

Enterprise Performance Management

1. Limitations of break-even-chart

The limitations of break-even-chart are as follows:

1. While preparing the break-even-chart, it is assumed that **revenue and costs can be represented with the help of straight lines**. It may not always be true.
2. The preparation of a break-even-chart requires the segregation of **semi-variable costs into fixed and variable components**. It may not always be possible to segregate semi-variable cost into fixed and variable elements accurately. There may be situations when semi-variable costs cannot be split.
3. A break-even-chart assumes that **selling price and variable cost per unit are constant at all levels of activity**. It may not always be true. Selling price as well as variable cost may either increase or decrease with the change in volume. Fixed costs also tend to vary beyond a certain output.
4. When a firm produces a number of products the **apportionment of fixed expenses over various products may be difficult** and often it may be done arbitrarily.
5. A break-even-chart assumes that business **conditions will not change**.
6. A break-even chart **does not consider the amount of capital employed in the business**, a very important factor for determining profitability of a concern.

2. Value analysis as a cost reduction technique: Value analysis or value engineering is one of the most widely used cost reduction techniques. It can be defined as a technique that yielding value improvement. It is the process of systematic analysis and evaluation of various techniques and functions with a view to improve organisational performance. It aims at reducing and controlling costs of a product from the point of view of its value by analysing the value currently received. It investigates into the economic attributes of value. It attempts to reduce cost through design change, modification of material specification, change in the source of supply and so on. It emphasises on finding new ways of getting equal or better performance from a product at a lesser cost without affecting its quality, function, utility and reliability. For example, the function of faster is to join two or more parts. Value analysis examines the value of this function of fastener is to join two or more parts. Value analysis examines the value of this function in terms of alternative methods such as welding, taping, stapling, etc. in view of the stress and vibrations involved in a specific application.

In value analysis each and every product or component of a product is subjected to a critical examination so as to ascertain its utility in the product, its cost, cost benefit ratio, and better substitute etc. when the benefits are lower than the cost, advantage may be gained up the activity concerned or replacing it for betterment. The product is one that will perform satisfactorily at the lowest cost.

The various steps involved in value analysis are:

- (1) identification of the problem;
- (2) collecting information about function, design material, labour, overhead costs, etc., of the product and finding out the availability of the competitive products in the market; and
- (3) exploring and evaluating alternatives and developing them.

3. Pre-requisites for a Responsibility Accounting System: Responsibility Accounting System is a system, which measures the plans (by budgets) and actions (by historical records) of each responsibility centre. Four major types of responsibility centres are:

1. Cost Centre – manager accountable for costs only.
2. Revenue Centre – manager accountable for revenue only.
3. Profit Centre – manager accountable for revenues and costs.
4. Investment Centre – manager accountable for investments, revenues and costs.

The essential pre-requisites for the proper functioning of a Responsibility Accounting System are as follows:

- (i) The area responsibility and authority of each responsibility centre should be clearly defined.
- (ii) The set of goals, which each manager of a responsibility centre is supposed to achieve, should be clearly stated.

- (iii) The performance report of a responsibility centre should include only the revenues, expenses profits and investments, which are to be controlled by the executives of that centre.
- (iv) The item, which may require management's attention like variance, should be highlighted in the performance report of each responsibility centre.
- (v) The help of managers of responsibility centre may be sought while establishing the goals of the centre.

4. "Transfer pricing is a widely debated and contested topic" – Discuss.

What should be the basis of transfer pricing, if unit variable cost and unit selling price are not constant?

Usually the management of decentralised units faces a conflict between a division of the company, and the company as a whole when products or services are exchanged among different divisions of the company. Such a conflict becomes more significant in the case of those concerns where profitability is used as a criterion for evaluating the performance of each division.

The essence of decentralisation is reflected in the freedom to make decisions. Under a set up it is expected that the top management should not interfere with the decision making process of its subordinates heading different units. In other words, management of decentralised units is given autonomy with regard to decision making. In this system, top management is expected to preserve 'autonomy in decision making'. The management of such companies also expects that each division should not only achieve its own necessary for evaluating the performance but should also achieve the objective of goal congruence.

A divisional head in a company under aforesaid set up is free to use a price as a transfer price for goods and services, which may provide incentive. Such a transfer price may fail to achieve the objective of 'Goal congruence' (which means a perfect congruence between division's goal and the goal of the company. In case of failure of a division to achieve the objective of 'Goal congruence' the management of the company may dictate their transfer price. Such an interference of management of the company is usually the main basis of conflict between a division and the company as a whole.

Further this conflict is aggravated if the management advocates the transfer of goods and services at cost. As such, the transfer price will not reflect a good picture about the performance of the transferring division. The profitability of the transferring division will not be known by the use of such a transfer price.

Each division appreciates the transfer of its goods/services at usual selling price/market price so as to arrive at the correct return / profitability figure, used for measuring the performance. There is no incentive to the transferring division if goods and services are transferred at variable cost.

If unit variable cost and unit selling price are not constant then the main problem that would arise while fixing the transfer price of a product would be as follows:

There is an optimum level of output for a firm as a whole. This is so because there is a certain level of output beyond which its net revenue will not rise. The ideal transfer price under these circumstances will be that which will motivate these managers to produce at this level of output.

Essentially, it means that some divisions in a business house might have to produce its output at a level less than its capacity and in all such cases a transfer price may be imposed centrally.

5. Incremental cost technique: It is a technique used in the preparation of adhoc information in which only cost and income differences between alternative courses of action are taken into consideration. This technique is applicable to situations where fixed costs alter.

The essential pre-requisite for making managerial decisions by using incremental cost technique, is to compare the incremental costs with incremental revenues. So long as the incremental revenue is greater than incremental costs, the decision should be in favour of the proposal.

Applications of incremental cost techniques in making managerial decisions

The important areas in which incremental cost analysis could be used for managerial decision making are as under:

- (i) Introduction of a new product (ii) Discontinuing a product, Suspending or closing down a segment of the business (iii) whether to process a product further or not (iv) Acceptance of an

additional order from a special customer at lower than existing price (v) Opening of new sales territory and branch (vi) Optimising investment plan out of multiple alternatives (vii) Make or buy decisions (viii) Submitting tenders (ix) Lease or buy decisions (x) Equipment replacement decisions.

6. Activity based costing: It focuses on activities as the fundamental cost objects and uses the costs of these activities as building blocks for compiling the costs of other objects.

According to CIMA, it is defined as “Cost attribution to cost units on the basis of benefits received from indirect activities i.e. ordering, setting-up, assuring quality etc.” Under activity based costing costs are accumulated for each activity as a separate cost object. The collected costs are applied to products based on the benefits received from various activities. The final product costs are built up from the costs of the specific activities undergone. In the first stage the activity driven overhead cost is charged to activity based cost pools and in the second stage cost driver based rates are derived to change cost to product lines. The cost driver based rates are based on activities.

Activity based costing can be used for:

(a) Pricing of products; (b) Design and development of new products.

7. Project Life Cycle Costing: Project life cycle costing is a technique which takes account of the total cost of owning a physical asset, or making a product, during its economic life. In many instances, the purchase of equipment is decided solely on the criteria of initial acquisition costs. Operating plans do not usually spell out the implications for the cost of operating physical assets during the current or future financial periods. Maintenance policies may be only infrequently reviewed.

The term ‘project life cycle cost’ has been defined as follows: ‘it includes the costs associated with acquiring, using, caring for and disposing of physical assets, including the feasibility studies, research, design, development, production, maintenance, replacement and disposal, as well as support, training and operating cost generated by the acquisition, use maintenance and replacement of permanent physical assets.’

8. Multiple regression analysis: Multiple regression analysis is further application and extension of the method of least squares for multiple independent variables. This method is applied when cost behaviour is dependent on more than one factor. With multiple independent variables, however, the cost relationship can no longer be shown on a two-dimensional graph and it becomes essential to work at the relationship without squares technique.

In the multiple regression analysis method the simple least square equation for straight line $y = a + bx$ with ‘a’ as the fixed element and ‘b’ as the degree of variability for the independent variable ‘x’ expanded to include more than one independent variable. For example if two independent variables are given, the equation takes the form, $y = a + bx + cz$ with ‘c’ as the degree of variability for an additional independent variable ‘z’.

Although the multiple regression concept is basically the same form a number of independent variables as it is for only one, manual computation become more complex, however, be easily made with the help of computers.

9. TQM: TQM is not just about awareness of Quality. TQM demands the implementation of new systems. ‘The Quality delivery process’ is a generic name for such a system. The purposes of the quality delivery process are to:

- (i) Ensure that everyone works on those activities which are most important for the success of the business by fulfilling work group missions.
- (ii) Improve the quality of work delivered (outputs) to the customers – internal customers, the next person down-the-line, who receives the work.
- (iii) Eliminate work that is wasted because people do not do it right the first time.
- (iv) Harness the combined skills, ideas and experience of the work group members to improve the business continuously through team work.
- (v) Satisfy the external customers.

The benefits of TQM include:

- Increased customer satisfaction and, therefore, additional sales.

- The achievement of competitive advantage. Companies are increasingly competing on the basis of quality products and services.
- The minimisation of waste.
- The ability to redeploy resources to add real value.
- Focussing attention on continuous improvement.

Overall, the process of developing a TQM culture can increase involvement, identification and commitment.

10. Statistical Quality Control: Although the need for maintaining and improving quality standard is growing with increasing competition, the idea of quality control is not a new one. With the use of statistical technique maintaining and improving quality standards are termed as Statistical Quality Control (SQC) which involves the statistical analyses of the inspection data, which is based on sampling and the principles involved in normal curve.

The quality of product can be controlled either by inspecting each and every item that is produced or through sampling and SQC techniques. The former is too expensive and the inspection is made at the end of the manufacturing cycle and hence provides few controls over the manufacturing process and hence statistical quality control is more economical and practical. SQC uses sampling techniques and mathematical analysis to ensure that during design, manufacturing and servicing, work is carried out and material is used within the specified limits required to produce the desired standards of quality, performance and reliability.

11. JIT: Just in time (JIT) philosophy was first developed in Japan. Toyota introduced it in 50’s and later, other companies in Japan have adopted it. The US companies started adopting in 80’s. Conceptually JIT is a management tool that helps to produce the needed quantities, at the needed time. It advocates in favour of right quantum of goods at right time. The ultimate goal of JIT is to reduce wastage and enhance productivity of the factors of production by taking part in manufacturing process.

JIT is a programme designed to enable the right quantities to be purchased or manufactured at the right time without waste. It provides for the required flow of production to be maintained with zero inventories (no buffer stocks) at each stage of the supply/manufacturing chain.

The overriding feature of JIT is that materials or part are generated in the exact quantity required and just at the time they are needed. A classic JIT system consists of a series of manufacturing units each delivery to one another in successive stage or production. The amount delivered by each unit to the next unit is exactly what the needs for the next production period (usually one day). There are no safety margins in the form of buffer stocks, lives storage or work-progress. JIT is a sophisticated approach in eliminating wastage in the process of manufacturing in difference stages, say from the production design stage to the stage of delivery of finished product. JIT is sometimes regarded as an inventory control technique or a purchasing method. It aims at eliminating all activities, which do not add ‘value’ to the product.

12. Residual income: As an alternative to ROI, the performance of a division can be measured by means of residual income method. The residual income (ROI) technique deducts a charge for the use of assets from divisional profits, and bases this charge on companies cost of capital. It is an operating profits or income of division less the inputted interest on the assets used by the division. In other words, interest on the capital invested in the division is treated as cost and any surplus is the residual income. This criterion in relevant managers of divisions is autonomous and accountable for his performances and makes his own decisions on capital investment. Residual income is the excess of net earnings over the cost of capital. A typical divisional residual income statement is shown in Table:

	Rs.	Rs.
Revenue		xxx
Less: Variable costs		<u>xxx</u>
Contribution		xxx
Less: Controllable fixed costs		<u>xxx</u>
Controllable profit		xxx
Less: Interest on controllable investment		<u>xxx</u>
Controllable residual income		xxx

Less: Uncontrollable cost (allocated head office charges)	xxx	
Less: Interest on uncontrollable investment	xxx	
Net residual income		xxx

Advantage of RI:

- Unlike the ROI, the RI approach is not concerned with preserving a relative measure. It strives to maximise as absolute figure, the RI thereby increasing shareholders’ wealth. This is achieved by accepting opportunities which earn a rate of return which is in excess of the cost of capital. Sub-optimal decisions should not, therefore, arise.
- The cost of capital charge on divisional investments ensure that managers are aware of the opportunity cost of funds.
- If each division is charged with a common group cost of capital then interest taken at divisional level should be compatible with the interest of the organisation as a whole.

13. Return on Investment:

The most common form of performance evaluation in divisionalised companies is return on investment (ROI) method. In this context, return on investment is calculated as a ratio of net divisional profits (before tax) to the assets (at book values) employed in the division. This is calculated with the help of the following formula:

$$ROI = \frac{\text{Profit margin}}{\text{Invested capital}} \times 100$$

and can decomposed into its elemental components:

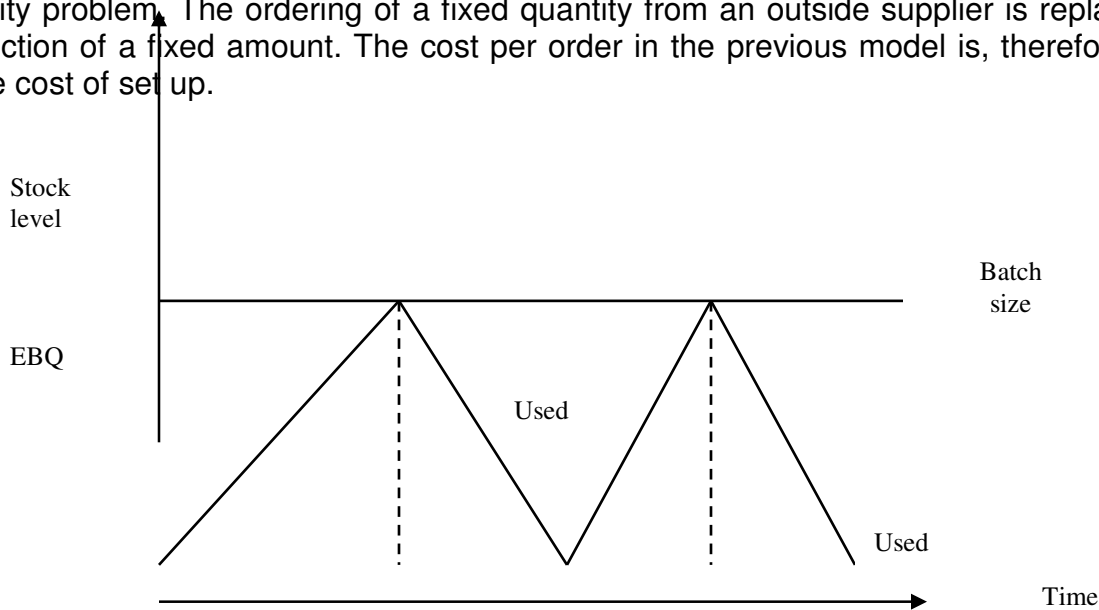
$$ROI = \frac{\text{Sales Revenue}}{\text{Invested Capital}} \times \frac{\text{Profit Margin}}{\text{Sales Revenue}} \times 100$$

= Capital turnover X Margin on Sales.

Advantages of ROI

- It relates return to level of investment.
- The ROI can be analysed into other ratios which are useful for analytical purpose.
- It can be used for inter-firm comparison, providing the firms, whose results are being compared, are of comparable size and of the same industry.

14. Economic Batch production: Companies, which produce a number of different lines, may organise their production on a batch basis rather than a continuous one. When batch production is used, the company has to decide how large a batch to make at a time and how often to make a batch of particular product. The problem is similar to the economic order quantity problem. The ordering of a fixed quantity from an outside supplier is replaced by the production of a fixed amount. The cost per order in the previous model is, therefore replaced by the cost of set up.



ECONOMIC BATCH PRODUCTION

Total annual cost of production = **Annual cost of set up + Annual holding cost.**

15. Cost Benefit Analysis: In order to create more wealth by reducing costs, it is absolutely essential to be able to differentiate between necessary and unnecessary costs. If you try to reduce the necessary costs, you almost certainly reduce the benefits created by the resources being consumed. This kind of cost reduction leads to lower than required quality, extended delivery periods, increased rejections from inadequate materials, and so on. The only really effective way of increasing the wealth created by the company is to search out and eliminate all unnecessary costs.

There are five steps involved in establishing the benefits created by resources consumed in the business. These steps are all analytical concerned with separating resources into the appropriate activities and establishing the reasons for their consumption.

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|---------|---------------------|---------|-----------------------|
| Step 1. | Cost analysis | Step 2. | Contribution Analysis |
| Step 3. | Benefit Analysis | Step 4. | Cost Reduction |
| Step 5. | Profit Improvement. | | |

16. Assignment Problems: Assignment is a special form of a 'Transportation Problem'. In case of an assignment problem, each resource can be assigned to only one job and each job requires only one resource, which can be considered as under:

If we have given 'N-facilities' and 'N-jobs' and also provided the effectiveness of each facility for each job, then problem is to assign each facility to one and only job, so that the given measure of effectiveness is optimised. Assignment problem is a complete degenerate form of the transportation problem.

Let's take an example, to clarify the concept of 'Assignment problems':

It is supposed that there are four Service Engineers having different skills for doing a service job, there are four different types of jobs are in hand and one man is to be given one and only one job and the cost, or, profit given to different persons is known. The problem is which job will be given to whom so that, the cost is minimum or profit is maximum.

Due to degeneracy, the assignment problem can't be solved straight way and a separate algorithm is used for solving it.

17. Rolling/ Continuous Budgets: This is a budget, which is continuously updated by adding a further period (a month/quarter) and deducting a corresponding earlier period.

Budgeting is a continuous process under this method of preparation of budget. Once the first period elapses, the forecast for that period is dropped and the forecast for the future period beyond the existing budget period is added, thereby a 12 months forecast is available. Where future costs or activities could be predicted and forecast reliable, this method is useful. However it is a costly exercise but matched by considerable reduction in operational variances.

18. CVP Analysis Under Uncertainty: Owing to uncertainties in the values, it is very difficult to get estimates and hence uncertainties are required to be specified in terms of probability distribution. Profit volume is very much dependent on sales (units), price, variable costs and fixed costs and uncertainties in one or more of these factors will also make the volume of profit as uncertain.

In some cases the distribution of sales, price or costs may be a known theoretical distribution such as the normal or uniform. In other cases, one may be able to specify only an empirical discrete distribution. The objective in CVP Analysis under uncertainty is to assess the probability distribution of the profit volume, under given distributions of one or more of the factors sales, price and profits. When the distribution of the factors follow theoretical distribution, it is possible to derive the distribution of the profit volume by theoretical methods.

Where the distribution are known only empirically, no theoretical derivation is possible.

19. Uses of Linear Programming: (i) It can be fruitfully applied in purchasing, routing assignment and other problems; (ii) It provides standards for the management problems; (iii) It can be used in blending problems; (iv) It contributes to the development of management; (v) It can be used in production scheduling and inventory control; (vi) The linear programming helps in better understanding the phenomenon of the business; (vii) It provides additional information

for proper planning; (viii) It provides optimum combination of several variables with given constraints.

Limitations of linear programming

- (i) Results are not necessary to be in whole number hence confusing.
- (ii) Uncertainties are not considered under this technique;
- (iii) Only quantitative problems can be solved;
- (iv) The solution of non-linear problems are not possible.

20. Curvilinear (CVP Analysis): Traditional CVP Analysis is of theoretical importance because the assumptions do not meet facts of reality. The economists hold the view that:

- (i) Based on phenomenon of diminishing marginal productivity total cost line will not be straight line but it will be Curvilinear Shape.
- (ii) In real situation, additional units can be sold only by lowering the prices. Therefore, sales line will concave, to the base.
- (iii) The decreasing rates of sales and behaviour of cost line (fixed cost is not fixed throughout and variable cost per unit is not the same throughout) provides two break-even points.



21. Dual Pricing: Dual pricing system is adopted the intention of the Govt. or price fixing agency is to provide essential goods or services to the weaker sections of the society at subsidised prices. Here the manufactures are compelled to sell a part of their production at controlled price and part at market price. Sugar industry is an example where dual price system has been in operation for a number of years. The sugar factories are required to sell 65% of the production to Govt. at a levy prices and remaining 35% production can be sold at market price. Cement industry is also under price system now. The objectives of dual pricing system in sugar industry are indicated below:

- (a) To safeguard the interest of weaker sections of the society. This objective is achieved by making available levy sugar to the common man at controlled price.
- (b) To enable the industry to pay higher sugarcane price to farmers than the minimum. This objective is met by charging higher price on sugar sold in the open market.
- (c) Min. return allowed on levy sugar. The goods and services sold to the common man should be at fair prices. Therefore the price worked out for levy sugar includes the minimum rate of return.

22. Zero-base budgeting (ZBB): ZBB is a method of budgeting whereby all activities are re-evaluated each time a budget is formulated. It is an approach to budget review and evaluation that requires a manager to justify the resources requested for all activities and projects, including on going activities and projects, in rank order. Each functional budget starts with the assumption that the function does not exist and it is at zero cost. Increments of costs are compared with increments of benefit, culminating in the planned maximum benefit for a given budgeted cost.

ZBB is a revolutionary concept of planning the future activities and there is a sharp contradiction from conventional budgeting. ZBB may be better termed as “De nova budgeting” or budgeting from the beginning without any reference to any base-past budgets and actual happening. ZBB may be defined as a planning and budgeting process which requires each manager to justify his entire budget request in detail from scratch (hence zero base) and shifts the burden of proof to each manager to justify why he should spend any money at all. The approach requires that all activities be analysed in decision packages, which are evaluated by systematic analysis and ranked in order of importance.

23. Value Added: ‘Value-Added’ is a basic and important measurement to judge the performance of an enterprise. It indicated the net value or wealth created by the manufacturer during a specified period. No enterprise can survive or grow, if it fails to generate wealth. An enterprise may exist without making profit, but cannot survive without adding value. Value added is a more meaningful measure of corporate performance than conventional measures based on traditional financial accounting, and can be practically useful for employee oriented approach which will allow more fruitful discussions with employees and can be especially

useful in productivity agreements. The 'Value added' is a basic and broad standard of judging the performance of an enterprise.

The investment made in an enterprise comprises investment by shareholders, debenture holders, creditors and specialised financial institutions, etc. If such an investment does not create wealth (i.e. value added), it means that it is a misuse of public funds. Therefore, the concept of value added has a direct linkage with the concept of "social responsibility".

24. Transportation Problem: The transportation problem is concerned with the allocation of items between suppliers (called origins) and consumers (called destinations) so that the total cost of the allocation is minimised. The problem can be solved using either linear programming methods or the special transportation algorithm. Transportation problems are basically allocation models. The objective is to minimise the cost of transportation of homogeneous commodity from different supply points to different demand points.

A few applications of the transportation method are mentioned below:

- Minimise shipping costs from factories to warehouses (or from warehouses to retail outlets)
- Determine lowest cost location for new factory, warehouse, office or other facility.
- Find minimum cost production schedule that satisfies firm's demand and production limitations (called 'production smoothing')

To use the transportation algorithm the following conditions must be satisfied

- The cost per unit for each combination of origin and destination must be specified.
- The supply of items at each origin must be known.
- The requirement of items at each destination must be known.
- The total supply must equal the total demand.

25. Bench-marking: Bench-marking is a systematic and continuous measurement process. It is a process of measuring and comparing an organisation's business processes against business process leaders anywhere in the world, to gain information which will help the organisation to improve its performance. It is basically a quality practice. Companies choose to bench-mark excellent companies whose business processes are analogous to their own.

Bench-marking identifies those practices that have enabled the successful company's superior performance and that can be adopted to the bench-marking company's business. This process results in two types of outputs; bench-marks or measures of comparative performance, and enables or practices that lead to exceptional performance.

Benchmarking was originated in Japan during the early 1960's due to the Japanese curiosity and fondness for imitation. Bench-marking has evolved through a process which has resembled the classic 'art-transitioning-to-science' model for the emergence of a new management discipline.

26. Back flush Accounting: Back flush accounting is defined as 'A cost accounting system which focuses on the output of the organisation and then work backwards to allocate costs between cost of goods sold and inventory.'

In essence, back flush accounting is a simpler bookkeeping designed to reflect key aspect of JIT systems i.e. little or no work-in-progress and demand-pull. There are several variants of back flush accounting (BFA); a popular one being the replacement of separate Raw Materials and WIP accounts with a single account; Raw and In Process (RIP) account. When items are sold the standard cost for the materials in the finished goods would be credited (or back-flushed) to the RIP account. All conversion costs (labour and materials) would be applied to the cost of finished goods production, none would be applied to WIP.