect progress information for various jobs, and

v) issue instructions for implementing the cost reduction activities

Such an authority may sometimes clash with some of the executive functions, but that cannot be helped

COST FOR COST REDUCTION :

When a system is to be analysed extra man-power of required qualifications will be needed. Some mills may not have such persons available, and to put wrong persons for such type of work will be dangerous. Money will have to be allocated for employing such persons. Analysis may prove that a particular equipment is insufficient and it should be changed to effect economy. Finances will have to be arranged for buying the new equipment. It may be found that by using a certain chemical or additives better quality of papers can be produced Money will have to be spent for buying chemicals and additives. Some persons, by accepting the challenge to save expenses in their areas of operation, give definit results. To boost their morale for further attacks and setting examples for others to follow, incentives will have to be paid.

All these and many such other instances will need finances and arrangements for these will have to be made.

IMPLEMENTATION OF COST REDUCTION :

Under normal circumstances, the cost reduction discipline reacts over such costs which are hidden.

Under normal circumstances, the cost reduction discipline reacts over such costs which are hidden. However, when the programme is taken on hand, every waste which does not contribute to its customer's features and increase the cost comes under its purview. Visible wastes can be located by simple survey and need no analytical study. Controlling of the visible wastes is a part of normal process and maintenance functions, and no separate discipline is needed to attack them. It is expected that control on the visible wastes will be done through management directives, and no digging-in will be required by the cost reduction programme. The hidden wastes cannot be located unless the systems and processes are analysed. It will, therefore, be necessary to understand the difference between visible and hidden wastes. These wastes should then be classified and procedures evolved to attack them according to priority. The difference between the visible wastes and hidden wastes can be understood from the followiug examples :

1. Any report or a record not used or acted upon by the person receiving it is a visible waste; but any report or record which can be simplified or avoided by changing the system is a hidden waste.
2. To have too many meetings is a visible wate, but not to take timely decisions on the points discussed or to sleep over the decisions are hidden wastes.
3. Draining/burning of bamboo/wood dust is a visible waste, but the conditions which produce such dust is a hidden waste.
4. Draining of pulp is a visible waste but the cooking and bleaching conditions which affects the yield is a hidden waste.
5. Draining of black liquor is a visible waste; discharge of chemical laden gases through the stack is also a visible waste, but the use of more cooking chemicals than required is a hidden waste.
6. Spillage of water from leaking pipes and fittings is a visible waste, but the condition which increases water consumption is a hidden waste.
7. Steam leakage is a visible waste. Lower efficiency of a steam generating plant is also a visible waste but the heat loss that can be recovered to supplement the cost of fuel has a component of hidden waste.
8. Idling of men is a visible waste. Improper supervision is also a visible waste, but the condtion or the management policies which result in idle time or improper supervision is a hidden waste.
9. Using a non-standard or inefficient equipment is a visible waste, but to wait for its replacement till it breaks down beyond repairs is a hidden waste.
10. Excess inventory is a visible waste. Improper utilisation of stocks is also a visible waste, but to keep the stock for which an alternative arrangement can be made when needed is a hidden waste.
11. To purchase an equipment at higher cost is a visible waste. To purchase a non-standard equipment at lower rate is also a visible waste, but the systems whlch lead to such purchasing is a hidden waste.

Number of such examples can be given in the administrative systems, manufacturing processes and maintenance of inventories. However, their nature will vary from place to place and industry to industry. How remunerative the waste reduction programme is for controlling these wastes can be known only after applying the cost reduction discipline. Analysing these wastes under cost reduction discipline will also justify the superiority of cost reduction over cost control. To list all such wastes will be the first function of the group committees. They will then sort out the visible and hidden wastes and place them for proper attack in priorities.

1. SURVEY OF AREAS OF ATTACK :

The committees after having decided the wastes to be attacked, have to discuss all aspects of cost reduction with the concerned persons, invite suggestions and note down the possible reactions on introducing the cost reduction programme. This is essential as one who suggests hardly opposes, but resents if forced upon by

the other. Difficulties may be faced because of the play-safe attitude of the concerned persons and under such conditions, decisions will have to be enforced by management directives. Survey is an immportant activity. All future plans depend upon the correctness of the survey report. Services of an industrial engineer can be of great help for this activity.

2. ANALYSIS OF SYSTEMS AND PROCESSES :

From the survey report, areas are picked out and listed under three categories.

i) Immediate
ii) Short-term, and
iii) Long-term

A thorough analysis is then made of the particular system or the Process and all such points where the cost reduction is possible are sorted out.

To analyse a system or a process, great skill is needed. If so required, expert advice can be taken from some outside agency, and findings thus arrived at should be conveyed to all concerned. It is here that labour, middle management, or both, may start putting obstacles in the way. The findings if not explained properly, may create an uncontrollable situation.

3. CHECKING OF ATTACK AND IMPLEMENTATION :

Points sorted out for cost reduction are then discussed with the concerned persons and systematic procedures are laid down to attack them. Time schedule, requirement of men and material, together with the expected results are forwarded to the cost analysing committee for explaining the financial implications. Based on the results of the cost analysing committee, the implementation of particular project is taken up. As has already been said, no change should be taken up just for change's sake. Every change has to be weighed against the return or saving.

4. CHECKING OF WORK PROGRESS :

Once the job is taken up, it is essential to regularly check and study the work progress. This job is done by the group committee. Day to day progress, bottlenecks resulting in hold-ups and such other problems which affect the progress of the job are brought to the notice of all concerned and then sorted out. The commmittee never interferes with the existing authority. It extends its helping hand to pool all such resources which the executing authority finds difficult to tap. The purpose of this group committee is to keep close liaison between the management and the executing authority on all such other activities which have direct bearing on the work progress.

Quite often, the functions of this committee are misunderstood as direct interference in the work of executing authority which creates a dangerons situation.

It is, therefore, necessary that the functions of the group committees are clearly defined and whenver a chance of clash appears dialogue should be held between the top management, cost reduction committees and executing authorities. The cost reduction committee should, therefore, see that what they project, analyse and report has sense in it.

5. ASSESSMENT OF COST REDUCTION :

From the data fed by the group committee, the cost analysing committee will weigh the total expenditure versus the resultant savings and forward the same back to the group committee. If found worthwhile, the job will be taken up according to schedule.

6. BUDGETARY ASSESSMENT OF RESULTS :

Every work done under the cost reduction discipline has to be weighed against its impact on economy. To accept or to reject a particular job is based on the assessment of cost reduction, but once the job is taken up and completed, its results are to be assessed. The group committee forwards all the relevant data and information about the working parameters for budgetary assessment of the results.

All the above activities need some expertise which may not be available with the people from within the organisation. The author, therefore, opts to hire the services of some outside agency having experience in this line to provide various check lists, data sheets, analysing formats etc.

Some administrative systems, manufacturing processes and inventories of different paper mills were subjected to cost reduction discipline. The findings are as follows:

ADMINISTRATIVE SYSTEMS:

A—A system exists where eight daily production reports are made and their copies sent to six senior executives early in the morning at their residence.

One executive invariably gets upset after going through the contents regarding prodution and down-time. The result is an unpleasant atmosphere on breakfast table. Some irritating exchanges with the family, and an irritated and disturbed temperament before he is on the work spot.

The other one just goes through the report, takes a sigh of relief saying, "Well, now I am ready to tell the boss about yesterday's working ! He least bothers about what was wrong and why it was wrong.

The third executive, after going through the report feels very happy as he thinks that some of the contents have given him enough ammunition to fire the subordinates. Just after reaching the Office, he dictates half a dozen memos asking the concerned to immediately explain why it has happened He is very particular to maintain a file of all such memos and their replies for future reference.

The fourth executive just pockets the report after receiving and never bothers to look at it before he is on the workspot. Seated on the table, he goes through the report with a cool temperament, marks all the events requiring his attention, and projects a picture of all that he has to do on a piece of paper. He discusses the problems with all concerned and gives guidance wherever necessary.

The fifth one does not know why the reports are being sent to him. He takes the reports back to the office and without looking at them sends them for filing.

The last one is very touchy. When asked as to why he wants these production reports, he retorts "What do you mean ? Am I not a senior officer !".

The analysis shows that no useful purpose has been served by sending the bunch of reports to the executives so early. One or more copies of the reports are not read or if read, are not acted upon. The question arises, as to why so many copies of the report then ! Is it for satisfying the vanity of some one in position or to make the receipient questionable, or just becaus the system of sending the copy was started some time back and the administration has forgotton to withdraw it !

In such cases, the copies of the reports should not be sent to those who do not use it for useful purposes. It would be better to get one conslidated report made giving necessary data abut the days working and the copy placed on concerned executive's table for information and necessary action.

There is hardly any use sending the report at their residences and increasing their tension before they are on work spot. It hardly matters if the previous days working results are known to the executive's at 7.00 A.M. rather than at 6.30 A. M.

Savings in stationery, manpower and executive's time can be easily assessed.

Some executives were found in the habit of sending memos and circulars for odd ideas that get into their head. Ohers collected data and information not relevant to their own fuuctions. They did it as a matter of routine without realising the waste of time and energy not only for themselves but for others also.

The analysis indicated that some of them did not have sufficient work load, some wanted to show off their existence; some did it for self protection or to provide ammunition for possible internal arguments.

In such cases, the cost reduction discipline suggests that the work load of the executives should be re-assessed and if necessary their duties re-allocated. Executives should be made to realise that memos and circulars that have no productive value are a waste and should not be issued. If necessary, movement of such memos and circulars should be stopped by management directives.

The resultant saving in executive-time and better team spirit is evident

B—In a purchasing system, requisition for all types of materials is routed through a long chain form the indentor to store-keeper to inventory controller, to chief engineer to works manager, to general manager before reaching the purchase officer.

Enquires are floated, comparative statement of quotations is made, purchase advice obtained from the indentor, chief engineer, works manager and general manager. Before placing the order, the papers are sent to the financial controller. The finance controller looking the finance position puts a remark "due to financial stringencies, the order for such and such material should preferably be deferred".

The purchase officer sends back the papers to the indentor for review. The requisition is again reviewed by all concerned and returned to the purchase officer with the remark "it is absolutely essential and hence arrangements should be made to get it immediately" or "the purchase can be deferred for a certain period." Analyse all the steps in sequence. See how much executive's time and energy this cross table shunting of papers has wasted.

Put the follawing questions :

i) Is it necessary to get a series of signatures for all the purchase requisitions ?

(i) Whether any useful purpose is served by such signatures or counter signatures, especially before knowing the financial position.

iii) Does it not mean that the management has no confidence on the indentors ? Or, this is done merely to shift the reponsibility and possible blame.

Streamlining of procedures to avoid multiple signatures, by giving required powers the chain of signatures can be brought down to half with equal control on purchases and financial liabilities. If necessary, different chains according to the value of the requisition can be made.

The results will be evident. Goods will be delivered faster, and executives of various ranks will feel more responsible and senior executive's time will be saved.

C—Certain salary grades and perquisite rules have been framed by a company and depending upon the placement and position standard set of salary grade and amenities are provided. Everything is systematic with no deviation whatsoever. Apparently, the system is good, every one gets what is due to him, as per the set pattern.

On the other hand, another company does not follow any set pattern for salaries, grades and perquisites. People have to depend on the whims of the management. Even whatever is agreed upon, committed or absolutely necessary, is not granted unless a series of requests are made.

The analysis proved that in both the cases, number of man-hours are lost because of mental strain, lack of basic amenities and internal rivalry. The time and energy which should have been utilised for productive work is spent and lost in grumbling, and unhealthy arguments. Examine the case where a set pattern is followed.

Supervisors or workers of one rank have been provided with a set type of house. One occupant has a small family while the other has half a dozen other dependents living with him. The company, as a rule, will not provide any extra living accommodation to the second employee with the result that while the first one will have no problems, the second will always be under strain. He will hardly have the peace to devote his time for productive activities.

Another employee, with his creative ingenuity has, won a lot of rewards and incentives from the management. However, due to lack of required academic qualifications, he is not given a position which, he rightly deserves. Well, this is what the rules say, and why should the rules be broken for one individual. The result will be that either that employee will leave the concern or lose the drive in him.

In the other concern where no set rules are followed one employee who is smart enough to keep the bosses pleased will get whatever he wants, irrespective of whether he deserves it or not. He wastes his time in pleasing his boss while the others waste by grumbling against him. Such disparities under such a system will be many, and both of them will be wasting time and energy on non-productive activities.

Such situations can be corrected by making systems which are neither too rigid nor too flexible. Give whatever is necessary within limited parameters. Let the employees realise that the management is sympathetic to all, but benevolent only to those who give better results. Managements, following the principle "you do the job and we shall look to your interest" can make things go smooth and even the slightest inefficiency will show up.

Keep record of all extra-ordinary activities and give the credit wherever necessary. Say no or act quickly if you have to. Delay in management's decision

ruins the cordial atmosphere which is essential for cost reduction discipline. If things are not smooth, it may be necessary to change, alter or re-organise the middle management. It is not the person who is important, it is his approach that counts.

Stationery for office use is supplied free by the company. Hypothetical figures are arrived at for its consumption. Analysis shows that a lot of it is wasted or taken away. If it does not exceed the quota fixed, why should anyone bother ! How much will the company save if its use is restricted. Well, the amount may not be very much, but for cost reduction discipline, this is a waste and every waste has to be controlled.

To start with, if free distribution is stopped and a reasonable allowance is fixed, the waste will automatically stop. If required, a stationery sale counter can be opened in the office. Wastes apart, the employees will probably save something.

If such a survery is made for other administrative departments, accounts, sales and all such other functions, a number of such cases where wasteful practices exist will come to light. Directly or indirectly, all these wasteful practices add to the cost of production. The total amount of waste may not be much, but waste is always a waste and it should not be allowed to continue.

MANUFACTURING PROCESSES :

A—Trucks directly unload the bamboos. on a conveyor where high pressure showers spray water over the bamboos. Most of the adhering dirt is removed or loosened. Nearly 6 percent of the bamboo is lost in the form of fine needles and fly dust while chipping. After screening, the accepted chips are washed, where about 1 to 1.5 per cent of the total weight of bamboo is again lost in the form of dirt and fine bamboo dust. During the entire process, nearly 15 to 20 per cent moisture is gained by the bamboo chips.

The system works well. The chips'cost as per the cost control standards, is within limits. What cost reduction discipline will do in such a perfect case !

The case was examined by cost reduction discipline procedures and the following was noted. The present system does not dislodge the adhering dirt completely before chipping. If, by some means this dirt is removed bef re chipping, the life of chipper knives will improve.

Why get contended with 7.5 percent bamboo loss in the form of fines and grit if a part of it can be utilised by installing suitable equipment for screening and cooking. Fines can be sold as a packing material cost. Probably the savings will pay for the recovery plant within a year or so.

Analyse the process economy of chip washing. Increasing the moisture contents in the chips by washing reduces the concentration of cooking liquor in digesters. The total process cost may show that chips washing is unnecessary and it increases the total production cost.

B—A certain amount of raw material is rejected from various stages of screening and cleaning. The quality of rejected stuff varies from uncooked raw material pieces to good bleached fibres. The cost controller keeps quiet as in spite of these rejections, the component of raw material cost of the product is within the set standards.

However, the cost reduction man feels otherwise. He will try to find out means to recover and utilise it.

His analysis proves that suitable systems and processes can be developed to utilise a part of these rejections in the mill itself while the remaining can be disposed of to prospective buyers. He sets a programme by dividing the rejections into two categories :

(1) for use of the mill.
(2) for disposal.

He prepares plans, balances the economy and proceeds. To get an advantage equivalent to 1 percent yield will not be difficult.

C—In one of the mills, cooking is done by indirect steaming through the preheater, the condensate of which is sent back to boiler house. Brown stock is washed in a 3-stage brown stock washing street. Filtered out block liquor is sent to soda recovery plant at 12/13°Tw. concentration for evaporation.

In another mill, cooking is done by direct steam injection and the steam is a bit superheated.

Analyse the two systems. In the first case, the total volume of cooking liquor is more as there is no possibility of liquor dilution. Desuperheated steam is fed to the preheaters and the resultant condensate is sent back to boiler house. The available concentration of black liquor from the digesters is high, but for maintaining proper washing conditions and loss of carry-over alkali in the brown stock washers, the ultimate black liquor concentration sent to soda recovery is around 12/13° Tw.

In the second case, the total volume of cooking liquor is less for allowing cooking stem condensation. The resultant black liquor concentration from the digesters is lower, but the concentration of black liquor from the brown stock washers to soda recovery is the same, i.e., 13/12°Tw. Analyse the process conditions and pulp quality.

There may be hardly any difference in the pulp quality Total cooking steam cost in the first case may be higher because of a desuperheating station in between

Total maintenance cost of the digesters is higher in the first case because of regular cleaning of preheater tubes, replacement of wornout tubes and other maintenance jobs in preheaters. Though the concentration of liquor sent to recovery plant is practically the same in both cases due to limitations of brown stock washers.

In the second case, superheated steam makes very little difference because it heats the cooking liquid with direct contact. A desuperheating station in thus avoided In the absence of preheaters, there is no maintenance cost in this account.

Why then an unnecessary eqnipment is placed in the process. Is it because the practice is being followed since the inception of the mill ? Is it due to a system that when an equipment exists it should be utilised, or just because no one has bothered to find out the actual benefit of this extra equipment !

These are some of the questions, the replies, for which are found out by the cost reduction man from the data, not only from the company in question, but from the other mills also. If a cheaper alternative is available, why the age old practice ? If the quality of pulp, total consumption of chemicals, steam consumption of chemicals, steam cousumption for cooking and evaporating the black liquor are not significantly different, the preheater should be discarded.

D—Steam is generated by sophisticated efficient and well maintained high pressure boilers. The turbine is two stage back pressure type, which, while generating power also supplies, the medium and low pressure process steam. Steam leakags in the steam distribution system is as efficient as it should be.

Why then the cost reduction discipline is required for this area ? Let us analyse, leaving everything else except the stack gases. The temperature of the stack gases is around 240°F. For a cost reduction discipline, this is enough. Can we not utilise the heat of the stack gases in some process ? Can it not be used to at least warm the water which is heated by direct steam ? Can it not be used for primary evaporation of black liquor ? Can its heat be not utilised for hot air blowing in paper machine hoods ? Many such other questions are raised, analysed, and the eesultant savings in direct fuel cost computed. It may be found that most of the live steam now utilised for low temperature processes can be made available from the stack gases. The project may look unconventional, but if the savings override the expenditure, it is worth accepting.

In a paper mill where scores of processes exist, it is not difficult to find such stops where, by eliminating the unnecessary and improving the necessary substantial savings can be achieved. Where the accustomed ways of doing things are changed and conventions are challenged, resistance and criticism are inevitable. But if the projects are planned properly, the resistance and the criticism will die a natural death.

INVENTORIES :

Inventory stocks were going high and they became uncontrollable. The cost control system goes on making a hue and cry to cut down the inventories. Drastic steps were taken to cut down the purchases Deliveries were deferred, Method Engineers were geared to regulate consumption and supply.

Results may be achieved or may not be achieved, but the pressure sometimes threatens the production.

Cost reduction discipline is very stingy about inventories. It is ruthless about inventory losses. It treats, every item which in a stipulated time does not give productive result, as a waste. But its approach towards the inventory is more systematic and production oriented. It never raises a hue and cry if the inventory has gone high. It tries to reason out, but when acts, acts with a stern hand.

Inventory can be analysed by two independent activities.

i) Inventory control, and

ii) Inventory reduction.

Inventory control, like cost control is a static function, and any function which is static, is suspected by cost reduction discipline. The cost reduction discipline, will therefore, hardly bother about what the inventory controller says. It will have its own line of action towards inventory reduction, which is a dynamic function.

Under cost reduction discipline, the inventories will be critically examined as to why they are at that high level. Is it due to wrong indenting or wrong purchasing policy ? Has the consumption pattern changed ? Have the process or maintenance departments installed too many varieties of equipment resulting in too many varieties of spares ? Are the receipts not synchronised with the consumption ? Is it that before the material is received some alternative has been found out and used, making the receipt redundant ? Do the plans change every now and then putting the existing spares and components in dead stock list ? Is that in the name of emergency spares, lot of equipment is being purchased and kept in godowns ? Has the management, due to its accounting policy not allowed the spares in stock to be used in time and has insisted on repairs, rectification and use of equipment even at lower efficiency ? All these and such other related questions are raised and their answers will provide a base for inventory reduction.

Cost reduction discipline not only attacks the purchasing and storing functions, but the consumption and re-utilisation pattern also. In fact, under this discipline, the inventory reduction is a very major activity and can hardly be looked after by executives engaged in day-to-day working.

This activity has a very close link with the manufacturing process activity and as such, if a competent technical person is attached with this group committee, the results will be quick and stable. For inventory reduction, the information on the following items is necessary.

Classification of stocks, and

Consumption and stock balance.

CLASSIFICATION OF STOCK :

All stocks are classified under six categories.

i) Consumables :

Normally all such stocks which have direct relation with the production like chemicals and additives, chipper knives, beater bars, refiner fillings, machine clothings cutter knives are considered as consumables. For inventory reduction even those spares like bearings, V-belts, lubricants, routine spares and all such other items which have regular consumption, are also treated as consumables. The inventory stock of all such items is adjusted on the basis of consumption and delivery pattern.

ii) Spares :

All such items of which the working life can be projected are taken in the category. Based on those projections, their stocks are maintained.

iii) Emergency Spares :

The quantity of emergency stocks depend upon many factors such as :

a) The expected life of the running unit.

b) Can an alternative arrangement be made if the spares get delayed, and what will be its impact on total production and working ?

c) To what extent the organisation can take risk on spares accounts ?

d) How will the spares' stock match with the obsolence of the working unit ?

e) Any other relevant point with regard to its emergency character.

In cost reduction discipline, there is hardly anything like emergency. If something has to be, it should be there. but if it can be avoided, even for some time, it should be avoided.

For cost reduction, the value of the spares should not be taken as the book value. It should either be

the reinstatement value or the total of its cost and the up-to-date interest. It is, therefore, very important to scrutinise the emergency items' stock.

iv) Standing Stocks :

Such stocks are divided into three categories.

a) Running items.
b) Stand by items (only those placed in position)
c) Items maintained in plant as spare.

List of standing stocks helps very much in deciding about the stock of emergency spares.

v) Obsolete Stock :

Obsolete stocks are classified into two categories
a) Possible substitutes.
b) Disposable.

vi) Rejected Stock :

There is nothing like scrap under cost reduction discipline. Everything has a value, and as far as it has a value, it cannot be ignored. Any rejected material which can fetch money by disposing off, is sold out, while the one which can substitute something which is costlier than its disposable value is considered as good as new. As such, rejected stocks are also classified under two categories.

a) Disposable
b) Serviceable/usable.

CONSUMPTION AND STOCK BALANCE :

At a certain time, there is some quantity in the stores godown, some quantity is in transit and some on order, scheduled to arrive.

For all such stock items, there will be a regular, or unforeseen consumption pattern. All this information for different categories of stocks are listed in a proforma to show the consumption versus stock balance. For proper analysis, the stock of standing obsolete and rejected items is also entered in the proforma.

One should not feel that by merely maintaining these records, the inventories will get controlled. These records will affect the future inventory expenditure but for reducing the exisisting inventories, something more than only making these records will be required. The data collection will, however, be the base.

The proforma to collect the data is to be made to suit the individual requirement. The one given in example 1 can serve as guide.

Example I :

Item	:	Refiner Rotor and Shell Fillings, Part No. A B C.
Classification	:	Consumable
Origin	:	Indigenous
Delivery	:	3–4 months
Consumption	:	6 sets/month
Minimum stock	:	9 sets

Compare Table 1 with the nsual ledger or cardex whichever is being maintained. No doubt, the standing stock, obsolete and rejected stock columns are not that important in this case, but from these columns, the store keeper and the purchase officer can remain in touch with the total units in operation and also the stock that is lying in the scrap yard for disposal.

Such a card is filled once a month and depending upon the balance position, the monthly orders are enhanced or reduced. When the stock is lower than the agreed minimum stock, the balance figure is underlined to indicate that the purchase officer should be vigilant to see that as far as posible, the due material is received in time. By keeping only one and a half month's stock, the delivery period of 3–4 months is beaten off without hinderance to production.

Example II :

Item	:	Bearing size X Y Z.
Classification	:	Spare
Origin	:	Imp/Ind.
Delivery	:	18/6 months
Consumption	;	Unscheduled 1 year
Minimum stock	:	2 Nos.

Compare Table 2 with usual ledger or Cardex form. In July '83, there was stock balance of 3 Nos. which got consumed all of a sudden in one month after 3 years. One spare of the standing stock was nowhere in the account as this was not a part of

ledger/cardex entry. From the 3 bearing pieces replaced, it was found that one was good enough to work in emergency and two were for disposal scrap. The one serviceable was kept in the consuming department for any eventuality, but was not recorded anywhere.

Finding the stock on hand nill, the indentor and the purchase officer took immediate steps to get one bearing immediately from the market and covered two more to be delivered in April '84. Thinking that as these bearings are imported, they will be available only in January 1985, they arranged for import licence and by October '83 ordered 3 pieces to be delivered in January '85.

In a usual course, there seems to be nothing wrong with this purchase pattern. But when the consumption versus stock balance was tabulated in the form given above, the mistake became evident. Minimem stock which should have been only two remained at the level of 3 Nos. from July '84 to April 85. The stock went upto 6 during July 85 and remained at 5 Nos. from October 85 to April 86 In July 86 it was 4 Nos. This shows that there was something wrong in purchase projection.

It is true that no one can forecast that the bearing consumption will move as per the table when all the three had to be changed at one time in July '83. though there was no consumption during the past 3 years. Well, for a mishap or an accident, there was already one in the department as a spare standing stock which, under the usual store keeping record, was not counted in the stock list.

In the rejected stock list, there was also one which could have been used, in emergency. As such if these bearings would have been ordered to have the effective delivery of one in April 1984 and the second in January '85, the position would have been as sate as in the present delivery schedule. The order for the third bearing before one is consumed does not arise.

Example III :

Item	:	Granite/Stonite Top Press Roll for Machine No. X-Y
Classification	:	Emergency.
Origin		Imported
Delivery	:	18/24 months
Consumption	:	Unscheduled
Minimum stock	:	One No.

Table 3 is an example of stock movement of an emergency item. A glance at this case will show the defects in indenting and ordering procedure. Normal life of a top press roll is 10 to 15 years.

As per the standing stock list, units were running in July 1980. The one which was replaced in January 1981 was probably not a complete loss and hence, has been shown in the spare column of the standing stock. When the store stock was one and rejected stock was not there, one piece was ordered in January 1981 for delivery in January 1983. For usual purchase pattern, there seems to be nothing wrong. But, if the stock movement of new stock, standing stock, spare and serviceable rejected stock is checked, it will be found that till January 1986, there was no necessity of ordering the new roll. Even to order one in January, 1986 was a luxury.

From the above three examples, the relevance of recording consumption versus stock balance as per the proforma given or any other suitable proforma can be justified Inventory stocks have direct relation with the maintenance systems and production planning. Industries following breakdown maintenance policies have to keep higher inventory stocks of spares and other consumables.

On the other hand, these following planned maintenance policies can forecast their spare consumption and adjust the stock accordingly. Similarly, if the production pattern is not planned, the stocks of various inputs will always be excessive. As such, inventory reduction under cost reduction discipline becomes an administrative function influencing both the maintenance organisation and the production planning structure.

Cost reduction does not advocate for any specific system of maintenance. However, it definitely disregards the breakdown maintenance system Cost reduction least believes in keeping an equipment running unless it works efficiently and economically.

From the test cases explained above, the scope of cost reduction can be easily understood. In a pulp and paper mill, there is hardly any process or activity where some form of waste is not generated. By applying cost reduction discipline, many of these wastes can be made remunerative. A substantial part of the money that will be required to control these wastes will come out of these wastes themselves. While the investment for controlling these wastes will only be once, the savings will be recurring.

CONCLUSION:

Paper mills in the past produced what they liked. But now they have to produce what the consumer wants. Tomorrow, still better quality praducts will be demanded. The existing equipment will go on becoming obsolete, and unless the wasteful activities are controlled, many mills will find it difficult to keep their plants upto-date.

Paper making raw materials are getting scarce and costly. Power and fuel rates are going high. Effluent treatment costs will add to the manufacturing costs. Wages and Salary account will go up. Every spare, every consumables will cost more, but the selling price of paper will hardly go up in the same proportion. This however, does not mean that the paper industry is heading towards a negative economy, but the return on investment will not be so lucrative. Application of cost reduction discipline is therefore the only answer if this industry has to keep its economy in balance.

TABLE—1

Period	Actual Stock Movement				Standing Stock			Obsolete		Rejected			To Order		
	Projected stock Balance	On hand	Due	Arrived	Consu-mption	Balance	Running	Stand by	Spare	Substi-tute	Dispo-sable	Servi-ceable	Dispo-sable	Nor-mal	Extra
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
July 1985	9	10	6	4	7	7	15	3	—	—	—	—	5	6	+2
Aug. 1985	9	7	8	6	7	6	15	3	—	—	—	—	3	6	+3
Sep. 1985	9	6	10	10	6	10	15	3	—	—	—	—	6	6	—1
Oct. 1985	9	10	8	6	7	9	15	3	—	—	—	—	3	6	—
Nov. 1985	9	9	11	8	6	11	15	3	—	—	—	—	6	6	—2
Dec. 1985	9	11	8	6	6	11	15	1	—	—	—	—	2	6	—2
Jan. 1986	9	11	8	8	5	14	15	1	—	—	—	—	3	6	—5
Feb. 1986	9	14	4	—	6	8	15	1	—	—	—	—	2	6	+1
Mar. 1986	9	8	8	5	6	7	15	1	—	—	—	—	2	6	+2
Apr. 1986	6	7	4	4	6	5	15	1	—	—	—	—	—	6	+4
May 1986	9	5	7	6	6	5	15	1	—	—	—	—	—	6	+4
June 1986	9	5	9	8	7	6	15	1	—	—	—	—	—	6	+3

TABLE II

Actual Stock Movement		Standing Stock			Obsolete		Rejected						To Order		
Period	Projected	On hand	Due	Arri-ved	Consum-ption	Balance	Runn-ing	Stand by	Spare	Substi tute	Dispo-sable	Servi ceable	Dispo-sable	Normal	Extra
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
July 1983	2	3	—	—	3	—	3	—	1	—	—	1	2	2	+1
Oct. 1983	2	—	1	—	—	—	3	—	1	—	—	2	—	3	—
Jan 1984	2	—	—	1	—	—	3	—	1	—	—	2	—	—	—
Apr 1984	2	1	2	—	—	1	3	—	1	—	—	2	—	—	—
July 1984	2	1	—	?	1	3	3	—	—	—	—	1	1	—	—
Oct. 1984	2	3	—	—	—	3	3	—	—	—	—	1	—	—	—
Jan. 1985	2	3	3	—	—	3	3	—	—	—	—	1	—	—	—
Apr. 1985	2	3	—	3	—	6	3	—	—	—	—	1	—	—	—
July 1985	2	6	—	—	1	5	3	—	1	—	—	1	—	—	—
Oct. 1985	2	5	—	—	—	5	2	—	1	—	—	1	—	—	—
Jan. 1986	2	5	—	—	—	5	2	—	1	—	—	1	—	—	—
Apr. 1986	2	5	—	—	1	4	2	—	1	—	—	1	—	—	—
July 1986	2	4	—	—	—	4	2	—	1	—	—	2	1	—	—

TABLE III

Period	Actual Stock Movement					Standing Orders			Obsolete			Rejected		To Order	
	Projected stock Balance	On hand	Due	Arr-ved	Consum-ption	Balance	Run-ing	Stand by	Spare	Substi-tute	Dispo-sable	Servi-ceable	Dispo-sable	Normal	Extra
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
July 1980	1	1	—	—	—	1	4	—	1	—	—	1	—	—	—
Jan. 1981	1	1	—	—	1	—	4	—	1	—	—	1	—	1	—
July 1981	1	—	—	—	—	—	4	—	2	—	—	1	—	—	—
Jan. 1982	1	—	1	1	—	1	4	—	2	—	—	1	—	—	—
July 1982	1	1	—	—	—	1	4	—	2	—	—	1	—	—	—
Jan. 1983	1	1	1	—	—	1	4	—	2	—	—	—	—	—	—
July 1983	1	1	—	1	—	2	4	—	2	—	—	—	—	—	—
Jan 1984	1	2	—	—	—	2	4	—	2	—	—	—	—	—	—
July 1984	1	2	—	—	—	2	4	—	2	—	—	—	—	—	—
Jan. 1985	1	2	—	—	1	2	4	—	2	—	—	—	—	1	—
July 1985	1	2	—	—	—	2	4	—	2	—	—	—	—	—	—
Jan. 1986	1	2	—	—	1	1	4	—	2	—	—	1	—	—	—
July 1986	1	1	—	—	—	1	4	—	2	—	—	1	—	—	—