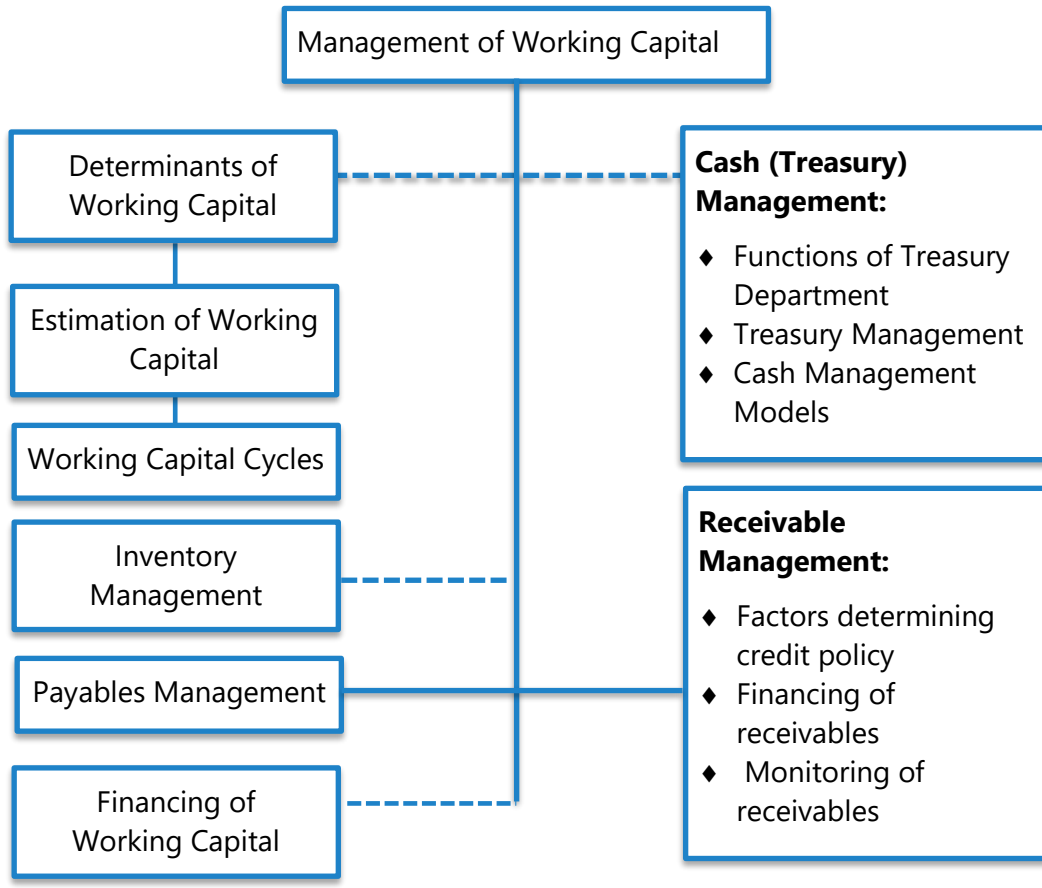
CHAPTER 9

MANAGEMENT OF WORKING CAPITAL

LEARNING OUTCOMES

- Understanding the meaning, need and importance of working capital for smooth functioning of an entity.
- Understanding the factors which determine the working capital.
- Learning the methods of estimating working capital.
- Understanding the various components of working capital with its management.
- Understanding methods of receivable management.
- Learning the methods of evaluating receivables and implementation of credit policy.
- Learning the importance and management of treasury (cash) in an entity.
- Learning the various sources of working capital finance.
- Learning the importance of optimal inventory level and management of payables.

CHAPTER OVERVIEW



This chapter is Divided into Six Units:

UNIT I: Introduction to Working Capital Management

UNIT II: Treasury and Cash Management

UNIT III: Management of Inventory

UNIT IV: Management of Receivables

UNIT V: Management of Payables

UNIT VI: Financing of Working Capital

UNIT - I
INTRODUCTION TO WORKING CAPITAL MANAGEMENT

1. MEANING AND CONCEPT OF WORKING CAPITAL

In accounting terms, working capital is defined as the difference between current assets and current liabilities. If we break down the components of working capital, we will find working capital as follows:

Working Capital = Current Assets – Current Liabilities

Current Assets: An asset is classified as current when:

(i) It is expected to be realised or intends to be sold or consumed in normal operating cycle of the entity or within twelve months after the reporting period whichever is longer; and

(ii) The asset is held primarily for the purpose of trading in the ordinary course of business.

For the purpose of working capital management, current assets of an entity can be grouped into the following categories:

(a) Inventory (raw material, work in process and finished goods)

(b) Receivables (trade receivables and bills receivables)

(c) Cash or cash equivalents (including short-term marketable securities)

(d) Prepaid expenses

Other current assets may also include short term loans or advances, any other accrued revenue etc.

Current Liabilities: A liability is classified as current when:

(i) It is expected to be settled in normal operating cycle of the entity or within twelve months after the reporting period whichever is longer; and

(ii) It is settled either by the use of current assets or by creation of new current liability.

For the purpose of working capital management, current liabilities of an entity can be grouped into the following categories:

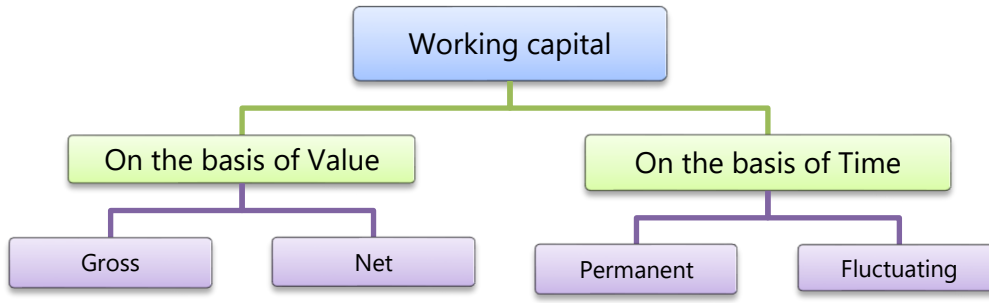
(a) Payable (trade payables and bills payables)

(b) Outstanding payments (wages & salary, overheads & other expenses etc.)

Other current liabilities may also include short term borrowings, current portion of long-term debts, short term provisions that are payable within twelve months such as provision for taxes etc.

Working Capital Management is process which is designed to ensure that an organization operates efficiently by monitoring & utilizing its current assets and current liabilities to the best effect. Primary objective is to enable a company maintaining sufficient cash flows in order to meet its day-to-day operating expenses and its short-term obligations.

The concept of working capital can also be explained through two angles.



(a) Value: From the value point of view, Working Capital can be defined as Gross Working Capital or Net Working Capital.

Gross working capital refers to the firm's investment in current assets.

Net working capital refers to the difference between current assets and current liabilities.

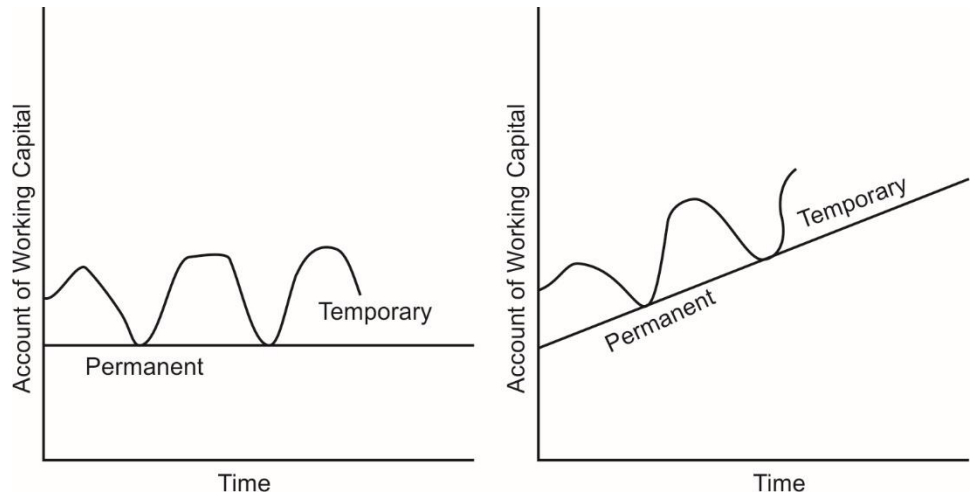
A positive working capital indicates the company's ability to pay its short-term liabilities. On the other hand, a negative working capital shows inability of an entity to meet its short-term obligations.

(b) Time: From the point of view of time, working capital can be divided into two categories viz., Permanent and Fluctuating (temporary).

Permanent working capital refers to the base working capital, which is the minimum level of investment in the current assets that is carried by the entity at all times to carry its day-to-day activities. It generally stays invested in the business, unless the operations are scaled up or down ***permanently*** which would also result in increase or decrease in permanent working capital. It is generally financed by long term sources of finance.

Temporary working capital refers to that part of total working capital, which is required by an entity in addition to the permanent working capital. It is also called variable or fluctuating working capital which is used to finance the short-term working capital requirements which arises due to fluctuation in sales volume. For instance, an organization would maintain increased levels of inventory to meet increased seasonal demand.

The following diagrams shows Permanent and Temporary or Fluctuating or variable working capital:



Both kinds of working capital i.e. permanent and fluctuating (temporary) are necessary to facilitate production and sales through the operating cycle.

2. SIGNIFICANCE OF WORKING CAPITAL

2.1 Importance of Adequate Working Capital

Management of working capital is an essential task of the finance manager. He has to ensure that the amount of working capital available is neither too large nor too small for its requirements.

A large amount of working capital would mean that the company has idle funds. Since funds have a cost, the company has to pay huge amount as interest on such funds that are used to invest in surplus working capital. Another way to look at it is that there is an opportunity cost involved where the company could have invested the surplus funds in long term investments and earned some return on the same.

Various studies conducted by the Bureau of Public Enterprises have shown that one of the reasons for the poor performance of public sector undertakings in our country has been the large amount of funds locked up in working capital. This results in over capitalization. Over capitalization implies that a company has too large funds for its requirements, resulting in a low rate of return, a situation which implies a less than optimal use of resources.

On the other hand, if the firm has inadequate working capital, such firm runs the risk of insolvency. Paucity of working capital may lead to a situation where the firm may not be able to meet its liabilities. It may also mean that a company may not be holding enough inventory in order to meet the customers' demand and hence would lose sales and eventually some reputation as well.

An organization, therefore, has to be very careful in estimating its working capital requirements.

Maintaining adequate working capital is not just important in the short-term, sufficient liquidity must be maintained in order to ensure the survival of the business in the long-term as well. When businesses make investment decisions, they must not only consider the financial outlay involved with acquiring the new machine or the new building, etc., but must also take account of the additional current assets that are usually required with any expansion of activity. For e.g.:

- Increased production leads to holding of additional stocks of raw materials and work-in-progress.

- An increased sale usually means that the level of debtors and the finished goods inventory requirements will increase.
- A general increase in the firm's scale of operations tends to imply a need for greater levels of working capital.

A question then arises what is an optimum amount of working capital for a firm? An organization should neither have too high an amount of working capital nor should the same be too low. It is the job of the finance manager to estimate the requirements of working capital carefully and determine the optimum level of investment in working capital.

2.2 Optimum Working Capital

If a company's current assets do not exceed its current liabilities, then it may run into trouble with creditors that want their money quickly. Not being able to meet its short-term obligations, company shall eventually lose its reputation and not many vendors would like to do business with them.

Current ratio (current assets/current liabilities) (along with acid test ratio to supplement it) has traditionally been considered the best indicator of the working capital situation.

It is understood that a current ratio of 2 (two) for a manufacturing firm implies that the firm has an optimum amount of working capital. A higher ratio may indicate inefficient use of funds and a lower ratio would mean liquidity issues as mentioned above. This is supplemented by Quick Ratio or Acid Test Ratio (Quick assets/Current liabilities) which should be at least 1 (one) which would imply that there is a comfortable liquidity position if liquid current assets are equal to current liabilities (where quick assets / liquid current assets refer to current assets less inventory & prepaid expenses).

Bankers, financial institutions, financial analysts, investors and other people interested in financial statements have, for years, considered the current ratio at 'two' and the acid test ratio at 'one' as indicators of a good working capital situation. As a thumb rule, this may be quite adequate.

However, it should be remembered that optimum working capital can be determined only with reference to the particular circumstances of a specific situation. Thus, in a company where the inventories are easily saleable and the sundry debtors are as good as liquid cash, the current ratio may be lower than 2 and yet firm may be sound or where the nature of finished goods are perishable in nature like a restaurant, then also the organization cannot afford to hold large amount of working capital. On the other hand, an organization dealing in products which take a longer production time, may need a higher amount of working capital.

In nutshell, a firm should have adequate working capital to run its business operations. Both excessive as well as inadequate working capital positions are dangerous.

3. DETERMINANTS OF WORKING CAPITAL

Working capital management is concerned with:

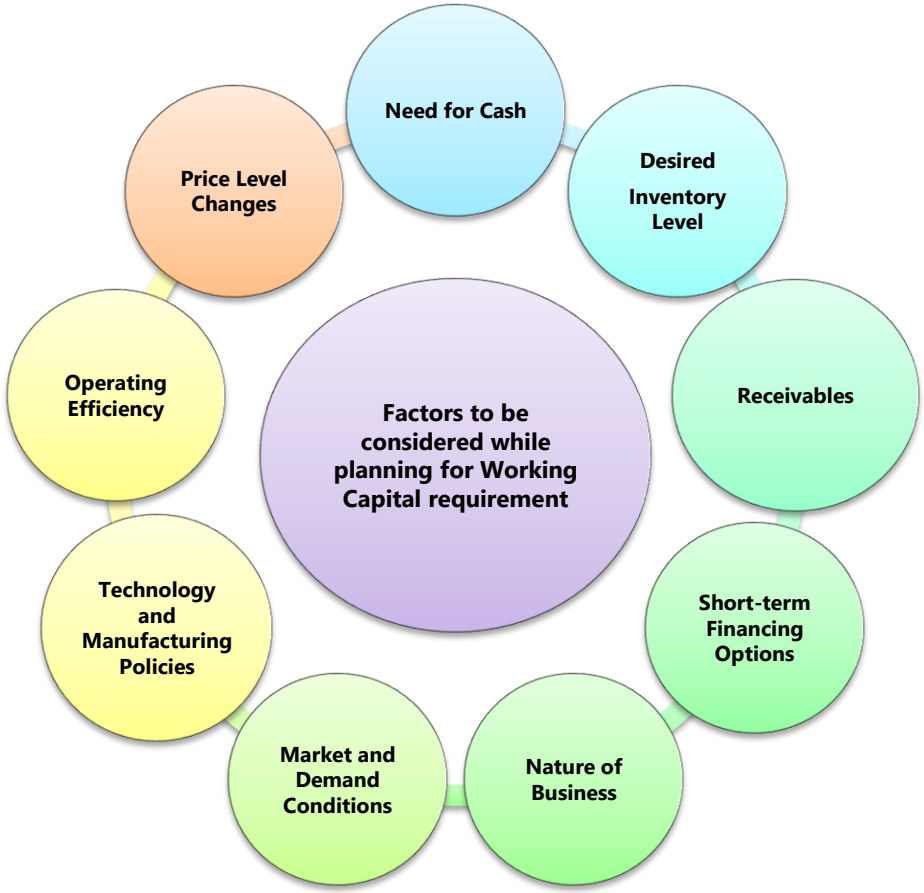
(a) **Maintaining adequate working capital** (managing the level of individual current assets and the current liabilities) and

(b) **Financing of the working capital.**

For the point a) above, a Finance Manager needs to plan and compute the working capital requirement for its business. And once the requirement has been computed he needs to ensure that it is financed properly. This whole exercise is known as Working Capital Management.

Sound financial and statistical techniques, supported by judgment should be used to predict the quantum of working capital required at different times.

Some of the factors which need to be considered while planning for working capital requirement are:



1. **Need for Cash:** Identify the cash balance which allows for the business to **meet day-to-day expenses** but reduces cash holding costs (example - loss of interest on long term investment had the surplus cash invested therein).

2. **Desired level of Inventory: Identify the level of inventory** which allows for uninterrupted production but reduces the investment in raw materials and hence increases cash flow. The techniques like Just in Time (JIT) and Economic order quantity (EOQ) are used for this.

3. **Receivables:** Identify the **appropriate credit policy**, i.e., credit terms which will attract customers, such that any impact on cash flows and the cash conversion cycle will be offset by increased revenue and hence Return on Capital (or vice versa). The tools like Early Payment Discounts and allowances are used for this.

4. **Short-term Financing Options:** Inventory is ideally financed by credit granted by the supplier. However, depending on the cash conversion cycle, it may be necessary to utilize a bank loan (or overdraft), or to "convert debtors to cash" through "factoring" in order to finance working capital requirements.

5. **Nature of Business:** For e.g. in a business of restaurant, most of the sales are in Cash. Therefore, need for working capital is very less. On the other hand, there would be a higher inventory in case of a pharmacy or a bookstore.

6. **Market and Demand Conditions:** For e.g. if an item's demand far exceeds its production, the working capital requirement would be less as investment in finished goods inventory would be very less with continuous sales.

7. **Technology and Manufacturing Policies:** For e.g. in some businesses the **demand for goods is seasonal**, in that case a business may follow a policy for steady production throughout the whole year or rather may choose a policy of production only during the demand season.

8. **Operating Efficiency:** A company can reduce the working capital requirement by **eliminating waste, improving coordination, process improvements** etc.

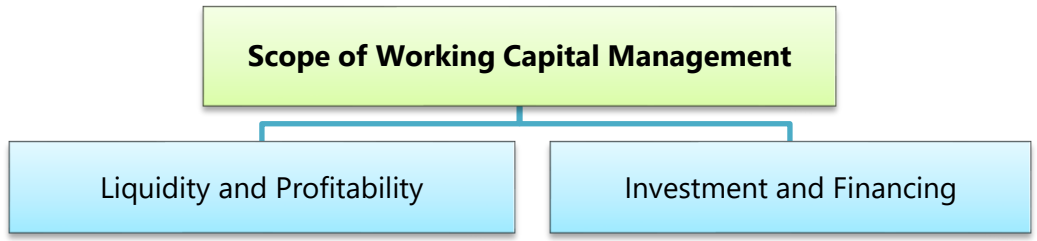
9. **Price Level Changes & Exchange Rate Fluctuations:** For e.g. **rising prices necessitate the use of more funds** for maintaining an existing level of activity. For the same level of current assets, higher cash outlays are required. Therefore, the effect of rising prices is that a higher amount of working capital is required. Another example would be unfavorable exchange rate movement in case of imported raw materials would warrant additional cost of same.

4. MANAGEMENT OF WORKING CAPITAL

The importance of working capital for an entity can be compared to importance of life blood for a living body or of a lubricant/ fuel for an engine. Working capital is required for smooth functioning of the business of an entity as lack of this may interrupt the ordinary course of activities. Hence, the working capital needs adequate attention and efficient management. When we talk about the management, it involves **3 Es i.e. Economy, Efficiency and Effectiveness** and all these three are required for the working capital management.

The scope of working capital management can be grouped into two broad areas:

(i) Liquidity and Profitability (ii) Investment and Financing Decision.



4.1 Liquidity and Profitability

For uninterrupted and smooth functioning of the day-to-day business of an entity, it is important to maintain liquidity of funds evenly. As we have already learnt in previous chapters that each rupee of capital bears some cost. So, while maintaining liquidity the cost aspect needs to be borne in mind. Also, a higher working capital may be intended to increase the revenue & hence profitability, but at the same time unnecessary tying up of funds in idle assets not only reduces the liquidity but also reduces the opportunity to earn better return from a productive asset. Hence, a trade-off is required between the liquidity and profitability which increases the profitability without disturbing the day-to-day functioning. This requires **3Es** as discussed above i.e. **economy** in **financing**, **efficiency in utilisation** and **effectiveness in achieving** the intended objectives.

The trade-off between the components of working capital can be summarised as follows:

Component of Working Capital	Advantages of higher side (Profitability)	Trade-off (between Profitability and Liquidity)	Advantages of lower side (Liquidity)
Inventory	Fewer stock-outs increase the profitability.	Use techniques like EOQ, JIT etc. to carry optimum level of inventory.	Lower inventory requires less capital but endangered stock-out and loss of goodwill.
Receivables	Higher Credit period attract customers and increase revenue (but can result in more bad debts)	Evaluate the credit policy; use the services of debt management (factoring) agencies.	Cash sales provide liquidity but fails to boost sales and revenue (due to lower credit period)

Pre-payment of expenses	Reduces uncertainty and profitable in inflationary environment.	Cost-benefit analysis required	Improves or maintains liquidity.
Cash and Cash equivalents	Payables are honoured in time, improves the goodwill and helpful in getting future discounts.	Cash budgets and other cash management techniques can be used	Cash can be invested in some other investment avenues
Payables and Expenses	Capital can be used in some other investment avenues	Evaluate the credit policy and related cost.	Payables are honoured in time, improves the goodwill and helpful in getting future discounts.

4.2 Investment and Financing

Working capital policy is a function of two decisions, first is investment in working capital and the second is financing of the investment. Investment in working capital is concerned with the level of investment in the current assets. It gives the answer of 'How much' fund to be tied in to achieve the organisation objectives (i.e. Effectiveness of fund). Financing decision concerned with the arrangement of funds to finance the working capital. It gives the answer 'Where from' fund to be sourced at lowest cost as possible (i.e. Economy). Financing decision, we will discuss this in later unit of this chapter.

Investment of working capital: How much to be invested in current assets as working capital is a matter of policy decision by an entity. It has to be decided in the light of organisational objectives, trade policies and financial (cost-benefit) considerations. There are not set or fixed rules for deciding the level of investment in working capital. Some organisations due to its peculiarity require more investment than others. For example, an infrastructure development company requires more investment in its working capital as there may be huge inventory in the form of work in process on the other hand a company which is engaged in fast

food business, comparatively requires less investment as inventory is of perishable nature & most sales are cash sales. Hence, level of investment depends on the various factors listed below:

(a) **Nature of Industry:** Construction companies, breweries etc. requires large investment in working capital due long gestation period.

(b) **Types of products:** Consumer durable has large inventory as compared to perishable products.

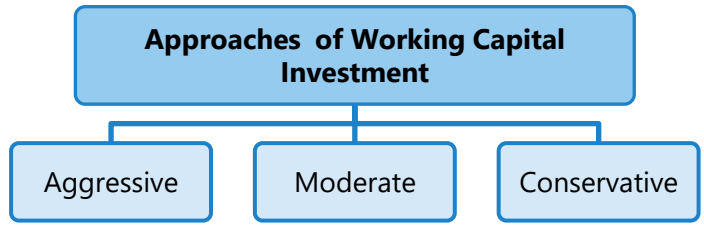
(c) **Manufacturing Vs Trading Vs Service:** A manufacturing entity has to maintain three levels of inventory i.e. raw material, work-in-process and finished goods whereas a trading and a service entity has to maintain inventory only in the form of trading stock and consumables respectively.

(d) **Volume of sales:** Where the sales are high, there is a possibility of high receivables as well.

(e) **Credit policy:** An entity whose credit policy is liberal has not only high level of receivables but may require more capital to fund raw material purchases as that will depend on credit period allowed by suppliers.

4.3 Approaches of working capital investment

Based on the organisational policy and risk-return trade off, working capital investment decisions are categorised into three approaches i.e. aggressive, conservative and moderate.

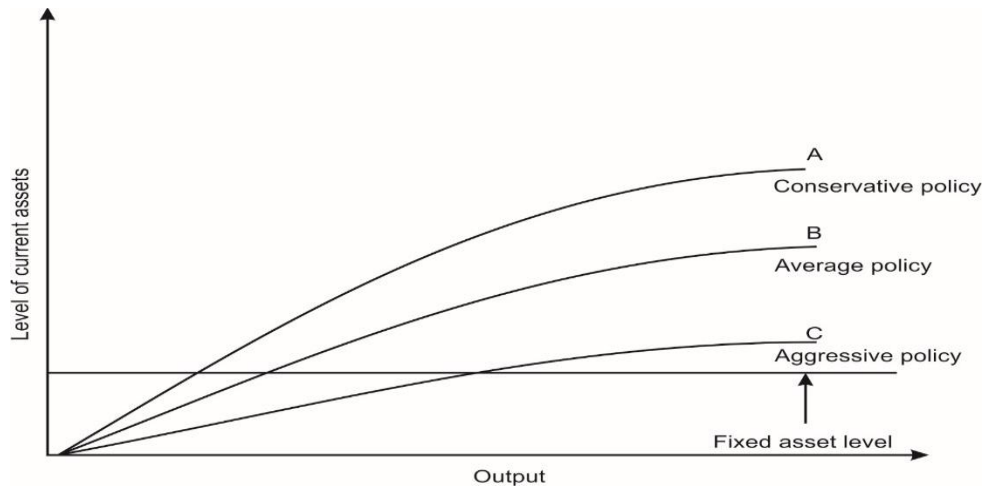


(a) **Aggressive:** Here investment in working capital is kept at minimal investment in current assets which means the entity does hold lower level of inventory, follow strict credit policy, keeps less cash balance etc. The advantage of this approach is that lower level of fund is tied in the working capital which results in lower financial costs but the flip side could be risk of stock-outs & that the organisation could not grow which leads to lower utilisation of fixed assets and long-term debts. In the

long run firm may stay behind the competitors. This approach would better suit a highly integrated organisation with efficient processes.

(b) Conservative: In this approach, organisation choose to invest high capital in current assets. Organisations use to keep inventory level higher, follows liberal credit policies, and cash balance as high as to meet any current liabilities immediately. The advantages of this approach are higher sales volume, increased demand due to liberal credit policy and increase goodwill among the suppliers due to payment in short time. The disadvantages are increased cost of capital, inventory obsolescence, higher risk of bad debts, shortage of liquidity in long run due to longer operating cycles.

(c) Moderate: This approach is in between the above two approaches. Under this approach a balance between the risk and return is maintained to gain more by using the funds in very efficient manner.



A conservative policy implies greater liquidity and lower risk whereas an aggressive policy indicates higher risk and poor liquidity. Moderate current assets policy will fall in the middle of conservative and aggressive policies which most of the firms follow to strike an appropriate balance as per the requirements of their trade or industry. Also, an organization may follow a different policy at different times as may be needed depending on determinants of working capital as discussed earlier.

4.4 Current Assets to Fixed Assets Ratio

The finance manager is required to determine the optimum level of current assets so that the shareholders' value is maximized.

A firm needs both fixed and current assets to support a particular level of output.

As the firm's output and sales increases, the need for current assets also increases. Generally, current assets do not increase in direct proportion to output; current assets may increase at a decreasing rate with output. As the output increases, the firm starts using its current asset more efficiently.

The level of the current assets can be measured by creating a relationship between current assets and fixed assets. Dividing current assets by fixed assets gives current assets/fixed assets ratio.

Assuming a constant level of fixed assets, a higher current assets/fixed assets ratio indicates a conservative current assets policy and a lower current assets/fixed assets ratio means an aggressive current assets policy assuming all other factors to be constant.

The following illustration explains the risk-return trade off of various working capital management policies, viz., conservative, aggressive and moderate.

ILLUSTRATION 1

A firm has the following data for the year ending 31st March, 2022:

	(₹)
Sales (1,00,000 @ ₹20)	*20,00,000*
Earnings before Interest and Taxes	*2,00,000*
Fixed Assets	*5,00,000*

The three possible current assets holdings of the firm are ₹5,00,000, ₹4,00,000 and ₹3,00,000. It is assumed that fixed assets level is constant, and profits do not vary with current assets levels. ANALYSE the effect of the three alternative current assets policies.

SOLUTION

Effect of Alternative Current Assets Policies

	Conservative (₹)	Moderate (₹)	Aggressive (₹)
Sales	20,00,000	20,00,000	20,00,000
Earnings before Interest and Taxes (EBIT)	2,00,000	2,00,000	2,00,000
Current Assets	5,00,000	4,00,000	3,00,000
Fixed Assets	5,00,000	5,00,000	5,00,000
Total Assets	10,00,000	9,00,000	8,00,000
Return on Total Assets (EBIT÷ Total Assets)	20%	22.22%	25%
Current Assets/Fixed Assets	1.00	0.80	0.60

The aforesaid calculation shows that the conservative policy provides greater liquidity (solvency) to the firm, but lower return on total assets. On the other hand, the aggressive policy gives higher return, but low liquidity and thus is very risky. The moderate policy generates return higher than Conservative policy but lower than aggressive policy. This is less risky than aggressive policy but riskier than conservative policy. It also reflects inverse relationship between Current Assets / Fixed Assets ratio and Return on Total Assets.

In determining the optimum level of current assets, the firm should balance the profitability – solvency tangle by minimizing total costs – Cost of liquidity and cost of illiquidity.

5. ESTIMATING WORKING CAPITAL NEEDS

Operating cycle is one of the most reliable methods of Computation of Working Capital.

However, other methods like ratio of sales and ratio of fixed investment may also be used to determine the Working Capital requirements. These methods are briefly explained as follows:

(i) **Current Assets Holding Period:** To estimate working capital needs based on the average holding period of current assets and relating them to costs based on the company's experience in the previous year. This method is essentially based on the Operating Cycle Concept.

(ii) **Ratio of Sales:** To estimate working capital needs as a ratio of sales on the assumption that current assets change with changes in sales.

(iii) **Ratio of Fixed Investments:** To estimate Working Capital requirements as a percentage of fixed investments.

A number of factors will, however, be impacting the choice of method of estimating Working Capital. Factors such as seasonal fluctuations, accurate sales forecast, investment cost and variability in sales price would generally be considered. The production cycle and credit and collection policies of the firm will have an impact on Working Capital requirements. Therefore, they should be given due weightage in projecting Working Capital requirements.

6. OPERATING OR WORKING CAPITAL CYCLE

A useful tool for managing working capital is the operating cycle.

The operating cycle analyses the accounts receivable, inventory and accounts payable cycles in terms of number of days. For example:

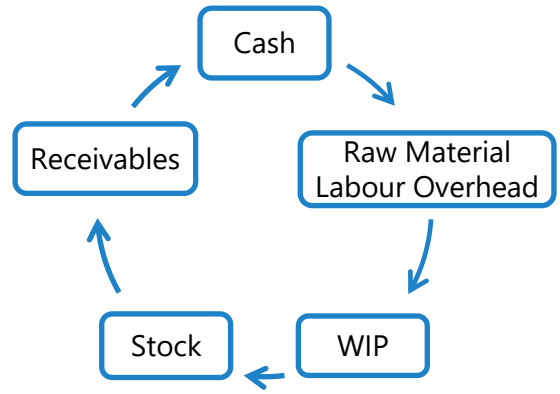
- Accounts receivables are analyzed by the average number of days it takes to collect an account.
- Inventory is analyzed by the average number of days it takes to turn over the sale of a product (from the point it comes in the store to the point it is converted to cash or an account receivable).
- Accounts payables are analyzed by the average number of days it takes to pay a supplier invoice.

Operating/Working Capital Cycle Definition

Working Capital cycle indicates the length of time between a company's paying for materials, entering into stock and receiving the cash from sales of finished goods. It can be determined by adding the number of days required for each stage in the

cycle. For example, a company holds raw materials on an average for 60 days, it gets credit from the supplier for 15 days, production process needs 15 days, finished goods are held for 30 days and 30 days credit is extended to debtors. The total of all these, 120 days, i.e., 60 – 15 + 15 + 30 + 30 days is the total working capital cycle.

Working Capital Cycle



Most businesses cannot finance the operating cycle (accounts receivable days + inventory days) with accounts payable financing alone. Consequently, working capital financing is needed. This shortfall is typically covered by the net profits generated internally or by externally borrowed funds or by a combination of the two.

The faster a business expands the more cash it will need for working capital and investment. The cheapest and best sources of cash exist as working capital right within the business. Good management of working capital will generate cash which will help improve profits and reduce risks. Bear in mind that the cost of providing credit to customers and holding stocks can represent a substantial proportion of a firm's total profits.

Each component of working capital (namely inventory, receivables and payables) has two dimensions Time and Money. When it comes to managing working capital then time is money**.** If you can get money to move faster around the cycle (e.g. collect amount due from debtors more quickly) or reduce the amount of money tied up (e.g. reduce inventory levels relative to sales), the business will generate more cash or it will need to borrow less money to fund working capital. Similarly, if you can negotiate improved terms with suppliers e.g. get longer credit or an

increased credit limit; you are effectively creating free finance to help fund future sales.

If you.....	**Then .....**
Collect receivables (debtors) faster	You release cash from the cycle
Collect receivables (debtors) slower	Your receivables soak up cash.
Get better credit (in terms of duration or amount) from suppliers.	You increase your cash resources.
Shift inventory (stocks) faster	You free up cash.
Move inventory (stocks) slower	You consume more cash.

The determination of operating capital cycle helps in the forecasting, controlling and management of working capital. The length of operating cycle is the indicator of performance of management. The net operating cycle represents the time interval for which the firm has to negotiate for Working Capital from its lenders. It enables to determine accurately the amount of working capital needed for the continuous operation of business activities.

The duration of working capital cycle may vary depending on the nature of the business.

In the form of an equation, the operating cycle process can be expressed as follows:

$$\text{Operating Cycle} = R + W + F + D - C$$

Where,

R = Raw material storage period

W = Work-in-progress inventory* holding period

F = Finished goods storage period

D = Receivables (Debtors) collection period

C = Credit period allowed by suppliers (Creditors)

* work in progress inventory may also be termed as works cost.

Also,

Number of Operating Cycles in a Year = 360 or 365 / Operating Cycle

Wherein, more the number of operating cycles better it is for the organization as it indicates shorter operating cycle.

The various components of Operating Cycle may be calculated as shown below:

(1)	Raw Material Storage Period	$= \frac{\text{Average stock of raw material}}{\text{Average Cost of Raw Material Consumption per day}}$
(2)	Work-in-Progress inventory holding period	$= \frac{\text{Average Work-in-progress inventory}}{\text{Average Cost of Production per day}}$
(3)	Finished Goods storage period	$= \frac{\text{Average stock of finished goods}}{\text{Average Cost of Goods Sold per day}}$
(4)	Receivables (Debtors) collection period	$= \frac{\text{Average Receivables}}{\text{Average Credit Sales per day}}$
(5)	Credit period allowed by suppliers (Creditors)	$= \frac{\text{Average Payables}}{\text{Average Credit Purchases per day}}$

6.1 Working Capital Based on Operating Cycle

One of the methods for forecasting working capital requirement is based on the concept of operating cycle. The calculation of operating cycle and the formula for estimating working capital on its basis has been demonstrated with the help of following illustration:

ILLUSTRATION 2

From the following information of XYZ Ltd., you are required to CALCULATE:

(a) Net operating cycle period.

(b) Number of operating cycles in a year.

		(₹)
(i)	*Raw material inventory consumed during the year*	*6,00,000*
(ii)	*Average stock of raw material*	*50,000*
(iii)	*Cost of Production for the year*	*5,00,000*
(iv)	*Average work-in-progress inventory*	*30,000*
(v)	*Cost of goods sold during the year*	*8,00,000*
(vi)	*Average finished goods stock held*	*40,000*
(vii)	*Average collection period from debtors*	*45 days*
(viii)	*Average credit period availed*	*30 days*
(ix)	*No. of days in a year*	*360 days*

SOLUTION

(a) Calculation of Net Operating Cycle period of XYZ Ltd.

Raw Material storage period (R)=

$$\frac{\text{Average stock of raw material}}{\text{Average Cost of Raw Material Consumption per day}}$$

$$= \frac{₹\,50,000}{₹\,6,00,000 \div 360\,\text{days}} = \frac{₹\,50,000}{1,667} = 30\ \text{days}$$

Work-in-progress inventory holding period (W)

$$= \frac{\text{Average Work-in-progress inventory}}{\text{Average Cost of Production per day}}$$

$$= \frac{₹\,30,000}{₹\,5,00,000 \div 360\,\text{days}} = \frac{₹\,30,000}{1,389} = 22\ \text{days}$$

Finished Goods storage period (F)

$$= \frac{\text{Average stock of finished goods}}{\text{Average Cost of Goods Sold per day}}$$

$$= \frac{₹40,000}{₹8,00,000 \div 360 \text{ days}} = \frac{₹40,000}{2,222} = 18 \text{ days}$$

Receivables (Debtors) collection period (D) = 45 days

Credit Period allowed by creditors (C) = 30 days

Net Operating Cycle = R + W + F+ D – C = 30 + 22 + 18 + 45 – 30 = 85 days

(b) Number of Operating Cycles in a year $= \frac{\text{No. of days in a year}}{\text{Operating Cycle period}}$

$$= \frac{360 \text{ days}}{85 \text{ days}} = 4.23 \text{ times}$$

6.2 Estimation of amount of Different Components of Current Assets and Current Liabilities

The various constituents of current assets and current liabilities have a direct bearing on the computation of working capital and the operating cycle. The holding period of various constituents of Current Assets and Current Liabilities cycle may either contract or expand the net operating cycle period.

Shorter the operating cycle period, lower will be the requirement of working capital and *vice-versa*.

Estimation of Current Assets

The estimates of various components of gross working capital or current assets may be made as follows:

(i) Raw Materials Inventory: The funds to be invested in raw materials inventory may be estimated on the basis of production budget, the estimated cost per unit and average holding period of raw material inventory by using the following formula:

$$\frac{\text{Estimated Production (units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost per unit} \times \text{Average raw material storage period}$$

(ii) Work-in-Progress Inventory: The funds to be invested in work-in-progress can be estimated by the following formula:

$$\frac{\text{Estimated Production(units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated WIP cost per unit} \times \text{Average WIP holding period}$$

(iii) Finished Goods: The funds to be invested in finished goods inventory can be estimated with the help of following formula:

$$\frac{\text{Estimated Production(units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost of production per unit} \times \text{Average finished goods storage period}$$

(iv) Receivables (Debtors): Funds to be invested in trade receivables (debtors) may be estimated with the help of following formula:

$$\frac{\text{Estimated Credit sales (units)}}{12\text{months}/365\text{days}^*} \times \text{Estimated cost of sales (Excl. Dep.) per unit} \times \text{Average receivable collection period.}$$

Note that only cash cost is considered for debtors and finished goods elements (as the sales to debtors include cost & profit whereas the funds required for working capital purposes doesn't need to include profit). Further, non-cash expense like depreciation is also excluded.

(v) Cash and Cash equivalents: Minimum desired Cash and Bank balance to be maintained by the firm has to be added in the current assets for the computation of working capital.

Estimation of Current Liabilities

Current liabilities are deducted from the current assets to get working capital. Hence, the amount of working capital is lowered to the extent of current liabilities (other than bank credit) arising in the normal course of business. The important current liabilities like trade payables, wages and overheads can be estimated as follows:

(i) Trade Payables: Trade payable can be estimated on the basis of material purchase budget and the credit purchase by using following formula:

$$\frac{\text{Estimated credit purchase}}{12\text{months}/365\text{days}^*} \times \text{Credit period allowed by suppliers}$$

(ii) Direct Wages: It is estimated with the help of direct wages budget by using following formula:

$$\frac{\text{Estimated labour hours} \times \text{wages rate per hour}}{12\text{months}/365\text{days}^*} \times \text{Average time lag in payment of wages}$$

(iii) Overheads (other than depreciation and amortization): It may be estimated with the help of following formula:

$$\frac{\text{Estimated Overheads}}{12\text{months}/360\text{days}^*} \times \text{Average time lag in payment of overheads}$$

**Number of days in a year may be taken as 365 or 360 days.*

Estimation of Working Capital Requirements

		Amount (₹)	Amount (₹)	Amount (₹)
I.	**Current Assets:**			
	Inventories:			
	-Raw Materials	---		
	-Work-in-process	---		
	-Finished goods	---	---	
	Receivables:			
	-Trade debtors	---		
	-Bills	---	---	
	Prepaid Expenses		---	
	Minimum Cash Balance		---	
	Gross Working Capital		**---**	**---**
II.	**Current Liabilities:**			
	Trade Payables		---	

	Bills Payables		---	
	Wages Payables		---	
	Payables for overheads		---	**---**
III.	**Excess of Current Assets over Current Liabilities [I – II]**			**---**
IV.	Safety Margin			---
V.	**Net Working Capital [III + IV]**			**---**

The following illustration shows the process of working capital estimation:

ILLUSTRATION 3

On 1st January, the Managing Director of Naureen Ltd. wishes to know the amount of working capital that will be required during the year. From the following information, PREPARE the working capital requirements forecast.

Production during the previous year was 60,000 units. It is planned that this level of activity would be maintained during the present year.

The expected ratios of the cost to selling prices are Raw materials 60%, Direct wages 10% and Overheads 20%.

Raw materials are expected to remain in store for an average of 2 months before issue to production.

Each unit is expected to be in process for one month, the raw materials being fed into the pipeline immediately and the labour and overhead costs accruing evenly during the month.

Finished goods will stay in the warehouse awaiting dispatch to customers for approximately 3 months.

Credit allowed by creditors is 2 months from the date of delivery of raw material.

Credit allowed to debtors is 3 months from the date of dispatch.

Selling price is ₹5 per unit.

There is a regular production and sales cycle.

Wages and overheads are paid on the 1st of each month for the previous month.

The company normally keeps cash in hand to the extent of ₹20,000.

SOLUTION

Working Notes:

1. **Raw material inventory:** The cost of materials for the whole year is 60% of the Sales value.

   Hence it is 60,000 units × ₹ 5 × $\frac{60}{100}$ = ₹1,80,000. The monthly consumption of raw material would be ₹ 15,000. Raw material requirements would be for two months; hence raw materials in stock would be ₹ 30,000.

2. **Work-in-process:** (Students may give special attention to this point). It is stated that each unit of production is expected to be in process for one month).

		(₹)
(a)	Raw materials in work-in-process (being one month's raw material requirements)	15,000
(b)	Labour costs in work-in-process (It is stated that it accrues evenly during the month. Thus, on the first day of each month it would be zero and on the last day of month the work-in-process would include one month's labour costs. On an average therefore, it would be equivalent to ½ of the month's labour costs) $\left(\frac{10\% \text{ of } (60,000 \times ₹5)}{12 \text{ months}} \times 0.5 \text{ month}\right)$	1,250
(c)	Overheads (For ½ month as explained above) $\left(\frac{20\% \text{ of } (60,000 \times ₹5)}{12 \text{ months}} \times 0.5 \text{ month}\right)$	2,500
	Total work-in-process	18,750

3. **Finished goods inventory:** (3 month's cost of production)

Raw materials $\left(\frac{60\% \text{ of } (60,000 \times ₹5)}{12 \text{ months}} \times 3 \text{ months}\right)$	45,000

Labour $\left(\frac{10\% \text{ of } (60,000 \times ₹\ 5)}{12 \text{ months}} \times 3 \text{ months}\right)$	7,500
Overheads $\left(\frac{20\% \text{ of } (60,000 \times ₹\ 5)}{12 \text{ months}} \times 3 \text{ months}\right)$	15,000
Total finished goods inventory	67,500
Alternatively, (60,000 units x ₹ 5 x 90%) x 3/12	67,500

4. **Debtors:** The total cost of sales = 2,70,000.

   Therefore, debtors = ₹ 2,70,000 × $\frac{3}{12}$ = ₹ 67,500

   Where, Total Cost of Sales = RM + Wages + Overheads + Opening Finished goods inventory – Closing finished goods inventory.

   = ₹ 1,80,000 + ₹ 30,000 + ₹ 60,000 + ₹ 67,500 – ₹ 67,500 = ₹ 2,70,000.

5. **Creditors:** Suppliers allow a two months' credit period. Hence, the average amount of creditors would be two months consumption of raw materials i.e. $\left(\frac{60\% \text{ of } (60,000 \times ₹\ 5)}{12 \text{ months}} \times 2 \text{ months}\right)$ = ₹ 30,000.

6. **Direct Wages payable:** $\left(\frac{10\% \text{ of } (60,000 \times ₹\ 5)}{12 \text{ months}} \times 1 \text{ month}\right)$ = ₹ 2,500

7. **Overheads Payable:** $\left(\frac{20\% \text{ of } (60,000 \times ₹\ 5)}{12 \text{ months}} \times 1 \text{ month}\right)$ = ₹ 5,000

Here it has been assumed that inventory level is uniform throughout the year, therefore opening inventory equals closing inventory.

Statement of Working Capital Required

	(₹)	(₹)
Current Assets or Gross Working Capital:		
Raw materials inventory (Refer to working note 1)	30,000	
Working–in-process (Refer to working note 2)	18,750	
Finished goods inventory (Refer to working note 3)	67,500	

Debtors (Refer to working note 4)	67,500	
Cash	20,000	2,03,750
Current Liabilities:		
Creditors (Refer to working note 5)	30,000	
Direct wages payable (Refer to working note 6)	2,500	
Overheads payable (Refer to working note 7)	5,000	(37,500)
Estimated working capital requirements		1,66,250

6.3 Working Capital Requirement Estimation based on Cash Cost

We have already seen that working capital is the difference between current assets and current liabilities. To estimate requirements of working capital, we have to forecast the amount required for each item of current assets and current liabilities.

In practice another approach may also be useful in estimating working capital requirements. This approach is based on the fact that in **the case of current assets, like sundry debtors and finished goods, etc., the exact amount of funds blocked is less than the amount of such current assets**. For example:

- If we have sundry debtors worth ₹ 1 lakh and our cost of sales is₹ 75,000, the actual amount of funds blocked in sundry debtors is ₹ 75,000 the cost of sundry debtors, the rest (₹ 25,000) is profit.
- Again, some of the cost items also are non-cash costs; depreciation is a non-cash cost item. Suppose out of ₹ 75,000, ₹ 5,000 is depreciation; then it is obvious that the actual funds blocked in terms of sundry debtors totaling ₹ 1 lakh is only ₹ 70,000. In other words, ₹ 70,000 is the amount of funds required to finance sundry debtors worth ₹ 1 lakh.
- Similarly, in the case of finished goods which are valued at cost, non-cash costs may be excluded to work out the amount of funds blocked.

Many experts, therefore, calculate the working capital requirements by working out the **cash costs of finished goods and sundry debtors**. Under this approach, the debtors are calculated not as a percentage of sales value but as a percentage of cash costs. Similarly, finished goods are valued according to cash costs.

ILLUSTRATION 4

The following annual figures relate to XYZ Co.:

	(₹)
Sales (at two months' credit)	*36,00,000*
Materials consumed (suppliers extend two months' credit)	*9,00,000*
Wages paid (1 month lag in payment)	*7,20,000*
Cash manufacturing expenses (expenses are paid one month in arrear)	*9,60,000*
Administrative expenses (1 month lag in payment)	*2,40,000*
Sales promotion expenses (paid quarterly in advance)	*1,20,000*

The company sells its products on gross profit of 25%. Depreciation is considered as a part of the cost of production. It keeps one month's stock each of raw materials and finished goods, and a cash balance of ₹ 1,00,000.

Assuming a 20% safety margin, COMPUTE the working capital requirements of the company on cash cost basis. Ignore work-in-process.

SOLUTION

Statement of Working Capital requirements (cash cost basis)

	(₹)	(₹)
A. Current Assets		
Inventory:		
-Raw materials $\left(\frac{₹\,9,00,000}{12\text{months}} \times 1\text{ month}\right)$	75,000	
-Finished Goods $\left(\frac{₹25,80,000}{12\text{months}} \times 1\text{ month}\right)$	2,15,000	
Receivables (Debtors) $\left(\frac{₹29,40,000}{12\text{months}} \times 2\text{months}\right)$	4,90,000	
Sales Promotion expenses paid in advance $\left(\frac{₹1,20,000}{12\text{ months}} \times 3\text{ months}\right)$	30,000	

Cash balance	1,00,000	9,10,000
Gross Working Capital		9,10,000
B. Current Liabilities:		
Payables:		
-Creditors for materials $\left(\frac{₹\ 9,00,000}{12 \text{months}} \times 2 \text{ month}\right)$	1,50,000	
Wages outstanding $\left(\frac{₹\ 7,20,000}{12 \text{months}} \times 1 \text{ month}\right)$	60,000	
Manufacturing expenses outstanding $\left(\frac{₹\ 9,60,000}{12 \text{months}} \times 1 \text{ month}\right)$	80,000	
Administrative expenses outstanding $\left(\frac{₹\ 2,40,000}{12 \text{months}} \times 1 \text{ month}\right)$	20,000	3,10,000
Net working capital (A - B)		6,00,000
Add: Safety margin @ 20%		1,20,000
Total Working Capital requirements		7,20,000

Working Notes:

(i)	**Computation of Annual Cash Cost of Production**	**(₹)**
	Material consumed	9,00,000
	Wages	7,20,000
	Manufacturing expenses	9,60,000
	Total cash cost of production	25,80,000
(ii)	**Computation of Annual Cash Cost of Sales:**	**(₹)**
	Total Cash cost of production as in (i) above	25,80,000
	Administrative Expenses	2,40,000
	Sales promotion expenses	1,20,000
	Total cash cost of sales	29,40,000

6.4 Effect of Double Shift Working on Working Capital Requirements

The greatest economy in introducing double shift is the greater utilization of fixed assets. Although production increases, little or very marginal funds may be required for additional assets.

But increase in the number of hours of production has an effect on the working capital requirements. Let's see the **impact of double shift** on some of the components of working capital:-

- It is obvious that in double shift working, an increase in stocks will be required as the production rises. However, it is quite possible that the increase may not be proportionate to the rise in production since the minimum level of stocks may not be very much higher. Thus, it is quite likely that the level of stocks may not be required to be doubled as the production goes up two-fold.
- The amount of materials in process will not change due to double shift working since work started in the first shift will be completed in the second; hence, capital tied up in materials in process will be the same as with single shift working. As such the cost of work-in-process will not change unless the second shift's workers are paid at a higher rate.
- Also, additional requirements of materials & other resources may result in some economies (for example better negotiation with vendors on account increased purchase of materials etc). Further all the fixed costs may not increase with additional shift.

ILLUSTRATION 5

Samreen Enterprises has been operating its manufacturing facilities till 31.3.2022 on a single shift working with the following cost structure:

	Per unit (₹)
Cost of Materials	*6.00*
Wages (out of which 40% fixed)	*5.00*
Overheads (out of which 80% fixed)	*5.00*
Profit	*2.00*
Selling Price	*18.00*
Sales during 2020-21 – ₹4,32,000	

As at 31.3.2022 the company held:

	(₹)
Stock of raw materials (at cost)	*36,000*
Work-in-progress (valued at prime cost)	*22,000*
Finished goods (valued at total cost)	*72,000*
Sundry debtors	*1,08,000*

In view of increased market demand, it is proposed to double production by working an extra shift. It is expected that a 10% discount will be available from suppliers of raw materials in view of increased volume of business. Selling price will remain the same. The credit period allowed to customers will remain unaltered. Credit availed of from suppliers will continue to remain at the present level i.e., 2 months. Lag in payment of wages and expenses will continue to remain half a month.

You are required to PREPARE the additional working capital requirements, if the policy to increase output is implemented.

SOLUTION

This question can be solved using two approaches:

(i) To assess the impact of double shift for long term as a matter of production policy.

(ii) To assess the impact of double shift to mitigate the immediate demand for next year only.

The first approach is more appropriate and fulfilling the requirement of the question.

(i) Assessment of impact of double shift for long term as a matter of production policy:

Comparative Statement of Working Capital Requirement

	Single Shift (24,000)			Double Shift (48,000)		
	Unit	Rate (₹)	Amount (₹)	Unit	Rate (₹)	Amount (₹)
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800

Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	8,000	5.40	43,200
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			57,200
Working Capital: (A) – (B)			1,92,000			2,86,800

Additional Working Capital requirement = ₹ 2,86,800 – ₹ 1,92,000 = ₹ 94,800

Workings:

(1) Statement of cost at single shift and double shift working

	24,000 units		**48,000 Units**	
	Per unit (₹)	**Total (₹)**	**Per unit (₹)**	**Total (₹)**
Raw materials	6.00	1,44,000	5.40	2,59,200
1. Wages - Variable	3.00	72,000	3.00	1,44,000
Fixed	2.00	48,000	1.00	48,000
Overheads - Variable	1.00	24,000	1.00	48,000
Fixed	4.00	96,000	2.00	96,000
Total cost	16.00	3,84,000	12.40	5,95,200
Profit	2.00	48,000	5.60	2,68,800
	18.00	4,32,000	18.00	8,64,000

(2) Sales in units 2020-21 $= \frac{\text{Sales}}{\text{Unit selling price}} = \frac{₹\ 4,32,000}{₹\ 18} = 24,000$ units

(3) Stock of Raw Materials in units on 31.3.2021

$= \frac{\text{Value of Stock}}{\text{Cost per unit}} = \frac{₹\ 36,000}{6} = 6,000$ units

(4) Stock of work-in-progress in units on 31.3.2021

$= \frac{\text{Value of work-in-progress}}{\text{Prime Cost per unit}} = \frac{₹\ 22,000}{(₹\ 6 + ₹\ 5)} = 2,000$ units

(5) Stock of finished goods in units 2020-21

$= \frac{\text{Value of Stock}}{\text{Total Cost per unit}} = = \frac{₹\ 72,000}{₹\ 16} = 4,500$ units

(ii) Assessment of the impact of double shift to mitigate the immediate demand for next year only & not as part of policy implementation.

In this approach, working capital shall be computed as if we are calculating the same for the next / second year with double production. Whereas, in the first approach to implement double-shift as part of policy implementation, we calculated comparative analysis of working capital requirement for single & double shift within the same year.

Workings:

(6) Calculation of no. of units to be sold:

No. of units to be Produced	48,000
Add: Opening stock of finished goods	4,500
Less: Closing stock of finished goods	(9,000)
No. of units to be Sold	43,500

(7) Calculation of Material to be consumed and materials to be purchased in units:

No. of units Produced	48,000
Add: Closing stock of WIP	2,000
Less: Opening stock of WIP	(2,000)
Raw Materials to be consumed in units	48,000

Add: Closing stock of Raw material	12,000
Less: Opening stock of Raw material	(6,000)
Raw Materials to be purchased (in units)	54,000

(8) Credit allowed by suppliers:

$$= \frac{\text{No. of units to purchased} \times \text{Cost per unit}}{12 \text{ months}} \times 2 \text{ months}$$

$$= \frac{54,000 \times ₹\ 5.40}{12 \text{ months}} \times 2 \text{ months} = ₹\ 48,600$$

Comparative Statement of Working Capital Requirement

	Single Shift (Current Year – 24,000 units)			Double Shift (Next Year – 48,000 units)		
	Unit	**Rate (₹)**	**Amount (₹)**	**Unit**	**Rate (₹)**	**Amount (₹)**
Current Assets						
Inventories:						
Raw Materials	6,000	6.00	36,000	12,000	5.40	64,800
Work-in-Progress	2,000	11.00	22,000	2,000	9.40	18,800
Finished Goods	4,500	16.00	72,000	9,000	12.40	1,11,600
Sundry Debtors	6,000	16.00	96,000	12,000	12.40	1,48,800
Total Current Assets: (A)			2,26,000			3,44,000
Current Liabilities						
Creditors for Materials	4,000	6.00	24,000	9,000	5.40	48,600
Creditors for Wages	1,000	5.00	5,000	2,000	4.00	8,000
Creditors for Expenses	1,000	5.00	5,000	2,000	3.00	6,000
Total Current Liabilities: (B)			34,000			62,600
Working Capital: (A) – (B)			1,92,000			2,81,400

Additional Working Capital requirement = ₹ 2,81,400 – ₹ 1,92,000 = ₹ 89,400

Notes:

(i) The quantity of material in process will not change due to double shift working since work started in the first shift will be completed in the second shift.

(ii) It is given in the question that the WIP is valued at prime cost hence, it is assumed that the WIP is 100% complete in respect of material and labour.

(iii) In absence of any information on proportion of credit sales to total sales, debtors quantity has been doubled for double shift. Hence, the units have been taken as 12,000 only.

(iv) It is assumed that all purchases are on credit.

(v) The valuation of work-in-progress based on prime cost (i.e. material & labor) as per the policy of the company is as under.

	Single shift (₹)	**Double shift (₹)**
Materials	6.00	5.40
Wages – Variable	3.00	3.00
Fixed	2.00	1.00
	11.00	9.40