

Budgeting and Materials Resource Planning

Budget

- A budget is an instrument of management used as an aid in the planning, programming and control of business activity.
- A budget may be defined as a financial and/or quantitative statement, prepared and approved prior to a defined period of time, of the policy to be pursued during that period for the purpose of attaining a given objective.
- It may include income, expenditure and employment of capital.
- Based upon this definition, a recreation budget of a person for one fine evening may look as:

Taxi charges to cinema hall = Rs. 100

Cinema ticket = Rs. 200

Dinner in a restaurant = Rs. 300

Taxi charges back to home = Rs. 100

Total = Rs. 700

Budget

- The budget is a statement showing the way the person plans to spend Rs. 700.
- Thus budget is a written plan of action.
- A budget is used for cost control purposes and it is one of the most important overall control devices employed by management.
- A budget represents the financial requirements of different sections of the business during a given period to achieve an estimated profit based upon a given volume of sales.
- A budget is based upon past statistical data and it predicts the estimated labour, sales, production and other management requirements for future, ie., for a definite budgetary period (of time).
- A budget can be thought of as an overall plan for the operation of the business in terms of sales, production and expenditures.

Budgeting

- Budgeting is an art of budget making.
- Budget plays an important role in the development and use of modern cost accounting systems in all types of business enterprises.
- A good budgeting shows the manager what he may expect in sales over the next few months; it permits the formulation of a production quota including the types and quantities of material, the number and kind of laborer's, the amount of overhead and the fixed assets requirements; and it points out financial requirements needed to accomplish the budget plans.
- Thus, budgeting implies forecasting and preplanning for the budget period, basing upon past (experience) statistical data, and present conditions.

Requirements for an Effective Budgeting

- There should be a proper and recognized organization (for budgeting) with all lines of authority and responsibility definitely allocated and defined.
- The budget should distinctly mark the responsibilities of each section of the business.
- Since a budget is based on estimates of sales, costs, etc., good care should be taken to make estimates.
- Cost accounting data should be used for (estimating) forecasting purposes.
- A budget should be made flexible so that unavoidable changes may be incorporated if and when necessary.

Budgetary Control

- Budgetary control makes use of budgets for planning and controlling all aspects of producing and/or selling products or services.
- Budgetary control attempts to show the plans in financial terms.
- Budgetary control is the planning in advance of the various functions of a business so that the business can be controlled.
- Budgetary control relates expenditure to a section or department who incurs the expenditure, so that the actual expenses can be compared with the budgeted ones, thus providing a convenient method of control.
- Budgetary control includes forecasts of income and expenditures (for the budgetary period) on equipment, machinery, manpower, materials, etc., necessary for the efficient production and distribution of estimated volume of sale.

Budgetary Control

- The budgetary control when applied to a business as a whole or to different sections within the business - compares actual performance and the predicted performance and thus enables all levels of management and supervision to know how their sections (of business) are moving towards the achievements of budgeted targets. Is corrective action needed; should it be applied?
- Thus, budgetary control attempts to bring actual performance at par with the predicted performance by keeping a strict supervisory eye on the actual performance and by exercising a control, if necessary.

Objectives of Budgets, Budgeting and Budgetary Control

- Budget should specify units to be produced, broken down into sizes and styles, as well as cost of production.
- Budget should analyze all the factors affecting the sections/departments and the business as a whole.
- Budget should facilitate planning within the company. It should help planning future income and expenses.
- Budget should harmonies departmental programs.
- Budget should serve as a medium of propagating policies throughout the business enterprise.
- Budget should hold back or control unwise expenditure.
- Budget should help stabilizing production and harmonise production and sale programs.
- Budgeting should decide basis for expenditure of funds.

Objectives of Budgets, Budgeting and Budgetary Control

- Besides planning, budgetary control should provide a basis for, measuring performance and exercising control-control means noting when expenditures fall outside the budget estimates, tracing down the cause of such variation and taking necessary corrective action.
- Budgetary control should watch the progress of achievements of the business enterprise and evaluate policies of the management.
- Budgetary control should pin-point those areas which are not working efficiently and according to the predetermined targets.
- Budgetary control, after planning, should coordinate the activities of a business so that each is a part of an integral total.
- Budgetary control should facilitate financial control; and control each function so that the best possible results may be obtained.
- A budget should be flexible.

Advantages of Budgets, Budgeting and Budgetary Control

- Policy, plans and actions taken are all reflected in the budgetary control system. There is a formal recognition of the targets which the business hopes to achieve.
- Not only departmental programs are developed, over expenditures in departments are also curtailed and controlled.
- Budgeting makes for better understanding, coordination and harmony of action in a business enterprise, because all departments take part in budget preparation.
- The targets, goals and policies of a business enterprise are clearly defined.
- Deviations from predetermined plans are brought to notice through variance analysis and corrective action is stimulated by reports, statements and personal contacts.

Advantages of Budgets, Budgeting and Budgetary Control

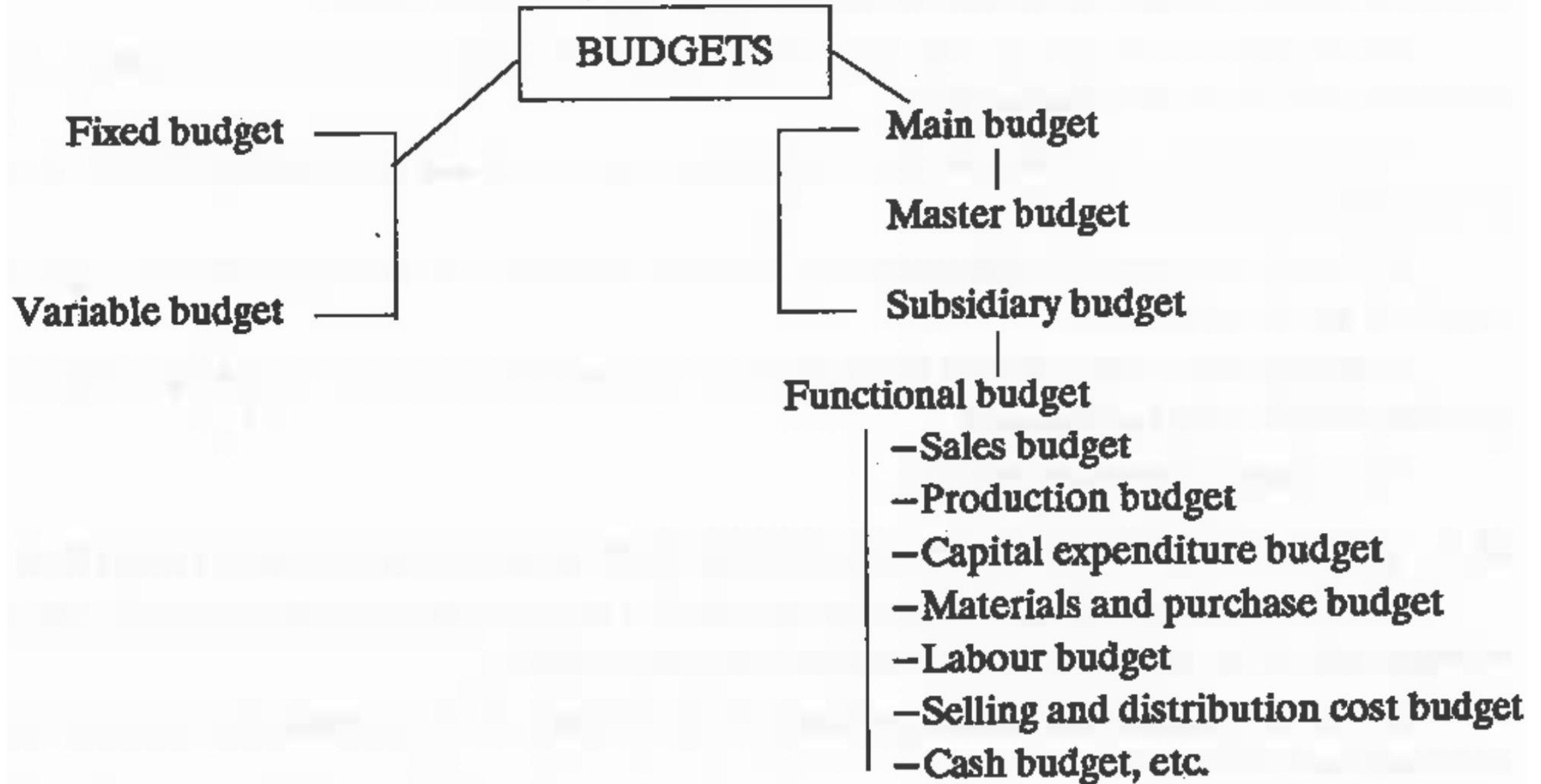
- It provides management with a guide of daily activities; thus helps determining performance and efficiency of each department, thereby leading to improvement.
- It informs management the progress made towards achieving the predetermined objectives.
- It facilitates financial control.
- Total capital required and price of an item (product) can be estimated in advance.
- Budgetary control builds morale when operated in a truly managerial spirit, i.e., it should not acquire merely a clerical outlook (or approach).

Limitations of Budgets, Budgeting and Budgetary Control

- Since budget is based on estimates, i.e., estimated sales, estimated costs, estimated business conditions, etc. it may need periodic revisions because estimates may not come out to be cent per cent true.
- A budget may not work if the idea of budgeting is not sold properly to different sections of the business. Only the persons working in different sections can make an established budget, a success. Thus it should be a cooperative budgeting.

A budget cannot work until the desire to make it work is established in the minds of persons working in the different sections of a business concern.

Types of Budgets



Types of Budgets / Fixed Budget

- A fixed or static budget shows one plan, one volume of output or sales and the related fixed costs.
- The fixed budget depends upon the ability to predict income, sales or shipments with at least a reasonable degree of accuracy. It assumes that this prediction or forecast will prove correct. Thus no provision is made for any changes that may occur during the budget period.
- Fixed budget serves a valuable purpose in the planning and control of certain fixed types of expenditures, e.g., a research project, hospitals, schools and colleges, etc.

Types of Budgets / Variable Budget

- A variable or flexible budget recognizes the unreliability of income or sales predictions and makes provision in advance for variations in production and expenditures in accordance with variations in sales.
- A variable budget shows a range of volumes of output or sales or costs for each.
- Variable budget takes in account only those costs, e.g., direct labour and materials, which vary with output and over which the department has control.
- Flexible budgets are used by those concerns whose activities and levels of operation, etc., are uncertain. This may be due to an uncertainty in customer demand, shortage of materials, labour disputes, priorities etc., which make business forecasting and preparation of accurate budget a difficult matter. For example, for a large bottler of soft drinks, it is difficult to forecast production and sales accurately because of weather changes, conventions, military demand etc.

Types of Budgets / Functional Budget

- A functional budget is one which relates to any of the functions of an undertaking e.g., sales, production, cash etc.
- Functional budgets are subsidiary to the master budget.
- The frequently used functional budgets are :
 1. Sales budget.
 2. Production and manufacturing budget.
 3. Capital expenditure budget.
 4. Material and purchase budget.
 5. Direct labour budget,
 6. Selling and distribution budget.
 7. Cash budget.

Types of Budgets / Functional Budget

1. Sales Budget

- This is the budget to which all other budgets must be geared.
- The estimated sales volume must be a realistic assessment of what can be sold. If sales figure is wrong, then practically all other budgets and especially the master budget will be affected.
- It is very difficult to prepare a sales budget because it is not simple to estimate consumer's future demands especially when the company is introducing a new product in the market.
- A sales budget is an estimate of the quantity of products that will be sold and the rupee revenue that will be received during the budgeted period (1, 2, 3 or 5 years).

Types of Budgets / Functional Budget

1. Sales Budget

Sales budget may be prepared by

- i. Head office personnel
- ii. Top executives on the basis of their past experience, judgement and opinions, and
- iii. The information collected from salesmen in the market, regional sales supervisors, sales executives, etc.

The following data should be considered in estimating sales:

- i. Information concerning past performance.
- ii. Statistics in regard to present conditions within the company and in each sales territory.
- iii. Data concerning the industry and general business conditions, e.g., unemployment conditions, steel, coal, and oil production, wholesale price indices, interest rate, etc.

Types of Budgets / Functional Budget

2. Production and Manufacturing Budgets

- A production Budget may be prepared by production manager in consultation with his assistants after receiving the sales budget.
- A production budget shows the quantity of products to be manufactured. It is based upon :
 - i. Sales budget
 - ii. Factory capacity (production and storage),
 - iii. Budgeted stock requirements,
 - iv. Economic lot size, and
 - v. Availability of raw material and labour, etc.
- A production budget finds the cost of producing the estimated volume of salable products.
- A production plan is calculated in terms of the number of units to be produced in each period, say a month.

Types of Budgets / Functional Budget

2. Production and Manufacturing Budgets

- Manufacturing budget needs the following basis budgets Or estimates to meet the plans.
 - i. Production budget outlining the schedule of product units to be manufactured.
 - ii. Direct material budget.
 - iii. Plant (space) and equipment budget.
 - iv. Maintenance budget.
 - v. Manufacturing expense budget (overhead).
 - vi. Labour budget.
- Production budget is a part of Manufacturing budget. Manufacturing budget helps management in keeping production at an even level and in controlling the use of labour, material, equipment, etc.
- Production budget may be compiled on departmental basis.

Types of Budgets / Functional Budget

3. Capital Expenditure Budget

- Capital expenditure budget represents the estimated expenditure on fixed assets during the budget period.
- The capital expenditure budget is prepared based upon the following information:
 - i. Requirements of new production machinery submitted by production manager.
 - ii. Overloading (in time for any corrective action, ef., overtime working, etc.) shown in the plant utilization budget.
 - iii. Requirements of new service machinery submitted by Works engineer.
 - iv. Requirement of a new transport by the distribution manager.
 - v. Board's decision to extend building, etc.
- Since usually there is insufficient money available to indulge in all the capital expenditures which appear justified, capital expenditure therefore should be related to the cash position of the business and pruned accordingly.

Types of Budgets / Functional Budget

4. Materials and Purchase Budget

- **A material budget** shows the quantities of each major type of raw material required by months or quarters to produce the goods as per the manufacturing budget.
- When determining the standard quantities, it is usual to allow for normal wastage and for parting off.
- Material quantities may be assessed from past-records, test runs, or technical estimates based on weight content or other factors.
- **Purchases budget** is prepared using the information available from materials budget.
- Purchases budget represents the total purchases to be made in the budget period.
- Purchases budget details the quantity of raw material (which should be available at the right time) and the estimated cost of the material.
- Purchases budget helps constructing purchase plans in accordance with established inventory procedures.

Types of Budgets / Functional Budget

5. Direct Labour Budget

- It contains an estimate of direct labour required to manufacture the products shown on the production budget.
- Labor requirements are determined as follows :
 - i. Split the product into operations.
 - ii. Using work study calculate the standard time for each operation.
 - iii. From step (ii) above, calculate total number of hours required for production.
 - iv. Convert the hours into labour requirements.
- Direct labour budget is prepared as follows:
 - i. Calculate man power requirements for the department. Ascertain the grade (ie., male and female) and the number of workmen.
 - ii. Set standard wage rates for the workmen.

Types of Budgets / Functional Budget

6. Cash Budget

- The direct labour budget helps establishment of a cash budget because each cash requirements for payments to workers have been estimated accurately.
- It is very necessary to procure cash to meet the company's needs. Cash budget represents the cash receipts and payments and the estimated cash balance for each month of the budget period.

Functions of Cash budget:

- To ensure that sufficient cash is available when required to meet daily cash expenditures.
- To reveal any expected shortage of cash so that it may be arranged by taking loan or through a bank overdraft.
- To reveal any expected surplus of cash so that it may be loaned or invested.

Types of Budgets / Functional Budget

- Cash budget should include two distinct parts, one including a detailed estimate of cash receipts and the other presenting a detailed estimate of cash disbursements.
- The estimates contained in the cash budget are projections of the cash requirements, assuming that the estimates of sales, production and costs included in all other budgets are correctly prepared.

7. Selling and Distribution Budget

- Selling and distribution are essential aspects of the profit earning functions.
- Selling and distribution budget represents the cost of selling and distributing the quantities shown in the Sales budget.

Types of Budgets / Master Budget

- Once the functional budgets have been completed, the next step is the preparation of the master budget.
- In brief, master budget includes the information from all functional budgets. It may be regarded as a summary budget. It portrays the overall plan for the budget period.
- Master budget is, in effect, a planned profit and loss account and balance sheet together with a
- certain statistical information such as return on capital employed, current ratio and quick or liquid ratio.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick or Liquid ratio} = \frac{\text{Liquid assets}}{\text{Current liabilities}}$$

Material Requirement Planning (MRP)

- MRP refers to the basic calculations used to determine components required from end item requirements. It also refers to a broader information system that uses the dependence relationship to plan and control manufacturing operations.

“Materials Requirement Planning (MRP) is a technique for determining the quantity and timing for the acquisition of dependent demand items needed to satisfy master production schedule requirements.”

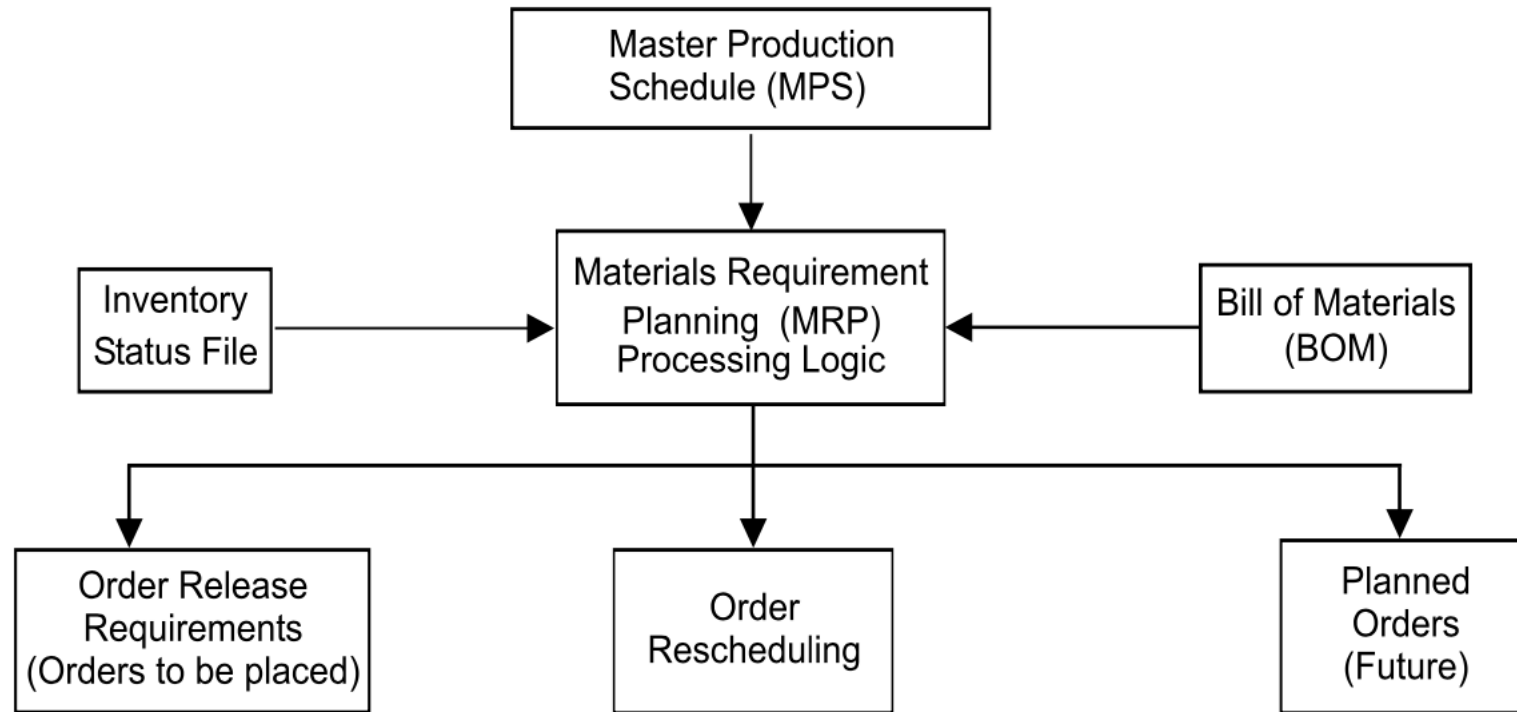
Objectives of MRP

- 1. Inventory reduction:** MRP determines how many components are required when they are required in order to meet the master schedule. It helps to procure the materials/ components as and when needed and thus avoid excessive build up of inventory.
- 2. Reduction in the manufacturing and delivery lead times:** MRP identifies materials and component quantities, timings when they are needed, availabilities and procurements and actions required to meet delivery deadlines. MRP helps to avoid delays in production and priorities production activities by putting due dates on customer job order.
- 3. Realistic delivery commitments:** By using MRP, production can give marketing timely information about likely delivery times to prospective customers.
- 4. Increased efficiency:** MRP provides a close coordination among various work centres and hence help to achieve uninterrupted flow of materials through the production line. This increases the efficiency of production system.

MRP System

The inputs to the MRP system are:

- (1) A master production schedule
- (2) An inventory status file
- (3) Bill of materials (BOM).



Using these three information sources, the MRP processing logic (computer programme) provides three kinds of information (output) for each product component: order release requirements, order rescheduling and planned orders.

MRP System

1. Master Production Schedule

- MPS is a series of time phased quantities for each item that a company produces, indicating how many are to be produced and when. MPS is initially developed from firm customer orders or from forecasts of demand before MRP system begins to operate.
- The MRP system whatever the master schedule demands and translates MPS end items into specific component requirements.
- Many systems make a simulated trial run to determine whether the proposed master can be satisfied.

MRP System

2. Inventory Status File

- Every inventory item being planned must have an inventory status file which gives complete and up to date information on the on-hand quantities, gross requirements, scheduled receipts and planned order releases for an item.
- It also includes planning information such as lot sizes, lead times, safety stock levels and scrap allowances.

3. Bill of Materials (BoM)

- BOM identifies how each end product is manufactured, specifying all subcomponents items, their sequence of build up, their quantity in each finished unit and the work centres performing the build up sequence.
- This information is obtained from product design documents, workflow analysis and other standard manufacturing information.

Lot Sizing

Lot sizing involves determining the amount of an item that needs to be manufactured. Whether Mohan needs to make 100 monitors every week or 1,000, lot sizing will help him determine the perfect lot size, or number of units. So, how does he approach lot sizing?

There are two basic approaches: static and dynamic:

Static lot sizing involves manufacturing the same quantity of items regularly. For example, if Mohan decides that he needs to make 100 glucose monitors per week on average, a static lot sizing approach will allow him to make 100 monitors every single week. But what happens if the amount he needs varies from week to week? He ends up with leftover inventory (sometimes called safety stock) in the weeks where he sells less than he makes, and the safety stock can then be used in those weeks where he sells more than he makes.

All that sounds okay, but what if Mohan doesn't want a large safety stock and doesn't want to store the extra monitors in his warehouse? What if, instead, he wants to produce just the right number of monitors each week to keep up with demand?

Lot Sizing

Dynamic lot sizing involves manufacturing different quantities of items based on what orders have been placed. For example, if Mohan has a big order from a hospital one week and needs 150 monitors, then dynamic lot sizing will allow him to make 150 monitors that week. Then, the following week, if he only needs 50 monitors, that's how many he'll produce. Dynamic lot sizing does away with having a large safety stock (though Mohan still might have some inventory set aside in his warehouse). It allows him to respond to the demand he's seeing at the moment.

Of course, there's a problem with this approach, too: Mohan could run into trouble if he gets a big order and doesn't have enough time to manufacture enough monitors. For example, if a client wants to order 300 monitors, but his factory can only make 150 monitors by the time the client needs them, then he's out of luck. On the other hand, if he has a large safety stock (as he likely will with static lot sizing), he can make up the rest of the order from the inventory in his warehouse. Hence, both static and dynamic lot sizing have benefits and drawbacks.

Lot Sizing

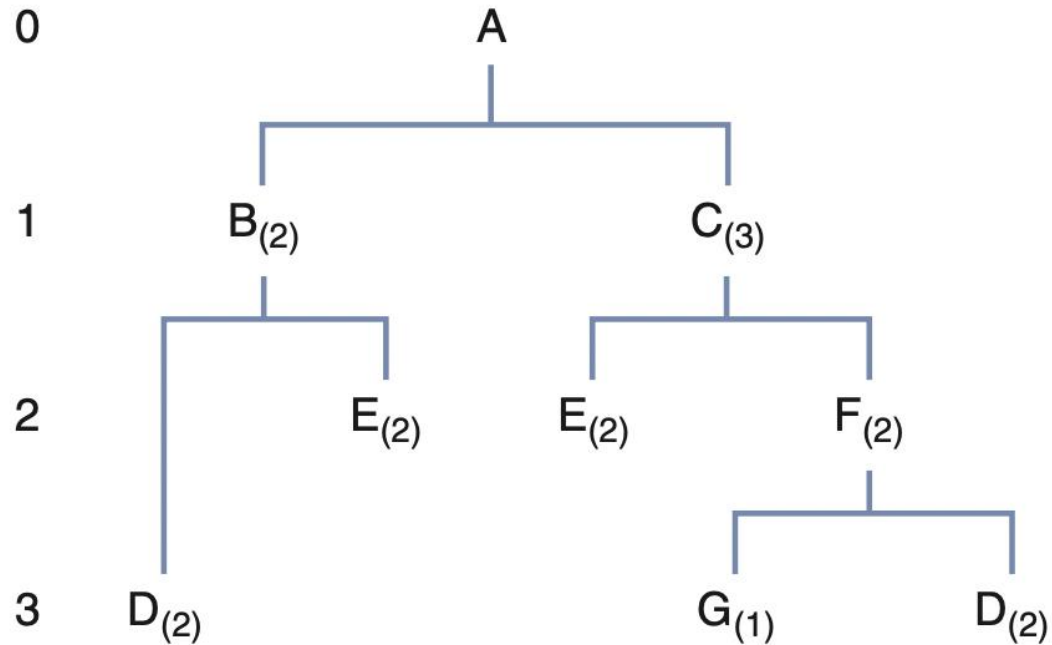
There are several methods for lot sizing. Some of the most popular are:

- Lot for Lot
- Economic order Quantity (EOQ)
- Period Order Quantity (POQ)
- Fixed Order Quantity
- Periods of Supply
- Least Unit Cost
- Least Total Cost
- Part Period Balancing

Example

Required Awesome Speaker Kits (A) = 50,

Level Product structure for “Awesome” (A)



Lead Times for Awesome Speaker Kits (As)

COMPONENT	LEAD TIME
A	1 week
B	2 weeks
C	1 week
D	1 week
E	2 weeks
F	3 weeks
G	2 weeks

Example

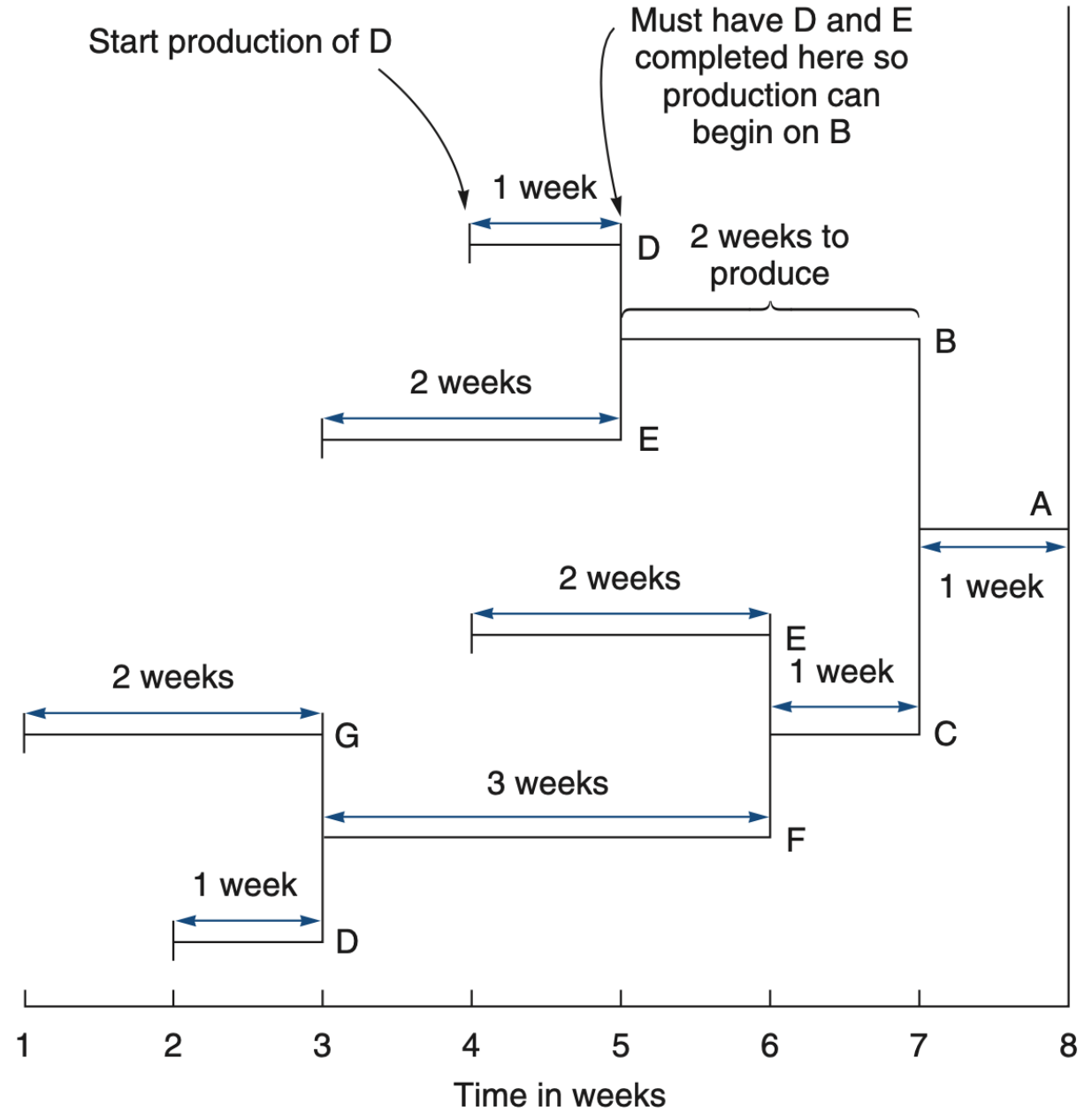
Calculation of each part required from product structure.

Required Awesome Speaker Kits (A) = 50,

Part B:	$2 \times \text{number of As} =$	$(2)(50) =$	100
Part C:	$3 \times \text{number of As} =$	$(3)(50) =$	150
Part D:	$2 \times \text{number of Bs} + 2 \times \text{number of Fs} =$	$(2)(100) + (2)(300) =$	800
Part E:	$2 \times \text{number of Bs} + 2 \times \text{number of Cs} =$	$(2)(100) + (2)(150) =$	500
Part F:	$2 \times \text{number of Cs} =$	$(2)(150) =$	300
Part G:	$1 \times \text{number of Fs} =$	$(1)(300) =$	300

Example

(Time-Phased Product Structure
from lead time)



Example

	WEEK								LEAD TIME
	1	2	3	4	5	6	7	8	
A. Required date Order release date							50	50	1 week
B. Required date Order release date					100		100		2 weeks
C. Required date Order release date						150	150		1 week
E. Required date Order release date			200	300	200	300			2 weeks
F. Required date Order release date			300			300			3 weeks
D. Required date Order release date		600	600	200	200				1 week
G. Required date Order release date	300		300						2 weeks

(Gross material requirement plan for 50 Awesome Speaker Kits with order release date)

Example

Interpretation of Gross Material Requirement Plan:

- If you want 50 units of A at week 8, you must start assembling A in week 7. Thus, in week 7, you will need 100 units of B and 150 units of C. These two items take 2 weeks and 1 week, respectively, to produce.
- Production of B, therefore, should start in week 5, and production of C should start in week 6 (lead time subtracted from the required date for these items). Working backward, we can perform the same computations for all of the other items. Because D and E are used in two different places in Awesome speaker kits, there are two entries in each data record.

Example

- So far, we have considered *gross material requirements*, which assumes that there is no inventory on hand.
- A net requirements plan adjusts for on-hand inventory.
- When considering on-hand inventory, we must realize that many items in inventory contain subassemblies or parts.
- If the gross requirement for Awesome speaker kits (As) is 100 and there are 20 of those speakers on hand, the net requirement for As is 80 ($100 - 20$).
- However, each Awesome speaker kit on hand contains 2 Bs. As a result, the requirement for Bs drops by 40 Bs ($20 \text{ A kits on hand} \times 2 \text{ Bs per A}$).
- Therefore, if inventory is on hand for a parent item, the requirements for the parent item and all its components decrease because each Awesome kit contains the components for lower-level items.

Example

- Consider the following on-hand inventory of speaker kits. Now, Determine Net requirement plan.
- Net material requirement plan for 50 units of Product A in week 8.

ITEM	ON HAND	ITEM	ON HAND
A	10	E	10
B	15	F	5
C	20	G	0
D	10		

Example

Lot Size	Lead Time (weeks)	On Hand	Safety Stock	Allocated	Low-Level Code	Item Identification	Week										
							1	2	3	4	5	6	7	8			
Lot-for-Lot	1	10	—	—	0	A	Gross Requirements									50	
							Scheduled Receipts										
							Projected On Hand	10	10	10	10	10	10	10	10	10	
							Net Requirements									40	
							Planned Order Receipts									40	
							Planned Order Releases								40		
Lot-for-Lot	2	15	—	—	1	B	Gross Requirements								80 ^A		
							Scheduled Receipts										
							Projected On Hand	15	15	15	15	15	15	15	15	15	
							Net Requirements									65	
							Planned Order Receipts									65	
							Planned Order Releases							65			
Lot-for-Lot	1	20	—	—	1	C	Gross Requirements								120 ^A		
							Scheduled Receipts										
							Projected On Hand	20	20	20	20	20	20	20	20	20	
							Net Requirements									100	
							Planned Order Receipts									100	
							Planned Order Releases								100		

Lot-for-Lot Technique

- With lot-for-lot, we order material only as it is needed. Once we have the cost of ordering (setting up), the cost of holding each unit for a given time period, and the production schedule, we can assign orders to our net requirements plan.
- This decision is consistent with the objective of an MRP system, which is to meet the requirements of dependent demand.
- Thus, an MRP system should produce units only as needed, with no safety stock and no anticipation of further orders.
- When frequent orders are economical (i.e., when setup costs are low) and just-in-time inventory techniques implemented, lot-for-lot can be very efficient. However, when setup costs are significant, lot-for-lot can be expensive.

Lot-for-Lot Technique

Example:

Holding cost = Rs. 1/unit/week,

Setup cost = Rs. 100

Gross requirement average per week = 27,

Lead time = 1 week

WEEK		1	2	3	4	5	6	7	8	9	10
Gross requirements		35	30	40	0	10	40	30	0	30	55
Scheduled receipts											
Projected on hand	35	35	0	0	0	0	0	0	0	0	0
Net requirements		0	30	40	0	10	40	30	0	30	55
Planned order receipts			30	40		10	40	30		30	55
Planned order releases		30	40		10	40	30		30	55	

Lot-for-Lot Technique

- The lot-sizing solution using the lot-for-lot technique is shown in the table.
- The holding cost is zero as there is never any end-of-period inventory.
- Inventory in the first period is used immediately and therefore has no holding cost.
- But seven separate setups (one associated with each order) yield a total cost of Rs. 700. (Holding cost = $0 \times 1 = 0$; ordering cost = $7 \times 100 = 700$.)

EOQ Technique

- EOQ is useful when we have relatively constant demand. However, demand may change every period in MRP systems. Therefore, EOQ lot sizing often does not perform well in MRP. Operations managers should take advantage of demand information when it is known, rather than assuming a constant demand.

Example:

Holding cost = Rs. 1/unit/week,

Setup cost = Rs. 100

Gross requirement average per week = 27,

Lead time = 1 week

EOQ Technique

- Ten-week usage equals a gross requirement = $27 * 10 = 270$ units
- Weekly usage equals 27, and 52 weeks (annual usage) = 1,404 units

$$\text{EOQ Model} = Q^* = \sqrt{\frac{2DS}{H}}$$

Where,

D = Annual usage = 1404

S = Setup cost = 100

H = Holding cost on annual basis per unit = Rs. 1 * 52 weeks = 52

$$Q^* = 73 \text{ units}$$

Therefore, place an order of 73 units, as necessary, to avoid a stockout.

EOQ Technique

WEEK		1	2	3	4	5	6	7	8	9	10
Gross requirements		35	30	40	0	10	40	30	0	30	55
Scheduled receipts											
Projected on hand	35	35	0	43	3	3	66	26	69	69	39
Net requirements		0	30	0	0	7	0	4	0	0	16
Planned order receipts			73			73		73			73
Planned order releases		73			73		73			73	

For the 10-week planning period:

Holding cost = 375 units * RS. 1 = RS. 375 (includes 57 remaining at the end of week 10)

Ordering cost = 4 * Rs. 100 = Rs. 400

Total = Rs. 375 + Rs. 400 = \$775

Lot Sizing with POQ

- Periodic order quantity (POQ) is a lot-sizing technique that orders the quantity needed during a predetermined time between orders, such as every 3 weeks.
- We define the POQ interval as the EOQ divided by the average demand per period.
- The POQ is the order quantity that covers the specific demand for that interval.
- Each order quantity is recalculated at the time of the order release, never leaving extra inventory.
- Using previous example data we will determine net requirements and POQ lot sizes.

Lot Sizing with POQ

- We know from previous data that $EOQ = 73$ units.
- Now,

$POQ \text{ interval} = EOQ / \text{Average weekly usage} = 73 / 27 = 2.7$, or 3 weeks

WEEK		1	2	3	4	5	6	7	8	9	10
Gross requirements		35	30	40	0	10	40	30	0	30	55
Scheduled receipts											
Projected on hand	35	35	0	40	0	0	70	30	0	0	55
Net requirements		0	30	0	0	10	0	0	0	55	0
Planned order receipts			70			80		0		85	0
Planned order releases		70			80				85		

Lot Sizing with POQ

- The POQ order size will vary by the quantities required in the respective weeks, as shown in the following table, with first planned order release in week 1.

Note: Orders are postponed if no demand exists, which is why week 7's order is postponed until week 8.

- Because POQ tends to produce a balance between holding and ordering costs with no excess inventory, POQ typically performs much better than EOQ.
- Notice that even with frequent recalculations, actual holding cost can vary substantially, depending on the demand fluctuations. We are assuming no stockouts. In this and similar examples, we are also assuming no safety stock; such costs would need to be added to our actual cost.

Other Techniques

- Other lot-sizing techniques, known as *dynamic lot-sizing*, are similar to periodic order quantity as they attempt to balance the lot size against the setup cost. These are *part period balancing* (also called *least total cost*), *least unit cost*, and *least period cost* (also called *Silver-Meal*).