

## **Construction Economics & Finance**

### **Module 6**

#### **Lecture-1**

##### **Financial management:**

Financial management involves planning, allocation and control of financial resources of a company. Financial management is essential as it controls the financial operations of a company. For a construction company, the decision to bid for a project will depend on its financial status which in turn will be governed by financial management principles. The decision to bid for a project will depend on various factors namely whether the company have enough funds or require outside financing, whether to acquire the equipment through purchase or acquisition through renting or leasing, whether to carry out the entire work or subcontract a portion of the work etc. If the company uses its own funds for the project, it may have an adverse effect on its financial status as it will reduce the liquid asset thus affecting company's working capital. The construction industry differs from other industries because of its unique characteristics and accordingly the financial management principles are applied for using the financial resources of the company. Generally the construction companies receive the payments from the owners at specified time intervals as the construction work progresses and owners often retain certain amount subject to the satisfactory completion of the project. Thus the terms and conditions for receipt of payments from owners affect the cash flow of the construction companies and need the changes in allocation of financial resources. Further construction companies often subcontract some portion of the work (as required) to the subcontractors, which in turn affect the cash flow. The financial management decisions include the decisions for investment, financing and distribution of earnings. For construction companies the investment decisions relate to investment in the business i.e. investment of funds in acquiring the assets (both current assts and long-term assets) to be utilized in the projects for the expected return along with the risk of cash flows associated with uncertain future conditions. The financing decisions depend on decision to investment the funds and the resources possessed by the construction companies. In addition the financing decisions

are also controlled by other factors namely source of financing (from banks or other financial institutions), cost of financing i.e. interest cost on the loan and the financing duration. The decision for distribution of earnings or profits of the company depends on the dividends to be paid to the stockholders and the retained earnings to be reinvested in the business to increase the return. Thus for any company or organization, financial management has to ensure the supply of funds in acquiring the assets and their effective utilization in business activities, to ensure the expected return on the investment considering the risk associated and optimal distribution of the earnings.

### **Construction accounting**

Construction accounting involves collecting, organizing, recording and reporting the financial data of a construction firm. It helps in identifying the problems encountered in effective management of financial resources of the firm and taking the corrective measures in time. The accounting system allows for the systematic recording and reporting the financial information from one period to another in accordance with the accounting principles. Financial data relates to assets, liabilities, net worth, cost incurred, revenue earned etc. and is required for preparing the financial statements of the construction firm. The most important financial statements which are used to represent the financial status and evaluate the performance of the firm are balance sheet and income statement. The financial statements are also used to communicate the financial status of the firm to the shareholders and financial institutions. The shareholders and financial institutions can get the useful information about the utilization of financial resources in the business activities, costs incurred, revenues earned and other financial information of the firm from period to period. In addition the financial information is also required for calculating the income tax to be paid by the firm.

Construction firms use different types of accounting methods for recognition of the revenues, costs and profit while preparing the financial statements. These accounting methods are cash method, accrual method, percentage-of-completion method and completed contract method. For obtaining the most accurate picture of financial status, the construction firm has to use the best suitable accounting practice for recognition of the revenue and expenses.

In **cash method**, revenue is recognized when construction firm actually receives the payments from the owner of the project for the services provided. Similarly the cost (expenses) is recognized when the construction firm actually pays the bills (to subcontractors, material suppliers etc.). Normally the cash method is not used for preparing the financial statements of the construction firm as the revenues or costs are recognized when these are actually received or paid rather than the revenues billed to date or the costs incurred to date. Due to this delay in the recognition of revenues and costs, this method does not provide accurate financial status of the firm.

In **accrual method**, revenue is recognized when construction firm bills the owner of the project i.e. before the actual receipt of payments from the owner and expenses are recognized as the construction firm receives the bills from subcontractors, material suppliers etc. i.e. before the bills are actually paid. This method of accounting is used for preparing the financial statements of the firm as it provides more accurate information about the financial status of the firm.

In **percentage-of-completion method**, the revenue and expenses are recognized as percentage of work that is complete during the course of the project. This method of accounting normally used for long-term construction projects. The revenue is recognized as the construction firm bills the owner of the project and expenses are recognized as the construction firm receives the bills from subcontractors, material suppliers etc. The percentage complete till date can be calculated by dividing the cost incurred to date by the total estimated cost at completion. Corresponding to this percentage completion, the revenue and profit to date are calculated. The percentage-of-completion method is used for preparing the financial statements and it provides the most accurate picture of the firm's financial status.

In **completed contract method**, the revenue and expenses are recognized when the project is complete. This method of accounting does not provide accurate information about the construction firm's financial condition as the recognition of revenue and expenses are deferred till the completion project rather than in the periods when the revenues are billed to date or the costs are incurred to date. The revenue recognized to date for the project at any stage within the project duration is zero, as the project is not complete. This method of accounting can be used for construction contracts having

higher uncertainty about the construction cost and revenue until the completion of the project, involving higher financial risks in the business. Further completed contract method causes large fluctuations in the profit as the cost and revenue are not recognized till the completion of the project.

### **Example -1**

The following table presents the information about the financial data of a construction project.

Description of financial data	Amount (Rs.)
Contract amount	3,85,00,000
Original estimated cost of the contract	3,46,50,000
Billed to date	2,57,95,000
Payments received to date	2,34,85,000
Costs incurred to date	2,07,90,000
Costs paid to date	1,84,03,000
Estimated or forecasted cost to complete	1,31,28,500

Calculate the revenue to date for the project using different methods of revenue recognition.

#### **Solution:**

##### Cash method

By using the data from above table, revenue to date for the project using cash method is calculated as follows;

$$\text{Revenue to date} = \text{Payments received to date} - \text{Costs paid to date}$$

$$\text{Revenue to date} = \text{Rs. } 2,34,85,000 - \text{Rs. } 1,84,03,000 = \text{Rs. } 50,82,000$$

##### Accrual method

The revenue to date for the project by using accrual method is calculated as follows;

$$\text{Revenue to date} = \text{Billed to date} - \text{Costs incurred to date}$$

$$\text{Revenue to date} = \text{Rs. } 2,57,95,000 - \text{Rs. } 2,07,90,000 = \text{Rs. } 50,05,000$$

Percentage-of-completion method

For calculating the revenue to date by using percentage-of-completion method, first the percentage of work that is complete is calculated.

$$\text{Percentage of completion} = \frac{\text{Costs incurred to date}}{\text{Total estimated cost at completion}} \times 100$$

Total estimated cost at completion is equal to costs incurred to date plus estimated or forecasted cost to complete.

$$\text{Percentage of completion} = \frac{\text{Costs incurred to date}}{\text{Costs incurred to date} + \text{Estimated cost to complete}} \times 100$$

$$\text{Percentage of completion} = \frac{\text{Rs.2,07,90,000}}{\text{Rs.2,07,90,000} + \text{Rs.1,31,28,500}} \times 100 = 61.29\%$$

The revenue to date for the project is now calculated by multiplying the contract amount with the percentage of completion and is given by;

$$\text{Revenue to date} = \text{Rs.3,85,00,000} \times 0.6129 = \text{Rs.2,35,96,650}$$

Now gross profit to date is calculated by subtracting costs incurred to date from revenue to date and is given by;

$$\text{Gross profit to date} = \text{Revenue to date} - \text{Costs incurred to date}$$

$$\text{Gross profit to date} = \text{Rs.2,35,96,650} - \text{Rs.2,07,90,000} = \text{Rs.28,06,650}$$

Completed contract method

By using completed contract method, revenue to date for the project would be zero as the project has not yet been completed.

## **Lecture-2**

### **Chart of accounts:**

Chart of accounts lists all the accounts which are required to organize the financial information of a construction firm. The accounts mentioned in chart of accounts are used to prepare the financial statements namely income statement and balance sheet of the firm. The accounts listed in chart of accounts are assets, liabilities, net worth, revenue, expenses and tax. In chart of accounts the components of balance sheet i.e. assets, liabilities and net worth are listed first followed by the components of income statement i.e. revenue, expenses and tax. Each account in the chart is assigned by a reference number for easy identification.

### **Financial statements**

As already stated in Lecture 1 of this module, financial statements are used to indicate the financial status and evaluate the performance of a firm. The most important financial statements are income statement and balance sheet (already mentioned).

### **Income statement (or Profit and Loss statement)**

Income statement is a summary of revenues, expenses and the resulting profit or loss of a firm for a stated period of time, usually the fiscal year. The income statement is also referred as profit and loss statement. It records the revenues and expenses in the interval between two balance sheets. It provides information about net profit or loss of the firm, thus indicating whether the firm is running the business with profit or loss. Profit is the excess of revenue over the expense. Through income statement, it is possible to track the performance of the firm during the stated period of time by analyzing the revenues and the expenses. Revenues represent the cash inflows earned in the exchange of services provided whereas the expenses represent the cash outflows, the firm spent for providing the services. In income statement the operating revenues and expenses represent the income and the expenditures those are associated with the core operations of the firm whereas the nonoperating revenue and expenses represent the income and expenditures from sources other than the core operations. For construction firms the operating revenues represent the earnings against the services provided i.e. earnings against the completion of portion of work or entire work of the projects. The operating expenses

represent the construction costs (both direct and indirect costs) i.e. material cost, equipment cost, labor cost, cost of subcontracted work and the overhead cost. As already mentioned in Lecture 1 of Module 5, the direct cost includes cost of materials, equipment and labor associated with each item of work, along with subcontracted costs whereas the indirect cost (overhead costs) is calculated for the entire construction project rather than allocating for each item of work in the project. In income statement, the nonoperating revenues include the interest earned and the revenue earned from sources other than the core operations (i.e. construction operations) of the firm. The nonoperating expenses include interest payments on loans and other expenditures which are not associated with the construction operations of the firm.

In the income statement, the operating revenues and expenses are shown first. From these records, the gross profit from operations is calculated. After that the net profit from operations is calculated by the subtracting the overhead cost from the gross profit (from operations). The nonoperating revenue and expenses are then recorded. The profit before tax is then equal to net profit from operations less the nonoperating revenue and expenses. It may be noted here that the nonoperating revenue is added whereas nonoperating expense is subtracted from net profit from operations. After that the net profit after tax is calculated by subtracting the income tax (at an appropriate income tax rate) from profit before tax.

A typical income statement of a construction firm is shown as follows.

<b>XY Construction Firm</b>	
<b>Income Statement</b>	
<b>Year Ended March 31, 2012</b>	
Operating Revenues	Rs.45260700
Operating Expenses	
Equipment	6338400
Materials	10304150
Labor	8067200
Subcontract	9185700
Total operating expenses	33895450
Gross profit from operations	<b>11365250</b>
General and administrative overhead cost	4661800
Net profit from operations	<b>6703450</b>
Nonoperating Revenues	
Interest receipts	769500
Nonoperating Expenses	
Interest payments	407850
Profit before tax	<b>7065100</b>
Income tax	2119530
Net profit after tax	<b>Rs.4945570</b>

For the above income statement, the calculations of gross profit from operations, net profit from operations, profit before tax and net profit after tax are presented below.

Gross profit from operations = operating revenues – operating expenses

$$= \text{Rs.}45260700 - \text{Rs.}33895450 = \text{Rs.}11365250$$

Net profit from operations = gross profit from operations – general and administrative overhead cost

$$= \text{Rs.}11365250 - \text{Rs.}4661800 = \text{Rs.}6703450$$

Profit before tax = net profit from operations + nonoperating revenues – nonoperating expenses

$$= \text{Rs.}6703450 + \text{Rs.}769500 - \text{Rs.}407850 = \text{Rs.}7065100$$

Net profit after tax = profit before tax – income tax

$$= \text{Rs.}7065100 - \text{Rs.}2119530 = \text{Rs.}4945570$$



## Lecture-3

### **Balance sheet**

A balance sheet shows details about the financial status of a firm at a particular point in time. A balance sheet is a summary of the firm's assets, liabilities and owners' equity or net worth (i.e. worth that the firm owes to its owners i.e. stockholders or shareholders) at a given point in time. In other words for a firm, a balance sheet provides details about the assets it owns, liabilities it owes and the equity it owes to its owners. Balance sheet represents a snapshot of firm's financial position. It is commonly prepared at the end of financial year (i.e. fiscal year). But it may also be prepared at other time intervals i.e. quarterly, semiannually within a financial year or calendar year as required by the firm. The fundamental relationship between assets, liabilities and owners' equity on the balance sheet is as follows;

$$\text{Assets} = \text{Liabilities} + \text{Owners' equity}$$

As observed from above relationship, on the balance sheet the assets of a firm must be equal to the sum of its liabilities and owners' equity. The categories of assets, liabilities and owners' equity are presented as follows.

**Assets** are the resources of monetary value those are owned by the firm. The assets of a typical construction firm are cash, plant and equipment, land, buildings, construction materials, receivables etc. Assets are classified into three categories namely current assets, long-term assets and other assets.

**Currents assets** are defined as the assets which are likely to be converted into cash within one year. The categories of current assets are cash, accounts receivable, notes receivable, costs and profits in excess of billings, inventory, prepaid expenditures etc.

**Cash** is the primary current asset. It includes cash in bank i.e. bank deposits (savings, term deposits with maturity less than one year) and petty cash. **Accounts receivable** include the amount that the owner of the project (i.e. client) owes to the firm for providing service or for the job done. For example the monthly bill to be paid by the client of a project to the construction firm is an account receivable till the payment against the bill is received. It also includes the retentions receivable. The retentions receivable represent the amount that is held up by the client of the project and is released

to the construction firm subject to fulfillment of requirements of the project. **Notes receivable** are the formal written notes that represent the amount that is expected to be received by the firm within a year. The formal note serves as written promise to receive the amount of money from the party obliged to make the payment. It includes bill payments to be received through a formal written promise within a year. **Costs and profits in excess of billings** are also known as underbillings and are recorded as current assets on the balance sheet. Costs and profits in excess of billings occur when the firm bills the clients (project owners) less than the sum of costs incurred and estimated profits for the portion of the work that is complete. The firms using percentage-of-completion method of accounting are required to recognize the revenues, expenses and estimated profits on the basis of percentage of project work that is complete and costs and profits in excess of billings are accordingly recorded on the balance sheet. Percentage-of-completion method is one of accounting methods that the construction firms use for preparing the financial statements. Underbillings may occur due to more cost incurred than the estimated on the completed work or due to non-proportionate distribution of profit. **Inventory** represents resources (mostly the materials) that are with the firm and are likely to be used in the project within a short period of time and its monetary value is entered in the balance sheet as current asset. For a construction firm, inventory includes the construction materials to be used in a project. The material suppliers (subcontractors) generally carry inventory of the construction materials which they supply to the construction firms. **Prepaid expenditures** represent the amount of money paid for future services and include prepaid insurance premium, prepaid taxes, advance rental payments etc.

**Long-term assets** represent the resources which can not readily be converted into money (cash) and these assets provide future benefits. **Fixed or tangible assets** (a category of long-term assets) include land, building, plant and equipment and other tangible assets with longer service life. Fixed assets are shown on the balance sheet at their original cost (i.e. purchase price) less the accumulated depreciation (except for land). The recorded accumulated depreciation on the balance sheet represents the loss in value of the fixed assets till date.

**Other assets** include other investments and equity in other enterprises.

**Liabilities** represent the obligations (i.e. debts) that the firm owes to other parties. Liabilities include bank loans, debts to subcontractors, advances from project owners (i.e. clients), taxes payable both current and deferred etc. Liabilities are classified into two categories namely current liabilities and long-term liabilities and are accordingly shown on the balance sheet.

**Current liabilities** represent the obligations which are likely to be paid within one year. The categories of current liabilities are accounts payable, billings in excess of costs and profits, accrued payables, lease payments etc. Current liabilities are usually paid by using current assets. **Accounts payable** include the debts that the firm owes to other parties for services provided. For example the monthly bills received by the construction firm from subcontractors and suppliers represent the accounts payable till the payment of the bills. It also includes the retentions payable which represents the amount of money that is held up by the construction firm and is released to subcontractors or suppliers subject to the fulfillment of the requirements. **Billings in excess of costs and profits** also known as overbillings are recorded as current liabilities on the balance sheet. Billings in excess of costs and profits occur when the firm bills the clients (project owners) more than the sum of costs incurred and estimated profits. Overbillings may occur due to less cost incurred than the estimated on the completed project work or due to non-proportionate distribution of profit. **Accrued payables** are the expenses which the firm owe and include accrued wages, accrued taxes, accrued interest and accrued rents which are not paid. **Lease payments** are recorded as a current liability on balance sheet and for construction firms it represents rental payments for acquiring the construction equipment. In addition to these current liabilities, **notes payable** (include the debts which are likely to be paid through a formal written promise within a year) and **dividends payable** (portion of the profits or earnings that a firm pays to its stockholders) are also recorded as current liabilities on the balance sheet.

**Long-term liabilities** also known as non-current liabilities are the debts which are not expected to be paid within a year and normally refer to loans from banks or other financial institutions. Long-term liabilities include loans taken to purchase construction plant and equipment and other assets, payment of mortgage for buildings etc.

**Owners' equity** or **net worth** of the firm represents the excess of assets of a firm over its liabilities and is recorded on the balance sheet. For the companies, the owners' equity consists of three components namely common stock, preferred stock and retained earnings. Common stock represents the major source of investment by the stockholders in the company and provides the stockholders with voting rights to exercise in company decisions. Preferred stock that represents the ownership in a company usually do not provide the stockholders the voting rights to exercise in company affairs, however it ensures a dividend to be received by stockholders (holders of preferred stock) before any dividend is paid to holders of common stock. Retained earnings represent the profits or earnings which are reinvested in the company rather than being distributed as dividends to the stockholders. These earnings are retained by the company to reinvest in the business to increase the income and thus to increase the value of stock.

A typical balance sheet of a construction firm is shown below. In the balance sheet the total assets of the construction firm is equal to the sum of total liabilities and owners' equity.

<b>AB Construction Firm</b>			
<b>Balance Sheet</b>			
<b>As of 31 March 2012</b>			
<b>Assets</b>		<b>Liabilities</b>	
<b>Current assets</b>		<b>Current liabilities</b>	
Cash	Rs.1050000	Accounts payable including retentions	Rs.5981400
Accounts receivable including retentions	6860000	Billings in excess of costs and profits	2736500
Costs and profits in excess of billings	4263000	Accrued payables	1371600
Inventory	3925000	Notes payable	1264900
Total current assets	Rs.16098000	Dividends payable	981200
<b>Fixed assets</b>		Total Current liabilities	Rs.12335600
Land	Rs.2362000	Long-term debts	Rs.4610700
Building	10152000	Total liabilities	Rs.16946300
Construction and other equipment	10572000	<b>Owners' equity</b>	
Total fixed assets	Rs.23086000	Common stock	Rs.3150600
Less accumulated depreciation	7046160	Preferred stock	2569040
Net fixed asset	Rs.16039840	Retained earnings	9471900
Total assets	<b>Rs.32137840</b>	Total owners' equity	Rs.15191540
		Total liabilities and owners' equity	<b>Rs.32137840</b>

## **Lecture-4**

### **Financial ratios**

Financial ratios are used to evaluate the financial status of a company. These ratios provide information about the company's ability to meet the financial obligations (i.e. ability to pay the bills, debt payment ability), profitability, liquidity and effective use of its assets. Financial ratios represent the relationship between the financial data shown on the financial statements (i.e. balance sheet and income statement). These ratios are calculated by dividing a category of financial data by another category shown on financial statements and are then compared with other companies within the industry. Through financial ratios, it is easy to identify the changes in the financial status of the company which are not evident, by only referring to the values of different categories of assets, liabilities net worth, revenue and expenses shown on the financial statements. The different financial ratios which are used to assess the financial status of a company are presented below.

### **Current ratio**

Current ratio indicates the ability of a company to meet the short-term financial obligations. In other words it is a measurement company's ability to pay the current liabilities by using the current assets and is given by;

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

Current assets and current liabilities shown on balance sheet are used to calculate this ratio and the details about the current assets and current liabilities are already stated in Lecture 3 (Balance sheet) of this module. This ratio gives information about working capital status of a company. A current ratio of less than 1.0 to 1 (i.e. 1.0:1) indicates that the current assets of the company is not sufficient to pay its current liabilities whereas a greater value of current ratio is a strong indicator of the ability of the company to pay its current liabilities. However on the other hand a considerably higher value of current ratio indicates that much of the assets of the company might have tied up in the current assets and can be invested in other business to increase the earnings of the firm.

**Quick ratio (or acid-test ratio)**

Quick ratio measures the ability of a firm to pay current liabilities using cash or other assets that can be readily converted into cash. Quick ratio is also referred as acid-test ratio. It is a measure of short-term liquidity of a firm and provides information about its immediate financial status. This ratio is calculated by dividing quick assets (categories of current asset) of a firm by its current liabilities. The quick assets include cash and accounts receivable. Quick ratio is given by the following relationship.

$$\text{Quick ratio} = \frac{\text{Cash} + \text{accounts receivable}}{\text{Current liabilities}}$$

Inventories and retentions receivable (of accounts receivable) are excluded from quick assets because these assets can not be converted into cash quickly. A quick ratio equal to or greater than 1.0:1 indicates the ability of a firm to pay the current liabilities with the quick assets. A quick ratio of less than 1.0:1 requires that the firm needs to convert inventories and other assets into cash for payment of current liabilities.

**Debt to worth ratio**

This ratio is calculated by dividing total liabilities of a company by its net worth or owners' equity. It is also referred as debt to equity ratio and is given by;

$$\text{Debt to worth ratio} = \frac{\text{Total liabilities}}{\text{Net worth}}$$

This ratio is a measure of a company's leverage and the desired value of this ratio should be less than or equal to 2.0:1. A debt to worth ratio less than 1.0:1 indicates that the firm is not utilizing the debt in the business to increase the return on the investment. Further a lower value of this ratio indicates that there is more protection to the creditors as the owners of the firm are contributing majority of the funds to the business of the firm. A debt to worth ratio of greater than 2.0:1 may result in a greater risk for the repayment of debt along with interest during recession in the construction industry.

**Return on assets ratio**

The return on assets ratio is calculated by dividing the net profit after taxes by the total assets of the company. This ratio is expressed as a percentage and is given by:

$$\text{Return on assets ratio} = \frac{\text{Net profit (after taxes)}}{\text{Total assets}}$$

The net profit after tax from income statement and total assets from balance sheet of a company are used to calculate this ratio. Return on assets ratio measures how efficiently a company uses its assets to earn the return and indicates profitability of a company. For a company, the efficient use of assets earns a higher return (higher value of this ratio) whereas there is low return on assets (lower value of this ratio) for a poorly run company.

### **Return on sales ratio**

This ratio is calculated by dividing the net profit after taxes by the net sales revenue. Return on sales ratio is expressed as a percentage. It is given by:

$$\text{Return on sales ratio} = \frac{\text{Net profit (after taxes)}}{\text{Net sales revenue}}$$

The operating revenues (net sales revenue) and net profit after tax from income statement are used to calculate this ratio. This ratio indicates the profit margin for a company and measures how efficiently a company can meet the adverse market conditions such as decline in demand, falling prices and increased costs. An increasing value of this ratio (%) indicates higher profit margin due to increased revenue and lowered company expenses. Similarly a lower value of this ratio (%) indicates lower profit margin due to decline in revenue and increase in the costs.

There are also other financial ratios such as current liabilities to net worth ratio, fixed assets to net worth ratio, assets to revenues ratio etc. (calculated from data of financial statements) can be used to assess the financial status of a company. The calculation of some of the financial ratios is presented in the following example.

### **Example -2**

Calculate the current ratio and debt to worth ratio for 'AB Construction Firm' (Balance Sheet, Lecture 3 of Module 6) and return on sales ratio for 'XY Construction Firm' (Income Statement, Lecture 2 of Module 6).

### **Solution:**

From the balance sheet of 'AB Construction Firm', the values of current assets and current liabilities are Rs.1,60,98,000 and Rs.1,23,35,600 respectively. Further the values



of total liabilities and net worth (or owners' equity) are Rs.1,69,46,300 and Rs.1,51,91,540 respectively.

The current ratio for 'AB Construction Firm' is given by;

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

$$\text{Current ratio} = \frac{\text{Rs.1,60,98,000}}{\text{Rs.1,23,35,600}} = 1.30$$

Thus the current ratio for the construction firm is 1.30.

The debt to worth ratio for 'AB Construction Firm' is given by;

$$\text{Debt to worth ratio} = \frac{\text{Total liabilities}}{\text{Net worth}}$$

$$\text{Debt to worth ratio} = \frac{\text{Rs.1,69,46,300}}{\text{Rs.1,51,91,540}} = 1.11$$

Thus the debt to worth ratio for the construction firm is 1.11.

From the income statement of 'XY Construction Firm', the values of operating revenues (net sales revenue) and net profit (after taxes) are Rs.4,52,60,700 and Rs.49,45,570 respectively.

The return on sales ratio for 'XY Construction Firm' is given by;

$$\text{Return on sales ratio} = \frac{\text{Net profit (after taxes)}}{\text{Net sales revenue}}$$

$$\text{Return on sales ratio} = \frac{\text{Rs.49,45,570}}{\text{Rs.4,52,60,700}} = 0.109 = 10.9\%$$

Thus the return on sales ratio for the construction firm is 10.9%.

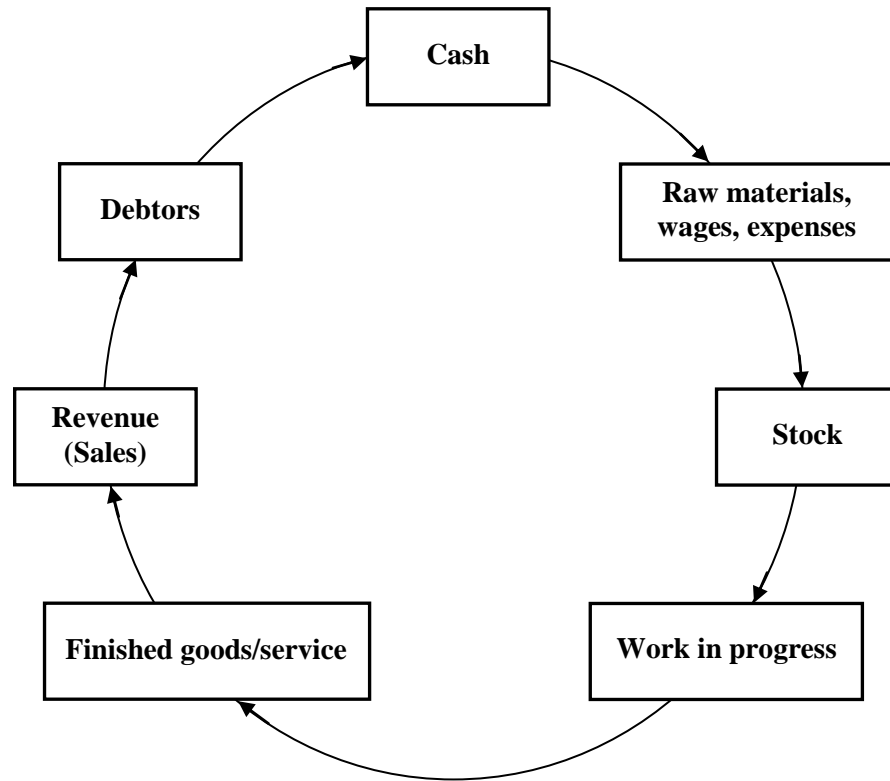
## **Lecture-5**

### **Working capital management**

Working capital represents the excess of current assets over the current liabilities. The details about current assets and current liabilities are already presented in Lecture 3 of this module. Working capital includes the cash or near-cash assets which are required for the daily operations in the business. Adequate working capital is required for ensuring regular supply of raw materials and other consumables, timely payment of wages and for meeting other short-term expenses so as to have smooth running of the operations in the business. Working capital measures the short-term financial strength and a company must have sufficient working capital to meet the short-term financial obligations. Insufficient working capital may result in difficulty in meeting the cash requirement for the operations in the business. On the other hand, much of assets tied up in working capital reduces the profit level of the company as excessive working capital makes the funds idle. Thus working capital management aims at establishing the optimum level of working capital for smooth running of the operations in the business by maintaining the desired liquidity and profitability of the company. For a company, the main objective lies in increasing the profit level so as to maximize the wealth of stockholders and increase the market value of stock and at the same time maintaining the liquidity for meeting the short-term financial obligations. Liquidity and profitability are inversely related as higher investment in current assets with lesser short-term borrowings increases the liquidity and reduces the profitability of the company whereas, for a company lesser investment in current assets with higher short-term borrowings decreases the liquidity and increases the profitability. Thus it is essential to have a balance between liquidity and profitability by maintaining the satisfactory level of working capital with the help of working capital management which assists in managing the desired level of current assets and current liabilities of the company.

Working capital is represented in a continuous cycle known as operating cycle and a typical operating cycle is shown in Fig. 6.1. The operating cycle is also referred to as working capital cycle or current assets and current liabilities cycle. The operating cycle starts with acquiring raw materials and consumables using cash (or on credit), maintaining their inventory, use in production, obtaining finished goods (or service)

followed by sales, receipt of payment against the bill and finally realizing the cash, which completes the operating cycle and the same process is again continued. In other words in the operating cycle, there is continuous flow from cash to suppliers, to inventory, to finished goods (or service), to accounts receivable and then to cash again. The length of an operating cycle (i.e. duration) depends on the number of stages involved (as mentioned above) and the average length (i.e. duration) of each stage. For a construction company undertaking a project, the operating cycle begins with procurement of construction materials and other consumables with cash (either available or from advance if any received from the owner of the project) or on credit from the suppliers. The quantities of these items to be purchased depend on how much to be used during a given period of time and how much to be kept in stock. Further cash is used for payment of wages to labourers employed in the project and payment of equipment rental charges to the equipment renting firm along with the payment of overhead expenses. If the equipment is owned by the construction company, then cash is utilized for meeting the operating cost of the equipment employed in the project. The construction material suppliers and equipment renting firm are regarded as creditors if the company acquires these items on credit. After completion of a portion of work, the construction company raises the bill against the activities carried out during that period of time i.e. billing period which may be one month or two months (i.e. as per conditions of contract between the owner and the construction company). The billed amount becomes accounts receivable and owner of the project is regarded as debtor to the construction company till the receipt of payment against the bill. The receipt of payment against the bill and realization of cash completes the operating cycle and the process continues. The construction company must have sufficient working capital to meet expenses of materials, equipment, labour and overhead till the receipt of payment from the client (i.e. owner of the project). The estimation of working capital requirement is an important aspect of working capital management. The factors those affect the working capital requirement are nature and size of the business, type of raw materials, production process, credit policy, duration of operating cycle, volume of production and sales etc.



**Fig. 6.1 Operating cycle**

In the construction projects, there is usually a time lag between completion of a portion of work and the receipt of payment from owner of the project and thus production (sales) is not converted into cash instantaneously. Therefore working capital is required to meet the financial requirement in daily operations in the project. Often material suppliers and the equipment renting firm also allow a credit period to the construction company. Thus the credit period allowed by material suppliers and equipment renting firm to the construction company and that allowed by the construction company to the owner of the project are to be considered while calculating working capital requirement of the construction company.

The calculation of working capital requirement of a construction company is presented in the following example.

**Example -3**

The estimated annual revenue of a construction company from a project is Rs.51000000. In the project, the proportions of material cost, labour cost, equipment cost, overhead cost and profit are 37%, 23%, 16%, 14% and 10% of the estimated annual revenue

respectively. On an average two months' credit (i.e. average time period between commencement of a portion of work and receipt of payment from owner of the project) is allowed to the owner of the project. The materials are purchased from material suppliers and equipment is hired on rental charges from the equipment renting company. The credit period allowed by material suppliers and equipment renting firm to the construction company is one month. On average, two and half months' supply of materials is kept in stock at all the times. Calculate the working capital requirement of the construction company for the operations in the project.

**Solution:**

The working capital requirement will be calculated for meeting the expenses of material, labour, equipment and overhead.

The annual material cost, labour cost, equipment cost and overhead with the corresponding percentages of annual revenue are Rs.18870000, Rs.11730000, Rs.8160000 and Rs.7140000 respectively.

**Materials**

Materials held in construction work (i.e. in work in progress) = 2 months

(i.e. average time period between the use of materials in the work and receipt of payment from owner of the project)

Materials in stock = 2.5 months

Credit from suppliers = 1 month

The construction company must have the working capital to meet the expense of 4.5 (i.e. 2 + 2.5) months' materials requirement. However the material suppliers allow 1 month credit to the company. Thus the construction company requires the working capital to meet the expense of 3.5 (i.e. 4.5 - 1) months' materials requirement. The working capital requirement for the materials is calculated as follows;

$$\text{Working capital requirement for materials} = \frac{(2 + 2.5 - 1) \text{ months} \times \text{Rs.}18870000}{12 \text{ months}} = \text{Rs.}5503750$$

Similarly the working capital requirement for labour, equipment and overhead are calculated and are shown below.

**Labour**

In work in progress = 2 months

(i.e. average time period between employment of labourers in the work and receipt of payment from owner of the project)

$$\text{Working capital requirement for labour} = \frac{2 \text{ months} \times \text{Rs.}11730000}{12 \text{ months}} = \text{Rs.}1955000$$

**Equipment**

In work in progress = 2 months

(i.e. average time period between use of equipment in the work and receipt of payment from owner of the project)

Credit from renting company = 1 month

$$\text{Working capital requirement for equipment} = \frac{(2 - 1) \text{ months} \times \text{Rs.}8160000}{12 \text{ months}} = \text{Rs.}680000$$

**Overhead**

In work in progress = 2 months

(i.e. average time period between commencement of work and receipt of payment from owner of the project)

$$\text{Working capital requirement for overhead} = \frac{2 \text{ months} \times \text{Rs.}7140000}{12 \text{ months}} = \text{Rs.}1190000$$

The working capital requirement of the construction company in the project till the receipt of payment from the owner of the project is given by;

$$\text{Working capital} = \text{Rs.}5503750 + \text{Rs.}1955000 + \text{Rs.}680000 + \text{Rs.}1190000 = \text{Rs.}9328750$$

**Working capital financing**

Financing of working capital is an important aspect of working capital management. The different sources of financing of working capital are short-term sources (bank financing such as loan facility, overdraft facility etc., trade credit, short-term sources other than banks etc.) and long-term sources (retained earnings, shares, debentures, long-term loans from banks and other sources, government development grants etc.). One of the important aspects in working capital financing lies in determining the suitable mix of

long-term and short-term finances as this is likely to affect the balance between liquidity and profitability of the company and the associated cost and risk of financing. The long-term finances are more costly as compared to short-term finances.

There are three basic approaches of financing working capital such as matching or hedging approach, conservative approach and aggressive approach. In matching or hedging approach, the permanent part of working capital requirement is financed by funds from long-term sources whereas the variable component is financed through short-term sources. Thus in this approach, the source of finance matches with the nature of the current assets. In conservative approach, the permanent part of working capital requirement and part of variable working capital are financed from long-term sources and short-term sources are used only to meet the emergency requirements. As majority of working capital financing is from long-term sources, this approach makes the financing more costly, less risky and leading to more liquidity and less profitability. In aggressive approach, the variable part of working capital requirement and even part of permanent working capital requirement are financed from short-term sources. As major sources of finances are short-term, this approach makes the financing less costly, more risky and results in low liquidity and high profitability.

It may be noted that, for further reading of various topics presented in lectures of different modules, the texts mentioned in the list of references for this course can be referred.