

# CH0401 Process Engineering Economics

## Chapter 2 – Balance Sheet and Cost Accounting

### Lecture 2d

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- 1 Capital requirements for process plants
- 2 **Balance Sheets**
- 3 Earnings, process and returns (Income statements)
- 4 Economic production, break even analysis charts
- 5 Cost accounting - pre construction cost estimation - allocation of cost.

# Process Engineering Economics – *Balance Sheet Ratios*

The Balance sheet provides the data for analyzing the financial condition of a company by means of certain ratios as listed below

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \times 100$$

$$\text{Worth-debt ratio} = \frac{\text{Networth}}{\text{Total Liabilities}} \times 100$$

$$\text{Acid test} = \frac{\text{Quick Assets}}{\text{Current Liabilities}} \times 100$$

$$\text{Fixed asset-worth ratio} = \frac{\text{Fixed Assets (Net)}}{\text{Networth}} \times 100$$

$$\text{Inventory ratio} = \frac{\text{Inventory}}{\text{Total Investment}} \times 100$$

$$\text{Fixed asset ratio} = \frac{\text{Fixed Assets (Cost)}}{\text{Total Investment}} \times 100$$

$$\text{Working capital ratio} = \frac{\text{Working Capital}}{\text{Total Investment}} \times 100$$

$$\text{Process investment ratio} = \frac{\text{Process Investment (Cost)}}{\text{Total Investment}} \times 100$$

The current ratio and worth-debt ratio are standard ratios used to estimate the credit of a company. For current ratio the ratio should be greater than 200.

The worth-debt ratio is a measure of the relative amount of borrow and proprietary capital in use.

Acid test is a measure of the company's ability to pay current obligations and it should be greater than 100.

## An example

For a company fabricating rubber products the following data are available:

Long-term debt	: \$3.0 million
Inventories	: \$5.0 million
Cash and Accounts receivable	: \$3.6 million
Fixed assets (cost)	: \$13.0 million
Depreciation reserve	: \$ 7.0 million
Current liabilities	: \$2.8 million
Surplus-earnings retained by company	: \$6.0 million

Prepare a balance sheet and compute the balance sheet ratios for the available data:  
Assumption: Assume no other assets; omit process investment ratio in the balance sheet ratio.

# Process Engineering Economics – *Balance Sheet*

## Solution

Assets			Liabilities		
Particulars	Assets*	Total*	Particulars	Liabilities*	Total*
Cash	1.8		Accounts payable	NA	
Accounts receivable	1.8		Accrued taxes	NA	
Inventories	5.0		Accrued interest	NA	
<b>CURRENT ASSET</b>	<b>8.6</b>	<b>8.6</b>	<b>CURRENT LIABILITIES</b>	<b>2.8</b>	<b>2.8</b>
			Outstanding bonds	NA	
			Mortgages	NA	
<b>TOTAL FIXED ASSET AT COST</b>	<b>13.0</b>		<b>LONG TERM DEBT</b>	<b>3</b>	<b>3</b>
			Outstanding stock	NA	
Depreciation	7.0		Earnings retained by company	6	
<b>NET FIXED ASSET</b>	<b>6.0</b>	<b>6.0</b>	<b>OWNER'S INVESTMENT or NETWORTH</b>	<b>8.8</b>	<b>8.8</b>
<b>OTHER ASSETS</b>	<b>0.0</b>	<b>0</b>			
<b>Total Asset</b>		<b>14.6</b>	<b>Total Liabilities</b>		<b>14.6</b>

\* Assets, Liabilities and total values are in million dollars

\* NA – Not Available

# Process Engineering Economics – *Balance Sheet*

Total investment = sum of assets (cost) or total assets + Working capital

Total investment = Total fixed assets + other assets  
+ current assets – current liabilities

Total investment =  $13.0 + 0 + 8.6 - 2.8 = 13.0 + 5.8$

Total investment = \$18.8 million

Form equation (a) Working Capital = Total investment – Total assets

Working Capital =  $18.8 - 14.6 = \$4.2$  million

Quick assets = Cash + Accounts receivable =  $1.8 + 1.8 = \$3.6$  million

# Process Engineering Economics – *Balance Sheet ratios*

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \times 100 = \frac{8.6}{2.8} \times 100 = 307.14$$

$$\text{Worth-debt ratio} = \frac{\text{Networth}}{\text{Total Liabilities}} \times 100 = \frac{2.8}{14.6} \times 100 = 19.18$$

$$\text{Acid test} = \frac{\text{Quick Assets}}{\text{Current Liabilities}} \times 100 = \frac{3.6}{2.8} \times 100 = 128.57$$

$$\text{Fixed asset-worth ratio} = \frac{\text{Fixed Assets (Net)}}{\text{Networth}} \times 100 = \frac{6.0}{2.8} \times 100 = 214.29$$

$$\text{Inventory ratio} = \frac{\text{Inventory}}{\text{Total Investment}} \times 100 = \frac{5.0}{18.8} \times 100 = 26.596$$

$$\text{Fixed asset ratio} = \frac{\text{Fixed Assets (Cost)}}{\text{Total Investment}} \times 100 = \frac{13.0}{18.8} \times 100 = 69.15$$

$$\text{Working capital ratio} = \frac{\text{Working Capital}}{\text{Total Investment}} \times 100 = \frac{4.8}{18.8} \times 100 = 22.34$$



## An example

A company has the following data as on 26.05.2011.

Current assets	: ₹100 lakhs
Inventory	: ₹20 lakhs
Current liabilities	: ₹50 lakhs
Fixed assets	: ₹400 lakhs
Depreciation reserve	: ₹100 lakhs
Funded debts	: ₹200 lakhs
Other assets	: NiL

- draw the balance sheet
- workout any five economic ratios for the available data
- and comment on stability of the company

# Process Engineering Economics – *Balance Sheet*

Assets			Liabilities		
Particulars	Assets*	Total*	Particulars	Liabilities*	Total*
Cash	NA		Accounts payable	NA	
Accounts receivable	NA		Accured taxes	NA	
Inventories	NA		Accured interest	NA	
<b>CURRENT ASSET</b>	<b>100.0</b>	<b>100.0</b>	<b>CURRENT LIABILITIES</b>	<b>50.0</b>	<b>50.0</b>
			Outstanding bonds	NA	
			Mortgages	NA	
<b>TOTAL FIXED ASSET AT COST</b>	<b>400.0</b>		<b>FUNDED DEBT</b>	<b>200.0</b>	<b>200.0</b>
			Outstanding stock	NA	
Depreciation	100.0		Earnings retained by company	NA	
<b>NET FIXED ASSET</b>	<b>300.0</b>	<b>300.0</b>	<b>OWNER'S INVESTMENT or NETWORTH</b>	<b>150.0</b>	<b>150.0</b>
<b>OTHER ASSETs</b>	<b>0.0</b>	<b>0.0</b>			
<b>Total Asset</b>		<b>400.0</b>	<b>Total Liabilities</b>		<b>400.0</b>

\* All values are in lakh rupees

Total investment = sum of assets (cost) or total assets + Working capital --- (a)

Total investment = Total fixed assets + other assets + current assets – current liabilities --- (b)

Total investment = 400.0 + 0 + 100.0 – 50.0 = 400.0 + 50.0

Total investment = \$450.0 million

Form equation (a) Working Capital = Total investment – Total assets

Working Capital = 450.0 – 400 = \$50.0 million

Quick assets = NA

Balance Sheet ratios are computed as shown in the slide number 8 for the available data.

## Comments

1. The current ratio (item-1) and Worth-debt ratio (item-2) are the standard ratios used to estimate the credit of a company. Therefore the ratio for item-1 is greater than 100, which implies that the company is having a good credit in their financial structure.
2. The Worth-debt ratio is a measure of the relative amount of barrow and proprietary capital in use. Therefore the ratio computed is less than 100, which implies the relative amount of barrow and proprietary is in balance.

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