Lesson 11

Techniques of Estimating Working Capital Needs

Objectives of the lesson

After studying this lesson, students will be able to:

- Develop understanding of the intricacies of the management of working capital,
- Learn the application of various techniques of estimating working capital.

1.0 Introduction

The level of current assets is determined by the level of operations and the requirement of working capital is a function of the current assets and current liabilities. The current assets except cash represent application of funds and the current liabilities are the sources of funds. The non-synchronous nature of cash inflows and outflows requires a concern to maintain an excess of current asset to facilitate uninterrupted production. This is done by managing various components of current assets as against the level of current liabilities. Hence, it becomes imperative to for the management to manage the levels of current assets for maximizing the profitability of the firm and increasing the shareholder value.

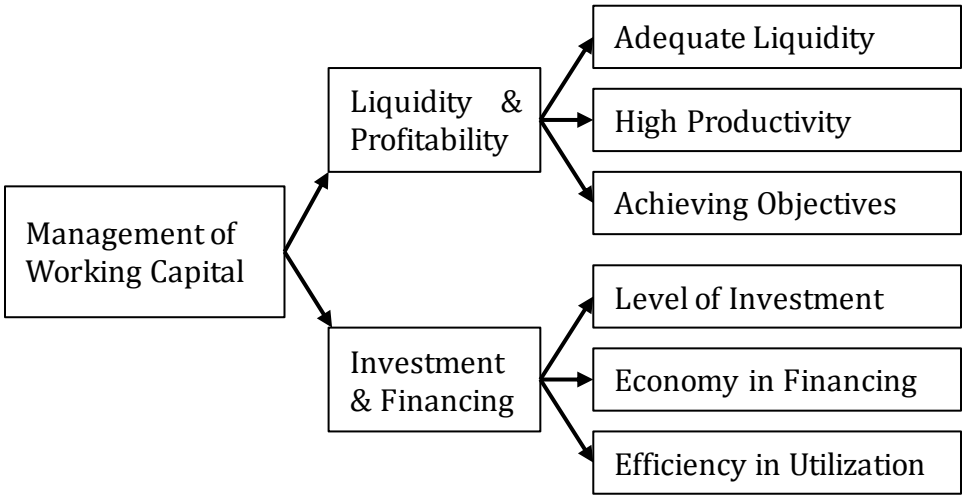
2.0 Management of Working Capital

Management of working capital follow three approaches:

- Aggressive policy,
- Moderate policy, and
- Conservative policy.

Aggressive working capital policy is highly risky, but profitable as it maintains low level of working capital against the high level of sales; the moderate working capital policy refers to the system in which firm maintains moderate level of working capital with moderate level of sales; while **c**onservative working capital policy is least risky because in this system firm maintains a higher level of working capital. **c**onservative policy is considered better for those concerns which face seasonal variations in sales. The management of working capital consists of two main components concerned with (i) Liquidity & Profitability, and (ii) Investment & Financing.

Liquidity of funds is of prime importance for smooth functioning of business operations. But, while maintain liquidity, it is important to keep cost aspect in mind because each rupee of capital bears some cost. Unnecessary tying up of funds in idle assets not only reduces the liquidity but also lessens opportunity to earn better return from investment in productive assets. Hence a trade-off between liquidity and profitability is highly needed. It increases profitability without disturbing routine functioning.



The arrangement of funds and their investment in working capital must be done with proper consideration to economy in financing, efficiency in utilization of funds, and efficiency in achieving objectives of firm. All this requires proper care in deciding the level of investment in major current assets such as inventories, accounts receivables, and cash; and identifying and exploring most economical sources of working capital financing.

3.0 Estimation of Working Capital Needs

Some important methods of estimating working capital needs are: (i) Operating cycle method, (ii) Estimation of current assets and current liabilities method, and (iii) Cash forecasting method.

3.1 Operating Cycle/ Working Capital Cycle Method

Business is about investing capital, acquiring the resources, adding value and realizing investments along with profits. There is an identifiable time lag between the purchase of raw materials and realization of Sales. The non-synchronous nature of cash outflows and inflows requires the firms to keep cash or invest in short term liquid securities to allow them to meet obligations when due. The firm is also required to maintain an inventory of raw materials and finished goods to prevent the loss of production or loss of business opportunity. The operating cycle of a company can be said to cover distinct stages, each stage requiring a level of supporting investment.

For a manufacturing firm, the cycle starts with the investment made in raw materials and other components. The inventories can be bought on trade credit as a result creditors will increase. Further goods are manufactured that are sold on credit as a result debtors will increase. Finally, debtors pay in the form of cash or cheque and consequently creditors are paid out. The time gap between the firm's paying cash for materials, entering into work in process, making finished goods, selling finished goods to the debtors and the inflow of cash

from debtors is known as working capital or operating cycle. It begins with the acquisition of raw material and ends with the collection of receivables. It is measured as:

Operating Cycle (O)=R+W+F+D−C

In this equation, components of operating cycle such as raw material holding period, work-in-progress holding period, finished goods holding period, debtors' collection period, and creditors payment period is calculated in terms of number of days for which working capital is blocked in concerned asset component or working capital advantage is available to the firm. Here:

$$\text{Raw Material Holding Period (R)} = \frac{\text{Average Stock of Raw Material}}{\text{Av. Raw Material Consumption Per Day}}$$

$$\text{WIP Holding Period (W)} = \frac{\text{Average Stock of WIP}}{\text{Average Cost of Production Per Day}}$$

$$\text{Finished Goods Holding Period (F)} = \frac{\text{Average Stock of Finished Goods}}{\text{Average Cost of Sales Per Day}}$$

$$\text{Debtors Collection Period (D)} = \frac{\text{Average Book Debts}}{\text{Average Credit Sales Per Day}}$$

$$\text{Creditors Payment Period (C)} = \frac{\text{Average Creditors}}{\text{Average Credit Purchases Per Day}}$$

The estimation of working capital needs by operating cycle method involves three steps.

- Measurement of Operating Cycle

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

- Calculation of Number of Operating Cycles

  $$\text{Number of Operating Cycles} = \frac{\text{Days in a Year}}{\text{Operating Cycles}}$$

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

- Measurement of Working Capital

  $$\text{Working Capital} = \frac{\text{Total Operating Cost}}{\text{Number of Operating Cycles}}$$

  Here, total operating cost means Annual Cost of Sales.

Determination of operating cycle helps in forecasting, controlling, and managing working capital. The length of operating cycle is an indicator of the efficiency of management. Though, length of operating cycle depends on nature of business, but, if small (less number of days),

is considered better. Similarly, the number of operating cycles, if more, is better for the business firm.

3.2 Estimation of Current Assets & Current Liabilities Method

Working capital consists of various current assets and current liabilities. Hence, finance manager estimates the amount of working capital to be invested in current assets such as inventories, receivables, cash etc. and also the amount of credit it will have from creditors for goods and services.

This method considers investment of working capital in various components of current assets and credit advantage from current liabilities.

Here: Working Capital = Current Assets − Current Liabilities

Investment in the components of current assets and credit advantage from current liabilities is calculated as:

$$\text{Raw Mat.} = \frac{\text{Budgeted Prod.} \times \text{Cost of RM pu} \times \text{RM Holding Period}}{\text{Months or Weeks or Days in a Year}}$$

$$\text{WIP} = \frac{\text{Budgeted Prod.} \times \text{Avg. Cost of WIP} \times \text{WIP Holding Pd.}}{\text{Months or Weeks or Days in a Year}}$$

$$\text{Finished Goods} = \frac{\text{Budgeted Prod.} \times \text{Average Cost of Prod.} \times \text{FG Holding Period}}{\text{Months or Weeks or Days in a Year}}$$

$$\text{Debtors} = \frac{\text{Budgeted Credit Sale} \times \text{Avg. Cost of Sales} \times \text{Average Collection Period}}{\text{Months or Weeks or Days in a Year}}$$

Cash and Cash Equivalents: Minimum Cash and Bank Balance desired

$$\text{Creditors} = \frac{\text{Budgeted Credit Purchase} \times \text{Cost of RM pu} \times \text{Average Payment Period}}{\text{Months or Weeks or Days in a Year}}$$

$$\text{O/S Wage} = \frac{\text{Budgeted Lab. Hours} \times \text{Wage per Hour} \times \text{Lag in Wage Payment}}{\text{Months or Weeks or Days in a Year}}$$

$$\text{O/S Overheads} = \frac{\text{Budgeted Overheads} \times \text{Lag in Overheads Payment}}{\text{Months or Weeks or Days in a Year}}$$

3.3 Cash Forecasting Method: This method is very much related to cash budgeting. It attempts to estimate cash surplus or deficiency. For this purpose, streams of cash inflows and outflows (expected in future period) are estimated. The surplus or deficiency indicated by difference between receipts and payments is managed.

Summary

Working capital management is a business tool that helps companies effectively make use of current assets, helping companies to maintain enough cash flow to meet short term goals and obligations. By effectively managing working capital, companies can free up cash that would otherwise be trapped on their balance sheets. As a result, they may be able to reduce the need for external borrowing, expand their businesses, fund mergers or acquisitions, or invest in R&D. Working capital is essential to the health of every business, but managing it effectively is something of a balancing act. Companies need to have enough cash available to cover both planned and unexpected costs, while also making the best use of the funds available.

Self check Questions

1. Write a detailed note on management of working capital.
2. Explain clearly various methods of working capital estimation.
3. Write short notes on: (a) Working capital cycle, and (b) Seed capital

Practical problems on Estimation and Management of Working Capital

Illustration # 1: From the following information calculate operating cycle and estimate working capital needs.

	01.04.2019	31.03.2020
Raw Material	80,000	1,20,000
Work-in-Process	20,000	60,000
Finished Goods	60,000	20,000
Debtors	40,000	40,000
Wage & Manufacturing Expenses		2,00,000
Selling & Distribution Expenses		40,000
Purchase of Raw Material		4,00,000
Total Sales		10,00,000

All goods are sold on credit basis

Suppliers of material allow two months credit

Solution:

$$\text{Raw Material Holding Period (R)} = \frac{\text{Average Stock of Raw Material}}{\text{Av. Raw Material Consumption Per Day}}$$

Material Consumed = (Opening Stock + Purchase – Closing Stock)

Material Consumed = (80,000 + 4,00,000 – 1,20,000) = 3,60,000

$$\text{Raw Material Holding Period (R)} = \frac{(80{,}000+1{,}20{,}000)/2}{3{,}60{,}000/365} = 101.39 \text{ Days}$$

$$\text{WIP Holding Period (W)} = \frac{\text{Average Stock of WIP}}{\text{Average Cost of Production Per Day}}$$

Cost of Production = (Material Consumed + Wage & Manufacturing Expenses + Opening Stock of Work-in-Process – Closing Stock of Work-in-Process)

Cost of Production = (3,60,000 + 2,00,000 + 20,000 – 60,000) = 5,20,000

$$\text{WIP Holding Period (W)} = \frac{(20{,}000+60{,}000)/2}{5{,}20{,}000/365} = 28.08 \text{Days}$$

$$\text{Finished Goods Holding Period (F)} = \frac{\text{Average Stock of Finished Goods}}{\text{Average Cost of Sales Per Day}}$$

Cost of Sales = (Op. Stock of Finished Goods+ Cost of Production – Cl. Stock Finished Goods)

Cost of Sales = (60,000 + 5,20,000 – 20,000) = 5,60,000

$$\text{Finished Goods Holding Period (F)} = \frac{(60{,}000 + 20{,}000)/2}{5{,}60{,}000/365} = 26.07 \text{ Days}$$

$$\text{Debtors Collection Period (D)} = \frac{\text{Average Book Debts}}{\text{Average Credit Sales Per Day}}$$

$$\text{Debtors Collection Period (D)} = \frac{(40{,}000+40{,}000)/2}{10{,}00{,}000/365} = 14.60 \text{ Days}$$

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

$$\text{Operating Cycle (O)} = (101.39 + 28.08 + 26.07 + 14.60 - 60) = 110.14 \text{ Days}$$

$$\text{Number of Operating Cycles} = \frac{\text{Number of Days in a Year}}{\text{Operating Cycle}} = \frac{365}{110.14} = 3.31$$

Cost of Goods Sold = (Cost of Sales + Selling & Distribution Expenses)

Cost of Goods Sold = (5,60,000 + 40,000) = 6,00,000

$$\text{Working Capital} = \frac{\text{Total Operating Cost or Cost of Goods Sold}}{\text{Number of Operating Cycles}} + \text{Desired Cash Balance}$$

$$\text{Working Capital} = \frac{6{,}00{,}000}{3.31} = \text{Rs. } 1{,}81{,}268$$

Illustration # 2: Silverline, a newly setup enterprise, has furnished following cost data.

- Cost per unit (as % to sale price): Raw material – 40%, labor – 30%, Overheads – 10%
- Raw materials are expected to remain in stores for an average period of 1 month.
- Each unit of production will be in process for ½ month on average. Production in process includes raw material – Full cost; Labor and overheads – Half of the cost.
- Finished goods are likely to stay in warehouse for an average period of 2 months.
- Half of the sale will be on credit basis, and customers are allowed 2 months credit.
- Credit period allowed by suppliers is 1 month.
- Lag in payment of wage is 1 month. Half of the overheads consist of salary to un-productive staff.
- Firm maintains 20% of computed working capital as reserve for contingencies.
- Output level is 6,000 units, and Sales price is Rs. 200 per unit.
- Production and sales follow constant pattern.

Determine working capital requirements.

Solution:

Calculation of Unit Cost:

Raw Material (40% of 200)	: Rs. 80
Labor (30% of 200)	: Rs. 60
Overheads (10% of 200)	: Rs. 20
Work-in-Process (80 + 50% of 60 + 50% of 20)	: Rs. 120
Finished Goods (80 + 60 + 20)	: Rs. 160
Investment in Debtors (80 + 60 + 20)	: Rs. 160

Statement of Estimated Working Capital

	Amount (Rs.)	Amount (Rs.)
Current Assets (A)		
Raw Material (6,000 * 80 * 1/12)	40,000	
Work-in-Process (6,000 * 120 * 1/24)	30,000	
Finished Goods (6,000 * 160 * 2/12)	1,60,000	
Debtors (20% of total Sales) (3,000 *160 * 2/12)	80,000	3,10,000
Current Liabilities (B)		
Creditors (6,000 * 80 * 1/12)	40,000	
Wage (6,000 * 60 * 1/12)	30,000	70,000
Net Working Capital (A – B)		2,40,000
Cash Balance for Contingencies (50% of 2,40,000)		48,000
Total working Capital Needs		2,88,000

Question # 3: The management of a company has called for a statement of working capital to finance activity level of 1,80,000 units of output for the year. The unit cost structure of the product at above mentioned activity level is: Raw Material – Rs. 20, Labor – Rs. 5, Overheads (including depreciation of Rs. 5) – Rs. 15; and unit sale price is Rs. 50. The guidelines to follow are:

- Raw materials are held in stock, on average for 2 months.
- Work-in-progress (assume 50% completion) will approximate to ½ s month's production.
- Cash sale is expected to be 25% of total sales.
- Finished stock remains in warehouse are held in stock, on average for 1 month.
- Customers are provided on average 2 months credit.
- Suppliers of raw materials extend 1 month's credit.
- Time lag in payment of wage is 1 month, and ½ month in case of overheads.
- Minimum desired cash balance is Rs. 20,000.

Solution:

Statement of Total Cost

	Activity Level – 1,80,000 Units
	Amount (Rs.)
Raw Material (1,80,000 * 20)	36,00,000
Labor (1,80,000 * 5)	9,00,000
Overheads (1,80,000 * 10)	18,00,000
Total Cost	63,00,000

Statement of Estimated Working Capital

	Amount (Rs.)	Amount (Rs.)
Current Assets		
Raw Material (36,00,000 * 1/6)	6,00,000	
Work-in-Progress (63,00,000/ 24) * 50%	1,31,250	
Finished Goods (63,00,000/ 12)	5,25,000	
Debtors (63,00,000/ 6) * 75%	7,87,500	
Cash Balance	20,000	20,63,750
Current Liabilities		
Creditors (36,00,000 * 1/12)	3,00,000	
Direct Labor (9,00,000 * 1/12)	75,000	
Overheads (excluding depreciation) (18,00,000 * 1/24)	75,000	4,50,000
Net Working Capital		16,13,750

Question # 4: Thapar Brothers started production of a classic toy on 1 January 2020. The components of cost per unit include: Raw Material – Rs. 8, Wage – Rs. 12, and Variable Expenses – Rs. 4. The fixed expenses per month are Rs. 15,000. Firm sells one-third of produce for cash and rest of sale is on credit basis. The selling price of toy is Rs. 40 per unit.

As per terms settled with suppliers and customers (i) payment for materials is to be made in the month following the month of purchase, and (ii) credit allowed to customers is one month on average. Payment of expenses is made in the month in which they incur.

The output and sales from January to June 2020 is 900 units, 1,200 units, 1,800 units, 2,100 units, 2,250 units, and 2,550 units. Due to very low profit estimates in quarter ending on 31 March 2020, firm's tax liability will be zero; but, in the next quarter ending on 30 June 2020, it will have to pay corporate tax of Rs. 32,000 in the last week of June.

Firm does not maintain huge cash balance (preferably below Rs. 10,000). Accordingly, it invests excess cash balance (in multiple of Rs. 5,000) in short term deposit schemes and get them matured, when required.

You are required to prepare a statement of cash forecast for a period from March to June 2020 assuming:

(i) Production and sale coincide, and
(ii) Opening cash balance as on 1 March 2020 is Rs. 3,800.

Solution:

Statement of Cash Forecast
(March 2020 – June 2020)

	March (1800 Units)	April (2100 Units)	May (2250 Units)	June (2550 Units)
Opening Balance	3,800	6,400	9,400	7,600
Cash Receipts				
Cash Sales (1/3 of Sale)	24,000	28,000	30,000	34,000
Collection from Debtors	32,000	48,000	56,000	60,000
Short-term Deposit Matured				10,000
Cash Available (A)	59,800	82,400	95,400	1,11,600
Cash Disbursements				
Payment to Creditors	9,600	14,400	16,800	18,000
Payment of Wage	21,600	25,200	27,000	30,600
Payment of Variable Exp.	7,200	8,400	9,000	10,200
Payment of Fixed Expenses	15,000	15,000	15,000	15,000
Corporate Tax				32,000
Short-term Deposit		10,000	20,000	
Cash Payments (B)	53,400	73,000	87,800	1,05,800
Closing Balance	6,400	9,400	7,600	5,800