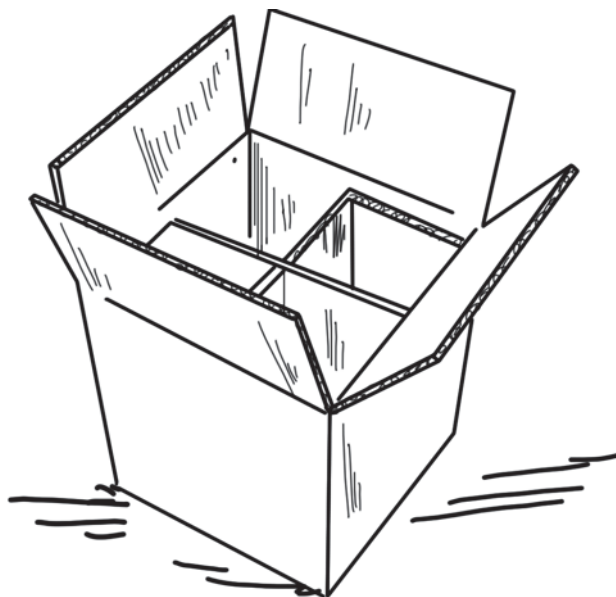


CORRUGATED BOX



1.0 INTRODUCTION

Corrugated Box is the most popular shipping container, now-a-days. The box is manufactured from corrugated board, which consists of 3 or more layers of kraft paper. The middle fluted layer is pasted with two flat parallel sheets of paper. The boxes find their number of applications in the packaging of chemicals & drugs, tobacco, engineering goods, canned & bottled goods, food products, lamps, electrical appliances, glasswares etc. Corrugated boxes have replaced wooden boxes & crates in many applications. Today, about 80% of all shipments in the world are being made in fibre board boxes.

Corrugated fibre board consists of a flat layer of paper sheet (liner) glued on one or both sides of a corrugated paper (medium). The corrugated board is made by passing two layers of paper (usually kraft) through corrugating machine. One layer of paper becomes corrugated after being passed through the heated rolls and other is brought into contact with it after the former having glued at tips. The corrugating 'medium' is generally made from a 0.009" thick (9 caliper) or 0.23 mm. The glue frequently used is starch or silicate of soda adhesive. When only one liner is used, the product is known as "Single face" or "two ply" board. This board is flexible in one direction. When the corrugated medium is combined on both sides with flat sheets, it is known as double faced or "3-ply board".

This project profile is for setting up of a corrugated box manufacturing unit with single face fibreboards having installed capacity of 900 tonnes per annum, based on 300 working days per annum and 8 working hours per day.

2.0 MARKET POTENTIAL

Packaging industry has witnessed a substantial turnaround in India during the past years considering the changes in the lifestyle as well as development of the economy. It is among the high growth industries and a high degree of potential exists for almost all user segments, which are expanding appreciably. Corrugated boxes market in India was estimated at ~INR 108 Billion in FY 2012. Market size of corrugated boxes has grown at a CAGR of ~12% over the period FY 2008-12. Market size of the corrugated box industry is estimated to grow at a CAGR of ~14% over the period FY 2012-15 to reach ~INR 159 Billion by FY 2014.

India's per capita consumption of corrugated boxes is just 1.5 kg while the global average is close to 15 kg and the US average 80 kg. According to a study, about 95 per cent of all products are packed in corrugated boxes in the US, an indication of the vast potential in the business.

3.0 PROCESS DETAILS

The process of manufacture of corrugated fibreboard & boxes comprises of two sections viz. corrugated board making and box making section.

Manufacture of corrugated board: Corrugated board is made of a corrugated paper sheet of paper glued to the facings of flat-paper, usually kraft. A corrugating machine is employed for the corrugation of flat sheet and preparation of corrugated flexible 2 ply board. The machine is called as single-face corrugating machine. One layer of paper becomes corrugated after passing through the heated fluted rolls and the other is brought in contact with the former having been glued at the tips. These two sheets get pasted together and are wound in rolls. The resulting roll is known as single face or 2-ply corrugated board.

By cutting this roll with board cutter machine, glueing the corrugated side on pasting machine & then placing 3rd ply of paper over it, double face or 3-ply corrugated board is produced. Similarly, board to board can be pasted to form thicker boards i.e. 5-ply, 7-ply and 9-ply boards.

Manufacture of boxes: The corrugated board produced as above is dried (for drying of glue) and may now be processed further to produce-corrugated boxes.

The size of a box is always given in terms of the inside dimensions, with the longer dimension (length) of the opening given first followed by width and depth. The most economical box for a given cubic contents has the proportions of 2:1:2 (L:W:D). However, other proportions may also be used. For manufacturing boxes of any particular dimensions, it is first decided as to how the

blanks for the boxes should be cut to minimise the wastage.

The various steps involved in the fabrication of corrugated fibre board boxes are: Slitting & creasing; slotting; flap or corner cutting and stitching or gluing. Cutting and creasing are simultaneously carried out over a rotary cutting & creasing machine. The trimmed and creased sheet is slotted and flapped out on an eccentric slotter. Finally, it is either stitched using stitching machine or glued/taped manually. The boxes are shipped in the form of flat tube, which is set up and closed by the packer.

Printing: There are different methods of printing the corrugated boxes. Some of the small scale manufacturers are printing the boxes after fabrication, by the technique of screen printing. However, printing can be done in a printer slotter machine. In this machine, the blanks are printed using soft rubber dies and the body score or vertical score and slots are introduced in the board.

Printing can also be performed on the paper sheet, before making corrugated sheet/board. The layer of paper, which will come outside of the box, is printed on flexographic machine.

The formed products are collected and the edges are trimmed to give it a proper shape. The plates and bowls are packed separately and stocked for dispatch.

4.0 COST OF THE PROJECT

The estimated project cost is given below:

		(Rs. in lacs)
Particulars	Amount (Rs)	
Land & Site Development	5.60	
Building & civil works	30.03	
Plant & Machinery	41.75	
Misc. Fixed assets	11.00	
Preliminary & pre-operative expenses	7.38	
Contingencies & escalation @ 3%	2.65	
Working capital margin	6.47	
TOTAL	104.88	

4.1 Land & Site Development: No cost has been considered for land. Expenses on site development are estimated as below.

Particulars	Area (Sqm)	Rate (Rs)	Amount (Rs)
Internal roads	100	400	40000
Boundary wall	140 rm	3000	420000
Site levelling, Gate, etc.	LS	LS	100000
TOTAL			560000
Say (Rs. in lacs)			5.60

4.2 Building & Civil Works: Details of building & civil works are given below.

Particulars	Area (Sqm)	Rate (Rs)	Amount (Rs)
Workshed (Open shed, CGI sheet roof, concrete floor)	300	3500	1050000
Store room (Brick wall, CGI sheet roof, concrete floor)	150	6000	900000
Labour quarters (Brick wall, CGI sheet roof, concrete floor)	80	6000	480000
Administrative Room (Brick wall, CGI sheet roof, concrete floor)	50	6000	300000
Sub total			2730000
Add: Electrification, water supply and sanitation @ 10%			273000
TOTAL			3003000
Say (Rs. in lacs)			30.03

4.3 Plant & Machinery: Details of plant & machinery are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Single face corrugating machine	1	400000	400000
Reel to sheet cutting machine	1	200000	200000
Creasing and cutting machine	1	250000	250000
Eccentric slotter	1	250000	250000
Partition slotter	1	80000	80000
Stitching machine	2	50000	100000
Vertical Bending machine	1	200000	200000
Single slotting machine	1	30000	30000
Multi color offset printing machine	1	1500000	1500000
Screen printing equipment	1	100000	100000
Grammage tester	1	10000	10000
Bursting Strength factor tester	1	50000	50000
Puncture Resistance tester	1	60000	60000
Compression Strength Tester	1	300000	300000
Miscellaneous items	LS	LS	100000
Sub total			3630000
Add: Installation, transportation, taxes, etc @ 15%			544500
TOTAL			4174500
Say (Rs. in lacs)			41.75

4.4 Misc. Fixed Assets: Details of miscellaneous fixed assets are given below.

Particulars	Qty	Rate (Rs)	Amount (Rs)
Installation of tube-well	1	150000	150000
Transformer & power connection	1	300000	300000
40 KVA DG Set	1	300000	300000
Weighing machine	2	50000	100000
Fire fighting equipment	LS	LS	50000
Furniture & fixtures	LS	LS	50000
Miscellaneous items	LS	LS	50000
Sub total			1000000
Add: Installation, transportation, taxes etc @ 10%			100000
TOTAL			1100000
Say (Rs. in lacs)			11.00

4.5 Preliminary & Pre-operative Expenses: Details of preliminary & pre-operative expenses are given below.

		(Rs. in lacs)
Particulars	Amount (Rs)	
Travelling expenses	1.00	
Professional & other fees	1.00	
Interest during implementation	4.88	
Miscellaneous expenses	0.50	
TOTAL	7.38	

4.6 Contingencies & Escalation: Contingencies & escalation has been assumed at 3% of the cost of site development, building & civil works, plant & machinery and miscellaneous fixed assets.

4.7 Working Capital: Details of working capital are given below.

		(Rs. in lacs)		
	Period (Days)	Amount (Rs)		
		Year 1	Year 2	Year 3
Raw Materials & Consumables	15	4.27	5.13	5.98
Power & fuel	30	0.17	0.20	0.24
Salary	30	0.77	0.77	0.78
Finished Goods	15	4.87	5.75	6.65
Receivables	15	6.10	6.66	7.77
Total		16.18	18.51	21.41
Working Capital Margin in Year 1 (40%)	6.47			

5.0 MEANS OF FINANCE

The means of finance for the project is estimated as below.

		(Rs. in lacs)	
Particulars	Percent	Amount (Rs)	
EQUITY			
A. Equity from Promoters	40%	41.95	
B. Subsidy from Central/State Govt.	-		
DEBT			
Term Loan from Banks/FIs	60%	62.93	
TOTAL	100%	104.88	

6.0 PROFITABILITY STATEMENT

(Rs. in lacs)							
Particulars	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7
<u>A. INCOME</u>							
Installed capacity (MT)	900	900	900	900	900	900	900
Capacity utilisation	50%	60%	70%	70%	70%	70%	70%
Production at cap. utilisation	450	540	630	630	630	630	630
Sale price (Rs/MT)	33000	30000	30000	30000	30000	30000	30000
Income from sales/annum	148.50	162.00	189.00	189.00	189.00	189.00	189.00
<u>B. OPERATING EXPENSES</u>							
Raw Materials & Consumables	103.95	124.74	145.53	145.53	145.53	145.53	145.53
Power & fuel	2.06	2.48	2.89	2.89	2.89	2.89	2.89
Salary	9.36	9.41	9.45	9.50	9.55	9.60	9.64
Repair & Maintenance	0.83	0.91	1.00	1.10	1.21	1.33	1.47

Selling & administrative expenses	1.49	1.62	1.89	1.89	1.89	1.89	1.89
Miscellaneous Expenses	0.74	0.81	0.95	0.95	0.95	0.95	0.95
Total Operating Expenses	118.43	139.96	161.71	161.86	162.02	162.18	162.37
Less: working expenses capitalised	6.47	0.00	0.00	0.00	0.00	0.00	0.00
Operating profit	36.54	22.04	27.29	27.14	26.98	26.82	26.63
C. FINANCIAL EXPENSES							
Depreciation	3.90	3.90	3.90	3.90	3.90	3.90	3.90
Interest on Term Loan	8.47	7.53	6.17	4.81	3.45	2.10	0.74
Interest on WC Loan	1.55	1.78	2.06	2.06	2.06	2.06	2.06
Net Profit	22.62	8.82	15.16	16.37	17.57	18.76	19.94
Net cash accruals	26.52	12.73	19.06	20.27	21.47	22.67	23.84
Principal Repayment	2.52	10.07	10.07	10.07	10.07	10.07	10.07

6.1 Raw material & consumables: Expenses on raw material and consumables at installed capacity is estimated as below.

Installed production capacity (Tonnes)	900
Scaling loss	5%
Total consumption of raw materials & consumables (Tonnes)	945
Avg price (Rs/tonne)	22000
Expenses on raw materials & consumables at installed capacity (Rs)	20790000

6.2 Power: Expenses on power at installed capacity is estimated as below.

A. Expenses on power

Connected load (kw)	40
Avg load factor	70%
Proportion running on power (%)	80%
Hrs/day	8
Days/annum	300
Annual power consumption	53760
Rate (Rs/unit)	5
Expenses on power (Rs)	268800

B: Estimate of Diesel required for Generator

Proportion running on diesel (%)	20%
Hrs/annum	480
Consumption (litres/hr)	6
Price (Rs/litre)	50
Expenses on diesel (Rs)	144000
Expenses on power & fuel at installed capacity (Rs)	412800

6.3 Salary: Expenses on salary in the 1st year are estimated as given below. It is assumed that salary expenses will increase @ 0.5% every subsequent year.

Particulars of Employees	Numbers	Salary/Month (Rs)	Cost/annum (Rs)
Plant Manager	1	10000	120000
Supervisor	1	8000	96000
Technicians/machine operators	4	6000	288000
Sales staff/administrative staff	3	4000	144000

Unskilled workers/helpers	8	3000	288000
Expenses on salary in the 1st year (Rs)			936000

6.4 Repair & Maintenance: Expenses on repair & maintenance in the 1st year is estimated as given below. It is assumed that expenses on repair & maintenance will increase @ 10% every subsequent year.

(Rs. in lacs)			
Particulars	Cost (Rs)	Rate	Amount (Rs)
Building & civil works	30.58	1%	0.31
Plant & Machinery	41.75	1%	0.42
Misc. Fixed assets	11.00	1%	0.11
Expenses on repair & maintenance in year 1			0.83

6.5 Selling & Administrative Expenses: Selling expenses have been assumed at 1% of sales.

6.6 Miscellaneous Expenses: Miscellaneous expenses have been assumed at 0.5% of sales.

6.7 Depreciation: Depreciation has been calculated by straight line method. The details of calculation are given below.

(Rs in lacs)			
Description	Cost (Rs)	Rate	Amount/ annum (Rs)
Building & Civil Works	30.03	3.34%	1.00
Plant & Machinery	41.75	5.28%	2.20
Misc. Fixed Assets	11.00	6.33%	0.70
TOTAL			3.90

6.8 Interest on Working Capital Loan: Interest rate on working capital loan has been assumed at 16%. The details of calculation are given below.

(Rs. in lacs)			
Particulars	Year 1	Year 2	Year 3
Total current assets	16.18	18.51	21.41
Bank Loan (60%)	9.71	11.11	12.84
Interest @ 16%	1.55	1.78	2.06

6.9 Interest on term loan & principal repayment: Interest rate on term loan has been assumed at 13.5%. Duration of Loan repayment has been considered for a period of 7 years including moratorium period of 12 months with equal monthly instalments. The details of calculation are given below.

(Rs in lacs)								
Month	Year	1	2	3	4	5	6	7
Month 1	Opening balance	62.93	60.41	50.34	40.27	30.21	20.14	10.07
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest (13.5%)	0.71	0.68	0.57	0.45	0.34	0.23	0.11
	Closing balance	62.93	59.57	49.50	39.44	29.37	19.30	9.23
Month 2	Opening balance	62.93	59.57	49.50	39.44	29.37	19.30	9.23
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.67	0.56	0.44	0.33	0.22	0.10
	Closing balance	62.93	58.73	48.67	38.60	28.53	18.46	8.39
Month 3	Opening balance	62.93	58.73	48.67	38.60	28.53	18.46	8.39
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84

	Interest	0.71	0.66	0.55	0.43	0.32	0.21	0.09
	Closing balance	62.93	57.89	47.83	37.76	27.69	17.62	7.55
Month 4	Opening balance	62.93	57.89	47.83	37.76	27.69	17.62	7.55
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.65	0.54	0.42	0.31	0.20	0.08
	Closing balance	62.93	57.06	46.99	36.92	26.85	16.78	6.71
Month 5	Opening balance	62.93	57.06	46.99	36.92	26.85	16.78	6.71
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.64	0.53	0.42	0.30	0.19	0.08
	Closing balance	62.93	56.22	46.15	36.08	26.01	15.94	5.87
Month 6	Opening balance	62.93	56.22	46.15	36.08	26.01	15.94	5.87
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.63	0.52	0.41	0.29	0.18	0.07
	Closing balance	62.93	55.38	45.31	35.24	25.17	15.10	5.03
Month 7	Opening balance	62.93	55.38	45.31	35.24	25.17	15.10	5.03
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.62	0.51	0.40	0.28	0.17	0.06
	Closing balance	62.93	54.54	44.47	34.40	24.33	14.26	4.20
Month 8	Opening balance	62.93	54.54	44.47	34.40	24.33	14.26	4.20
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.61	0.50	0.39	0.27	0.16	0.05
	Closing balance	62.93	53.70	43.63	33.56	23.49	13.42	3.36
Month 9	Opening balance	62.93	53.70	43.63	33.56	23.49	13.42	3.36
	Repayment	0.00	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.60	0.49	0.38	0.26	0.15	0.04
	Closing balance	62.93	52.86	42.79	32.72	22.65	12.59	2.52
Month 10	Opening balance	62.93	52.86	42.79	32.72	22.65	12.59	2.52
	Repayment	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.71	0.59	0.48	0.37	0.25	0.14	0.03
	Closing balance	62.09	52.02	41.95	31.88	21.82	11.75	1.68
Month 11	Opening balance	62.09	52.02	41.95	31.88	21.82	11.75	1.68
	Repayment	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.70	0.59	0.47	0.36	0.25	0.13	0.02
	Closing balance	61.25	51.18	41.11	31.05	20.98	10.91	0.84
Month 12	Opening balance	61.25	51.18	41.11	31.05	20.98	10.91	0.84
	Repayment	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Interest	0.69	0.58	0.46	0.35	0.24	0.12	0.01
	Closing balance	60.41	50.34	40.27	30.21	20.14	10.07	0.00
Principal Repayment		2.52	10.07	10.07	10.07	10.07	10.07	10.07
Interest		8.47	7.53	6.17	4.81	3.45	2.10	0.74

7.0 DEBT SERVICE COVERAGE RATIO (DSCR)

(Rs. in lacs)

Year	1	2	3	4	5	6	7	TOTAL
Profit After Tax (Net Profit)	22.62	8.82	15.16	16.37	17.57	18.76	19.94	
Depreciation	3.90	3.90	3.90	3.90	3.90	3.90	3.90	
Interest	8.47	7.53	6.17	4.81	3.45	2.10	0.74	
Total	34.99	20.26	25.23	25.09	24.93	24.76	24.58	179.84
Interest	8.47	7.53	6.17	4.81	3.45	2.10	0.74	
Loan repayment	2.52	10.07	10.07	10.07	10.07	10.07	10.07	
Total	10.98	17.60	16.24	14.88	13.52	12.16	10.80	96.20
DSCR	3.19	1.15	1.55	1.69	1.84	2.04	2.27	

Average DSCR = 1.87

8.0 BREAK EVEN POINT (BEP)

(Rs. in lacs)

Year	1	2	3
A. Net sales	148.50	162.00	189.00
B. Variable cost			
Raw Materials & Consumables	103.95	124.74	145.53
Power & fuel	2.06	2.48	2.89
Selling & administrative expenses	1.49	1.62	1.89
Miscellaneous expenses	0.74	0.81	0.95
Interest on Working Capital Loan	1.55	1.78	2.06
Total variable cost	109.79	131.42	153.31
C. Contribution (A-B)	38.71	30.58	35.69
D. Fixed & Semi-fixed Costs			
Salary	9.36	9.41	9.45
Repair & maintenance	0.83	0.91	1.00
Interest on Term Loan	8.47	7.53	6.17
Depreciation	3.90	3.90	3.90
Total fixed cost	22.56	21.75	20.53
E. BREAK EVEN POINT	58.28%	71.15%	57.53%
F. BEP at operating capacity	29.14%	42.69%	40.27%
G. Cash BEP	24.10%	35.03%	32.61%

9.0 INTERNAL RATE OF RETURN (IRR)

(Rs. in lacs)

Year	0	1	2	3	4	5	6	7
CASH OUTFLOW								
Capital Expenditure	88.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Working Capital	0.00	16.18	2.33	2.90	0.00	0.00	0.00	0.00
Total (A)	88.38	16.18	2.33	2.90	0.00	0.00	0.00	0.00
CASH INFLOW								
Profit After Tax		22.62	8.82	15.16	16.37	17.57	18.76	19.94
Add: Depreciation		3.90	3.90	3.90	3.90	3.90	3.90	3.90
Add: Interest		8.47	7.53	6.17	4.81	3.45	2.10	0.74
Add: Salvage Value								
Total (B)	0.00	34.99	20.26	25.23	25.09	24.93	24.76	24.58
NET FLOW (B-A)	-88.38	18.81	17.93	22.34	25.09	24.93	24.76	24.58

IRR = 16%

MACHINERY SUPPLIERS

- B.R.D Manufacturing Company
1, Raja Gopi Mohan Street, Near Manicktola Market, Kolkata - 700 006, West Bengal, India
- Easy Packaging Machinery
5/1, Chawlpatty Road, Beliaghata, Kolkata - 700 085, West Bengal, India
- B. N. Engineering Works
No. 131, Keshab Chandra Sen Street, Near Amherst Street, Kolkata - 700 009, West Bengal, India