Chapter 6
Management of Logistics Systems and Operations

ABSTRACT

In this chapter, the author explores and explains the different elements of logistics, namely, packaging, material handling, warehousing, and transportation. It provides the guiding principles of packaging and material handling. In this chapter, the management of warehouse has been explained. The author elaborates the concepts and different forms of shipping.

LOGISTICS ELEMENTS

Logistics Mix

Logistics comprises elements, namely, packaging, material handling, warehousing and transportation. Packaging leads to description of the cargo as bulk, break-bulk or container cargo. Bulk, dry or liquid, are handled in free form and stowed loose (i.e., without any packaging). This form cargo require distinct material handling equipment such as spade, grabs, conveyors, pay loaders, stackers and reclaimers. Bulk cargo that are affected by climatic conditions (for example, temperature, moisture and air or gases) and contaminations with external materials (such as dust or so) and organisms such as pest, insects or any micro-organisms are stored in covered warehouses such as silos or specially designed storage centres. These warehouses protect and preserve the bulk cargo. The carriers that move bulk cargo also possess

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the specifications similar to warehouses. The dry bulk carriers on road, rail and sea ensure preservation and protection of the cargo. For example, paddy or food grains are stored in silos with temperature, humidity and air regulators. Such cargo move in carriers those are cleaned and fumigated to eliminate contaminations and insects or pests respectively with water tight compartments or holds.

The cargo when packaged in bags, boxes, cartons, crates, drums and barrels or in any similar manner, ensure the first level protection and preservation followed by additional protection and preservation provided by the warehouse and the carriers. In cases where, warehouses and carriers cannot ensure such protection, the packaging is enhanced to meet all the protection and preservation requirements. For example, break-bulk packages are wrapped with water proof material such as: Craft paper coated with polyethylene to prevent from moisture, grease or bacteria; or other synthetic covers) and / or Plastic linings to protect from moisture. Goods are packaged with dry ice, or coolant gels to keep them under the right temperature. Such packaged cargo does not demand much intricacy of warehouses and carriers to protect and preserve the cargo. Break-bulk cargo are handled in pieces and hence the material handling equipment include, hand carts, forklifts, cranes and lifts. Packaging is done in the manner as specified by the customer ensuring preservation of quality. In certain cases, packaging may undergo change on the way to the destination. This is done to optimize the cost without affecting the quality of the goods. For example, goods such as food grains may be shipped from one sea port to another by dry bulk carriers to save cost. The loose cargo is then bagged in the warehouses to delivered as prescribed by the customer (i.e., in the last leg of delivery), say bagged in 50 Kg bags.

Handling of packaged material involves varied efforts, time and cost as packages may vary in dimensions, shape, volume and weight. This led to the adoption of principle of standardisation of packages and unitisation of smaller packages in to standard forms. The of boxes, cartons, crates of standard sizes and packaging them on pallets of standard dimensions are the steps in this direction. Pallets are platforms of uniform dimensions that help tying together individual packages, to give strength, protection and uniformity in efforts.

Containers, whether marine or air containers, are a step ahead of palletisation leading to unitisation and standardisation (Singh et al, 2014. Maritime or intermodal freight containers have standard dimension led down by the International Standard Organisation (ISO). The standard sizes of these
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