

# Financial Performance Evaluation of Construction Industries

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## Abstract

This study applies financial performance evaluation of Construction companies in India. Indian economy has been hit by various economic crises from last few years and the economic stagnation still continues. Experiences in various countries show that it is vitally important to encourage construction activities in order to get out of stagnation, as construction output directly affects other sectors. Current research introduces a performance evaluation model for construction companies in order to provide a proper tool for a company's managers, owners, shareholders, and funding agencies to evaluate the performance of construction companies. The model developed helps a company's management to make the right decisions. Financial, economical, and industrial data are collected from 100 Indian construction companies for five consecutive years (2011-2015). Firstly understand the principles underlying in the analysis of financial statements pertaining to the Indian construction organizations. Previous research has shown that there are about 21 financial ratios that are important for the construction companies. This, in turn, requires elimination of unrelated data. Factor analysis is a data reduction and classification technique, which can be applied in financial analysis. Factor analysis was thus applied to the financial data collected construction companies for a 5-year period in order to determine the financial indicators that can be used to analyze the financial trend of the industry. Seven independent factors, i.e. liquidity, Activity, profitability, long term solvency, Asset management, Inventory and Efficiency were identified to be sensitive to the economic changes in the country. The final outcome of this research is a performance grade, which provides the performance of a construction company and ranking the companies based of calculated performance grade and finally assessing the risk of bankruptcy by using Z-score model.

**Keywords:** Financial Ratios; Factor Analysis; Performance Grade; Performance Rating, Bankruptcy, Construction Industry.

## 1. Introduction

The constructions industries act an important role in strengthen the economic performance and the national benefit of a country. Construction sector contributes an average of 7%–9% of the gross domestic product (GDP) of developing countries (Bakar, 2002). In the Indian economy, the average annual contribution of the construction industry to GDP is only 5-8 %. Indian construction industries absolutely disappointing the share of construction over GDP is continuously decreasing recent years due to financial crises. Thus, the government should analyse the financial state of the construction industry urgently and undertake related action. The construction industry provides critical backward and forward linkages to support the development of other economic sectors Abdullah (1990). However, in terms of business survival the construction industry regularly facing comparatively high proportion of business failure compared to other industries (Yin, 2006). In the United States (US) construction industry, the average rate of failure from 1989–2002 was nearly 14% higher than the average rate of failure for all industries, the same phenomenon occurs in Malaysia, comparatively failure rate of Indian construction industries were less but maintaining low profits. Construction companies have been found to be highly fluctuating, to have weak financial positions and to be subject to large business cycle fluctuations. Consequently, share prices tend to overheat when the economy grows quickly, and then collapse when the economy goes into recession (Wagle, 2006). Performance evaluation of construction companies" get its importance from the fact that today's world is moving rapidly toward globalization. In this universal, many multinational companies are awarded business in other countries in which they are competing with local companies. Both multinational and local construction companies should

seriously look forward to improving their performance in order to maintain their international reputation. This evaluation is useful for owners, managers, shareholders, and funding agencies of a company because it clearly draws the correct position of the company, many models are developed for evaluate companies" performance, but some of them consider economical and industrial changes in their models. Therefore, the main objective of this study is to develop the performance index that evaluates a company"s financial current study is to develop the performance index that evaluates a company"s financial position within the construction industry considering the economical factors and company size. Financial ratios quantify many aspects of a business and are an important part of financial statement analysis. There are many standard ratios which are used to evaluate the overall financial situation of an organization. Financial ratios are used by managers within a firm, by potential stockholders of a firm, firm's creditors and business analysts to compare the strengths and weaknesses of various companies. position within the construction industry considering the economical factors and company size.

### 1. Relationship between the construction industry and growth of national income

The construction industry is an important contributor to the growth of any national economy and is directly affected by the government policies as governments usually regulate the economy by cutting back on public construction works during stagnation periods. Past experiences in various countries show that it is also important to encourage construction activities to get out of stagnation as construction directly affects about 200 other sectors. Indian economy was affected by the Asian crises in last year 2014 and still it continuing .The effect on the growth of construction industry is saviour we can observe values from below

table1.1. The growth of construction sector which is accounted for an average of 5-8% before year 2013 and it suddenly dropped to 4.5% in the year 2014 we can observe from Fig 1.2. Depression of Indian currency caused economical crises in the country in September 2014 and February 2015 affected all of the sectors seriously. Indian government seriously targeted the financial crises in presently coming budget planning mainly with low inflation rates, low bank

credit rates so that government hopes to regain previous position as well. These economic factors provide us with a model to study the past trends to rate the performance and to compare our performance in the industry. Thus the innovative approach in mind for forecasting the performance of the industry, the perception of the performance of the construction industry is essential.

Table 1.1 Micro macro economic factors:

<b>GDP Growth Vs Construction sector growth in India:</b>	<b>Micro economic factors :</b>
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Year	Growth of GDP %	Growth of construction sector %	Interest Rates %	Inflation Rates %
2007-08	7.5	7.1	10.5	3.3
2008-09	9	7.4	11	7.65
2009-10	9.4	8	9.8	5.69
2010-11	9	8.4	11.5	5.25
2011-12	6.7	8.7	13	9.5
2012-13	8.2	8.9	11.5	10
2013-14	7.8	8	10.5	11.5
2014-15	6.9	4.8	9.8	7.5

Source: Ministry of Finance, Govt of India.

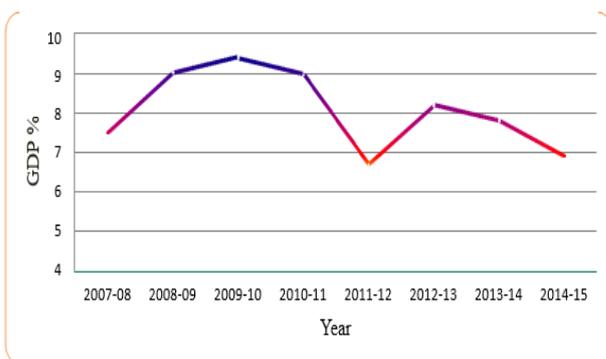


Fig 1.1 GDP growth rate

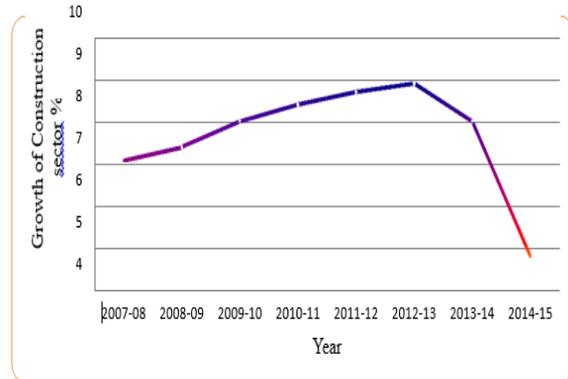


Fig 1.2 Construction growth rate

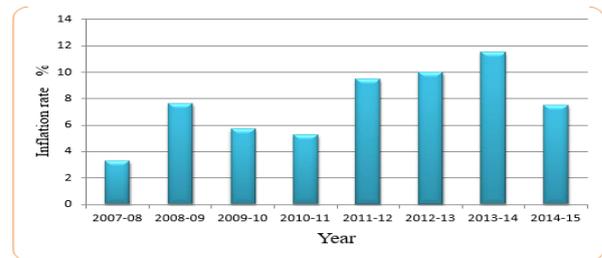


Fig 1.4 Inflation rates

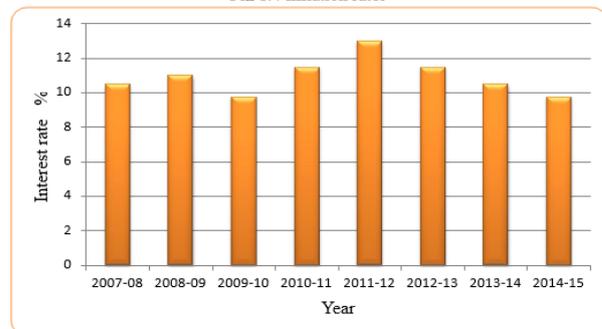


Fig 1.3 Interest rates

## 2. LITERATURE REVIEW

According to Moyer et al. (2011), financial ratio analysis is employed for three main purposes: (1) as an analytical tool to identify the strengths and weaknesses of a firm in order to assess its viability and to determine whether a satisfactory return will be earned from the risk taken (2) as a monitoring device to ensure that company objectives are compatible with its resources; and (3) as an effective tool in planning to achieve company goals.

Suberi (2011) tries to find out company financial health on Malaysian Construction firms by using financial ratios analysis relative comparison of company performance as well as comparison of performance across different companies for that he selected six construction companies find the 17 financial ratios for three years; secondly data collection involved interviews with representatives from six respondent companies. Finally a questionnaire was

designed. He concluded that the overall performance of the construction companies seems to be below industry average. With weak liquidity ratios, their cash and capital would be insufficient to finance their construction projects, and a strong indication that companies were undercapitalized and would experience financial problems in the future.

Singh et al. (2010) states that models evaluating construction companies' insolvencies, it can be concluded that financial ratio based models only give an indication, rather than a calculation of the future performance of companies, and that suitable financial models for construction companies remain undeveloped and unrealized.

Edmund (1994) had tried to introduce few financial principals for the management and founders of small firms. Project accounting is often a principle no tracking of project budgets takes place. The concept of accrual accounting is introduced. Also introduced the basis of ratio analysis for computation of overhead, billing ratio, and other key factors that allow comparison with other firms.

According to Moyer et al. (2011), financial ratios analysis is used to address three main purposes. First, it is used as an analytical tool in identifying the strengths and weaknesses of the firm as well as to assess its viability as an ongoing enterprise or to determine whether a satisfactory return can be earned for the risk taken. Second, financial ratios are useful as monitoring tools for ensuring the company objectives are compatible with its resources. Third, financial ratios play a very effective role in planning to achieve the company's goals. Financial ratio is a relationship that indicates a firm's activities. Financial ratios enable an analyst to make a comparison of a firm's financial condition over time or in relation to other firms.

Ocal et al. (2005) highlighted that financial ratios not only allow the comparison of a company's financial performance with its rivals within the same industry but also allow that of the industry itself over time.

James Clausen (2009), He state that the Ratio analysis of the income statement and balance sheet are used to measure company profit performance. He said the learn ratio analyses of the income statement and balance sheet. The income statement and balance sheet are two important reports that show the profit and net worth of the company. It analyses shows how the well the company is doing in terms of profits compared to sales. He also shows how well the assets are performing in terms of generating revenue. He defines the income statement shows the net profit of the company by subtracting expenses from gross profit.

### Research Methodology:

The methodology in my research was carried out following these steps:

- A list of companies prepares which are actively participating in construction; determine qualification like Scope, job nature age of the company.
- Financial statements for 100 construction companies for five years 2011-2015 are collected.
- Calculate the financial ratios for above collected financial statements by using excel database.

- To conduct the factor analyses by using SPSS software for identify the significant ratios which contribute much to the growth of the organization.
- To develop the model for calculating the performance grade and ranking the companies based on performance grade, the flow of steps for model development shown in fig 1.4
- To classify the zone of discrimination of company by using Z-score bankruptcy prediction model.

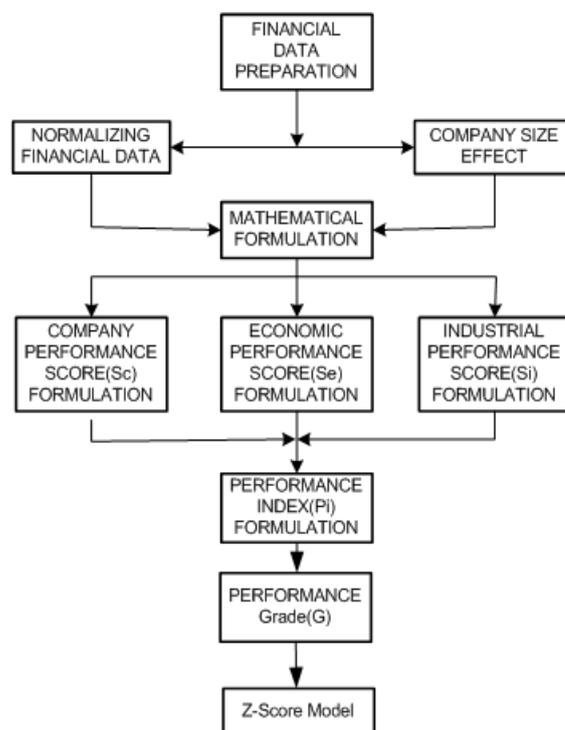


Fig 1.5 Flow chart of model creation process

Source: Elamany et al. (2007), ASCE, 133:8 (576)

### 3. DATA COLLECTION

I have selected the list of 100 companies which are in construction sector. [www.fundoodata.com](http://www.fundoodata.com) official website helpful for selecting the companies as per our requirements like type of Industry, location, company entity, turnover, type of sector etc. Financial statements for a 5 consecutive years (2011-15) were collect from companies official website or some of the companies not publishing in their website in that case companies data collected from NSE [www.moneycontrol.com](http://www.moneycontrol.com) , <http://economictimes.indiatimes.com/> these websites helpful for collect the financial data (balance sheet, Profit & loss statement , cash flow statement) of companies with required period.

**LIST OF COMPANIES**

1	Acrow India Limited	26	Garnet Constructions Limited
2	Akruti Nirman Limited	27	Gayatri Projects Limited
3	Anant Raj Industries Limited	28	GMR Infrastructure Limited
4	Ansal Buildwell Limited	29	HB Estate Developers Limited
5	Ansal Housing & Construction Limited	30	Hindustan Construction Company Limited
6	Ansal Properties & Infrastructures Limited	31	Housing Development & Infrastructures Development
7	Arihant Foundations & Housing Limited	32	Iron International Limited
8	Artson Engineering Limited	33	ITD Cementation (India) Limited
9	Ashiana Housing & Finance (India)	34	IVR Prime Urban Developers Limited
10	Atlanta Limited	35	IVRCL Infrastructure & Projects Limited
11	B L Kashyap & Sons Limited	36	Jaihind Projects Limited
12	Bhagheeratha Engineering Limited	37	Jai Prakash Associates Limited
13	C & C Constructions Limited	38	JMC Projects (India) Limited
14	Consolidated Construction Consortium	39	Kamanwala Housing & Construction Limited
15	CCAP Limited	40	KEC Infrastructures Limited
16	Conart Engineers Limited	41	KCP Limited
17	D S Kulkarni Developers Limited	42	Lanco Infratech Limited
18	DCM limited	43	Lancor Holdings Limited
19	Dhurv Estates Limited	44	Larsen & Toubro Limited
20	DLF limited	45	Lok Housing & Constructions Limited
21	Eldoco Housing & Industries Limited	46	Madhucon Projects Limited
22	Elnet Technologies Limited	47	Mahindra Lifespaces Limited
23	Engineers India Limited	48	Marg Constructions Limited
24	Era Constructions (India) Limited	49	Martin Burn Limited
25	Gammon India Limited	50	Maruti Infrastructures Limited
51	MSK Projects (India) Limited	76	Ruchi Infrastructures Limited
52	Nagarjuna Construction Company Limited	77	SAAGRR Infrastructures Limited
53	Narendra Properties Limited	78	Simplex Infrastructures Limited
54	Navkar Builders Limited	79	Simplex Projects Limited
55	Nila Infrastructures Limited	80	Sobha Developers Limited
56	Noida Toll Bridge Company Limited	81	Soma constructions
57	Omaxe Limited	82	Sriniwas Shipping & Property Development Limited
58	Orbit Corporation Limited	83	Subhash Projects & Marketing Limited
59	Parsvnath Developers Limited	84	Regaliaa Realty Limited
60	Patel Engineering Limited	85	Tantia Constructions Limited
61	PBA Infrastructures Limited	86	Templex infraprojects Ltd
62	Peninsula Land Limited	87	Thackers Developers Limited
63	Petron Engineering Construction Limited	88	Trenchless engineering services pvt Ltd
64	Prajay Engineers Syndicate Limited	89	Trinetra infra ventures Ltd
65	Prathiba Industries Limited	90	Tribhuvan Housing Limited
66	Praveen Properties Limited	91	UB Holdings Limited ( KingFisher Properties & Holdings
67	Prime Property Development Corporation	92	Uniquet infra ventures pvt Ltd
68	Punj Lloyd Limited	93	Unitech Limited
69	Puravankara Projects Limited	94	Unity Infra Projects Limited
70	Radhe Developers (India) Limited	95	Valecha Engineering Limited
71	Raghava Estates Limited	96	Viaton infrastructures pvt Ltd
72	Rainbow Foundations Limited	97	Victoria Enterprises Ltd
73	Rander Corporation Limited	98	Vijay Shanti Builders Limited
74	Reliance Industrial Infrastructures Limited	99	Vipul Infrastructure Developers Limited
75	Roman Tarmat Limited	100	Wirtgen India Pvt ltd

**4. RATIO ANALYSIS**

Financial analysts use financial ratios to compare the strengths and weaknesses in various companies. Financial ratios are useful indicators of affirms performance and financial situation. Most ratios can be calculated from provided by the financial statements. Financial ratios can be used to analyse the trends and to compare the firm’s financials to

those of other firms financial ratios are the microscope that allows us to see behind the raw numbers and find out what’s really going on. When analysing these ratios always, remember that no one ratio provides the whole story and that the standards for each ratio are different for every industry. In our case, 100 construction firms were short listed for carrying out the ratio analysis. Literature

study revealed that a five year database of financial ratios would sufficiently amount for the forecast prediction of the organization. Thus basic requirement is that these companies should take part at present in the economy building of the nation and also they should have a track record of five years in the industry. Using the advantage of the excel data base asses the ratios from companies financial statements. From these construction organizations, their 21 financial ratios were selected as follows:

**LIQUIDITY RATIOS:** Current ratio, Quick ratio, Cash ratio, Inventory ratio

**SOLVENCY RATIOS:** Debt Asset Ratio, Debt equity ratio, Debt to total equity, Cash flow coverage, Debt to total capital ratio, Inventory coverage ratio.

**PROFITABILITY RATIOS:** Pre tax profit ratio, Return on total assets, Return on Fixed Assets, Rate on Capital Employed, Dividend Payout Ratio, ROR on Total Shareholders Equity

**EFFICIENCY RATIOS:** T.A Turn over ratio, F.A Turn over ratio, Capital turn over, Working capital turn over, Finished goods inventory turn over.

#### 4.2 HORIZONTAL & VERTICAL PROFILE ANALYSIS (HV ANALYSIS):

Financial details and ratio information varies across industries and size. It provides management information on which issues to address to improve the operation, and ultimately the financial performance, of any business. The two types of performing ratio analysis include horizontal analysis and vertical analysis.

The ratio analysis especially the horizontal and vertical analysis helps us in determining the strength and weakness of the business the ratios can be effectively used for finding

- Whether the business model is

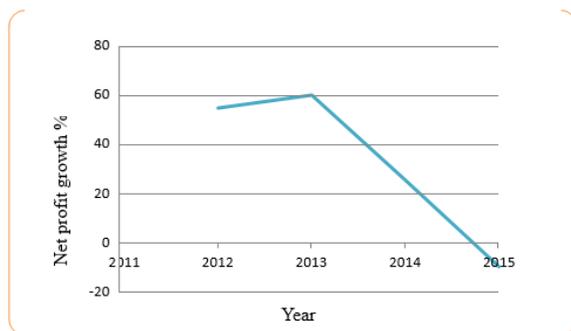


Fig 4.3.1 Net profit growth rate

Often, the Operating profit & Net profit of a business are mutually interlinked. The Graph shows that Larsen & Toubro Limited in from recent few years back struggling with marinating very low profit growth rates, there is sudden fall from year 2013 to 2015 main causes would be the weak national economic growth.

#### 4.3.2 Earnings per share growth rate:

profitable?

- Whether we are using our resources and assets efficiently?
- Whether we are on the right track of growth?

#### Horizontal Analysis

Horizontal analysis expresses change between periods as percentages for each account in the financial statements. The basic formula for horizontal analysis is percentage change which is equal to the difference between the most recent period and previous period divided by the previous period.

#### Vertical Analysis

Vertical analysis expresses financial statements as percentages. On the balance sheet, total assets are assigned 100% and on the income statement, total revenues are assigned 100% and the various contributors to these ratios are analysed with respect to time.

#### 4.3 Horizontal Analysis:

#### CASE STUDY: LARSEN & TOUBRO LIMITED

Let us consider the case of Larsen & Toubro Limited for our study and analyse their performance horizontally. The analysis is as follows,

##### 4.3.1 Net profit growth rate

Often referred to as the bottom line, net profit is calculated by subtracting a company's total expenses from total revenue, thus showing what the company has earned in a given period of time. In business and finance accounting, net profit is equal to the gross profit minus overheads minus interest payable plus one off items for a given time period.

In simplistic terms, net profit is the money left over after paying all the expenses of an endeavour.

Earnings per Share (EPS) are defined as the net income of a company divided by the number of outstanding shares. EPS is the single most popular variable in dictating a share's price. EPS also indicates the profitability of a company.



Fig 4.3.2 Growth in earnings per share

It tells an investor how much of the company's profit belongs to each share of stock. This is significant because it allows analysts to value the stock based on the price to earnings ratio. The best way to value the company is to evaluate this trend with the other companies involved in the same business. This

would give us a clear picture of how the company had excelled. Fig 4.3.2 shows that the Larsen and Toubro limited share price growth is negative.

**4.3.3 Sales growth rate**

Predicting a company's top line growth is arguably the most important part of determining its performance. Companies with increasing sales and market share, growing profit margins, market growth and a rising P/E ratio are tomorrow's big winners on the business field.

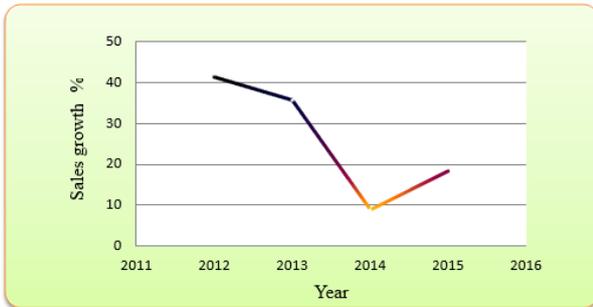


Fig 4.3.3 Total sales growth

The graph describes sales growth rate achieved by Larsen & Toubro Limited plugged down from 2013 to 2015 and sharp recover in next year main reason for terrible growth is having weak infrastructure growth in growing economies like India, China; the scope of business in the forthcoming years also expects slow growth rates. But theory states that, every growing company would pauses its growth due to the financial crises in recent years and this stagnation effect will continue some more years.

**4.3.4 Operating profit growth rate:**

Operating profit is the difference between revenue and the cost of making a product. Operating profit is an important guide to profitability. Given the growing sales rate, it is mandatory for the organization to maintain its operating profit margin, but the competition in today's construction business would make the process of maintaining the growth rate of operating profit tougher. Larsen & Toubro Limited operating profit growth rate was declining down constantly from year 2011.

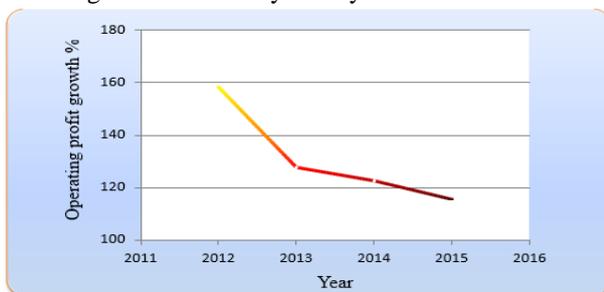


Fig 4.3.4 operating profit growth rate

**4.3.5 Assets growth rate:**

Total assets growth rate is an indicator to explain how dedicated the management is towards stretching the field of business. Hence forth, it is wise to invest in companies which show significant assets growth

rate. Larsen & Toubro Limited in this aspect shows sharp fall continuous years from 2011 line shows that it takes very huge period to regain.

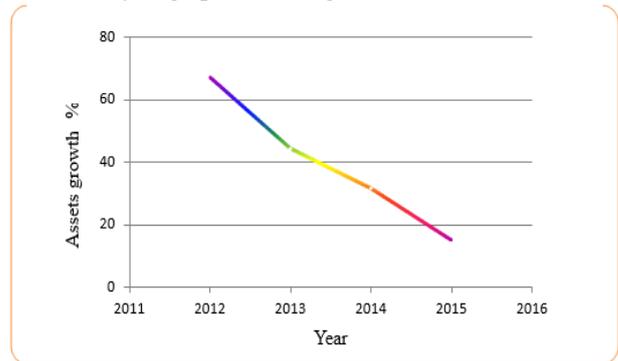


Fig 4.3.5 Total assets growth rate

**4.4 VERTICAL ANALYSIS: CASE STUDY: LARSEN & TOUBRO LIMITED**

Let us consider the case of Larsen & Toubro Limited for our study and analyses their performance vertically. The analysis is as follows,

**4.4.1 EXPENSES INCURRED:**

The area diagram indicates that the percentage of selling & administrative expenses and the percentage of the labour expenses out of the total expenditure had remained almost the same throughout the period of study.

The organization Larsen & Toubro Limited had been successful in reducing the percentage of the cost of power & fuel expenses to almost nil. And the percentage of the cost of manufacturing had increased its field showing the increase in the quantum spent. But the percentage of cost incurred in acquiring the materials had increased in the year 2012 and then had dropped down but this would depend upon the various other factors such as inflation, material cost, transportation cost, etc. But all these factors need to be considered and the best possible combination would drastically reduce down the total expenditure. Also this best possible combination would be different for various industries. Here, Larsen & Toubro Limited should factor in all these factors and arrive at the best proportion and this mix should be proposed to be implemented.

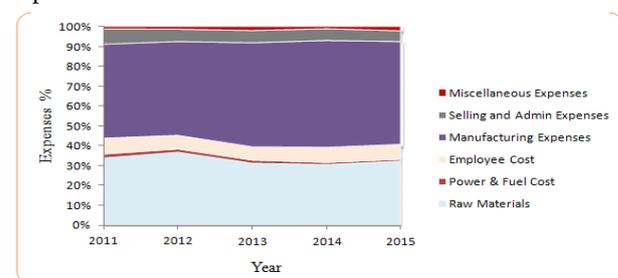
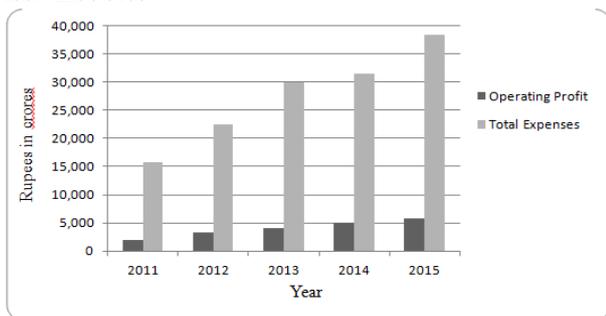


Fig 4.4.1 Breakdown of expenses incurred

**4.4.2 EXPENSE Vs INCOME:**

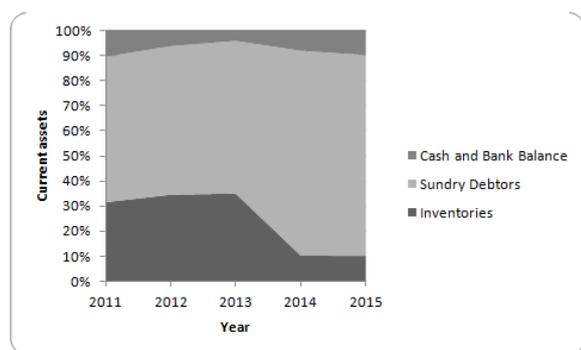


4.4.2 Expenses Vs income

The cost of expense and the income is shown in the area diagram as below. It shows how the operating profit of the organization Larsen & Toubro Limited has varied in the period of study. It would be better if the area of the operating profit can creep up and the cost of sales would come down. This should be the prime motto of the organization which the management should keep in mind before taking any of the policy decisions. Fig shows that the percentage of operating profit in cost of sales is quite low, growth of operating profit is almost nil in recent years.

**4.4.3 CURRENT ASSETS:**

The drastic change in the area diagram for the breakdown of current assets depicts that the company had worked out competitively in for reducing down the inventories and huge bank balances. Fig shows that the company disposing the retained inventories in recent periods and maintaining desirable bank balances. The area diagram clearly shows the managements inability to visualise the best proportion of the current assets.



4.4.3 Break down of current assets

**4.4.4 LIABILITIES & EQUITY TO TOTAL ASSETS:**

The area diagram shows that the shows that the percentage of the equity of the organization Larsen & Toubro Limited constantly growing with total liabilities of the company. As far as possible, the liabilities should be minimal for any organization because the equity fund may generate interest for that liability also.

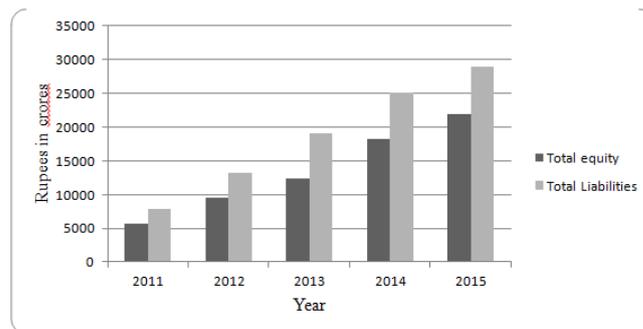


Fig 4.4.4 Liabilities & equity

The reasons which can be imagined for this may be as follows

- Rights issue to increase the outstanding number of shares
- Raising capital in foreign soil
- Raising debt funds, etc

**5. FACTOR ANALYSIS**

Factor analysis is used to find latent variables or factors among observed variables. In other words, if your data contains many variables, you can use factor analysis to reduce the number of variables. Factor analysis groups variables with similar characteristics together. With factor analysis you can produce a small number of factors from a large number of variables which is capable of explaining the observed variance in the larger number of variables. The reduced factors can also be used for further analysis.

There are three stages in factor analysis:

1. First, a correlation matrix is generated for all the variables. A correlation matrix is a rectangular array of the correlation coefficients of the variables with each other.
2. Second, factors are extracted from the correlation matrix based on the correlation coefficients of the variables.
3. Third, the factors are rotated in order to maximize the relationship between the variables and some of the factors.

**FACTOR ANALYSIS RESULTS**

The various statistical analyses required for this study, we have taken the help of statistical software, SPSS 19.0 version, at first, inter-correlation matrix amongst the variables has been derived. An Intercorrelation matrix is a k×k (k = the number of variables) array of the correlation coefficients of the variables with each other. With the help of this matrix, variables (financial ratios) with weak correlation (i.e. < ±0.5) with other variables are identified and excluded, i.e. out of 21 ratios 3 ratios were excluded. However, elimination is effected only after exercising domain knowledge to ensure that no important variable (financial ratio) is excluded from the study. After that, Factor Analysis with Principal Component extraction method is performed on the remaining set of variables. VARIMAX rotation is used to get better final results. Factor Analysis is conducted once again on the remaining 18 variables (21 minus 3),

that 18 variables have been categorized in 8 factors. Results of Factor analysis produced below as

## 6. FINANCIAL RATIOS

Financial ratios used for Initial solution:

List of variables:

Variable No.	Financial Ratios
1	Current ratio
2	Quick Ratio
3	Cash Ratio
4	Inventory Turnover
5	Debt Asset Ratio
6	Debt Equity Ratio
7	Debt to Total Equity
8	Cash Flow coverage
9	Debt to total capital Ratio
10	Inventory Coverage Ratio
11	Pre tax profit ratio
12	Return on Total Assets
13	Return on Fixed Assets
14	Rate on Capital Employed
15	Dividend Payout Ratio
16	ROR on Total Shareholders' Equity
17	T.A turnover Ratio
18	F.A turnover ratio
19	Capital Turn over
20	Working capital Turnover
21	Finished goods inventory turnover

### Performance Evaluation:

A performance evaluation tool is very useful for both multi-national and local construction companies to assess their performance in order to maintain their competitiveness in any market. Also, this evaluation tool is very essential for Company Managers, owners, shareholders, and funding Agencies of the company, because it would clearly show its relative position in the market. Many models were developed to evaluate construction companies' performance, but non have incorporate economical and industrial variables together in their models. This study presents a performance evaluation model that does not only concentrate on financial Performance, but also on company size, macroeconomic, and industry related factors as well. It also considers the effect of company size, along with economical and industrial variables on its performance. The developed company performance model is generic and can be applied to any company in any market. Performance evaluation of construction company's gains its importance from the fact that today's world is moving rapidly toward globalization, in this environment, many multinational companies are awarded business in other countries in

follows.

which they are competing with local companies. Both multinational and local construction companies should seriously look forward to improving their performance in order to maintain their international reputation. Company performance measurement is a valuable tool in any business sector because it evaluates a company's current status and may help predict its future health. Traditionally, the evaluation of a firm's performance usually employs the financial ratio method, because it provides a simple description about the firm's financial performance in comparison, with previous periods and helps to improve its performance of management. Although there are many company performances measurement tools cited in the literature, the construction industry was slow to develop a complete performance measurement tool. They are dealing with this problem at three different levels (1) construction industry, (2) company and (3) project. Models at the construction industry level are used to measure the effect of economical, political, and social changes on the performance of the construction industry as a whole. Most performance evaluation models for construction companies are based on their annual financial statements. Different analytical

techniques have been used to develop these ratios:

(1) financial statement trend analysis (2) financial statement structural analysis; and (3) financial statement ratio analysis.

### 6.1 EFFECT OF COMPANY SIZE:

Comparing performance of a company with the overall industry average is inappropriate, because the financial composition and characteristics of small companies are different from those of well established, large firms to resolve this problem, a size factor ( $Z_i$ ) is introduced into the model, is defined as the ratio of "financial ratio  $i$  of an

overall, average-size construction company in each group" over the "same ratio  $i$  of an average size company in the same size as the company under consideration. "To get the size factor ( $Z_i$ ), procedure follows as well:

- 1) Sort the companies according to total Assets and divide them into 3 sectors,
- 2) Obtain the median of each sector, and median of the whole construction sector,
- 3) To obtain the Size coefficient divide the construction sector median by median of each sector

Table 6.1.1 Company size factor ( $Z_i$ ):

Company size factor ( $Z_i$ ):						
TOTAL ASSETS IN Cr	CURRENT RATIO	DEBT TO TOTAL EQUITY	PRETAX PROFIT RATIO	RETURN ON TOTAL ASSETS	FIXEDASSETS TURNOVER RATIO	WORKING CAPITAL TURNOVER RATIO
> 500 Cr	1.05	1	0.86	0.63	0.83	0.81
500-50 Cr	0.99	1.22	1	1.31	1.5	1.27
< 50 Cr	1.05	0.77	1.71	3.17	1.78	3.04

### 6.2 NORMALIZING THE FINANCIAL DATA:

Collected raw data cannot use directly for model building because some data have dissimilar units; these data should normalize first before proceeding, by using mathematical formulation. The financial ratios what we are calculated in terms of time others in terms of percentage so such type of ratios will result in bias to the larger values of ratios .in order to overcome this problem need to normalize the values and make them non bias .The process of Normalizing financial data as follows:

1. Develop the financial ratios,

2. Calculate the median of each ratio,
3. Divide the max median value by each median values of six ratios,
4. Round the resultant of division to get normalization coefficient( $F_n$ ) for each ratio,
5. Obtain the normalized value of each ratio using formulae,

Where:  $X_{ni}$ =Normalized value of financial ratio  
 $X_{si}$ =Standard value of ratio,  
 $F_{ni}$ =Normalization coefficient,  $S_i$ =Sign correction factor (set the value equal to -1 if  $X_{si}$  is negative, & +1 if  $X_{si}$  is positive),  
 $Z_i$ =Company size factor.

Table6.2.1 Normalization coefficients ( $F_{ni}$ ):

	CURRENT RATIO	DEBT TO TOTAL EQUITY	PRETAX PROFIT RATIO	RETURN ON TOTAL ASSETS	FIXEDASSETS TURNOVER RATIO	WORKING CAPITAL TURNOVER RATIO
<b>Median</b>	1.78	0.11	0.06	0.23	2.89	1.81

<b>Normalization coefficient (Fni)</b>	2	26	48	13	1	2
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### 6.3 MATHEMATICAL FORMULATION:

The following mathematical formulations used for develop the company performance:

- Industrial performance score (Se)
- Economy performance score (Si)
- Company performance score (Sc)

**6.4 Mathematical formulation for Industry performance score (Si):** The industry performance score (Si) is developed by using Regression analysis.

- Performance Index (PI)
- Performance grade (PG)
- Z-score Bankruptcy test.

Regression analysis is used for develop the current model, by using statistical package software. The reason for using the regression analysis is simplicity, reliability, and suitability for the problem.

Macroeconomic and industry related variables are used for asses the industry performance score.

GDP Growth Vs Construction sector growth in India:			Micro economic factors :	
Year	Growth of GDP %	Growth of construction sector %	Interest Rates %	Inflation Rates %
2007-08	7.5	7.1	10.5	3.3
2008-09	9	7.4	11	7.65
2009-10	9.4	8	9.8	5.69
2010-11	9	8.4	11.5	5.25
2011-12	6.7	8.7	13	9.5
2012-13	8.2	8.9	11.5	10
2013-14	7.8	8	10.5	11.5
2014-15	6.9	4.8	9.8	7.5

Development of industry performance score (Si) include the following steps:

- Sort the values of Growth of construction sector in ascending order ,this is because of best situation for a company occurs when market demands exceeds the supply i.e. the growth of construction sector is positive.
- Assign the five values i.e. for five years equal to 100,50,0,-50,-100 for industry performance score (Si) respectively
- Using the regression analysis, develop the regression equation for Si

Where: Co=Regression constant, C1=Regression coefficient for X1, X1=Growth of construction

sector, Si=Industry performance score.

- Regression analysis developed the equation,
- Apply the above equation on values of economy variables
- Normalize the calculated values Si based on the above equation, by using following equation to be with in the range -100 to 100

Where:

**Si mod** =Modified industry performance score  
**Si**=Industry performance score **Si max** =Maximum value of industry performance score  
**Si min** =Minimum value of industry performance score

Table 6.8.2 Industry performance values:

Year	X1	Si	Si mod
2011	8.4	-24.96	-75.61
2012	8.7	-36.65	-90.24
2013	8.9	-44.45	-100.00
2014	8	-9.36	-56.10
2015	4.8	115.42	100.00

**6.5 Mathematical formulation for Economical performance score (Se):**

performance score (Se) includes the following process:

- Sort the economical variables Inflation and

Developme  
nt of  
Economical

Interest rates in ascending order from the best to worst

□ Assign the five values i.e. for five years equal to 100,50,0,-50,-100 for economical performance score (Se) respectively

□ Using the regression analysis, develop the regression equation for Se

Where:  $C_0$ =Regression constant,  $C_1$ & $C_2$ =Regression coefficients for  $X_1$ &  $X_2$  respectively,  $X_1$ =Inflation rate,  $X_2$ =Interest rate,  $Se$ =Economical performance score.

Statistical analysis shows that excluding  $X_1$  from above equation generate best results (Neter *et al.*,

1996; Lapin, 1983; Little, 1978).then the equation developed as follows

□ Regression analysis developed the equation,

□ Apply the above equation on values of economy variables

□ Normalize the calculated values Se based on the above equation, by using following equation to be with in the range -100 to 100

Where:  $Se_{mod}$  =Modified economical performance score  $Se$ =Economical performance score  $Se_{max}$  =Maximum value of economical performance score  $Se_{min}$  =Minimum value of economical performance score

Table 6.5.1 Economical performance score (Se):

Year	Interest Rates %	Inflation Rates %	Se	Se mod
2011	11.5	5.25	182.46	-6.25
2012	13	9.5	149.88	-100
2013	11.5	10	182.46	-6.25
2014	10.5	11.5	204.18	56.25
2015	9.8	7.5	219.38	100

### 6.6 Mathematical formulation for company performance score (Sc):

The company performance score (Sc) according to Kangari *et al.*(1992) is defined as “ a performance grading system for evaluate the position of a company within the overall construction industry and which is very difficult to be assigned a certain value”. The Sc method is applied by Goda (1999). The development of Company performance score includes following steps:

□ Divide the prepared Normalized ratios into Upper, median and lower quartile as shown in table

□ Preliminary values of 100,0,-100 are assigned to company performance score(Sc) for the upper ,median, lower quartile values respectively,

□ By using regression analysis develop the equation for Sc

where,  $S_c$ = Company performance score;  $C_0$ =Regression constant  $C_1... C_6$ = regression coefficients; and  $X_{ni}$ = Regression variable

represents the normalized value of standard ratio; calculated by using same earlier used equation

□ So, by substituting  $X_{ni}$  equation into Sc equation

□□Regression analysis developed equation is

□ By using above equation find the Sc values for all 100 companies year wise.

□ Assume that the company performance score ( $S_c$ ) values for the whole construction sector under consideration follow a normal probability distribution. This normal distribution has 99.7 % of the area under curve falls within a distance =  $3\sigma$  from the mean. Assuming the arithmetic mean and standard deviation of Sc values for the whole construction sector are  $\mu$  and  $\sigma$ , respectively, the prediction interval for the company performance (  $S_c$  ) would be calculated using the below equation.

□ Values of company performance score (Sc) falling outside the interval are excluded, while the other values are modified within the range -100 to +100 as shown in the below equation,

6.10.1 REGRESSION CONSTANTS AND COEFFICIENTS

Regression constant $C_0$	CR $C_1$	DER $C_2$	PPR $C_3$	ROTA $C_4$	FATR $C_5$	WCTR $C_6$
-59.035	18.439	-20.022	0.052	4.233	31.647	-3.494

6.10.2 QUANTILES OF FINANCIAL RATIOS:

YEAR	CURRENT RATIO	DEBT TO TOTAL EQUITY	PRETAX PROFIT RATIO	RETURN ON TOTAL ASSETS	FIXEDASSETS TURNOVER RATIO	WORKING CAPITAL TURNOVER RATIO
UPPER QUARTILE						
2011	2.974	0.815	3.263	3.393	3.551	4.826
2012	3.191	0.841	3.279	3.276	3.717	5.184
2013	3.343	0.978	3.496	3.775	3.746	6.595
2014	3.564	1.234	4.311	4.490	3.993	6.120
2015	2.824	1.445	3.308	4.970	4.295	4.493
MEDIANQUARTILE						
2011	1.831	1.520	1.504	1.865	1.654	2.164
2012	1.857	1.479	1.680	1.633	1.648	2.247
2013	1.897	1.709	1.795	1.841	1.953	2.596
2014	2.020	1.961	2.040	2.304	1.901	2.467
2015	2.023	2.668	2.043	2.480	1.895	2.019
LOWER QUARTILE						
2011	1.413	4.907	0.641	0.721	0.667	0.684
2012	1.528	3.791	0.739	0.724	0.668	0.921
2013	1.543	4.251	1.048	0.832	0.853	1.132
2014	1.564	4.792	1.249	1.110	0.912	1.141
2015	1.494	5.377	1.083	1.283	0.794	0.869

### 6.7 Development of Performance Index (PI):

For development of performance Index (PI) considered the effect of company, economy, and the industry related factors. These factors are represented in model using  $S_c$ ,  $S_e$ , and  $S_i$  respectively. The grouping process were performed based on the Hasabo (1996) which reported that the responsibility of company failure was carried out by three major factors,

- Macroeconomic factors (35-40%)
- Industry related factors (10-15%)
- Company related factors (40-45%).

These factors are used for formulate the PI. Macroeconomic, industry, and company related factors are represented by the normalized values of  $S_e$ ,  $S_i$ , and  $S_c$  respectively. The PI value can be determined from the below equation as follows,

Where, PI = performance index;  $S_c$ = company performance index;  $S_e$ =economy performance score and  $S_i$ =industry performance score.

When a company has the best  $S_c$  value ( $S_c =$

### 6.8 Development of Performance grade (PG):

The performance grade (PG) is defined as the percentage of construction companies that have performance indexes lower than that of the company under consideration. Thus PG is equivalent to the cumulative distribution function of PI. In other words, PG is the integration of

+100) during a year that has the worst values of both  $S_e$  and  $S_i$  ( $S_e = -100$  and  $S_i = -100$ ), it will be assigned the best value for performance index grade (PI = +100). This company might have a good financial performance during fiscal year that has bad economical and industrial circumstances. In such a case, this company has good financial and managerial performance; however it is worth surviving in business. On the other hand, a company might have the worst  $S_c$  value ( $S_c = -100$ ) during a year that has the best values of both  $S_e$  and  $S_i$  ( $S_e = +100$  and  $S_i = +100$ ). This company will be assigned the worst value of performance index (PI = -100). Therefore, a company had bad financial performance during a fiscal year that had good economical and industrial circumstances. Therefore, the company has weak financial and managerial performance that needs suitable remedial actions to survive in business.

the PI function from negative infinity to a company's performance index, multiplied by 100. The PI of a construction company should be compared to other companies in the same construction sector in order to know the relative situation of such a company within the industry. The models developed was sufficient to rate the performance of a particular company among the other companies in the industry. The value of the

performance grade (PG) mentioned in the following table, based on the performance grade of the company recommendations shall be given to the management for the corrective measures. These remedial actions taken shall rectify the errors in policy decisions of the management. Also, given appropriate regards to the look a head plan of the company, these corrective measures are to be taken. Managers might use these remedies to evaluate their company's financial position in relative to other construction companies Fig 6.12.1 shows comparison between Performance Index (PI) and Performance grade (PG) for all companies in

our study, observed that from fig according to the performance grade the pioneer position in construction Industry with only 40% of its companies have PI zero In table 6.12.1 shows the calculated values of company performance score, Industry performance score, Economical performance score, PI and PG for Larsen & toubro ltd, and the remaining companies scores can see in Appendix-III the variation of PG values for 5 consecutive year's period shown in Fig.6.12.2 Fig 6.12.3 shows the normal distribution of Performance Indexes of all selected companies includes PI of five consecutive year's period.

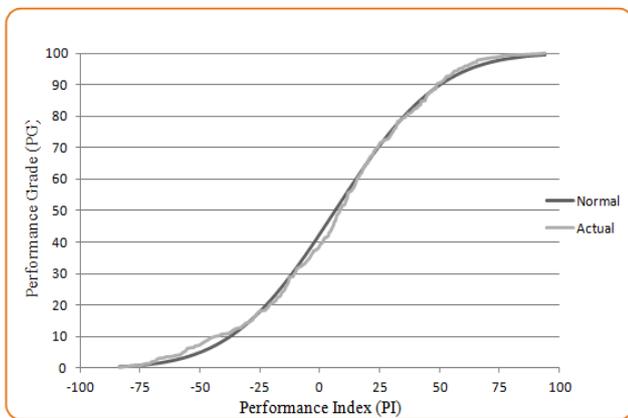


Fig 6.12.1 Performance grade Vs Performance Index

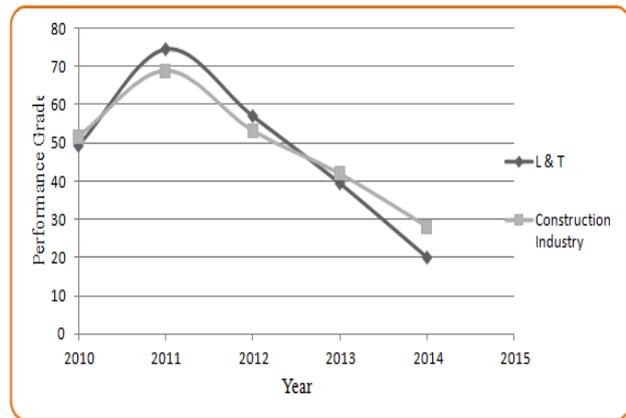


Fig 6.12.2 Performance grade comparison L&T Vs Total construction industry

Table 6.8.1 Performance grade (PG) for Larsen and Toubro Ltd:

YEAR	Sc	Se	Si	PI	PG
2011	-15.45	-6.25	-75.61	4.07	49.30
2012	0.08	-100.00	-90.24	48.82	74.49
2013	5.84	-6.25	-100.00	17.76	57.01
2014	1.24	56.25	-56.10	-13.46	39.44
2015	4.25	100.00	100.00	-47.88	20.06

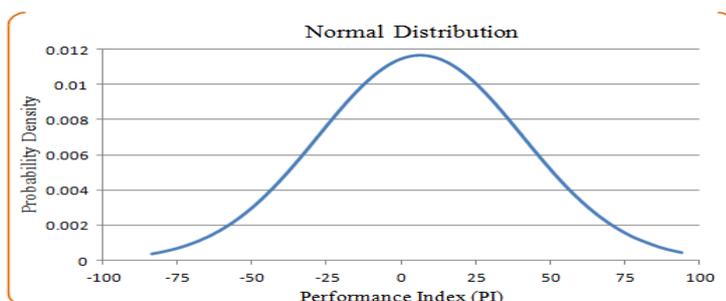


Fig 6.12.3 Performance Index (PI) Vs Probability density

**6.9 RANKING OF THE CONSTRUCTION COMPANIES:** Table 6.13.1 ranking the companies:

S.No	Name of the Company	PI	PG	Rank
1	TANTIA CONSTRUCTIONS LIMITED	38.16	100.00	1
2	THAKKERS DEVELOPERS LIMITED	37.16	98.40	2
3	PRAVEEN PROPERTIES LIMITED	29.78	86.58	3
4	NAVKAR BUILDERS LIMITED	28.14	83.95	4
5	TEMPUS INFRA PROJECTS PVT LTD	27.51	82.94	5
6	VIPUL LIMITED	26.67	81.60	6
7	RAINBOW FOUNDATIONS LIMITED	24.2	77.64	7
8	PRATHIBA INDUSTRIES LIMITED	22.14	74.34	8
9	ANSAL BUILDWELL LIMITED	19.53	70.16	9
10	RUCHI INFRASTRUCTURES LIMITED	19.12	69.50	10
11	HOUSING DEVELOPMENT & INFRASTRUCTURES LIMITED	18.11	67.88	11
12	PARSVNATH DEVELOPERS LIMITED	17.84	67.45	12
13	TRINETRA INFRA VENTURES LTD	17.76	67.32	13
14	UNIQUEST INFRASTRUCTURE LTD	16.91	65.96	14
15	OMAXE LIMITED	16.38	65.11	15
16	CCAP LIMITED	15.63	63.91	16
17	MSK PROJECTS (INDIA) LIMITED	15.44	63.61	17
18	SIMPLEX INFRASTRUCTURES LIMITE	14.27	61.73	18
19	HB ESTATE DEVELOPERS LIMITED	13.13	59.91	19
20	PENINSULA LAND LIMITED	13.01	59.71	20
21	ELDECO HOUSING & INDUSTRIES LIMITED	12.74	59.28	21
22	MARUTI INFRASTRUCTURES LIMITED	12.22	58.45	22
23	D S KULKARNI DEVELOPERS LIMITED	11.65	57.54	23
24	CONSOLIDATED CONSTRUCTION CONSORTIUM LIMITED	11.35	57.06	24
25	IVRCL INFRASTRUCTURES & PROJECTS LIMITED	10.8	56.17	25
26	RAGHAVA ESTATES LIMITED	10.76	56.11	26
27	ITD CEMENTATION INDIA LIMITED	9.92	54.77	27
28	SAAG RR INFRASTRUCTURES LIMITED	9.58	54.22	28
29	ARTSON ENGINEERING LIMITED	9.57	54.20	29
30	PETRON ENGINEERING CONSTRUCTION LIMITED	8.72	52.84	30
31	SUBHASH PROJECTS & MARKETING LTD	7.97	51.64	31
32	NAGARJUNA CONSTRUCTION COMPANY LIMITED	7.81	51.39	32
33	ORBIT CORPORATION LIMITED	7.52	50.92	33
34	TRIBHUVAN HOUSING LIMITED	7.38	50.70	34
35	PBA INFRASTRUCTURE'S LIMITED	7.22	50.44	35
36	JMC PROJECTS (INDIA) LIMITED	6.67	49.56	36
37	JAI PRAKASH ASSOCIATES LIMITED	6.42	49.16	37
38	SRINIVASA SHIPPING & PROPERTY DEV LIMITED	6.32	49.00	38
39	VIJAY SHANTI BUILDERS	6.32	49.00	39
40	LOK HOUSING & CONSTRUCTIONS LIMITED	5.49	47.67	40
41	GAYATHRI PROJECTS LIMITED	5.32	47.40	41
42	SIMPLEX PROJECTS LIMITED	5.32	47.40	42
43	IVR PRIME URBAN DEVELOPERS LIMITED	4.88	46.69	43
44	PURAVANKARA PROJECTS LIMITED	4.38	45.89	44
45	BHAGHEERATHA ENGINEERING LIMITED	4.13	45.49	45
46	ARIHANT FOUNDATIONS & HOUSING LIMITED	3.97	45.23	46
47	B L KASHYAP & SONS LIMITED	3.73	44.85	47
48	IRCON INTERNATIONAL LIMITED	3.27	44.11	48
49	LANCER HOLDINGS LIMITED	2.87	43.47	49
50	PATEL ENGINEERING LIMITED	2.69	43.18	50
51	ANSAL PROPERTIES & INFRASTRUCTURES LIMITED	2.6	43.04	51
52	NARENDRA PROPERTIES LIMITED	2.48	42.85	52
53	ASHIANA HOUSING & FINANCE (INDIA) LIMITED	2.06	42.18	53
54	LARSEN & TOUBRO LIMITED	1.86	41.85	54
55	PUNJ LLOYD LIMITED	1.61	41.45	55
56	RELIANCE INDUSTRIAL INFRASTRUCTURES LIMITED	1	40.48	56
57	CONART ENGINEERS LIMITED	0.53	39.72	57
58	SOBHA DEVELOPERS LIMITED	0.45	39.60	58
59	C & C CONSTRUCTIONS LIMITED	0.4	39.52	59
60	VIATON INFRASTRUCTURE LTD	-0.15	38.64	60
61	KAMANWALA CONSTRUCTION & HOUSING LIMITED	-0.17	38.60	61
62	ENGINEERS INDIA LIMITED	-0.43	38.19	62
63	ROMAN TARMAT LIMITED	-0.76	37.66	63
64	PRAJAY ENGINEERS SYNDICATE LIMITED	-1.4	36.63	64
65	ERA CONSTRUCTIONS (INDIA) LIMITED	-1.65	36.23	65
66	DLF LIMITED	-1.72	36.12	66
67	ANSAL HOUSING & CONSTRUCTION LIMITED	-1.78	36.02	67
68	KCP LIMITED	-2.59	34.73	68
69	GAMMON INDIA LIMITED	-2.88	34.26	69
70	UNITY INFRA PROJECTS LIMITED	-2.94	34.17	70
71	ORIENT LIMITED	-3.02	34.04	71
72	TRENCHLES ENGINEERING SERVICES	-4.47	31.72	72

73	HINDUSTAN CONSTRUCTION COMPANY LIMITED	-4.53	31.62	73
74	MAHINDRA LIFE SPACES LIMITED	-5.02	30.83	74
75	ANANT RAJ INDUSTRIES LIMITED	-5.16	30.61	75
76	MADHUCON PROJECTS LIMITED	-5.47	30.11	76
77	GMR INFRASTRUCTURES LIMITED	-5.9	29.42	77
78	PRIME PROPERTY DEVELOPMENT CORPORATION LIMITED	-5.92	29.39	78
79	MARG CONSTRUCTIONS LIMITED	-6.17	28.99	79
80	GARNET CONSTRUCTIONS LIMITED	-7.37	27.07	80
81	DCM SHRIRAM CONSOLIDATED LIMITED	-7.55	26.78	81
82	ATLANTA LIMITED	-7.59	26.72	82
83	UNITECH LIMITED	-8.7	24.94	83
84	LANCO INFRA TECH LIMITED	-8.86	24.68	84
85	MARTIN BURN LIMITED	-9.17	24.19	85
86	RADHE DEVELOPERS (INDIA) LIMITED	-9.18	24.17	86
87	KEC INFRASTRUCTURES LIMITED	-9.21	24.12	87
88	VICTORIA ENTERPRISES LTD	-9.21	24.12	88
89	DHURV ESTATES LIMITED	-10.08	22.73	89
90	WIRTGEN INDIA PVT LTD	-10.5	22.06	90
91	UNITED BREWERIES (HOLDINGS) LIMITED	-12.2	19.33	91
92	AKRUTI NIRMAN LIMITED	-12.69	18.55	92
93	ACROW INDIA LIMITED	-12.82	18.34	93
94	RANDER CORPORATION LIMITED	-12.88	18.24	94
95	NILA INFRASTRUCTURES LIMITED	-13.62	17.06	95
96	JAIHIND PROJECTS LIMITED	-14.01	16.43	96
97	NOIDA TOLL BRIDGE COMPANY LIMITED	-15.52	14.02	97
98	VALECHA ENGINEERING LIMITED	-17.1	11.48	98
99	REGALIA REALTY LIMITED	-21.32	4.73	99
100	ELNET TECHNOLOGIES LIMITED	-24.27	0.00	100

### 7.0 Edward Altman's Z score Model:

Altman is known for the development of the Z-Score formula, which he published in 1968. The Z-Score for predicting Bankruptcy is a multivariate formula for a measurement of the financial health of a company and a powerful tool that forecasts the probability of a company entering bankruptcy within a 2 year period. Most managers use ratio analysis to identify future failure of companies. Altman (1968) is of the opinion that ratios measuring profitability, liquidity, and solvency are the most significant ratios. From about 1985 onwards, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman, 2003). However, it is difficult to know which is more important as various studies indicate different ratios as indicators of potential problems. For example, a company may have poor liquidity ratios and may be leads for liquidation. That same company's good profitability may escape the potential risk that is highlighted by the poor liquidity ratios. As a result, interpretation using traditional ratio analyses may be incorrect. Altman's 1968 model took the following form:

Where: Z=overall index

A= Working capital / Total Assets

B=Retained earnings/ Total Assets

C=EBIT / Total Assets

D=Market value of Equity/Book value of total debt

E=Sales / Total Assets

Z < then the firm classified as "Failed".

#### 7.1.1 Altman's Revised Z-Score Model:

Rather than simply inserting a variable into an existing model to calculate the Z-Scores Altman advocated for a complete re-estimation of the model,

substituting the book values of equity for the Market value in D. This resulted in a change in the coefficients and in the classification criterion and related cut-off scores. The revised Z score model took the following form:

Where:

R1 = (Current Assets-Current Liabilities) / Total Assets

R2 = Retained Earnings / Total Assets

R3 = Earnings before Interest and Taxes / Total Assets

R4 = Book Value of Equity / Total Liabilities

R5 = Sales/ Total Assets

Zones of Discrimination:

Z' > 2.9 "Safe" Zone

1.23 < Z' < 2.9 "No conformation" Zone (Grey zone)

Z' < 1.23 "Distress" Zone

#### 7.2 EMPIRICAL RESULTS:

Five common business ratios weighted by coefficients were used to calculate the Z-score. Weighted and summed up to arrive at an overall score that formed the basis for classification of firms into one of the a priori groupings (distressed and non-distressed).

The Z-score formula:  $Z' = 0.717R1 + 0.847R2 + 3.107R3 + 0.420R4 + 0.998R5$ .

The following zones of discrimination: Z' > 2.9 "Safe" Zone, 1.23 < Z' < 2.9 "Grey" Zone and Z' < 1.23 "Distress" Zone. All the companies which had a Z score below

1.23 were classified as companies in a distress zone, companies which had a Z score of between 1.23 and 2.9 were classified as companies in a No conformation zone while those companies which had a Z score above 2.9 were classified as companies in a safe zone. In a distress zone there is a high probability of bankruptcy for a firm, in a no conformation zone there is uncertainty whether the

firm be bankrupt or not, while in a safe zone there is a low probability of firm becoming bankrupt. The following table shows company with the state of the discrimination.

Edward Altman's financial distress prediction model is found out of 100 companies , 45 companies in safe zone,50 companies in grey zone and 5 companies is under Distress zone .

S.No	Company Name	Z-score	Zone
1	ACROW INDIA LIMITED	3.75	Safe
2	AKRUTI NIRMAN LIMITED	1.97	Grey
3	ANANT RAJ INDUSTRIES LIMITED	11.62	Safe
4	ANSAL BUILDWELL LIMITED	2.89	Grey
5	ANSAL HOUSING & CONSTRUCTION LIMITED	1.98	Grey
6	ANSAL PROPERTIES & INFRASTRUCTURES LIMITED	2.2	Grey
7	ARIHANT FOUNDATIONS & HOUSING LIMITED	1.96	Grey
8	ARTSON ENGINEERING LIMITED	3.97	Safe
9	ASHIANA HOUSING & FINANCE (INDIA) LIMITED	12.29	Safe
10	ATLANTA LIMITED	1.84	Grey
11	B L KASHYAP & SONS LIMITED	4.42	Safe
12	BHAGHEERATHA ENGINEERING LIMITED	8.14	Safe
13	C & C CONSTRUCTIONS LIMITED	2.36	Grey
14	CCAP LIMITED	4.48	Safe
15	CONART ENGINEERS LIMITED	1.43	Grey
16	CONSOLIDATED CONSTRUCTION CONSORTIUM LIMITED	8.24	Safe
17	D S KULKARNI DEVELOPERS LIMITED	2.06	Grey
18	DCM SHRIRAM CONSOLIDATED LIMITED	2.23	Grey
19	DHURV ESTATES LIMITED	5.18	Safe
20	DLF LIMITED	1.45	Grey
21	ELDECO HOUSING & INDUSTRIES LIMITED	5.12	Safe
22	ELNET TECHNOLOGIES LIMITED	2.03	Grey
23	ENGINEERS INDIA LIMITED	3.29	Safe
24	ERA CONSTRUCTIONS (INDIA) LIMITED	2.01	Grey
25	GAMMON INDIA LIMITED	3.07	Safe
26	GARNET CONSTRUCTIONS LIMITED	9.8	Safe
27	GAYATHRI PROJECTS LIMITED	2.38	Grey
28	GMR INFRASTRUCTURES LIMITED	4	Safe
29	HB ESTATE DEVELOPERS LIMITED	3.69	Safe
30	HINDUSTAN CONSTRUCTION COMPANY LIMITED	2.07	Grey
31	HOUSING DEVELOPMENT & INFRASTRUCTURES LIMITED	2.91	Safe
32	IRCON INTERNATIONAL LIMITED	7.42	Safe
33	ITD CEMENTATION INDIA LIMITED	3.31	Safe
34	IVR PRIME URBAN DEVELOPERS LIMITED	2.58	Grey
35	IVRCL INFRASTRUCTURES & PROJECTS LIMITED	3.02	Safe
36	JAI PRAKASH ASSOCIATES LIMITED	3.06	Safe
37	JAIHIND PROJECTS LIMITED	1.46	Grey
38	JMC PROJECTS (INDIA) LIMITED	4.89	Safe
39	KAMANWALA CONSTRUCTION & HOUSING LIMITED	2.23	Grey
40	KCP LIMITED	4.61	Safe
41	KEC INFRASTRUCTURES LIMITED	3.51	Safe
42	LANCER HOLDINGS LIMITED	2.74	Grey

43	LANCO INFRA TECH LIMITED	1.88	Grey
44	LARSEN & TOUBRO LIMITED	4.39	Safe
45	LOK HOUSING & CONSTRUCTIONS LIMITED	3.54	Safe
46	MADHUCON PROJECTS LIMITED	2.51	Grey
47	MAHINDRA LIFESPACES LIMITED	5.43	Safe
48	MARG CONSTRUCTIONS LIMITED	1.93	Grey
49	MARTIN BURN LIMITED	2.07	Grey
50	MARUTI INFRASTRUCTURES LIMITED	2.85	Grey
51	MSK PROJECTS (INDIA) LIMITED	1.92	Grey
52	NAGARJUNA CONSTRUCTION COMPANY LIMITED	2.87	Grey
53	NARENDRA PROPERTIES LIMITED	2.69	Grey
54	NAV KAR BUILDERS LIMITED	4.87	Safe
55	NILA INFRASTRUCTURES LIMITED	2.18	Grey
56	NOIDA TOLL BRIDGE COMPANY LIMITED	1.61	Grey
57	OMAXE LIMITED	1.93	Grey
58	ORBIT CORPORATION LIMITED	2.58	Grey
59	ORIENT LIMITED	2.84	Grey
60	PARSVNATH DEVELOPERS LIMITED	2.13	Grey
61	PATEL ENGINEERING LIMITED	2.43	Grey
62	PBA INFRASTRUCTURES LIMITED	1.98	Grey
63	PENINSULA LAND LIMITED	2.71	Grey
64	PETRON ENGINEERING CONSTRUCTION LIMITED	6.35	Safe
65	PRAJAY ENGINEERS SYNDICATE LIMITED	2.78	Grey
66	PRATHIBA INDUSTRIES LIMITED	3	Safe
67	PRAVEEN PROPERTIES LIMITED	1.56	Grey
68	PRIME PROPERTY DEVELOPMENT CORPORATION LIMITED	3.22	Safe
69	PUNJ LLOYD LIMITED	2.56	Grey
70	PURAVANKARA PROJECTS LIMITED	2.03	Grey
71	RADHE DEVELOPERS (INDIA) LIMITED	16.11	Safe
72	RAGHAVA ESTATES LIMITED	1.34	Grey
73	RAINBOW FOUNDATIONS LIMITED	2.01	Grey
74	RANDER CORPORATION LIMITED	15.92	Safe
75	REGALIA REALTY LIMITED	3.08	Safe
76	RELIANCE INDUSTRIAL INFRASTRUCTURES LIMITED	3.63	Safe
77	ROMAN TARMAT LIMITED	3.01	Safe
78	RUCHI INFRASTRUCTURES LIMITED	0.18	Distress
79	SAAG RR INFRASTRUCTURES LIMITED	3.26	Safe
80	SIMPLEX INFRASTRUCTURES LIMITED	3.48	Safe
81	SIMPLEX PROJECTS LIMITED	1.87	Grey
82	SOBHA DEVELOPERS LIMITED	2.5	Grey
83	SRINIVASA SHIPPING & PROPERTY DEV LIMITED	3.86	Safe
84	SUBHASH PROJECTS & MARKETING LTD	3.22	Safe
85	TANTIA CONSTRUCTIONS LIMITED	2.18	Grey
86	TEMPUS INFRA PROJECTS PVT LTD	1.37	Grey
87	THAKKERS DEVELOPERS LIMITED	17.08	Safe
88	TRENCHLES ENGINEERING SERVICES	1.24	Grey
89	TRIBHUVAN HOUSING LIMITED	1.09	Distress

90	TRINETRA INFRA VENTURES LTD	3.12	Safe
91	UNIQUEST INFRASTRUCTURE LTD	2.38	Grey
92	UNITECH LIMITED	2.96	Safe
93	UNITED BREWERIES (HOLDINGS) LIMITED	2.02	Grey
94	UNITY INFRA PROJECTS LIMITED	3.97	Safe
95	VALECHA ENGINEERING LIMITED	1.22	Distress
96	VIATON INFRASTRUCTURE LTD	0.61	Distress
97	VICTORIA ENTERPRICES LTD	0.61	Distress
98	VIJAY SHANTI BUILDERS	3.64	Safe
99	VIPUL LIMITED	10.91	Safe
100	WIRTGEN INDIA PVT LTD	2.19	Grey

## CONCLUSION:

Based on my study the following conclusions have been drawn: Identified the seven factors which are important indicators of the construction industry they are liquidity factor, activity factor, long-term solvency, efficiency, profitability, asset management, inventory factors. A performances result shows that the performance of Indian construction industries in our study has been diminishing year by year. The reason might be continuous economic crises and still continuous the stagnation. The performance grades of the Indian construction industry shows that pioneer position of the construction sector have 40% of companies under Zero performance index. The government should analyse the financial state of the construction industry urgently and undertake related action. From discriminate analysis shows that 45 % companies in safe zone, 5% of companies in Distress zone and remaining 55% companies under grey zone. Performance evaluation study provide a basis for the governments to undertake corrective action Meanwhile, in order to start any action a realistic and continuous review of the industry is a necessity.

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