

COST CONTROL THROUGH VARIANCE ANALYSIS

Control is one of the important functions of management and in essence it requires concrete efforts to assure conformity of performance with predetermined standards. No management can swagger the perfect adherence to its plans: "in fact it is the very perversity of the things in not going according to the plans that gives management, - and commercial accounting - its raison d'etre".[1]

Control of costs through 'exception principle' is best accomplished by determining and analysing "variances". Once the standard costing system has been pressed into operation, it is no longer significant for the purpose of control and the "variances" become majore signposts to which the management must turn its attention since it is they that reveal the extent to which cost can be controlled. The real benefit to be derived from a system of standard cost is not the ease with which the costs can be accumulated but the improvements in production that can be obtained by correcting the conditions disclosed by the variance accounts.[2] Variance information as revealed by standard costing would be of assistance in cost control and in pinpointing the source of loss and inefficiency.

II

NATURE OF VARIANCES

A cost variance is the difference between the standard cost and the comparable actual cost for the same element and for the same period. The total of the variances consequently represents the difference between the actual profits and the standard profits i.e., the profits that ought to have been made. The variances are said to be 'favourable' or 'credit variances' when the actual performance exceeds the standard performance or the actual costs are lower than the standard costs. On the other hand, the variances are 'unfavourable' or debit when the actual performance falls short of the standard performance or the actual costs exceed the standard costs. It is further held that debit variances should be considered as loss since the company did not receive full value for the assets expended while the credit variances represent saving because to treat them otherwise would amount to valuing the unsold portion of the retained asset at more than actual cost.

III

INTERPRETING THE VARIANCES

Interpretation of variances is essential in the effective cost control because the simple fact that variances exist, does not help management derive any conclusion. The management is interested to know 'why' 'where' and 'how much'. This necessitates the innovation of some techniques which may provide some clue or insight into the nature of the variances. Two methods are commonly employed in interpreting the variances, viz., 'Comparison and 'Analysis'. In addition, 'graphic methods' are used for variance control.

Comparison. Under this method, the variance of one period is compared with its counterpart for the previous period. The idea is to take separately various components of cost. Managerial efforts would be deemed effective only when tendency is towards diminution. We may, however, not get the exact comparison since the absolute figures of variances do not take into account other changes such as increase in the volume of operation. In order to overcome this difficulty, a percentage variance of standard for two periods is computed. The advantages of this method are simplicity and ready comparability over time-periods.

Analysis. 'Comparison', though simple, fails to exploit the detailed cost data supplied by the standard cost system to study the variances down to any particular cause. It would only mean to say : "buying an expensive Jig borer and then using it for nothing but routine drill-press jobs." Hence the total variances must be decomposed into their respective parts so as to study the reasons for each of them. This is done through the 'method of analysis', as "the essential purpose of examining variances is not to realize that a variance exists or to recognise the fact that it has changed form month to month, but rather to learn what cost components caused it to change and, knowing what these factors are, to trace them to their original sources in plant operations."^[4]

The understanding of the causes of variances by the analysis process aids management in exercising effective control over costs. It is significant to know, for instance, that there is a fall in the profits because labour has cost that much more than was planned. The excess might be due to a wage board award, inefficiency on the part of the workers, machine breakdowns, ineffective supervision, faulty material or bad workmanship, absence of properly planned production (so that some departments were idle while others worked extra shifts), employment of labour grades not appropriate to the work being done, bad rate fixing, excessive piece-work prices, absence of properly detailed drawings or process layouts necessitating delays and defective work or retention of redundant employees as a matter of short term policy and so on.

Control Through Graphs. The graphs are sometimes used to exhibit the trend of variances in an effort to determine whether or not the performance is moving towards the standard. Two types of graphs are used, namely, the *percent graphs* and the *money graphs* disclosing, respectively the per cent or relative changes and the rupee or absolute changes—favourable and unfavourable. The graphs provide a method, simple and readily available to control the variances. A careful scanning is imperative for the correct understanding of the graphs. Henrici^[5] has aptly emphasised:

“Neither method can be used without some degree of evaluation. Thus in studying the percentage graph, we must remember that a high percentage variance may, in some cases, represent only a few dollars, while a small one may, in others, stand for large sum. The corrective action to be taken must give regard to the circumstances attached to the percentage.

On the other hand, a graph of variance in terms of dollars needs interpretation too. A variance of 5300 dollars may be catastrophic in small cost centre; negligible, perhaps beyond the reach of control, in a large one.”

It is proposed to examine the ‘analysis method’ in this article more elaborately. The reason for preferring this to other methods is obvious. Analytical superiority is a distinct gain that is likely to accrue.

IV

SCHEDULE OF VARIANCE

What is to be controlled must be fully known. An account of the factors responsible for the deviations of the actual from the standard would disclose that there are two sets of forces in the total variances:

- First*, which are usually beyond the control of the management, and
- Second*, which are actionable.

Accordingly variances can be categorised as uncontrollable and controllable.

UNCONTROLLABLE VARIANCES

As the name indicates, the emergence of variance is due to some such factors as the sudden shortage of raw materials, the new wage awards, enhancement of some duty etc., all of which manifest inability of the management. Some of the well known uncontrollable variances may be listed below:

Calendar Variance. This has affinity with the actual time spent on the operations which may be shorter or longer than the standard and thus the resultant variance. It is therefore the difference between the number of working days in the period to which it is applied. If the expenses, for instance, have been budgeted on a four week basis, these cannot be completely absorb-

ed since, in practice there would be a number of holidays—public or otherwise—and therefore direct comparison is impossible.

To overcome this hurdle, the suggestion put forward is to apply a factor to the standard figure to bring it in line with the number of working days covered in the actual operation. In India, the working days are usually 290 in a year (i.e. 365 less 52 Sundays, 20 gazetted holidays and three others). The number would be further reduced where no work is done on Saturdays and if the accounting period covers 250 days, the charges should be allocated as 250/290. None can, therefore, be held responsible for calendar variances and results are distorted in most of the cases.

Revision Variance. This would depend on whether or not the revised figures have been incorporated in the standard. Thus if increased wage rates, material prices etc. are included and standard figures are revised, the 'revision variance' would not arise. But contrary to it, if charges are uncertain and cannot be conveniently included in the budgets, the effects would be reflected in the 'revision variance' which is the amount not incorporated in the standard cost rates. In the case of, a new wage award, as an illustration, if the budgeted labour cost was Rs. 2,000 and actual Rs. 2,200; total variance would be Rs. 200. If there had been 6 per cent increase in the wage rates, the budget could rise to 2120. Revision variance is calculated by multiplying the budget standard by 6 per cent (Rs. 120), leaving only Rs. 80, remaining of the total variances, to be controlled.

Output Variance. In line with other uncontrollable factors, the variations in output give rise to 'output variance' and it will indicate the under or overabsorption of, fixed costs especially. The treatment of this variance is contingent on the policy of the management regarding the nature of the budget—fixed or flexible. The output variance is certain to arise when there are fixed budgets while its emergence can be resisted when flexible budgets are in operation.

CONTROLLABLE VARIANCES

Once the uncontrollable variances are isolated from the 'total variances', the residue is controllable variance which can be identified as the primary responsibility of a specified person. It is the controllable variance the interpretation of which makes some contribution to effective management control. Special reports are made to the departmental heads in order that 'control action' can be exerted.

The distinction between 'controllable' and 'uncontrollable' variances is significant, for a variance may be controllable in some circumstances and uncontrollable in others, e.g., the material cost variance may be the responsibility of the production department, but if the price rise is due to unexpected factors (sudden break-out of the war or some natural calamities),

the variance would be uncontrollable. In order to ensure the effective application of the exception principle it is always appropriate to analyse only the controllable variance so that the causes are investigated and action taken.

V
C O N T R O L

Having attempted a distinction between the 'Controllable and Uncontrollable variances', it is now simple to embark upon a detailed study of the 'variance' occurring in each element of cost.

Direct Labour : Total variance in the labour cost arises because the actual rates of pay differ from standard and because more or less time has been taken by the workers. This variance could result from a number of factors requiring immense explanations and calculations. The important reasons are, *first*, there may be a general or blanket wage increase without a corresponding correction in the standard cost. "This could be the situations where the employer has made no attempt to keep standard cost at current levels or where there has not been sufficient time to adjust the standard costs for plantwide pay increases such as those accompanying a new union contract or general increases due to inflation,"^[6] *second* where the wage rates are based upon worker's ability and length of the service (and not fixed for job), the rate variance would occur when :

the persons are not competent to do high calibre job; the foreman is biased in the assignment of the jobs: the number of routine jobs may be more at a particular time and new persons are given high grade jobs while the expensive men do whatever other jobs available.

Thirdly, where the proportion of men is not in accordance with the standard proportion as is clear from the following :

No. of Men		Rate per Hour
Standard	Actual	(Rs.)
7	5	10
8	9	8
10	12	6
5	4	4
Standard rate per man		= 214/30
Actual rate per man		= 210/30

Finally, overtime payments^[7] either not included in the standard or, if included, are more than what is provided for in the standard.

These factors suggest that the responsibility lies at the door of the production centre where specific persons, like foreman, may be asked to clarify the variances. The variance is uncontrollable in case there is a general rise in the wage levels or a new agreement is entered into with trade unions.

There would be no *labour efficiency variance*, if the workers are paid strictly on the piece-wage system. An analysis, depending upon the availability of the data, may show that efficiency variance is due to the absence of vocational selection or training; lack of cooperation and imperfect guidelines for the task. Moreover, it may be due to general factors such as bad working environments—inadequate light, absence of ventilation, excessive heat or cold etc., indifferent supervision, inadequate system of production control causing delays; defective machinery and other operating equipment resulting in frequent breakdowns and nature of the materials handled. Attempts must be made to improve the efficiency of the workers and the analysis of these factors can be utilised to the best advantage of management.

Direct Material. The cost of materials in a product is based upon two factors: price and quantity and the variance is the divergence of actual from either standard price or standard quantities or both. The causes of material price variance are explained as, *firstly*, the general inflationary or deflationary conditions after the standards have been established; *second*, when there are variations in the volume of purchasing—actual quantities purchased are either more or less than the anticipated standard quantities—the variances may be due to the concessions or allowances such as trade discounts, free carriage etc.; *Thirdly*, if the practice is to include incidental charges in the price of the materials, the increase or decline in such charges may give rise to price variance, e.g., storage, transport etc., *Finally*, the primary material may have to be substituted due to shortage and any disparity in the price would mean a 'price variance'.

Material quantity or usage variance would result from theft, pilferage, scrap, spoilage, shrinkage etc.; faulty use of the materials; employment of inefficient or untrained workers and when the inspection department is ill-managed, additional quantities may be needed to replace already manufactured units of off-standard quality.

Control of material price and quantity is a very tough exercise as there is an interdependence of functions between the purchasing and production departments. It is generally considered that the responsibility for price variance is that of the purchasing section and that of the quantity or usage variance rests upon the production or works management. The purchasing function demands that the materials must satisfy five Rs'—right price, right quantity, right quality, right time and right source of supply. Even if the

purchasing department does its best to keep the optimum level of stock in-hand, additional demands of the production centres may force the purchasing department to acquire deliveries at unfavourable prices. In this case the price variance should not be interpreted to mean a reflection on the purchasing personnel. Thus a detailed investigation of the causes is imminent. The purchasing and production departments will have to work in close association and extend the necessary cooperation. It is suggested here that a committee consisting of the personnel of these departments should be constituted to make appraisals at regular intervals.

The discussion also highlights whether or not the material variances can be controlled. The general price rise will entail revision while the variance stemming from theft pilferage, discounts etc., could be controlled only when the loopholes are effectively plugged.

Overheads or Fixed Burden. Overheads or indirect costs, also referred to as burden costs, are fixed as well as variable. But these are mostly fixed. Moreover, the treatment of variable overheads or burden costs is similar to that of direct labour and material and variances are accordingly computed without much difficulty. The fixed burden costs are liable to distortion in the computation because these do not change frequently and are not dependent upon activity. These represent managerial commitment to expenses such as salaries, insurance, rent, depreciation, taxes, marketing etc. Certainly the supervisor has little to do to influence them, at least in the short run. Technically it is not a simple task to establish standards for the burden costs and variances can be computed only when such costs are budgeted.

In this process two variables are encountered: 'total amount of expenses' and 'the normal level of volume'. Thus the overhead variance can be spread into *spending variance* and *volume variance*.

Generally the actual and budgeted burden costs are approximately the same because fixed expenses, as noted above, do not change frequently. But at times, for a variety of reasons, such as changes in tax and insurance rates or shifts in depreciation charges as new equipment is purchased and old becomes fully depreciated or sold, actual costs may differ from the estimates. This deviation is called the *spending variance* which is the difference between the actual cost and the budgeted overhead costs. This variance measures the efficiency or inefficiency in spending. In an actual case, it would be desirable if the variances are traced down to the individual expenses constituting the burden costs. But it will depend on the degree of details and willingness on the part of the persons concerned.

The budgeted overheads (fixed) remain constant upto a specific level of volumes or activity called the Normal Standard Volume or Capacity. These overheads will be fully absorbed when the actual volume is equal to the standard volume. But if this is not the case, there would be an over—or

under-absorption of overheads and a *volume variance*—difference between budgeted cost and overhead cost—results.

We have confined our analysis of overhead costs only to the spending and volume variances. It is argued that the *efficiency variance* may be estimated to ascertain the effectiveness of the labour in the utilisation of fixed facilities. If the hours worked are 10,000 to produce some quantity against the budgeted hours of 9,000, there will be an efficiency variance of 1,000 unfavourable. And if the rate is Rs. 2 per hour, the monetary value would be Rs. 2,000.

Spending variance is not of much help since the actual fixed costs are not controllable in the short run by the personnel of the production centres. In practice, the spending variance is analysed down to its respective constituents of fixed costs involved. The supervisor should be held responsible only if there are no uncontrollable factors and a reasonable explanation may be sought for the spending variance.

In respect of volume variance, the interpretation is fruitful only if some allied matters other than the volume are also studied. The budgeted costs remain underabsorbed, if production is curtailed during the period on account of slump in sales; the non-delivery of necessary material by other departments also contributes to the unattainment of the required volume. Under these conditions, the supervisor or other persons of the production department cannot be held responsible for not keeping the volume in line with the budgeted volume and the adverse comments can be reasonable only if such adverse factors are absent.

Turning to the efficiency variance, the mute point is: should the supervisor be held responsible for unfavourable efficiency variance? It is advocated that the responsibility can not be fixed because: *first* the burden costs are not within his control; *second* fixed costs do not depend upon the efficiency of the labour *i.e.*, these are not increased if labour is inefficient or *vice-versa* (This is contrary to the variable costs which increase if there is any waste in their use), and *lastly* the efficiency of the workers is controlled by the workmen and not by the supervisor.

A scrutiny of these arguments would reveal that the first point is a reality while the second point is well supported in the sense that the efficiency of the labour at least in the short run, does not produce any effect on the fixed costs; though in the long run, perpetual inefficiency may require more or expensive equipment to maintain the output.

The last point is weak and cannot elicit sympathy as there is a general belief that efficiency of the worker is attuned with the supervision. The supervisor is made to account for the efficient utilisation of the space, equipment and other overhead facilities under his charge. And he should be properly awarded for efficient utilisation of resources. An analysis of the efficiency

variance may necessitate the wage-incentive plans or other schemes to motivate the workers.

An important plank for controlling the overhead costs is that the management must get only the key figures and must not be bogged down by the mass of details.

VI

SUB-VARIANCES

A study of the variances for cost control would be incomplete if a reference is not made to the commonly used term 'sub-variance'. The material, labour and overhead variances, segregated in terms of price or rate and quantity are known as 'principal variance' and when different parts making these variances are analysed, the variance of each part is referred to as 'sub-variance'. Simply stated, a sub-variance is a part of the principal-variance. Of the innumerable types of sub-variances, the so called yield variance and mix variance are important for the purpose of cost control. Although the sub-variances can be ascertained for labour too, the calculation is usually restricted to material sub-variances.

YIELD SUB-VARIANCE: It brings into light the extent to which the actual yield from a given material or types of material has differed from the standard. In process industries, in particular, the inputs have to be moved from one process to another with the result that the finished product of one stage forms the raw material of the next stage. As such it is desirable to take a note of the yield at each stage so that control becomes effective. An unfavourable yield sub-variance would show that more than the standard quantity of material has been used. And a favourable yield variance indicates the use of the material quantity that is less than the standard. In order to simplify the procedure, the yields are expressed as percentage such as yield/input X 100.

'MIX SUB-VARIANCE': In certain products, like medicines, more than one material or more than one grade of the same material is used. Such different materials or grades of material have to be combined or mixed in a standard proportion. It is feasible to calculate the mixture sub-variance considering each type or grade of material. The mix sub-variance is, therefore, the difference between the actual quantity of material used and the standard proportion (i.e. the quantity that would have been used if the standard proportions were adhered to), priced at the standard price.^[9] If the mixture is varied in the sense that a larger than a standard proportion of more expensive is used, there will be an unfavourable mix variance; contrary to it, if change in proportion is done to include cheaper materials, then the resultant mix variance will be favourable one.

CONTROL: The variance is often the outcome of faulty use of the materials and it can be controlled if supervision is efficient. After making allowance for standard loss the additional unfavourable changes in yields must be investigated and responsibility fixed. The increase in yields will help management to meet the demands of the customer and thus the orders can be executed without delay. The employees can also share the outcome of enhanced yield through bonus or other incentive schemes.

The mixture variance is the result of multiple factors e.g., natural calamities such as floods, fires, etc., labour troubles causing slow work and strikes; shortages in the market necessitating the use of substitute materials and inefficient store-keeping in the sense that materials are either unpacked or inaccessible.

It is clear, therefore, that both controllable and uncontrollable factors are in operation. There may be little responsibility for the sudden breakout of fire or the occurrence of flood, still precautionary steps can be introduced to meet the shortages. Attention may be directed to the compliance of re-order level of the stocks in hand, the improvements in the storekeeping and the ensuring of good human relations.

In certain products, the standard mixture is essential for the sake of a particular brand because sometimes that is the only attraction for the customers. For instance, the standard mixture of 'Bournvita' and 'Ovaltine'—the energy food drinks—determine the liking for each. In medicines there is no scope for change since the mixture is primary determinant of usefulness.

VII

UTILITY OF THE VARIANCES INFORMATION

The vital significance of the variance information is that it shows the extent to which the costs are controllable. "The variance itself is not a control, for costs are not controlled by compiling statistics about them. The control consists of the steps that management takes to regulate or limit the costs."^[9] It is, thus, imperative that the variations between the standard and the actual must be interpreted to indicate the situations requiring corrective actions. The degree of details in the interpretation of the variances rests on the willingness of the organisation to spend time, money and efforts and also the urgency of the situation. The limiting factor is that the utility of the variance information cannot be determined in advance. Some causes of variances are significant in a situation but may not be useful in others. Similarly, in time too, the utility of the causes does not remain stable. It is here that the variances must be analysed and therefore, interpreted consistently. Otherwise it will be impossible or too costly to assemble the details at a later date.

The interpretation of analysis is an important tool in the hands of those using it and can be effective only when facts are simple to understand. The equilibrium of incremental costs and benefits has to be achieved. The utility of variances analysis can be derived by the top management, the departmental heads and the cost accountants in varying degrees.

Management at top eschelons, really speaking, is management by exception. L.P. Alford has described it as: "Management efficiency is greatly increased by concentrating managerial attention solely upon those executive matters which are variations from routine, or plan or standard."

It is this exception principle which contributes to control and efficiency. The top management will be able to ascertain the overall efficiency of the organisation when compared with the standard or budget. Trend in the progress of the organisation will specify the sections or functions for control actions. The responsibility centres will be established on the basis of the analysis disclosing controllable and uncontrollable factors.

Needless to say that the utility accrues to the departmental heads right from the time, the analysis or variances is done. They can detect the efficiency of variance elements of cost and then put the organisation on a sound footings. Finally the cost accountant can determine the standard price or cost which may nearly approach the actual price or cost with the help of variances analysis.

REFERENCES

1. Beacham, R.H.S.: Commercial Accounting, the Society of Commercial Accountants, Ltd., Bristol, 1964, p. 354.
2. Lawrence, W.B.: Cost Accounting, Prentice Hall, New York, 1955, p. 266.
3. Perhaps there may be more or less money in the standard cost column.
4. Henrici, S.B.: Standard Cost for manufacturing, Mcgraw Hill Book Co., New York, 1960, p. 255.
5. *Ibid.*, p. 262.
6. Lawrence, W.B., *op. cit.*, p. 274.
7. The treatment of overtime payments or wage premiums as a part of the price variance does not sound well since it is a managerial rather than a productive decision. As Lawrence (*op. cit.*, p. 274) has remarked: 'Its inclusion in the overall price-variance clouds rather than clarifies the interpretation of the accumulated price variance. Although the wage premiums result in lower profits than if the work had been performed at regular day rates, the reduction in profit is not a loss, because the company did receive what it paid for, that is, service during other than normal hours. Since the wage premium is a managerial or overall cost, it is best accumulated as an element of direct costs. Better control of wage premiums is accomplished when they are disclosed in total, by centres, for a period of time rather than when they are mixed with price variance by product.'
8. Anthony, R.N.: Management Accounting, Richard D. Irwin, 1967, p. 527.
9. Henrici, S.B., *op. cit.*, p. 253.