Cover Feature

Break-even analysis of paper industry

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In a scenario of globalization Indian paper industry has to leave with global cycle while improving its own cost competitiveness. In this context break even analysis assumes a very important role - A real life case study

Paper industry is considered to be one of the core industries of A.P. The first paper mill in the State was established at Rajahmundry, East Godavari district, in the year 1924. It was incorporated in 1964 as the first Joint Sector Enterprise in Indian Paper Industry. The mill became a three dimensioned company equal participation among the Government, the Public and the West Coast Paper Mill Ltd. The State has 5 large-scale and 18 small-scale paper units at the end of the year 2000.

Andhra Pradesh occupies sixth position in the production of paper and paperboard in India. It ranks 5th position in the case of number of mills and 6th rank in terms of the installed capacity of paper production in the country. The reason for the establishment of number of units may be attributed to the encouragement of the Government by giving concessions in excise duty particularly to small-scale units. There are total 23 paper units in the State. Among these the Coastal Andhra region ranks first with 11 units followed by Telangana with 10 units and Rayalaseema with 2 units.

Sample Design

The sampling has been adopted covering the units on the basis of size, area and raw material aspects in the research area, Coastal Andhra.

Table 1 indicates the sample design. In Coastal Andhra there are 11 paper mills. Out of these, there is one large-scale paper mill and 10 small-scale mills on the basis of size. Among the 11 paper mills, 5 units have been chosen on stratified random sampling technique. These units are renamed as A, B, C, D & E in order to maintain the secrecy of the business. On an average, the study covers 62.5 per cent of the total units. On geographical lines, the units are also classified as urban and rural. On this principle, there is one unit in

Table 1: Sample Design of Paper Mills in Coastal Andhra

S.No	Basis	Category	Total Units	Sample Units	%age of the sample
1.	Size	large-scale	1	1	100
		Small-scale	10	4	25
			11	**5**	**125/2=62.5**
2.	Area	Urban,	1	1	100
		Rural	10	4	25
			11	**5**	**125/2=62.5**
3.	Raw	Wood-based	1	1	100
	Material	Agro-based	10	4	25
		&Waste paper-based	**11**	**5**	**125/2=62.5**

Source: Field Survey.

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urban area and 10 units in rural area. Out of these one unit in urban area and 4 units in rural area are included in the study on stratified sampling technique.

Further, on the basis of raw materials, the units are categorized as wood-based and agro-residue and recycled waste paper based small-scale mills. Among the total 11 units, 1 wood-based unit and 4 agro residue and recycled waste paper based units have been drawn on stratified sampling basis. This study is based on wood, agro residue, and waste paper units and also represented rural and urban regions in the Coastal Andhra Pradesh. Thus the inclusion of all types and regions in the sample coverage is quite satisfactory for the purpose of analysis of this research paper. In this context, 'The Circar Paper Mill' a small-scale agro-residue based unit of Nellore District is excluded from the sample study as it has become a sick unit and was closed in 1996. Thus, the paper units of the Coastal Andhra, the present research area of sample design specified in the Table 1 covered 62.5 per cent.

Basic Data of Sample Mills:

To have a comprehensive study of the sample mills the preliminary details would provide an understanding of their structure and progress. These details are depicted in Table 2.

The data communicates that the large mill 'A' is the old mill whereas the small mills are of recent origin. During the last seven years between 1994 and 2000, the capital appreciation is double in large mill whereas it is slow in small mills. The same trend is viewed with regard sales also. The sales have increased from Rs 14154 lakhs in 1994 to Rs 27021 lakhs in 2000 in unit 'A' while in small mills the growth rate is less. However, unit 'B' improved substantially from Rs 2848 lakhs to 6705 lakhs as it turned into a large mill in 1999. The profitability of small mills is depressing while the large mill did better with 7-fold increase.

Cost Analysis:

Cost analysis is a significant tool in cost management. Cost ascertainment is done by means of a cost sheet. The data incorporated in cost sheet is collected from various statements of accounts that are written in company accounts regularly. Analysis of cost is necessary for comparison over the years for cost control and cost planning. Table 3 depicts the cost sheet of Unit 'A' from 1993-94 to 1999-2000.

Cost Analysis in Sample Mills:

The purpose of cost analysis is to have a clear perception of the variations in the components of cost. Cost sheets for a period of 7 years have been considered to eliminate fluctuations. Table 3 furnishes the cost structure data relating to unit 'A'. It is observed from the table that the material cost constitutes 31.9 per cent of the total cost while conversion expenses 59.4 per cent. In absolute terms, the material cost on an average was at Rs. 6004 lakhs where as conversion expenses about Rs. 11279 lakhs. Hardwood is the major component of material cost followed by chemicals. The cost of hardwood increased from Rs.2124 lakhs in 1993-94 to Rs.3724 lakhs in 1999-2000 registering an increase of more than one and half times. Among the conversion expenses, power and fuel eroded a lion's share where administrative and manufacturing expenses occupied a sizeable amount. On the other hand, selling and distribution expenses showed an increasing trend rising from Rs. 75 lakhs in1993-94 to Rs. 554 lakhs in 1999-2000 Interest component shares a little amount.

In case of wages and salaries, there was a sharp rise till 1997-98 and thereafter showed a downtrend. Introduction of automation resulted in the reduction of staff costs. Being large-scale company in the industry, the unit 'A' has set up a costing department to monitor the cost. This department is vested with the responsibility of minimizing costs at every stage of production and suggesting cost saving techniques. Consequent upon this measure, the firm has been able to control costs wherever possible.

Break - even Analysis:

The term "Break-even Analysis" refers to a system of determination of the level of activity where total cost equals the total selling price. It implies the system of analysis that determines the probable profit at any level of output. The relationship be-

Table 2: Basic Details of Sample Paper Mills from 1994 to 2000

Units	Location A.P. District wise	Year Of establ-ishment	Installed capacity Tones (&Yr 1994 to 2K)		Capital Rs. Lakhs & (Yr 1994 to 2K)		Sales Turnover Rs. Lakhs (Yr 1994 to 2K)		Net profit Rs. Lakhs (Yr 1994 to 2K)	
			Yr1994	2K	1994	2K	1994	2K	1994	2K
A	E.G. Dist.	1964	92500	98500	563	1125	14154	27021	652	4788
B	E.G.Dist.	1974	18000	55000	75	1090	2848	6705	202	1640
C	W.G. Dist.	1975	9000	18000	300	331	4213	5554	29	75
D	E.G.Dist.	1975	5750	6000	90	72	936	1655	90	56
E	Srikakulam Dist.	1978	12000	16500	90	172	1607	1699	235	75

Source: Field Survey.

Table 3: Cost Sheets of unit 'A' from 1993-94 to 99-2000 and average based on 7-year data.

PARTICULARS	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	AVG.
Installed capacity	92500	92500	92500	98500	98500	98500	98500	95928.6
Production — tones	79465	83313	83251	79861	84330	91543	94334	85156.7
Capacity Utilization (%)	86	90	90	81	86	93	96	88.9
(A) Material cost								
Bamboo	789	713	940	946	1079	965	964	913.7
Hard wood	2124	2605	2726	2995	3020	3883	3724	3011.0
Waster paper cuttings	180	305	443	341	264	293	404	318.6
Cost of chemicals	1393	1640	1874	1953	2009	1897	1978	1820.6
Total Cost of material(A)	4486	5263	5983	6235	6372	1038	1010	6063.9
Conversion Expenses								
Power &. Fuel	2545	2562	2614	3267	3680	4096	3736	3214.3
Wages & Salaries	2140	2306	2408	2387	2982	3033	3230	2640.9
Repairs & Maintenance	233	315	453	383	315	353	465	359.6
R & D expenses	26	27	26	30	22	30	26	26.7
Depreciation	326	415	543	781	821	838	894	659.7
Adm. Overheads	3137	3416	4652	5451	4653	4463	4872	4377.7
Conversion on cost (B)	8407	9041	10696	12299	12473	12813	13223	11278.9
Total Conversion cost (A+B)	12893	14304	16679	18534	18845	19851	20293	17342.7
Add Opening Stock of W.I.P	31	53	27	50	79	55	55	50.0
TOTAL	12924	14357	16706	18584	18924	19906	20348	17392.7
Less Closing Stock of W.I.P	53	27	50	79	55	55	105	60.6
Cost of Production (C)	12871	14330	16656	18505	18869	19851	20243	17332.1
Add Op. Stock of fin. Goods	429	547	323	394	900	991	629	601.9
TOTAL	13300	14877	16979	18899	19769	20842	20872	17934.0
Less CI. Stock of fin goods	547	323	394	900	991	629	309	584.7
Cost of Sales (D)	12753	14554	16585	17999	18778	20213	20563	17349.3
Selling &. Dist. expense	75	224	286	307	386	551	543	338.9
Interest	556	678	722	798	831	850	886	760.1
Total Cost (E)	13384	15456	17593	19104	19995	21614	21992	18448.3

Source: Compiled from Annual Reports of 'P'.

tween cost of production, volume of output, quantum of profit and sales value is established by break-even analysis. This analysis is also known as cost -volume-profit (CVP) analysis. It is an important medium through which one can have an insight into effects of profitability due to variations in cost and sales. It enables the entrepreneur to take effective decisions. BEP refers to that level of activity where income of the business exactly equals the expenditure. In other words, it is a "no profit-no loss point". If production is increased beyond this level, profit shall accrue and if decreased below this level, loss shall be suffered.

Break-Even Analysis of Unit 'A':

Break-even analysis of 'A' is made after considering the fixed and variable expenses. On the basis of a 7-year period, average expenses are computed to arrive at the contribution and profit. The data relating to break-even has been presented in Table 4.

According to the table 4 it is evident that the company's required production "no profit no loss point" is 55038 tones and sales amount comes to Rs. 14964 lakhs. This company is in a comfortable position having produced 85157 tones on an average worth Rs. 23138 lakhs sales and maintains a safety margin of Rs. 8174 lakhs. Immense opportunities are available to the company to take up expansion programme in the face of profitable area.

Cost Analysis of 'B'

The cost sheets of unit '8' for a seven-year period from 1993-94 to 1999-2000 are shown in Table 5. A perusal of the table brings forth several interesting points. The raw materials consumed in the mill include rice straw, jute waste, waste paper, and wood pulp. Another significant

Table 4: Break-even analysis based on the average of seven years Form 1994 to 2000

(Rs. In Lakhs)

FIXED COST	**Amount**
1) Wages & Salaries	2640.86
2) Repairs and Maintenance	359.57
3) Administrative expenses	4377.71
4) Depreciation	659.71
5) Interest	760.14
TOTAL FIXED COST (A)	8798.00
VARIABLE COST	
1) Material Cost	6063.86
2) Power & Fuel	3214.29
3) Selling & Distribution expenses	338.86
TOTAL VARIABLE COST (B)	9617.00
BREAK-EVEN ANALYSIS	
SALES	23138.00
Less Variable Cost	9617.00
CONTRIBUTION	13521.00
Less Fixed Cost	8798.00
PROFIT	**4723.00**
B.E.P. QUANTITY = FIXED COST / CONTRIBUTE PER UNIT	
TOTAL No. OF UNITS =	85157.00
CONTRIBUTION PER UNIT	15877.73
B.E.P. UNITS =	**55411**
2) B.E.P. IN AMOUNT = FIXED COST /PV RATIO	
PV RATIO = CONTRIBUTION /ALES	
PV RATIO =	58.44
B.E.P. IN AMOUNT (in lakhs)= 873800000/58.4%	**15055.70**
MARGIN OF SAFETY:	
Actual Sales — BEP Sales Rs. (23138-14964)lakhs	8174

ingredient is chemicals and stores. Among all, the major raw material is jute waste, which costs high. On the whole, the material cost comes to 58.9 per cent, while the conversion on cost contributes to 39.3 per cent. Finance expenses, selling and distribution expenses account for the remaining share.

Among the conversion expenses, the cost of power and fuel forms the major component followed by wages and salary. While the selling and distribution cost remained more or less static, the interest charges had increased thrice from Rs. 63 lakhs in 1993-94 to an abnormal level of Rs.1579 lakhs in 1999-2000. The causes of increase can be traced to large-scale borrowing for expansion programme.

Break-even Analysis:

In order to analyze the costs of BEP the breakeven technique is adopted. The data relating to cost volume and profit of unit 'B' are depicted in table 6. As per the table it is evident that the average sales value, variable cost, and fixed cost of unit 'B' are put at Rs. 3704 lakhs, 2943 lakhs and Rs. 857 lakhs respectively.

After applying the formula it is found that the production of products of unit 'B' at break even level should be at 24877 tones whereas the actual production is only 22091 tones. Similarly, when there should be sales value of Rs. 4180.48 lakhs, actual sales of the company are at Rs. 3704s. Thus there is a deficit of sales activity. As such there is no margin of safety as the concern is in losses.

Chart analysis of unit 'B':

In unit 'B' the fixed costs have been incurred at Rs. 857 lakhs and variable cost at Rs. 2943 lakhs. The sales turnover came to about Rs. 3704 lakhs and the average out put has been around 22091 tones. Basing on this data the BEP chart has been drawn in chart 2. As per the chart the BEP out put is computed at 24877 tones and sales turnover at Rs. 4180.48 lakhs. But the actual production has been less than BEP quantity. Thus there is no margin of safety.

Cost Analysis of unit 'C':

Unit 'c' mill's cost sheet is portrayed in Table 7 in which the material cost, conversion cost, and total cost are shown.

Table 5: Cost Sheets of unit 'B' from 1993-94 to 99-2000 and the average based on a - 7-year data

PARTICULARS	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	AVG.
Installed capacity	18000	18000	18000	18000	18000	18000	55000	23280
Production — tones	20028	20017	20482	19607	17440	18533	38533	22091
Capacity Utilization (%)	111	111	114	109	97	103	70	102
(A) Material cost								
Rice straw	103	76	118	114	135	144	140	119
Gunny Waste	372	400	470	476	335	359	377	398
Waster paper	182	282	85	40	31	28	2439	441
Wood pulp	195	84	315	234	164	123	151	181
Misc. Materials	43	80	90	14	153	106	8	85
Cost of Chemicals	704	769	989	795	675	656	1287	839
Total Material cost (A)	1599 (59.8)	1671 (58.4)	2067 (61.7)	1773 (56.3)	1493 (51.3)	1416 (44.8)	4402 (55.3)	2060 (58.9)
(B) Conversion Expenses								
Power & Fuel	631	658	754	836	852	851	1431	859
Wages & Salaries	135	151	181	209	195	221	352	206
Repairs & Maintenance.	82	81	66	57	53	53	96	70
Depreciation	35	38	46	53	48	56	401	97
Adm. Overheads	87	99	163	128	97	104	321	143
Conversion on cost (B)	970 (36.3)	1027 (35.9)	1210 (36.1)	1283 (40.7)	1245 (42.8)	1285 (40.7)	2601 (31.4)	1375 (39.3)
Total Conversion cost (A+B)	2569	2765	3287	3076	2795	2764	7003	3435
Add Opening Stock of W.I.P	20	20	10	20	57	63	28	31
TOTAL	2589	2785	3297	3096	2852	2827	7031	3466
Less Closing Stock of W.I.P.	27	10	20	57	63	18	122	45
Cost of Production (C)	2562	2715	3267	3019	2732	2740	6909	3421
Add Op. Stock of fin. goods	55	34	18	23	137	247	152	148
TOTAL	2617	2809	3295	3062	2926	3056	7061	3273
Less CL Stock of fin goods	34	18	23	137	247	152	368	140
Cost of Sales (D)	2583	2791	3272	2925	2679	2904	6693	3133
Selling & Distribution Exps.	25	22	21	18	20	37	22	24
Interest	63	50	58	207	210	218	1579	341
Total Cost (E)	2671 (100)	283 (100)	3351 (100)	3150 (100)	2909 (100)	3159 (100)	8294 (100)	3498 (100)

Source: Compiled from Annual Reports of 'B'.

It is appalling to note that the material cost on an average constituted 44.8 per cent of the total cost. The material cost has shown fluctuations between 2003 lakhs and 2438 lakhs. During the year 1998-99, it recorded lowest cost at Rs. 1798 lakhs. On the other hand, conversion expenses over this period contributed to 55.2 per cent on the average. It was highest in 1999-2000 recording Rs. 2363 lakhs. The conversion cost has been continuously increasing during the study period. The cost of fuel and power has been the major component of cost among conversion expresses to 122 lakhs in 1999-2000.

This unit consumes gas in power generation. It is supplied by ONGC through pipelines and available at cheaper rates. So cost of power is at controllable level. It is interesting to note that despite decrease in production volume, there have been uptrends in cost of production. The causes are traced to hike in wages and salaries and in effective monitoring of costs.

Break-even Analysis of 'C':

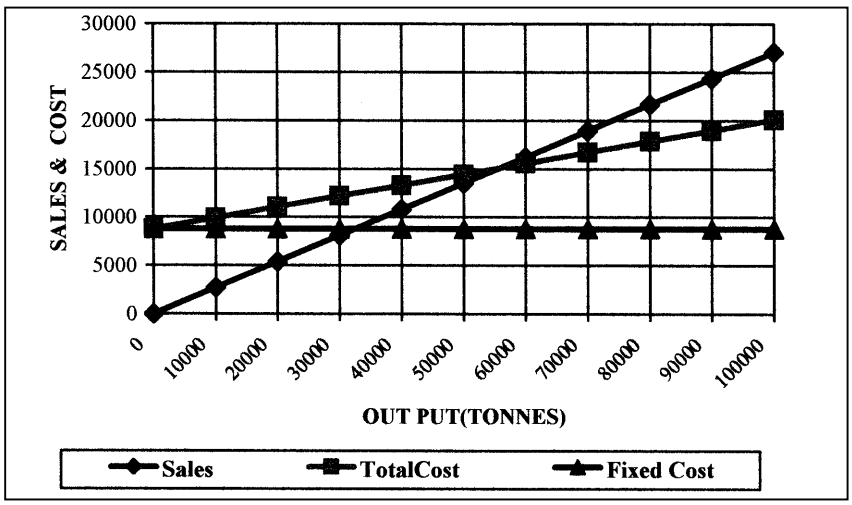
The data pertaining to break-even of unit 'c' is provided in Table 8, a 7-year data has been considered for the purpose of analysis and to eliminate fluctuation, an average is computed. The contribution of the enterprise is put at Rs.1305 lakhs, while the fixed cost were at 1002 lakhs and variable costs Rs. 3308 lakhs. After the application of the formula, the BEP units came to 15905 tones while BEP sales value to Rs, 3540 lakhs. The company has the safety margin for production is calculated at 4808 tones and the sales value of Rs. 1073 lakhs. As per the analysis, the unit can take up expansion programme in the face of large margin of safety.

Table 6: Statement of Break- even Analysis of unit 'B

PARTICULARS	AMOUNT IN
FIXED COST	RS. LAKHS
1) Wages & Salaries	206
2) Repairs and Maintenance	70
3) Administrative expenses	143
4) Depreciation	97
5) Interest	341
TOTAL FIXED COST (A)	857
VARIABLE COST	
1) Material Cost	2060
2) Power & Fuel	859
3) Selling & Distribution expenses	24
TOTAL VARIABLE COST (B)	2943
BREAK-EVEN ANALYSIS	
SALES	3704
Less Variable cost	2943
CONTRIBUTION	761
Less Fixed cost	857
LOSS	-96
B.E.P QUANTITY = FIXED COST/CONTRIBUTE PER UNIT	857/3445
TOTAL No OF UNITS =	22091
CONTRIBUTION PER UNIT	3445
B.E.P UNITS =	24877
2) B.E.P IN AMOUNT = FIXED COST/ PV RATIO	857/20.5%
PV RATIO = CONTRIBUTION /SALES	761/3704X100= 20.5%
PV RATIO =	20.5%
B.E.P IN AMOUNT (in lakhs)= 857/20.5%	4180.48

Source: Cost Sheet of unit 'B';

Chart 1 : Break - even Chart of Unit 'A'



Analysis of unit 'C' BEP Chart:

On the basis of cost and sales data, the BEP chart relating to unit 'C' has been incorporated in Chart 3. Basing on the data, the BEP quantity has been arrived at 15905 tones and sales value at Rs. 3540 lakhs. This unit is producing above the BEP quantity and maintaining the sales value as well. The safety margin is to the tune of Rs. 1073 lakhs. In view of the encouraging result, this unit can be take-up for expansion programme.

Cost Analysis of 'D':

Cost sheet describes various components of cost at different stages. Cost control and cost efficiency are achieved only through the cost statement. The cost sheets of unit 'D' over a period of 7 years from1993-94 to 1999-2000 has been presented in table 9.

On an analysis of the table it is apparent that the average total cost was computed at Rs. 1083 lakhs of which material cost alone contributed to Rs. 556 lakhs constituting 50.9 per cent on an average. The expenses incurred towards conversion of raw materials into finished products came to about Rs. 480 lakhs registering 43.7 per cent.

Among the conversion expenses power and fuel constitute the significant item of cost covering nearly three-fourths of conversion cost. The interest burden contributed to Rs. 32 lakhs forming 3.2 per cent of the total cost.

On an examination of the data it is observed that the material cost has shown an increasing trend from Rs, 405 lakhs in 1993-94 to Rs. 607 lakhs in 1997-98 but thereafter there has a decreasing trend to Rs. 558 in 1999-2000. In case of conversion cost there was a continuous rise throughout the study period except in the

Table 7: Cost Sheets Of Unit 'c' from 1993-94 to- 99-2000 and the average based on a - 7-year data (In Rs. Lakhs)

PARTICULARS	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	AVG.
Installed capacity	18000	18000	18000	18000	18000	18000	18000	18000
Production - tones	22826	21900	21648	17842	18993	19143	22649	20713
Capacity Utilization (%)	126.8	121.6	120.2	99.1	105.5	106.3	125.8	115
(A) Material cost								
Rice straw	205	189	162	141	159	146	173	168
Gunny Waste	77	77	142	79	100	93	90	94
Waster paper	381	501	779	607	420	415	615	531
Wood pulp	38	3	18	82	104	74	41	51
Misc. Materials	6	-	-	13	32	18	-	17
Cost of Chemicals	958	911	1103	1074	918	884	1009	980
Total Material Cost (A)	1665 (42.5)	1681 (44.9)	2204 (50.9)	1996 (52.3)	1733 (41.1)	1630 (44.6)	1928 (38.1)	1841 (44.8)
(B) Conversion Expenses								
Power & Fuel	820	831	883	896	1032	1042	1224	961
Wages & Salaries	239	246	309	338	322	343	368	309
Repairs & Maintenance.	130	129	163	153	164	18	220	154
Depreciation	110	113	117	125	130	131	68	113
Manufacturing Expenses	101	123	124	104	102	91	145	113
Adm. Over heads	77	101	79	110	99	99	338	129
Conversion on cost (B)	1477 (57.5)	1543 (55.1)	1675 (49.1)	1726 (47.7)	1849 (58.9)	1824 (55.4)	2363 (61.9)	1779 (55.2)
Total Conversion cost (A+B)	3142	3224	3879	3724	3582	3454	4290	3620
Add Opening Stock of W.I.P.	101	51	67	133	135	140	111	105
TOTAL	3242	3275	3946	3857	3717	3594	4401	3725
Less Closing Stock of W.I.P.	38	46	117	135	140	111	92	97
Cost of Production (C)	3204	3229	3859	3722	3577	3483	4309	3628
Add Op. Stock of fin. goods	129	38	46	117	527	311	535	243
TOTAL	3333	3267	3875	3839	4104	3794	4844	3871
Less Cl. Stock of fin goods	51	67	133	527	311	535	73	242
Cost of Sales (D)	3282	3200	3742	3312	3799	3259	4771	3629
Selling & Distribution Exp.	186	228	229	147	160	154	165	181
Interest	347	310	443	353	260	247	119	297
Total Cost (E)	3815	3738	4414	3812	4213	3660	5055	4107

Source: Compiled from Annual Reports of Unit 'C'.

year 1998-99. The causes for the downward trend has been attributed to reduction in production of paper due to heavy piling of stocks and pressure from recessionary trends in the market.

Computation of break-even point entails a company to knowwhere it stands at any level of output. Different aspects of break-even of 'D' are portrayed in Table 10. Break-even of 'D' is computed on the basis of average values for a seven-year period from 1993-94 to 1999-2000. It is arrived at after taking average sales value at Rs. 1314 lakhs, variable cost Rs. 904 lakhs, and fixed cost at Rs. 188 lakhs. After application of the formula, the contribution of the firm is reckoned as Rs 410 lakhs and profit Rs. 222 lakhs. During the study period, the average production volume was found to be 6576 tones. On application of the principle, it is computed that the break-even production is 3016 tones and the sales value is about Rs. 602.56 lakhs. At these values, there is a large safety margin to the firm at Rs. 711.44 lakhs of sales value. In the ultimate analysis, it is deduced that the firm is in a comfortable position in profitability enabling it to take up further expansion programmes.

Analysis of BEP Chart of unit 'D':

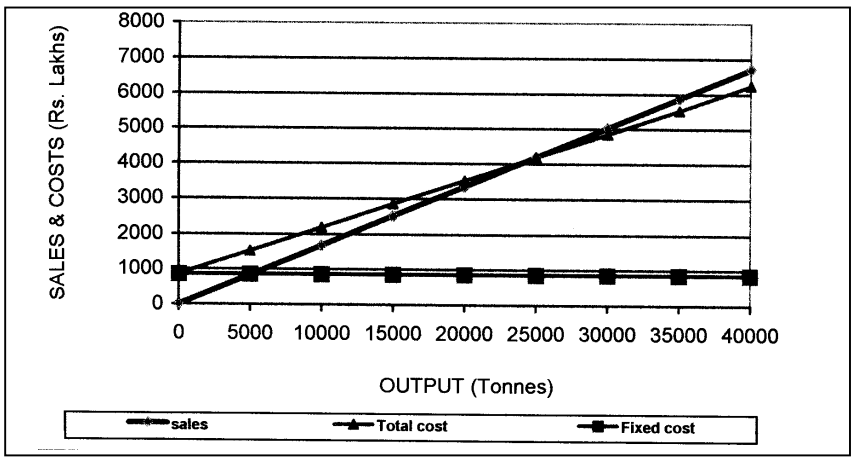
This mill's BEP chart is portrayed in Chart 4. The fixed cost of the mill has been computed at Rs. 188 lakhs at variable cost at Rs. 904 lakhs. Accordingly the BEP chart is drawn in which the production is shown on an X-axis and sales and costs are shown on Y-axis. The sales lie and the total cost line have intersected at 3016 tones, at the point of no loss-no profit. At the same time the BEP sales- value is arrived at Rs. 602.56 lakhs. The company has a comfortable safety margin of 3565

Table 8: Statement of Break- even Analysis of unit 'C'

PARTICULARS	AMOUNT IN
FIXED COST	RS. LAKHS
1) Wages & Salaries	309
2) Repairs and Maintenance	154
3) Admistrative expenses	129
4) Depreciation	113
5) Interest	297
TOTAL FIXED COST (A)	1002
VARIABLE COST	
1) Material Cost	2053
2) Power & Fuel	961
3) Selling & Distribution expenses	181
4) Manufacturing Expenses	113
TOTAL VARIABLE COST (B)	3308
BREAK-EVEN ANALYSIS	
SALES	4613
Less Variable Cost	3308
CONTRIBUTION	1305
Less Fixed Cost	1002
Profit	303
B.E.P. QUANTITY = FIXED COST/CONTRIBUTE PER UNIT	1002/6300
TOTAL No. OF UNITS =	20713
CONTRIBUTION PER UNIT	6300
B.E.P. UNITS =	15905
2) B.E.P. IN AMOUNT = FIXED COST/ PV RATIO	1035/28.3%
PV RATIO = CONTRIBUTION /SALES=1305/4613×100=	28.3%
B.E.P. IN AMOUNT (in lakhs)= 857/20.5%	3540
MARGIN OF SAFETY	1073
Actual Sales - BEP Sales =4613 – 3540=	

Source: Cost Sheet of unit 'C'

Chart 2 Break-even analysis of unit 'B'



tones and sales turnover of Rs. 711.44 lakhs.

Cost Analysis of unit 'E':

Financial analysis implies not only financial statement but cost analysis as well. A deep study of costs at different stages will entail understanding the cost behaviour cost of unit- 'E' has been prepared. A Cost sheet is depicted in Table- 11. It discloses that the average capacity, production, and utilization levels are 14570 tones, 13634 tones and 93.5% respectively. The average material cost comes to 757 lakhs constituting 45 per cent where as the conversion cost of Rs 825 lakhs forming 49.5 per cent. The interest forms about Rs. 90 lakhs adding 4.5 per cent to the total cost. Though the material cost increased from Rs. 616 lakhs to 845 lakhs during the last 7 years Its share has come down considerably from 45.7 to 43.4 per cent during this period. Similarly the conversion expenses also showed an up trend rising from Rs. 655 lakhs 1993-94 to 971 lakhs in 1999-2000. But in contrast to material cost, its- stake has increased from 48.8 per cent to 51.2 per cent. The interest component was static at 4.5 per cent during this period. It is evident from this analysis that the overhead costs have lost control. Cost control measures are to be mooted on overheads. Table 11 portrays the cost data.

Table 12 indicates unit of 'E' BEP analysis based on 7year average from 1993-94 to 1999-2000. The company has incurred fixed cost of Rs. 477 lakhs and variable costs of Rs. 1666 lakhs with a production of 13634 tones on an average. Basing on these details the BEP table 12 calculation has been shown to compute the production and sales at no profit no loss basis. It shows that the sales and the total cost line have inter-

Table 9: Cost sheets of 'D' from 1993-94 to 1999-2000 and the average based on a 7-year data

PARTICULARS	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	AVG.
Installed capacity (tones)	5750	6000	6000	6000	6000	6000	6000	6000
Production - tones	5849	5935	7274	6508	6830	6575	7059	6576
Capacity Utilization (%)	101.7	98.9	121.2	108.4	113.8	109.5	117.6	109.6
(A) Material cost								
Rice straw	61	52	84	78	75	78	74	72
Gunny waste	46	58	94	140	126	117	113	99
Waster paper	23	39	34	35	21	15	16	26
Cotton linters	50	26	35	22	9	3	9	22
Misc. Materials	116	220	175	187	207	201	208	188
Cost of Chemicals	109	109	184	178	169	157	138	149
Total Material Cost (A)	405 (50.8)	504 (54.0)	606 (52.0)	640 (53.8)	607 (50.0)	571 (50.3)	558 (45.7)	556 (50.9)
(B) Conversion Expenses								
Power & Fuel	220	240	320	349	388	377	405	328
Wages & Salaries	43	49	56	64	72	72	86	63
Repairs & Maintenance.	33	61	53	42	47	35	42	48
Depreciation	11	14	17	20	22	22	22	18
Effluent Treatment	3	4	4	3	2	2	1	3
Adm. Overheads	20	6	52	25	19	8	32	20
Conversion on Cost (B)	330 (41.4)	374 (40.2)	502 (43.1)	503 (42.3)	550 (45.3)	516 (45.5)	588 (48.2)	480 (43.7)
Total Conversion Cost A+B)	735	878	1108	1143	1157	1087	1146	1036
Add Opening Stock of W.LP	3	2	3	3	4	13	14	6
TOTAL	737	880	1111	1146	1161	1100	1160	1042
Less Closing Stock of W.LP	2	3	3	4	13	14	8	7
Cost of Production (C)	735	877	1108	1142	1148	1086	1152	1035
Add Op. Stock of fin. goods	54	47	6	32	181	177	292	113
TOTAL	789	924	1114	1174	1329	1263	1444	1148
Less CL Stock of fin goods	47	6	32	181	177	292	113	121
Cost of Sales (D)	742	918	1082	993	1152	971	1331	1027
Selling & Distribution Exps.	27	27	36	18	1	0	8	20
Interest	35	25	20	28	54	46	65	36
Total Cost (E)	804 (100)	970 (100)	1138 (100)	1039 (100)	1207 (100)	1017 (100)	1403 (100)	1083 (100)

Source: Compiled from Annual Reports of 'D'.

sected at the point of Breakeven.

Break even Analysis of unit 'E':

On the basis of data of sales, cost and production of unit 'E' the BEP is depicted in chart 5. The chart shows that the break-even production of this company has been arrived at 12753 tones and sales turnover of Rs. 1589 lakhs. This mill has a small safety margin of 851 tones of production and Rs. 109 lakhs of sales turnover. In the event of the small margin it is difficult for the mill to plan for futures expansion programme.

The costs and break-even levels of the sample mills have been thoroughly analyzed for every component at different stages. Among the mills, 'A' and 'C' have shown better performance while the working of 'B', 'D' and 'E' is pathetic.

The paper industry is passing through difficult times. Obsolete machinery, outdated technology, high cost of production, paucity of funds, dwindling supply of forest raw materials, non-availability of skilled man power, recession in the market are some of the vital problems to focus attention. These problems have been studied in different perspectives and recommendations are made. These problems and suggestions, emanated from the study, are briefed hereunder.

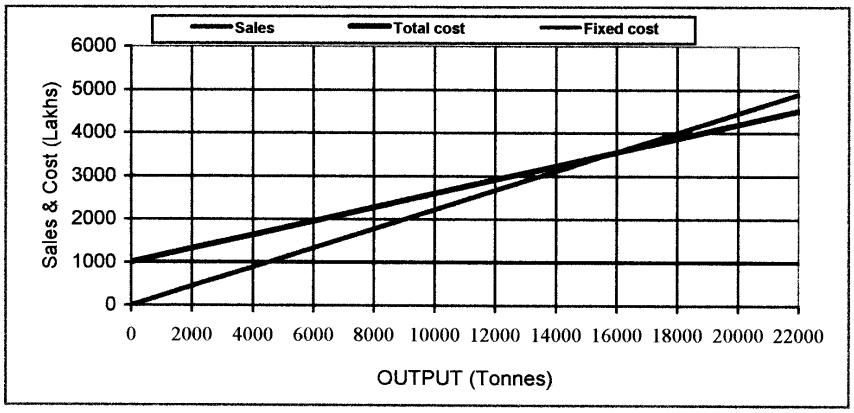
Need for Renovation and Moderanization :

The industry suffers from obsolete machinery and outdates technology. As such the paper units are not in a position to compete with the units at global level in terms of quality and cost. In order to overcome this problem the paper mills need urgent renovation and modernization of plant and

Table: 10: Statement of Break- Even Analysis of 'D'

PARTICULARS	AMOUNT IN
FIXED COST	RS. LAKHS
1) Wages & Salaries	63
2) Repairs and Maintenance	48
3) Administrative Expenses	20
4) Depreciation	18
5) Interest	36
6) Effluent Treatment	03
TOTAL FIXED COST (A)	188
VARIABLE COST	
1) Material Cost	556
2) Power & Fuel	328
3) Selling & Distribution expenses	20
TOTAL VARIABLE COST (B)	904
TOTAL COST (A+B)	1092
BREAK - EVEN ANALYSIS	
SALES	1314
Less Variable Cost	904
CONTRIBUTION	410
Less Fixed Cost	188
Profit	222
B.E.P. QUANTITY(In Tones)	188/6234=
= FIXED COST/CONTRIBUTE PER UNIT	3016
B.E.P. QUANTITY(In Tones)	3016
TOTAL No. OF UNITS Produced =	6576
PV RATIO = CONTRIBUTION /sales=410/1314×100=	31.2%
B. E .P. IN AMOUNT = FC/PV RATIO	
B.E.P. IN AMOUNT (in lakhs)= 188/31.2%	602.56
MARGIN OF SAFETY:	
Actual Sales - BEP Sales	
Margin of safety Amount Rs. In lakhs:1314-602.56=	711.44

Break-even Chart 3 of Unit 'C'



machinery to meet the requirements of the global market.

Financing the Expansion Projects :

In some of the mills ambitious expansion projects were taken up without proper financial planning. Most of the projects were financed by long-term loans. The cost of finance on these loans was very high when compared to its return. This created the financial chaos leading to sickness of the mills. In case if it is not possible to mobilize the equity capital, it is suggested to limit such programmes to the extent of internally available funds. No new expansion programmes should be financed through debt capital only as it would endanger the already exiting financial crisis.

Establishment of a Mother Pulp Unit :

Pulp making is a complex process. Small paper mills are faced with an intricate problem with making pulp. If the pulp is available readily they can concentrate on papermaking. It is necessary for the small mills to relieve from this hardship.

In order to protect the small mills from the dearth of raw materials and pulp, it is suggested that the government has to set up a mother pulp industry in the state. This measure would help to a large extent in reducing congestion on raw material and helps in smooth sailing of the paper industry.

Alternative Energy Resource :

Paper industry is energy intensive. Cost of energy has been on the increase year by year. Cost reduction is an urgent need of the industry. One of the major elements of total cost is the cost of energy. On an average it contributes 20 to 25 per cent of the total cost. Paper mills should introduce energy efficient equipment pro-

Table: 11: Cost Sheets of 'E' from 1993-94 to 1999-2k and the average based on a - 7-year data

(Rs. Lakhs

PARTICULARS	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	99-2000	AVG.
Installed capacity	12000	12000	12000	16500	16500	16500	16500	14570
Tones								
Production Tones	11850	12245	12811	14650	14973	14168	14745	13634
Utilization %	98.7	102.0	106.7	88.7	90.7	85.8	89.3	93.5
(A) Material Cost								
Waste Pacer	275	315	375	475	559	508	558	438
Straw	81	86	89	98	93	87	77	87
Gunny Waste	75	69	58	45	5	-	-	50
Others	20	24	28	38	33	37	55	34
Chemicals	165	172	160	165	138	139	155	148
Total Material cost	616 (45.7)	666 (45.9)	710 (45.6)	821 (45.2)	828 (45.2)	771 (44.3)	845 (43.4)	757 (45)
(B)ConversTon Cost								
Power & Fuel	270	291	309	327	330	341	375	320
Wages & salaries	94	101	106	110	136	119	144	116
Repairs & Maints.	15	17	16	20	26	29	20	20
Manufacturing Expenses.	96	102	115	133	137	128	112	118
Depreciation	45	50	54	67	68	70	72	61
Adm. ExDenses	135	143	161	234	214	194	253	190
Total conversion	655	704	761	891	911	881	971	825
on cost (B)	(48.8)	(48.6)	(49.1)	(49.21)	(47.7)	(51.7)	(51.2)	(49.5)
Conversion Cost (A+B)	1211	1310	1471	1712	1739	1652	1821	1576
Interest & Finance	75	80	83	103	94	88	104	90
Charaes	(5.5)	(5.5)	(5.3)	(5.6)	(5.1)	(5.0)	%.4)	(4.5)
Total Cost	1346 (100)	1450 (100)	1554 (100)	1815 (100)	1833 (100)	1740 (100)	1925 (100)	1666 (100)

Source : Annual Reports of unit 'E"

cesses and technology.

As a measure of cost reduction it is suggested that it should consume alternative sources of energy. Abundant natural gas is available in the coastal area of A.P. and the K.G project of ONGC has permitted the natural gas for industrial use. Natural gas is cheap and eco-friendly in consumption. In this context it is desirable to the paper mills to use the natural gas for energy purposes as a measure of cost reduction. This would save the energy cost to a considerable magnitude.

Research Development Facilities :

Research is an indispensable activity of the paper industry. It facilitates the viability of the industry in terms of quality and, cost and productivity. Lack of research activity endangers the paper mills in meeting the standards of paper. Many of the sample mills are of small size and cannot afford to employ in- house the research and development facilities and equipment. Though there are research laboratories in North India at Sheranpur and Dehradun, they are confined to that area only. South Indian Paper Mills suffer from lack of R&D. facilities. It is found necessary a central research institute for pulp and papermaking should be set up at Vijayawada or any centrally locate place with necessary funds provided by the government.

Conclusion :

The Indian paper industry will have to learn to live with global cycles while simultaneously improving its own cost competitiveness. Softening of local prices due to sluggish consumption growth, surge of imports due to readjustment of tariff as a part of trade reforms for raw materials, chemicals, power and fuel, labor administration and finances on the other, have squeezed the operating margins to a non-sustainable limit. It is a challenge to decide the

Table 12: B.E.P. Analysis of 'E' based on 7 years average

PARTICULARS	AMOUNT IN
1) FIXED COST	RS. LAKHS
WAGES & SALARIES	116.00
REPAIRS & MAINTENANCE	20.00
ADMINISTRATION OVERHEADS	19.0.00
DEPRECIATION	61.00
INTEREST	90.00
TOTAL FIXED COSTS	477
2) VARIABLE COSTS	
RAW MATERIALS	751.00
POWER II. FUEL	320.00
Manufacturing Expenses	118.00
TOTAL VARIABLE COST	1189
TOTAL COST	1666
BREAK-EVEN ANALYSIS	
SALES	1699
Less VARIABLE COST	1189
CONTRIBUTION	510
Less FIXED COST	477
PROFIT	33
1) B.E.P. UNITS = FIXED Cost / CONTRIBUTION PER-UNIT	
TOTAL No OF UNITS =	13634
B.E.P. UNITS =	12753
2) B.E.P IN AMOUNT = FIXED COST/PVRATIO	
PV RATIO = CONTRIBUTION/SALES	
PV RATIO =	30.02
B.E.P. IN AMOUNT (in lakhs)=	1589.06
Margin of Safety = Actual - BEP sales 1699 - 1589.06	109.04

Source: Cost Sheet of 'E'

Chart 4 : BEP Chart of unit 'D'

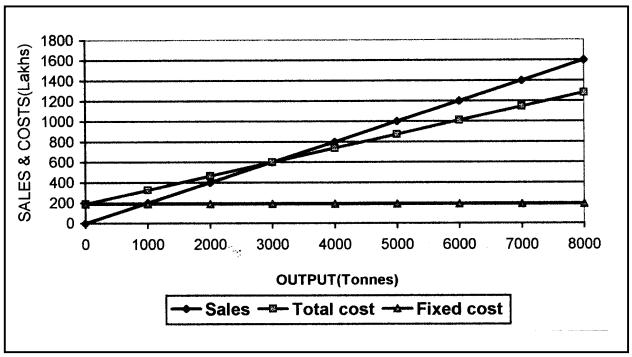
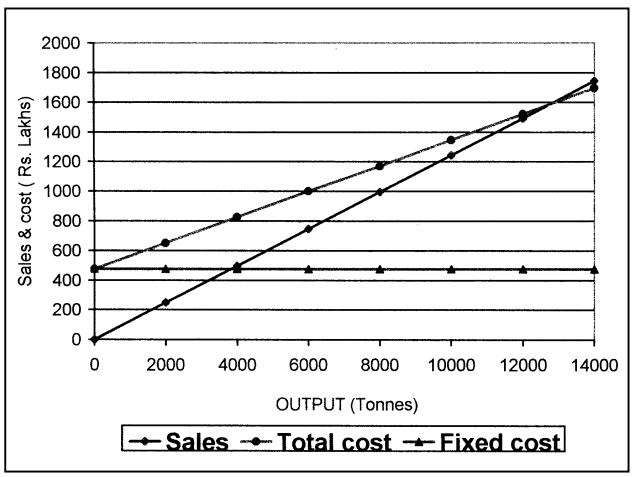


Chart 5 : BEP Chart of unit 'E'



direction the paper industry should travel from the present status. The concept of globalization where the industry at present has not able to compete in price with the global market but also with quality and other specifications of the product, making the decision more difficult. It is true that liberalization has given the Indian entrepreneur an opportunity to step up industrial development and economic growth for promoting globalization, but the trade reforms and other factors introduced resulted in the pace with which the process of our socio-economic transformation being overlooked. It seems, we have embarked upon liberalization without realizing the major gap in our policy making related to the desired infrastructure development. It is now left to initiative and understanding as to how the Government, Industry, and Trade Associations work together to minimize the disadvantages and maximize advantages under the new policy. A political and economical commitment is essential to develop policies and long-term perspectives involving private and public sectors that have to face the challenges boldly with strong determination and accountability. q