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**EVALUATION OF WORKING CAPITAL PERFORMANCE IN BATTERY INDUSTRY IN ANDHRA PRADESH**

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**ABSTRACT**

*Working capital plays a pivotal role in a business enterprise just like the role of a heart in human body. The efficiency of business enterprise depends largely on its ability to manage its working capital. Gross working capital may be used to refer to the total current assets whereas net working capital refers to the surplus of current assets over current liabilities. The aim of present research paper is to ascertain the status of working capital of select battery companies in Andhra Pradesh. The present study is based on the secondary data only. The present study needs a ten-year period commencing with the financial year 2002-03 and ending with 2011-12. Various tools like trend, average, percentage, 'F'-test and Least squares method are applied. Graphs and diagrams are presented to illuminate the facts and figures at appropriate contexts. With a view to obtaining a better perspective of the working capital position in the battery industry in Andhra Pradesh, an analysis of structure of working capital and trends in current assets, current liabilities and net working capital are carried out. It is noted that the excess of current assets over current liabilities was recorded in all battery companies in Andhra Pradesh. It may be observed that all the battery companies have enjoyed positive net working capital position. In order to increase optimisation of investment in inventories in ARBL and HBL, effective measures and methods for management of inventories need to be undertaken.*

**KEYWORDS**

ARBL, HBL NBL, working capital, current assets, current liabilities, Operating cycle, Battery Industry in A.P.

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**INTRODUCTION**

**W**orking capital plays a pivotal role in a business enterprise just like the role of a heart in human body. Working capital management, therefore, is one of the important facets of a firm's overall financial management.<sup>1</sup> The efficiency of business enterprise depends largely on its ability to manage its working capital. Without adequate working capital and its effective use, no business unit can achieve its targets. Efficient management of working capital resources will ensure not only liquidity but also enhance profitability, which reflects on the growth of an enterprise. Working capital in common terminology is the amount of funds which a company must possess to finance its day-to-day operations.<sup>2</sup> Working capital management is concerned with the problems that arise in attempting to manage the current assets, current liabilities and the inter-relationship that exists between them.<sup>3</sup>

**REVIEW OF LITERATURE**

Deloof, M.,<sup>4</sup> (2003) evaluated the effects of working capital management on profitability. He suggested that managers could create value for their shareholders by reducing number of days account receivables and inventories to a reasonable minimum. Abdul Raheman and Mohamed Nasir<sup>5</sup> (2007) in their research on working capital management results show that there is a strong negative relationship between variables of the working capital management and profitability of the firm. It means that as the cash conversion cycle increases it will lead to decreasing profitability of the firm, and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. Nancy Beneda<sup>6</sup> (2008) conducted a study to examine the effects of working capital management on firm performance for different levels of growth. High growth firms also exhibit higher levels of risk. Nalini, J.,<sup>7</sup> (2010) the study on financial management, she suggests that to maintain both profitability and liquidity, a balanced growth in fixed assets and working capital is needed.

**OBJECTIVE OF THE PAPER**

The aim of present research paper is to ascertain the status of working capital of select battery companies in Andhra Pradesh.

**HYPOTHESIS**

The hypothesis formulated in the present study is:

H<sub>0</sub> : There is no significant difference between the working capital condition of select battery companies in Andhra Pradesh.

Result: The null hypothesis was rejected for all battery companies under study.

**RESEARCH METHODOLOGY****SAMPLE DESIGN**

According to A.P. industries website, four registered battery companies are operating in the state of Andhra Pradesh. They include Nippo Batteries Limited (NBL - 1972), Amara Raja Batteries Limited (ARBL - 1985), Hyderabad Batteries Limited (HBL - 1986) and Energy Leader Batteries India Limited (ELBIL - 2007). In order to carryout time series analysis, the companies with ten years of existence were brought into the sample frame. In other words, the companies which were established prior to 2002-03 alone are considered for the purpose of the study. Barring ELBIL, the rest of the battery companies fulfilled this criteria.

**DATA BASE**

The present study is based on the secondary data only. The data for the study have been primarily obtained from the annual reports of select battery companies in Andhra Pradesh. Relevant information is also gathered from the data published by the reports of battery companies, libraries of various institutions and the companies' website and other related websites on the battery industry were consulted. Also internet, journals, magazines, periodicals and research dissertations on finance and industry have been referred.

**PERIOD OF THE STUDY**

The present study needs a lengthy period so as to arrive at meaningful and purposeful inferences. Therefore, a ten year period commencing with the financial year 2002-03 and ending with 2011-12 has been adopted.

**SCOPE AND LIMITATIONS OF THE STUDY**

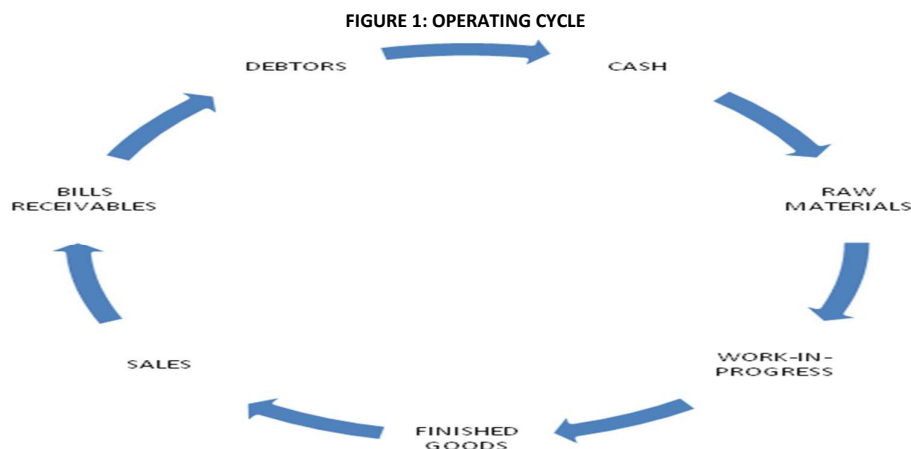
The present study is confined to issues relating to the evaluation of working capital performance of battery industry in Andhra Pradesh. The present study may not be free from limitations. The figures taken from the annual reports have been rounded off to two decimals of rupees in crores. Secondary data have been collected from more than one source. Hence, there may be slight discrepancies between one source and another on the same variable. The reliability and correctness of calculation and findings depend upon the information obtained through secondary data.

**TOOLS AND TECHNIQUES OF ANALYSIS**

The data gleaned from the annual reports of select battery companies in Andhra Pradesh has been carefully processed, tabulated, analysed, and interpreted by using well-established financial tools. Various tools like trend, average, percentage, 'F'-test and Least squares method are applied. Graphs and diagrams are presented to illuminate the facts and figures at appropriate contexts.

**WORKING CAPITAL ANALYSIS**

The firm should maintain investment in various components of current assets at an optimal level to maximise benefits. Working capital is referred to as 'Circulating Capital' by C.W. Gerstenberg<sup>8</sup> and as, 'Operating Capital', 'Rotating Capital' or 'Short Term Capital', by others. Current assets will be in a state of continual change and involve constant movement of funds, where the original form of cash gets transformed into various stages of inventory, debtors and back to cash. The process is popularly known as operating cycle or cash cycle. The operating cycle of a business enterprise is shown in the Figure 1.

**CONCEPT OF WORKING CAPITAL**

The term 'Working Capital' has been quite controversial in the financial accounting terminology, as it does not have a universally accepted definition. It has two concepts: Gross Working Capital (Quantitative Concept) and Net working Capital (Qualitative Concept). Kuchhal suggests that the term 'Gross Working Capital' may be used to refer to the total current assets whereas 'Net Working Capital' refers to the surplus of current assets over current liabilities.<sup>9</sup>

**STRUCTURE OF WORKING CAPITAL**

The analysis of the structure of working capital is another name for the study of elements of current assets and current liabilities. With a view to obtaining a better perspective of the working capital position in the battery industry in Andhra Pradesh, an analysis of structure of working capital is carried out. The details pertaining to the structure of working capital of select battery companies and the industry in Andhra Pradesh are depicted in Table 1. Figure 2 shows the average components of current assets as a percentage of total current assets.

**AMARA RAJA BATTERIES LIMITED**

The observation of the structure of working capital in ARBL reveals that the current assets were more than the current liabilities throughout the study period. The level of investment in inventory as a percentage of total current assets ranged from the lowest of 25.08 per cent in 2005-06 to the highest of 38.60 per cent in 2010-11 the average being 29.07 per cent. An analysis of the company shows that sundry debtors occupied prime position in the total current assets with an average of 38.40 per cent. In other words, the trade debtors took precedence among current assets in ARBL. Cash and bank balances as a percentage of total current assets had ranged between the lowest of 0.87 per cent in 2005-06 and the highest of 7.24 per cent in 2009-10. 'Others' forms the least component of current assets. Current liabilities as a percentage of current liabilities and provisions, however, are marked by a falling tendency as they came down from 57.09 per cent in 2002-03 to 50.29 per cent in 2011-12. Inconsistency can be observed in the level of current liabilities as can be seen from its percentage fluctuations. Provisions as a percentage of total current liabilities and provisions had increased from 42.91 per cent in 2002-03 to 49.71 per cent in 2011-12 in absolute values also increased from Rs. 30.18 crores to Rs. 220.71 crores during the same period.

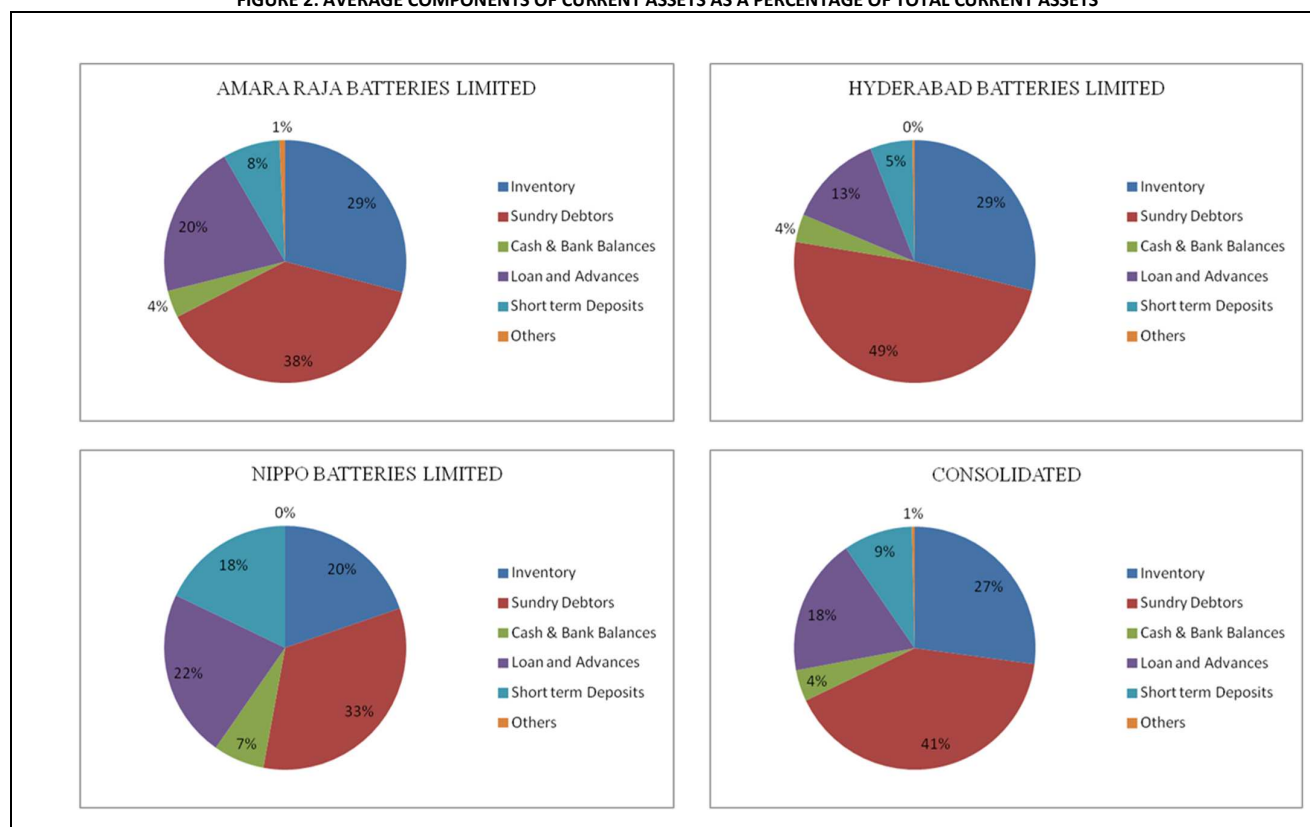
TABLE 1: STRUCTURE OF WORKING CAPITAL (Rupees in crores)

Particulars	2002-03		2003-04		2004-05		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11		2011-12		Average	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
<b>Amara Raja Batteries Limited</b>																						
Inventory	29.42	22.06	30.72	25.63	44.10	27.34	57.20	25.08	92.17	26.33	194.33	32.52	160.83	30.58	217.57	34.48	284.70	38.60	266.62	28.10	137.77	29.07
Sundry Debtors	45.57	34.18	47.17	39.36	64.97	40.28	85.65	37.55	145.95	41.70	226.47	37.90	207.85	39.52	242.30	38.40	305.66	41.44	319.68	33.69	169.13	38.40
Cash and Bank Balance	5.63	4.22	1.56	1.30	4.88	3.03	1.98	0.87	4.99	1.43	28.96	4.85	34.18	6.50	45.71	7.24	8.17	1.11	54.18	5.71	19.02	3.62
Loan and Advances	32.82	24.61	26.73	22.30	35.29	21.88	64.70	28.37	86.29	24.65	125.65	21.03	87.03	16.55	108.73	17.23	107.09	14.52	133.38	14.06	80.77	20.52
Short term Deposits	9.68	7.26	13.67	11.41	12.04	7.47	18.54	8.13	20.61	5.89	22.18	3.71	36.11	6.87	16.76	2.66	32.04	4.34	175.04	18.45	35.67	7.62
Others	10.22	7.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.02	0.77
Total Current Assets	133.34	100.00	119.85	100.00	161.28	100.00	228.07	100.00	350.01	100.00	597.59	100.00	526.00	100.00	631.07	100.00	737.66	100.00	948.90	100.00	443.38	100.00
Current Liabilities	40.15	57.09	31.55	61.39	47.60	61.83	82.09	63.10	87.14	60.16	119.69	54.65	132.05	65.19	187.27	54.96	212.38	57.46	223.27	50.29	116.32	58.61
Provisions	30.18	42.91	19.84	38.61	29.39	38.17	48.01	36.90	57.70	39.84	99.34	45.35	70.51	34.81	153.45	45.04	157.22	42.54	220.71	49.71	88.64	41.39
Current Liabilities and Provisions	70.33	100.00	51.39	100.00	76.99	100.00	130.10	100.00	144.84	100.00	219.03	100.00	202.56	100.00	340.72	100.00	369.60	100.00	443.98	100.00	204.95	100.00
<b>Hyderabad Batteries Limited</b>																						
Inventory	34.43	27.09	33.17	26.55	53.19	26.47	67.68	25.89	75.32	24.65	172.47	32.14	179.98	30.65	228.31	28.32	268.17	33.15	287.75	33.53	140.05	28.84
Sundry Debtors	55.64	43.77	65.82	52.68	115.62	57.55	138.34	52.92	174.20	57.01	273.01	50.88	282.64	48.13	337.67	41.89	310.08	38.33	380.87	44.38	213.39	48.75
Cash and Bank Balance	2.71	2.13	0.87	0.70	1.65	0.82	9.43	3.61	6.55	2.14	17.94	3.34	52.31	8.91	24.76	3.07	51.86	6.41	50.73	5.91	21.88	3.70
Loan and Advances	17.97	14.14	12.80	10.24	19.16	9.54	30.25	11.57	29.75	9.74	42.36	7.89	42.46	7.23	185.87	23.06	143.27	17.71	138.90	16.18	66.28	12.73
Short term Deposits	14.76	11.61	11.21	8.97	10.74	5.35	15.28	5.85	18.60	6.09	29.99	5.59	29.39	5.00	29.44	3.65	35.63	4.40	0.00	0.00	19.50	5.65
Others	1.60	1.26	1.08	0.86	0.56	0.28	0.43	0.16	1.13	0.37	0.82	0.15	0.51	0.09	0.00	0.00	0.00	0.00	0.00	0.61	0.32	
Total Current Assets	127.11	100.00	124.95	100.00	200.92	100.00	261.41	100.00	305.55	100.00	536.59	100.00	587.29	100.00	806.05	100.00	809.01	100.00	858.25	100.00	461.71	100.00
Current Liabilities	32.71	73.67	45.00	88.86	64.14	83.84	73.43	80.59	105.06	93.13	159.58	91.98	168.45	87.49	162.64	52.44	224.57	95.02	440.28	97.07	147.59	84.41
Provisions	11.69	26.33	5.64	11.14	12.36	16.16	17.69	19.41	7.75	6.87	13.91	8.02	24.09	12.51	147.51	47.56	11.77	4.98	13.31	2.93	26.57	15.59
Current Liabilities and Provisions	44.40	100.00	50.64	100.00	76.50	100.00	91.12	100.00	112.81	100.00	173.49	100.00	192.54	100.00	310.15	100.00	236.34	100.00	453.59	100.00	174.16	100.00

Particulars	2002-03		2003-04		2004-05		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11		2011-12		Average	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
<b>Nippo Batteries Limited</b>																						
Inventory	23.71	22.41	18.95	17.62	15.42	9.93	20.62	12.37	24.35	13.57	21.20	17.10	25.44	19.05	32.31	23.32	44.11	30.59	43.70	31.51	26.98	19.75
Sundry Debtors	34.20	32.32	30.95	28.78	34.47	22.19	31.60	18.96	36.03	20.08	40.15	32.38	65.29	48.90	55.05	39.74	60.51	41.96	63.97	46.13	45.22	33.14
Cash & Bank Balances	3.53	3.34	5.77	5.36	6.30	4.06	7.72	4.63	13.33	7.43	11.80	9.52	8.56	6.41	9.68	6.99	3.94	2.73	24.50	17.67	9.51	6.81
Loan and Advances	13.21	12.48	16.04	14.91	66.13	42.58	70.37	42.23	80.37	44.78	21.64	17.45	18.52	13.87	21.61	15.60	22.23	15.41	6.51	4.69	33.66	22.40
Short term Deposits	31.17	29.46	35.84	33.32	33.00	21.25	36.34	21.81	25.38	14.14	29.19	23.54	15.71	11.77	19.89	14.36	13.43	9.31	0.00	0.00	24.00	17.90
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Current Assets	105.82	100.00	107.55	100.00	155.32	100.00	166.65	100.00	179.46	100.00	123.98	100.00	133.52	100.00	138.54	100.00	144.22	100.00	138.68	100.00	139.37	100.00
Current Liabilities	33.88	74.41	32.36	73.41	33.99	37.38	30.36	32.46	35.29	35.42	30.99	72.44	26.32	50.07	26.97	50.25	25.71	48.98	28.66	77.97	30.45	55.28
Provisions	11.65	25.59	11.72	26.59	56.95	62.62	63.17	67.54	64.33	64.58	11.79	27.56	26.25	49.93	26.70	49.75	26.78	51.02	8.10	22.03	30.74	44.72
Current Liabilities and Provisions	45.53	100.00	44.08	100.00	90.94	100.00	93.53	100.00	99.62	100.00	42.78	100.00	52.57	100.00	53.67	100.00	52.49	100.00	36.76	100.00	61.20	100.00
<b>Consolidated</b>																						
Inventory	87.56	23.91	82.84	23.51	112.71	21.78	145.50	22.18	191.84	22.97	388.00	30.84	366.25	29.37	478.19	30.35	596.98	35.31	598.07	30.74	304.79	27.09
Sundry Debtors	135.41	36.97	143.94	40.85	215.06	41.56	255.59	38.95	356.18	42.66	539.63	42.89	555.78	44.58	635.02	40.30	676.25	39.99	764.52	39.29	427.74	40.80
Cash & Bank Balances	11.87	3.24	8.20	2.33	12.83	2.48	19.13	2.92	24.87	2.98	58.70	4.67	95.05	7.62	80.15	5.09	63.97	3.78	129.41	6.65	50.42	4.18
Loan and Advances	64.00	17.47	55.57	15.77	120.58	23.30	165.32	25.20	196.41	23.52	189.65	15.07	148.01	11.87	316.21	20.07	272.59	16.12	278.79	14.33	180.71	18.27
Short term Deposits	55.61	15.18	60.72	17.23	55.78	10.78	70.16	10.69	64.59	7.74	81.36	6.47	81.21	6.51	66.09	4.19	81.10	4.80	175.04	9.00	79.17	9.26
Others	11.82	3.23	1.08	0.31	0.56	0.11	0.43	0.07	1.13	0.14	0.82	0.07	0.51	0.04	0.00	0.00	0.00	0.00	0.00	0.00	1.64	0.39
Total Current Assets	366.27	100.00	352.35	100.00	517.52	100.00	656.13	100.00	835.02	100.00	1258.16	100.00	1246.81	100.00	1575.66	100.00	1690.89	100.00	1945.83	100.00	1044.46	100.00
Current Liabilities	106.74	66.60	108.91	74.54	145.73	59.62	185.88	59.06	227.49	63.67	310.26	71.27	326.82	73.00	376.88	53.49	462.66	70.27	692.21	74.09	294.36	66.56
Provisions	53.52	33.40	37.20	25.46	98.70	40.38	128.87	40.94	129.78	36.33	125.04	28.73	120.85	27.00	327.66	46.51	195.77	29.73	242.12	25.91	145.95	33.44
Current Liabilities and Provisions	160.26	100.00	146.11	100.00	244.43	100.00	314.75	100.00	357.27	100.00	435.30	100.00	447.67	100.00	704.54	100.00	658.43	100.00	934.33	100.00	440.31	100.00

Source : Annual Reports of select battery companies in Andhra Pradesh

FIGURE 2: AVERAGE COMPONENTS OF CURRENT ASSETS AS A PERCENTAGE OF TOTAL CURRENT ASSETS



### HYDERABAD BATTERIES LIMITED

In HBL, the investment in inventory had a second major component in current assets. Inventory had varied between the minimum of Rs.33.17 crores in the year 2003-04 and the maximum of Rs.287.75 crores in 2011-12. In spite of fluctuations, it is noticed that there was an overall increase in its investment. The first major item of current assets was in the form of sundry debtors and it had increased over the years of study except in 2010-11. Sundry debtors, on an average, worked out to 48.75 per cent of total current assets amounting to Rs.213.39 crores, and it was more than that of other battery companies. 'Loans and advances' had, on an average, registered 12.73 per cent of the total current assets. 'Others' had shown decreasing trend over the years. 'Others', short-term deposits and cash and bank balances were represented insignificantly because the share of these components was very nominal. Excepting for the year 2009-10, all other years have witnessed an increasing trend in current liabilities in terms of absolute figures. The share of Provisions is 15.59 per cent in the total current liabilities and provisions.

### NIPPO BATTERIES LIMITED

An analysis of NBL shows that the first major item of current assets was in the form of sundry debtors and it fluctuated over the years of study. In spite of the fluctuations, it is noticed that there was an overall increase in its investment. The other important component of working capital was loans and advances as it formed 22.40 per cent in total current assets. Inventory and Short-term deposits shared more or less equally i.e., 19.75 per cent and 17.90 per cent respectively. Cash and bank balances was the least component of current assets, which ranged between a minimum of 2.73 per cent in 2010-11 and the maximum of 17.67 per cent in 2011-12. 'Others', it seems had no place in the firms' current assets. The average current liabilities and provisions (Rs.61.20 crores) of NBL were less than the average current assets (Rs.139.37 crores). Current liabilities formed, on an average, 55.28 per cent of total current liabilities and provisions. Another important item was provisions with an average percentage of 44.72 per cent of current liabilities and provisions. It declined from 25.59 per cent in 2002-03 to 22.03 per cent in 2011-12.

### CONSOLIDATED

In the consolidated position of the companies, the current assets had exceeded the current liabilities throughout the study period. Among the current assets, the leading item was sundry debtors as it forms 40.80 per cent of the total current assets followed by inventories (27.09 per cent). It means that larger funds were invested in sundry debtors as compared to inventory. The other important component of working capital namely loans and advances had formed, significantly, 18.27 per cent of the total current assets while short-term deposits form 9.26 per cent. It may be observed that the cash and bank balances had occupied 4.18 per cent of total current assets whilst 'others' had registered very negligible proportion of the current assets.

Current liabilities as a percentage of total current liabilities and provisions had varied between the lowest of 53.49 per cent in 2009-10 and the highest of 74.54 per cent in 2003-04, with an average of 66.56 per cent. Inconsistency can be observed in the level of provisions as can be seen from its fluctuations in terms of percentages.

To sum up, HBL enjoyed sound working capital position. It was moderately good in ARBL and showed signs of improvement in NBL. It is noted that the excess of current assets over current liabilities was recorded in all battery companies in Andhra Pradesh. It may be observed that all the battery companies have enjoyed positive net working capital position.

### WORKING CAPITAL STATUS IN BATTERY INDUSTRY

An examination of trends in current assets, current liabilities and net working capital enables the financial analyst to assess the state of working capital position. In order to ascertain the trends in working capital, indices of current assets, current liabilities and net working capital of the battery industry are computed. Working capital position in a concern would be satisfactory, provided the pace of increase in current assets is more than that of the current liabilities and vice-versa. If the net working capital indices also increase, it further confirms the strengthening of working capital position in a business undertaking.

The particulars of the trends in current assets, current liabilities and net working capital of the select battery companies and the industry in Andhra Pradesh are presented in Table 2. Figure 3 shows the quantum of current assets, current liabilities and net working capital.

#### AMARA RAJA BATTERIES LIMITED

An analysis of individual battery companies reveals that in ARBL, the pace of growth in the indices of current assets was more than that of current liabilities throughout the study period under observation, barring 2005-06 and 2009-10. In other words, the rate of increase in the indices of current assets was higher than the current liabilities. The net working capital indices also confirm it. However, it is gratifying to observe that in ARBL, efforts were made to strengthen its working capital base. It may be observed that the working capital base was good in ARBL.

#### HYDERABAD BATTERIES LIMITED

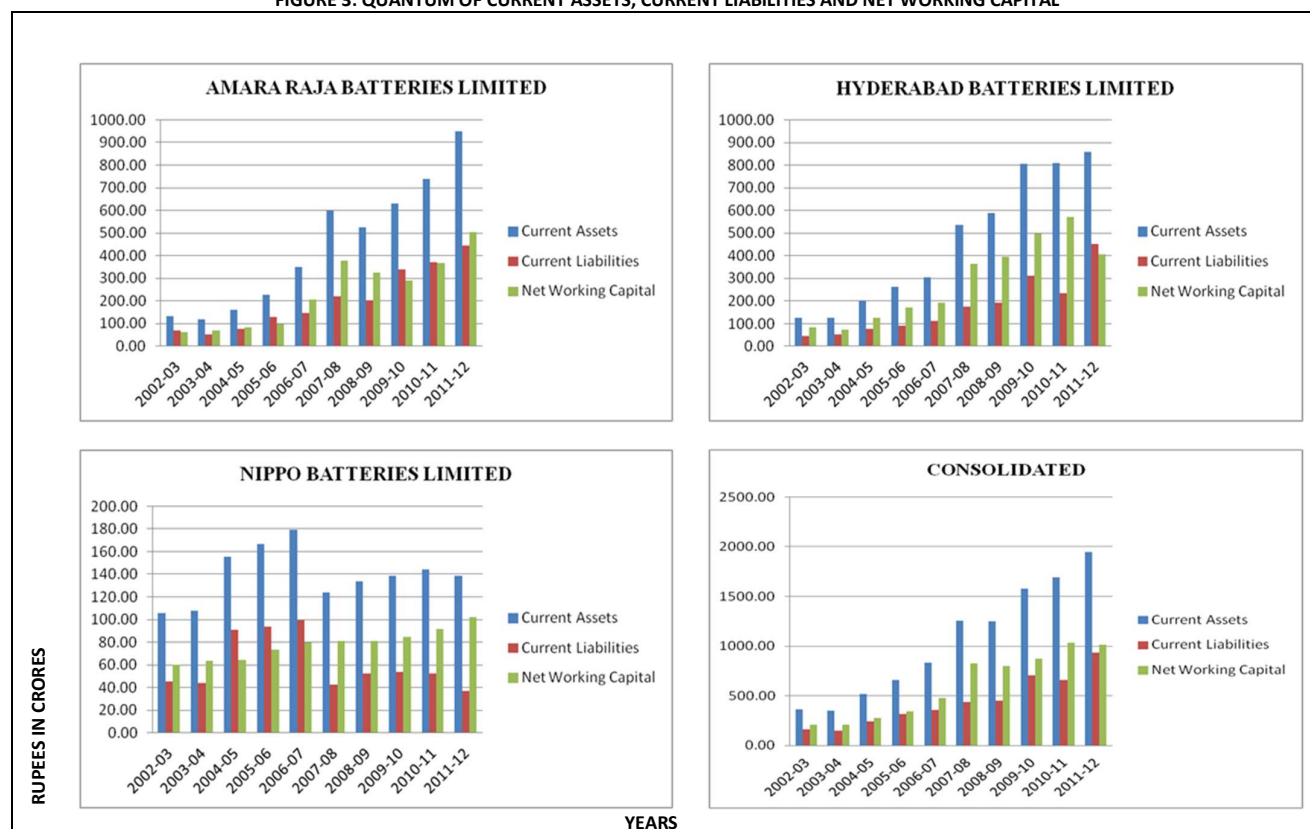
In HBL, the pace of growth in the indices of current assets was greater than that of the current liabilities during the half of the study period. The indices of both current assets and current liabilities had shown an increasing trend throughout the study period under reference except in the year 2003-04 in the case of current assets and in 2010-11 in the case of current liabilities. Further, the indices of net working capital have increased from 2003-04 to 2010-11 and, thereafter, decreased in the concluding year of study. It may be observed that the company had enjoyed positive net working capital in all the years under study.

**TABLE 2: TRENDS IN CURRENT ASSETS, CURRENT LIABILITIES AND NET WORKING CAPITAL** (Base year 2002-03 = 100) (Rs. in crores)

Particulars	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
<b>Amara Raja Batteries Limited</b>											
Current Assets	133.34	119.85	161.28	228.07	350.01	597.59	526.00	631.07	737.66	948.90	443.38
Trend (in percentage)	100	90	121	171	262	448	394	473	553	712	333
Current Liabilities	70.33	51.39	76.99	130.10	144.84	219.03	202.56	340.72	369.60	443.98	204.95
Trends (in percentage)	100	73	109	185	206	311	288	484	526	631	291
Net Working Capital	63.01	68.46	84.29	97.97	205.17	378.56	323.44	290.35	368.06	504.92	238.42
Trend (in percentage)	100	109	134	155	326	601	513	461	584	801	378
<b>Hyderabad Batteries Limited</b>											
Current Assets	127.11	124.95	200.92	261.41	305.55	536.59	587.29	806.05	809.01	858.25	461.71
Trend (in percentage)	100	98	158	206	240	422	462	634	636	675	363
Current Liabilities	44.40	50.64	76.50	91.12	112.81	173.49	192.54	310.15	236.34	453.59	174.16
Trends (in percentage)	100	114	172	205	254	391	434	699	532	1022	392
Net Working Capital	82.71	74.31	124.42	170.29	192.74	363.10	394.75	495.90	572.67	404.66	287.56
Trend (in percentage)	100	90	150	206	233	439	477	600	692	489	348
<b>Nippo Batteries Limited</b>											
Current Assets	105.82	107.55	155.32	166.65	179.46	123.98	133.52	138.54	144.22	138.68	139.37
Trend (in percentage)	100	102	147	157	170	117	126	131	136	131	132
Current Liabilities	45.53	44.08	90.94	93.53	99.62	42.78	52.57	53.67	52.49	36.76	61.20
Trends (in percentage)	100	97	200	205	219	94	115	118	115	81	134
Net Working Capital	60.29	63.47	64.38	73.12	79.84	81.20	80.95	84.87	91.73	101.92	78.18
Trend (in percentage)	100	105	107	121	132	135	134	141	152	169	130
<b>Consolidated</b>											
Current Assets	366.27	352.35	517.52	656.13	835.02	1258.16	1246.81	1575.66	1690.89	1945.83	1044.46
Trend (in percentage)	100	96	141	179	228	344	340	430	462	531	285
Current Liabilities	160.26	146.11	244.43	314.75	357.27	435.30	447.67	704.54	658.43	934.33	440.31
Trend (in percentage)	100	91	153	196	223	272	279	440	411	583	275
Net Working Capital	206.01	206.24	273.09	341.38	477.75	822.86	799.14	871.12	1032.46	1011.50	604.16
Trend (in percentage)	100	100	133	166	232	399	388	423	501	491	293

Source: Table 1

FIGURE 3: QUANTUM OF CURRENT ASSETS, CURRENT LIABILITIES AND NET WORKING CAPITAL

**NIPPO BATTERIES LIMITED**

In NBL, indices of current assets recorded lesser pace of increase than those of its current liabilities in six years of the study under reference. But, the indices of both current assets and current liabilities have been fluctuating inconsistently. Further, the indices of net working capital had reported an increasing trend throughout the study period except in the year 2008-09. However, the company could enjoy positive net working capital position throughout the study period.

**CONSOLIDATED**

An observation of working capital indices in the consolidated position of battery companies in Andhra Pradesh points out that the current assets and current liabilities recorded an upward trend and the indices of current assets were more than those of the current liabilities during the maximum years of the study under reference. In other words, the rate of increase in current assets was higher than the current liabilities. These observations are further confirmed from the increasing indices of net working capital in majority of the years of study. It may be observed that the battery industry could enjoy positive working capital position throughout the study period. It may be said that the battery industry's working capital condition was reasonably good over the study period.

To sum up, an analysis of individual battery companies reveals that all battery companies have enjoyed positive net working capital condition throughout the study period.

**ANALYSIS OF VARIANCE ('F' - TEST) IN WORKING CAPITAL**

Analysis of variance of indices of current assets, current liabilities and net working capital of select battery companies in Andhra Pradesh is presented in Table 3.

TABLE 3: ANALYSIS OF VARIANCE OF INDICES OF WORKING CAPITAL

Source of Variation	Degree of Freedom	Sum of squares	Mean Square of Variance	'F' Ratio (Calculated Value of 'F')	P-Value	'F' critical Value
<b>Current Assets</b>						
Between Companies	2	655521.5461	327760.773	5.806142**	0.007991	3.354131
Error of Residual	27	1524168.99	56450.70333			
Total	29	2179690.536				
<b>Current Liabilities</b>						
Between Companies	2	114582.2	57291.09	4.711237*	0.017576	3.354131
Error of Residual	27	328334	12160.52			
Total	29	442916.2				
<b>Net Working Capital</b>						
Between Companies	2	239772.9361	119886.47	6.278014241**	0.005768	3.354131
Error of Residual	27	515598.4859	19096.24			
Total	29	755371.422				

Source: Computed on the basis of data furnished in Table 2

**Notes**

- i) NS indicates Not Significant at 5% level of significance
- ii) \* indicates significant at 5% level of significance
- iii) \*\* indicates highly significant at 5% level of significance

**CURRENT ASSETS**

To determine whether there is any significant variation in the current assets between the individual battery companies in Andhra Pradesh, the following hypothesis was formulated and it was tested through ANOVA (Analysis of Variance) at 5 per cent level of significance.

H<sub>0</sub>: There is no significant difference between the current assets of select battery companies in Andhra Pradesh.

The hypothesis is tested by ANOVA, it is inferred that there exists a highly significant difference in the current assets of all individual battery companies. Hence, the null hypothesis ( $H_0$ ) was rejected for all battery companies under study.

#### CURRENT LIABILITIES

To examine whether there is any significant variation in the current liabilities of the individual battery companies in Andhra Pradesh, the following hypothesis was formulated and it was tested through ANOVA (Analysis of Variance) at 5 per cent level of significance.

$H_0$ : There is no significant difference between the current liabilities of select battery companies in Andhra Pradesh.

The hypothesis is tested by ANOVA, it is said that all individual battery companies under study significantly differ in their current liabilities. Hence, the null hypothesis ( $H_0$ ) was rejected for all battery companies under study.

#### NET WORKING CAPITAL

To examine whether there is any significant variation in the net working capital between the battery companies in Andhra Pradesh, the following hypothesis was formulated and it was tested through ANOVA (Analysis of Variance) at 5 per cent level of significance.

$H_0$ : There is no significant difference between the net working capital of select battery companies in Andhra Pradesh.

The hypothesis is tested by ANOVA, it is found that there are statistically significant differences in the net working capital of all individual battery companies under study. Hence, the null hypothesis ( $H_0$ ) was rejected for all battery companies under study.

#### LEAST SQUARES METHOD

Computation of the trend values for the net working capital of battery industry by Least Squares Method are presented in Table 4

**TABLE 4: TREND VALUES FOR NET WORKING CAPITAL OF BATTERY INDUSTRY BY LEAST SQUARES METHOD** (Rs. in crores)

Years	(X)	NWC (Y)	$\bar{X} - \bar{X}$	$(\bar{X} - \bar{X})^2$	$Y - \bar{Y}$	$(\bar{X} - \bar{X})(Y - \bar{Y})$	Trend Values
2002-03	1	206.01	-4.5	20.25	-398.1	1791.6525	120.30
2003-04	2	206.24	-3.5	12.25	-397.9	1392.7025	227.82
2004-05	3	273.09	-2.5	6.25	-331.1	827.6625	335.34
2005-06	4	341.38	-1.5	2.25	-262.8	394.1625	442.87
2006-07	5	477.75	-0.5	0.25	-126.4	63.2025	550.39
2007-08	6	822.86	0.5	0.25	218.71	109.3525	657.92
2008-09	7	799.14	1.5	2.25	194.99	292.4775	765.44
2009-10	8	871.12	2.5	6.25	266.97	667.4125	872.97
2010-11	9	1032.46	3.5	12.25	428.31	1499.0675	980.49
2011-12	10	1011.50	4.5	20.25	407.35	1833.0525	1088.01
Total	55	6041.55	0	82.5	0	8870.75	6041.55
Mean	5.5	604.16	0	8.25	0	887.07	604.16

Source: Computed from Table 2

The formulae to compute trend values for the net working capital of the battery industry by using the method of least squares is as follows:

$$Y^t = a + b x$$

If,

$$a = \bar{y} - b\bar{x},$$

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

The estimated net working capital of battery industry is shown as follows:

$$a = 604.16 - (107.52 \times 5.5)$$

$$= 604.16 - 591.36$$

$$= 12.80$$

$$b = 8870.75/82.5$$

$$= 107.52$$

The model is  $Y^t = a + b(x)$

For the year 2016-17,  $X = 15$ , substituting these values

$$Y^t = 12.80 + 107.52(15)$$

$$= 54.86 + 1612.80$$

$$= 1667.66$$

Therefore, the estimated net working capital of battery industry for the year 2016-17 would be Rs. 1667.66 crores.

The estimated net working capital for the year 2016-17 in the case of HBL (Rs.810.72 crores) is higher when compared to other battery companies i.e., ARBL (Rs.696.42 crores) and NBL (Rs.118.46 crores). The least net working capital is projected in NBL for the year 2016-17. It may be observed that the future net working capital requirement is lower in battery companies when compared to the consolidated picture.

#### CONCLUSION

The prime item of current assets was in the form of sundry debtors and the investment in inventory had a second major component in all the battery companies under study. In the combined picture, larger funds were invested in sundry debtors as compared to inventory. The cash and bank balances had occupied 4.18 per cent of total current assets whilst 'others' had registered very negligible proportion of the current assets. Inconsistency can be observed in the level of provisions as can be seen from its fluctuations in terms of percentages. HBL enjoyed sound working capital position. It was moderately good in ARBL and showed signs of improvement in NBL. The excess of current assets over current liabilities was recorded in all battery companies in Andhra Pradesh. All the battery companies had enjoyed positive net working capital position.

#### SUGGESTIONS

The following are some of the suggestions offered for improving working capital performance of the battery industry in Andhra Pradesh.

Inventory formed one-third of current assets in the battery industry in Andhra Pradesh. Proper planning and control of investment in inventory is necessary. In order to increase optimisation of investment in inventories in ARBL and HBL, effective measures and methods for management of inventories need to be undertaken. Hence, investment in inventory needs to be optimised. To this end, the following points may be considered for the efficient management of inventory in the battery companies.

- In order to keep the cost of inventory at a low level, the inventory carrying cost, inventory ordering cost and stock-out cost shall be ascertained and monitored so as to bring a balance among these costs.
- Modern technique of inventory management, like JIT needs to be adopted by the battery companies to minimise the blocking up of working funds.
- Adequate norms shall be developed for different levels of inventory holdings. Inventory gap analysis shall be carried out by comparing the actuals with standards so that loopholes, if identified, shall be plugged out.
- The concept of EOQ should be given the utmost importance while placing orders for purchase of raw materials.
- ABC analysis shall be carried out to overcome the problem of overstocking.
- An exclusive inventory planning cell can be established with long and short term planning for inventory holdings.

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