ORGANIZED SECTOR

Although industrialization has everywhere been accompanied by an increase in the use of mechanical aids for load lifting yet the manual transport of load is still extremely common. The distances covered may be long and the handling materials are frequently heavy. Bales of cotton weigh between 100-150 kg, sacks of grains, sugar and flour between 65-95 kg and crates of bottles between 50-70 kg. Raw materials like coal, limestone and ores are frequently carried in baskets on head or shoulder. Coal is often shoveled into boilers by hand; the loading of materials onto forklifts, hoists and trucks etc. and the stacking of goods in warehouses are all operations commonly involving varying degree of manual effort. In industries like construction work, railways, docks, heavy engineering, foundry, agriculture and forestry, manual load handling is still common.

Low-wage workers represent an ever-increasing proportion of the US workforce. A wide spectrum of firms demand low-wage workers, yet just 10 industries account for 70% of all low-paying jobs. The bulk of these jobs are in the services and retail sales industries. In health services, 60% of all workers are low-paid, with nursing aides, orderlies, personal attendants, and home care aides earning an average hourly wage of just 7.97 US dollars—a wage that keeps many of these workers hovering near or below the poverty line (Muntaner et al, 2006).\(^\text{177}\)

Rapidly industrializing India is described by the IMF as a young, disciplined, and vibrant economy with a projected growth of 6.7% for 2005 (Joshi et al, 2006).\(^\text{189}\)
Manufacturing sector plays a vital role in Indian economy. The manufacturing sector is further sub-divided into two parts—organized sector and unorganized sector. Here, organized sector means the units registered under Section 2m of Factories Act, 1948, for which the data are collected regularly on an annual basis through Annual Survey of Industries (ASI) and unorganized sector means the rest, for which the data are collected in a gap of normally 5 years through socio-economic survey of National Sample Survey (NSS).

In India only 2% of the total enterprises fall under the organized sector category with the workers getting complete social security coverage. However, workers involved in manufacturing are known to comprise a high-risk population for occupational injury and this risk is greater in SMEs (Nakata et al., 2006).  

The total workforce of 457 million in India has only 8% of workers employed in the organized sector with construction, employing about 5%. Thus the number of workers in the construction industries seems to be more than half the total number employed in the organized sector. Apart from the construction industries, a significant contributor is the heavy engineering industries, occupying a fair share of the organized sector. These are located in different parts of the country and are manufacturing innumerable products. Of all the other industries under organized sector, the steel mills entailing iron foundries and steel plants are also noteworthy. They do not encompass specific parts of the country but are widely distributed in various states and associated with the production of assorted products.
PART- 1: ORGANIZED SECTOR

CHAPTER- I: HEAVY ENGINEERING INDUSTRIES
HEAVY ENGINEERING INDUSTRIES

In India, particularly in West Bengal, where the entire study has been conducted, a number of heavy engineering industries are present. They are primarily associated with the manufacture of several products for the Indian Railways; road rollers; all types of cranes; manufacture, maintenance and repair of ships for the defence like hovercraft, coastguard, corvette, FAC, frigate etc; manufacture and maintenance of battery operated forklift trucks, capacity ranging from 1-3 tons and battery operated platform trucks. The study was performed in the following industries:

A) JCL
B) GRSE
C) FTS
D) EEE
E) AAF

A) JCL: It is a company with 200 years heritage and located in Kolkata. It is a major supportive unit for a range of industries such as steel, power, paper, oil, transport, mixing and agriculture. The product range includes industrial and technological structures, hydraulic gates, all types of cranes, especially heavy duty cranes, road rollers, vibratory compactors, railway wagons, electrical multiple unit (EMU), hydraulic components and powered roof supports for long wall face mixing and proper machinery.
Description of Work Station: The unit has the following departments:
1) Coach workshop
2) Road Roller workshop
3) Hydraulic machinery workshop
4) Crane workshop.

MMH is practiced in all the departments in some extent or the other. The workers work in the general shift from 8.30 AM to 5 PM, 6 days a week. They get a lunch break of 30 minutes from 1 PM to 1.30 PM. The workers, who are under the ESI benefit, get medicine, welfare and other medical assistance from the ESI. But those who are not under the ESI concerned get benefit from the general hospital.

B) GRSE: Established in 1884, it is one of the largest ship manufacturing, maintenance and repairing unit situated in Kolkata. It contains 3 major divisions:
1) Ship division: It deals with shipbuilding and repair.
2) Engine division: It deals with manufacture and maintenance
3) Engineering division: It deals with project division and shipboard equipments.

The materials required for these processes are steel, iron, welding electrodes, machinery, air compressors, gas (oxygen, acetylene, nitrogen etc), oil etc. These materials are transported in the factory through trucks under the supervision of the “Transport Department” of GRSE. These materials are purchased from well-established supplying companies via quotation under the supervision of the “Purchase Department” of GRSE. The workers are provided with uniform and different PPD like mask, glasses, gloves etc to avoid unwanted incidents. Workers are provided with one day off each week and a lunch break of half an hour (12.30 PM-1 PM) everyday. They work in the general shift.
Description of workstation: The unit consists of the following department where a number of load handling workers are involved:

1) Shipbuilding Shop
2) Dock Department
3) Stores
4) Civil Engineering Department
5) Mechanical Maintenance
6) Electrical Maintenance
7) Internal Combustion Engine Repair (ICER): Deals with engineering assignment of the factory.
8) Utility Service
9) Safety
10) Hull Shop 1: Manufactures as well as repairs the hull of the ships.
11) Hull Shop 2
12) Ophthalmic Drawing Office (ODO) and Plate Preparation (PP) Shop: The PP shop deals with manufacture and repair of different parts of ships.
13) Machine Shop 1
14) Machine Shop 2
15) Paint Shop: Deals with painting different parts of the ships, after completion of all other works.
16) Repair Department
17) Machine and Fitting Outfit Shop (MFOS): Deals with fitting of different parts of ships, which are being manufactured or repaired in other shop floors of the factory.
18) Pump Division
19) Transport Division
20) Light Turning and Fitting Shop (LTFS)
21) Central Designing Unit: Designing of different work assignments.
22) Foundry Shop: Deals with manufacture of different parts, required to work out the assignments. This department includes furnace to melt metals.
C) **FTS:** Established in 1993 in Kolkata, this concern manufactures battery operated forklift trucks, capacity ranging from 1-3 tons and battery operated platform trucks. These trucks apart from being manufactured are also being serviced by the company. This concern is being represented throughout India for selling and servicing of these machines.

**Description of the concern:** It has a working general shift from 9 AM-6 PM, including a one-hour lunch break from 1 PM -2 PM. The factory has 5 operational sections where MMH workers are engaged at work:

1) Electrical Section
2) Inspection Section
3) Assembly Section
4) Store Section
5) Packaging and Dispatch Section

The Electrical Section deals with the electrical fittings and the panel preparation. The various electrical jobs required for the manufacturing of the forklift trucks is taken care off in this department.

The Inspection Section is responsible for the checking of the quality of raw materials and components, which are brought from the market, needed for the manufacturing of the forklifts. The purchase department places the orders for the raw materials and when they arrive, they undergo stringent inspection, carried out by the inspection department. On the later part they also inspect the vehicle produced.

At the Assembly Section, the components required to manufacture the forklift are all put together, giving a shape to the product. The Store Section is responsible for maintaining a continuous supply to the assembly department. The incoming raw materials are stacked at the store department and accordingly supplied to the other departments, as assembly, electrical etc. A complete file record is kept at all times for proper functioning of the concern.
The Packing and the Dispatch Section is responsible for the shipment and delivery of the finished product. Before the product is packed and dispatched to the customer of the concern, they undergo vigorous quality inspection, carried out by the inspection section.

**Description of the Product:** The concern mainly specializes in the manufacture of “Battery Operated Counter Balanced Forklift”. There are 3 broad sections of the forklift trucks, depending upon the lift: a) 3-5 ton lift; b) 2-4 ton lift and c) 1-2 ton lift.

There are various models in this section, some of which are: a) Twin lift fork-having a two stage lift and b) Triple lift fork- having a three stage lift, for higher lift and lower clearance.

The time taken to produce a complete truck, which is mostly customized, if the supply of raw material in unhindered, is nearly 10 days. The battery operated forklift trucks have “Traction batteries”. These batteries are used for these specific types of vehicles. These vehicles have a maximum speed of 10 km/hour. This is a safety mechanism as having high speed might cause fatal accident when traveling with a heavy load. The main function of the vehicle is to pick up heavy materials up into the air and stack at high racks. The speed of the lift is 2 m/min.

There is a speciality in the batteries, which are used in these vehicles. Depending upon the amount of weight the truck has to lift, the battery is provided. For a 1-2 ton truck lift, 36 volts battery will do fine, whereas for a truck lifting 3 tons, a 72 volts battery is needed. The connection and working of the battery is also a typical one. At the initial stage when the truck moves the battery cell connection are parallel, whereas after the vehicle has gained momentum the battery connection gets changed to series mode. A battery life span is nearly 7-8 hours after which a charging is necessary. An overnight charging is enough to rejuvenate the cells for the next 7-8 hours work.
**D) EEE:** It is established in 1976 in Kolkata and is associated with the manufacture of heavy earth moving equipments, their spares for Eastern Coal Fields and Western Coal Fields; locomotive spare parts for Indian Railways and Metro Railways; spare parts of bulldozer, dumper, excavator etc. based on drawing specification. Beside domestic markets, the unit has also established its credentials in overseas market like Middle East.

They give proper attention to the welfare of the workers. The doctors within the factory premises give the first aid and medication whenever injuries occur. If case is serious then they refer the patient to the ESI Hospital. The medication and treatment cost of the worker is paid by the factory from the worker’s welfare fund. The workers are provided with different PPD to avoid unwanted incidents. Since it is not a large unit and not mechanized, MMH is very predominant in almost all sections of the factory.

**E) AAF:** At the early 1990, AAF started. Till date it has established itself in the field of Architectural Aluminium System. It is a leading manufacturer of Architectural Aluminium System in eastern India. Only anodizing and fabrication are done here using latest machines. The raw materials (aluminium sheets) come from outside. Quality control gets priority during the manufacturing process. All measurements are done through mathematical calculation and every worker follows these calculations. The design department is fully equipped with CAD facilities and the installation department capable to handle multiple tasks simultaneously. There is also E.R.P. (Enterprise-Wide-Resource Planning) package for optimum utilization of resources. There is only one shift from 9 A.M. to 5.30 P.M. The workers enjoy ESI benefit.

**Description of some Projects of AAF:** 1) Infinity-Phase 1, Kolkata; 2) Lansdowne Towers, Kolkata; 3) Godfrey Philips, New Delhi; 4) L & T Chambers, Kolkata; 5) Camac Center, Kolkata; 6) TCI Seaways, Port Blair; 7) TCI Ltd., Gurgaon; 8) Ideal Plaza, Kolkata; 9) Techno campus- IBM School; 10) Times of India, Kolkata; 11) Haldiram Bhujiawala, Kolkata and 12) Emami Shopper’s City.
Description of the Products: They manufacture a) windows; b) doors; c) automatic sliding doors; d) façade glazing (curtain wall and structural glazing); e) alucobond metal cladding; f) planar system glazing.

Manufacturing Process: Modern integrated and sophisticated fabrication cum anodizing electrocolouring methods set them apart. The anodizing baths are 7 meter in length and anodic coating is guaranteed from 5-50 microns in matt or glossy finish, in shades ranging from natural to bronze, black and golden. The fabrication shop has an installed capacity of fabricating about 10,000 sq.m. of windows, doors, curtains, walls etc. per annum. With unit number 11 being recently commissioned fabricating, ALUCOBOND cladding panels and glass structural glazing is done effortlessly.

Anodizing Section: The aluminium sheets are electroplated and coloured by different chemical compounds. Firstly aluminium sheets are drilled on a long rod. Then the sheets with rod are manually taken to the nitric acid bath to remove the oily nature. The concentration of nitric acid is constant and titrated once in every week. After degreasing, the sheets are washed with distilled water supplied from the water treatment plant. After rinsing with water, these plates are dipped into etching tank-containing sodium hydroxide (NaOH) of definite concentration. This reduces the natural oxidation. After etching, the plates are transferred to nitric acid bath and then to water bath. Their characteristics are same as before.

After going to the next section, the plates are kept in water to avoid oxidation. These plates are then trapped into another rod that then connects with crane. This part of the anodizing section is more or less mechanically operated. The sheets are now dipped into sulphuric acid bath. Concentration of sulphuric acid is maintained strictly. They are then rinsed with distilled water and ready for electroplating. These sheets are dipped into stannous sulphate solution. Then they are rinsed with water twice. Then the small holes are sealed by cold plating and again rinsed.
In this part of the shop floor different chemical baths are present and everywhere the compositions of the chemicals are mentioned on the wall of the corresponding bath. Different chemical compositions are given below.

**Etching Bath Specification**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Working range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caustic Soda</td>
<td>40-80 g/litre</td>
</tr>
<tr>
<td>Dissolved Aluminium</td>
<td>20-50 g/litre</td>
</tr>
<tr>
<td>Aluico-46 (additive)</td>
<td>15-20 g/litre</td>
</tr>
<tr>
<td>Temperature</td>
<td>500-600 °C</td>
</tr>
<tr>
<td>Etching time</td>
<td>5-20 min.</td>
</tr>
</tbody>
</table>

**Cold Sealing Bath Specification**

<table>
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<tr>
<th>Parameters</th>
<th>Working range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sealing chemicals</td>
<td>5-8 g/litre</td>
</tr>
<tr>
<td>pH</td>
<td>5.5-6.5</td>
</tr>
<tr>
<td>Temperature</td>
<td>Room Temperature</td>
</tr>
<tr>
<td>Immersion time</td>
<td>1 min./micron</td>
</tr>
</tbody>
</table>

**Colour Bath Specification**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Working range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stannous sulphate (DC-8732)</td>
<td>10-18 g/litre</td>
</tr>
<tr>
<td>Sulphuric acid</td>
<td>16-22 g/litre</td>
</tr>
<tr>
<td>Dipping time</td>
<td>15-25 sec. (depending on colour shade)</td>
</tr>
</tbody>
</table>