Sustainable Human Resource Development in logistics services for ASEAN Member States

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Chapter 3 – Containerization

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- Condensation and preventive measures

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Objectives:

Students should have the understanding of usage and purposes of each type of shipping containers as well as airfreight containers.

Students also have and understanding of container packing methods and safety issues.

Students should also have a basic understanding of the costliness of maintaining containers by carriers and leasing service.

Introduction

Containerization is a system of intermodal freight transport using intermodal containers (also called shipping containers and ISO containers) made of weathering steel to transport goods. The containers have standardized dimensions and they can be loaded and unloaded, stacked, transported efficiently over long distances, and transferred from one mode of transport to another eg, container ships, rail ships, rail transport, flat cars and semi-trailer trucks without being opened. The handling system is completely mechanized so that all handling is done with cranes and special forklift trucks. All containers are numbered and tracked using computerized systems. Recent developments are using GPS secured container seals for cargo tracking purposes.

3.1 Container description

An ocean freight container is basically a box of various construction types used in international freight movements. Containers used in international movements must conform to the ISO-Norm (International Standards Organisation), thus ensuring that no matter where in the world the container is made or shipped from, there is a standard in the construction, fittings and dimensions.

Steel containers have a steel framework and all-steel cladding. Repair facilities are available all over the world, however they are susceptible to rust and require a general overhaul every 5 years. Because of steel's brittleness, these containers are also susceptible to tension damage.

Aluminum containers have a steel frame with aluminum cladding. The lighter weight of the metal and its comparative elasticity give better tensile strength. Because aluminum does not rust, damage to the steel framework from salt water is not always easily detectable and the container may no longer be watertight without showing any apparent damage.

Plywood or fiberglass containers have a steel framework with walls, doors and top made of plywood with a waterproof coating or fiber glass. They have great tensile strength and elasticity. The construction also minimizes condensation and increases the insulation properties of the box. However, they are very expensive to produce and difficult to repair.

Like ships, containers must be classified with a register (usually the same as for ships: Lloyd's, Bureau Veritas, etc) to ensure that they comply with ISO and Container Safety Convention (CSC) regulations.

3.2 Container leasing service

Apart from those containers owned outright by steamship lines and some of the larger forwarding organisations, there also exist companies which lease out “ no-name” containers to ship owners, forwarders or directly to shippers for certain lengths of time.

The importance of having containers available for lease becomes apparent when one considers that on the Trans-Atlantic traffic, for eg, a liner operator must own for each of its vessels a minimum of 3 sets of containers: one in Europe, one in North America and one on the high seas.

Since containers are very expensive, steamship lines thus cover any imbalance by short-term or long-term leasing.

What are the advantages of leasing?

- Containers must be leased quickly as soon as a shortage is noticed anywhere.
- Containers may be returned as soon as a line has once again been able to cover its needs with its own equipment.
- By utilizing the leasing system, shipping liners avoid tying up too much of their capital on their own equipment.

The leasing companies are also concerned with imbalance in their container supply and try to counterbalance this with drop-off charges and pick-up charges. There are even liners which own none of their own containers, preferring to lease all their equipment.

There are various types of leases:

One-Way

For eg, from Vancouver to Yokohama, where the container is leased in Vancouver and may be returned to the lessor's leasing depot in Yokohama.

Round Trip

Leasing of a container, for eg, for Europe/Canada/Europe movement. This type of lease is the only one possible on routes where the point of destination has no return depot.

Short Lease

The leasing of a container for 60 or 90 days.

Long Lease

The leasing of a container for 2, 3 or more years.

Master Lease

Most steamship lines have a master lease contract with leasing companies. Whenever a container is leased and returned, the owner makes out a report (known as the EIR or Equipment Interchange Receipt) in which the following information appears:

- date/place of pick-up
- lessee
- description of contents
- condition of container

Most leased containers are covered by a Damage Protection Plan (DPP), however the cost of normal wear and tear, ie rust holes, etc need not be borne by the lessee.

Leasing companies are in many senses pioneers. In developing countries, they assist in building up container services by leasing container ships and container cranes to the operator.

3.4 Container specifications

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		20′ container		40′ container		40′ high-cube container		45′ high-cube container	
		imperial	metric	imperial	metric	imperial	metric	imperial	metric
external dimensions	length	19′ 10 ½″	6.058 m	40′ 0″	12.192 m	40′ 0″	12.192 m	45′ 0″	13.716 m
	width	8′ 0″	2.438 m	8′ 0″	2.438 m	8′ 0″	2.438 m	8′ 0″	2.438 m
	height	8′ 6″	2.591 m	8′ 6″	2.591 m	9′ 6″	2.896 m	9′ 6″	2.896 m
interior dimensions	length	18′ 8 13⁄16″	5.710 m	39′ 5 45⁄64″	12.032 m	39′ 4″	12.000 m	44′ 4″	13.556 m
	width	7′ 8 19⁄32″	2.352 m	7′ 8 19⁄32″	2.352 m	7′ 7″	2.311 m	7′ 8 19⁄32″	2.352 m
	height	7′ 9 57⁄64″	2.385 m	7′ 9 57⁄64″	2.385 m	8′ 9″	2.650 m	8′ 9 15⁄16″	2.698 m
door aperture	width	7′ 8 ⅛″	2.343 m	7′ 8 ⅛″	2.343 m	7′ 6"	2.280 m	7′ 8 ⅛″	2.343 m
	height	7′ 5 ¾″	2.280 m	7′ 5 ¾″	2.280 m	8′ 5″	2.560 m	8′ 5 49⁄64″	2.585 m
internal volume		1,169 ft³	33.1 m³	2,385 ft³	67.5 m³	2,660 ft³	75.3 m³	3,040 ft³	86.1 m³
maximum gross weight		66,139 lb	30,400 kg	66,139 lb	30,400 kg	68,008 lb	30,848 kg	66,139 lb	30,400 kg
empty weight		4,850 lb	2,200 kg	8,380 lb	3,800 kg	8,598 lb	3,900 kg	10,580 lb	4,800 kg
net load		61,289 lb	28,200 kg	57,759 lb	26,600 kg	58,598 lb	26,580 kg	55,559 lb	25,600kg

3.5 CONTAINER TYPES

3.5.1	The Standard or Box Container (GP)
3.5.2	High Cube Container 9’ 6” or 2 895 mm
3.5.3	Hardtop Container
3.5.4	Open Top Container
3.5.5	Flat Container
3.5.6	Ventilated Container
3.5.7	Bulk Container
3.5.8	Tank Container or ISO Tank Containers
3.5.9	Insulated Container
3.5.10	Refrigerated Container (Reefer)

3.6 Container Loading

"The objects to be loaded must be safe and secure and should not be able to move as a result of jolts or vibrations that can be expected under normal operating conditions. The possibility of longitudinal movement is permitted insofar as the magnitude of this movement is limited by the use of appropriate means and there is no risk posed to safety."

3.7 Container Lashing and Packing

Container lashing methods are ways of tying down the goods either with or without timber bracing. Normally wire ropes with turnbuckles or slings are used to secure the goods inside the container to ensure no movements occurs in the long journey ahead. Sea voyages are made under a variety of weather conditions which are likely to exert a combination of forces upon the ship and its cargo.

Pitching, rolling, heaving, surging, swaying or a combination of two or more such action exert forces on cargo far greater than those encountered ashore and may exert them over a prolonged period.

Packing and securing of cargo inside a container or vehicle should be carried out bearing this in mind. During longer voyages through various climatic zones, the internal conditions of a container may give rise to condensation (sweating) on cargo or internal surfaces. Where cargo is liable for damage from such cause, expert advice should be sought.

a) Visual inspection prior to packing/stuffing

b) Exterior of a container

c) Interior of a container

d) Stowage Planning **(CBM calculations)**
- Before packing
- During packing
- Completion of packing of a container

e) Points to consider for packing of container, prevention of condensation.

3.8 Airfreight Containers

Airfreight shipments are loaded into containers normally called ULD or Unit Load Device. A ULD can be in pallet form or container form. It is used for carrying luggage, freight and airmails on wide-body aircraft and/or specific narrow-body aircraft. It allows a large quantity of cargo to be bundled into a single unit. It saves ground crews time and effort and helps prevent flights delays. Each ULD has its own manifest or packing list in order for the contents to be easily tracked.

ULD pallets are rugged aluminium sheets with rims designed to lock “cargo nets” lugs. ULD pallets are closed containers of aluminium or combination of other steel for strength. Some units have built-in refrigeration units.