COST CONTROL SYSTEM OF MANUFACTURING COMPANIES
(A CASE STUDY ON DABUR NEPAL (P) LTD.)

by

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RECOMMENDATION

This is to certify that the thesis:

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Has been prepared as approved by this department in the prescribed format of the faculty of Management. This thesis is forwarded for examination.

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ABBREVIATION

BEP	-	Break Even Point
CMPU	-	Contribution Margin per Unit
P/V Ratio	-	Profit Volume Ratio
SPPU	-	Selling Price per Unit
VCPU	-	Variable Cost per Unit
FC	-	Fixed Cost
S	-	Sales
V	-	Variable Cost
MOS	-	Margin of Safety
TS	-	Total Sales
TC	-	Total Cost
C	-	Contribution
No.	-	Number
D.N.	-	Dabur Nepal
D.M.	-	Direct Material
D.L.	-	Direct Labour
OH	-	Overhead
MCV	-	Material Cost Variance
MPV	-	Material Price Variance
AQ	-	Actual Quantity
SP	-	Standard Price
MUV	-	Material Usage Variance
MMV	-	Material Mix Variance
SQ	-	Standard Quantity
SY	-	Standard Yield
AY	-	Actual Yield
LCV	-	Labour Cost Variance
LRV	-	Labour Rate Variance
LMV	-	Labour Mix Variance
LEV	-	Labour Efficiency Variance

LYV	-	Labour Yield Variance
LITV	-	Labour Idle Time Variance
SR	-	Standard Rate
AR	-	Actual Rate
AT	-	Actual Time
ST	-	Standard Time
UVC	-	Unit Variable Cost

CHAPTER – I

INTRODUCTION

1.1 Historical Perspective

In spite of more than sixty years of history of the beginning of modern industry in the country, Nepal is still an underdeveloped country in terms of industrial development. Most of the manufacturing industries are food and agro-based. Since many years the contribution of manufacturing industries to GDP has remained around 20 percent per only. Service industries like nursing homes, educational institutions security service, airlines, tourism sector etc are growing position and manufacturing industries like sugar, dairy and noodles industries have decreased in this decade. Hand knotted woolen, carpet industries and readymade garment industries, hand made paper, knitted woolen sweater and pashmina (shawl) industries are declining position.

The preamble of Industrial Enterprises Act (IEA), 1992 of His Majesty's Government of Nepal states that the objectives of IEA, 1992 is to promote overall economic development of Nepal by fostering industrial enterprises and by making the environment of industrial investment more congenial, straight forward and encouraging. IEA, 1992 is also known as an Act made to provide proper legislation for the industrial development. It has been amended twice, once in August 1997 and second time is July 1998 since its implementation.

There are around 500 industries that involve foreign investment and technology transfer and are registered with the department of industry. Most of them are in manufacturing, tourism and service sectors. Out of the 44 industries approved for foreign collaboration B.S. 2055 (1991/99). More than 90 industries are small – scale industries (i.e. fixed capital investment less than NRS 30 million) while rest of the others are mainly service industries. According to census of manufacturing establishment, in 1996/67 there were around 3600 manufacturing establishment with more than 10 persons engaged in each unit. They give employment to about 200,000 people and the value of the local raw material purchased by those industries amounts

to more than NRs 10 million each year. Around NRs 4 billion of raw materials like tea leaves, sugarcane, wheat, raw milk, holidays. More raw milk is provided dairies by the farmers. The woolen yard and textile fabric worth NRs 4 billion is imported each year for carpet and readymade garments industries. The absence of concrete strategy and programme for commercial farming and development of raw materials for food & agro based industries like vegetable oil/ghee, woolen, carpets, woolen sweater, fruits & vegetable processing textiles and cigarettes etc.

A lot of public manufacturing companies are closed, liquidated, Margear or sold due to the miss management. They have lack of continuity and stability of working style, over staffing, administrated pricing system, cost management etc. cost control is a technique of managing the cost in the organization. It use the different kinds of cost control tools like cost volume, profit analysis, labour cost, material cost, inventory management, standard costing, trend analysis etc. This study attempts to focus on the cost control system on the behalf of one private manufacturing company that is Dabour Nepal (D.N.) (p.) Ltd.

Dabur Nepal Private Limited (D.N.)was established in 1989. It is a joint venture company with India limited and date of incorporation it was successfully running from April 1992. Dabur Nepal (D.N.)manufactures at least 20 types of products like healthcare, food, drugs, intermediate, ayurvedic, honey etc. The corporate office is located TNT building, Tinkune, Koteswor, Kathmandu and its factory is located Rampur, Tokani, Bara district Nepal.

In order to product the Ayurvedic products the company needs raw material and depends solely on the materials that grow in the wild. The company faces pressures from the environment who claimed that various species and herbs where getting endangered. Under this situation, Daubur developed farm herbs and put up a state of Art Technology Green house near Banepa in Nepal. The greenhouse has a facility to produce about 30 lacs of saplings per annum with an aim give these saplings to various farmers located at remote areas of high hills and mid far their income generation as well as the source the renewable sources of raw material. Total No. of

employees of DN are around 750. Apart from that more than 2500 families at various remote places are benefited from the collection of taxes Baccata leaves, Pipli, Tomar seeds, Sunthi etc. Over and above, His Majesty's Government of Nepal is also going royalty for more than 2.00 caror from raw materials collection, which are the basic raw materials for manufacturing of Dabur Nepal's Product with introduction of Nursery of medicinal plants and development of agriculture for honey, there would be large amount of employment in various remote places of Nepal. It has achieved at over of Rs. 222.5 crores in the year 2004-2005, Oct. of which NRs. 200.00 crores were export. The company was great marketing demand for the honey in the overseas markets. In addition to there is a significant demand for the honeybee products like was peoples beebread, pollens bee and royal jelly. Dabur has received the export orders fro the honeybee queens and honey bee hives from various European countries USA and Australia.

With the liberalization policy adopted by both India and Nepal, the later has become a place for immediate environment to Indian entire Premiers. Considering the geographical advantage of Nepal, Dabur entered into a joint Venture with a majority share, thereby establishing DABUR NEPAL Pvt Ltd in 1989.

Table-1: Capital structure of Dabur Nepal Pvt. Ltd. Is as follows

Particulars	amount
Share capital (1400,000 equity @ Rs. 100 each)	140,000,000
Issued capital (800,000 equity @ Rs. 100 each)	800,00,000
Subscribed & paid up capital (798500 equity @ Rs. 100 each fully paid up)	79,852,000

Table-2 : Long term loans of Dabur Nepal Pvt. Ltd. Is as follows:

Particulars	amount
Secured loan	67,64,58,000
Unsecured loan	523,950,000
Total	1200408,000

Dabur Nepal (D.N.), with in span of more than 12 years of its operation, it has created good image for the further achievement, still, it has to make long journey, some year ago it is regular and timely monitoring of overall activities of the company is essence for successful future operation. But still it is not monitoring in time of over all activities because cost control mechanism is very week. Thus, this study is concerned with the evaluation of the performance of DN from the stand point of cost control aspects.

The organization structure of D.N. Pvt. Ltd. Has been given below:

There are nine division in DN these are given below.

1. Work division
2. Quality control section/Blending section
3. Procurement division
4. Marketing division
5. Financial administrative division
6. Corporate planning division
7. General service division
8. Internal audit division
9. Store division

1.2 Statement of the problems

Cost control system in manufacturing companies of Nepal is primarily based on traditional approach, lacking in a scientific approach. A more serious aspects of cost control has been the absence of reduce cost and formulized system of planning and budgeting. The main objective in managing the cost should be at minimum level in the organization. The cycle of cost control system of the companies has that find satisfactory. They need to be economically and financially sound. It is possible only when manufacturing companies has sufficient material, minimum overhead cost, and minimum cost of production etc. The Nepalese manufacturing companies are suffering from high level of cost in comparison to the private companies, due to inefficiency lack of technical knowledge and mismanagement. Some other invisible factors may be responsible for high cost of production.

The process of managing the cost in the organization effectively and efficiently is called cost control system. Cost control is a part of overall planning process of an organization. The cost control system means the development and acceptance of using the tools which are standard costing, quantity control techniques, bench marking, diverficaiton of cost etc. The success of an organization depends upon the cost

control. It required different types of tools and techniques such as volume profit analysis, labour cost control, standard costing and trend analysis etc.

In our country, Nepal most of the development activities are one of the disposed of the state and so it is necessary for the country to make surplus money from the manufacturing companies like Dabur Nepal to finance other development activities but all most manufacturing companies are going in loss day by day. It can not generate surplus due to carelessness of the cost control. So that cost control system is a vital part of overall management. It is just like as backbone of the manufacturing companies. If the cost control system is not strong in companies then goal and target can't achieved in time. Therefore, the cost control system has great responsibility for smooth operation of an organization. So determining the cost control system of Nepalese Manufacturing Companies like Dabur Npeal to overcome the above problems:

i. What is the status of cost control system in manufacturing companies like D.N?
ii. What are the major problems faced by the Nepalese manufacturing companies in developing and implementing the cost control mechanisms?
iii. Are the companies asking to control their cost and increase their profit by using cost control tools?
iv. What types of contemporary steps are needed to be taken instantly?
v. Whether the Nepalese manufacturing companies (D.N.) are applying cost control system properly or not?

DN has lack of continuity and stability of working style, administered pricing system, lack of commercial sprit, limited uses of modern technology, frequently change of chief executive, so, it is going in loss day by day.

1.3 Objective of the study

The basic objective of the study is to evaluate the practice of cost control system and its effectiveness in Dabur Nepal (P) Ltd. In order to meet the objective of this study, the following specific objectives have been proposed.

i. To examine and critically analysis two cost control mechanism practices in the manufacturing practices in the manufacturing companies like Dabur Nepal.

ii. To provide a correct analysis of cost by using different method of cost control tools.

iii. To find out exact cause of decrease or increase the profit of Dabur Nepal.

iv. To analyze the cost control mechanisms of Dabur Nepal through cost volume profit analyze, labour control and standard costing etc.

1.4 Scope and Limitation of the Study

The study confines only to the applying cost control tools of Dabur Nepal (p) Ltd. Following factors have limited the scope of this study.

i. This study is focused mainly on cost behviour and their control tools.

ii. The comprehensibility and accuracy of the study is based on the data availed from the management of D.N.

iii. This study will concentrate only evaluation of the performance of D.N. from the stand point of cost control mechanism.

iv. This study related with certain method of cost control mechanism like as: cost volume profit analysis labour of control, standard costing correlation and trend analysis etc.

v. Analysis is concentrated in some managerial, financial and cost accounting aspect and it does not cover other areas of the enterprises.

1.5 Research Methodology

The objective of this study proved by doing various research, analysis tools and techniques of cost control mechanism. These are given below.

i) Research Design: The first step of research methodology is research design. It means search related components and explains it's carefully for the study purpose historical data financial year 2063/064 to 2067/068 have been collected.

ii) Sources of Data: The following sources of data are given below.
   a. Annual published reports and bulletins of the DN
   b. Annual auditors general reports of DN
   c. Previous year data and publication of DN
   d. Income statement and balance sheet of DN
   e. Cost sheet of DN

iii) Data collection procedure : The data and information use in this study from secondary source. These are directly collected form DN records.

iv) Data processing and tabulation : Data processing and tabulation method most be clear because it shows DN image efficiency and capability etc.

v) Analytical tools and techniques use: The following analytical tools and techniques use in determining the cost control mechanism for this study purpose.
   a. Cost volume profit analysis.
   b. Labour cost control
   c. Standard costing
   d. Trend analysis
   e. Correlating analysis

1.6 Plans of the study

The plans of the study are designed as follows:

The study is divided into five chapters. The first chapter focuses on the general introduction of subject matter, statement of subject matter, statement of the problems,

objectives of the study, importance of the study, limitations of the study and plans of the study.

The second chapter is related with review of literature. It deals conceptual frame work setting, analytical tool's Definition, explanation, and formula used in studying cost control mechanism and review of relevant literature related to study under the main heading of review of literature.

In the third chapter, the research methodology has been presented. This chapter covers research design, sources of data collection procedure, data processing and tabulation, analytical tools, and techniques used.

The fourth chapter deals with the presentation, interpretation, and analysis of data through selected cost tools.

Last chapter contains a brief summary conclusion and recommendation of the present study.

CHAPTER – II

REVIEW OF LITERATURE

The second chapter has given emphasis one the review of literature regarding cost control mechanism. This Chapter is divided into two parts. The first part is theoretical consideration of cost control. It focuses on the conceptual frame work setting, analytical tool's. Definition, explanation, and formula used on cost control techniques and formula used on cost control techniques and second part is review of relevant literature related to studies

Theoretical Consideration

2.1 Conceptual Setting

2.1.1 Cost

Cost represent the portion of the acquisition price of goods, properties or, services which has been differed or not yet assigned against revenue of a period. In other words expenses are costs which have been applied against the revenue of a period.

Mr. Gardori Shilling low in his book cost accounting analysis and control "Cost represent the resources that have been or must be scarified to attain a particular objectives"[1]

Accounting to him, cost accounting deals with the measurement of resource sacrifices an concerned primarily with four activities as below.

a. Cost Finding: - Measurement of estimation of the costs of individual products, departments or other segments of the firm's operation.

b. Cost Analysis: Estimation of the relationship between costs and various determinants of costs.

[1] Gardon Shilling. "Cost Accounting Analysis and Control", p. 11

c. Cost Recording: - Classification and distribution of cost among the various ledge accounts.

d. Cost Reporting: - communication of costs data to various interested parties.

2.1.2 Cost Control

Cost control mechanism is the cost function of the management. It is always operating in business enterprises. Now a days management are facing problems of survival because of actual competition, only those organization can meet the competition effectively and have hold on the market which are in a position to keep their cost minimum. Cost control can be instrument in this regard by eliminating all inefficiencies and wastage.

Cost control can be defined as "The guidance and regulation by executive action of the costs of operating and undertaking" (Terminology of cost accounting I.C.W.A.) In other words, it is defined as "A process of measuring and evaluation actual performance of each organizational component of an enterprises and taking correct action when necessary to ensure efficient accomplishment of an enterprises objective goal and policies. Cost control aims to guiding the actual towards the line of targets. Regulates the actual, if deviate or vary from targets. This guidance and regulation done by an executive action i.e. by the person responsible for causing the deviations.[2]

Cost control mechanism helps in planning the production according to availability of materials, labour and overhead cost and stock can be arranged in time. Loss due to carelessness or any other mistake is deducted and steps taken to minimize such loss in future. It is also giving detailed information about machine, labour, cost of raw materials, overhead cost, and factory capacity. The maintenance of time and job cards for workers disclosed the loss incurred by idle time and indicates the directions in which techniques through losses may be minimized. it is also provides the knowledge use of budget and making performance report. It gives the knowledge about use of standards to assist management in making estimates and plans for future on the basis

[2] Jain S.P. and Narang. K.L., "Cost Accounting", Thirteenth Edition. p. 15.

of management efficiency. The organization and management understanding must be planned and controlled in such a way that desire volume of production is achieved a the least minimum possible cost in relation to schedule quantity of the product with the help of cost control techniques.

2.1.3 Steps for cost control mechanism

A manager should take the following steps to make cost control mechanism intelligently and skillfully: These are given below.

i. Set up targets.
ii. Measure the actual with the targets.
iii. Compare actual with the targets.
iv. Find the exact causes for the variation between the targets and the actual.
v. Take control action to eliminate these variations.

First of all cost control requires fixing the expenses target for a given period. This target should necessary be related to production targets. Particularly in respect of variable expenses. Having decided the targets. In second step is to measure the actual. The actual should be measure on the same basis as the targets. In the third step cost control is the comparison of the actual with targets. The objective of this comparison is to bring out the difference between these two sets of figures. it is not enough if just the arithmetical difference are worked out the vocations are expressed as a (+) or (-) the cost controller should be able to analyses these difference in to sufficient details and find out exact causes of variation between target and actual. The last step cost controller to keep a watch on whether or not necessary action is being taken to eliminate the variations and actual are brought close to the targets.[3]

2.1.4 Essentials for success of cost control (mechanism)

There are certain basic factors which should be taken care of making success of cost control mechanism.

[3] Welsch Gleen A. "Budgeting Profit Planning and control", Prentice Hall of (India PV Ltd. New Delhi 1992), pp. 261-262

i. Proper fixation of targets.
ii. Timely presentation of comparison
iii. Periodical review of results.

First step the target should always be fixed up in consultation with the individual responsible for achieving the target. It target is not fixed then whole objective of cost control mechanism will there y defeated second step the comparisons between the targets and the actual should be presented. Sufficiently in time for necessary action to e taken, information delay is information denied. If a considerable time elapses between happing of events and reporting, opportunity for taking appropriate action ma be lost or some wrong decision may be taken by management in the absence of information. Third step the report should draw management is attention to exceptionally good or bad performance so that management by exception may be carried out effectively. The aim should be to bring to light the factors leading to increase in cost rather than to punish people to take the remedial action to improve the performance in future.[4]

2.1.5 Cost Control System in Nepal

Nepalese management, whether in public enterprises or private enterprises, has not as yet effectively utilized the tools of cost control for the purpose of improving the organizational performance. It is because due to the virtual absence of the atmosphere of cost consciousness for the sake of efficient utilization of resources, and they are not required to earn a predetermined rate of return on the capital employed.

Nepalese managers seem to be living in the world of panic stricken adhoc cost decision rather than making endeavors to wards proper planning and control of costs. The information system prevailing in Nepalese enterprises does not even seem adequate to properly record the historical costs. Predetermination of cost and the timely provision of control reports is just possible from the management information system operating in them. Must of them even lack the basic cost accounting

[4] Swaminathan, "Lecture on Costing". pp 345-349

organization and carry on their operations without any cost information what so ever, very much like shots in the dark.

Nepalese managers seem to follow the easy way out of their financial difficulties even at the cost of consumers. they resort to simple strategy of price inflation.[5]

2.2. Analytical tools definition, explanation, and formula used.

There are various analytical tool's are available for effective cost control like as personal supervision, internal reports, brake even analysis, budgetary control, material cost control, overhead cost control, labour cost control and standard cost control but among them the following important tools will be used in this study.

2.2.1 Cost Volume Profit Analysis

The relationship between cost, volume and profit is known as cost volume profit analysis it is an analytical tools for studying the relationship between volume, cost price and profit. It is also an important tool used for the controlling cost in a business. There are three factors of cost volume profit analysis which are dependent on one anther. For example profit depends upon sales, selling price will depends upon the costs, and cost depends upon the volume of production.[6]

C.V.P. helps to determine the minimum sales level to avoid losses and the sales volume at which the profit goal of the firm will be achieved. It also helps management to choose the most profitable combination of costs and volume. C.V.P. analysis can be used by a dynamic management to predict and evaluate the implication of its short run decisions about fixed and variable costs volume and selling price for its profit plans on a continuous basis. It is also provides the answer to question such as:

i. Which product or product mix is most profitable?

ii. Which product or operation of plan should be discontinued?

[5] Govind Ram Agrawal. "Cost Control Aspects". pp 39-40

[6] Ratana M. Dongol, "Management Accounting", 2nd Edition, M.B.A. 1st Year, pp. 49-50

iii. What will be the effects of changes price? and so no.

2.2.2 Break Even Analysis

Break even analysis is an analytical techniques used to study C.V.P. relationship. It shows the relationship between the costs and profits with respects of sales volume. It is an effective reporting system. BEP analysis is a powerful instrument in the hands of policy makers who makes policy for decision making, cost control and maximize profit.

The term break even analysis is interpreted in the narrower as well as broad sense. Used in its narrower sense, it is concerned with finding out the break even point, i.e. level of activity where total cost equals total selling price, used in its broader sense, it means that system of analysis which determines the probable profit at any level of production.[7]

The break even points means the level of output or sales which makes no profit or loss. In other words in which point total revenue equals to total cost. That point is called bread even point. In that situation profit is zero. If the actual volume of sales is higher than the break even there will be profit and actual volume of sales is lower than break even there will be loss. For the break even point to occur, it is necessary that the firm has some fixed costs and some variable cost.

Break even formula.

Break even point of business can be determined by following simple algebraic formula.

$$\text{Break Even Point is Unit} = \frac{\text{Total Fixed Cost}}{\text{CMPU}}$$

$$\text{Break Even Point, in Rs.} = \frac{\text{Total Fixed Cost}}{\text{PV Ratio}}$$

$$\text{Where, PV ration} = 1 - \frac{V}{S}$$

[7] Jain S.P. and K.L.Narang. "Cost Accounting". Thirteenth Edition, p

CMPU = Selling price per unit – Variable cost per unit

2.2.3 Margin of Safety

Margin of safety is the margin by which the actual volume of sales exceeds the level sales. In other words the margin of safety is the difference between the total sales and the sales at the break even point. The size of the margin of safety shows performance of a business enterprises. A business enterprises high margin of safety shows better performance. It can safe position in competition market because it can make profit or increase earning capacity. Further low margin of safety indicated high fixed costs and profit can not be made unless there is a high level of activity to absorb the fixed cost. The margin of safety can be calculated in the following manner.

Margin of Safety = Total sales – Break even sales

$$\text{MOS} = \frac{\text{Profit}}{\text{Profit Volume Ration}}$$

If company finds that its margin of safety is unsatisfactory the following possible steps can be taken to rectify the situation.

i. Increase the selling price.
ii. Reduce the Variable cost
iii. Reduce fixed cost.
iv. Substitute the existing products.
v. Increase volume of output.

2.2.4 Contribution Margin

Contribution margin is the difference between sales and marginal cost. It is also called marginal profit or gross margin. The marginal profit provides the contribution towards fixed cost and profit. If contribution is less than fixed cost, the loss is incurred and more than fixed cost profit is incurred.

The following formula is used to calculate contribution margin:

Contribution Margin = Sales – Variable Cost

2.2.5 Contribution Margin Ration

Contribution martin or profit volume ration expresses relationship between contribution and the value of sales. It may be employed to measure the relative contribution of products or of a company or measure he relative contribution of product or company for different period. The following formula can be apply to calculate contribution margin ratio.

$$\text{Profit Volume ration or contribution margin ration} = \frac{\text{Contribution}}{\text{Sales}}$$

or, PV ration or CMR ration = C/S

2.3 Labour Cost Control

2.3.1 Introduction

Labour cost is a second major element of cost under the present political condition with a restive labour in organized industry, it is very difficult to reduce the labour cost. Therefore, proper control and accounting for labour cost is one of the must important problems of a business enterprise. The human element in laboure makes difficult the control of labour cost labour is the most perishable commodity and as such should be effectively utilized immediately. Labour, once cost, can not be recouped and is bound to increase the cost of production.[8]

Human contribution to production of goods or rendering of services represent labour cost, fundamentally, a labour cost consists of daily o weekly wages and the monthly salary paid to employees, in addition to the base pay labour cost usually includes overtime payment, leave pay, bonus, insurance such as life accident health and workmen compensation, hospital and surgical benefits for employees and other departments, retirement benefits like pensions, gratuity payment etc. So, labour cost constitute significant portion of the total cost of product. Labour cost may be excessive due to inefficiency of labour, more wastage of materials by labour due to lack of proper supervision, high labour turn, over idle time and unusual overtime

[8] S.P. Jain and K.L. Narang, "Cost Accounting", Thirteen Edition, pp. 2.102-2.107

work, inclusion of bongs workers in the wags sheet and may other related factors. Therefore, economic utilization of labour is a need of the present day industry to reduce of cost of production of the products manufactured or services rendered.[9]

Hence, control of labour cost's a important objective of management and realization of this objective depends upon the cooperation of every number of the supervisory forces the top executive to Forman. From functional print of view. Control of laboure cost is effected in a large industrial concern by the co-ordinated efforts of the following six department.

a) Personal Department

Personal department deals with the human aspects in organizational work environment. It refers to organization, motivation, and coordination to human resources towards accomplishment of desire organizational objectives. The responsibility of personal management ranges from assistance in laying down personnel policies by to management to the implementation of such polices in the work environments of the organization. Such policies may relate to employment aspects such as recruitment, selection, placement, transfer, retrenchment, and retirement. They may relate to factors such as remuneration fringe benefits incentive schemes, evaluation of performance, promotion, reward, and punishment. The policies may also relate to development aspects such as training education and job-rotation.

b) Engineering Department

The engineering department maintains control over working conditions and production method of each job. The main functions of engineering department are given below.

i. Preparation of plans and specification for each job schedule for peroration.
ii. Supervision of production activities in production departments.
iii. Inspection of parts and job successive stage of production.

[9] Trith Raj Updhaya "Labour Cost Control"

iv. Maintaining good working condition to health and efficiency of workers.
v. Conducting research and experimental work before undertaking new jobs.
vi. Maintaining safety conditions so that there may be minimum possible number of accidents.[10]

c) Time and Motion Study Department

i) Motion Study : The study deals with the management technique of studying the job by dividing it into its fundamental elements, eliminating or reducing all un necessary movements in order to do the eliminating or reducing all un necessary movements in order to do the job in the easiest way, timing them and reducing the fatigue element. The main objective is to improve the method of working by economizing efforts while maintaining efficiently.

ii) Time Study: After the motion study is completed, study of time is made for each operation to fix up standard time required to do a job.[11]

d) Time Recording Department

Recording of the time that a worker is available for work has two different aspects.

(i) Arrival and departure of the worker, i.e. his attendance in the factory

(ii) Availability of the worker for particular operations, jobs or work orders.

The recording of the workers time of arrival and departure is known as time keeping. The objective of time keeping is to keep a day to day record to the worker's attendance and to enforce discipline in attendance. Time keeping also helps in the calculation of wages of workers who are aid on a time basis besides, it enables management to determine the normal time of work, late attendance, over time and early leaving by employees and to conform to the legal requirements about daily hours of work.

[10] Jawahar Lal, "Cost Accounting", Second Edition, Tata McGraw Hill Publishing Company Ltd. New Delhi. pp 163-165

[11] Govinda Ram Agrawal, "Aspect of Cost Control", The Never Centre of Effective Management Banijay Sansar, Vol. 7, Issue 4

Availability of the worker for particular operations jobs and process during his period of attendance in a factory is known as time booking its objective is to ensure that the time for which a worker is paid is properly utilized. Secondly, it helps computation of the labour cost for different job and work order. Thirdly, it provides a basis for the apportionment of overheads among different jobs. Besides, idle time can be easily ascertained and controlled with the help of proper time booking.[12] [12]

e) Cost Accounting Department

The cost accounting department is responsible for the accumulation and classification of all cost data of which labour costs are one of the most important elements on the basis of the labor time the cost department records direct labour cost on the appropriate cost sheet or, production reports and indirect cost on the departmental records direct labour cost on the appropriate cost sheet or, production reports and indirect cost on the departmental expenses sheet. The time keeping department sends copies of daily time tickets to the cost department where they are costed and checked as to total time in a factory as well as labour distribution.

f) Payroll Department

The important activities of the pay roll department in controlling and accounting for labour cost are follows:

i. To distribute wages and salary.
ii. To maintain a permanent par roll records for each employee.
iii. To prepare departmental summaries.
iv. To compute employee wages.
v. To verify and summarize the time of each worker as shown on time cards.[13]

[12] P.K. Ghosn and G.S. Gupta, "Cost Analysis and Cost Control", pp. 148 – 149

[13] S.P. Jain and K.L. Narang "Cost Accounting", Thirteen Edition, pp. 2.136 – 2.143

Preparation of Pay roll or wages sheets.

Employment of labour and utilization of labour time must be accompanied by factory of wage payment. This involves computation of gross wags, deduction their from and calculate the net wags payable to him at last. the pay roll are either prepared weekly fortnightly or monthly according to the practice followed in the factory. The pay rolls are prepared department wise and where the department work more than one shift, for each sift separately Dabur Nepal has prepared monthly pay rolls and wags sheet. When pay roll is prepared a pay slip is made out for each worker and these are distributed to the worker a day before the before the actual date of payment.

The objective of distributing pay slip is two:

i) To enable the worker to verify the amount of wages that he will be receiving.

ii) To serve as an identification at the time of payment.

DN, pay slips or wages sheet presented as follows.

Table- 3 : Dabur Nepal Pvt. Ltd.

Pay slip
Year

Month :
Roll No. : Level : Account No. :
Name : Section :

Salaries and Allowances	
	Rs.
Basic Salary	
Provident Fund	
House Allowance	
Compulsory	
Grade	
Special Allowance	
Dashain Expenses	
Children Education Expenses	
Damkal	
Staff Welfare Fund	
Extra	

Gross Salary	
Allowable education	
Provident Fund	
House Borrowing	
Interest	
Medical Expenses	
Social Borrowing	
Provident Fund Borrowing	
Advance Bonous	
Extra Advance	
Personal Telephone	
Staff Welfare Fund	
Advance Dashain Expenses	
Other Expenses	
Total	
Net Salary	

2.3.2 Wages System

An important aspect of labour cost control is a wages system designed primarily for exercising management control over labour. The following objective should be considered in selection wages system.

i) The employer should be responsible to avoid slowdowns and work stoppages in factory.
ii) Factory administration should be economy.
iii) Stabilization of labour turn over.
iv) Minimizing of absenteeism and idle time should be controllable.

There are two system to pay wages for labour.

a) Straight Time

Straight time wages basis system is prepare by on hourly, daily weekly rate and monthly to pay wages for who depends upon the time and not upon production. If a

worker works for on overtime, the wages agreement usually provides that all hours worked of an excess, paid at a higher rate than normal rate.

It this method payment of wages workers have feelings of security and certainty for a definite wages or salary regardless of the amount of work completed or the efficiency of their work provided it is above the minimum requirements.

The time basis is still most popular wages system for workers. DN has adopted straight time wages payment system form establishment period to now.

b) Piece work

Under this method, a fixed rate is paid for each unit produced, job performed, or number of operation completed. The worker wage depends upon his output not upon spends in the factory.[14]

2.3.3. Idle Time

Loss of time which takes place during the regular hours of work is known as idle time. In other words idle time is that time for which the employer pays but from which he obtains on production idle time does not include festival, holidays, annual leave etc.

Idle time may be two types.

a) Normal Idle Time

Normal idle time represents the time, the wastage of which can not be avoided and there fore, the employer must bear the lobour cost of this time. This idle time is caused by several reasons like a time lost in waiting for materials, instruments, time cost in moving from one job to another, temporary absences from duty because of minor accidents, personal needs, tea breaks and time taken in picnic up the work for the day.

[14] Jawalhar Lal "Cost Accounting", Second Edition, Tata McGraw Hill Publishing Company Ltd. New Delhi, pp 167 - 168

b) Abnormal Idle Time

The wastage of time which can be avoided if proper precautions are taken. That is called abnormal idle time. The abnormal idle time caused by effect of following factors such as.

i) The time lost through the break down of machinery due to inefficiency of workers.

ii) The time wasted due to shortage of material on account inefficiency of storekeeper or, the purchasing department.

iii) The time wasted due to strike, fire, wind water dama etc.

Control of Idle Time

Production should be always planned and supervised so that idle time is reduce to minimum efficient worker must be apply to do work in time to reduce idle time. Idle time de to internal power failure should be reduced by keeping a proper inspection and maintenance of the power plant. Timely provisioning of materials and regular maintenance of plant and machinery will also reduce the idle time control of strike, lockout, fire and labour union also control idle time.[15] [15]

2.3.4 Over Time

When a worker works beyond his normal hours of work, that time is known as over time According to Factory "Act 1948 every worker is to be paid over time at a higher rate, generally at double the normal wage rate. If he is required to work more than 8 hours a day." the excess rate over normal wages rate is called. Overtime arise due to break down of machinery of failure of power during normal hours, absenteeism of worker in duty time. It is desire to complete the normal work in over time. Demand of the product is high in the market but factory has limited machine, labour capacity. In

[15] S.P. Jain and K.L. Narang "Cost Accounting", Thirteen Edition, pp. 2.130 – 2.132

that situation factory can not fulfill the demand of market doing work in normal time and do work in over time for fulfill the element of market.

Over time payment made to workers engaged in direct labour are treated as direct labour cost and payment of indirect labour are treated as factory overheads and payment made to the staff of selling and distribution department is treated as distribution overheads.

Control the Overtime

Working overtime hours is a very bad practice for a factory because over time wage rate is higher than normal rate. Worker will adopt the habit of postponing the work to be done in over time just to earn more wages. Expenses like lighting, cost of supervision, wear and tear of machinery etc. will increase disproportionately.

So control of overtimes is most necessary a factory.

A proper control should be exercised during normal hours to ensure that overtime is not allowed when normal output is not achieved during normal working hours. A statement of overtime work should be prepared with the advise of related authority. Normal rate per hour and overtime rate per hour of output should be compared and excess of overtime rate should be try to decrease at normal hour rate for reduce over time cost. I possible in a factory on upper limit of over time should be fixed for each category of workers and periodical reports overtime work should be sent to the top level management for taking corrective action.[16]

2.3.5 Labour Turnover

Laboure turnover is defined as the engagements and losses in the lobour complement as related to the total numbers employed at the beginning of the period labour turn over denotes the percentage change in labour forces of an organization. Every factor should see that its labour turn over percentage is kept at the minimum. Increase in

[16] Jawalhar Lal "Cost Accounting", Second Edition, Tata McGraw Hill Publishing Company Ltd. New Delhi, pp 179 - 180

labour over denotes that labour is not stable and there are frequent changes in the labour forces because of new workers engaged and workers who left organization. So high labour turn over affect the working efficiency of the factory and low turn over effect adversely of high turn over.

There are three methods of measurement of labour turn over.

i) Separation Method

This method is calculating on the basis of number of worker left during a period and average number of worker during a period. This method does not take consideration the fact of surplus labour. It will give incorrect result when the surplus workers are discharged because labour turn over calculated in this way will high. The following formula can be used for calculating labour turnover by separation method.

$$\text{Labour Turn Over} = \frac{\text{No. of employees left during a period}}{\text{Average number of employee in a period}} \times 100$$

ii) Flux Method

Flux method is calculating only the basis of number of worker left and number of worker joined. This method should be applicable when the factory is not expending. In such a case, many new workers are engaged and there may be no separation. When calculating labour turn over from flux method following formula can be use.

$$\text{Labour Turn Over} = \frac{\text{No. of worker left + No. of worker joined}}{\text{Average number of employee in a period}} \times 100$$

iii) Replacement Method

In this method only mind number of workers replaced during a period, not mind number of workers left job during a period. It gives correct labour turn over when factory is expanding. So, this method is most reliable method of above of them.[17]

$$\text{Labour Turn Over} = \frac{\text{No. of worker replaced in a period}}{\text{Average number of employee in a period}} \times 100$$

[17] Ratana M. Dongol, "Management Accounting", 2nd Edition, M.B.A. 1st Year, pp. 49-50

2.4 Standard Costing

2.4.1 Concept and Definition

Standard cost is predetermined cost. It is a determination in advance of production, what a product should be cost, it is a measure of acceptable performance, established by management as a guide of certain economic decision.[18]

The costing terminology of charted institute of management accountants, London defines "Standard costing is the predetermined cost based on a technical estimate for materials, labour and overhead for a select period time and for a prescribed set of work conditions.

A standard cost has been defined by the chartered institute of management accountants London as "A predetermined calculation of how much costs should be under specified working conditions."

From above given definition it is clear that standard cost is predetermined cost. It is built up by correlating standard quantity (of machine time, labour time and material) and forecast of future market trend for price standard (price of materials, wage rates, machine cost per hour etc.)

When standard cost are used for the purpose of cost control, the technique is known as the standard costing. It is important to determine what a product should cost, and if the actual cost is more than the determined cost then why it is so.

Standard costing aims is to reduce the wastage and increase efficiency in performance through setting up standards for production expenses and production performance.

I.C.M.A. London had defined the term of standard costing " As the preparation of standard cost products and services."

[18] Richard M. Lynch, Robert W. Williamson, "Accountancy for Management Planning and Control "Third Edition, p. 194

Eric L. Kholer has defined "Standard costing is the preparation of standard costs and applying them to measure the variations from actual costs and analysis the causes of variations with a view to maintain maximum efficiency in production." From the above definition it is clear that the techniques of standard costing may be summarized as below:

i. To fixed the standard cost for material, labour and overhead.

ii. To find out actual cost.
iii. To compare the actual cost with standard cost.
iv. To analyses the variance between standard cost and actual cost for taking the appropriate action where necessary so that maximum efficiency may be achieved.[19]

The system of standard costing is more commonly applied in an industries where the production is repetitive type i.e. where, the manufacturing operation are limited in number and the range of product is large.

DN production process of all products are reparative type. It's manufacturing operation are limited and the range of products is large so standard costing is very essential for controlling cost.

2.4.2 Objective of Standard Costing

The following are the major objective of standard costing.

i) To help in making budgets and evaluating managerial performance.
ii) To help in control of excess cost like as material, labour and overhead etc.
iii) To simplify the tasks of tracing costs to products for inventory valuation purpose.
iv) To provide a prediction of future costs that can be used decision making.

[19] Terminology of Cost Accountancy (London Institute of Cost and Management Accountants, 1996 for definitions of Concept Related to Standard Costing

2.4.3 Type of Standard Costing

There are three types of standards.

i) Basic Standard

It is a long term standard which would remain unchanged over the years. It is also known as budgetary standard, fixed standard, and static standard. This standard is fixed for long period so as to help forward planning. It is established for some base year and not change for a long period of time as material prices, labour rates. Basic standard is not use any practical life because it is constant over a long period of time and not adjusted to current market condition. So this type of standard is not suitable for cost control point of view.

ii) Expected or Attainable Standards

This type of standards based on expected performance and represent cost that should be incurred under forth coming efficient operating conditions, normal losses are allowed for while setting expected standard. Actual costs are compared against expected standard costs in order to isolate the variances. Managers can hope to achieve and even better expected standards. They can effectively apply the principle of "management by exception". Moreover, such standard exert desirable motivational impact on the employees. Hence, this type of standard is best suited from cost control point of view because this standard reveals real variances from the attainable performance.

iii) Ideal Standard

It is based on the best operating conditions, no breakdowns, no material wastage, no stoppages in work. This standard is extremely tight and available capacity is fully utilized. It is not likely to e achieved because ideal condition of performance will not prevail.[20]

[20] Ratna Man Dongol "Management Accounting" M.B.A. 1st year page no. 315 to 316

2.4.4 Variances Analysis

Control is a very important function of management control through management ensures that performance of the organization conforms to its plans and objective. Analysis of variance is helpful in controlling the performance and achieving the profits that have been planned.

The difference between actual cost or profit or sales from the standard cost or profit or sales is known as "Variance". If actual cost is greater than standard cost, the variance is known as adverse or unfavorable where as if actual cost is less than standard cost the variance is known as favorable. The favorable and unfavorable variances are also known as credit and debit variances respectively.

The Following three variances are the main variances for practical purpose.

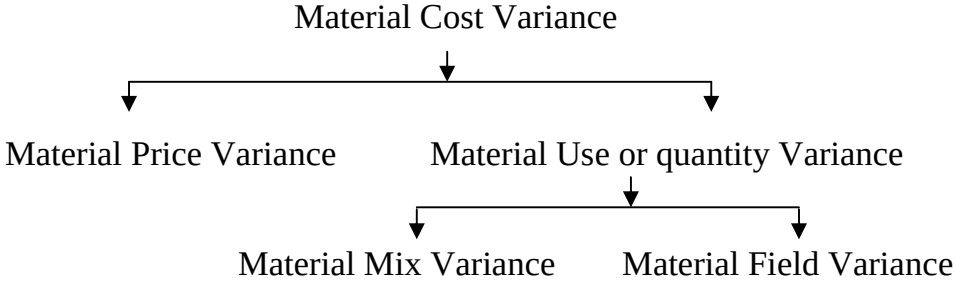
2.4.4.1 Direct Material Variances

The difference between actual direct material and budgeted direct material is known as direct material variances.

In case of material following may be variance.

- Material cost variance
- Material Price variance
- Material use variance
- Material mix variance
- Material yield variance.

The following chart shows the division an sub division of material variances.



i) Material cost variance (MCV)

The difference between the standard cost of material specified and the actual cost of material used is known as mat material cost variance. Material cost variance is generally caused by either or both of two factors derivations of price and quantity of materials from the standards specified of materials.

It is computed as follows.

MCV = SQ x SP – AQ x AP or,
MCV = MPV + MUV or MQV or,
MCV = MPV + MMV + MYV

ii) Material Price Variance (MCV)

The difference between actual price paid and standard price specified is known as the material price variance. This variance may be caused by several reasons like as increase in market price of material, emergency purchase in smaller quantity of material, failure to secure discount on bulk purchase and failure to secure cash discount provided for while setting standards.

It is computed as follows : MPV = AQ (SP-AP)

iii) Material Usage variance (MUV) or

Material quantity variance (MQV)

It is that portion of the material cost variance which is due to the difference between the standard quantity of materials specified for the actual output and the actual quantity of material used. The wage variance may have been caused by following factors such as : difference in quality of material use in production, inefficiency in production due to lack of necessary skill in workmen, abnormal wastage through defective machinery and wrong specification of materials by planning engineer etc. It is calculated as follows:

MUV = SP (SQ – AQ)

Where more than one year of material is used in the process, material mix variance (MMV) and material yield variance (MYV) are worked out in the place of material usage variance.

iv) Material Mix Variance (MMV)

The material mix variance is represented by the difference between the actual quantity of respective materials valued at the standard price for each, and the actual quantity of material in standard proportion valued are the standard price for each.

I case of MMV two situations may arise:

i) Actual weight of mix and the standard weight of mix do not differ. In such a case, material mix variance is calculated as follows.

   Standard unit cost (Standard quantity – Actual quantity)

   In the standard is revised due to shortage of material, the material mix variance is calculated as follows:

   Standard unit cost (Revised St. quantity actual quantity)

ii) Actual weight of mix differs from the standard weight of mix. In such case, it is calculated as follows.

$$\frac{\text{Total Weight of Actual Mix}}{\text{Total Weight of (Revised) st. mix}} \text{ x St. cost of revised st. mix}$$

The material mix variance may arise from a variety of causes such as change in market condition, shortage one of the material in the mix, delay in material supply and so on.

V) Material Yield Variance (MYV)

The difference between the standard yield specified and the actual yield obtained is known as material yield variance. This variance measures the abnormal loss or saving of materials. It is important in case of process industries where certain percentage of loss of materials inevitable. If the actual loss of materials differs from the standard

loss of materials, yield variance will arise. This loss may result in the following two situations.

i) When standard and actual mix does not differ in such case it is calculated as follows.

MYV = St. Rate (Actual yield – Standard yield)

Where, st. rate = $\frac{\text{Standard cost of St. mix}}{\text{Net st. output} - \text{St. loss}}$

ii) When actual mix differs from standard mix.

MYV = St. Rate (Actual yield – Revised st. yield)

Where, $\frac{\text{St. Cost of revised st. mix}}{\text{Net st. output}}$

The yield variance may be caused by such factors as: defective method of operation, sub-standard quality of material purchased, lack of proper supervision etc.[21]

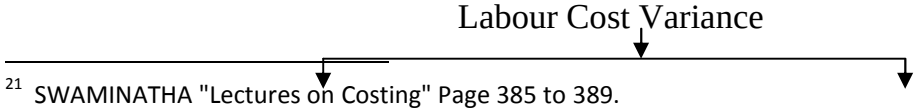
2.4.4.2 Direct labour Variances.

The difference between standard labour and actual labour is known as direct labour variance.

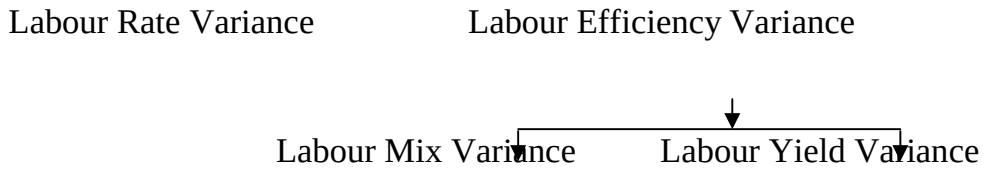
In case of labour, the following may be variance.

- Labour Cost Variance.
- Labour Rate Variance
- Labour Efficiency Variance
- Labour Mix Variance
- Labour Yield Variance
- Labour Idle Time Variance

The following chart shows the division and sub division of labour variance.



[21] SWAMINATHA "Lectures on Costing" Page 385 to 389.



i) Labour Cost Variance (LCV)

The difference between the standard wage specified and the actual wage paid is known as direct labour cost variance it is also known as wages variance. Cost of labour is determined by on the basis of labour time and wages. It is calculating with the help of following formula:

LCV = ST x SR – AT x AR

ii) Labour Rage Variance (LRV)

The difference between the actual and standard rate of wages multiplied by the actual hours of labour, time represents the labour rate variance. It is calculating with the help of following formula:

LRV = AT (SR-AR)

Labour rate variance may have been caused by such factors as grade of labour overtime rate for urgent completion of job and change in the basic wage rates etc.

iii) Labour Efficiency Variance (LEV)

The difference between the actual labour time expended to any work and the standard labour time specified valued at standard wage rate is known as labour efficiency variance. The computation of the variance is as follows:

LEV = SR (ST-AT)

Labour efficiency variance may have been caused by such factors as: inefficiency work man, machinery break down, lack of proper supervision, unsatisfactory working condition, and hours last in waiting etc.

iv) It is part of labour efficiency variance. The variance which is due to the difference between standard labour grades specified and the actual labour grades utilized is known as labour mix variance. It is calculated as follows:

$$LMV = \frac{\text{Actual labour mix}}{\text{St. labour mix}} \text{ x St. cost of st. mix} - \text{St. cost of actual mix}$$

The labour mix variance may be caused by following factors as: different grades of labour and inadequate training of employees etc.

v) Labour Yield Variance (LYV)

The difference between standard output expected and actual output is known as labour yield variance.

It can be calculated as follows :

LYV = (AY – SY) x St. cost per unit of output

vi) Labour Idle Time Variance

It is that portion of labour cost variance which is abnormal idle time of workers. This variance is shown separately to show the effect of abnormal causes affecting production like power failure, break down of machinery and shortage of materials etc.[22]

It can be expressed as follows:

Labour idle time variance = Abnormal idle time x SR

2.2.4.3 Overhead Variance

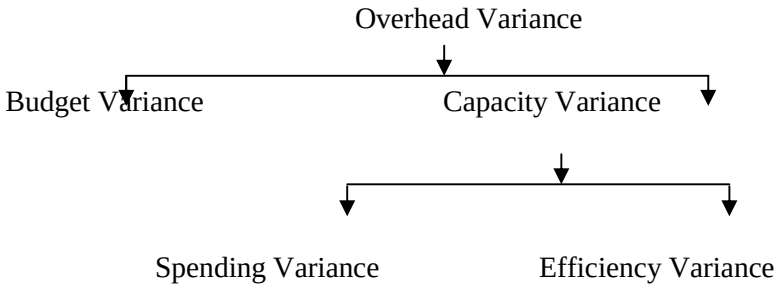
In case overhead following may be variance

- Overhead Variance
- Capacity Variance
- Budget Variance

[22] P.K. Ghosh G.S. Gupta. "Cost Analysis and Cost Control", pp. 230-232

- Efficiency Variance
- Spending Variance

The following charts shows the division and sub division of overhead variance.



i) Overhead Variance

The difference between the standard cost of overhead allowed for the actual output achieved and the actual overhead cost incurred is know as overhead variance. It can be expressed as follows:

Overhead Variance = Actual O.H. – budgeted O.H.

ii) Capacity Variance

The portion of the overhead variance which is caused by a difference between the actual usage of plant capacity and the planned usages of plant capacity is known as capacity variance. It is calculated as:

Overhead capacity Variance = FC + [(UVC x SQ)-(SRxSQ)]

iii) Overhead Budget Variance

The difference between total overhead cost actually incurred and standard overhead cost for output achieved is know as overhead budget variance it is presented as follows :

Oh budgeted variance = Actual Oh. cost – budget Oh. cost or,

Spending variance – Efficiency variance

iv) Overhead Efficiency Variance

The difference between the actual hours worked and the standard hours for actual production is known as overhead efficiency variance. It is calculated as follows :

Efficiency Variance : UVC (AQ – SQ)

v) Spending Variance

The difference between actual rate and standard rate specified is known as spending variance it is calculated as follows :

Spending Variance = (AQ x AR) [FC + (UVC x AQ)]

Overhead variance may be caused by several reasons like as : change in price of overheads, excessive or under utilization of machine capacity, breakdown, Labour absenteeism, strikes, or shortage of labour, change in customer demand and idle time etc.[23]

2.5 Inventory Control

Every business organization however big or small has to maintain some inventory Inventories service as caution to observe the shocks of errors in demand forecast and also provides more efficient use of the resources. Inventory requires valuable space, consumer taxation, and insurance charges.

A significant portion of the capital invested in inventories remains till the items present in stock are not used. Inventory for any organization is a necessary evil and requires careful planning and formulation keeping in view the best interest of the organization.

The techniques of maintaining the size of the inventory some desired level keeping in view the best economic interest of an organization is known as inventory control. Inefficient procedure in purchasing and stocking of inventories result in an unbalanced inventory. Causing some items out of stock and other over stocking. Such in efficiencies ultimately have an adverse effect up on profit. Such inefficiencies are controlled. Only through planning ordering and scheduling of materials used in the manufacturing process more specially. "The purpose of inventory control is to stock

[23] W.M. Hearpar Cost Accounting OP. Cit. Also See J. Batty Cost and Management Accountancy for Students (Heineman, 1968) Page 137-138

an adequate amount of inventory on one hand and on the other hand with minimum storage and handing lost, obsolescence and deterioration lost, insurance and interest charges and risk of price level changes are to be minimized.

2.6 Cost reduction

Cost reduction is to be understood as the achievement of real and permanent reduction in the unit cost of goods manufactured or, services rendered without impairing their suitability for the use intended.

It means to say that reduction must be a real one in the course of manufacture or services rendered. Real cost reduction comes through greater productivity. Reduction in the price of inputs and improvements in the method of production form research work.

2.7 Budgetary control

Budgetary Control is planned to assist the management in the allocation of responsibilities and authority to aid in making estimates and plans for future. To assist in analysis of variations between estimated and actual results and develop basis of measurement or standards with which to evaluate the efficiency of operations.

2.8 Review of Related Studies

In this study, efforts has been made to study the cost control mechanism of DN. Thus review focused on the literature relation to cost control mechanism of Nepalese public enterprises along with the study relating to DN.

Mr. Shyam Bahadru Khadka carried out of his study " study on Economic Performance and pricing policy to public enterprises" and observed that the efficiency of the enterprises creates the burden it general people in the from of highs price in comparison to cost on Nepalese Public enterprise. It is said that all enterprises are

suffering from under utilization of capacities this has become the prime reason of high cost and pricing, low cost and low pricing is recommended by him.[24]

Mr. Mukunda Prasad Dahal has made s study on capacity utilization of public enterprises in Nepal and has conducted that, the public enterprises on Nepal have been suffering from the problem of non availability of raw materials. Which has resulted the low capacity utilization of man facturing capacities there in. The lake of skilled labour also is the major factor of low capacity utilization higher price of products of enterprises increased the he inventory of unsold goods. It cerates the problem to utilize the capacity in the succeeding and next following years. He has suggested that utilization the full capacity of machine and reducing the price by recruiting. skilled labuour and replacement of new machine and innovated technology to some extent, the problem of unemployment may be solved.[25]

Management consultant and company was conducted a study on the performance of public enterprises in Nepal. This study has pointed out the poor performance of Nepalese public enterprises and due to mismanagement of available resources, lack of operational objectives, bas implementation of long term planning, not use of modern and reliable tools of budgetary control, management theories and devices, cost control techniques not proper allocation between current and fixed assets etc.[26]

Mr. Suraj Sing Thapa had drawn secondary data from the central office of DN and he adopts only ratio to evaluate the performance of DN he gave major findings were as follows.

Profitability condition of DN was in fluctuation trend. Sometimes it was widely high and some time it was below the satisfactory point. It is due to cost of production,

[24] Shyam Bahadur Khadka, " Study on Economic Preformance and Pricing Policy of Public Enterprises"

[25] Mukuna Prasad Dahal, "A study on Utilization of Production Capacity, Unpublished Dissertation" Submitted to Kirtipur Campus. 1982. p. 32

[26] Management Consultant and Company, "Economic and Management Study of PEs in Nepal" Kathmandu.

administration and selling and distribution expenses, mismanagement of resources allocation have responsible in bringing down the profits of DN.[27]

The case study of DN. was also under taken by Jitendra Prasad Upadhaya, on the basis of this study, he revealed that profitability position on DN not good means extremely poor. From liquidity point of view also not a satisfactory result which was indicating poor working capital policy. Capital point of view also, unsatisfactory result but efficiency was indicating efficient utilization to some extent. After observing the fact and figure Mr. Upadhay suggested to cut down the excess cost of production, administrative and selling expenses and highly financial expenses and specially emphasized for establishment the spar at department for cost planning and control.[28]

A study was conducted by Mr. Dhurba Raj Pokheral on "A study on inventory management in DN. He observed that the DN procurement and consumption rate of raw material wad varied and different factor wean responsible for so procurement and production policy of DN was defective the company was facing the problem of overstocking of RM and finished goods. As a consequent, W. Capital was showing high and selling price was in increasing trend year by year.[29]

Although this study are related with financial performance, inventor management. But or study is related with cost control, financial performance and stocks review is also essential for cost control.

The above review of literature studies clearly pointed out that most of the public enterprises in our country suffering from high cost of production high price of products, over staffing, over selling and distribution cost and excess overhead cost. So cost control mechanism is the most important factor for every enterprises for controlling cost. It helps minimizing the cost by use of several techniques like as standard costing, BEP analyses, material cost control labour cost control. Cost minded manager must have knowledge about cost control tools and techniques as … as concerned with cost control analysis.

[27] A Thesis "The Financial analysis of Mfg. Public Enterprises in Nepal" A case study of JCF submitted to T.U. 1996

[28] Upadhaya, Jitendra Prasad, "A Financial analysis of Manufacturing Public Enterprises in Nepal" A Case Study of JCF 1993

[29] Mr. Dhurrab Raj Pokharel, "A study on Inventory Management in JCF", An Unpublished Master Dissertation Submitted to Faculty of Management, T.U. 1992

CHAPTER – III

RESEARCH METHODOLOGY

Cost control mechanism in the Dabur Nepal Pvt. Ltd. Is the major factor of high price so there is need of effective cost control system in the factory. The basic objective of the study is to analyze the cost of DN and to recommend necessary suggestion for the improvement of cost control. To fulfill this objective of the study, appropriate methodology as been followed. So this chapter concerned with the research methodology applied in this study. This study covers research design, sources of data, data collection procedures, data processing and tabulation and analytical tool used.

3.1 Research design

This present study related with "cost control mechanism of DN has been prepared on the basis of five years secondary data and analytical research design used to access and analyze the highest cost of production. This exploratory design has been used to explore and find out the trend of cost, production, sales, and the relationship among them.

3.2 Sources of Data

The following sources have been used to collect necessary data.

i) Annual report of DN which comprised balance sheet and income statement.
ii) Published reports and bulleting of the factory.
iii) Unpublished official records.
iv) Relevant previous studies and publication.

3.3 Data collection procedure

For the completion of any thesis report reliable data and information are very essential because, with out reliable data and information a thesis report can never be perfect and can never be able to fulfill the objective of the thesis report. Therefore, for my thesis report, the required data are secondary and it is collected from the account section, production section, personal management department of DN. Verification and clarification of data has been done through personal interview and discussion with concerned authority where ever it is possible.

3.4 Types of Data

Secondary data are only used in this thesis report. It has collected from annual report, bulletins and reverent previous studies and publication of DN

3.5 Data processing and Tabulation

First of all, collection data are compiled organized, tabulated and processed according to the need and objective or the study. Data for five years 2060/061 to 2064/065 presented on table according to time series.

3.6 Analytical Tools used

Since the study is concentrate on cost control aspects of DN. Some importance cost control tools/techniques like cost volume profit analysis, labour cost control and standard costing have been used. There are also simple statistical tools like average, percentage trend and correlation analysis have been used.

3.6.1 Cost Volume analysis

The DN analysis helps in finding out the relationship of cost and revenue to volume. It is a device used to determine the usefulness of profit planning process of the firm. Really speaking there is interrelationship between cost volume profit and profit planning. However, it should be noted that the formal profit planning and control involves the use of budgets and other forecasts and CVP analysis simply provides an

overview of the profit planning process and helps to evaluate the purpose and reasonableness of such budgets and forecasts. CVP helps to determine the minimum sales level to avoid losses and sales volume at which the profit goal of the firm will be achieved. It also helps management to choose the most profitable combination of costs and volume. CVP analysis can be used by a dynamic management of its short run decisions about price for its profit plans on a continuous basis.

3.6.2 Labour Cost Control

Labour cost is one of the important tools for cost control analysis. Labour, once lost, can not be recouped and is bound to increase the cost of production. So, labour cost constitute a signification portion of the total cost of a product. It may be excessive due to inefficiency of labour, more wastage of material by labour due to lack of proper supervision, high labour turnover, idle time and unusual overtime work, inclusion of bogus workers in the wages sheet and many other related factors. Therefore, economic utilization of labour is a need of the present day industry to reduce the cost of product manufactured or service rendered.

3.6.3 Standard Costing

Standard costing is a very important system of cost control. It is important to determine what a product should cost, and if the actual cost is more than the determine cost, then why it is so. Standard costing aims at eliminating the wastage and increasing efficiency in performance through setting up standards for production expenses and production performance. A standard Costing system eliminates the effect on job cost of fluctuation in volume of output by separating the cost of idle facilities because standard costs have been define as the normal costs or normal production efficiency at a normal level of output. The system of standard costing an be more commonly used in inductees producing standardized products which are repetitive in nature.

3.6.4 Trend Analysis

In cost control analysis, the direction of changes over a period of years is crucial important. Trend analysis of ration indicates the direction of hinge. This kind of analysis is particularly applicable to the items of profit and loss account.

Trend analysis is a significant tool of horizontal cost analysis. It is a dynamic method to indicate the change and derivations in items of cost statements. Trend analysis help of identify the controllable in terms of given period and future forecast can be made for on going concern. It is one of the useful tools in making a comparative study of the cost statement of the number of years. It makes easy to identify the change in an item or in group of items over a period of time and to draw in a group of items over a period of time and to draw the conclusions regarding the changes there on.

Trend relationship is the ratio analysis and interpretation of the items of the comparative cost statements of different period. Trend analysis reveals the direct of changes or is guide to the movements of different periods. This way the favorable or unfavorable situation of business is being revealed.

3.6.4.1 Utility of Trend Analysis

The analysis of trend is great significance for the DN which are given below.

i) It helps in the analysis of past behavior of a variable.

Analysis of past data disclose the effect of various factor on the variable under study. These studies isolate and analysis the effect of various sets of homogenous factors on the problem under study.

ii) It helps in forecasting :

The analysis of past conditions is the basis of forecasting the future behaviors of the variable under study.

iii) It helps in evaluation of current achievement :

The review and evaluation of progress made on the basis of a plan are done on the basis of time series data. Similarly, the evaluation of our policy of controlling inflation

and price rise is done by the study of various prices indices which are based on analysis of time series.

iv) It helps in making comparative studies

Once the data are arranged chronologically comparison between on time period and another is facilitated. It provides a scientific basis for making comparison by studying and isolating the effect of various components of a trend.

3.6.4.2 Measurement of Trend Analysis

There are two important method for trend analysis measurement which are given below.

a) **Graphic Method**

This is the simplest method of studying trend. The procedure of obtaining a straight line trend by this method is given below:

i. Plot the time series in a graph
ii. Examine carefully the direction of the trend based on the plotted information.
iii. Draw a straight line which will best fit to the data according to personal judgment. The line now shows the direction of the trend.

The following points must be kept in mind in drawing a graphic curve.

i. The curve is smooth either a straight line or a combination of long gradual curves.

ii. The number of points above the line or curve is equal to the points below it.

iii. The sum of vertical deviations of the point above the smoothed line is equal to the sum of the vertical deviations of the points below the line

iv. The sum of the square of the vertical deviations of the observations form the trend should be as small as possible.

b) Method of last square

This method is most widely used in practice. It is a mathematical method and with its help a trend line is fitted to the data is such a manner that the following two conditions are satisfied.

i) $\sum (Y-Y_0) = 0$

i.e. the sum of deviations of the actual values of Y and the computed values of Y is Zero.

ii) $\sum (Y-Y_0)^2$ is least

i.e. the sum of the squares of the deviations of the actual and computed values is least from this line and then the name of least square. The line obtained by this method is known (as the line of best fit)

The method of least squares may use to fit a straight line trend. The straight line trend is represented by the equation.

$Y = a + bx$

Where,

Y = estimated values of dependent variables.

x= time in trend analysis

a= Y -intercept

b = slope of trend line.

whenever, fit any straight line trend by least squares method. Three things should be specified.

(i) Which year was selected as the origin?

(ii) What is the unit of time represent by x?

(iii) In what kind of units is Y being measured. Is it production in tones, sales in rupees, prices in rupees etc. [31]

3.7 Correlation

Correlation is a statistical technique which measures and analyses the degree or extent to which two or more variables fluctuate with reference to one another. Correlation thus denotes the interdependence amongst variables. The degree of relationship between the variables under consideration is measured through the correlation analysis. The measure of correlation called the correlation coefficient or correlation index summarizes. The correlation or correlation index summarizes. The correlation analysis refers to the techniques used in measuring the closeness of the relationship between the variables.

In business, correlation, analysis enables to executive to estimate costs, sales, prices and other variables on the basis of some other variables on the basis of some other series with which there costs, sales or prices may be functionally related. Some of the guess work can be removed from decision when the relationship between a variable to be estimated and the one or more close and reasonably invariant. However, it should be noted that coefficient of correlation is one of the most widely used and also of the most widely" abused statistical measures. It is abused in the one sometimes over looks tile fact that correlation measures are nothing but the strength of linear relationship and that is does not necessarily imply a cause effect relationship.

3.7.1 Use of correlation

The use of correlation to the fields of business and economics for following manner.

(i) Economic theory and business studies show relationship between variables like price and quantity demanded, advertising expenditure and sales etc. The correlation analysis helps in deriving precisely the degree and direction of such relationships.

(ii) The relationship between variables are studies under various economic laws or the concepts like the law of demand and the elasticity of demand. The advantage of statistical techniques of correlation is that the average of

relationship in a series can be summed up in a single value of changes called the coefficient of correlation.

(iii) The effect of correlation is to reduce the range of uncertainty of our prediction. The prediction based on correlation analysis will be more reliable and near to reality.

(iv) The concept of regression and ratio of variation are also based upon the measure of correlation.

3.7.2 Coefficient of correlation

Coefficient of correlation is calculated to study the extent or degree of correlation between tow variable. The correlation between tow variable does not mean that their relationship is functional or constant. If the value of a variable is known, it is not always possible obtain to exact value of the other variable. This can be done only where there is linear relationship between the two variables. In these two variables, one relating to radii of various circles and the other relating to their areas.

The coefficient of correlation between the two limits of + 1 and -1. When there is positive correlation its value is + 1 and. when there is negative correlation its value is -1. Its mid-point is zero, which indicates absence or there is no correlation. As the value of this coefficient decreases from the. upper limit of + 1. The extent of positive correlation between the two variables also declines. When it reaches the value of zero it indicates complete absence of correlation and when it goes further down in negative values (less than zero). it indicates negative correlation.

Karl Pearson's has given a formula for the calculation of coefficient of correlation. According to him the coefficient of correlation of two variables is obtained by using following formula.

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \times \sum y^2}}$$

where, $x = (X - \overline{X})$ and $y = (Y - \overline{Y})$

r = (Product moment) correlation coefficient

CHAPTER – IV

DATA PRESENTATION AND ANALYSIS

4.1 Cost Volume Profit Analysis:

Cost–volume-profit analysis is an analytical technique studying the relationship among volume, costs (fixed and variable), prices and profits. It is a device used to determine the usefulness of the profit planning process of the firm. In fact, the entire field of profit planning has become associated with the CVP interrelationships. However, it should be noted that the formal profit planning control involves the use of budgets and other forecasts and CVP analysis simply provides on overview of the profit planning process and helps evaluate the purpose and reasonableness of such budgets and forecasts As a starting point in the cost control, CVP helps to determine the minimum sales volume to avoid losses, and the sales: volume at which the profit goal of the firm will be achieved. It helps management to seek the most profitable combination of costs and volume.

The CVP analysis is immense inutility to management as It provides an insight into the effect and inter relationship of the factors which influence the profits of the firm. It is with the help of the CVP analysis that the accountant is enabled to present facts and figures in accurate report and intelligible chats to management for action.

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Table No. 4 : Cost volume profit analysis (in DN)

('000)

Year	T. Sales	T. Variable costs	T. fixed costs	Contribution margin	P/V ratio	B.E.P. sales	MOS
2063/064	798473	707860	146312	81613	10%	1415330	(622587)
2064/065	686568	633590	166771	52978	8%	2161366	(1474798)
2065/066	688032	635755	193815	52277	8%	2457086	(1769055)
2066/067	911377	786373	204997	125004	14%	1494588	(5832211)
2067/068	960392	802534	205876	157858	16%	1252528	(292137)

From the above table, it is absorbed that the sales revenue of DN showed in FY 2064/065 & 2065/066 were decreasing trend and FY 2066/067 & 2067/068 were increasing trend on the comparison of base FY 2063/064. The sales revenue was maximum of Rs. 960392 in FY 2067/067 where as it was minimum of Rs. 686568 in FY 2064/065.

Variables costs are those cost which has direct relationship with volume. If the sales volume increase variable costs also increases and vice versa. In DN variable costs were decreasing in FY 2064/065 and 2065/066 on the comparison of base FY 2063/064 so, sales volume also decreased due to competitive market, political situation, lack of modern technology, but now DN have improved some situation to meet competitive market. So, sales volume of DN in FY (2066/067 & 2067/068 were increasing trend and variable cost of DN also increased due to increases in wages of labour, cost of material excise duties and other etc.

The fixed costs are period cost and it trends to be constant for a given period of time after the given period of time the fixed cost also varies. The fixed cost of DN also varies year after year. It is increasing continuously. The fixed cost were increasing due to change of machinery, equipment's, depreciation and other fixed assets etc. The fixed cost of DN in FY 2063/064 to 2067/068 were Rs. 146312, Rs. 16677, Rs.

193815, Rs. 204997 and Rs. 205876 respectively. It was minimum in FY 2063/064 and maximum in FY 2067/068.

4.1.1 Break even analysis

The break even point determines the equilibrium point where total revenue equals to total costs and profit is zero. For break even point to occur, it is necessary that firm has some fixed and variable costs.

It may be expressed as follows :

$$\text{B.EP. (inunits)} = \frac{\textit{Total fixed cost}}{\textit{S.P.P.U.} - \textit{V.C.P.U}}$$

$$\text{B.EP. (in Rs.)} = \frac{\textit{Total fixed cost}}{\textit{p/v RATION}}$$

The break even point analysis of DN showed in FY 2064/065 to 2066/067 were increasing trend and decreasing trend in FY 2067/068 on the comparison of base FY 2063/064. The break even sales (in Rs.) of DN for the FY 2063/064 to 2067/068 were Rs. 1415330, Rs. 2161366, Rs. 2457086, Rs. 1494588 and Rs. 1252528 respectively. The increased fixed costs and low cost of margin ratio shows decreasing in profit.

4.1.2 Margin of Safety

The margin of safety is the difference between the total sales and the break even sales. The size of the margin of safety is indication of the strength of the company. A firm is strength when it must have high margin of safety and vice versa. The margin of safety can be calculated with the help of following formula.

MOS = Total actual sales – B.E.P. sales.

The amount of margin of safety in DN in FY 2063/064 to 2067/068 were Rs. (625857), Rs. (1474798), Rs. (1769055), Rs. (583211) and Rs. (292137) respectively. Thus amount of margin of safety in DN were negative during the study period. The company break even sales for 5 years study period always exceed the actual sales. It indicates that the company was suffering good position during the study period.

4.1.3 Contribution Margin

The difference between sales revenue and variable cost is known as contribution margin. Conceptually, this is the contribution made by the sales of any period, after coverage of all applicable variable costs toward the cover of the fixed costs of the period and the realization of profit. The contribution margin can be calculated by applying following formula.

Contribution Margin – (Sales – variable cost)

The contribution margin of DN in FY 2063/064 to 2067/068 were Rs. 81613, Rs. 52978, Rs. 52277, Rs. 125004 and Rs. 157858 respectively. Above data shows FY 2063/064 to 2067/068 contribution margin were decreasing tread DN was going on profit per year.

4.1.4 Profit Volume Ration

Profit volume ratio indicates the relationship between contributions are turnover. It measure the relative contribution of a company for different period. It can be calculated by using following formula.

$$\text{P/V ratio} = 1 - \frac{V}{S}$$

The P/V ratio of DN FY 2063/064 to 2067/068 were 10%, 8%, 8%, 14% and 16%, It shows maximum sales in FY 2067/068 and minimum sales in FY 2064/065 & 2065/066, maximum P/V ratio in FY 2067/068 indicates that proportion of sales revenue were higher than the proportion of variable costs and versa.

4.2 Labour Cost Control

Labour cost is the cost of remuneration of the employees of at undertaking. labour constitutes often 50% percent of the cost to product and article. It is subject to product and article. It is subject to wastage like any other factor of production. It should always be remembered that labour is the one factor of production which is capable of

increasing in productivity. In other cases physical limitations set a limit to the out put that can be obtained from

given quantity of input Good production management and there fore, cost control demands that there should be a constant study of labour efficiency and the ways and means to improve it. The one point that will be worth remembering always is that it is the will to work that is the most important single factor in this respect.

DN has to pay average total wages and salary to all staff and worker is Rs, 120,200,000 per year. Therefore, it is clear that if an effective cost control system is adopted by the management than great economy can be obtained in the labour expenses.

Certain items of labour cost control related with DN which are given below:-

- Idle time
- overtime and absenteeism
- Labour turnover
- Time recording

4.2.1 Idle time

Where workers are remunerated on a time basis, some difference may occur between the time for which they are paid and the time that they have actually spent for production. This time difference is known as idle time.

DN does not keep idle time record but idle times are happening by several causes like as production, economic causes. Production causes are those which arise out of waiting of materials, machinery break down and un utilized man power. DN workers wasted time excessively due to break down of machinery parts of oldness, It has been brought when factory was established Now it is not in good working condition and its salvage value is zero. because of load seeding, political strike and so on.

DN production process is divided into three parts.

i) cutting department ii) making department iii) packing department

The materials are cutting in one department after that it is brought in making department due to that it takes too much time and create idle time.

Economic cause is the arising demand because DN products are qualitative so, DN can compete in competitive market. The demand of products are going up day by day. So, economic causes is also responsible for good idle time.

4.2.2 Overtimes and Absenteeism

When a worker works beyond his normal hours of work that time is known as over time.

In DN every worker overtime wages paid 0.5 times more than normal wage rate. The amount of overtime cost of DN in FY 2063/064 to 2067/068 were given below respectively.

Table No. 5: Overtimes and Absenteeism

Year	Amount Rs.	Difference	Percentage
2063/064	3050000	198000	-
2064/065	3248000	51000	6.1
2065/066	3299000	4701000	1.54
2066/067	8000000	4701000	58.71
2067/068	10601000	2609000	24.6

From the above data shows that are FY 2063/064 to 2067/068 overtime cost were fluctuating trend. The ratio of overtime shows maximum overtime cost increasing in FY 2063/064. Although maximum or minimum overtime cost is not good for factory because overtime cost increase cost of production. Workers are also adopt the habit of postponing the work to be done in over time just to earn more money.

Absenteeism

Workers absenteeism also responsible for over time creation. DN staff and workers

are spearted on the basis of machines and shifts. The machines are operating on the basis of labour. If one worker are absent in duty machine can not operate and production target can not achieve in time. For achievement production target. factory must e necessary to work in overtime. So absenteeism plays vital role to create overtime.

Table No. 6 Absenteeism

Year	Men	Days	Days (Average per worker in month)
2063/064	2262	108576	4
2064/065	2174	102004	3.91=4
2065/066	2011	95080	3.94=4
2066/067	1957	82194	3.50
2067/068	1896	91008	4

Above data shows that DN staff and workers absenteeism average 4 or 3.50 days in a month, which bush to work do in overtime because normal daily target of production can not achieve due to absenteeism of worker or break down of machinery.

To conclusion

Over time may be created in DN due to break down of machinery. power failure, absenteeism of worker postponing work habit, lack of proper super vision and to meet the target etc.

4.2.3 Labour Turnover

Labour turnover denotes the percentage change in labour force of an organization high percentage of labour denotes that labour is not stable and there are frequent changes in the labour forces because of new workers engaged and workers who have left the organization. A higher turnover is not' desirable for factory. There are three methods of labour turnover measurement. Which are given below:

a) Separation method

b) Flux method

c) Replacement method

DN all staff and worker are permanent and skilled. They have not done recruitment and selection of worker in FY 2063/064 to 2067/068 So, separation method is only appropriate for calculation labour turnover.

a) Separation Methods

This method is calculating on the basis of number of worker left during a period and average number of worker during a period. This definition does not taken into consideration the fact of surplus labour. It will give incorrect result when the surplus workers are discharged because labor turnover calculated in this way will be high. The effect of a high or low turnover ratio should be analyzed on training basis, on production efficiency and employee morale.

The following formula can be used determining labour turnover according to separation method.

$$\text{Labour turnover} = \frac{\text{No. of employee left during a period}}{\text{Average No. of employees during a period}} \times 100$$

Table No. 7: Labour Turnover

Year	Turnover ratio
2063/064	4.32
2064/065	3.92
2065/066	7.79
2066/067	2.72
2067/068	3.16

The above data shows that DN labour turnover ratios were flexible trend. There must be some labour turnover due to personal an unavoidable causes. There must be some labour turnover due to personal an unavoidable causes. It has been observed by the

employers that a normal labour turnover, which is between 3% to 5% need not cause much anxiety DN in FY 2063/064, 2064/065, 2065/066, 2066/2067 and 2067/068 turnover ratio were 4.32%, 4.32%, 3.92%, 2.72% and 3.16% were applicable because these ratios lie between 3% to 5%. The workers may leave the factory purely on personal causes. accident marking workers permanently incapable of doing work death of workers, finding better jobs at some other place and cases involving moral turpitude. In all such cases labour turnover is unavoidable.

But DN in FY 2065/066 was not applicable turnover on the basis of normal turn over ratio. This year workers left the factory on the force of management requirement and action like as : termination of services due to mis-behaviour, indiscipline, workers who had joined on the basis of duplicate certificate, long term absence and retirement due to old age.

4.2.4 Time recording

DN time recorder records the time of arrival and departure of the workers in security section. The record or time is kept normally fourth times a day/because factory is running two shifts. The objective of time recording helps the administration to keep the workers under discipline and wages calculation on the basis of working hours. The worker level the factory premises for lunch break, the time keeper keeps the arrival and departure time. If somebody waste maximum time outside the factory, then they get punished to improver for delay. So, time recording system is very good system in DN it is also help in labour cost control

4.5 Standard Costing

Standing costing is only a means to an end it aims at control over costs and performance it is essential for building a budgeting and feed back system for management decision making indeed it provides a frame work for judging performance. Standards are predetermined against which actual costs are compared to obtain variances raise questions they do not provide answers. Analysis of variance allows management to take corrective actions in order to prevent recurrence of the

events which brought about the variances. However, it is extremely important to identify variances to cost responsibility centers for making the corrective action effective.

There is no doubt 'that the increased accuracy obtained from standard costing will inspire management to look more and more to costs as a guide to decision making standard costs techniques, therefore, leads to positive improvement in efficiency, so standard costing is an effective tools for cost control purpose.

4.5.1 Variance Analysis

The word variance is derived from the world vary of variation. In cost accounting, the divergence between planned result and actual result is known as variance. The prime object is known as variance. The prime objective of standard costing is to reveal the difference between actual costs and standard costs. A variance in standard costing refers to the divergence of an actual costs from standard cost variances of different cost items provide the key to cost control. They indicate whether, and to what extent, standards set have been achieved. This enables management to correct adverse tendencies if any.

Variance analysis refers to an examination of the conditions of operation which gives rise to any cost variance. It provides an explanation as to why and how variances have arisen. Variances analysis involves not only the examination of causes but, also the determination of the contribution of caused factor to the overall variances. It implies suitable steps for the control of cost wherever necessary.

4.5.2 Direct Material Variance

Without input no output is possible so for the cost control of the cost of raw material is seemed to be very essential. Management, is not aware about the cost of raw materials it is never through that this much will be material cost for that much of sales volume and production volume and so on. So direct material variance always help to cost control of materials because materials variance always comparison among standard material, actual material cost, and quantity etc. Then find out difference

1Table No. 9 : Material Price variance

Year	Material price variance
2063/064	2202.72 F
2064/065	4650.18 A
2065/066	12134.4 A
2066/067	48298.25 A
2067/068	7938.97 A

From above table it shows that M.P.V. of. DN in FY 2063/064 was favorable and in FY 202064/065 to 2067/068 were adverse by Rs. 4650.18, Rs. 12134.40, Rs.· 48298.25 and Rs. 7938.97 respectively it means to say that M.P. V. were fluctuating trend in study period. The table as shows that maximum adverse in FY 2066/067 increase prince per kg Rs. 21.23 more than standard price and minimum in FY 2064/065 increased price per kg Rs. 1.94 than standard price

In conclusion, material price variances were adverse due to increased high market price material and failure to purchase material in time.

The portion of the material cost variances which are due to the difference between the standard quantity specified and actual quantity used are known as material usage variance. The M. U. V may be calculated by using following formula.

MUV = SP(SQ-AQ)

The material usage variance of DN in FY 2063/064 to 2067/068 are shown in following table.

Table No. 10 : Material Usage Variance

Year	M.U.V.
2063/064	3285 F
2064/065	2655 F
2065/066	2548 F
2066/067	33770 F
2067/068	5760 F

From above table it is observed that the .M.U.V. of DN in FY 2063/064 to 2067/068 were favorable by Rs. 3285, Rs. 2665, Rs. 3770 and Rs. 5760. Out of FY 2063/064 M.U.V. were increasing trend. The maximum increased in FY 2066/067 to 2067/068 by Rs. 1990 and minimum favorable in FY 2064/065.

In conclusion, material usage variances were favorable due to defective of machinery and wrong specifications of materials by planning engineer etc.

4.5.2.4 Material Yield Variance

The portion of direct material usage variance due to the difference into actual output and standard output specified it is calculated as follows.

M.Y.V. = SR (Actual yield – standard yield)

The M.Y.V. of DN in FY 2063/064 to 2067/068 is sown in following table.

Table No. 11 : Material Yield Variance

Year	M.Y.V.	Days
2063/064	Rs. 4275000 A	950000 output
2064/065	Rs. 876195 A	1948710
2065/066	Rs. 86646560 A	1666280
2066/067	Rs. 40301950 A	620030
2067/068	Rs. 50409500 A	600550

The above table shows that M.Y.V. of DN were adverse in FY 2063/064 to 2067/068 by Rs. 4275000, Rs. 87691950, Rs. 86646560, Rs. 403019500 and Rs. 50409500 respectively due to standard loss of output 950000, 1948710, 1666280, 620030 and 600550 respectively. The standard loss of were decreasing trend in FY 2064/065 to 2067/068 out of in FY 2063/064 and material yield variance were flaunting trend in FY 2063/064 to 2067/068. The maximum M.Y.V. adverse in 2064/065 and maximum in FY 2066/067 and maximum standard loess in FY 2064/065 and minimum in FY 2067/068.

The conclude, material yield variance were adverse in study period. This situation is result of lack of proper supervision, machinery break down and lack of material duped.

4.5.3 Labour Cost Variance

Labour variance implies the maintenance the costs with in predetermined limits. When standard costs can, be set and employed the problems of control tend to be greatly simplified.

In broad terms the concept of labour various refers to most economical use of labour in factory. Generally, companies have to pay approximately the same price as standard determined to earn an adequate return on capital employed. It is essential to aim at minimum labor cost with maximum production; bearing in mind the price to be charged management should be for costing and planning followed by the execution of the plans. These should be measured at all stages of labour variance for cost control. The actual labour costs include are compared with the standard labour cost find out the variances and take corrective action where ever necessary for avoid labour variances.

The actual number of employees and their salary in DN in FY 2063/064 to 2067/068 are shown in following table.

Table No 12 : Labour Cost Variance

Year	No. of employees	No. of Decrease	Total Salary	Diff
2063/064	2262		1029470	-
2064/065	2174	88	1163910	+13.06%
2065/066	2011	163	1284350	+10.35%
2066/067	1957	54	602120	-53.11%
2067/068	1896	61	661570	9.9%

Above table shows that employees of DN in FY 2063/064 to 2067/068 were decreasing trend per years by 88,163,54 and 61 men due to retirement, death and illegal work done by employees. These causes are avoidable and unavoidable. The wages and salary of employees were increasing per year of total salaries in FY 2063/064 to 2067/068 were 13.06%, 10.35%, -53.11 %, and 9.9% it shows total salaries ratio were fluctuating trend because it is given on the basis of number of worker and staff of DN

4.5.4 Overhead Variances

First of all we know about meaning of overhead cost and overhead variance before analysis of DN overhead variances

The aggregate of indirect material cost indirect wages, indirect labour cost and indirect expenses are called overhead cost and difference between standard and actual indirect costs are called overhead variances. It is necessary to consider all these indirect costs which are described' as overhead and which relative either to business as a whole or to a particular location or functions.

In this way amounts spent by a concern in carrying on day to day work, except those on prime cost may be treated as overheads it comp8.res indirect materials, indirect labour and other indirect expenses Overhead must not be ignored while ascertain the cost of production because it often from a considerable proportion or the total cost management should must consider should must consider very careful the effects that its decisions will have on the level of overhead.

The total overhead costs are conveniently divided under three heads as below:

i. Factory overhead expo
ii. Office and administrative overhead exp.
iii. Selling and distribution overhead exp

i) Item Constitute in Factory Overhead

All expenses incurred inside a factory and for the benefit of manufacture as such will be include in factory exp.

These are following

a) Wages paid to indirect workers such (IS watch and ward staff, repair gangs, foreman etc.
b) Works managers salary and fee paid to directors devoting their attention to production problems.
c) Workers canteen and welfare expenses
d) Contribution to any social security schemes such as the employees insurance.
e) Provident fund contribution by the company.
f) Carriage in ward on material purchased if such carriage has not been include in the cost of materials.
g) Materials of small value whose accounts are not kept
h) Buying and storekeeping expenses including value of normal losses.
i) Normal idle time wage of direct workers if this has not been charged out to job through inflation of wage rates,
j) Factory rent and rates,
k) Insurance or factory premises, plant etc.
l) Factory lighting
m) Power and fuel
n) Depreciation all plant and machinery tool's factory premises and repair of these
o) Works station my and cost of works telephone.

ii) Item Constitute in Office and Administrative Overhead

All expenses relating to general administration (not connected with production of sales) will be include in office and administrative overheads.

The usual items comprised in these overhead are us follows:

a) Salary of General Manager, Finance Manager, Accountant, secretary their staffs etc.

b) Office rent and rates and repairs and deprecations of office premises.

c) Deprecation and repairs of and power required for duce equipment.

d) Insurance of office premises and equipment

e) Fees of directors (other than those Connected with sales and production)

f) Telephone, telegram and postage

g) Printing and stationery

h) Audit fees

i) Gratuity

j) Legal changes

k) Leave compensation

1) Bank, charges

m) Interest on Loan

n) Medical facility

0) Direct allowances

iii) Item Constitute in Selling and Distribution Overhead

Selling expenses from no part of the cost of production. The line between making and selling is clearly drawn. Nor it is possible to set down any comparable figures for production and selling cost.

The usual items to be included in this overhead are as follows:

a) Salaries of these sales manager and his staff including his office staff and his salesman.

b) Travelling expenses and commission payable to sales man.

c) Advertising and show room expenses

d) Printing of catalogues and price lists and general stationery

e) Rent of finished good, godowns and their repairs etc.

f) Rent of finished goods godowns role their repairs etc.

g) Show room expenses including rent and lighting etc.

h) Packing and carriage outwards

i) Insurance of finished goods, godowns show room and goods internist.

j) Fees of directors who pay attention to sales

k) Telephone and postage.

l) Depreciation of delivery vans etc and their running expenses

m) Entertainment expenses.

n) Subscription to mercantile agencies and trade journals.

The Overhead expenses of DN in FY 2063/064 to 2067/068 is found as following.

Table No. 13: Overhead expenses

Year	Factory Oll	Difference	Adm. OH	Difference	Selling OH
2063/064	403248	-	106449	-	5250
2064/065	39277	-2.6%	99554	-6.5%	6084
2065/066	431558	9.9%	113577	14.1%	7075
2066/067	449673	4.2%	123430	8.7%	7295
2067/068	489513	8.8%	126106	2.2%	8075

The above table shows that factory OH cost were increasing trend of FY 2064/065. The percentage of increasing in FY 2067/068 were 9.9%, 4.2% and 8.8% respectively. The difference of increasing in FY 2065/066 and small difference in FY 2067/068.

The above table also shows that administrative OH cost were increasing trend out of

FY 2064/065. The percentage of increasing in FY 2065/066 to 2067/068 were 14.1%, 8.7% and 2.2% respectively, The difference in FY 2065/066 and small difference in FY 2067/068 or also same difference in FY 2066/068.

The table also shows that selling OH cost in FY 2063/064 to FY 2067/068 were increasing trend. The percentage of increasing in FY 2063/064 to 2067/068 were 15.8% 16.3%, 3.12% and 1.1%. The difference of increasing in FY 2064/065 and small difference in FY 2067/068.

In Conclusion

DN HO, Adm. OH, and selling OH were increasing trend in study period. In FY 2064/065 factory OH and Administrative OH were decreasing and selling OH were increasing.

4.6 Trend Analysis

The trend analysis is used to determine patterns in data collected overtime, in this topic various data related to cost structure of DN have been analysis by the method of least square to fit straight line trend of DN during FY 2063/064 to FY 2067/068. The actual trend lines of respective variables are also plotted in graph. In our Study, the variables like, variable cost, fixed cost, Net profit, gross profit, selling expenses, administrative expenses, Net sales, production in quantity, sales in quantity, overtime, cost, and Raw material cost per kg. etc. are analyzed to defect patterns of change in statistical information over regular interval of time. This analysis includes both crude and calculated data of DN for estimating straight line trends of these variables, following equation is used.

$Y = a + bx$

Where,

Y= estimated value of dependent variables.

X = time in trend analysis (Independent variables)

a = Y-intercept

b = slope of the trend line.

By solving above equation for these different variables, the value of Y- intercept, slope of the trend line and estimated value of dependent variables are obtained which are summarize in following table, however, the detail calculation are shown in Appendix.

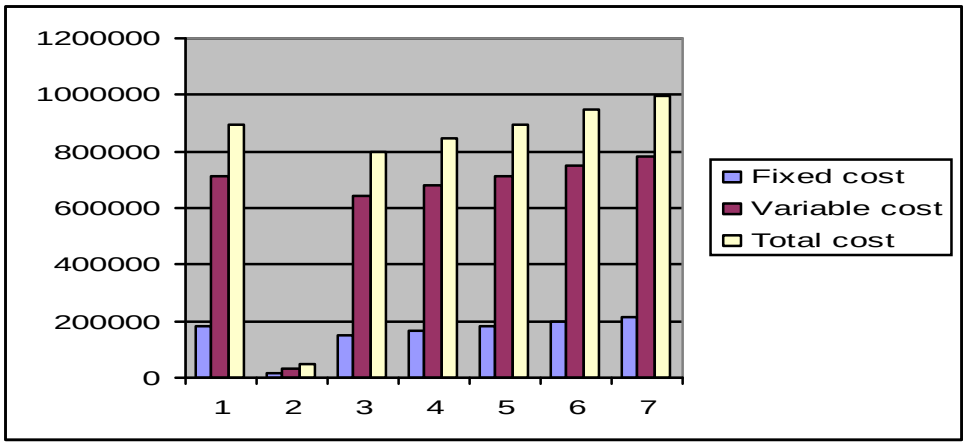
Table No. 14 : Trend Analysis Results

Variables	'a'	'b'	Estimate value of dependent variables (Y)				
			2063/064	2064/065	2065/066	2066/067	2067/068
Fixed cost	183354	15735	152084	167819	183554	199289	215024
Variable cost	713222	34213	644796	679009	713222	747435	781648
Total cost	896777	49949	796879	846828	896777	946726	996675
Gross profit	125496	23644	78208	101852	125496	149140	172784
Other Income	185000	25000	150000	185000	185000	1060133	164152
Net profit	310496	48644	108046	102566	75196	1012369	150977
Net sales	807169	56665	693839	750540	807169	863834	920499
Selling exp.	67572	6859	53854	60713	67572	74431	81290
Adm. exp.	113823	6319	101185	107504	113823	120142	126461
Sales (in qty.)	2003774	159	2003456	2003615	2003774	2003933	2004092
Production (in qty.)	2037296	-4652	2046600	2041948	2037296	2032644	2027992
Overtime cost	5641200	1987000	1667200	3654200	5641200	628200	9615200
To raw material cost per Kg.	66	14	38	52	66	80	94

Now, above summarized the actual data of related variables plotted in graph to obtain past straight line trend and actual trend respective. In this topic, the related variables like total cost, fixed cost and variable costs are shown in Diagram-1, gross profit, net profit and net sales are shown in Diagram-2, selling expenses, administrative expenses and net sales are shown in Diagram-3, production and sales (in quantity) are shown in Diagram-4, overtime cost in Diagram-S and R.M. cost per kg. is shown in Diagram-6.

All these Diagrams are briefly analyses as follows:

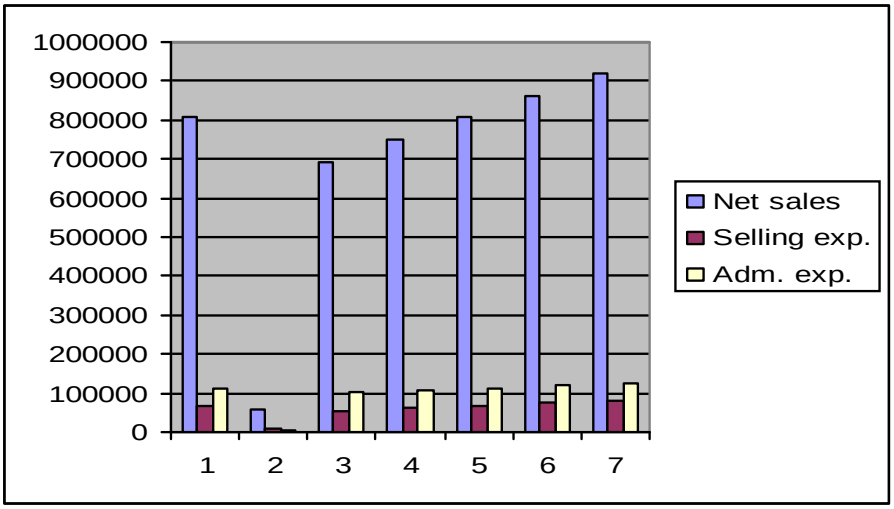
Diagram-l : Trend of total cost, fixed cost and variable cost



It is observed that the slope of the trend line for fixed cost was positive because fixed cost was increasing slowly year by year, due to increasing repair and maintenance of machinery, purchase of some fixed assets. Variables cost was also fluctuating trend, in FY 2064/065 and 2065/066 were going down but FY 2066/067 and 2067/068 were increasing proportionally very high so, slope of trend line of variable cost was positive due to high market price or raw material because Raw material cost were increasing year by year.

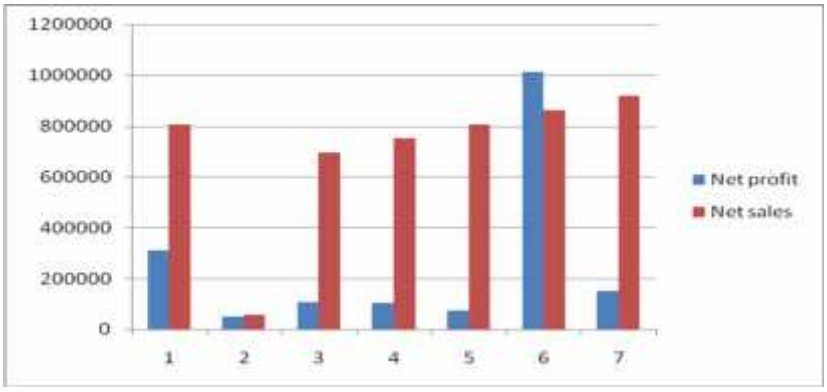
Thus, the trend of fixed cost and variable cost were positive so total cost of the slope line was also positive because of total cost = fixed cost + variable cost.

Diagram-2 : Trend of net sales, selling and distribution expenses and administration expenses



It is observed that selling and distribution expenses and net sales were slowly increasing in trend line due to publicity, advertising and sales promotion. So, increasing proportion of sales and selling and distribution were excellent but administration expenses shows highly increasing in trend line due to over staffing, channel of administrative division working style is very weak and delay. and red tapism in work. It means expenses were unfavorable condition of DN The Diagram only shows slight change of net sales. It means DN administrative expenses were very high or increasing year by year greater than sales revenue .

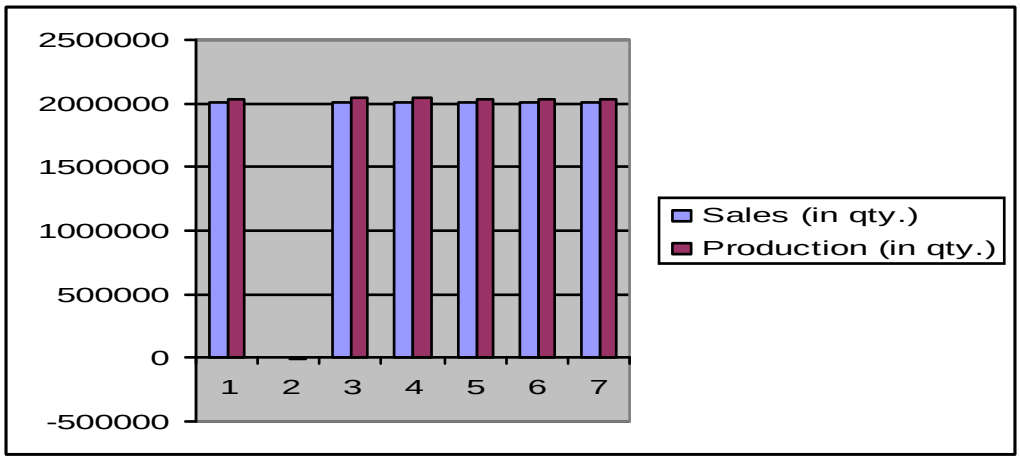
Diagram – 3 : Net Profit and Net Sales



The graphic trend of net sales, gross profit and net profit were positive. The DN of net

sales and gross profit were slowly increasing because it products are ill maturity stage. The industry is faced by over capacity. The sales are at the peak level and price war take place during the period. Net profit trend line is also positive. It is good symbol for future, DN is trying to reduce loss and make profit by increasing sales revenue through product differentiation is done with ·new brands and models. Product modification is also done in terms of quality and feature of products. Brand loyalty is emphasized and advertising is redesigned to stress brand difference and benefits. Post sale services are offered. So, net profit was increasing year by year in the study period.

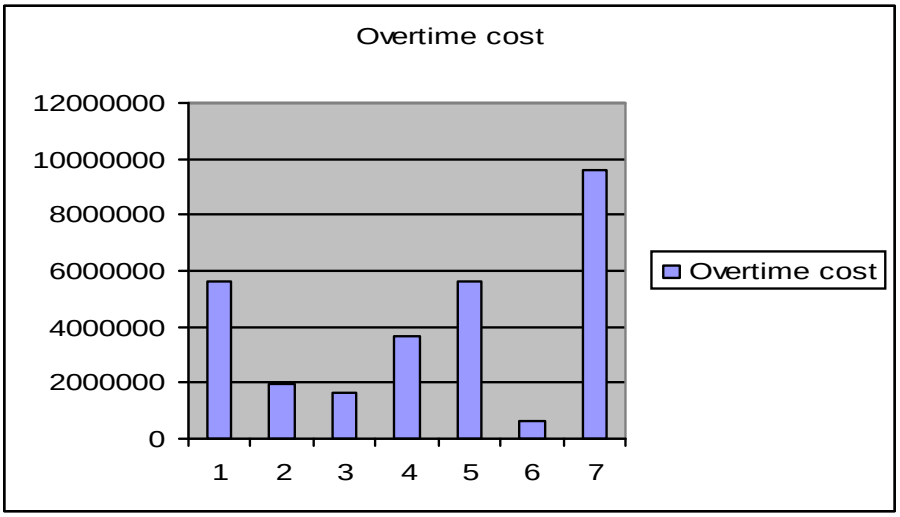
Diagram – 4 : Trend of sales and production (in quality)



The trend lines of sales (in quantity) have Shown in increasing and. productions have shown decreasing trend, It means that equipment, plant and machinery, direct materials and indirect material were not favorable to meet targeted production. The sales were also slowly increasing trend. It could not made sufficient sales revenue to meet total cost or target profit in study period.

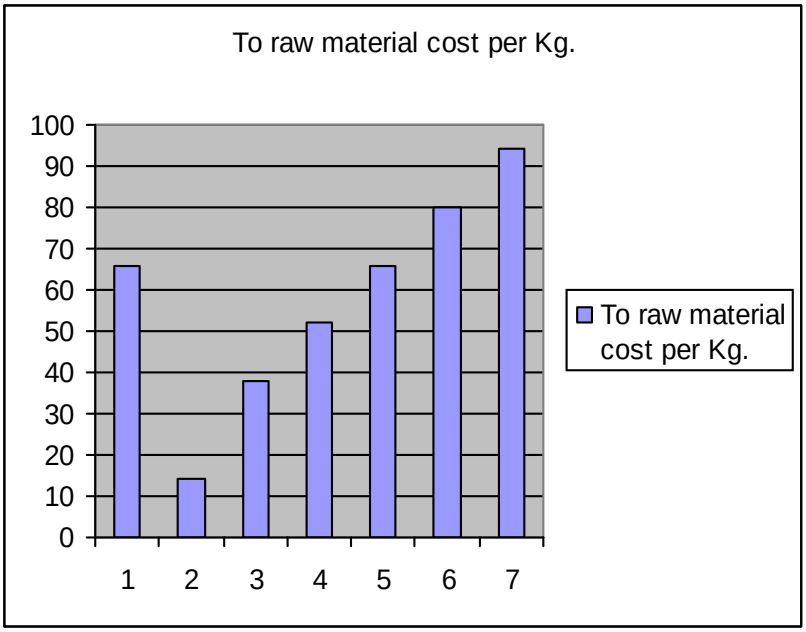
By comparing these two trends, it was cleared that DN was not sufficient to meet its target production and sales in study period.

Diagram – 5 : Trend of overtime cost



It is observed that slop of trend line of overtime cost were positive because the overtime of DN cost were increasing by machinery breakdown absenteeism of workers and staffs, lack proper repair and maintenance of machinery. So, overtime costs were increasing in study period.

Diagram – 6 : Trend of raw material per kg.



From the above diagram trend line of tobacco costs were positive thus the graph showed the increasing trend of Raw material cost of DN because market price of R.M.

was highly increases due to seasonal variation, transportation cost was increase a s well as tobacco was purchasing from India and Thailand or outside of Nepal. It means DN per kg. Raw material cost was not favorable in study period.

4.7 Correlation Analysis

Correlation is a statistical technique which measures and analysis the degree or extent to which two or more variables fluctuate with reference to one another of DN Correlation thus, denotes the inter-dependence amongst variables. The degrees are expressed by a coefficient which ranges, between - 1 and + 1. The direction of change is indicated by + or – signs. The former, refers to the sympathetic movement in the same direction and the latter, in opposite direction an absence of correlation is indicated by zero. Correlation thus expresses the relationship through a relative measure of change of DN and it has nothing to do with the units in which the units in which the variables are expressed.

For calculating coefficient of correlation of DN by using Karl Pearson's method. Thus, measure known as Pearsonian correlation coefficient between two variables (series) X and Y, usually denoted by 'r' is a numerical measure of linear relationship. The formula of Karl Pearson's method for calculating correlation coefficient is

$$r= \frac{\sum xy}{\sqrt{\sum x^2 \times y^2}}$$

By using above formula the value of dependent variables are obtained which are summarized in the following table:

Table No. 15 : Correlation Analysis

Variables	Value of r
Total cost and loss	0.88
Sales and selling and distribution expenses	0.73
Sales and loss	-0.96
Production and sales (in quantity)	0.04

There was high degree of' positive correlation between total cost and lass. If total cost was increasing, loss was also increasing or total cost was decreasing, loss is also decreasing. The correlation between total cost and loss of DN were 0.88 in study period. So, DN must be tried to reduce total cost by applying modern technology like as computer in administration work, old machine which salvage value is zero, will replaced by how advance technology machine and also try to reduce maintenance cost of machinery.

Sales and selling and distribution costs were highly positive correlated. The correlation between sales and selling and distribution expenses were 0.73 in study period. If sales was increasing, selling and distribution expenses was also increasing. So, factory must be tried to increase sales by doing advertising, sales promotion, product differentiation and so all. But these costs were must be lower than proportion of sales increasing.

Sales and production (in quantity) were positive correlated in study period. The correlation between sales and production (in quantity) were 0.04. If sales of product increased, production of product also increased and vice versa. Production of product increasing, all fixed cost and variables cost are separated on production per pack basis which is lower. So, factory must be tried to increase in sales quantity to increase production quantity, which is must essential for cost reduction.

4.8 Major Findings of the Study

From the above analysis of the facts and figures revealed by different cost control tools following finding have drawn about cost control of DN.

i) The cost volume profit analysis has indicated that contribution margin of DN is not sufficient to meet all its fixed costs. The factory's break even sales during the study period always exceeded the actual sales volume. It is absorbed that the company has not sufficient margin of safety. The high proportion of variables cost, contribution margin were not able to meet increasing fixed costs. In the DN. observing the data, recovery was occurring year by year but sales figure as fluctuating trend. ii) Overtime, idle time and absenteeism are find most responsible for labour cost increasing.

iii) Labour turn over is fluctuating trend and efficient workers are also going out from factory by avoidable cause.

iv) Material cost also plays a vital role in the total cost structures. So material price and cost variance were not favorable in study period because Those required materials which are imported from India and Australia and UK are very costly and not matched as standard price.

v) Trend of production of all product are not favorable and it goes on fluctuating trend due to machine break down, lack of proper supervision and lack of demand in market and costs are increasing trend in FY 2063/064 to 2067/068.

vi) Overhead costs are Increasing per year in the respect of sales and inflation of market which is also most responsible for incurring cost.

vii) Was running in profit during study period clue to high production, law-cost, high selling distribution cost, law labor cost and material cost.

viii) Correlation analysis has showed that the relations between the selected variables (table No. 15) are highly correlated.

CHAPTER – V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Agriculture has been the highest primary industry in the world economy and Nepal is also not exception ill this regard. This sector has played a predominant role in Nepalese economy in terms of G.D.P. contribution and employment generation. In order to develop agro-based industries with a view to import substitution, further employment and income generation, the Nepalese government has undertaken the task of creating number of agro-based enterprises. In this context is necessary to monitor whether these manufacturing entireness are successful in accomplishing the basis objectives for when they were created.

The government perception of role in public welfare has produced manufacturing enterprises engaged in public utility and necessities such as drug cement, paper etc. In present context, manufacturing enterprises provides such goods and services which are provided by ltd· enterprises more efficiently public enterprises face two types of challenges the first one is to meet public responsibility of providing quality goods and services at cheap late and the second one is to utilized score resources more effectively. In this context this study is concerned to appraise DN and examine that in what extent the factory is applying cost control as to minimize its cost, that ultimately affect the price of the product.

This study covers a period of five years starting FY 2063/064 to FY 2067/068. This is the most latest study and covers information of relatively more years to analyze the cost control of DN. The main sources of data are secondary data which consists of mostly the annual reports. It comprises balance sheet and profit and loss account (income statement), besides this information will also been supplemented published and unpublished reports and bulletins of the company.

This study applied various cost control tools in the process of the study. They are cost volume profit analysis, labour cost control and standard costing a part from these

tool's simple statistical tools like average, percentage we also use where ever they were needed.

5.2 Conclusion

Everyday we hear news regarding the shut-down of many big corporations. Although the reason whatever, the cost can be sometimes explained reasonable. Every business organization wants its contribution in the society. It wants to niche at least a sustainable margin for it. But it is not reachable when organizations fail to manage its cost. Then it becomes very miserable condition for organization. Most of organizations think that to purchase at lower price from supplier is only the key factor to reduce the cost.

Nepalese manufacturing organizations prefer to increase in sales volume and reduction in cost for increasing profit of their organization. Most of the Nepalese manufacturing organizations are selecting the purchase of raw material, production planning and control as the area of reducing their cost. No any organizations are applying the mass customization as the tool of cost reduction. The main cause of not applying this tool is the lack of modern technology. Dabur Nepal Pvt. Ltd. is based in Bara district prefer the measures such as bargaining with the suppliers of materials and managing cost in the scientific way to lower the price of their product. It is conscious about TQM as the technique of cost reduction. DNPL is not applying the design for manufacturability and concurrent engineering, on demand lean production, build to order, part standardization, various functional budgets production system as the tools of cost reduction. The cost volume profit analysis has indicated that contribution margin of DN is not sufficient to meet all its fixed costs. The factory's break even sales during the study period always exceeded the actual sales volume. It is absorbed that the company has not sufficient margin of safety. The high proportion of variables cost, contribution margin were not able to meet increasing fixed costs. In the DN. observing the data, recovery was occurring year by year but sales figure as fluctuating trend. ii) Overtime, idle time and absenteeism are find most responsible for labour cost increasing. Labour turnover is fluctuating trend and efficient workers are

also going out from factory by avoidable cause. Material cost also plays a vital role in the total cost structures. So material price and cost variance were not favorable in study period because. Those required materials which are imported from India and Australia and UK are very costly and not matched as standard price. Trend of production of all product are not favorable and it goes on fluctuating trend due to machine break down, lack of proper supervision and lack of demand in market and costs are increasing trend in FY 2063/064 to 2067/068. Overhead costs are Increasing per year in the respect of sales and inflation of market which is also most responsible for incurring cost. Correlation analysis has showed that the relations between the selected variables are highly correlated.

5.3 Recommendations

There is a need or economic production and that can be obtained through a proper planning and policy of the factory. Some recommendation can be given as below.

i) The cost volume profit relationship in DN was not favorable because sales were decreasing and increasing where as cost was increasing. In order to make profit, the company should match their sales over cost and make profit plan with their sales (volume) and costs.

ii) Labour cost constitute a high percentage of the total cost. It should always be remembered that labour is one of the factor of production which is capable or increasing it's productivity In other cases physical set of limitation limits to the output that can be obtained from given quantity of input. So overtime, idle time and absenteeism take high role of increasing in cost of production. Thus management should take corrective action for idle time, make senile rules and regulation for absenteeism, repair and maintenance of old machinery which call not operate efficiency and replacement of old machinery by new advance technology types of machine to avoid overtime.

iii) A suitable personnel policy should be framed of employing the right man for the right job and giving a fair equal treatment to all workers to reduce the labour

turnover. Men-Management relationship should be improved by encouraging labour participation in management will also help to reduce labour turnover in DN.

iv) Material takes a high portion of the total cost of production and this means that efficiency as regard material is a vital factor in the total cost of production and in the profit earned. Any amount saving from material will be directly reflected in profits, it is therefore, necessary that at most are should be devoted to the purchase and use of materials. The factory should try to buy material from local market and invest some fund or give loan to local farmers to produce tobacco. Factory must be also try to procurement of material in time to save high price war of Row material.

v) DN profit position was just favorable. It was going on profit during study period. but due to the high cost of MFG (cost of good sold), high selling and administration cost. The factory did not follow cost control measures.

Thus, the DN should lunch a long term programme to cut down excessive cost and to reduce Wastage. Hence the measure and techniques such as economic order quantity, inventory control, performance standards, budgetary cost controlling, standard costing are suggested to be followed which will perhaps improve the cost efficiency and cost responsibility center should be clearly defined and pointed out

vi) DN has not maintained costing system refers to the establishment of cost standards and their application to problems of management, particularly those problems relating to product cost and departmental cost control. For any given cost unit, standards are set for materials, wages, direct expenses' variable overhead, fixed overhead, selling and distribution expenses, selling price and profit and lobour for cost. Budeget and standard costing tools provide the effective idea for cost control procedure and so the factory is suggested to adopt the standard costing system for cost control.

vii) The frequent change of Top level management has also affected the smooth functioning of management. It creates unstable environment So the post of G.M. should be professionalism and it should be far from political interference.

In addition to above mentioned recommendations some important advise are also given for improvement of DN.

DN has no separate costing department will the section, should be entrusted with responsibility of categorizing the actual cost into direct and indirect fixed and variable, controllable and uncontrollable and joint cost should be separated on product wise basis.

The program should be complemented by adopting definite and suitable pricing policies regarding price fixation side by side.

Power should not be centralized i.e. authority should delegated top to bottom level - for freedom in the work. Reward and punishment policy should adopted fairly to motivate and discourage them promotion and transfer should be evaluated with their performance in the factory other than political favoritism political appointment of staff should be discouraged. Attention should be paid to reduce overstaffing because it raises unnecessary operation expenses.

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APPENDICES

Appendix – 1

FY 2063/064

Total Sales revenue Rs. 789473

Total fixed cost Rs. 146312

Total variable costs Rs. 707860

Contribution margin = T. sales revence – T. variable costs

= Rs. (789473 – 707860)

= Rs. 81613

$$\text{P/V ratio} = 1 - \frac{\text{T. variable costs}}{\text{T. Sales}}$$

$$= 1 - \frac{707860}{789473}$$

= 103376556

= 10%

$$\text{B.E.P. (inRs.)} = \frac{\text{T. fixed costs}}{\text{P/V ratio}}$$

$$= \text{Rs. } \frac{146312}{103376556}$$

= Rs. 1415330.55

Margin of Safety = (T. sales revenue – B.E.P. sales)

= (789473 – 1415330.55)

= Rs. – 625857.55

FY 2064/065

Total Sales revenue Rs. 686568

Total fixed cost Rs. 166771

Total variable costs Rs. 633590

Contribution margin = T. sales revence – T. variable costs

= Rs. (686568-633590)

= Rs. 52978

$$\text{P/V ratio} = 1 - \frac{\text{T. variable costs}}{\text{T. Sales}}$$

$$= 1 - \frac{633590}{686568}$$

= 0.07716

= 7.71% or 8% approximately

$$\text{B.E.P. (inRs.)} = \frac{\text{T. fixed costs}}{\text{P/V ratio}}$$

$$= \text{Rs. } \frac{166771}{0.07716}$$

= Rs. 2161366

Margin of Safety = (T. sales revenue – B.E.P. sales)

= (686568 – 2161366)

= Rs. – 1474798

FY 2065/066

Total Sales revenue Rs. 688032

Total fixed cost Rs. 193815

Total variable costs Rs. 635755

Contribution margin = T. sales revence – T. variable costs

= Rs. (688032-635755)

= Rs. 52277

$$\text{P/V ratio} = 1 - \frac{\text{T. variable costs}}{\text{T. Sales}}$$

$$= 1 - \frac{635755}{688032}$$

= 0.00788873

= 7.98% or 8% approximately

$$\text{B.E.P. (inRs.)} = \frac{\text{T. fixed costs}}{\text{P/V ratio}}$$

$$= \text{Rs. } \frac{193815}{0.07888}$$

= Rs. 2457086.70

Margin of Safety = (T. sales revenue – B.E.P. sales)

= (6888032 –2457086.70)

= Rs. – 176905.70

FY 2066/067

Total Sales revenue Rs. 911377

Total fixed cost Rs. 204997

Total variable costs Rs. 786373

Contribution margin = T. sales revence – T. variable costs

= Rs. (911377-786373)

= Rs. 125004

$$\text{P/V ratio} = 1 - \frac{\text{T. variable costs}}{\text{T. Sales}}$$

$$= 1 - \frac{786373}{911377}$$

= 0.137159485

= 13.71% or 14% approximately

$$\text{B.E.P. (inRs.)} = \frac{\text{T. fixed costs}}{\text{P/V ratio}}$$

$$= \text{Rs. } \frac{204997}{0.13715948}$$

= Rs. 1494588.58

Margin of Safety = (T. sales revenue – B.E.P. sales)

= (911377 –1494588.58)

= Rs. – 583211.58

FY 2067/068

Total Sales revenue Rs. 960392

Total fixed cost Rs. 205876

Total variable costs Rs. 802534

Contribution margin = T. sales revenue – T. variable costs

= Rs. (960392-802534)

= Rs. 802534

$$\text{P/V ratio} = 1 - \frac{\text{T. variable costs}}{\text{T. Sales}}$$

$$= 1 - \frac{802534}{960392}$$

= 0.164368299

= 16.44% or 16% approximately

$$\text{B.E.P. (inRs.)} = \frac{\text{T. fixed costs}}{\text{P/V ratio}}$$

$$= \text{Rs. } \frac{205876}{0.16436829}$$

= Rs. 1252528.62

Margin of Safety = (T. sales revenue – B.E.P. sales)

= (960392 –1252528.62)

= Rs. – 292136.62

Appendix – 2

Labour Turnover

According Separation Method

FY 2063/064

No. of workers at the beginning of the year = 2362

No. of workers at the end of the year = 2262

No. of worker at left during the period = (2362 – 2262)

= 100

Average no of workers = No. of workers at the beginning at the during the year

$$= \frac{\text{End of the year}}{2}$$

$$= \frac{2362 + 2262}{2}$$

= 2312

$$\text{Labour turnover} = \frac{\text{No. of worker left during the year}}{\text{Average no of workers during the year sales}} \times 100$$

$$= \frac{100}{231} \times 100$$

= 4.32%

FY 2064/065

No. of workers at the beginning of the year = 2262

No. of workers at the end of the year = 22174

No. of worker at left during the period = (2262 – 2174 - 2262) = 88

Average no of workers = No. of workers at the beginning at the during the year

$$= \frac{\text{End of the year}}{2}$$

$$= \frac{2262 + 2174}{2}$$

$$= 2218$$

$$\text{Labour turnover} = \frac{\text{No. of worker left during the year}}{\text{Average no of workers during the year sales}} \times 100$$

$$= \frac{88}{2182} \times 100$$

$$= 3.98\%$$

Year 2065/066

No. of workers at the beginning of the year = 2174

No. of workers at the end of the year = 2011

No. of worker at left during the period = (2174 – 2011)

= 163

Average no of workers = No. of workers at the beginning at the during the year

$$= \frac{\text{End of the year}}{2}$$

$$= \frac{2174 + 2011}{2}$$

= 2092.5

$$\text{Labour turnover} = \frac{\text{No. of worker left during the year}}{\text{Average no of workers during the period}} \times 100$$

$$= \frac{163}{2092.5} \times 100$$

= 7.79%

FY 2066/067

No. of workers at the beginning of the year = 2011

No. of workers at the end of the year = 1957

No. of worker at left during the period = (2011 – 1957)

= 54

Average no of workers = No. of workers at the beginning at the during the year

$$= \frac{\text{End of the year}}{2}$$

$$= \frac{2011 + 1957}{2}$$

= 1984

$$\text{Labour turnover} = \frac{\text{No. of worker left during the year}}{\text{Average no of workers during the period}} \times 100$$

$$= \frac{54}{1984} \times 100$$

= 2.72%

FY 2067/068

No. of workers at the beginning of the year = 1957

No. of workers at the end of the year = 1896

No. of worker at left during the period = (1957 – 1896)

= 61

Average no of workers = No. of workers at the beginning at the during the year

$$= \frac{\text{End of the year}}{2}$$

$$= \frac{1957 + 1896}{2}$$

= 1926.5

$$\text{Labour turnover} = \frac{\text{No. of worker left during the year}}{\text{Average no of workers during the period}} \times 100$$

$$= \frac{61}{1926.5} \times 100$$

= 3.16%

Appendix – 3

Material Variances

F.Y. 2063/064

Standard material 2897 kg @ Rs. 45

Actual material 2824 kg @ Rs. 44.22

Standard output = 4000000 sticks

Actual output = 3050000 sticks

1. Material cost variance = (SQ x SP) – (AQ x AP)

= (2897 x 45) – (2824 x 44.22)

= Rs. 5487.72 favorable

ii) Material price variance = AQ (SP-AP)

= 2824 (45-44.22)

= Rs. 2202.72 favorable

iii) Material usage = SP (SQ-AQ)

= 3.45 (2897 – 2824)

= Rs. 3285

iv) Material yield variance = SR (Actual output – Standard output)

= 45(3050000 – 4000000)

= Rs. 42750000 Adverse

F.Y. 2064/065

Standard material 2456 kg. @ Rs. 45

Actual material 2397 kg. @ Rs. 44.22

Standard output = 3900000 sticks

Actual output = 1951290 sticks

i) Material cost variance = (SQ x SP) – (AQ x AP)

= (2456 x 45)-(2397 x 46.94)

= Rs. 1995.18 Adverse.

ii) Material price variance = AQ (SP-AP)

= 2397 (45-46.94)

= Rs. (2397 x 1.94)

= Rs. 4650.18 Adverse

iii) Materilusage variance = SP (SQ - AQ)

= 45 (2456-2.397)

= Rs. 2655 Favorable

iv) Material yield variance = SR (Actual Output – Standard output)

= 45 (1951290 – 3900000)

= Rs. (45 x 1948710)

= 8791950 Adverse

F.Y. 2065/066

Standard material 1969 kg. @ Rs. 5.2

Actual material 1920 kg. @ Rs. 58.32

Standard output = 3375000 sticks.

Actual output = 1708720 sticks.

i. Material cost variance = (SQ x SP) - (AQ x AP)

= (1969 x 52) - (1920 x 58.32)

=Rs. 9586.40 Adverse

ii. Material price variance = AQ (SP-AP)

= 1920 (52-58.32)

= Rs. (1920 x 6.32)

=Rs. 12134.40 Adverse

iii. Material usage variance = SP (SQ - AQ)

= 52 (1969 - 1920)

= Rs. 52 x 49

= Rs. 2548 Favorable.

iv. Material yield variance = SR (Actual output – Standard output)

= 52 (1708720-3375000)

= Rs. (52 x 1666280)

= 86646560 Adverse

F.Y. 2066/067

Standard material 2333 kg. @ Rs. 65

Actual material 2275 kg. @ Rs. 86.23

Standard output = 270000 sticks.

Actual output = 2079970 sticks.

i. Material cost variance = (SQ x SP) - (AQ x AP)

= (2333 x 52) - (2275 x 86.23)

=Rs. 44528.25 Adverse

ii. Material price variance = AQ (SP - AP)

= 2275 (65-68.23)

= Rs. 48298.25 Adverse

iii. Material usage variance = SP (SQ - AQ)

= 65 (2333 - 2275)

= Rs. 65 x 58

= Rs. 3770 Favorable.

iv. Material yield variance = SR (Actual output – Standard output)

= 65 (2079970 - 2700000)

= Rs. (65 x - 620030)

= Rs. 40301950 Adverse

F.Y. 2067/068

Standard material 2313 kg. @ Rs. 90

Actual material 2275 kg. @ Rs. 93.53

Standard output = 2780000 sticks.

Actual output = 2179450 sticks.

i. Material cost variance = (SQ x SP) - (AQ x AP)

= (2313 x 90) - (2249 x 93.53)

=Rs. 2178.97 Adverse

ii. Material price variance = AQ (SP - AP)

= 2249 (90 – 93.53)

= Rs. 7938.97 Adverse

iii. Materilusage variance = SP (SQ - AQ)

= 90 (2313 - 2249)

= Rs. 90 x 64

= Rs. 5760 Favorable.

iv. Material yield variance = SR (Actual output – Standard output)

= 90 (2179450 - 2780000)

= Rs. (90 x - 600550)

= Rs. 50409500 Adverse

Appendix-4

Total employees of DN in FY 2063/064 to 2067/068 were given in following table

Year	Technician		Non-technician		Total	
	Beginning of year	Ending of year	Beginning of year	Ending of year	Beginning of year	Ending of year
2063/064	1122	1047	1240	1215	2362	2262
2064/065	1047	1008	1215	1166	2262	2171
2065/066	1008	962	1166	1049	2174	2011
2066/067	962	991	1049	966	2011	1957
2067/068	991	963	966	933	1957	1896
2068/069	963		933		1896	

Appendix-5

DN fixed cost, variable cost and sales production in FY 2063/064 to 2067/068 were given below:

Year	Total Sales	Fixed Cost	Variable cost
2063/064	798473	146312	707860
2064/065	686568	166771	633590
2065/066	688032	193815	635755
2066/067	911377	204997	786373
2067/068	960392	205876	802534

Appendix-7

Trading and Profit/Loss Account

Particulars	063/064	064/65	065/66	66/67	67/68	Particulars	063/064	064/65	065/66	66/67	67/68
To opening stock	23068	3745	26299	24734	25829	By Sales	789473	686568	688032	911377	960393
To Mfg. cost	292978	270011	293628	380848	413861	By closing stock	37345	26299	24734	25829	35912
To direct cost (selling)	391814	326234	315828	380791	355216						
To gross profit	118953	79277	77011	150833	201399						
Total	826818	712867	712766	937206	996305	Total	826818	712867	712766	937206	536305
To administrative exp.	106449	99554	113577	123430	126106	By gross profit	118358	79277	77011	150833	201399
To selling dist. exp.	52540	60844	70743	72954	80781	By income from others	150000	185000	185000	1060133	164152
To dep.	1323	1313	2495	2213	1688						
To provision for staff welfare fund (SWF)											
To provision for bonus											
To provision for taxation											
To provision for staff housing											
To provision for general reserve											
To provision for serve											
To Net profit	108046	102566	75196	1012369	150977						
Total	268358	264277	262011	1210966	359552		268358	264277	262011	1210966	365551

1. Fixed cost

Let, least square line of Y on X be

Y = a + bx

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	1446312	-292624	4
2	-1	166771	-166771	1
3	0	193815	0	0
4	1	204997	204997	1
5	2	205876	411752	4
$\sum X$ =15	$\sum x=0$	$\sum y=917771$	$\sum xy$ = 157354	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{917771}{5} = 183554.2 = 183554$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{157354}{10} = 15735.4 = 15735$$

Hence, the least square line fitting the data is

Y= 18354 + 15735x

For x = -2 i.e., 2063/064 Y = 183554 + 15735 x – 2 = 152084

For x = -1 i.e., 2064/065 Y = 183554 + 15735 x – 1 = 167819

For x = 0 i.e., 2065/066 Y = 183554 + 15735 x 0 = 183554

For x = 1 i.e., 2066/067 Y = 183554 + 15735 x 1 = 199289

For x = 2 i.e., 2067/068 Y = 183554 + 15735 x 2 = 215024

2. Variable Cost

Let, least square line of Y on X be

Y = a + bx

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	707860	-1415720	4
2	-1	633590	-633590	1
3	0	635755	0	0
4	1	786373	786373	1
5	2	802534	1605068	4
$\sum X$ =15	$\sum x=0$	$\sum y=356612$	$\sum xy$ = 342131	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{3566112}{5} = 713222.4 = 713222$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{342131}{10} = 34213.1 = 34213$$

Hence, the least square line fitting the data is

Y= 713222 + 34213x

For x = -2 i.e., 2063/064 Y = 713222 + 34213 x – 2 = 644796

For x = -1 i.e., 2064/065 Y = 713222 + 34213 x – 1 = 679009

For x = 0 i.e., 2065/066 Y = 713222 + 34213 x 0 = 713222

For x = 1 i.e., 2066/067 Y = 713222 + 34213 x 1 = 747435

For x = 2 i.e., 2067/068 Y = 713222 + 34213 x 2 = 781648

3. Total Cost

Let, least square line of Y on X be

Y = a + bx

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	854172	-1708344	4
2	-1	800361	-800361	1
3	0	829570	0	0
4	1	991370	991370	1
5	2	1008410	2016820	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 4483883$	$\sum xy = 499485$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{4483883}{5} = 896776.6 = 896777$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{499485}{10} = 49948.5 = 49949$$

Hence, the least square line fitting the data is

$Y = 896777 + 49949x$

For x = -2 i.e., 2063/064 $Y = 896777 + 49949 \text{ x } -2 = 796879$

For x = -1 i.e., 2064/065 $Y = 896777 + 49949 \text{ x } -1 = 846828$

For x = 0 i.e., 2065/066 $Y = 896777 + 49949 \text{ x } 0 = 896777$

For x = 1 i.e., 2066/067 $Y = 896777 + 49949 \text{ x } 1 = 946726$

For x = 2 i.e., 2067/068 $Y = 896777 + 49949 \text{ x } 2 = 996675$

4. Net Sales

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	789473	-1578946	4
2	-1	686568	-686568	1
3	0	688032	0	0
4	1	911377	911377	1
5	2	960393	1920786	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 4035843$	$\sum xy = 566649$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{403543}{5} = 807168.6 = 807169$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{56649}{10} = 56664.9 = 56665$$

Hence, the least square line fitting the data is

$Y = 807169 + 56665x$

For x = -2 i.e., 2063/064 $Y = 807169 + 56665 \times -2 = 693839$

For x = -1 i.e., 2064/065 $Y = 807169 + 56665 \times -1 = 750504$

For x = 0 i.e., 2065/066 $Y = 807169 + 56665 \times 0 = 807169$

For x = 1 i.e., 2066/067 $Y = 807169 + 56665 \times 1 = 863834$

For x = 2 i.e., 2067/068 $Y = 807169 + 56665 \times 2 = 920499$

5. Gross profit

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	118958	-237916	4
2	-1	79277	-79277	1
3	0	77011	0	0
4	1	150833	150833	1
5	2	201399	402798	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 627478$	$\sum xy = 236438$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{627478}{5} = 125495.2 = 125496$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{236438}{10} = 23643.8 = 23644$$

Hence, the least square line fitting the data is

$Y = 125496 + 23644x$

For x = -2 i.e., 2063/064 $Y = 125496 + 23644 \times -2 = 78201$

For x = -1 i.e., 2064/065 $Y = 125496 + 23644 \times -1 = 101852$

For x = 0 i.e., 2065/066 $Y = 125496 + 23644 \times 0 = 125496$

For x = 1 i.e., 2066/067 $Y = 125496 + 23644 \times 1 = 49140$

For x = 2 i.e., 2067/068 $Y = 125496 + 23644 \times 2 = 172734$

6. Net profit

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	–39193	78386	4
2	-1	-80580	80580	1
3	0	-82728	0	0
4	1	-33706	-33706	1
5	2	-2839	-5678	4
$\sum X = 15$	$\sum x = 0$	$\sum y = -239046$	$\sum xy = 119582$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{-239046}{5} = 47809.2 = 47809$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{119582}{10} = 11958.2 = 11958$$

Hence, the least square line fitting the data is

$Y = 807169 + 56665x$

For x = -2 i.e., 2063/064 $Y = 807169 + 56665 \times -2 = -71725$

For x = -1 i.e., 2064/065 $Y = 807169 + 56665 \times -1 = -59767$

For x = 0 i.e., 2065/066 $Y = 807169 + 56665 \times 0 = -47809$

For x = 1 i.e., 2066/067 $Y = 807169 + 56665 \times 1 = -35851$

For x = 2 i.e., 2067/068 $Y = 807169 + 56665 \times 2 = -23893$

7. Selling and Distribution expenses

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	52540	-105080	4
2	-1	60844	-60844	1
3	0	70743	0	0
4	1	72954	72954	1
5	2	80781	161562	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 337862$	$\sum xy = 68592$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{337862}{5} = 67572.4 = 67572$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{68592}{10} = 6859.2 = 6859$$

Hence, the least square line fitting the data is

$Y = 67572 + 6859x$

For x = -2 i.e., 2063/064 $Y = 67572 + 6859 \times -2 = 53854$

For x = -1 i.e., 2064/065 $Y = 67572 + 6859 \times -1 = 60713$

For x = 0 i.e., 2065/066 $Y = 67572 + 6859 \times 0 = 67572$

For x = 1 i.e., 2066/067 $Y = 67572 + 6859 \times 1 = 74431$

For x = 2 i.e., 2067/068 $Y = 67572 + 6859 \times 2 = 81290$

8. Administrative expenses

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \bar{X})$	y	xy	x^2
1	-2	106449	-212898	4
2	-1	99554	-99554	1
3	0	113577	0	0
4	1	123430	123430	1
5	2	126106	252212	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 569116$	$\sum xy = 63190$	$\sum x^2 = 10$

$$\bar{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{569116}{5} = 113823.2 = 113823$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{63190}{10} = 6319$$

Hence, the least square line fitting the data is

$Y = 113823 + 6319x$

For x = -2 i.e., 2063/064 $Y = 113823 + 6319 \times -2 = 101185$

For x = -1 i.e., 2064/065 $Y = 113823 + 6319 \times -1 = 107504$

For x = 0 i.e., 2065/066 $Y = 113823 + 6319 \times 0 = 113823$

For x = 1 i.e., 2066/067 $Y = 113823 + 6319 \times 1 = 120142$

For x = 2 i.e., 2067/068 $Y = 113823 + 6319 \times 2 = 126461$

9. Manufacturing cost

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	292978	-585956	4
2	-1	170011	-270011	1
3	0	293628	0	0
4	1	380348	380348	1
5	2	413861	827722	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 1650823$	$\sum xy = 352103$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{1650826}{5} = 330165.2 = 330165$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{352103}{10} = 35210.3 = 35210$$

Hence, the least square line fitting the data is

$Y = 330165 + 35210x$

For x = -2 i.e., 2063/064 $Y = 330165 + 35210 \times -2 = 259745$

For x = -1 i.e., 2064/065 $Y = 330165 + 35210 \times -1 = 294955$

For x = 0 i.e., 2065/066 $Y = 330165 + 35210 \times 0 = 330165$

For x = 1 i.e., 2066/067 $Y = 330165 + 35210 \times 1 = 365375$

For x = 2 i.e., 2067/068 $Y = 330165 + 35210 \times 2 = 400585$

10. Production

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	2267052	-4534104	4
2	-1	1951290	-1951290	1
3	0	1708720	0	0
4	1	2079970	2079970	1
5	2	2179450	4350900	4
$\sum X$ =15	$\sum x=0$	$\sum y= 10186482$	$\sum xy = -46524$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{10186482}{5} = 2037296.4 = 2037296$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{-46524}{10} = 4652.4 = 4652$$

Hence, the least square line fitting the data is

Y= 2037296 + (-4652)x

For x = -2 i.e., 2063/064 Y = 2037296 + (-4652) x – 2 = 2046600

For x = -1 i.e., 2064/065 Y = 2037296 + (-4652) x – 1 = 2041948

For x = 0 i.e., 2065/066 Y = 2037296 + (-4652) x 0 = 2037296

For x = 1 i.e., 2066/067 Y = 2037296 + (-4652) x 1 = 2032644

For x = 2 i.e., 2067/068 Y = 2037296 + (-4652) x 2 = 2027992

11. Raw material Cost Per Kg.

Let, least square line of Y on X be

Y = a + bx

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	44.22 = 44	-88	4
2	-1	46.94 = 74	-74	1
3	0	58.32 = 58	0	0
4	1	86.23 = 86	86	1
5	2	93.53 = 94	188	4
$\sum X = 15$	$\sum x = 0$	$\sum y = 329$	$\sum xy = 139$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{329}{5} = 65.8 = 66$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{139}{10} = 13.9 = 14$$

Hence, the least square line fitting the data is

$Y = 66 + 14x$

For x = -2 i.e., 2063/064 $Y = 66 + 14 \times -2 = 38$

For x = -1 i.e., 2064/065 $Y = 66 + 14 \times -1 = 52$

For x = 0 i.e., 2065/066 $Y = 66 + 14 \times 0 = 66$

For x = 1 i.e., 2066/067 $Y = 66 + 14 \times 1 = 80$

For x = 2 i.e., 2067/068 $Y = 66 + 14 \times 2 = 94$

12. Overtime cost

Let, least square line of Y on X be

$Y = a + bx$

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	y	xy	x^2
1	-2	3050000	-6100000	4
2	-1	3248000	-3248000	1
3	0	3299000	0	0
4	1	8000000	8000000	1
5	2	10609000	21218000	4
$\sum X$ =15	$\sum x=0$	$\sum y= 28206000$	$\sum xy$ = 19870000	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{28206000}{5} = 5641200$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{19870000}{10} = 1987000$$

Hence, the least square line fitting the data is

Y= 5641200 + 1987000x

For x = -2 i.e., 2063/064 Y = 5641200 + 1987000 x – 2 = 1667200

For x = -1 i.e., 2064/065 Y = 5641200 + 1987000 x – 1 = 36425200

For x = 0 i.e., 2065/066 Y = 5641200 + 1987000 x 0 = 5641200

For x = 1 i.e., 2066/067 Y = 5641200 + 1987000 x 1 = 7628200

For x = 2 i.e., 2067/068 Y = 5641200 + 1987000 x 2 = 9615200

13. Sales (in quantity)

Let, least square line of Y on X be

Y = a + bx

and coding the time in trend analysis.

FY 2063/064, 2064/065, 2065/066, 2066/067 and 2067/068 as 1, 2, 3, 4 and 5

X	$x = (X - \overline{X})$	Y	xy	x^2
1	-2	2160088	-4320176	4
2	-1	1963613	-1963613	1
3	0	1728980	0	0
4	1	2047005	2047005	1
5	2	2119182	4238370	4
$\sum X$ =15	$\sum x=0$	$\sum y= 10018871$	$\sum xy = 1586$	$\sum x^2 = 10$

$$\overline{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$$a = \frac{\sum y}{N} = \frac{10018871}{5} = 2003774.2 = 2003774$$

$$b = \frac{\sum xy}{\sum x^2} = \frac{1586}{10} = 158.6 = 159$$

Hence, the least square line fitting the data is

$Y= 2003774 + 159x$

For x = -2 i.e., 2063/064 $Y = 2003774 + 159 x – 2 = 2003456$

For x = -1 i.e., 2064/065 $Y = 2003774 + 159 x – 1 = 2003615$

For x = 0 i.e., 2065/066 $Y = 2003774 + 159 x 0 = 2003774$

For x = 1 i.e., 2066/067 $Y = 2003774 + 159 x 1 = 2003933$

For x = 2 i.e., 2067/068 $Y = 2003774 + 159 x 2 = 2004092$

Appendix – 10

Correlation

i) Sales and selling and distribution expenses

Let, Sales = x

Selling and distribution expenses = Y

Calculation of coefficient of correlation

(in 0000)

X	**x = (X– $\bar{X}$)**	**X^2**	**Y**	**y = (Y– $\bar{Y}$)**	**Y^2**	**xy**
78947	-1770	3132900	5254	-1503	2259009	2660310
68657	-12060	145443600	6084	-673	452929	8116380
68803	-11914	141943396	7074	317	400489	3775738
91138	10421	108597241	7295	538	289444	5606498
96039	15322	234763684	8078	1321	1745041	20240362
$\sum$ X = 403584		$\sum x^2$ = 633880821	$\sum$ y = 33785		$\sum y^2$ = 4846912	$\sum$ xy = 40400288

$$\bar{X} = \frac{\sum X}{N} = \frac{403584}{5} = 80716.8 = 80717$$

$$\bar{Y} = \frac{\sum Y}{N} = \frac{33785}{5} = 6757$$

The correlation coefficient between x and y is

$$r = \frac{\sum X}{\sqrt{x^2 \times y^2}}$$

$$= \frac{40400288}{\sqrt{633880821 \times 4846912}}$$

$$= \frac{40400288}{55428914.46} = 0.7288 = 0.73$$

ii) Production and sales (in quantity)

Let, Production = X

Sales = Y

Calculation of coefficient of correlation

(in 0000)

X	**x = (X– $\bar{X}$)**	**X^2**	**Y**	**y = (Y– $\bar{Y}$)**	**Y^2**	**xy**
2267052	229756	52787819536	2160088	4163862	17337746755044	956672277672
1951290	-86006	7397032036	1963613	3967387	15740159607769	-341219086322
1708720	-328576	107962187776	1728980	3732754	13933452424516	-1226493378304
2079970	42674	1821070276	2047005	4050779	16408810506841	172862943046
2179450	142154	2020775972	2119185	4122959	16998790915681	586095113686
$\sum X$ = 10186482		$\sum x^2$ = 171988885596	$\sum y$ = 10018871		$\sum y^2$ = 80418960209851	$\sum xy$ = 147917869778

$$\bar{X} = \frac{\sum X}{N} = \frac{10186482}{5} = 2037296.4 = 2037296$$

$$\bar{Y} = \frac{\sum Y}{N} = \frac{10018871}{5} = 20037742 = -2003774$$

The correlation coefficient between x and y is

$$r = \frac{\sum X}{\sqrt{x^2 \times y^2}}$$

$$= \frac{147917869778}{\sqrt{171988885566 \times 8041890209}} = 0.040$$