

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 wounds 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. INDUSTRY OUTLOOK/TREND

The material handling market is dependent upon equipment such as cranes, forklifts, tele handlers and production line conveyors. According to industry sources, the material handling products industry growth is closely linked with growth of construction, infrastructure, manufacturing, transport, and shipping activities. These industries are poised for significant growth in next several decades in India.

According to a report published by Global Market Insights, the worldwide material handling equipment market size was over USD 110 billion in 2015 and growth is pegged at over 5 per

cent CAGR estimation from 2016 to 2024.

There are large number of SME – over 200 units in this sector offering equipment like conveyors, overhead traveling cranes etc. for industrial, food, pharma etc. applications. However for specialized applications, like steel sector, mining, power generation, shipping and heavy machinery sector, large organized sectors unit like Elecon, etc. are specializing in these sectors.

5. 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, modernization of industries for material conveying and handling in food, Pharma, agri processing and chemical industries as also in transport/ warehouses, etc., demand for material handling systems is likely to rise.

India is expecting a CAGR of 10 per cent up to 2020 in the material handling sector. "A recent study reveals that the Indian material handling equipment industry is expected to grow steadily. The improvement in the Indian economy will result in accelerated demand for goods movement and create opportunities for suppliers of goods handling products and services of all types. With the government's ambitious 'Make in India' plan taking root, the industry is expecting to see good growth in manufacturing and consequently in logistics and distribution activities for the next few years.

The evolution in the technology to assist smooth warehouse and logistics operations in meeting customer demand is rapidly changing the business environment. Growing automation in the manufacturing space will provide a fillip to the material handling equipment market size. Automation aids in reducing costs and delivering high-quality products. The automated storage and retrieval systems are anticipated to witness substantial growth. These systems integrate automated software and hardware for precise replenishment and picking.

The need for MHE is directly related to the amount of cargo and freight traffic. With a wide

production capacity base, 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.

6. 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.

7. 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.

8. 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

9. 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

10. 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

11. 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

12. 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

13. 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
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>				9940000
	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>				450000
	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>				530000
	Other Assets/ Preliminary and Preoperative Expenses	LS	1	250000	250000
	TOTAL PLANT MACHINERY COST				11170000

All the machines and equipment are available from local manufacturers. The entrepreneur needs to ensure proper selection of product mix and proper type of machines and tooling to have modern and flexible designs. It may be worthwhile to look at reconditioned imported machines, dies and tooling. Some of the machinery and dies and tooling suppliers are listed here below:

1. Techno Machines
Chikkanahalli Road,
Opp. Shahi Exports (Unit No 6),
Near Annapoorneshwari Temple, Bommanahalli,
BENGALURU-560 068, INDIA
2. S. S. Engineering Works
Ajit Khanna(Proprietor)
Plot No. 100, Sector 6 IMT Manesar, Gurgaon - 122050, Haryana, India
3. Taurus Private Ltd Co
No. 24, D 2 / E 3, Kiab Industrial, Area AtPivele
Kiab Industrial Area
Bengaluru – 560100 Karnataka, India
4. Micro Engineering Works;
No. 6/140, Gandhi Nagar, Nallampalayam Road NanjaiGounden, Pudur, G. N. Mills Post,
Coimbatore - 641029, Tamil Nadu, India

14. 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

The basis of profitability calculation:

Unit will have capacity of 1,000 nos per year of OHT cranes/ conveyors of various types, Jib cranes, manual lift trucks, etc. Depending on the type/ size of equipment and other components, the average sales price varies from Rs 30,000 to Rs 15,00,000 per unit. Normally supply of complete system/ solution is offered to customers.

The material requirements are MS sections, beams, flats, carbon alloy steel, etc. Cost of these materials range from Rs 35 per Kg to Rs 90 per kg. Other items like gear box, electrical drives, hydraulic and pneumatic systems etc. cost depend on system ratings. The scrap generated is to be sold at @ Rs 20 ~ 80 per Kg depending on type. The income of same is added. Consumables costs also considered based on prevailing rate. Energy Costs are considered at Rs 7 per Kwh. The depreciation of plant is taken at 10 % and Interest costs are taken at 14 -15 % depending on type of industry.

15. 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

16. STATUTORY/ GOVERNMENT APPROVALS

The unit will require state industry unit registration with District Industry center. No other procedures are involved. For export, IEC Code and local authority clearances. The industry registration and approval for factory plan, safety etc. is required as per factory inspectorate and labor laws. Other registration are as per Labor laws are ESI, PF etc. Before starting the unit will also need GST registration for procurement of materials as also for sale of goods. As such there is no pollution control registration requirement, however the unit will have to

ensure safe environment through installation of chimney etc. as per rules. Solid waste disposal shall have to meet the required norms. Entrepreneur may contact State Pollution Control Board where ever it is applicable.

17. BACKWARD AND FORWARD INTEGRATION

The machines and equipment offer scope for diversification in to producing several industrial parts/ components and parts of hydraulic systems and auto components. The unit can utilize the spare capacities. As such there is not much scope for organic backward or forward integration. The entrepreneur needs to ensure proper selection of product mix and also be careful in maintaining product parameters in terms of dimensions, tolerances and geometric profiles along with final weights of products.

The workshop business needs building up reputation, ensuring reliability and quality of services rendered. Also personal rapport of key persons can generate good business volumes from OEM units and ancillary component unit. The location with good catchment area ensures good market potential to new business units.

18. TRAINING CENTERS/COURSES

There are no specific training centers for product technology. The Prototype Development Centers can provide some assistance for precision machining, Tools development, etc. Other centers of excellence viz Indo German Tool Room at Ahmedabad, Rajkot, Chennai, etc. shall be helpful. The most important scope of learning is in product design and development by study of the new product designs, product range, features and specifications of leading Brands / competitors across the world by scanning the Internet and downloading data from websites.

Udyamimitra portal (link: www.udyamimitra.in) can also be accessed for hand-holding services viz. application filling / project report preparation, EDP, financial Training, Skill Development, mentoring etc.

Entrepreneurship program helps to run business successfully is also available from Institutes

like Entrepreneurship Development Institute of India (EDII) and its affiliates.

Disclaimer:

Only few machine manufacturers are mentioned in the profile, although many machine manufacturers are available in the market. The addresses given for machinery manufacturers have been taken from reliable sources, to the best of knowledge and contacts. However, no responsibility is admitted, in case any inadvertent error or incorrectness is noticed therein. Further the same have been given by way of information only and do not carry any recommendation.