

MANUFACTURING MATERIAL HANDLING EQUIPMENT

1. INTRODUCTION:

Material handling is an integral part of design of most production systems since the efficient flow of material is required from start of raw material feeding to finished material flow up to the consumer point and in between the activities of a production system. The high cost of material transport is due to both the labor and equipment costs, in process inventory and impacts the performance of a production system.

Material handling equipment is mechanical equipment used for the movement, storage, and protection of materials, goods and products throughout the processes of manufacturing, distribution, consumption and disposal. The different types of handling equipment can be classified into four major categories viz. transport, lifting and positioning, stacking and unit formation, and storage equipment.

2. PRODUCT & ITS APPLICATION:

Various types of material handling systems have evolved but the most common is for transport, lifting and positioning, stacking of materials along the raw material stage to finished products and also for distributing the finished products in market up to consumer points. Material handling equipment are available from simple to complex systems for material handling depending on type, size, weight and volume in a unit or one lot of material.

Transport equipment like cart, to trucks with lifting and stacking tackles are used to move material from one location to another viz conveyors, cranes, and industrial trucks.

Conveyors:

Different types of conveyors are designed depending on the type size and weight of product being handled for regular / continuous point to point transport and the conveyor's can be

located at any place even *overhead*.

The most common designs are the roller and flat-belt type either with the power or free rolling system of rolls. Some special design of conveyor are integral to manufacturing process steps viz drying, baking, heating, cooling, wintering, sieving, segregating, painting, spraying, coating etc. Wire mesh, Screw type, Bucket type, vibrating and pneumatic etc. various conveyor designs are required by industries. Conveyor system is also used for sorting and separating operations.

Conveyor systems are commonly used in industries, like Mining, automotive, agricultural, computer, electronic, food processing, aerospace, pharmaceutical, chemical, bottling and canning, print finishing, packaging and even in airport baggage sorting and handling.

Industrial Trucks and Trolleys:

These are used to move materials over variable paths and when there are insufficient or intermittent flow volumes. They provide more flexibility in movement and with they may be built with vertical lifting movement or platform. Hand trucks including carts and dollies are the simplest type of industrial truck, is non-powered. It may be provided with manual or powered lifting tackles to lift and stack pallets. Different types of industrial trucks with Fork lifting and counter balance are available for handling pelleted unit loads provided with motive and lifting power.

Hoists and Pulley blocks:

These are devices used for lifting or lowering a load by means of a drum or lift-wheel around which rope or chain winds or wraps. It may be manually operated or can be powered. Jib cranes are fixed or rail mounted movable hoist or pulley block, mounted on a movable a horizontal member called jib or boom. These are fixed to a wall or to a floor-mounted pillar. Jib cranes are used in industrial premises and on vehicles and warehouse buildings for loading/unloading and even as positioning equipment.

Mechanical Positioners:

These are designs for automation of machinery to handle material at a single location and meant to raise the productivity, avoid human error, and reduce fatigue and injuries when for safe handling in hazardous or inaccessible environment. It can be used to feed, orient, load/unload, or manipulate materials so that it is in the correct position for subsequent handling, machining, transport, or storage.

Cranes:

These are special constructions of rail or track mounted structures with hoists and pulley blocks to handle heavy loads and large objects. The most common cranes include the jib, bridge, gantry, and stacker cranes. Cranes are commonly employed in the transport industry for the loading and unloading of freight, in the construction industry for the movement of materials, and in the manufacturing industry for the assembling of heavy equipment. An overhead traveling crane is a common sight in heavy industries, it has horizontal traveling beam resting on column supported rail structure. The beam has a trolley mounted hoist with hook and line. The most common overhead crane use is in the steel and heavy fabrication industry.

3. DESIRED QUALIFICATIONS FOR PROMOTER:

Any ITI, Diploma or Graduate with some background in manufacturing or marketing.

4. MARKET POTENTIAL AND MARKETING ISSUES. IF ANY:

The growth of material handling equipment industry is close linked with growth of manufacturing, transport, and shipping activities. In view of rapid growth of manufacturing, and the new regime of GST that will reduce the turnaround time in goods transport sectors, there will be need for all types of innovative material handling solutions.

Any new unit with new economical and effective designs and solutions will have good success in this sector.

5. RAW MATERIAL REQUIREMENTS:

Based on types of product mix, the unit will require different types of bought out items, ranging from IC engines and electric drives and motors, to wire ropes, chains etc. for building material handling equipment. Other parts are to be procured are castings, forgings and heavy steel sections, plates etc. All are available easily from local sources.

6. MANUFACTURING PROCESS:

The components are mostly in semi-finished stage viz castings, forgings etc. These components are machined in a machine shop. Other items involve fabrication processes of structures as per designs. These items are made from steel sheets, plates, and sections. Materials to be used are also normally prescribed by design. Each sub assembly and components will have details precise dimensions; tolerances, etc. weld joint quality parameters. Based on design drawings, the fabrication job carried out.

The process steps of fabrication involved are cutting to Size, Forming with machines like press, roller bending machine etc., Machining of machine frames, the holes of bearing houses etc. of and mating edges of frame are machined. These parts/ Sub-assemblies are prepared and welded with suitable welding technology depending on material and thickness to be weld. Some manipulators and jigs and fixtures are used.

The final welded structure is inspected and assembled to get the final product. The equipment is tested for all specification parameters before dispatch.

7. MANPOWER REQUIREMENT:

The unit shall require highly skilled service persons. The unit can start from 30 employees initially and increase to 71 or more depending on business volume.

Sr No	Type of Employees	Monthly Salary	No of Employees				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Skilled Operators	18000	10	10	15	18	20
2	Semi-Skilled/ Helpers	9000	15	20	25	30	35
3	Supervisor/ Manager	30000	2	3	4	5	6
4	Accounts/ Marketing	20000	2	3	3	4	4
5	Other Staff	8000	1	3	4	6	6
	TOTAL		30	39	51	63	71

8. IMPLEMENTATION SCHEDULE:

The unit can be implemented within 6 months from the serious initiation of project work.

Sr No	Activities	Time Required in Months
1	Acquisition of Premises	2
2	Construction (if Applicable)	2
3	Procurement and Installation of Plant and Machinery	3
4	Arrangement of Finance	2
5	Manpower Recruitment and start up	2
	Total Time Required (Activities run concurrently)	6

9. COST OF PROJECT:

The unit will require total project cost of Rs 221.24 lakhs as shown below:

Sr No	Particulars	In Lakhs
1	Land	25.00
2	Building	35.00
3	Plant and Machinery	103.90
4	Fixtures and Electrical Installation	5.30
5	<i>Other Assets/ Preliminary and Preoperative Expenses</i>	2.50
6	Margin for working Capital	49.54
	TOTAL PROJECT COST	221.24

10. MEANS OF FINANCE:

The project will require promoter to invest about Rs 92.46 lakhs and seek bank loans of Rs 128.78 lakhs based on 70% loan on fixed assets.

Sr No	Particulars	In Lakhs
1	Promoters Contribution	92.46
2	Loan Finance	128.78
	TOTAL:	221.24

11. WORKING CAPITAL REQUIREMENTS:

Working capital requirements are calculated as below:

Sr No	Particulars	Gross Amount	Margin %	Margin Amount	Bank Finance
1	Inventories	45.94	40	18.37	27.56
2	Receivables	24.24	40	9.70	14.55
3	Overheads	6.92	100	6.92	0.00
4	Creditors	36.36	40	14.55	21.82
	TOTAL	113.47		49.54	63.93

12. LIST OF MACHINERY REQUIRED:

Sr No	Particulars	UOM	Quantity	Rate	Total Value
	Main Machines/ Equipment				
1	Heavy duty Saw Machine	Nos	2	200000	400000
2	Laser/Plasma Plate Cutting m/cs	Nos	1	800000	800000
3	Hydraulic Press 800 T	Nos	1	800000	800000
4	3 Roller Plate Bending Machine	Nos	2	250000	500000
5	TIG/ MIG/ SAW Welding M/c	Nos	3	250000	750000
6	Fixtures/ Positioners/ Rails	Nos	3	80000	240000
7	Shot Blasting Machine	Nos	1	450000	450000

Sr No	Particulars	UOM	Quantity	Rate	Total Value
8	Weld Heat treatment Plant	Nos	1	200000	200000
9	Radial Drill Machine	Nos	2	450000	900000
10	Vertical Lathe	Nos	1	800000	800000
11	Heavy Duty Lathe 3.5 mtrs Bed	Nos	3	500000	1500000
12	Ultrasonic/ Magnetic test systems	Nos	1	350000	350000
13	Motor/ Rope etc. test facility	LS	1	500000	500000
13	X Ray Test System	Nos	1	450000	450000
14	Jib crane/ Hoists	LS	3	200000	600000
15	Air Compressor and Air Handling	Nos	1	250000	250000
16	EOT Cranes	Nos	1	450000	450000
	<u>subtotal:</u>				<u>9940000</u>
	Tools and Ancillaries				
1	Misc. equipment Dies tools etc.	LS	1	300000	300000
2	Hand Tools and gauges	LS	1	150000	150000
	<u>subtotal:</u>				<u>450000</u>
	Fixtures and Elect Installation				
	Storage and transport trolley	LS	1	50000	50000
	Office Furniture	LS	1	50000	50000
	Telephones/ Computer	LS	1	80000	80000
	Electrical Installation	LS	1	350000	350000
	<u>subtotal:</u>				<u>530000</u>
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	250000	250000
	TOTAL PLANT MACHINERY COST				11170000

13. PROFITABILITY CALCULATIONS:

Sr No	Particulars	UOM	Year Wise estimates				
			Year 1	Year 2	Year 3	Year 4	Year 5
1	Capacity Utilization	%	30	40	50	60	70
2	Sales	Rs. Lakhs	436.37	581.83	727.29	872.75	1018.21
3	Raw Materials & Other Direct Inputs	Rs. Lakhs	367.49	489.98	612.48	734.97	857.47
4	Gross Margin	Rs. Lakhs	68.89	91.85	114.81	137.78	160.74
5	Overheads Except Interest	Rs. Lakhs	23.51	23.51	23.51	23.51	23.51
6	Interest	Rs. Lakhs	18.03	18.03	18.03	18.03	18.03
7	Depreciation	Rs. Lakhs	14.67	14.67	14.67	14.67	14.67
8	Net Profit Before Tax	Rs. Lakhs	12.68	35.64	58.61	81.57	104.53

14. BREAK EVEN ANALYSIS

The project is can reach break-even capacity at 24.48 % of the installed capacity as depicted here below:

Sr No	Particulars	UOM	Value
1	Sales at Full Capacity	Rs. Lakhs	1454.58
2	Variable Costs	Rs. Lakhs	1224.95
3	Fixed Cost incl. Interest	Rs. Lakhs	56.21
4	Break Even Capacity	% of Inst Capacity	24.48